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Database of Prompt Gamma Rays from Slow Neutron Capture for Elemental Analysis

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FOREWORD

The increasing importance of Prompt Gamma-ray Activation Analysis (PGAA) in a broad range of applications is evident, and has been emphasized at many meetings related to this topic (e.g., Technical Consultants' Meeting, Use of neutron beams for low and medium flux research reactors: radiography and materials characterization, IAEA Vienna, 4-7 May 1993, IAEA-TECDOC-837, 1995). Furthermore, an Advisory Group Meeting (AGM) for the Co-ordination of the Nuclear Structure and Decay Data Evaluators Network has stated that there is a need for a complete and consistent library of cold- and thermal-neutron capture gamma-ray and cross-section data (AGM held at Budapest, 14-18 October 1996, INDC(NDS)-363); this AGM also recommended the organization of an IAEA Co-ordinated Research Project (CRP) on the subject.

The nuclear data programmes of the IAEA arise as a consequence of the advisory reviews of the International Nuclear Data Committee (INDC). At a biennial meeting in 1997, the INDC strongly recommended that the IAEA support new measurements and update the database on Neutron-induced Prompt Gamma-ray Activation Analysis.

As a consequence of the various recommendations, a CRP on *"Development of a Database for Prompt Gamma-ray Neutron Activation Analysis (PGAA)"* was initiated in 1999. Prior to this project, several consultants had defined the scope, objectives and tasks of this CRP, as approved subsequently by the IAEA. Each CRP participant assumed responsibility for the execution of specific tasks. The results of their and other research work were discussed and approved by the participants in a series of research co-ordination meetings (see Summary reports: INDC(NDS)-411, 2000; INDC(NDS)-424, 2001; and INDC(NDS)-443, 2003).

PGAA is a non-destructive radioanalytical method capable of rapid or simultaneous "in-situ" multi-element analyses across the entire Periodic Table, from hydrogen to uranium. However, inaccurate and incomplete data have been a significant hindrance in the qualitative and quantitative analysis of complicated capture-gamma spectra by means of PGAA. Therefore, the main goal of the CRP was to improve the quality and quantity of the required data in order to make possible the reliable application of PGAA in fields such as materials science, chemistry, geology, mining, archaeology, environment, food analysis and medicine. This aim was achieved thanks to the dedicated work and effort of the participants. The CD-ROM included with this publication contains the database, the retrieval system, the three RCM reports, and other important electronic documents related to the project (see also Chapter 8).

The IAEA wishes to thank all CRP participants who contributed to the success of this project and the formulation of this publication. Special thanks are due to R.B. Firestone for his leading role in the evolution of this CRP and his comprehensive compilation, analysis and provision of the adopted database and V. Zerkin for the software developments associated with the retrieval system. An essential component of this data compilation is the extensive sets of new measurements of capture gamma-ray energies and intensities undertaken at the Institute of Isotope and Surface Chemistry, Budapest, Hungary. Thanks are also due to S.C. Frankle and M.A. Lone for their active involvement as consultants at some of the meetings. Finally, R. Paviotti-Corcuera (Division of Physical and Chemical Sciences) was the responsible officer for the CRP, this publication and the resulting database.

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1. INTRODUCTION

R.M. Lindstrom

Neutron-capture prompt-gamma activation analysis (PGAA) is especially valuable as a non-destructive nuclear method in the measurement of elements that do not form neutron capture products with delayed gamma-ray emissions. Furthermore, the elemental coverage of PGAA complements that of conventional (delayed) instrumental neutron activation analysis (INAA). The list of measurable elements emphasizes the low-Z and high-abundance elements in organic and geological materials, and the high cross-section elements: B, Cd, Sm and Gd. The analysis for hydrogen and boron is especially important because of the paucity of other reliable analytical techniques for trace levels of these elements. PGAA is extremely sensitive for the quantitative determination of B compared with destructive chemical techniques, particularly since boron is such an important element over a wide range of applications from meteorites to human tissue [1.1-1.4]. Together PGAA and INAA can measure all elements except oxygen in most common materials. Conveniently, in silicate rocks and similar oxidized materials, the completeness of the analysis can be tested by expressing the elements as oxides and comparing their sum with 100% [1.5]. Because nearly every neutron capture is an (n, γ) reaction, the yield of prompt gamma rays per neutron is greater than that of delayed gammas [1.6]. Unfortunately, PGAA has usually poorer sensitivity compared to INAA because the neutron flux is some five orders of magnitude lower in an external reactor beam than an irradiation position near the core.

Many review articles have been published on PGAA and its applications [1.7-1.12], and two extensive bibliographies have been compiled [1.13, 1.14]. The latter lists 522 references up to and including 1983. A dedicated book has also appeared [1.15], and an extensive handbook is in preparation [1.16]. Prompt gamma-ray analysis developed slowly after the first reports of gamma radiation from neutron capture by Lea [1.17] and the Fermi group [1.18]. The first published tabulation of gamma-ray energies and intensities [1.19] and plots of spectra [1.20] led to a number of applications during the era of NaI scintillation counters, from borehole logging [1.21] to planetary exploration [1.22]. Applications involving coincidence counting were first reported at the second international conference on Modern Trends in Activation Analysis (MTAA-2) [1.23].

The first measurements by reactor-based PGAA were published in 1966 [1.6, 1.24, 1.25]. Chopped (pulsed) beams were used in one of the first applications to separate prompt gamma rays from delayed activation products [1.26]. Neutron guides were also first reported in the same year [1.27], and soon afterwards pioneering PGAA work at Saclay with thermal guides and Ge(Li) detectors was reported at MTAA-3 [1.28, 1.29].

A major breakthrough in the late 1960s was the introduction of germanium semiconductor gamma-ray detectors, with energy resolutions twenty or more times better than the best NaI scintillators. This development was a considerable aid in the interpretation of complex spectra resulting from neutron capture [1.30]. Diffraction spectrometers used by the nuclear physics community have still better resolution [1.31], but their efficiency is far too low for practical analysis of materials. Application of Ge detectors to INAA [1.32] and PGAA [1.33] was rapid, and their superior resolution gave improved detection limits [1.34] which led to Ge replacing NaI wherever liquid nitrogen was available to cool the detector.

Early in the application of Ge detectors, a group at the Massachusetts Institute of Technology (MIT) measured the capture-gamma spectra of every element systematically [1.35, 1.36].

Compilations of these data were published in the open literature, with analytical sensitivities and spectral contrasts tabulated [1.37, 1.38]. At this time the combination of high-power research reactors and large, high resolution gamma-ray detectors was pursued in parallel at several reactor centres in the USA, Japan and Canada [1.5, 1.39-1.42]. Each of these laboratories compiled tables of analytical gamma rays and their interferences. For example, at the University of Maryland 28 gamma rays from 20 elements were found to be potential interferences with the sulphur line at 841.1 keV (from the $^{32}S(n, \gamma)^{33}S$ reaction) [1.43]. An evaluation directed at the spectrometry of planetary surfaces was published at the same time [1.22].

A major advance was the comprehensive Chalk River compilation of more than 10,000 capture gamma rays of the elements [1.44], with their energies, abundances, and cross sections drawn chiefly from the MIT measurements. The completeness of the data and their convenient format made the “Lone table” indispensable at the desk of every PGAA researcher for twenty years, despite some inadequacies inherent in these early measurements. A substantial computer-readable subset of these data was made available on diskette with an IAEA Technical Report [1.45], and the complete table has been circulated informally in spreadsheet form among many researchers.

Very recently, a carefully evaluated table of capture gamma rays from the elements hydrogen through zinc has been published [1.46]. The present work incorporates this evaluation, and adds recently measured energies and intensities of capture gamma rays of the elements from the PGAA facility at the Budapest Research Reactor, and data from other CRP participants and elsewhere. As discussed in detail in chapter 6, these data are combined and compared with nuclear levels and other information from the Evaluated Nuclear Structure Data File (ENSDF) to produce a comprehensive, self-consistent set of capture gamma rays.

In the past decade the application of PGAA has increased because of the availability of high-flux thermal and cold beams from neutron guides [1.47]. Guided beams can be entirely free of fast neutrons and tramp gamma rays, and therefore signal/background ratios can be much improved. Thermal guide studies at Kyoto have also shown that spectral quality is perhaps as important as flux in performing high- sensitivity analyses [1.4]. Fifteen years after the pioneering work at Grenoble using a flux that is still the highest ever used for PGAA [1.48], there has been a flowering of applications at several neutron sources [1.49-1.55].

Prompt-gamma neutron activation analysis has become a well-established analytical method with applications in many areas. The new data compilation presented here should encourage the further use of PGAA in the future.

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2. NOMENCLATURE, WESTCOTT g_W FACTORS AND NEUTRON SPECTRAL SHAPE DEPENDENT FORMALISM

H.D. Choi, A. Trkov

A wide range of neutron source facilities are used for the implementation of PGAA that can be divided into two groups: one group uses thermal or cold neutrons from nuclear reactors, while the other group utilizes smaller mobile systems that involve moderated neutrons from isotopic sources, neutron generators or accelerator driven systems. Reactor-based systems use an internal target [2.1, 2.2] or external direct beam [2.3] to take advantage of the large neutron flux. At present, the common trend is towards building facilities around guided thermal beams [2.4-2.6] or guided cold beams [2.4, 2.7-2.9] in order to prepare a very clean beam free from epithermal neutrons and background gamma rays. Another possibility is to use external filtered beams [2.10] or diffracted beams [2.11, 2.12], which are also characterized by low background.

Among the many differences between the facilities, the neutron energy spectrum and the epithermal neutron fraction have an important influence on the measured capture rate, particularly for large samples and non-1/v absorber nuclides. Even for some nuclides that are commonly considered good 1/v absorbers, slight deviations from 1/v capture may exist. Inhomogeneous flux profile also affects the measurement. Precise measurements and standardization can only be achieved by investigating the impact of these effects before k_0 values from different facilities can be compared for consistency. Hence in the present chapter, definition of nomenclature and a general formalism are reviewed in the context of k_0 standardization to accommodate the various forms of neutron spectra.

2.1. Definitions and nomenclature

2.1.1. Prompt k_0 factor

Co-irradiating in a neutron field an analyte (x) and a comparator (c) element contained in the sample results in the composite nuclear constant (k_0 factor) defined as [2.13-2.15]:

$$k_0 = \frac{P_x(E_{\gamma,x})}{P_c(E_{\gamma,c})} \cdot \frac{\sigma_{0,x}}{\sigma_{0,c}} \cdot \frac{\theta_x / M_x}{\theta_c / M_c}, \qquad (1)$$

where the subscripts x and c refer to the analyte and comparator element respectively, θ is the isotopic abundance, M the atomic weight of the element, $P(E_\gamma)$ the absolute γ emission probability (γs emitted per capture) of the prompt gamma ray of energy E_γ and σ_0 is the 2200 m s^{-1} neutron capture cross section. It is implicitly assumed that the specific isotope that captures a neutron will decay promptly by emitting a γ ray of energy E_γ.

The evolution of k_0-methodology has resulted in different definitions (e.g., by using either effective capture cross section or effective thermal capture cross section instead of 2200 m s^{-1} cross section [2.16]). Use of σ_0 is emphasized in the present definition in order to keep the k_0 factor as an absolute constant measurable in a facility-independent manner.

2.1.2. Elemental cross section

Neutron speed-dependent capture cross sections $\sigma_\gamma(v)$ and 2200 m s^{-1} values (σ_0) are defined for a nucleus of an isotope. The partial capture cross section for the nucleus ($\sigma_\gamma(E_\gamma)$), is defined by the product $P(E_\gamma)\sigma_0$; the differential form $P(E_\gamma)\sigma_\gamma(v)$ is also used in physics studies. An elemental cross section is defined for practical convenience in terms of a sample with isotopic natural abundance, and this parameter should be distinguished from the nuclear capture cross section and partial nuclear capture cross section. A partial elemental capture cross section for the element Z is defined by:

$$\sigma_\gamma^Z(E_\gamma) = \theta\, P(E_\gamma)\,\sigma_0\,, \tag{2}$$

where the notation is the same as listed previously. This term is the cross section per elemental atom to produce a particular gamma-ray of energy E_γ from irradiation with thermal neutrons. Different names are frequently used, such as "gamma-ray production cross section" [2.17] or "partial (elemental) cross section" [2.18], both implying the partial elemental capture cross section.

2.1.3. Effective capture cross section

The effective capture cross section is defined as the averaged cross section over the neutron spectrum by the equation:

$$\hat{\sigma} = \frac{1}{v_0}\cdot\frac{\int_0^\infty n(v)\sigma_\gamma(v)v\,dv}{\int_0^\infty n(v)dv} = \frac{1}{n_t v_0}\int_0^\infty n(v)\sigma_\gamma(v)v\,dv = \frac{1}{v_0}\int_0^\infty \rho(v)\sigma_\gamma(v)v\,dv \tag{3}$$

where v is the neutron speed and v_0 equals 2200 m s^{-1}, n(v)dv is the number density of neutrons with speed between v and v+dv, $\sigma_\gamma(v)$ is the neutron speed-dependent capture cross section of the nuclide under consideration, n_t is the total neutron density including both thermal and epithermal neutrons, and $\rho(v)$ is the neutron speed distribution function after normalization. These are :

$$n_t = \int_0^\infty n(v)dv \quad \text{and} \quad \int_0^\infty \rho(v)dv = 1 \tag{4}$$

in which the Westcott convention is adopted [2.19]. However, when the Stoughton and Halperin convention is used [2.20], thermal neutron density appears in the denominator of Equation (3). A different convention is used for the effective cross section $<\sigma>$ in Chapter 4 to characterize the neutron beam:

$$\langle\sigma\rangle = \frac{\int_0^\infty n(v)\sigma_\gamma(v)v\,dv}{\int_0^\infty n(v)v\,dv} \tag{5}$$

where the integrated total flux is used in the denominator. The average cross section is related to the effective cross section in Equation (3) by $\langle\sigma\rangle = \hat{\sigma}\, v_0 / \langle v\rangle$ where $<v>$ is the average speed calculated using neutron density n(v) as the weighting function. Equations (3) – (5) are applicable to any arbitrary neutron spectrum.

2.1.4. Thermal and epithermal flux

As a consequence of the importance of thermal neutrons in capture reaction and the very large differences in the spectral shape and the fraction of epithermal neutrons in different irradiation facilities, the neutron density per unit speed interval is split into thermal and epithermal components:

$$n(v) = n_{th}(v) + n_{ep}(v) \tag{6}$$

Reactor thermal neutron spectrum is well represented by the Maxwellian speed distribution, and the integrated thermal neutron density is given by:

$$n_{th} = \int_0^\infty n_{th}(v)dv = n_{th}\int_0^\infty \rho_M(v)dv\,, \tag{7}$$

where $\rho_M(v)$ is the normalized Maxwellian function. Different definitions for the thermal flux can be found in the literature [2.20]. The widely used definition in activation analysis is the "conventional" thermal flux given by:

$$\phi_{th} = n_{th}v_0 \tag{8}$$

while the "true (integrated)" or "mean" thermal flux is the most convenient in reactor physics calculations and is defined as:

$$F_{th} = \int_0^\infty n_{th}(v)vdv = n_{th}\int_0^\infty \rho_M(v)vdv = n_{th}\bar{v} \tag{9}$$

where $\bar{v}$ is the average speed of the Maxwellian distribution. Hence, the relationship between the two fluxes [$F_{th}/\phi_{th} = \bar{v}/v_0 = (4T/\pi T_0)^{1/2}$] holds true for the Maxwellian thermal spectrum (where T is the Maxwellian temperature, T_0 = 293.6K). The thermal capture rates for 1/v absorbers are the same for either flux representation, so long as the correct cross section is used; for example, $R_{th} = n_{th}v_0\sigma_0 = n_{th}\overline{v\sigma}$ where $\bar{\sigma}$ is the capture cross section at neutron speed $\bar{v}$. The neutron flux φ_{ep} is more convenient in the case of epithermal neutrons, and represents the product of neutron speed and density ($\varphi_{ep} = vn_{ep}$). This approach describes the neutron flux spectrum in terms of energy, and is based on theoretical considerations that ideally the distribution follows 1/E shape. Since the flux integral in neutron speed and in energy domain must be the same, we obtain the relationship between the epithermal neutron density and the flux:

$$n_{ep}(v)vdv = \varphi_{ep}(E)dE = \phi_{ep}dE/E \tag{10}$$

Slight deviations from 1/E can be described by $1/E^{1+\alpha}$ where α is the epithermal shape parameter used widely in instrumental neutron activation analysis (INAA) [2.13, 2.21]. However, most PGAA facilities prepare a clean thermal or cold beam by means of neutron guide tubes or short wavelength filters. These beams are free from epithermal neutrons as indicated by the cadmium ratio, being typically larger than 10^4 [2.22]. Hence, the need to consider epithermal neutrons is obviated in facilities capable of producing a clean thermal neutron beam.

2.1.5. Westcott g-factor

The effective cross section in Equation (3) is equal to the 2200 m s^{-1} cross section σ_0 for a perfect 1/v absorber or even a realistic 1/v absorber nuclide irradiated in neutron fields with negligible epithermal neutron fraction in the resonance region of the nuclide. When the nuclide is a non-1/v absorber (^{113}Cd, ^{124}Xe, ^{149}Sm, most Eu isotopes, $^{155,\,157}$Gd, $^{175,\,176}$Lu,

^{180}Ta etc.) or the neutron spectrum contains a significant epithermal component, the effective cross section is no longer equal to σ_0. Westcott approached this problem for the case of a Maxwellian thermal spectrum and a 1/E epithermal spectrum [2.19]. Adopting the Westcott convention, the effective cross section is given by:

$$\hat{\sigma} = \sigma_0 (g_W + rs) \tag{11}$$

where g_W is the Westcott g-factor, r is an index for epithermal fraction in the neutron density, and s is a parameter related to the reduced resonance integral. Parameter *r* for 1/E epithermal neutrons can be obtained by measuring the Cd ratio with a thin 1/v detector or an activation foil [2.19]. Since the Maxwellian shape depends on the temperature, both g_W and *s* are dependent on the Maxwellian temperature. Hence, the Westcott g-factor is given by the ratio of the effective cross section for the pure Maxwellian spectrum ($\hat{\sigma}_M$) to the 2200 m s^{-1} cross section:

$$g_w(T) = \frac{\hat{\sigma}_M(T)}{\sigma_0} = \frac{1}{\sigma_0 \quad v_0} \int_0^\infty \rho_M(v,T)\sigma_\gamma(v) v dv = \frac{1}{\sigma_0 \quad v_0} \int_0^\infty \frac{4}{\sqrt{\pi}} \left(\frac{v}{v_T}\right)^3 e^{-(v/v_T)^2} \sigma_\gamma(v) dv \tag{12}$$

where v_T is the most probable speed of the Maxwellian function, and is related to the temperature (T) by $mv_T^2/2 = kT$ or $v_T = v_0(T/T_0)^{1/2}$.

The latest published values of the Westcott g-factors are given by Holden [2.23] for nuclides with Westcott g-factors that deviate significantly from unity and for temperatures between 0 and 400°C. A series of new g-factor calculations has been carried out for this CRP using the capture cross sections from the EAF-99 library [2.24] over an extended temperature range of 20 to 600K. Almost all isotopes up to ^{257}Fm have been considered in these calculations. Two sets of calculated data have been generated using different codes:

- ENDF utility code INTER was used to generate the Westcott g-factors by direct integration.
- A new code GRUPINT was developed to deal with the general neutron spectrum (e.g., a sum of Maxwellian functions of different temperatures, which is typically adopted to describe the spectrum of guided neutron beam). Instead of using direct integration, GRUPINT reads in fine-group cross sections in 685-group structure, and calculates the Westcott g-factors by group condensation.

GRUPINT was validated by comparing the results from both codes for a pure Maxwellian spectrum. The g-factors agree within considerably less than 1% for all isotopes considered, although a few exceptional cases are noted:

- ^{153}Tb exhibits an anomalous jump in the tabulated cross sections at the thermal energy, although the overall trend is 1/v. The INTER result reflects the anomalous behaviour; and the final GRUPINT g-value is produced assuming a smooth 1/v shape.
- ^{187}Re(n, γ) has different shapes for the cross sections of the final activation products ^{188}Re (ground state) and ^{188m}Re, in which only the excitation cross section for the ground state exhibits a non-1/v behaviour. Even though the reasons for such cross sectional behaviour need closer investigation, this example indicates that explicit consideration of cross sections for the final production state could be important, depending on the nature of activation detection.

The Westcott g-factors are listed in Tables 2.1-2.3 for those stable isotopes in which the Westcott g-factor deviates from unity by more than 1% at some temperature in the specified range.

Table 2.1 Westcott g-factors (A ≤ 143).

T(K)	E(eV)	^{30}Si	^{36}S	^{36}Ar	^{38}Ar	^{83}Kr	^{87}Sr	^{103}Rh	^{105}Pd	^{109}Ag	^{111}Cd
20	0.0017	1.000	0.799	1.135	1.266	1.011	0.990	0.964	1.008	0.991	1.009
40	0.0034	1.000	0.842	1.104	1.242	1.010	0.991	0.968	1.008	0.992	1.008
60	0.0052	1.000	0.871	1.078	1.197	1.009	0.992	0.972	1.007	0.993	1.008
80	0.0069	1.000	0.894	1.060	1.161	1.008	0.994	0.976	1.006	0.994	1.006
100	0.0086	1.000	0.912	1.049	1.133	1.006	0.995	0.981	1.005	0.995	1.005
120	0.0103	1.001	0.928	1.040	1.111	1.005	0.996	0.985	1.004	0.996	1.004
140	0.0121	1.001	0.942	1.035	1.095	1.004	0.997	0.989	1.003	0.997	1.003
160	0.0138	1.003	0.954	1.030	1.082	1.003	0.998	0.993	1.002	0.998	1.002
180	0.0155	1.003	0.965	1.026	1.072	1.001	0.999	0.998	1.001	0.999	1.001
200	0.0172	1.003	0.975	1.023	1.064	1.000	1.000	1.002	0.999	1.000	0.999
220	0.0190	1.004	0.984	1.021	1.057	0.999	1.001	1.007	0.999	1.001	0.999
240	0.0207	1.005	0.993	1.020	1.051	0.998	1.003	1.011	0.998	1.003	0.998
260	0.0224	1.006	1.001	1.018	1.046	0.996	1.004	1.015	0.997	1.003	0.996
280	0.0241	1.007	1.009	1.016	1.043	0.996	1.005	1.020	0.996	1.005	0.996
293	0.0253	1.007	1.014	1.016	1.040	0.995	1.006	1.023	0.995	1.005	0.995
300	0.0258	1.007	1.017	1.016	1.039	0.994	1.006	1.025	0.995	1.005	0.994
320	0.0276	1.008	1.023	1.015	1.036	0.993	1.007	1.029	0.994	1.006	0.993
340	0.0293	1.008	1.030	1.014	1.033	0.992	1.008	1.034	0.993	1.007	0.992
360	0.0310	1.009	1.036	1.013	1.031	0.991	1.010	1.039	0.992	1.008	0.991
380	0.0327	1.009	1.042	1.012	1.029	0.989	1.011	1.044	0.991	1.009	0.990
400	0.0345	1.010	1.047	1.012	1.027	0.988	1.012	1.048	0.990	1.010	0.989
420	0.0362	1.010	1.053	1.011	1.025	0.987	1.013	1.053	0.989	1.011	0.988
440	0.0379	1.011	1.058	1.011	1.024	0.986	1.014	1.059	0.988	1.012	0.987
460	0.0396	1.012	1.063	1.010	1.023	0.985	1.015	1.064	0.987	1.013	0.986
480	0.0414	1.012	1.068	1.010	1.021	0.984	1.017	1.069	0.986	1.015	0.985
500	0.0431	1.013	1.072	1.010	1.020	0.982	1.018	1.074	0.985	1.015	0.984
520	0.0448	1.013	1.077	1.010	1.019	0.981	1.019	1.079	0.984	1.017	0.983
540	0.0465	1.014	1.081	1.010	1.018	0.980	1.020	1.085	0.983	1.018	0.982
560	0.0482	1.014	1.086	1.009	1.018	0.979	1.022	1.090	0.983	1.019	0.980
580	0.0500	1.015	1.090	1.009	1.017	0.978	1.023	1.096	0.982	1.020	0.979
600	0.0517	1.015	1.094	1.009	1.016	0.976	1.024	1.101	0.981	1.021	0.979

T(K)	E(eV)	^{113}Cd	^{113}In	^{115}In	^{121}Sb	^{123}Te	^{124}Xe	^{133}Cs	^{132}Ba	^{138}Ce	^{143}Nd
20	0.0017	0.780	0.979	0.969	0.994	0.980	0.994	0.995	1.000	0.936	1.007
40	0.0034	0.802	0.982	0.973	0.995	0.983	0.994	0.996	1.000	0.952	1.006
60	0.0052	0.826	0.984	0.976	0.995	0.985	0.995	0.997	1.000	0.962	1.005
80	0.0069	0.852	0.986	0.979	0.996	0.987	0.996	0.997	0.999	0.969	1.005
100	0.0086	0.880	0.988	0.984	0.997	0.989	0.997	0.998	0.998	0.974	1.004
120	0.0103	0.911	0.991	0.987	0.997	0.992	0.997	0.998	0.997	0.978	1.003
140	0.0121	0.945	0.993	0.990	0.998	0.994	0.999	0.999	0.995	0.981	1.002
160	0.0138	0.982	0.996	0.994	0.999	0.996	0.999	0.999	0.993	0.983	1.002
180	0.0155	1.023	0.998	0.998	0.999	0.998	1.000	1.000	0.991	0.985	1.001
200	0.0172	1.068	1.000	1.002	1.000	1.000	1.000	1.000	0.989	0.986	1.000
220	0.0190	1.118	1.003	1.005	1.001	1.003	1.001	1.001	0.987	0.988	0.999
240	0.0207	1.173	1.005	1.009	1.002	1.005	1.003	1.001	0.984	0.989	0.998
260	0.0224	1.231	1.008	1.012	1.002	1.008	1.003	1.002	0.983	0.990	0.997
280	0.0241	1.294	1.010	1.016	1.003	1.010	1.004	1.002	0.980	0.991	0.997
293	0.0253	1.337	1.012	1.019	1.003	1.011	1.004	1.002	0.979	0.991	0.996
300	0.0258	1.361	1.013	1.021	1.003	1.013	1.004	1.003	0.979	0.992	0.996
320	0.0276	1.429	1.015	1.025	1.004	1.015	1.005	1.003	0.977	0.992	0.995
340	0.0293	1.501	1.018	1.028	1.005	1.017	1.006	1.004	0.975	0.993	0.994
360	0.0310	1.575	1.021	1.033	1.005	1.019	1.007	1.004	0.973	0.993	0.994
380	0.0327	1.649	1.023	1.037	1.006	1.022	1.008	1.005	0.971	0.994	0.993
400	0.0345	1.724	1.026	1.041	1.007	1.024	1.008	1.005	0.969	0.994	0.992
420	0.0362	1.799	1.029	1.045	1.007	1.027	1.009	1.006	0.967	0.995	0.991
440	0.0379	1.873	1.031	1.049	1.008	1.029	1.010	1.006	0.966	0.995	0.990
460	0.0396	1.947	1.034	1.053	1.009	1.031	1.011	1.007	0.964	0.995	0.990
480	0.0414	2.018	1.037	1.057	1.009	1.034	1.011	1.007	0.962	0.996	0.989
500	0.0431	2.088	1.040	1.062	1.010	1.036	1.012	1.008	0.961	0.996	0.988
520	0.0448	2.158	1.042	1.066	1.011	1.039	1.013	1.008	0.960	0.996	0.987
540	0.0465	2.223	1.045	1.071	1.011	1.041	1.014	1.009	0.958	0.996	0.987
560	0.0482	2.287	1.048	1.075	1.012	1.044	1.015	1.009	0.957	0.997	0.986
580	0.0500	2.349	1.051	1.080	1.013	1.047	1.015	1.010	0.955	0.997	0.985
600	0.0517	2.408	1.054	1.084	1.013	1.049	1.016	1.010	0.954	0.997	0.985

Table 2.2 Westcott g-factors (149 ≤ A ≤ 176).

T(K)	E(eV)	^{149}Sm	^{152}Sm	^{151}Eu	^{153}Eu	^{155}Gd	^{157}Gd	^{156}Dy	^{158}Dy	^{160}Dy	^{161}Dy
20	0.0017	0.622	0.994	1.273	1.088	0.838	0.794	0.986	1.021	0.985	1.016
40	0.0034	0.656	0.995	1.251	1.078	0.865	0.824	0.988	1.019	0.987	1.014
60	0.0052	0.696	0.995	1.223	1.068	0.887	0.850	0.990	1.017	0.988	1.013
80	0.0069	0.743	0.996	1.193	1.057	0.904	0.871	0.992	1.015	0.990	1.011
100	0.0086	0.800	0.997	1.161	1.048	0.914	0.887	0.993	1.012	0.992	1.009
120	0.0103	0.867	0.997	1.129	1.038	0.919	0.898	0.994	1.010	0.994	1.007
140	0.0121	0.947	0.998	1.097	1.029	0.920	0.904	0.996	1.007	0.995	1.005
160	0.0138	1.036	0.999	1.067	1.020	0.918	0.905	0.997	1.005	0.997	1.003
180	0.0155	1.135	0.999	1.038	1.012	0.911	0.904	0.999	1.002	0.999	1.001
200	0.0172	1.239	1.000	1.010	1.003	0.903	0.899	1.001	1.000	1.000	0.999
220	0.0190	1.345	1.001	0.984	0.994	0.892	0.891	1.002	0.998	1.002	0.998
240	0.0207	1.452	1.002	0.959	0.986	0.880	0.882	1.004	0.995	1.004	0.996
260	0.0224	1.556	1.002	0.936	0.979	0.867	0.872	1.006	0.993	1.006	0.994
280	0.0241	1.656	1.003	0.914	0.971	0.853	0.860	1.008	0.991	1.008	0.992
293	0.0253	1.718	1.003	0.900	0.966	0.843	0.852	1.009	0.989	1.009	0.991
300	0.0258	1.749	1.003	0.893	0.963	0.838	0.847	1.009	0.988	1.009	0.991
320	0.0276	1.838	1.004	0.874	0.956	0.823	0.834	1.011	0.986	1.011	0.989
340	0.0293	1.918	1.005	0.856	0.949	0.808	0.821	1.013	0.984	1.013	0.987
360	0.0310	1.992	1.005	0.840	0.942	0.793	0.807	1.014	0.982	1.015	0.985
380	0.0327	2.058	1.006	0.825	0.935	0.778	0.793	1.016	0.979	1.016	0.984
400	0.0345	2.119	1.007	0.811	0.928	0.763	0.779	1.018	0.977	1.018	0.982
420	0.0362	2.172	1.007	0.799	0.922	0.749	0.765	1.019	0.975	1.020	0.980
440	0.0379	2.219	1.008	0.787	0.916	0.734	0.751	1.021	0.973	1.022	0.979
460	0.0396	2.260	1.009	0.777	0.910	0.720	0.737	1.023	0.971	1.024	0.977
480	0.0414	2.294	1.009	0.769	0.903	0.706	0.723	1.025	0.969	1.026	0.975
500	0.0431	2.325	1.010	0.761	0.897	0.692	0.710	1.026	0.966	1.028	0.974
520	0.0448	2.349	1.011	0.755	0.892	0.678	0.697	1.028	0.964	1.030	0.972
540	0.0465	2.370	1.011	0.750	0.886	0.665	0.684	1.030	0.962	1.031	0.970
560	0.0482	2.387	1.012	0.746	0.880	0.653	0.671	1.032	0.960	1.033	0.969
580	0.0500	2.400	1.013	0.744	0.875	0.640	0.659	1.033	0.958	1.035	0.967
600	0.0517	2.409	1.013	0.743	0.870	0.628	0.647	1.036	0.956	1.037	0.965

T(K)	E(eV)	^{162}Dy	^{163}Dy	^{164}Dy	^{167}Er	^{169}Tm	^{168}Yb	^{175}Lu	^{176}Lu	^{174}Hf	^{176}Hf
20	0.0017	0.991	1.003	1.023	0.917	0.992	0.925	1.065	0.716	1.028	0.995
40	0.0034	0.993	1.002	1.021	0.926	0.993	0.933	1.057	0.744	1.025	0.996
60	0.0052	0.993	1.002	1.018	0.936	0.994	0.942	1.050	0.774	1.022	0.996
80	0.0069	0.994	1.001	1.015	0.945	0.995	0.951	1.042	0.808	1.019	0.997
100	0.0086	0.995	1.002	1.013	0.955	0.996	0.960	1.035	0.847	1.016	0.998
120	0.0103	0.996	1.001	1.010	0.965	0.997	0.969	1.028	0.892	1.012	0.998
140	0.0121	0.997	1.001	1.008	0.975	0.998	0.978	1.021	0.945	1.010	0.999
160	0.0138	0.998	1.001	1.005	0.986	0.999	0.987	1.015	1.010	1.006	0.999
180	0.0155	0.999	1.001	1.002	0.998	1.000	0.997	1.008	1.086	1.003	1.000
200	0.0172	1.000	1.001	0.999	1.008	1.001	1.007	1.003	1.176	1.000	1.000
220	0.0190	1.001	1.001	0.997	1.020	1.001	1.017	0.996	1.280	0.997	1.001
240	0.0207	1.002	1.002	0.994	1.033	1.003	1.028	0.991	1.395	0.994	1.001
260	0.0224	1.003	1.002	0.992	1.046	1.004	1.039	0.985	1.523	0.992	1.002
280	0.0241	1.004	1.003	0.989	1.059	1.005	1.050	0.980	1.658	0.988	1.002
293	0.0253	1.005	1.003	0.988	1.069	1.005	1.057	0.976	1.752	0.986	1.002
300	0.0258	1.005	1.003	0.987	1.073	1.005	1.061	0.975	1.802	0.985	1.003
320	0.0276	1.006	1.003	0.984	1.089	1.007	1.073	0.969	1.949	0.983	1.003
340	0.0293	1.007	1.004	0.982	1.104	1.008	1.086	0.964	2.099	0.980	1.004
360	0.0310	1.008	1.004	0.979	1.120	1.008	1.098	0.960	2.250	0.977	1.004
380	0.0327	1.009	1.005	0.976	1.138	1.010	1.111	0.955	2.399	0.974	1.005
400	0.0345	1.010	1.006	0.974	1.157	1.010	1.125	0.950	2.545	0.971	1.005
420	0.0362	1.011	1.006	0.972	1.177	1.012	1.139	0.946	2.688	0.968	1.006
440	0.0379	1.012	1.007	0.969	1.199	1.013	1.154	0.941	2.826	0.965	1.006
460	0.0396	1.013	1.008	0.967	1.222	1.013	1.170	0.937	2.959	0.963	1.007
480	0.0414	1.014	1.009	0.964	1.248	1.015	1.187	0.933	3.085	0.960	1.007
500	0.0431	1.015	1.010	0.962	1.276	1.016	1.204	0.929	3.205	0.957	1.008
520	0.0448	1.016	1.011	0.960	1.306	1.017	1.222	0.925	3.318	0.955	1.008
540	0.0465	1.017	1.012	0.957	1.339	1.018	1.242	0.921	3.424	0.952	1.009
560	0.0482	1.018	1.013	0.955	1.375	1.019	1.262	0.917	3.524	0.949	1.010
580	0.0500	1.019	1.014	0.952	1.415	1.020	1.283	0.914	3.618	0.947	1.010
600	0.0517	1.020	1.015	0.950	1.458	1.021	1.306	0.910	3.704	0.944	1.011

Table 2.3 Westcott g-factors (A ≥ 177).

T(K)	E(eV)	^{177}Hf	^{178}Hf	^{179}Hf	^{180}Hf	^{180}Ta	^{181}Ta	^{180}W	^{182}W	^{185}Re	^{187}Re
20	0.0017	0.969	0.994	1.006	1.005	0.831	0.993	1.006	0.995	0.991	1.046
40	0.0034	0.973	0.995	1.005	1.005	0.850	0.994	1.005	0.995	0.991	1.040
60	0.0052	0.976	0.996	1.005	1.004	0.869	0.995	1.005	0.996	0.992	1.035
80	0.0069	0.979	0.996	1.004	1.003	0.889	0.996	1.004	0.997	0.993	1.030
100	0.0086	0.983	0.997	1.003	1.003	0.911	0.996	1.003	0.997	0.994	1.025
120	0.0103	0.987	0.997	1.003	1.003	0.935	0.997	1.003	0.997	0.995	1.020
140	0.0121	0.990	0.998	1.002	1.002	0.962	0.998	1.002	0.999	0.996	1.015
160	0.0138	0.994	0.999	1.001	1.001	0.991	0.999	1.002	0.999	0.997	1.011
180	0.0155	0.998	1.000	1.001	1.001	1.026	0.999	1.001	1.000	0.998	1.006
200	0.0172	1.002	1.000	1.000	1.000	1.065	1.000	1.000	1.000	0.999	1.002
220	0.0190	1.006	1.001	0.999	0.999	1.111	1.001	1.000	1.001	1.000	0.997
240	0.0207	1.010	1.002	0.999	0.999	1.166	1.002	0.999	1.002	1.001	0.993
260	0.0224	1.013	1.002	0.998	0.998	1.230	1.002	0.998	1.002	1.002	0.989
280	0.0241	1.017	1.003	0.997	0.997	1.304	1.003	0.998	1.003	1.004	0.985
293	0.0253	1.020	1.003	0.997	0.997	1.358	1.004	0.997	1.003	1.004	0.982
300	0.0258	1.021	1.003	0.996	0.997	1.389	1.004	0.997	1.003	1.004	0.981
320	0.0276	1.025	1.004	0.996	0.996	1.484	1.005	0.996	1.004	1.005	0.977
340	0.0293	1.029	1.005	0.995	0.995	1.589	1.005	0.996	1.004	1.007	0.973
360	0.0310	1.033	1.005	0.994	0.995	1.704	1.006	0.995	1.005	1.008	0.970
380	0.0327	1.038	1.006	0.994	0.994	1.829	1.007	0.994	1.005	1.009	0.966
400	0.0345	1.042	1.007	0.993	0.993	1.961	1.008	0.994	1.006	1.010	0.962
420	0.0362	1.046	1.007	0.992	0.993	2.101	1.008	0.993	1.007	1.011	0.959
440	0.0379	1.051	1.008	0.992	0.992	2.247	1.009	0.993	1.007	1.012	0.956
460	0.0396	1.055	1.008	0.991	0.992	2.398	1.010	0.992	1.008	1.013	0.952
480	0.0414	1.059	1.009	0.990	0.991	2.554	1.010	0.991	1.009	1.015	0.949
500	0.0431	1.064	1.010	0.990	0.990	2.713	1.011	0.991	1.009	1.016	0.946
520	0.0448	1.069	1.010	0.989	0.990	2.874	1.012	0.990	1.010	1.017	0.942
540	0.0465	1.073	1.011	0.988	0.989	3.039	1.013	0.989	1.010	1.018	0.939
560	0.0482	1.078	1.012	0.988	0.989	3.204	1.014	0.989	1.011	1.019	0.936
580	0.0500	1.083	1.013	0.987	0.988	3.370	1.014	0.988	1.012	1.020	0.933
600	0.0517	1.088	1.013	0.987	0.988	3.536	1.015	0.988	1.012	1.022	0.930

T(K)	E(eV)	^{186}Os	^{187}Os	^{191}Ir	^{193}Ir	^{197}Au	^{196}Hg	^{199}Hg	^{232}Th	^{234}U	^{235}U
20	0.0017	1.005	1.035	1.018	0.973	0.991	1.023	1.021	1.008	1.019	1.173
40	0.0034	1.005	1.032	1.016	0.976	0.992	1.021	1.019	1.007	1.017	1.143
60	0.0052	1.004	1.027	1.014	0.979	0.993	1.018	1.016	1.006	1.015	1.119
80	0.0069	1.003	1.023	1.012	0.983	0.994	1.015	1.015	1.005	1.012	1.100
100	0.0086	1.003	1.020	1.010	0.985	0.995	1.013	1.012	1.005	1.010	1.083
120	0.0103	1.003	1.015	1.008	0.988	0.996	1.010	1.010	1.003	1.008	1.068
140	0.0121	1.002	1.012	1.006	0.992	0.997	1.008	1.007	1.003	1.006	1.054
160	0.0138	1.001	1.008	1.005	0.995	0.998	1.005	1.005	1.002	1.004	1.042
180	0.0155	1.001	1.004	1.003	0.998	0.999	1.002	1.002	1.001	1.001	1.031
200	0.0172	1.000	1.000	1.002	1.001	1.000	0.999	1.000	0.999	0.999	1.021
220	0.0190	1.000	0.996	1.001	1.005	1.001	0.997	0.997	0.999	0.998	1.012
240	0.0207	0.999	0.993	0.999	1.008	1.003	0.994	0.995	0.998	0.995	1.003
260	0.0224	0.998	0.989	0.998	1.011	1.003	0.992	0.993	0.997	0.993	0.995
280	0.0241	0.998	0.985	0.997	1.014	1.005	0.989	0.991	0.996	0.991	0.989
293	0.0253	0.998	0.983	0.996	1.017	1.005	0.988	0.989	0.995	0.990	0.985
300	0.0258	0.997	0.982	0.996	1.018	1.005	0.987	0.988	0.995	0.989	0.983
320	0.0276	0.997	0.978	0.995	1.022	1.006	0.984	0.986	0.994	0.987	0.977
340	0.0293	0.996	0.975	0.995	1.025	1.007	0.982	0.984	0.993	0.985	0.972
360	0.0310	0.996	0.971	0.994	1.029	1.008	0.979	0.981	0.992	0.983	0.967
380	0.0327	0.995	0.967	0.994	1.032	1.009	0.977	0.979	0.991	0.981	0.963
400	0.0345	0.994	0.964	0.994	1.036	1.010	0.974	0.977	0.990	0.979	0.960
420	0.0362	0.994	0.961	0.994	1.039	1.011	0.972	0.975	0.990	0.977	0.957
440	0.0379	0.993	0.957	0.994	1.043	1.012	0.969	0.973	0.989	0.975	0.954
460	0.0396	0.993	0.954	0.994	1.047	1.013	0.967	0.970	0.988	0.973	0.952
480	0.0414	0.992	0.950	0.994	1.051	1.014	0.965	0.968	0.987	0.972	0.950
500	0.0431	0.992	0.947	0.995	1.055	1.015	0.962	0.966	0.986	0.970	0.949
520	0.0448	0.991	0.944	0.996	1.059	1.016	0.960	0.964	0.985	0.968	0.948
540	0.0465	0.990	0.941	0.997	1.062	1.018	0.957	0.962	0.984	0.966	0.947
560	0.0482	0.990	0.937	0.998	1.066	1.018	0.955	0.960	0.983	0.964	0.946
580	0.0500	0.989	0.934	1.000	1.071	1.020	0.953	0.957	0.983	0.962	0.946
600	0.0517	0.989	0.931	1.001	1.075	1.021	0.951	0.955	0.982	0.960	0.946

2.2. Generalized formalism

2.2.1. Capture rate

The instantaneous neutron capture rate dR(t) of a stable nuclide in differential volume $d^3\mathbf{r}$ localized at $\mathbf{r}$ of a sample in a neutron field is given by :

$$dR(t) = d^3\boldsymbol{r} \quad n_x(\boldsymbol{r}) \int_0^\infty n(\boldsymbol{r},v,t)\sigma_\gamma(v)vdv \tag{13}$$

where $n_x(\mathbf{r})$ is the capturing nuclide density in the sample target, and $n(\boldsymbol{r},v,t)$ is the neutron density per unit speed interval at location $\boldsymbol{r}$ and time t. By preparing a target sample of homogeneous nuclide density, the time-averaged capture rate by the given nuclide in the sample is given by [2.14]:

$$\langle R\rangle = \frac{1}{t_m}\int_0^{t_m} dt \int_V d^3\boldsymbol{r} \quad n_x(\boldsymbol{r})\int_0^\infty n(\boldsymbol{r},v,t)\sigma_\gamma(v)vdv = \frac{1}{V}\frac{m}{M}N_A\theta\int_V d^3\boldsymbol{r}\int_0^\infty n(\boldsymbol{r},v)\sigma_\gamma(v)vdv \tag{14}$$

where t_m is the irradiation period, V is the volume of sample, m is the mass of the relevant element in the target, M is the atomic mass of the element, N_A is Avogadro's number, θ is the abundance of the capturing isotope in the element, and $n(\boldsymbol{r}, v)$ is the time-averaged neutron density per unit speed interval at location $\boldsymbol{r}$ given by:

$$n(\boldsymbol{r},v) = \frac{1}{t_m}\int_0^{t_m} dt \quad n(\boldsymbol{r},v,t) \tag{15}$$

The expressions are greatly simplified for 1/v absorbers. Using the relationship $\sigma(v) = \sigma_0 v_0/v$, the capture rate in Equation (14) becomes proportional to the total neutron density in the sample, and is given by:

$$\langle R\rangle_{1/v} = \frac{1}{V}\frac{m}{M}N_A\theta \int_V d^3\boldsymbol{r}\int_0^\infty n(\boldsymbol{r},v)\sigma_\gamma(v)vdv = \frac{m}{M}N_A\theta\sigma_0 v_0\bar{n}_t \tag{16}$$

where $\bar{n}_t$ is the volume-averaged total neutron density in the sample. The result is exact even when the spectrum in the sample is distorted or the neutron beam profile is inhomogeneous. Thus, for an approximately good 1/v absorber nuclide over the neutron spectral range, Equation (16) is valid to a reasonable degree. Hence, for a PGAA facility in which the neutron beam is free from an epithermal component, no detailed information about the incident beam spectrum nor the spectrum inside the sample is required for 1/v absorbers as far as k_0 standardization is concerned.

Capture rates of realistic nuclides with resonances in the epithermal region are composed of contributions by thermal and epithermal neutrons within the sample. This problem has been addressed in numerous INAA studies, in which the underlying assumptions are that the thermal neutron spectrum is Maxwellian and the epithermal flux is characterized by 1/E or $1/E^{1+\alpha}$. Since the beam spectrum in PGAA is closely described by a Maxwellian with or without a significant 1/E epithermal flux contribution, the existing formalism in INAA is judged to be equally applicable [2.25].

2.2.2. Non-1/v absorber, effective g-factor and Cd ratio

The capture rate for a non-1/v absorber has been quantified in terms of the Westcott g-factor. As the g-factor is defined for a Maxwellian thermal spectrum, one is faced with the problem of treating realistic neutron spectra, which may deviate significantly from the Maxwellian shape in the thermal energy region. Measured TOF spectra for super-mirror guided cold beams exhibit large deviations of this kind, which are difficult to parametrize [2.26]. The curved mirror guided thermal beam also has spatial inhomogeneity and results in deviations with respect to spectral correlation as a function of position along the mirror curvature [2.27]. Furthermore, the thermal spectrum deviates from Maxwellian in filtered beam facilities [2.28], where the spectrum form is distinctly non-Maxwellian [2.12, 2.29]. As the capture rate for a non-1/v absorber is highly dependent on the shape of the thermal and epithermal spectrum, a generalized approach is described in terms of an effective g-factor.

Even when the neutron spectrum is correlated with the neutron density in the sample, the reduction of the capture rate to measurable quantities is possible for a 1/v absorber. However, this correlation becomes more complex for a non-1/v absorber because the strong capture process causes spectral hardening at low energies and from self-shielding around the resonances. A thin sample with infinite (or sufficiently realistic) dilution of strong absorber nuclides is an important requirement to ensure that the neutron spectrum within the sample does not change compared to that of the incident beam. When the neutron density of the incident beam can be separated [$\mathrm{n}(\boldsymbol{r},\mathrm{v}) = \mathrm{n}(\boldsymbol{r})\rho(\mathrm{v})$], this same separation process is valid for dilute thin samples and simplifies theoretical considerations. If the thermal spectrum deviates significantly from Maxwellian, the Høgdahl convention can be used to classify the thermal and epithermal neutrons in terms of cadmium cutoff [2.30], and the neutron density separates into two terms:

$$\mathrm{n}(\boldsymbol{r},\mathrm{v}) = \mathrm{n}(\boldsymbol{r})\rho(\mathrm{v}) = \mathrm{n}_{\mathrm{th}}(\boldsymbol{r})\rho_{\mathrm{th}}(\mathrm{v})\Theta(\mathrm{v}_{\mathrm{Cd}} - \mathrm{v}) + \mathrm{n}_{\mathrm{ep}}(\boldsymbol{r})\rho_{\mathrm{ep}}(\mathrm{v})\Theta(\mathrm{v} - \mathrm{v}_{\mathrm{Cd}}) \tag{17}$$

where $\mathrm{n}_{\mathrm{th}}(\boldsymbol{r})$ and $\mathrm{n}_{\mathrm{ep}}(\boldsymbol{r})$ are local thermal and epithermal neutron density respectively, $\Theta(\mathrm{x})$ is the step function which is unity for the non-negative argument x and zero otherwise, and v_{Cd} is the neutron speed corresponding to the cadmium cutoff energy $E_{Cd} \sim 0.5$ eV (and $m v_{Cd}^2/2 \equiv E_{Cd}$). The speed distribution functions $\rho(\mathrm{v})$, $\rho_{\mathrm{th}}(\mathrm{v})$ and $\rho_{\mathrm{ep}}(\mathrm{v})$ are normalized so that:

$$\int_0^\infty \rho(v)dv = \int_0^{v_{Cd}} \rho_{th}(v)dv = \int_{v_{Cd}}^\infty \rho_{ep}(v)dv = 1 \tag{18}$$

Hence, the capture rate is given by:

$$\begin{aligned}\langle R\rangle_{non-1/v} &= \frac{1}{V}\frac{m}{M}N_A\theta\int_V d^3\boldsymbol{r}\quad n(\boldsymbol{r})\int_0^\infty \rho(v)\sigma_\gamma(v)vdv \\ &= \frac{m}{M}N_A\quad \theta\left[\bar{n}_{th}\int_0^{v_{Cd}} \rho_{th}(v)\sigma_\gamma(v)vdv + \bar{n}_{ep}\int_{v_{Cd}}^\infty \rho_{ep}(v)\sigma_\gamma(v)vdv\right]\end{aligned} \tag{19}$$

where $\bar{\mathrm{n}}_{\mathrm{th}}$ and $\bar{\mathrm{n}}_{\mathrm{ep}}$ are the volume-averaged thermal and epithermal neutron densities in the sample, respectively. A general beam spectrum can be considered by including the epithermal capture rate in parallel.

Accordingly, an effective g-factor is defined in Ref. [2.31]:

$$\hat{g} \equiv \frac{1}{\sigma_0 v_0} \frac{\int_0^{v_{Cd}} \rho_{th}(v)\sigma_\gamma(v)v dv}{\int_0^{v_{Cd}} \rho_{th}(v) dv} = \frac{1}{\sigma_0 v_0} \int_0^{v_{Cd}} \rho_{th}(v)\sigma_\gamma(v)v dv \quad (20)$$

for the realistic thermal neutron spectrum $\rho_{th}(v)$ of the incident beam. Therefore, the effective g-factor for a given non-1/v absorber nuclide is specific for a particular PGAA beam facility, and is unity for an exact 1/v absorber, regardless of the spectral shape. If resonances are present above E_{Cd} and if the epithermal neutron contribution to the reaction rates is not negligible, the definition of the effective g-factor is still valid, but the second integral in Equation (19) must be accounted for explicitly. Procedures developed for INAA can be applied. Generally, the effective g-factor depends on E_{Cd}, but this dependence is usually weak, except for a few nuclides (^{176}Lu, ^{151}Eu, ^{115}In, etc.) with strong resonances near this energy.

If detailed information about the neutron spectral shape is available, the effective g-factors can be calculated from the pointwise capture cross sections (e.g. JEF-2.2 dataset [2.32]). However, there are additional complications that may arise when a cold beam is incident on the target at room temperature. The neutron energy gain by up-scattering in the target can lead to spectral distortion, which is difficult to predict and complicates the interpretation of measurements of non-1/v absorbers [2.33].

Effective g-factors for a particular PGAA facility can be determined by measuring the k_0 factors (described in Section 2.2.4) and comparing them to reference values from the literature. According to Equation (1), k_0 factors are composite nuclear constants independent of the facility. Therefore, if the k_0 value is known, it is possible to determine the ratio of the effective g-factor of the measured nuclide and the comparator, which is normally a 1/v absorber with the g-factor equal to one.

The epithermal contribution to the capture rate of a nuclide can be estimated from the measured cadmium ratio (R_{Cd}), which is the ratio of the specific activities of this nuclide in the sample irradiated without and with a cadmium cover. Activity is proportional to the reaction rate which can be calculated by defining the cadmium transmission function, assuming exponential neutron attenuation through the cadmium cover:

$$t(v) = \exp[-d\, n_{Cd}\, \sigma_{Cd}(v)] \quad (21)$$

where d is the cadmium cover thickness, n_{Cd} is the cadmium number density, and σ_{Cd} is the cadmium cross section. The cadmium ratio is given by:

$$R_{Cd} = \frac{\bar{n}\int_0^\infty \rho(v)\sigma_\gamma(v)v\,dv}{\bar{n}\int_0^\infty t(v)\rho(v)\sigma_\gamma(v)v\,dv} \quad (22)$$

Due to the nature of the cadmium cross section, the transmission function is close to unity above the cadmium resonance at about 0.5 eV and nearly zero below. This parameter can be approximated by an idealized Heaviside function, with a step from zero to one at speed v_{Cd}, to give a greatly simplified expression for the cadmium ratio:

$$R_{Cd} = \frac{\left[\bar{n}_{th}\int_0^{v_{Cd}} \rho_{th}(v)\sigma_\gamma(v)vdv + \bar{n}_{ep}\int_{v_{Cd}}^{\infty} \rho_{ep}(v)\sigma_\gamma(v)vdv\right]}{\bar{n}_{ep}\int_{v_{Cd}}^{\infty} \rho_{ep}(v)\sigma_\gamma(v)vdv} = 1 + \frac{\bar{n}_{th}v_0\hat{g}\sigma_0}{\bar{n}_{ep}\int_{v_{Cd}}^{\infty} \rho_{ep}(v)\sigma_\gamma(v)vdv}, \tag{23}$$

and the capture rate is given by:

$$\langle R \rangle_{non-1/v} = \frac{m}{M} N_A \theta \, \bar{n}_{th} v_0 \hat{g} \sigma_0 \left(\frac{R_{Cd}}{R_{Cd} - 1} \right) \tag{24}$$

which is a generalized expression for Eq. (16). By comparing Equations (22) and (23), an effective cadmium cutoff speed (v_{Cd}) can be determined that depends mainly on the thickness of the cadmium cover. Dependence on the shape of the cross section is weak, except for nuclides with resonances near the cadmium cutoff speed. Cd cutoff energies have been determined for various Cd thicknesses, epithermal neutron components and beam geometries that are applicable to Maxwellian thermal spectra and 1/E epithermal spectra above ~ 5kT [2.19, 2.20, 2.34].

When the Cd ratio is too large to obtain a statistically meaningful γ-count rate, the terms in Equation (24) that involve the Cd ratio are not required. The estimated lower limit of the Cd ratio can be used to assign the error arising from epithermal neutron contribution.

2.2.3. Prompt capture-γ counting rate

The measured count rate of a prompt γ ray of energy E_γ emitted from a capturing nuclide is given by:

$$\langle C \rangle = \frac{1}{V}\frac{m}{M} N_A \theta \int_V d^3\boldsymbol{r} \;\; \varepsilon(\boldsymbol{r}, E_\gamma) \int_0^\infty P(E_\gamma, v) n(\boldsymbol{r}, v) \sigma_\gamma(v) vdv \tag{25}$$

where $\varepsilon(\boldsymbol{r}, E_\gamma)$ is the detection efficiency for the prompt γ ray of energy E_γ emitted at location $\boldsymbol{r}$, and $P(E_\gamma, v)$ is the absolute γ-ray emission probability (gammas emitted per capture) of the prompt γ ray of energy E_γ emitted from the nucleus capturing a neutron of speed v.

Using a small sample, the detection efficiency $\varepsilon(\boldsymbol{r}, E_\gamma)$ is assumed to have the same shape over the sample volume and is separable into $f(\boldsymbol{r})\varepsilon(E_\gamma)$ where $f(\boldsymbol{r})$ is a geometrical factor independent of the γ-ray energy, unless attenuated [2.14]. A high resolution gamma-ray spectroscopy system is assumed for the detection, consisting of a single or Compton-suppressed semiconductor detector and associated electronics. Typically, the sample should be as small as practicable (point source) and located 15-20 cm or more from the detector so that the effects of the gradient of the detection efficiency through the sample is negligible [2.22]. Gamma-ray attenuation within the sample is insignificant due to the small sample size and high prompt γ-ray energy (greater than 200 keV). Typical correction factors arise from sum coincidence, random coincidence and dead time losses, and are introduced during or after the measurement. Typical corrections for saturation, cooling and decay before and during the counting period are not required.

The absolute γ-ray emission probability $P(E_\gamma, v)$ is dependent on the captured neutron speed (energy) [2.28]. This parameter is related to the partial capture cross section and partial radiative width, which fluctuates from resonance to resonance (Porter-Thomas fluctuation

[2.35]). Neutron capture models based on statistical theory [2.36] or simple direct (potential) capture [2.37-2.39] predict negligible energy dependence for $P(E_\gamma, v)$ in the thermal region. However, the neutron energy dependence can only be appreciable when interference occurs [2.40, 2.41] either between different resonance amplitudes [2.42] or between resonance and direct capture amplitudes [2.43]. Such experimental studies are difficult to perform and are scarce, especially in the thermal and cold energy range. Some signatures have been determined for a few transitions from ^{238}U(n, γ) [2.44], ^{197}Au(n, γ) [2.45], ^{195}Pt(n, γ) [2.42], ^{169}Tm(n, γ) [2.46] and ^{149}Sm(n, γ) [2.47] resonances that influence the thermal region. Even though there is some experimental evidence and theoretical models that support the energy variation in P, quantitative prediction of this phenomenon requires further study beyond the present scope. For most nuclides, the slow neutron energy region (< 0.1 eV) is far from the lowest positive energy resonance (e.g., Table 2.4 [2.48]), while the negative energy resonance is closest to the neutron threshold. Hence, the absolute γ-ray emission probability $P(E_\gamma)$ is assumed to be independent of the neutron energy for slow neutron capture. Data for absolute γ-ray emission probabilities are based on the incident neutron energy being thermal, as specified in the current PGAA database [2.49].

Table 2.4 Energy (eV)-ordered resonances.*

E_0	Isotope	E_0	Isotope	E_0	Isotope	E_0	Isotope	E_0	Isotope
0.031	^{157}Gd	0.178	^{242}Am	0.307	^{241}Am	0.546	^{192}Ir	0.653	^{191}Ir
0.084	^{135}Xe	0.192	^{154}Eu	0.321	^{151}Eu	0.574	^{241}Am	0.702	^{249}Cf
0.097	^{149}Sm	0.195	^{249}Bk	0.400	^{231}Pa	0.584	^{167}Er	0.807	^{169}Yb
0.141	^{176}Lu	0.200	^{180}Ta	0.435	^{180}Ta	0.597	^{168}Yb	0.872	^{149}Sm
0.148	^{182}Ta	0.256	^{192}Ir	0.460	^{151}Eu	0.603	^{155}Eu	0.884	^{152}Eu
0.169	^{148}Pm	0.258	^{241}Pu	0.460	^{167}Er	0.609	^{229}Th	1.000	^{252}Cf
0.178	^{113}Cd	0.296	^{239}Pu	0.489	^{237}Np	0.615	^{242}Am	1.060	^{240}Pu

* extracted from Appendix A of Ref. [2.48].

By combining Equations (24) and (25), the specific count rate (per mass of element in the sample, or the so-called analytic sensitivity) is given by:

$$A = \left\langle \frac{C}{m} \right\rangle = \frac{N_A}{M} \theta P(E_\gamma) \varepsilon(E_\gamma) \bar{n}_{th} v_0 \, \hat{g} \sigma_0 \left(\frac{R_{Cd}}{R_{Cd} - 1} \right). \tag{26}$$

2.2.4. Experimental k_0 factor

The same irradiation conditions for analyte (x) and comparator (c) elements are achieved by co-irradiating a homogeneous mixture of analyte and comparator element in a neutron field, and measuring the signature of prompt gamma rays in parallel. Hence, the experimental prompt k_0 factor is given from Equations (1) and (26) by:

$$k_0 \equiv \frac{P_x(E_{\gamma,x})}{P_c(E_{\gamma,c})}\cdot\frac{\sigma_{0,x}}{\sigma_{0,c}}\cdot\frac{\theta_x/M_x}{\theta_c/M_c} = \frac{A_x/\varepsilon(E_{\gamma,x})}{A_c/\varepsilon(E_{\gamma,c})}\cdot\frac{\hat{g}_c}{\hat{g}_x}\cdot\frac{\left(\frac{R_{Cd}}{R_{Cd}-1}\right)_c}{\left(\frac{R_{Cd}}{R_{Cd}-1}\right)_x} \tag{27}$$

This general expression contains two correction factors: $\hat{g}$ for non-1/v absorption, and R_{Cd} for epithermal absorption. Typical comparator elements H and Cl are both good 1/v absorbers with effective g-factors close to unity in most facilities. The last term in parentheses deviates from unity by about $(1/R_{Cd})_c$ - $(1/R_{Cd})_x$ and therefore is closer to unity for a clean beam. Guided or filtered neutron beams result in conditions that do not require epithermal correction.

Accurately determined k_0 factors permit the generation of precisely measured datasets of partial cross sections by normalization to the well-defined comparator element H. Datasets of partial cross sections are known to be considerably more precise than either the isotopic cross section (σ_0) or the absolute γ-ray emission probability (P) [2.49]. Hence, by measuring the ratio of gamma-ray emission rates for two selected elements and using the known k_0 factors, the concentration ratio of the two elements can be precisely determined. Furthermore, the absolute elemental concentrations could be obtained if all the elements in the sample are observed in the measured gamma-ray spectrum (elemental analysis of a sample).

2.3. Concluding remarks

Typical spectra of the neutron beams used for PGAA deviate appreciably from the ideal Maxwellian function. Although analysis in terms of k_0-standardization has been expanded to non-1/v absorbers, the resulting deviation is neglected and the thermal spectrum has been approximated by the Maxwellian with or without 1/E epithermal contribution so that developments in INAA apply. Since the majority of nuclides exhibit 1/v absorption in the thermal energy region and even the non-1/v absorbers behave asymptotically as 1/v absorbers in the cold region (below 5 eV), the analytical solution is relatively simple in most cases. Quantification of the various effects becomes important as the accuracy in the measured k_0 factors is reported to be less than 3% (typically around 1%). Therefore, highly accurate PGAA requires well-defined experimental conditions and procedures, along with the analytical data and the assumptions underlying the final result. PGAA applications are widely diverse in terms of the sample composition and size, neutron beam characteristics, analysis method and procedure, and therefore the validity and limitations of the present approach need to be considered in greater detail.

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3. CHARACTERISTICS OF PGAA FACILITIES

H.D. Choi

3.1. SNU-KAERI PGAA facility and diffracted polychromatic neutron beam

The SNU-KAERI Prompt Gamma Activation Analysis (PGAA) facility was developed through the joint efforts of Seoul National University (SNU) and Korea Atomic Energy Research Institute (KAERI), and has been operational since May 2001. A detailed layout of the facility is shown in Fig. 3.1. The PGAA system is installed on a platform located at the exit of the 4-m long ST1 tangential beam port of Hanaro [3.1]. Pyrolytic graphite (PG) crystals are used to extract the thermal beam by the method of Bragg diffraction, with the Bragg angle set at 45° so that most of the beam flux originates from diffraction orders 2, 3 and 4. The diffracted beam is diverted vertically to the first collimator positioned downstream from the PG crystals, and is controlled further by a second collimator of ^{6}LiF positioned on the beam shutter. The neutron flux and Cd-ratio for gold at the sample location are 7.9×10^{7} n cm^{-2} s^{-1} and 266, respectively. Flux uniformity of within 12% is achieved in the central area of 1×1 cm^2 of the total beam cross section (of 2×2 cm^2).

The neutron beam spectrum has been characterized both experimentally and theoretically [3.1, 3.2]. A time-of-flight (TOF) spectrometer was used to measure the spectrum of the diffracted polychromatic beam, as shown in Fig. 3.2. Bragg peaks up to 6th-order diffraction are recognizable, and hence the measurement is only restricted in the thermal energy region. Higher-order diffractions above 6th order and the epithermal region of the spectrum were obtained indirectly by comparing theoretical predictions with the measured effective cross section for the ^{10}B(n, α) reaction and Cd-ratios for various nuclides.

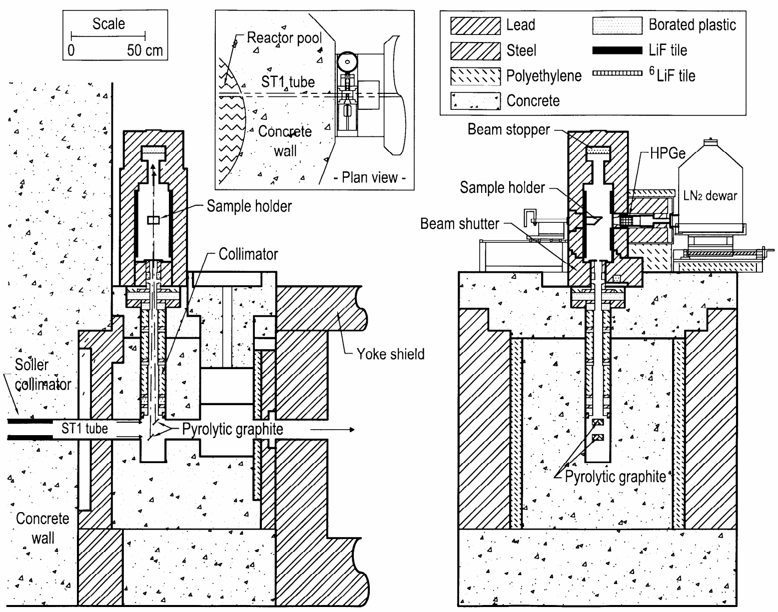

FIG. 3.1 SNU-KAERI PGAA facility.

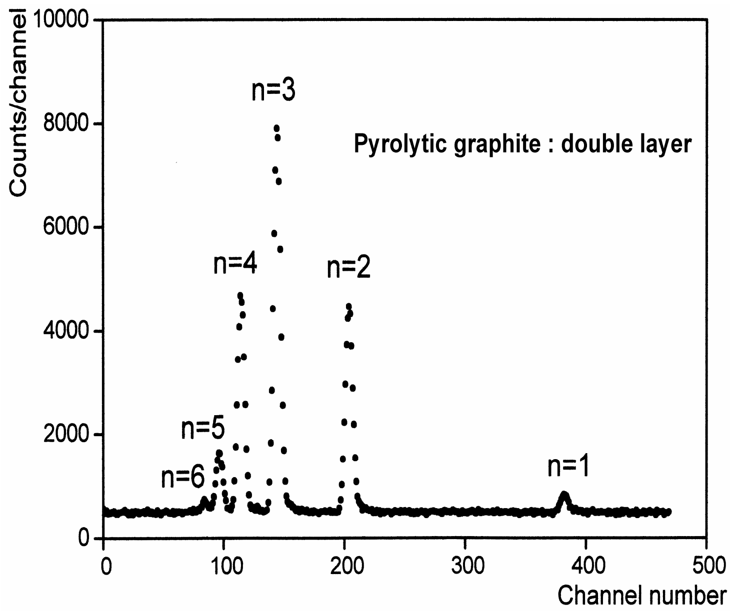

FIG.3. 2 Diffracted neutron TOF spectrum measured by double-layered crystals set at a Bragg angle of 45°.

The theoretical diffracted beam spectrum was obtained from the reflectivity model of the PG crystal. Lattice vibration effects were included in the calculation using the reported vibrational amplitude of the PG crystal and comparing with the measured time-of-flight spectra in the thermal region [3.3]. A continuous spectrum of background neutrons was included as a minor component that originated mainly from the incoherent scattering by the structural materials of the PG crystal mount and goniometer. The calculated neutron spectrum up to 40 eV is shown in Fig. 3.3, while the neutron flux and energy width of each diffraction order up to $n = 15$ was compared with the TOF measurement in Table 3.1. The energy width was determined theoretically considering the mosaic spread of the PG crystal and the angular divergence of the white neutron beam. Cadmium ratios for Au, Cl, Cd, Sm, Eu and Gd, and the effective cross section of the ^{10}B(n, α) reaction were measured and compared with theoretical calculations based on the spectrum and pointwise neutron cross sections. These theoretical

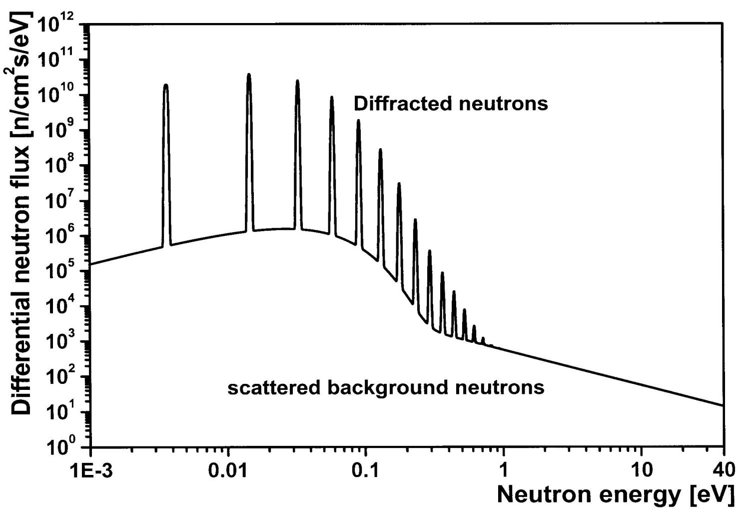

FIG. 3.3 Neutron spectrum at the sample position of SNU-KAERI PGAA facility.

Table 3.1 Relative fraction of the diffracted neutron flux as a function of diffraction order.

Diffraction Order (n)	Energy [meV]	Width [meV]	Relative flux [%]	
			TOF measurement	Theoretical calculation
1	3.6	0.2	4.4 ± 0.2	5.2
2	14.6	0.7	25.9 ± 0.2	29.6
3	32.8	1.5	39.3 ± 0.3	36.4
4	58.3	2.6	22.9 ± 0.2	20.4
5	91.0	4.1	6.2 ± 0.1	6.7
6	131.1	5.9	1.3 ± 0.1	1.4
7	178.4	8.0	n/d	2.1×10^{-1}
8	233.0	10.4	n/d	2.5×10^{-2}
9	294.9	13.2	n/d	4.1×10^{-3}
10	364.1	16.3	n/d	1.2×10^{-3}
11	440.5	19.7	n/d	4.0×10^{-4}
12	524.3	23.4	n/d	1.3×10^{-4}
13	615.3	27.5	n/d	4.0×10^{-5}
14	713.6	31.9	n/d	1.1×10^{-5}
15	819.1	36.6	n/d	3.0×10^{-6}

n/d - not detected.

predictions were consistent with the measured quantities, even though the agreement was not perfect.

The measured effective wavelength and velocity of the beam are 1.87 ± 0.02 Å and 2117 ± 21 m s^{-1}, respectively. All of the measured Cd-ratios except that for Au are in the range of 340 to 410, and hence the epithermal neutrons have negligible impact on the capture rate. Details of the method of analysis and the results are reported in Refs. [3.2] and [3.3].

A gamma-ray detector (n-type/HPGe, with a relative efficiency of 43%) is normally placed a distance of 25 cm from the sample. The pulse processing system consists of a preamplifier with resistive feedback, amplifier, 16k ADC, multichannel buffer and a PC with Ethernet connection to the buffer. Data collection and on-line analysis of the spectra are undertaken by commercial software, while off-line analysis is carried out by HYPERMET [3.4]. The total background counting rate for a neutron beam incident on a blank target is approximately 3000 counts s^{-1}, while the ADC deadtime is less than a few percent. Most of the background gamma-ray peaks identified are nitrogen and germanium capture lines, along with gamma rays originating from the inelastic excitation of Ge isotopes. Several methods have been proposed to reduce the background in a future upgrade. Radiation levels around the lead wall and sample position are kept low to ensure safety, with measured γ-ray and neutron dose rates of 10 and 30 μSv h^{-1}, respectively. Both the efficiency and energy calibration of the detection system are determined according to the procedures adopted by the Budapest group [3.5, 3.6]. Full energy peak efficiency is determined by fitting polynomials to the measured data; relative standard uncertainty is < 3% over the low-energy region, and < 5% for the complete spectrum. Non-linearity of the spectrometer is determined in a similar manner by fitting a polynomial function to the observed data for accurately known gamma-ray lines [3.7].

Table 3.2 Measured sensitivities and detection limits for some elements.

Element	Energy [keV]	Sensitivity [counts s^{-1} mg^{-1}]	Detection limit [μg]
H	2223	4.322 ± 0.005	11.500 ± 0.001
B	478	2131 ± 40	0.067 ± 0.001
Cl	1165	4.170 ± 0.020	11.500 ± 0.001
K	770	0.532 ± 0.010	105.00 ± 0.07
Ti	1382	2.023 ± 0.010	23.600 ± 0.001
Cd	558	452 ± 10	0.165 ± 0.001
Sm	333	2663 ± 40	0.043 ± 0.001
Gd	182	3071 ± 40	0.057 ± 0.001

The facility was first used to determine the sensitivity for boron. Dilute boric acid was used to prepare the solid samples, and a sensitivity of 2131 counts s^{-1} $(mg\text{-}B)^{-1}$ was derived from the 478 keV Doppler-broadened peak. Sensitivities for various elements are listed in Table 3.2, along with the detection limits for a counting period of 10,000 s [3.1]. Since the neutron spectrum is simple and well-defined, k_0-standardization can be applied in the study of non-1/v absorbers. The k_0-factors and relative γ-ray emission intensities have been measured for ^{113}Cd, ^{149}Sm, ^{151}Eu and $^{155,157}Gd$ [3.7].

Thus, diffracted polychromatic neutrons can be successfully used in a PGAA facility. Even though the purity of the resulting thermal neutrons is inferior to that of a mirror-guided thermal beam, a higher flux and detection sensitivity have been achieved at considerably lower cost and effort. For example, quantification of sub-ppm boron content is feasible in a non-destructive manner within 30 min for a small sample of 0.1 g. Future upgrading of the facility to reduce the background is expected to enhance the performance further.

3.2. Characterization of prompt gamma neutron activation analysis at the Dalat research reactor

The principle of extraction of the neutron beam, and the design of the beam shutter, beam catcher, detector shielding, and gamma-ray spectrometer are briefly described below for the Prompt Gamma Neutron Activation Analysis (PGAA) facility at the Dalat reactor. Neutron flux, cadmium ratio, gamma dose rate and absolute efficiency are also quantified.

3.2.1. Experimental configuration

Neutron beam

The beam emerging from the reactor beam port consists mainly of fast and thermal neutrons and high-energy gamma rays. Peak to background ratio of the gamma-ray spectrum depends upon the background gamma radiation within the thermal neutron beam. Thermal neutrons are extracted from the beam port for PGAA by slowing down the fast neutrons to thermal energy and filtering out the high-energy gamma rays. Radiation beam port No. 4 was selected for the installation of the PGAA facility. The average neutron flux inside the reactor is of the order of 10^{13} n cm^{-2} s^{-1}, from which a neutron flux level of 10^{12} n cm^{-2} s^{-1} is required at the base of the collimator for PGAA. Graphite was selected as the moderator because of availability and the large diffusion length (40-cm thick, and placed 85 cm from the end side wall of the reactor). A 20-cm thick block of bismuth is used as a beam filter to minimize the high-energy gamma radiation at the sample position and to reduce the need for additional shielding outside the biological shield. The beam aperture consists of two boron carbide sheets (each 3-mm thick) to give an aperture diameter of 25 mm. A hollow graphite block 15-cm thick separates the aperture from the moderator block in order to obtain a uniform neutron beam, and the outer diameter of the divergent beam collimator is 30 mm. Streaming of the radiation is eliminated by using bismuth and lead as beam stoppers that intercept all the radiation coming from the core of the reactor, gamma rays that arise from radiative capture of the neutrons, and scattered radiation from the sample and sample holder.

The beam shutter ensures the safe operation of the facility while positioning the sample. This shutter system consists of two parts:

(a) first segment is made from borated paraffin, cadmium and boron carbide, and cadmium sheets, and is enclosed in aluminium casing - thermalized neutrons are attenuated and absorbed by the borated paraffin, cadmium and boron carbide sheets;

(b) second part consists of 15-cm thick shutter made from lead bricks and boron carbide sheets, and enclosed in a steel casing.

The shutter is mounted on a trolley, and is moved into position by means of an overhead crane. The beam catcher is fabricated from borated paraffin, lead, boron carbide and steel, while an enclosure of concrete blocks provides additional shielding from the scattered gamma rays and neutron radiation. Fig. 3.4 shows the layout of the PGAA facility.

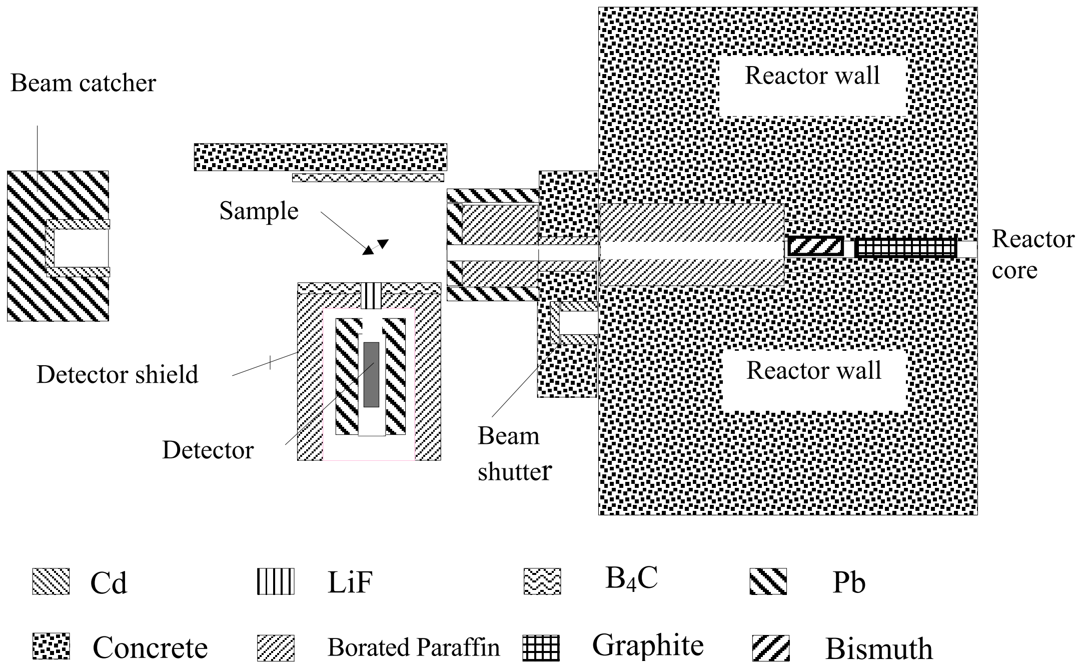

FIG.3.4 Configuration of PGAA facility at DNRI.

Detector shield and sample arrangement

90 cm^3 horizontal HPGe detector manufactured by Intertechnique is used to count the prompt gamma rays (resolution of 2.5 keV at 1332 keV). The MCA has been calibrated from 0.121 to 8 MeV by means of the delayed gamma rays from ^{152}Eu and prompt gamma rays from $^{35}Cl(n, \gamma)$ and $^{14}N(n, \gamma)$, using the energies and intensities recommended by Molnár *et al.* [3.8].

Samples are sealed in a film of 25-μm thick fluorinated ethylenepropylen resin (FEP), and placed on the sample holder using 0.3-mm diameter PTFE string. The spectrometer system is directly shielded from the neutrons by a layer of 3-mm thick boron carbide, and on all sides by 10-cm borated paraffin. A 10-cm layer of lead is placed within the borated paraffin to protect the detector from undesired gamma rays that originate from the filtered neutron beam or neutron-capture reactions on the shielding materials (Fig. 3.4). The prompt gamma rays are detected through a window of Li_2CO_3 (32-mm diameter) located in the upper lead layer.

3.2.2. Characteristics of the system

Neutron flux, cadmium ratio and gamma dose rate

The beam position was determined by neutron radiography, and the neutron flux and flux distribution were measured by means of activated Au foils. The cadmium ratio was also determined by activating Au foils with and without a cadmium cover. Neutron flux and cadmium ratio are 2.1×10^7 n cm^{-2} s^{-1} and 21, respectively. Flux variations at the sample position during one reactor operation cycle of 100 hours were measured every 5 hours by means of 0.025-mm thick Au foils, and found to be 1.2%. The gamma dose rate at the sample position was determined by TLD to be 200 mR h^{-1}.

Efficiency calibration

Efficiency measurements have been described by many authors: the full-energy peak efficiency curve is divided into three energy regions of 100 to 658 keV, 447 to 2754 keV and

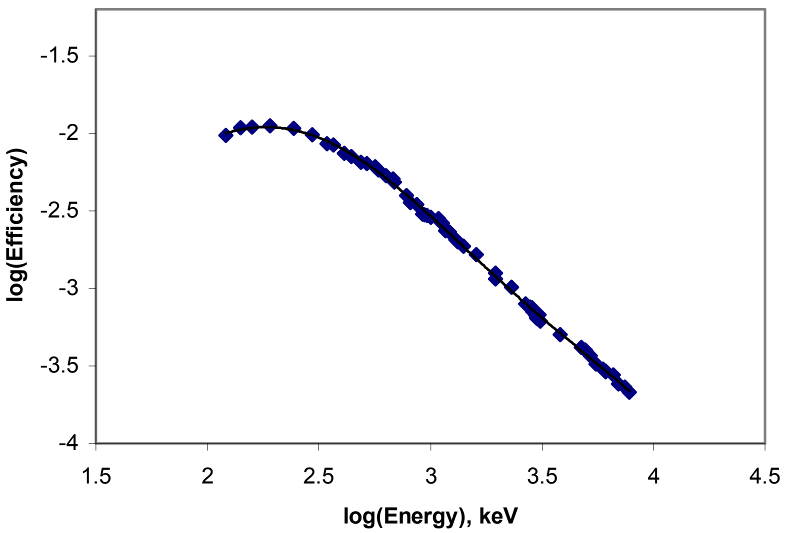

FIG. 3.5 Absolute efficiency curve.

1262 to 10829 keV. Gamma-ray sources of ^{24}Na, ^{54}Mn, ^{57}Co, ^{60}Co, ^{65}Zn, ^{88}Y, ^{137}Cs, ^{152}Eu and ^{241}Am were used for the absolute efficiency calibration from 100 to 2754 keV (calibrant emission probabilities from all of these sources have been recommended in IAEA-TECDOC 619 [3.9]). Prompt gamma rays from the $^{14}N(n, \gamma)$, $Cl(n, \gamma)$ and $Ti(n, \gamma)$ reactions cover a wide energy span from 0.5 to 10.829 MeV, and are sufficiently well-spaced to cover the efficiency curve from the low- to high-energy region; their intensity values (I_γ) are accurately defined in Proc. 4th Int. Symp. Neutron-capture Gamma-ray Spectroscopy and Related Topics, 1981. The resulting absolute efficiency curve is shown in Fig. 3.5.

3.3. NIST PGAA

The National Institute of Standards and Technology (NIST) Center for Neutron Research (NCNR) is centred on 20-MW research reactor that is cooled and moderated by D_2O [3.10]. This reactor operates on a seven-week cycle, with about 38 days of continuous operation between refuelling. Among the experimental facilities are two instruments for prompt gamma activation analysis (PGAA).

The thermal-neutron system was developed jointly by the University of Maryland and NIST, and has been in regular operation since 1978 [3.11, 3.12]. A vertical collimator extends 7 m down from the top of the reactor to the reactor midplane, with an external beam tube, beam stop and Ge detector with Compton suppressor; a 5-cm sapphire filter was added recently to reduce the background from fast neutrons and gamma rays. With the filter, the neutron fluence rate is 3.0×10^8 n cm^{-2} s^{-1} and the cadmium ratio is 160. All components of the system outside the reactor have recently been replaced, with a large reduction in the background for H, B, C and N [3.13]. Furthermore, the titanium sensitivity for the capture line at 1382 keV is 1120 counts s^{-1} g^{-1} in the current configuration (detector efficiency of 40% when located about 45 cm from the irradiated sample).

A second system has been developed for cold-neutron prompt gamma-ray activation analysis (CPGAA), and has been operational since December 1990 [3.14]. Significant modifications have been made to this system [3.15]: CPGAA spectrometer is located 41 m from the liquid-hydrogen cold-neutron source at the end of the lower half of neutron guide NG7. Neutrons are filtered through 127-mm Be and 203-mm single-crystal Bi (both at 77K), before emerging through a 0.25-mm thick Mg-alloy window. The upper half of this neutron beam continues past the prompt gamma-ray station to a 30-m small-angle neutron scattering (SANS) instrument. Walls of 30-cm thick steel shot surround the guide tube, and a shutter composed of ^{6}Li-enriched glass can be opened to admit neutrons to the prompt gamma-ray station [3.16]. The neutron beam is collimated to 20 mm or smaller, as required, by apertures of ^{6}Li glass located upstream from the sample, and unused neutrons are absorbed by a fixed beam stop of ^{6}Li glass. Samples can be irradiated in air, or within a 120-mm cubical magnesium-alloy box that can be evacuated or purged with helium. The CPGAA spectrometer is shown in Fig. 3.6, with the detectors in position.

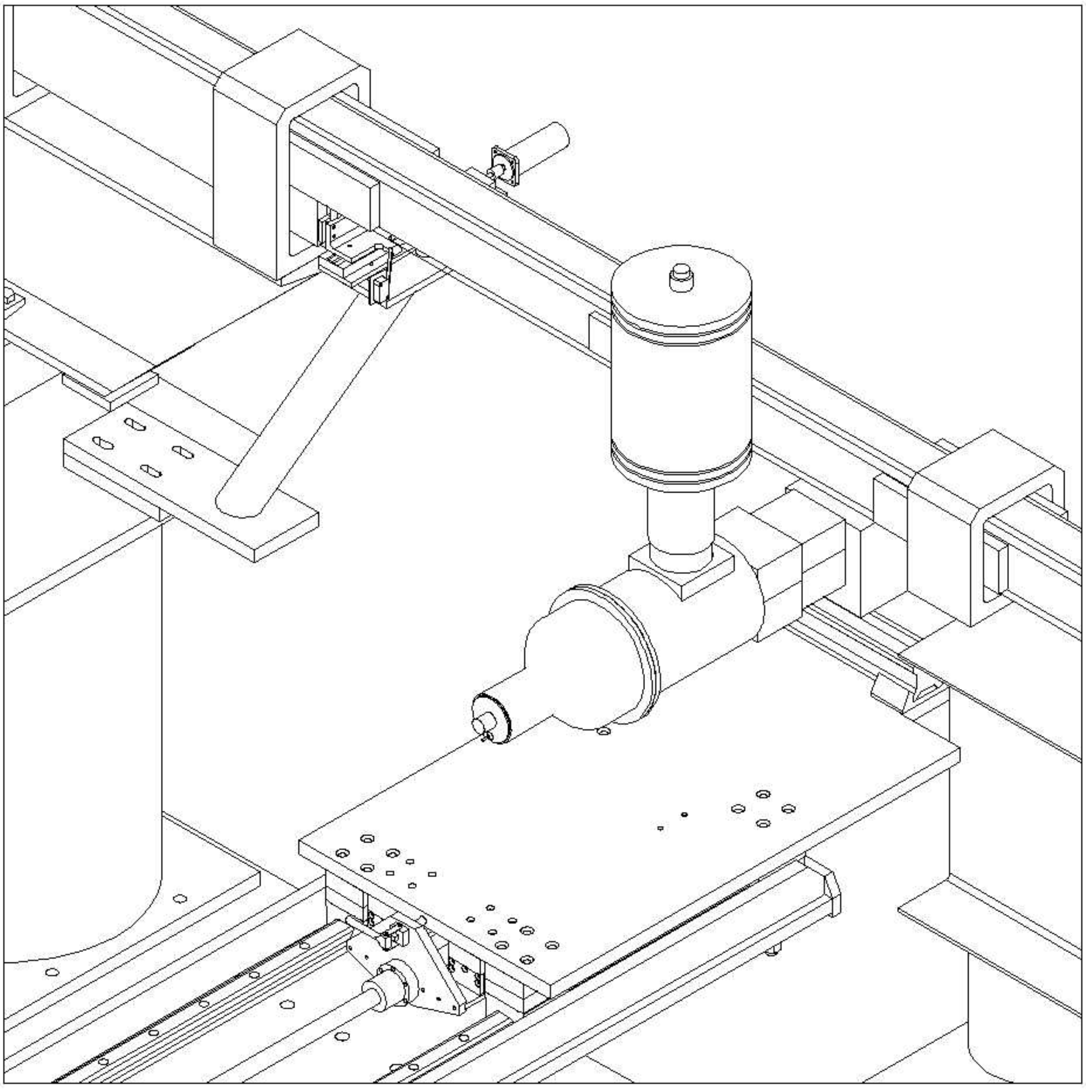

FIG.3.6 Isometric view of detectors in position with shielding removed.
The sample position is hidden by the gamma-ray collimator (rectilinear block in front of the horizontal BGO Compton detector), and the plate carrying the final neutron collimator, sample support, detectors and associated shielding is movable on the rails perpendicular to the neutron beam.

Prompt gamma rays are measured by a high-purity germanium detector (35% relative efficiency, 1.7 keV resolution) positioned vertically inside a horizontal bismuth germanate (BGO) Compton suppression detector at a distance of 35 cm from the sample. The detectors and their shielding are located on an aluminium plate carried on rails perpendicular to the neutron guide. Both the sample holder and neutron collimator are mounted on the same plate at a fixed position in front of the detector. Exchangeable lead apertures of different sizes placed between the detector and the sample allow variable collimation of the gamma-ray signal in order to balance detector efficiency with the field of view. A third-generation cold-neutron source was installed in early 2002 to give a thermal equivalent neutron fluence rate (reaction rate per atom divided by the 2200 m s^{-1} cross section) at the sample position of 9.5 × 10^8 n cm^{-2} s^{-1}, and titanium sensitivity of 7700 counts s^{-1} g^{-1} at 1382 keV.

Spectra up to 11 MeV can be measured in both the thermal- and cold-neutron PGAA system, using a digital signal processor on the cold-neutron system with Compton suppression electronics and Ethernet 16384-channel pulse height analyzers. Data reduction and spectral manipulation are accomplished by means of standard Canberra nuclear data software, the

HYPERMET program [3.4, 3.17], and an interactive algorithm SUM written at NIST [3.18].

Cold neutrons gain energy by scattering in hydrogenous samples at room temperature, and therefore the cross section for absorption depends on the sample temperature [3.19]. The thermal PGAA system is preferred for the analysis of materials such as biological tissues and foods, while the greater sensitivity and lower hydrogen background make the cold-neutron system advantageous for small samples and low concentrations.

3.4. Neutron capture gamma-ray facilities at the Budapest research reactor

The Budapest research reactor is a light-water moderated and light-water cooled reactor operating at 10 MW thermal power. Three neutron guides serve the external neutron beam facilities, and a liquid-hydrogen cold source was commissioned in early 2001.

The thermal-neutron prompt gamma activation analysis (PGAA) facility has been rebuilt, and includes a neutron-induced prompt gamma-ray spectrometer (NIPS) for a variety of experiments involving nuclear reaction-induced prompt and delayed gamma rays (including γ-γ-coincidences) [3.20-3.22]. A pneumatic beam shutter at the end of the guide tube allows the neutrons to enter the 3-m long evacuated aluminium tube that extends across the experimental area (3×5 m^2) to the beam stop at the rear wall of the guide hall (Fig. 3.7). This neutron beam can be divided into two separate beams of smaller diameter by appropriate collimation: the upper beam is used for PGAA measurements, while the lower beam is directed to the NIPS station.

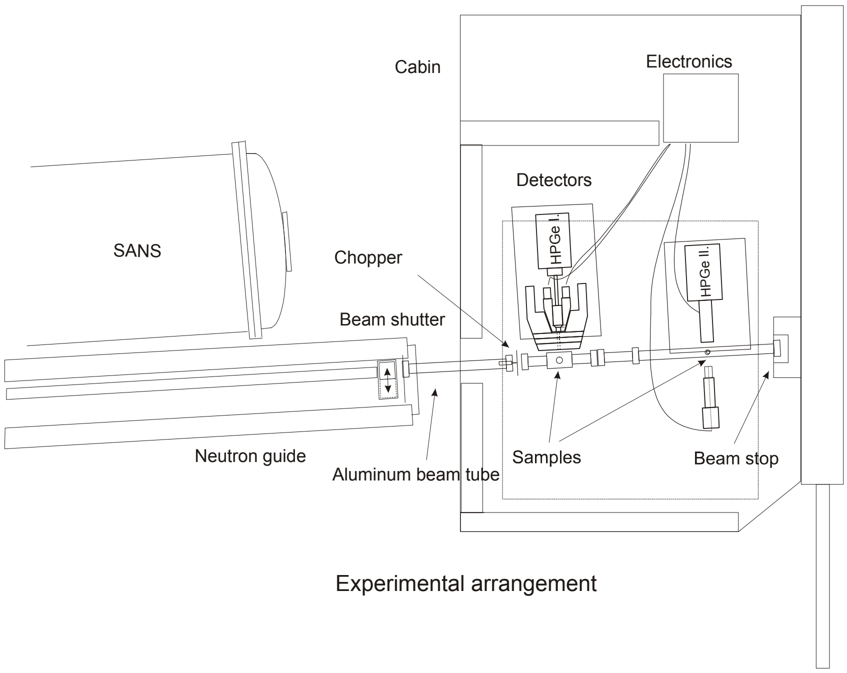

FIG. 3.7 PGAA-NIPS experimental area [3.20].

The PGAA target chamber is located at a distance of 1.5 m from the end of the guide tube, and targets are suspended on a thin aluminium frame by fine Teflon strings. Vacuo, ^{4}He or other gaseous atmospheres can be maintained inside the sample box to decrease the background radiation induced by the neutrons. Furthermore, a neutron absorber layer can be placed in the horizontal plane to prevent scattering from the lower beam to the PGAA sample.

NIPS is positioned a further 1 m from the PGAA station, and is shielded with lead bricks to minimize the background radiation that originates from other measurements. The aluminium tubing and NIPS chamber are sufficiently narrow for several detectors to be placed close to the irradiated sample.

All three sections of aluminium tube can be easily removed if necessary, so that samples larger than the target chamber can be studied. A beam chopper is also provided for specific experimental investigations.

3.4.1. Beam characteristics

The thermal-equivalent neutron flux achieved at the old PGAA facility was 2×10^6 n cm^{-2} s^{-1} [3.22]; fluxes at the sample positions of the new cold-neutron PGAA and NIPS facilities are 5×10^7 and 3×10^7 n cm^{-2} s^{-1}, respectively [3.20]. Both beams are individually collimated to give a cross section of 2×2 or 1×1 cm^2. The neutron flux profile at the PGAA sample position is shown in Fig. 3.8

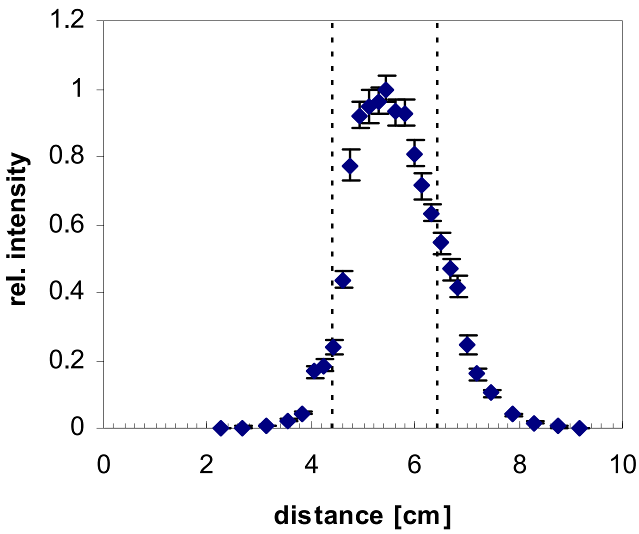

FIG. 3.8 Neutron flux profile at the sample position of the PGAA facility [3.21].

3.4.2. PGAA instrumentation

An n-type high-purity germanium (HPGe) detector with closed-end coaxial geometry is normally used in the PGAA facility, along with a BGO-scintillator guard detector annulus surrounded by 10-cm thick lead shielding [3.21, 3.22]. This complete system is positioned on a movable table. By removing the three lead disks in front of the detector, the HPGe detector can be placed 12 cm from the target, and as close as 3 cm by simply using the bare detector. The BGO annulus and catchers around the HPGe detect most of the scattered gamma photons. Connecting the HPGe and BGO in anticoincidence mode results in the accumulation of Compton-suppressed spectra.

Table 3.3 Main specifications of PGAA facility, Budapest research reactor [3.20].

Beam tube	NV1 guide, end position
Distance from guide end	1.5 m
Beam cross section	1×1 cm^2 or 2×2 cm^2
Thermal-equivalent flux at target	$\approx 5\times10^7$ cm^{-2} s^{-1}
Vacuum in target chamber (optional)	≈ 1 mbar
Target chamber Al-window thickness	0.5 mm
Form of target at room temperature	solid/powder/liquid/gas (pressurized chamber)
Target packing at atmospheric pressure	sealed FEP Teflon bag or vial
Activity of target after irradiation	negligible
Largest target dimensions	$4 \times 4 \times 10$ cm^3
γ-ray detector	n-type coaxial HPGe with BGO shield
Distance from target to detector window	23.5 cm
HPGe window	0.5 mm Al
Relative efficiency	25% at 1332 keV (^{60}Co)
FWHM	1.8 keV at 1332 keV (^{60}Co)
Compton suppression enhancement	≈ 5 (1332 keV) to ≈ 40 (7000 keV)

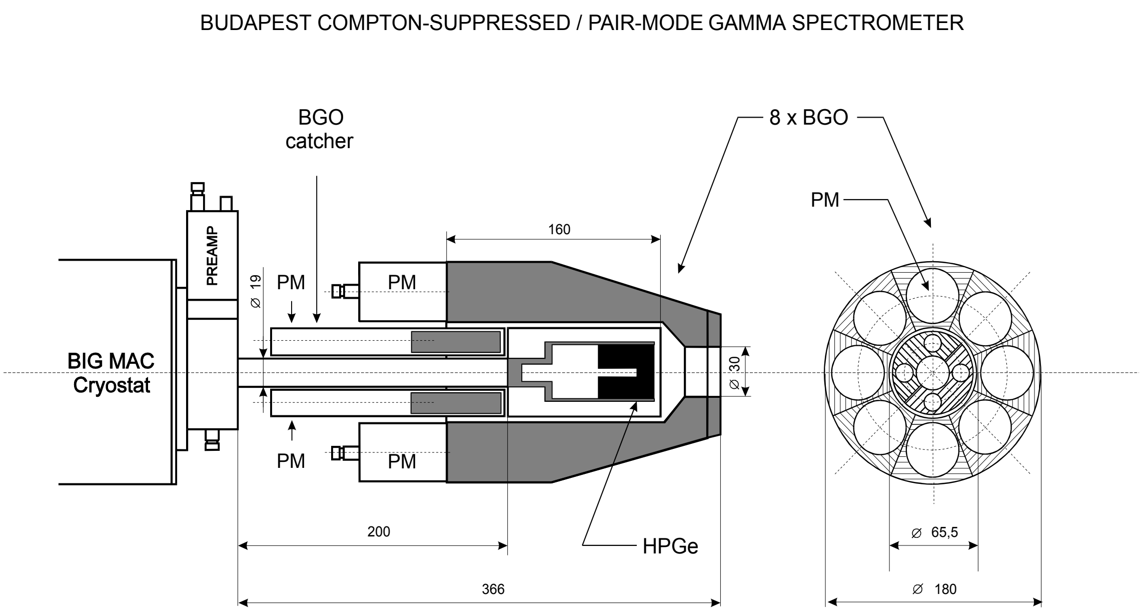

FIG. 3.9 Cross section of HPGe-BGO gamma-ray spectrometer [3.22].

With appropriate electronic gating, the HPGe-BGO gamma-ray spectrometer can also be used in annihilation-pair mode to simplify the spectra at high energies [3.22]. A 16k PC-based multichannel analyzer collects the resulting data. The HPGe-BGO detector assembly is shown in Fig. 3.9, and the operational characteristics of the PGAA system are listed in Table 3.3. A Compton-suppression ratio of about 5 can be achieved for the 1332 keV gamma-ray emission of ^{60}Co (although this ratio is much larger for higher-energy gamma rays, as can be seen in Fig. 3.10).

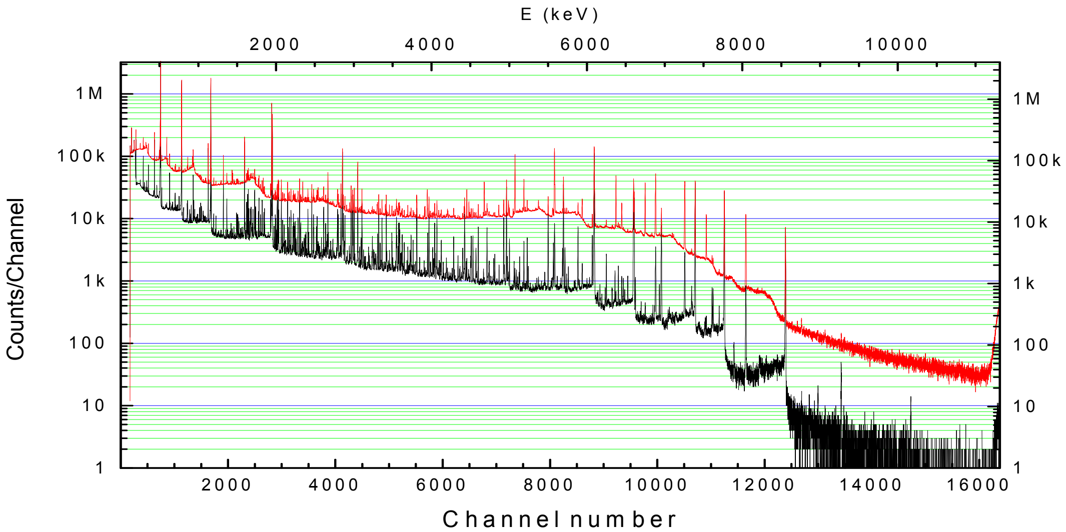

FIG. 3.10 Normal (upper) and Compton-suppressed (lower) spectra of CCl_4 sample.

3.4.3. Detection efficiency and system non-linearity

The energy and intensity calibration of the γ-ray spectrometer system is important for both nuclear spectroscopic and analytical experiments. However, this essential procedure becomes problematic when the energy of interest is greater than the highest gamma-ray energy of the ^{56}Co calibrant source. The counting efficiency has been accurately determined over the energy range of 50 keV to 10 MeV using several multi γ-ray sources and (n, γ) reactions in order to avoid this difficulty. The accuracy of the efficiency function is better than 1% from 500 keV to 6 MeV [3.22]. Fig. 3.11 shows the absolute full-energy peak efficiency for a target-to-detector distance of 23.5 cm, with the single- and double-escape peak efficiencies also included.

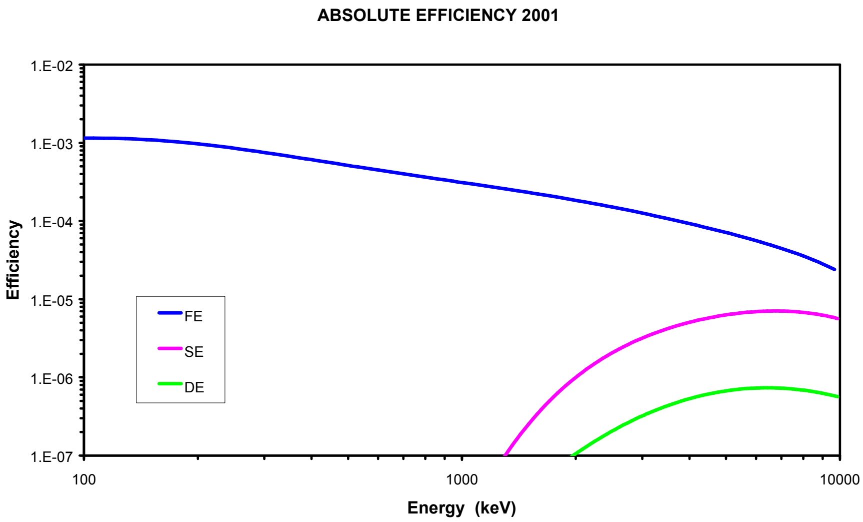

FIG. 3.11 Efficiency of PGAA spectrometer in Compton-suppressed mode (FE–full energy; SE-single escape; DE–double escape peak).

When constructing the non-linear energy function, long-term instabilities of the system may result in peak shifts and create inconsistencies between independent measurements. Therefore, a non-linear calibration procedure has been introduced to overcome this problem that uses radioactive sources and capture gamma rays with well-known energies [3.6]. When the non-linear function is combined with the normal linear energy calibration for strong gamma-ray peaks, an energy precision of between 0.01 and 0.1 keV can be achieved depending on the statistics. The non-linearity functions are regularly determined at the beginning of each period of reactor operation.

3.4.4. Data acquisition and analysis

A Canberra S100-type single-input, PC-based multichannel analyzer (MCA) has been used to collect PGAA spectra. However, a digital spectrum analyser will soon be installed to achieve a much higher input rate without any substantial deterioration in the spectral resolution.

Gamma-ray spectra from neutron capture are extremely complex, and therefore a high-quality fitting code has been developed for the data analysis [3.23]. HYPERMET-PC is an interactive, non-linear fitting code that evolved from the spectrum evaluation program HYPERMET. The PC version has user-friendly graphics and a database to store the fitted regions, as well as quality assurance, calibration and nuclide identification modules. Peak energies and intensities that result from the fitting process can be corrected within the program for non-linearity and detector efficiency, respectively. Element identification on the basis of peak energies is also possible with the help of the built-in library.

3.5. Prompt gamma-ray neutron activation analysis at Bhabha Atomic Research Centre (BARC)

Initial PGAA studies at BARC were carried out using a guided-beam facility, and subsequent improvements included the installation of a reflected beam. A dedicated beam line is currently being developed. Brief descriptions of these systems are given in below.

3.5.1. PGAA systems

The thermal guided-beam facility in the 100 MW Dhruva reactor at BARC, Trombay has been used for PGAA. A beam tube was used to guide and transport the neutrons about 30 m away from the reactor core to a temporary experimental facility (beam of cross section 2.5 × 10 cm^2). 1-cm thick boron carbide sheet minimized the neutrons scattered towards the detector, except when boron was contained within the sample for analysis. The γ-ray detector was located about 40 cm from the irradiated sample, and was provided with 30-cm thick lead shielding to reduce the background radiation. A lead collimator (3 cm diameter and 30 cm length) was placed in front of the detector to control the gamma rays emitted from the sample. The layout of this PGAA system is shown in Fig. 3.12.

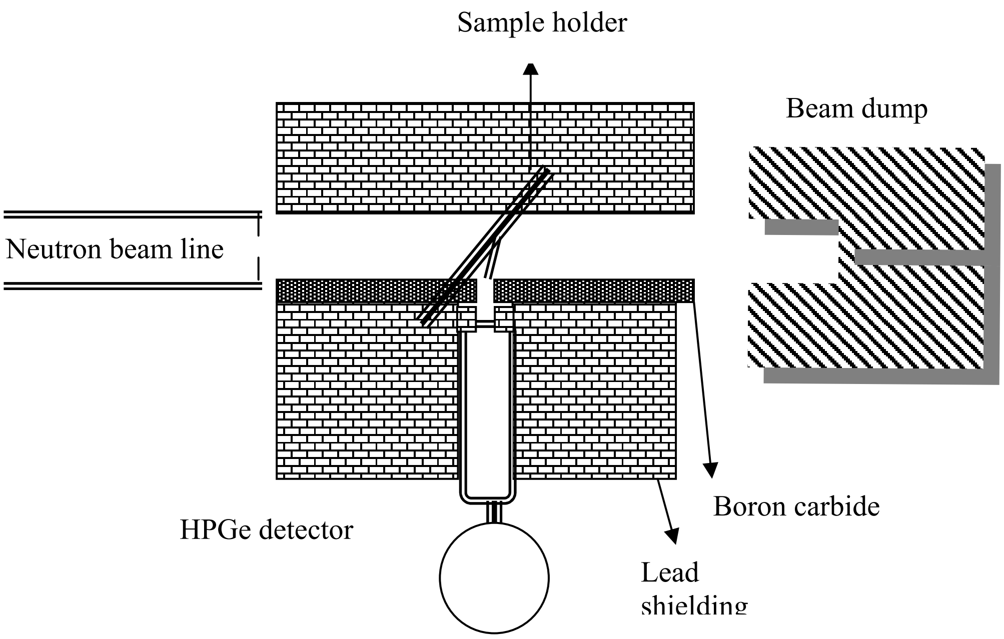

FIG. 3.12 PGAA arrangement at BARC.

The effective thermal neutron flux at the sample irradiation position has been measured by means of In foils, while the cadmium ratio method was used to determine the sub-cadmium to epithermal flux ratio. An In foil (110 mg cm^{-2}) was irradiated with and without a covering of cadmium (0.8-mm thick), followed by off-line counting of ^{116m}In by means of 15% relative efficiency HPGe detector coupled to a 4k multichannel analyzer (MCA). The sub-cadmium to epithermal neutron flux ratio was found to 3.45×10^4, indicating that more than 99.99% of the neutron beam consisted of thermal neutrons at the irradiation position. $Q_o(I_0/\sigma_0)$ value of 16.8 was derived from ^{116m}In gamma rays (E_γ of 1097 and 1293 keV), and used to estimate a total neutron flux of $(1.4 \pm 0.1) \times 10^7$ n cm^{-2} s^{-1} [3.24]. The In foil was estimated to attenuate the beam by as much as 8%, which affected the cadmium ratio. However, this effect does not impact on the k_0 values or elemental analyses based on this method.

3.5.2. Sample irradiation and data acquisition

Samples weighing between 100 and 500 mg were wrapped in thin Teflon tape and placed at 90° with respect to the beam direction. Care was taken to ensure that the sample size was significantly less than the beam dimensions. 22% relative efficiency HPGe detector connected to a PC-based 8k MCA was used to assay the prompt gamma rays, with a resolution of 2.4 keV at 1332 keV.

3.5.3. Energy calibration and peak area analysis

The MCA has been calibrated from 0.1 to 8.5 MeV by means of the delayed gamma rays of ^{152}Eu and ^{60}Co, and prompt gamma rays of ^{36}Cl and ^{49}Ti. Non-linearity over this energy range was not significant, and therefore a second-order polynomial was used for the energy calibration. The Lone et al. compilation of capture gamma rays was used to identify the prompt gamma-ray emissions of the different elements [3.25].

Photopeak areas in the gamma-ray spectra were determined using the PHAST-2.6 code developed in Electronics Division, BARC [3.26]. This software can be used to derive energy

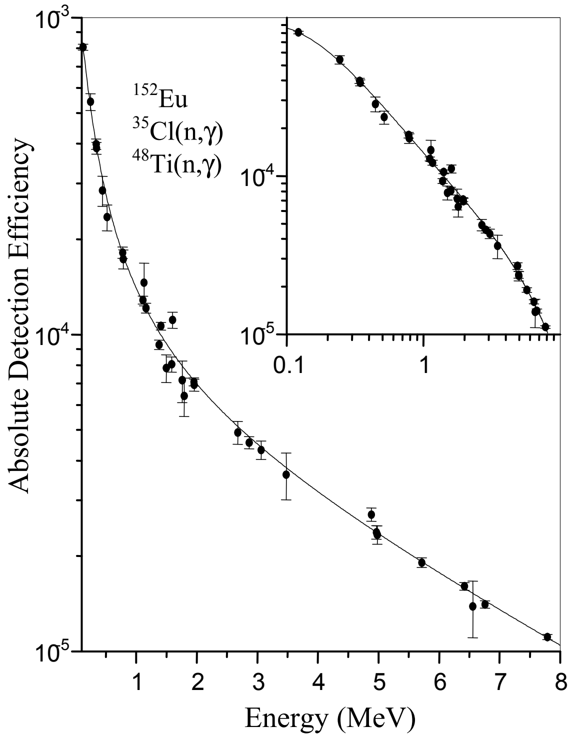

FIG. 3.13 Absolute detection efficiency of PGAA system at BARC.

calibrations and determine spectral shape parameters. A second-order polynomial was used to calibrate the width (FWHM) of the photopeaks, and the measured FWHM and shape parameters as functions of energy were subsequently used to identify multiplets and undertake their deconvolution.

3.5.4. Efficiency calibration

Delayed gamma rays from ^{152}Eu and prompt gamma rays from ^{36}Cl and ^{49}Ti were used for absolute/relative efficiency calibrations of the detector over a wide energy range from 100 keV to 10 MeV. The absolute gamma-ray abundances of ^{36}Cl and ^{49}Ti were obtained from the literature [3.9, 3.27]. Ammonium chloride packed in Teflon was irradiated for about 12 hours, and capture gamma-ray spectra were accumulated. Absolute full-energy peak efficiencies were determined for the lower energy region (i.e., up to 1500 keV) using the gamma-ray spectrum of ^{152}Eu, and the relative efficiency plot from 0.5 to 8 MeV was obtained from the prompt gamma-ray spectra of ^{36}Cl and ^{49}Ti. Relative efficiencies were converted to absolute values using the overlap with equivalent ^{152}Eu data.

Efficiencies as a function of gamma-ray energy (E_γ) were fitted to a fifth-order polynomial using Equation (1):

$$(\ln \varepsilon)_{E_\gamma} = k_j + \sum_{i=0}^{5} a_i (\ln E_\gamma)^i \qquad (1)$$

where a_i are the coefficients of the polynomial, and k_j is the normalization constant for the jth gamma-ray emitting nuclide used in the efficiency calibration. The number of free parameters used to fit the efficiency data are $(6 + (n - 1))$, where n is the number of radionuclides whose gamma-ray emissions have been used in the fitting procedure. A standard non-linear least squares program was used in which the peak areas of the gamma rays from each specific nuclide are fitted with a particular constant k_j so that the relative efficiency curves from different radionuclides are normalized with respect to the absolute efficiency determined from ^{152}Eu. The efficiency of the PGAA system at BARC is shown in Fig. 3.13 (insert shows the efficiency on logarithm scale).

3.5.5. New beam facility at Dhruva reactor

Another PGAA system has been established at the Dhruva reactor (BARC), using a reflected neutron beam that is normally applied to neutron diffraction experiments. The tangential beam of neutrons is reflected by a graphite crystal towards the PGAA experimental facility (neutron energy of 0.05 eV, and composed mainly of first-order reflection). Neutron beam characteristics have been determined in terms of dimensions, homogeneity and thermal equivalent flux. A Gd-loaded neutron radiographic film was held in the beam path to measure a neutron beam area of 2.5 × 3.5 cm^2. The neutron flux profile was obtained by irradiating Au foil (40 mm × 40 mm) for 48 hours in the beam, cutting the foil into 64 squares (5 mm x 5 mm), and then measuring the activity.

Separate shielding has been placed in front of the detector: 8 cm × 8 cm × 30 cm collimator was located inside a lead shield of 30 cm × 30 cm × 60 cm. Graded shielding was also used around the detector. Samples are held in quartz containers placed in front of the collimator and within the path of the neutron beam. Compared to the earlier PGAA system, the background in the newer facility has been reduced by a factor of two. The same data acquisition system is used as previously, and the procedures followed for the energy and efficiency calibrations are identical. Fig. 3.14 shows the efficiency calibration of the new facility presented as both logarithm and linear scales.

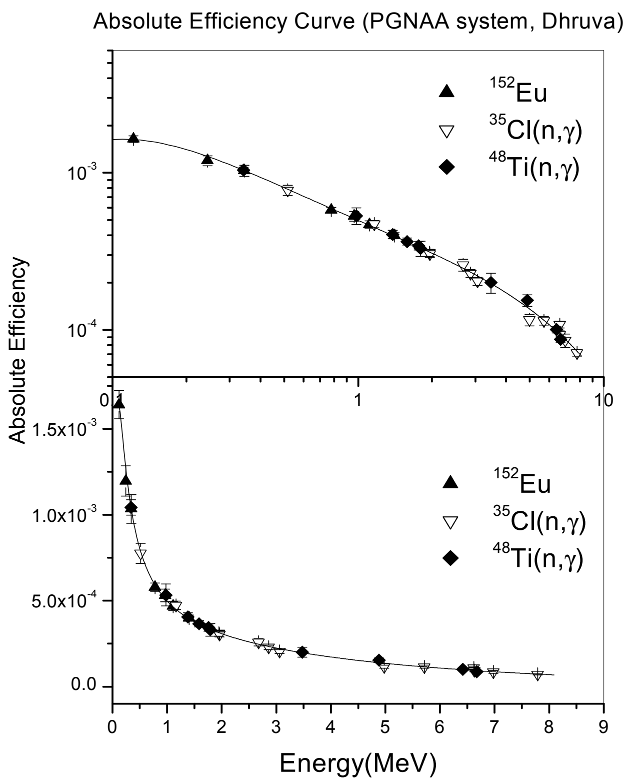

FIG. 3.14 Detection efficiency as a function of energy, PGAA system, BARC.

3.6. Summary of experimental facilities

The most important performance characteristics of any PGAA facility are the thermal equivalent neutron flux and the associated neutron spectrum, gamma-ray detection sensitivity, and achieving low background. Other essential features included the method and quality of the calibrations and spectral analyses. The main characteristics of the facilities associated with the present CRP are summarized in Table 3.4. These comparative data show that the development of an excellent performance feature for a particular facility is usually achieved at the expense and degradation of other features. While improved characteristics can be achieved in various ways, the best performance is often achieved by considering conditions at the site and tailoring the facility design accordingly, and by improving operational characteristics gradually during the course of the various work programmes.

Table 3.4 Main characteristics of the PGAA facilities in the CRP.

Facility	Characteristics
SNU-KAERI	Thermal beam extraction: diffraction (pyrolytic graphite) Beam flux: 8.2×10^7 n cm^{-2} s^{-1} (thermal equivalent) Beam size: 2×2 cm^2 Cd-ratio: 266 (for gold) Effective temperature: 269K Ti (1382 keV) sensitivity: 2020 counts s^{-1} g^{-1} Detection system: single HPGe with pulse processing system Total background counting rate: 3000 counts s^{-1}
Dalat Research Reactor	Thermal beam extraction: moderation (graphite) and filtering (Bi) Beam flux: 2.1×10^7 n cm^{-2} s^{-1} Beam size: 2.5 cm Cd-ratio: 21 (for gold) Detection system: single HPGe with pulse processing system
NIST (Thermal)	Thermal beam extraction: filtering (sapphire) Beam flux: 3.0×10^8 n cm^{-2} s^{-1} Cd-ratio: 160 Effective temperature: 300K Ti (1382 keV) sensitivity: 890 counts s^{-1} g^{-1} Detection system: HPGe and Compton suppression electronics
(Cold)	Cold beam extraction: filtering (Be, Bi) and mirror guide Beam flux: 9.5×10^8 n cm^{-2} s^{-1} (thermal equivalent) Beam size: 2 cm or smaller Effective temperature: 14K Ti (1382 keV) sensitivity: 7700 counts s^{-1} g^{-1} Detection system: HPGe and Compton suppression electronics
Budapest Research Reactor	Cold beam extraction: mirror guide Beam flux: 5×10^7 n cm^{-2} s^{-1} (thermal equivalent) Beam size: 1×1 cm^2 or 2×2 cm^2 Effective temperature: ~ 60K Ti (1382 keV) sensitivity: 750 counts s^{-1} g^{-1} Detection system: HPGe and Compton suppression electronics
BARC (Thermal 1)	Thermal beam extraction: mirror guide Beam flux: 1.4×10^7 n cm^{-2} s^{-1} (total) Beam size: 2.5×10 cm^2 Cd-ratio: 3.4×10^4 (for indium) Detection system: single HPGe with pulse processing system
(Thermal 2)	Thermal beam extraction: diffraction (graphite) Beam flux: 1.6×10^6 n cm^{-2} s^{-1} (thermal equivalent) Beam size: 2.5×3.5 cm^2 Detection system: single HPGe with pulse processing system

3.7. Experiments

The largest amount of new PGAA data has come from the Institute of Isotope and Surface Chemistry, Budapest, Hungary. Neutron capture reactions on all naturally-occurring elements except the four noble gases have been studied by means of the guided thermal-neutron beam PGAA facility at the Budapest Research Reactor (i.e., 79 elements from H to U). The $^{10}B(n, \alpha\gamma)$ reaction on natural boron has also been measured. These results are described below.

A thermal guided beam was used for PGAA experiments at the Bhabha Atomic Research Centre (BARC), India. Activities concentrated on the experimental determination of prompt k_0-factors with respect to the 1951-keV gamma-ray emission from the $^{35}Cl(n, \gamma)^{36}Cl$ reaction using a mixture of ammonium chloride and other stoichiometric compounds [3,28, 3.29]. The emission probabilities of capture gamma rays from ^{60}Co were also determined [3.29, 3.30].

The Seoul National University-KAERI PGAA system was used in Korea to measure the prompt k_0-factors for the major non-1/*v* nuclides, and to determine the corresponding effective g-factors for their polychromatic diffracted neutron beam [3.7].

Vietnam Atomic Energy Commission has supported Dalat measurements of prompt k_0-factors for a number of elements with respect to the 1951-keV gamma-ray emission from chlorine, using a filtered thermal neutron beam [3.31]. The reliability of these k_0-factors has been tested on all facilities for a number of applications.

The Budapest group has measured partial cross sections for the elements. As the other CRP participants have measured only k_0-factors with respect to the 1951-keV chlorine line, comparison with the adopted set and the new Budapest data is only possible for the similar inferred k_0-factors. Available data are compared in Table 3.5 with the adopted set from the CRP and the new Budapest data [3.32]. Data from the NIST-University of Maryland thermal-beam facility [3.33], as well as recent data obtained in thermal and cold guided beams at the Japan Atomic Energy Research Institute (JAERI) [3.34, 3.35], are also included in order to assess the possible dependence on neutron beam characteristics.

The data in Table 3.5 show that the agreement is generally good for 1/v nuclides at the quoted uncertainty level. Furthermore, it is especially gratifying to observe that the very precise JAERI data corroborate the adopted values, as do the new Budapest data. Moreover, the cold neutron data from JAERI agree well with similar data from NIST and with the thermal data, supporting the 1/*v* form of the cross sections. The only exceptions are the well-known cases discussed in Chapter 2: ^{113}Cd, ^{149}Sm and $^{155,\,157}Gd$ for which the g-factor deviates strongly from unity.

Table 3.5 Comparison of library $k_{0,Cl}$-factors with other measurements for the most prominent γ rays of selected elements.

Z	Target Isotope	E(dE)	Adopted	Dalat thermal beam [3.31]	BARC thermal guide [3.28]	SNU diffraction beam [3.7]	NIST- thermal beam [3.33]	JAERI thermal guide [3.34, 3.35]	NIST cold guide [3.33]	JAERI cold guide [3.34, 3.35]	Budapest thermal guide [3.32]
1	1-H	2223.25	1.848(11)		1.800(16)		2.00(10)	1.80(6)	2.05(11)	1.86(6)	1.803(10)
3	7-Li	2032.30(4)	0.0307(8)	0.0230(5)[*]							
5	10-B	477.595(3)	369.5(23)		312(22)			371(31)		380(32)	360(3)
6	12-C	1261.765(9)	0.000579(15)	0.00041(1)[*]				0.000573(5)		0.000551(6)	0.000546(9)
	12-C	4945.301(3)	0.001218(25)					0.00124(3)		0.001160(17)	0.001192(13)
7	14-N	1884.821(16)	0.00588(8)	0.00567(11)				0.005800(13)		0.005890(18)	0.00569(4)
11	23-Na	472.202(9)	0.1165(11)				0.105(4)	0.11600(41)	0.105(4)	0.1160(25)	0.1181(13)
12	25-Mg	585.00(3)	0.0072(3)				0.0065(2)		0.0064(3)		
13	27-Al	1778.92(3)	0.0482(10)				0.0467(18)	0.0440(4)	0.0463(21)	0.0433(14)	0.0472(9)
14	28-Si	2092.902(18)	0.00660(13)	0.00603(11)							
	28-Si	3538.966(22)	0.0237(4)				0.0214(7)	0.02180(10)	0.0216(9)	0.02110(11)	0.0231(5)
15	31-P	636.663(21)	0.0056(3)					0.00572(9)		0.00570(9)	0.0055(3)
16	32-S	840.993(13)	0.0606(11)	0.0603(15)			0.0558(18)	0.0554(10)	0.0562(23)	0.0570(12)	0.0608(13)
17	35-Cl	786.3020(10)	0.540(3)		1.30(3)[&]		1.28(6)[&]	1.330(45)[&]	1.26(7)[&]	1.350(44)[&]	
	35-Cl	788.4280(10)	0.856(9)		1.30(3)[&]		1.28(6)[&]	1.330(45)[&]	1.26(7)[&]	1.350(44)[&]	
	35-Cl	1951.1400(20)	1	1	1	1		1		1	1
19	39-K	770.3050(20)	0.1294(18)		0.116(4)		0.126(4)	0.127(4)	0.122(5)	0.128(4)	0.127(3)
20	40-Ca	1942.67(3)	0.0492(10)		0.045(2)		0.0461(16)	0.047(2)	0.0459(19)	0.0464(16)	0.0463(14)
22	48-Ti	341.706(5)	0.215(3)		0.187(6)[*]			0.211(3)		0.2250(16)	
	48-Ti	1381.745(5)	0.606(15)	0.433(10)[*]	0.604(13)		0.582[@]	0.582(6)	0.591[@]	0.591(6)	0.591(7)
	48-Ti	1585.941(5)	0.0730(10)		0.056(3)[*]						
24	50-Cr	749.09(3)	0.0614(10)		0.065(8)			0.0562(20)		0.0601(25)	
	50-Cr	834.849(22)	0.149(3)		0.138(8)			0.141(5)		0.142(5)	0.145(2)
	50-Cr	7938.46(23)	0.0457(11)		0.048(3)						
25	55-Mn	314.398(20)	0.1488(22)					0.152(5)		0.149(8)	0.150(3)
26	56-Fe	352.347(12)	0.0274(3)				0.0253(9)	0.0273(10)	0.0248(10)	0.0269(11)	
	56-Fe	7631.136(14)	0.0654(13)					0.0568(24)[*]		0.0537(27)[*]	0.0676(14)

Table 3.5 Cont.

Z	Target Isotope	E(dE)	Adopted	Dalat thermal beam [3.31]	BARC thermal guide [3.28]	SNU diffraction beam [3.7]	NIST- thermal beam [3.33]	JAERI thermal guide [3.34, 3.35]	NIST cold guide [3.33]	JAERI cold guide [3.34, 3.35]	Budapest thermal guide [3.32]
27	59-Co	229.879(17)	0.682(8)		0.58(4)			0.67(2)		0.664(22)	0.702(8)
	59-Co	277.161(17)	0.643(8)		0.55(4)*			0.619(21)		0.615(21)	
	59-Co	555.972(13)	0.547(6)		0.46(3)*			0.516(18)	0.460(12)*	0.509(20)	
	59-Co	1515.720(25)	0.165(3)		0.186(6)*						
	59-Co	1830.800(25)	0.1616(24)		0.19(1)*						
	59-Co	6485.99(3)	0.220(6)		0.185(15)*						
	59-Co	7214.42(3)	0.131(3)		0.156(6)*						
28	58-Ni	464.978(12)	0.0804(10)				0.075(3)	0.081(3)	0.074(3)	0.0811(28)	0.0781(9)
29	63-Cu	278.250(14)	0.0787(14)		0.068(4)			0.077(3)		0.0762(25)	0.0831(9)
	63-Cu	384.45(5)	0.00617(13)		0.019(1)&			0.0174(7)&		0.0166(6)&	
	65-Cu	385.77(3)	0.01155(18)		0.019(1)&			0.0174(7)&		0.0166(6)&	
	63-Cu	7306.93(4)	0.0283(15)		0.0261(14)						
37	85-Rb	556.82(3)	0.00599(17)	0.00210(5)*							
38	87-Sr	898.055(11)	0.0449(8)					0.042(2)		0.0425(14)	0.0434(6)
	87-Sr	1836.067(21)	0.0658(12)								0.0634(7)
49	113-Cd#	558.32(3)	92.6(16)		41(2)*	90(6)	132(7)*	81(2)	66(4)*	61.5(1.5)*	90.7(11)
55	133-Cs	116.3740(20)	0.059(6)					0.172(6)&		0.172(6)&	
	133-Cs	116.612(4)	0.061(6)					0.172(6)&		0.172(6)&	
	133-Cs	307.015(4)	0.0612(13)					0.0692(25)*		0.0711(26)*	0.0546(7)*
56	138-Ba	627.29(5)	0.01200(25)		0.0106(3)			0.0111(4)		0.0108(4)	
	135-Ba	818.514(12)	0.00865(17)		0.012(2)*						
	137-Ba	1435.77(4)	0.0126(3)		0.011(1)			0.0118(4)		0.0118(4)	
62	149-Sm#	333.97(4)	178.4(24)	188(4)		172(14)	339(18)*	131(9)*	111(7)*	116(1)*	178(2)
63	151-Eu#	89.847(6)	52.7(11)			46(3)					
64	157-Gd#	181.931(4)	257(11)			277(15)	222(12)	255(3)	236(13)	214(1)*	267(6)
	155-Gd#	199.2130(10)	71.9(23)			68(5)					
	157-Gd#	944.174(10)	110.0(25)	162(3)							

Table 3.5 Cont

Z	Target Isotope	E(dE)	Adopted	Dalat thermal beam [3.31]	BARC thermal guide [3.28]	SNU diffraction beam [3.7]	NIST- thermal beam [3.33]	JAERI thermal guide [3.34, 3.35]	NIST cold guide [3.33]	JAERI cold guide [3.34, 3.35]	Budapest thermal guide [3.32]
	155-Gd#	1187.120(21)	12(4)		111(4)&*	105(6)&*					
	157-Gd#	1187.122(9)	51(3)		111(4)&*	105(6)&*					
73	181-Ta	402.623(3)	3.29(8)	0.156(3)*							
80	199-Hg	367.947(9)	7.00(15)		5.8(3)			7.11(26)		7.01(14)	6.82(12)
	199-Hg	1693.296(11)	1.57(5)		1.37(8)			1.41(5)		1.40(5)	
	199-Hg	5967.02(4)	1.74(4)								1.43(6)*
82	207-Pb	7367.78(7)	0.00370(8)					0.00338(6)		0.00329(3)	0.00361(8)

* Value deviates significantly from Adopted Value.
& Doublet line.
# Non 1/*v* nuclide.
@ Normalizing transition - set equal to corresponding JAERI value.

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4. BENCHMARKS AND REFERENCE MATERIALS

R.M. Lindstrom

Two sets of sample materials were sent to the experimentalists within the CRP to aid in characterizing each neutron beam and detector system, and to analyze an unknown sample.

The first set of samples comprised the following:

- 99.65% titanium foil, 0.25-mm thick: 2.5-cm square, and 6- and 13-mm disks;
- Gold foil, 0.025-mm thick by 5-mm diameter;
- Borophosphosilicate glass on silicon: ~ 5 x 10^{16} atoms ^{10}B cm^{-2} (surface density measured by neutron depth profiling);
- ^{10}B-aluminum alloy sheet, 1.3-mm thick and 4.5 wt % ^{10}B as two ~ 2.5 cm squares;
- Approximately 2 g of an “unknown” mixture of aluminosilicate and graphite.

The titanium foil was used to measure the sensitivity of the PGAA system (i.e., the product of neutron flux and detector efficiency, expressed as the count rate per milligram of Ti of the 1381.5-keV capture gamma ray of ^{48}Ti). The effective velocity or wavelength of the beam can be measured by means of the boron samples, as described below. Excel spreadsheets for flux and wavelength were also developed and made available on the IAEA server; as illustrated below.

The unknown sample was distributed in order to demonstrate the participants’ ability to perform quantitative analysis. This material was made by blending dried and weighed quantities of two NIST fly ash Standard Reference Materials (SRMs 1633a and 1633b) with spectroscopic graphite as a diluent in a mixer mill. The participants were not informed about the constituents, or their proportions. The known values of eleven elements were calculated from the SRM certificates or from published consensus numbers. Unfortunately for the comparison, the concentrations of hydrogen and boron reported by all three participants are not known in SRM 1633b, so the “correct” value of these elements is unknown as well.

4.1. Characterization of the neutron beam

Foil activation is the simplest and perhaps the most accurate method of measuring the neutron flux [4.1]. A known mass of a monitor element is irradiated for a known time and the resulting radioactivity measured with a detector of known efficiency. If the reaction rate per atom ($R = \sigma\phi$) is calculated with the 2200 m s^{-1} thermal cross section (for example, σ_0 = 98.65 b for ^{198}Au production), the thermal equivalent flux (ϕ_0) can be determined. Epithermal flux is often measured by irradiating a bare monitor and another specimen of the same monitor under 1-mm shielding of cadmium, as described in Section 2.2.2. Fast-neutron (MeV) monitoring is similar, using threshold reactions that cannot be induced by slow neutrons, such as ^{54}Fe(n, p)^{54}Mn [4.2].

The effective temperature (or wavelength) is a useful single parameter that has been devised to characterize a neutron beam in the thermal and subthermal energy region where most analytically useful reactions take place. This basic concept involves measuring the reaction rate of a thin sample (proportional to the temperature-sensitive effective cross section), and comparing with the total flux incident on a “black” sample [4.3]. One approach involves the adoption of the same element for both samples, negating the need to determine the detector efficiency, but resulting in a large difference in count rate.

When the effects of neutron absorption and scattering can be neglected, the neutron capture rate (R) of a given element in an irradiated sample is proportional to the product of the number of atoms in the beam (N) and the neutron flux (ϕ), defined as the number of neutrons entering the sample per unit area per unit time:

$$R = N\phi\langle\sigma\rangle \tag{1}$$

where the effective cross section ($<\sigma>$) is the constant of proportionality.

For a thin sample of area S with a known surface density D atoms cm^{-2} of the target species, $N = DS$, and therefore the counting rate C for a detection efficiency ε counts per capture is given by the equation:

$$C_{thin} = \varepsilon R_{thin} = \varepsilon SD\phi\langle\sigma\rangle \tag{2}$$

However, for a thick "black" sample of the same material, every neutron is captured, and the reaction rate is:

$$C_{thick} = \varepsilon S\phi \tag{3}$$

If thick and thin samples are identically irradiated (same sample area (S) and capture-gamma detection efficiency (ε)), the ratio of counting rates is given by:

$$\frac{C_{thin}}{C_{thick}} = \frac{\varepsilon SD\phi\langle\sigma\rangle}{\varepsilon S\phi} \tag{4}$$

from which the effective cross section can be derived:

$$\langle\sigma\rangle = \frac{C_{thin}}{D \cdot C_{thick}} \tag{5}$$

For a *1/v* absorber for which the cross section is inversely proportional to the neutron velocity, the effective velocity $<v>$ is defined as:

$$\langle v\rangle = v_0\frac{\sigma_0}{\langle\sigma\rangle} \tag{6}$$

where by convention $v_0 = 2200$ m s^{-1}. The corresponding effective wavelength is defined as

$$\langle\lambda\rangle = \frac{h}{m \cdot \langle v\rangle} \tag{7}$$

where h is Planck’s constant, and m is the neutron mass. A spreadsheet in which these calculations can be performed is displayed below.

Neutron Beam Wavelength Measurement

Sample	Live time, s	Clock time, s	Dead time	count/s B @478	1s uncert
Thick boron	***340.4***	***391.5***	13.1%	***6330.6***	***0.08%***
Thin boron	***29989.6***	***30409.8***	1.4%	***5.96***	***0.84%***

	Input data		SI units		Equivalent natural B	
Thick source thickness	***1.3***	mm				
^{10}B content	***4.5%***					
Density	***2.70***	g/cm ^{3}				
Thin deposit thickness D	***4.83E+16***	at ^{10}B/cm ^{2}	4.83E+20	atom/m ^{2}	4.05E-06	g/cm ^{2}
angle with beam	***45.0***	deg	7.85E-01	radian		
thickness in beam direction	6.83E+16	at ^{10}B/cm ^{2}	6.83E+20	atom/m ^{2}	5.73E-06	g/cm ^{2}

	Results			
sigma(eff)	**13,792**	barn	1.38E-24	m^2
sigma(eff)/sigma(0)	**3.6**			
v(eff)	**612**	m/s	612	m/s
lambda(eff)	**6.5**	Å	6.47E-10	m
E(eff)= mv ^{2}/2	**0.0020**	eV	3.13E-22	J
T(eff) = E/k	**22.7**	K		

Calculated absorption of thick source	**99.9998%**	
Calculated absorption of thin source	**9.42E-08**	(boron only)

4.2. Analysis of the unknown sample

Three participants reported measurements of the composition of the unknown mix of silicate and graphite. Some adjustment was necessary to compare results because the Budapest measurements were forced to sum to 100% and the BARC measurements were normalized to an assumed (and incorrect) Fe concentration. Both sets of results were renormalized to the known Fe concentration of 5.35%. Table 4.1 summarizes the comparisons. Eight to ten elements were reported: about half of the elements of known concentrations in the mixture (not H or B) were measured correctly to within ± 25%. A weak comparison can be made by taking into account the measurement uncertainties (reported by two participants). About a third of the measured concentrations agreed with the expected values to within the stated uncertainties. If the true uncertainties of the expected values had been known and taken into account, this measure of PGAA performance would have been considerably better.

Table 4.1 Measurements made by the different laboratories.

Laboratory	BARC	IISC	NIST	SNU	VAEC	unit
Sensitivity	0.031	0.54	6.2	2.0		cps @1382/mg Ti
Neutron flux		4.3E+07	8.3E+08	7.9E+07		$cm^{-2}s^{-1}$, thermal equivalent
Effective neutron velocity		473	610	2120		$m\ s^{-1}$
Unknown sample analysis						
Elements reported	8	11		10		
Number within 25%	4	6		5		
Number within stated uncertainty		3		4		

4.3. Cross-section measurements

A second set of materials was distributed to assist in the resolution of a discrepancy in the thermal cross section of carbon. These materials were as follows:

~ 2 g of urea $(NH_2)_2CO$ (NIST Standard Reference Material 912, 99.7 %);

~ 1.2 g of deuterourea $(ND_2)_2CO$ (Aldrich 176087, 98+ at.% D);

~ 2.5 g of melamine $C_3N_3(NH_2)_3$ (Fisher ACROS 220481, assay ≥ 99%);

spectroscopic graphite (Union Carbide UCAR L4100, palletising grade).

No results from these materials have been reported to NIST.

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5. THERMAL NEUTRON CAPTURE CROSS SECTIONS AND NEUTRON SEPARATION ENERGIES

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Thermal radiative neutron capture cross sections have been re-evaluated [5.1] as part of an ongoing project at the National Nuclear Data Center at Brookhaven National Laboratory to update the *Neutron Cross Sections* compendia, Vol. 1, parts A and B, *Neutron Resonance Parameters and Thermal Capture Cross Sections*, published by Academic Press in 1981 and 1984 [5.2, 5.3]. Neutron separation energies are evaluated as part of an on-going project at the Atomic Mass Data Center in Orsay, France [5.4]. The adopted data are compared with new results derived from this evaluation.

5.1. Thermal cross-section evaluation methodology

A brief description of the evaluation procedure is presented below. As an initial step in the evaluation procedure, CINDA retrievals were carried out on nuclear parameters, such as thermal capture, scattering and total cross sections, as well as coherent scattering amplitudes for measurements since 1979, the cut-off date of the publication of Neutron Cross Sections, Vol.1, part A. The search engines of the American Physical Society and Elsevier Science Web sites were utilized for the most recent publications that may not be referenced in CINDA.

Since the present evaluated capture cross sections are applied to test the validity of the k_0 methodology described elsewhere in this report, the capture cross sections derived by this technique were not included in the present evaluation. As in other previous evaluation studies [5.2, 5.3], various factors were considered in evaluating the thermal capture cross sections:

Normalization of the reported cross section under consideration to recent recommended standard cross sections (^{1}H, ^{14}N, ^{35}Cl, ^{55}Mn, ^{59}Co, ^{197}Au and ^{235}U).

a. Half-lives of the product nuclei, branching ratios, and conversion coefficients.
b. Measurement accuracy.
c. Measurement method, as to whether it is specific or non-specific, such as an absorption measurement by a pile oscillator method as compared to quantification by an activation method.
d. Sample characteristics, which include information regarding the isotopic enrichment, impurities, chemistry and sample thickness.
e. Measurer's experience and general consistency.
f. Characterization of the neutron spectrum.
g. Paramagnetic scattering cross sections of rare earth nuclei in dealing with total cross sections.
h. Accurate total cross-section measurements, from which capture cross sections can be obtained if the scattering cross sections are well known.

In some cases, measured reactor capture cross sections can be converted to 2200 m s^{-1} values if the thermal reactor-index and the capture-resonance integrals are known.

For light and medium weight nuclides, as well as near-magic nuclides, the direct capture cross section is computed within the framework of the Lane-Lynn theory [5.5-5.7] following the Mughabghab procedure outlined in Ref. [5.6], and can shed some light on the measured capture cross section.

In the final step of the evaluation procedure, the contribution of positive-energy resonances to the thermal capture cross section is computed and subsequently compared with measurements. For the majority of nuclides, negative-energy resonances are postulated to achieve consistency between calculations and measurements. However, in some cases, the computed thermal capture cross section can be accounted for in terms of positive-energy resonances, such as ^{162}Dy [5.3].

Finally, consistency between the isotopic and elemental cross sections is sought. Several iterations in the evaluation procedure may be necessary for this objective to be realized.

5.2. Adopted thermal neutron cross sections

The resulting evaluated thermal neutron capture cross sections for elements Z=1-92 are summarized in column 3 of Table 5.1 for 395 naturally abundant isotopes and isomers [5.1-5.3]. The quoted natural abundances, listed in column 2, are representative isotopic compositions (Atom %) from the 1997 IUPAC values published by Rosman and Taylor [5.8]. The uncertainties of the presently evaluated capture cross-sections have been substantially reduced for the following nuclides:

> ^{14}N, ^{24}Mg, ^{25}Mg, ^{28}Si, ^{29}Si, ^{30}Si, ^{32}S, ^{33}S, ^{36}S, ^{47}Ti, ^{49}Ti, ^{51}V, ^{55}Mn, ^{58}Fe, ^{66}Zn, ^{71}Ga, ^{73}Ge, ^{74}Ge, ^{75}As, ^{79}Br, ^{81}Br, ^{82}Kr, ^{83}Kr, ^{105}Pd, ^{108}Cd, ^{117}Sn, ^{128}Xe, ^{136}Ba, ^{137}Ba, ^{146}Nd, ^{148}Nd, ^{150}Nd, ^{144}Sm, ^{156}Gd, ^{174}Yb, ^{174}Hf, ^{182}W, ^{187}Os, ^{192}Os, ^{190}Pt and ^{232}Th.

Also, in the cases of

> ^{9}Be, ^{33}S, ^{36}S, ^{49}Ti, ^{104}Ru, ^{117}Sn, ^{128}Xe, ^{137}Ba, ^{144}Sm, ^{187}Os, ^{192}Os, ^{190}Pt, ^{196}Pt, ^{206}Pb, ^{207}Pb and ^{208}Pb,

the most recent recommended capture cross sections [5.1] are not consistent with previous evaluation [5.2, 5.3], lying outside the sum of the uncertainties of previous and present recommendations. Of particular importance is the significant change of the capture cross section of ^{207}Pb from 0.712 ± 0.010 b to 0.620 ± 0.014 b.

5.3. Experimental thermal neutron cross sections

Thermal neutron cross sections have been derived from the evaluated gamma-ray production cross sections discussed in Chapter 7, and are shown in column 4 of Table 5.1. These values are derived from the sum of primary gamma-ray cross sections de-exciting the capture state and/or secondary gamma-ray cross sections populating the ground state and isomers, as indicated in columns 5 and 6 of Table 5.1, and from selected decay gamma-ray cross sections. The primary gamma-ray cross sections are typically incomplete due to large, unobserved statistical feedings, except for the light nuclei. Secondary gamma-ray intensities are also incomplete, but often the total intensity populates only a few gamma rays leading to reliable total cross section determination. Cross sections derived from decay gammas were corrected for neutron irradiation time and are expected to be very reliable. All other cross sections may be considered as lower limits, depending on the completeness of the data.

Inspection of the measured cross sections shows that agreement with the experimentally deduced values is fairly good, especially for light nuclides, and the precision has been improved in many cases. One notable discrepancy is the cross section for ^{12}C where the new value of 3.89 ± 0.06 mb exceeds the adopted value of 3.53 ± 0.07 mb by 11 ± 3 %. A summary of the eleven measurements [5.9-5.19] considered in deriving the adopted value is given in Table 5.2. Four measurements agree with the new value within one standard deviation, and five measurements disagree by more than two standard deviations.

In view of the importance of the carbon cross section, new experiments were performed at Budapest on four different compounds containing carbon with a well defined stoichiometry to test the accuracy of the new value. These measurements yielded a cross section of 3.87 ± 0.05 mb, in excellent agreement with the earlier value. Other recent values deduced from JAERI k_0-factors [5.20, 5.21] are 3.63 ± 0.13 mb for their cold neutron guide and 4.01 ± 0.15 mb for their thermal neutron guide, which appear to corroborate the new value. All of the measurements discussed in Table 5.2 were performed with external comparator standards and may be susceptible to error due to neutron scattering, so we recommend that the new internally calibrated value should be adopted in the future.

^{14}N is an important standard for thermal neutron capture cross section and gamma-ray spectra measurements. The measured capture cross sections for this nuclide [5.17, 5.22, 5.23] are presented in Table 5.3. The adopted value of 79.8 ± 1.4 mb [5.1] agrees well with the new value of 79.0 ± 0.9 mb from this work. All of the measured values except one of Islam [5.22] agree within their uncertainties. The discrepant value is based on a ^{207}Pb standard that in turn was based on the adopted ^{12}C standard which we have shown to be too low. Adjusting this value to the new ^{12}C measurement gives 76.4 ± 1.9 mb which is in reasonable agreement with all other values.

5.4. Neutron separation energies

Neutron separation energies (S_n) have been evaluated as part of an ongoing effort at the Atomic Mass Data Center in Orsay, France [5.4]. The most recent S_n values are shown in column 7 of Table 5.1. The gamma-ray energies from this evaluation have undergone least-squares fits to the level scheme to derive "best" level energies including S_n for the capture state. The energies are corrected for the nuclear recoil and uncertainties are adjusted for outliers as described in Chapter 6. The new S_n values are shown in column 8 of Table 5.1; agreement is generally good and greater precision has been achieved in most cases.

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Table 5.1 Comparison of adopted neutron cross sections σ_γ [5.1-5.3] and neutron separation energies Sn [5.4] with the results of this evaluation. Total isotopic (n, γ) cross sections are shown except when the cross section populating a specific level or reaction is indicated. Adopted neutron separation energies were calculated from least-squares fits of the primary gamma-ray energies to the level scheme, and the adopted cross sections are based on primary, secondary and/or decay gamma-ray cross sections. In many cases the decay scheme may be incomplete so the adopted cross sections should be considered as lower limits.

Isotope and (E), (mode)	**Percent Abundance**[8]	**σ_γ (mb or b)** Mughabghab[1-3]	This work	Secondary	Primary	**Sn (keV)** Audi[4]	This work
1H	99.9885(70)	332.6(7) mb	Standard			2224.5725(22)	2224.576(19)
2H	0.0115(70)	0.519(7) mb	0.492(25) mb			6257.2482(24)	
3He	0.000137(3)	0.031(9) mb				20577.62	
4He	99.999863(3)						
6Li	7.59(4)	39(3) mb	52.6(22) mb	52.7(21) mb	52.5(22) mb	7249.96(9)	7249.94(4)
6Li(n, α)		940(4) b					
7Li	92.41(4)	45(3) mb	45.7(9) mb	45.7(9) mb	45.7(9) mb	2033.8(3)	2032.57(4)
9Be	100	8.8(4) mb	8.8(6) mb	8.8(6) mb	8.9(6) mb	6812.33(6)	6812.10(3)
10B	19.9(7)	500(200) mb	303(20) mb	306(16) mb	298(15) mb	11454.12(20)	11454.15(14)
10B(n, α)		3837(9) b	3820(135) b				
11B	80.1(7)	6(3) mb				3370.4(14)	
12C	98.93(8)	3.53(7) mb	3.89(6) mb	3.89(6) mb	3.90(6) mb	4946.310(10)	4946.311(3)
13C	1.07(8)	1.37(4) mb	1.22(6) mb	1.22(6) mb	1.21(11) mb	8176.440(10)	8176.61(18)
14N	99.632(7)	79.8(14) mb	79.0(9) mb	78.8(9) mb	79.6(16) mb	10833.230(10)	10833.317(12)
14N(n, p)		1.83(3) b					
15N	0.368(7)	24(8) mb				2490.8(23)	
16O	99.757(16)	0.190(19) mb	0.189(8) mb	0.177(11) mb	0.194(7) mb	4143.33(21)	4143.06(10)
17O	0.038(1)	0.54(7) mb		0.54(11) mb	0.49(7) mb	8044.4(8)	8043.5(10)
17O(n, α)		235(10) mb					
18O	0.205(14)	0.16(1) mb				3957(3)	
19F	100	9.6(5) mb	9.50(11) mb	9.49(11) mb	9.51(14) mb	6601.31(5)	6601.344(16)

Isotope and (E), (mode)	Percent Abundance[8]	σγ (mb or b) Mughabghab[1-3]	This work	Secondary	Primary	Sn (keV) Audi[4]	This work
20Ne	90.48(3)	37(4) mb		36.9(5) mb	37(3) mb	6761.11(4)	6761.19(5)
21Ne	0.27(1)	670(110) mb		670(190) mb	580(100) mb	10363.96(23)	10363.9(4)
22Ne	9.25(3)	45(6) mb		44(6) mb	44(2) mb	5200.62(12)	5200.64(17)
23Na	100	530(5) mb	527(7) mb	516(4) mb	527(7) mb	6959.44(5)	6959.592(15)
23Na(472)		400(30) mb	478(4) mb				
24Mg	78.99(4)	53.6(15) mb	53.7(14) mb	53.6(14) mb	53.9(14) mb	7330.67(4)	7330.53(4)
25Mg	10.00(1)	200(5) mb	197(5) mb	197(5) mb	192.8(22) mb	11093.09(4)	11093.157(21)
26Mg	11.01(3)	38.6(6) mb	37.7(13) mb	37.2(13) mb	38.3(14) mb	6443.35(4)	6443.35(3)
27Al	100	231(3) mb	232(3) mb	232(3) mb	187.2(17) mb	7725.05(6)	7725.170(4)
28Si	92.2297(7)	177(5) mb	186(3) mb	187(3) mb	185.2(23) mb	8473.56(3)	8473.537(23)
29Si	4.6832(5)	119(3) mb	118(3) mb	117(3) mb	120(3) mb	10609.18(3)	10609.23(3)
30Si	3.0872(5)	107(2) mb	116(3) mb	116(3) mb	117(7) mb	6587.40(5)	6587.39(3)
31P	100	172(6) mb	167(5) mb	167(5) mb	159.1(22) mb	7935.65(4)	7935.596(23)
32S	94.93(31)	548(10) mb	536(8) mb	528(8) mb	543(8) mb	8641.58(3)	8641.809(25)
33S	0.76(2)	454(25) mb	461(15) mb	461(15) mb	383(14) mb	11416.94(5)	11417.219(16)
34S	4.29(28)	235(5) mb	277(8) mb	277(8) mb	278(19) mb	6985.84(4)	6986.091(15)
36S	0.02(1)	230(20) mb		230(25) mb	247(21) mb	4303.58(9)	4303.61(4)
35Cl	75.78(4)	43.6(4) b	43.84(17) b	43.84(17) b	41.89(20) b	8579.70(7)	8579.672(18)
37Cl	24.22(4)	430(6) mb	553(23) mb	553(23) mb	550(40) mb	6107.78(10)	6107.73(9)
36Ar	0.3365(30)	5.2(5) b		5.2(8) b	4.1(7) b	8788.9(4)	8789.9(9)
38Ar	0.0632(5)	800(200) mb				6598(5)	
40Ar	99.6003(30)	660(10) mb		710(50) mb	660(40) mb	6098.7(6)	6099.1(4)
39K	93.2581(44)	2.1(2) b	2.19(3) b	2.19(3) b	1.737(14) b	7799.50(8)	7799.558(14)
40K	0.0117(1)	30(4) b	76(3) b	96(15) b	76(3) b	10095.18(10)	10095.255(15)
41K	6.7302(44)	1.46(3) b	1.64(6) b	1.64(6) b	1.37(5) b	7533.77(15)	7533.822(10)
40Ca	96.94(16)	410(20) mb	415(7) mb	415(7) mb	378(6) mb	8363.7(3)	8362.86(5)
42Ca	0.647(23)	680(70) mb	740(40) mb	740(40) mb	670(80) mb	7933.0(3)	7932.73(16)
43Ca	0.135(10)	6.2(6) b	7.3(5) b	7.3(5) b	3.3(2) b	11132.0(7)	11131.54(18)
44Ca	2.09(11)	880(50) mb	1055(25) mb	1055(25) mb	990(70) mb	7414.8(3)	7414.79(15)

Isotope and	Percent		σ_γ (mb or b)			Sn (keV)	
(E), (mode)	Abundance[8]	Mughabghab[1-3]	This work	Secondary	Primary	Audi[4]	This work
46Ca	0.004(3)	720(30) mb		730(70) mb	750(60) mb	7276.1(5)	7276.1(3)
48Ca	0.187(21)	1090(70) mb	1050(120) mb	920(110) mb	1050(120) mb	5146.6(4)	5146.48(21)
45Sc	100	27.2(2) b	26.28(23) b	26.28(23) b	19.29(24) b	8760.62(11)	8760.745(20)
45Sc(143)		9.8(11) b	7.78(11) b				
46Ti	8.25(3)	590(180) mb	310(16) mb	229(19) mb	310(16) mb	8877.7(10)	8880.5(3)
47Ti	7.44(2)	1.52(11) b	1.63(4) b	1.63(4) b	1.177(11) b	11626.59(4)	11626.657(14)
48Ti	73.72(3)	7.88(25) b	8.6(3) b	8.32(16) b	8.84(15) b	8142.36(5)	8142.351(14)
49Ti	5.41(2)	1.79(12) b	1.88(4) b	1.88(4) b	1.675(18) b	10939.13(4)	10939.201(13)
50Ti	5.18(2)	179(3) mb	172(3) mb	142(2) mb	172(3) mb	6372.3(9)	6372.6(6)
50V	0.250(4)	21(4) b	20.4(8) b	20.4(8) b	13.5(3) b	11051.28(9)	11051.142(24)
51V	99.750(4)	4.92 b 4	5.18(18) b	5.18(18) b	4.65(11) b	7311.24(23)	7311.273(15)
50Cr	4.345(13)	15.9(2) b	15.73(21) b	15.73(21) b	16.0(5) b	9261.6(3)	9260.63(8)
52Cr	83.789(18)	760(60) mb	871(14) mb	871(14) mb	855(17) mb	7939.17(16)	7939.10(23)
53Cr	9.501(17)	18.2(15) b	19.0(4) b	19.0(4) b	18.2(6) b	9719.01(25)	9720.00(5)
54Cr	2.365(7)	360(40) mb	440(40) mb	440(40) mb	390(40) mb	6246.3(4)	6246.28(17)
55Mn	100	13.36(5) b	11.33(9) b	11.36(10) b	11.31(9) b	7270.5(3)	7270.419(25)
54Fe	5.845(35)	2.25(18) b	2.44(6) b	2.31(10) b	2.44(6) b	9297.9(3)	9298.53(19)
56Fe	91.754(36)	2.59(14) b	2.49(5) b	2.49(5) b	2.447(24) b	7646.03(10)	7646.0954(6)
57Fe	2.119(10)	2.5(3) b	1.9(5) b	1.9(5) b	1.5(5) b	10044.5(3)	10044.65(14)
58Fe	0.282(4)	1.30(3) b	1.30(5) b	1.30(5) b	1.20(2) b	6580.90(20)	6581.02(6)
59Co	100	37.18(6) b	38.4(3) b	38.4(3) b	32.4(5) b	7491.93(8)	7492.05(3)
59Co(59)		20.4(8) b	20.76(20) b				
58Ni	68.077(9)	4.5(2) b	4.36(5) b	4.36(5) b	4.30(5) b	8999.44(14)	8999.151(15)
60Ni	26.223(8)	2.9(2) b	2.42(3) b	2.42(3) b	2.36(3) b	7820.04(10)	7820.055(21)
61Ni	1.1399(6)	2.5(8) b	1.65(12) b	1.65(12) b	1.28(11) b	10597.2(4)	10595.6(3)
62Ni	3.6345(17)	14.5(3) b	14.99(22) b	14.99(22) b	14.97(22) b	6837.85(7)	6837.89(3)
64Ni	0.9256(9)	1.63(7) b	2.2(3) b	2.2(3) b	2.1(4) b	6098.01(20)	6098.28(14)
63Cu	69.17(3)	4.52(2) b	4.75(4) b	4.75(4) b	4.74(11) b	7915.96(11)	7916.14(4)
65Cu	30.83(3)	2.17(3) b	2.134(18) b	2.134(18) b	1.81(3) b	7065.93(11)	7066.13(4)

Isotope and (E), (mode)	Percent Abundance[8]	σ_γ (mb or b) Mughabghab[1-3]	This work	Secondary	Primary	Sn (keV) Audi[4]	This work
64Zn	48.6(6)	1100(100) mb	843(20) mb	843(20) mb	627(7) mb	7979.6(5)	7979.28(7)
66Zn	27.9(3)	620(60) mb	376(6) mb	375(6) mb	360(20) mb	7052.2(4)	7052.5(3)
67Zn	4.10(13)	9.5(14) b	11.44(14) b	11.44(15) b	4.93(11) b	10198.2(5)	10198.06(7)
68Zn(0)	18.8(5)	1000(100) mb	790(50) mb	790(50) mb	660(40) mb	6482.2(5)	6482.07(10)
69Zn(439)		72(4) mb	68(9) mb				
70Zn(0)	0.62(3)	83(5) mb				5834(10)	
70Zn(158)		8.7(5) mb					
69Ga	60.108(9)	1.68(7) b	1.753(16) b	1.753(16) b	0.373(11) b	7655.1(8)	7653.65(8)
71Ga	39.892(9)	4.73(15) b	4.29(17) b	4.29(17) b	2.61(4) b	6521.0(10)	6520.44(14)
71Ga(120)		150(50) mb	429(9) mb				
70Ge	20.8(9)	3.45(16) b	3.69(7) b	3.69(7) b	1.71(10) b	7415.90(5)	7415.925(23)
70Ge(198)		280(70) mb	400(30) mb				
72Ge	27.54(34)	950(110) mb	770(80) mb	770(80) mb	620(19) MB	6782.90(5)	6783.12(6)
72Ge(67)			460(40) mb				
73Ge	7.73(5)	14.4(4) b	16.5(3) b	16.5(3) b	5.43(18) b	10196.20(6)	10196.056(13)
74Ge	36.3(7)	530(50) mb	505(10) mb	505(10) mb	231(13) mb	6505.22(8)	6505.45(4)
75Ge(140)		170 mb 30	164 mb 5				
76Ge(0)	7.61(38)	140(20) mb	140(30) mb	140(30) mb	330(60) mb	6072.6(11)	6072.3(4)
76Ge(160)		100(10) mb	155(21) mb				
75As	100	4.23(8) b	4.01(5) b	4.01(5) b	3.07(4)	7328.44(7)	7328.808(8)
74Se	0.89(4)	51.8(12) b	49(3) b	49(3) b	27(7) b	8027.53(8)	8027.585(18)
76Se	9.37(29)	85(7) b	84.3(8) b	84.3(8) b	46.6(9) b	7418.81(7)	7418.850(21)
76Se(162)		22(1) b	17.2(4) b				
77Se	7.63(16)	42(4) b	36.3(7) b	36.3(7) b	18.4(5) b	10498.0(3)	10497.75(3)
78Se(0)	23.77(28)	50(10) mb	98(15) mb	198(6) mb	9 mb	6962.9(7)	6963.11(10)
78Se(96)		380(20) mb	135(30) mb				
80Se(0)	49.61(41)	530(50) mb	441(17) mb	545(18) mb	280(60) mb	6701.0(6)	6700.9(5)
80Se(103)		80(10) mb	104(7) mb				
82Se(0)	8.73(22)	5.2(4) mb				5818(3)	

Isotope and (E), (mode)	Percent Abundance[8]	σγ (mb or b) Mughabghab[1-3]	This work	Secondary	Primary	Sn (keV) Audi[4]	This work
82Se(228)		39(3) mb					
79Br	50.69(7)	10.32(13) b	8.97(14) b	8.97(14) b	1.035(13) b	7892.19(20)	7892.41(8)
79Br(86)		2.4(6) mb	2.16(6) b				
81Br	49.31(7)	2.36(5) b	2.40(10) b	2.40(10) b	0.50(2) b	7592.90(20)	7593.017(22)
81Br(46)		2.4(4) b	2.32(10) b				
78Kr	0.35(2)	4.7(7) b				8355(8)	
78Kr(130)		170(20) mb					
80Kr	2.28(6)	11.5(5) b				7872(3)	
80Kr(190)		4.6(7) b					
82Kr	11.58(14)	19(4) b				7464(4)	
82Kr(42)		14.0(25) b					
83Kr	11.49(6)	202(10) b		180(3) b	41.1(4) b	10520.4(19)	10520.60(25)
84Kr	57.00(4)	111(15) mb				7119(4)	
84Kr(305)		90(13) mb					
86Kr	17.3(2)	3(2) mb		3.0(3) mb	2.8(4) mb	5515.4(8)	5515.20(25)
85Rb(0)	72.17(2)	427(11) mb	426(7) mb	426(7) mb	94(2) mb	8651.2(10)	8650.98(10)
85Rb(556)		53(5) mb	57.4(14) mb				
87Rb	27.83(2)	120(30) mb	122(4) mb	95(2) mb	44(2) mb	6080(3)	6082.52(11)
84Sr	0.56(1)	620(60) mb	630(80) mb	630(80) mb	300(50) mb	8529(4)	
84Sr(239)		600(60) mb	300(50) mb				
86Sr(0)	9.86(1)	200(30) mb	124(10) mb	1090(30) mb	910(17) mb	8428.12(17)	8428.170(15)
86Sr(389)		840(60) mb	970(30) mb				
87Sr	7.00(1)	17(3) b	15.0(3) b	15.0(3) b	8.31(9) b	11112.63(22)	11112.64(3)
88Sr	82.58(1)	5.8(4) mb	4.1(4) mb	4.1(4) mb	8..9(11) mb	6358.71(13)	6358.73(4)
89Y	100	1.28(2) b	1.282(13) b	1.282(13) b	1.22(4) b	6857.08(15)	6857.008(17)
89Y(682)		1.0(2) mb	1.8(5) mb				
90Zr	51.45(40)	11(5) mb	470(40) mb	470(40) mb	5.6(25) mb	7194.6(5)	7192.7(8)
91Zr	11.22(5)	1240(250) mb	1210(40) mb	1210(40) mb	405(21) mb	8634.8(3)	8635.00(16)
92Zr	17.15(8)	220(60) mb	101(5) mb	101(5) mb	46(3) mb	6734.2(6)	6735.3(7)

Isotope and (E), (mode)	Percent Abundance[8]	σ_γ (mb or b) Mughabghab[1-3]	This work	Secondary	Primary	Sn (keV) Audi[4]	This work
94Zr	17.38(28)	49.9(24) mb	110(9) mb	110(9) mb	32(4) mb	6462.6(9)	6357.8(3)
96Zr	2.80(9)	22.9(10) mb	920(30) mb	920(30) mb	82(14) mb	5580(3)	5575.1(4)
93Nb	100	1.15(5) b	1.138(14) b	1.138(14) b	0.828(8) b	7227.47(9)	7227.631(13)
93Nb(41)			783 mb 13				
92Mo	14.84(35)	19 mb	82(9) mb	82(9) mb	31(4) mb	8069.71(9)	8070.0(3)
94Mo	9.25(12)	15 mb	340(30) mb	340(30) mb	42(4) mb	7369.06(10)	7368.4(5)
95Mo	15.92(13)	13.4(3) b	13.6(4) b	13.6(4) b	2.30(6) b	9154.26(5)	9153.90(9)
96Mo	16.68(2)	500(200) mb	780(40) mb	780(40) mb	220(20) mb	6821.13(25)	6821.5(4)
97Mo	9.55(8)	2.5(2) b	2.20(7) b	2.20(7) b	0.50(11) b	8642.50(7)	8642.57(6)
98Mo	24.13(31)	137(5) mb	160(30) mb	160(30) mb	28 mb	5925.39(15)	5927.7(5)
100Mo	9.63(23)	199(3) mb	150(13) mb	150(13) mb	50(4) mb	5398.50(20)	5398.27(8)
96Ru	5.54(14)	220(20) mb	270(30) mb	270(30) mb	0	8112(3)	
98Ru	1.87(3)	<8 b	>480 mb	480(90) mb	0	7464(7)	
99Ru	12.76(14)	7.1(10) b	13.7(10) b	13.7(10) b	3.03(14) b	9673.16(14)	9673.413(19)
100Ru	12.60(7)	5.0(6) b	0.93(5) mb	0.93(5) b	0.69(3) b	6802.1(7)	6802.04(21)
101Ru	17.06(2)	3.4(9) b	6.4(5) b	6.4(5) b	1.34(7) b	9219.59(5)	9219.632(15)
102Ru	31.55(14)	1.21(7) b	2.5(1) mb	2.5(1) b	0.49(3) b	6232.4(3)	6232.00(11)
102Ru(238)			120(13) mb				
104Ru	18.62(27)	470(20) mb	860(40) mb	860(40) mb	570(90) mb	5910.07(19)	5910.11(7)
103Rh	100	145(2) b	156(5) b	103(2) b	7.69(10) b	6999.05(6)	6998.946(24)
103Rh(129)		10(1) b	9.7(8) b				
102Pd	1.02(1)	3.4(3) b	1.11(22) b	1.11(22) b	0	7624.7(15)	7625.6(9)
104Pd	11.14(8)	600(300) mb	373(25) mb	373(25) mb	0	7094.1(7)	
105Pd	22.33(8)	21.0(15) b	19.95(18) b	19.95(18) b	0.55(3) b	9561.5(3)	9561.4(4)
106Pd(0)	17.33(8)	290(30) mb	197(12) mb	197(12) mb	44(11) mb	6539(7)	6536.4(5)
106Pd(242)		13(2) mb					
108Pd	26.46(9)	7.6(4) b	7.01(6) b	7.01(6) b	2.76(9) b	6153.3(3)	6153.54(12)
108Pd(189)		180(30) mb	185(10) mb				
110Pd(0)	11.72(9)	190(30) mb	160(30) mb	144(25) mb	175(25) mb	5750(40)	5726.3(4)

Isotope and (E), (mode)	Percent Abundance[8]	Mughabghab[1-3]	σ_γ (mb or b) This work	Secondary	Primary	Sn (keV) Audi[4]	This work
110Pd(172)		36(6) mb					
107Ag	51.839(8)	37.6(12) b	38.2(5) b	38.2(5) b	3.08(9) b	7269.6(6)	7271.41(8)
107Ag(109)		330(80) mb	170(40) mb				
109Ag(0)	48.161(8)	86(3) b	78(3) b	78(3) b	10.21(11) b	6809.20(10)	6808.20(9)
109Ag(118)		4.7(2) b	8.82(16) b				
106Cd	1.25(6)	~1 b				7926(9)	
108Cd	0.89(3)	720(130) mb				7324(6)	
110Cd	12.49(18)	11(1) b		11.0(6) b	0.147(13) b	6975.84(19)	6975.1(4)
110Cd(396)		140(50) mb	780(70) mb				
111Cd	12.80(12)	24(3) b		24(3) b	0	9398.1(22)	
112Cd	24.13(21)	2.2(5) b				6540.2(6)	
113Cd	12.22(12)	20600(400) b	19560(250) b	19560(250) b	1970(30) b	9042.7(3)	9043.18(6)
114Cd(0)	28.73(42)	300(20) mb				6140.9(6)	
114Cd(181)		36(7) mb					
116Cd(0)	7.49(18)	50(8) mb				5777.2(10)	
116Cd(136)		25(10) mb					
113In(0)	4.29(5)	3.9(4) b	6.2(12) b	15.0(18) b	0.92(7) b	7274.4(12)	7273.83(23)
113In(190)		8.1(8) b	8.2(13) b				
113In(502)		3.1(7) b	0.63(21) b				
115In(0)	95.71(5)	40(2) b	42(3) b	190(7) b	7.27(21) b	6784.3(8)	6784.72(17)
115In(127)		162.3(7) b	88(4) b				
115In(290)		81(8) b	60(4) b				
112Sn	0.97(1)	860(90) mb				7742.9(18)	
112Sn(77)		300(40) mb					
114Sn	0.66(1)	120(30) mb				7545.7(16)	
115Sn	0.34(1)	30(7) b	58.0(8) b	12.5(4) b		9563.41(11)	9563.55(3)
116Sn(0)	14.54(9)	130(30) mb	154 mb 3	154(3) mb	6.7(14) mb	6944.5(11)	6942.9(5)
116Sn(314)		6(2) mb					
117Sn	7.68(7)	1.32(18) b	1.045(18) b	1.045(18) b	0.027(3) b	9326.3(14)	9327.9(11)

Isotope and (E), (mode)	Percent Abundance[8]	σγ (mb or b) Mughabghab[1-3]	This work	Secondary	Primary	Sn (keV) Audi[4]	This work
118Sn	24.22(9)	220(50) mb	83(3) mb	83(3) mb	3(1) mb	6585.2(14)	6483.3(6)
118Sn(90)		10(6) mb					
119Sn	8.59(4)	2.2(5) b	1.134(16) b	1.134(16) b	0	9107.2(22)	
120Sn(0)	32.58(9)	140(30) mb	118(8) mb	118(8) mb	4(1) mb	6170.8(6)	6170.1(4)
120Sn(6)		1(1) mb	1.9(4) mb				
122Sn(0)	4.63(3)	1 mb 1				5946.0(12)	
122Sn(25)		138(15) mb	126(4) mb	79(6) mb	0		
124Sn(0)	5.79(5)	4(2) mb	13(2) mb	13(2) mb	0	5733.0(5)	
124Sn(28)		130(5) mb	148(3) mb				
121Sb	57.21(5)	5.9(2) b	8.0(11) b	8.0(11) b	0.74(2) b	6806.6(10)	6806.36(7)
121Sb(164)		60(10) mb	49(10) mb				
123Sb(0)	42.79(5)	4.1(1) b	3.14(25) b	4.19(26) b	0.68(3) B	6467.45(7)	6467.58(5)
123Sb(11)		37(10) mb	740(80) mb				
123Sb(37)		19(10) mb	310(16) mb				
120Te(0)	0.09(1)	2.0(3) B				7230(30)	
120Te(294)		340(60) mb					
122Te	2.55(12)	3.9(5) b	1.49(9) b	1.49(9) b	0.88(10) b	6939.4(25)	6929.16(10)
122Te(248)		1.1(5) b	300(30) mb				
123Te	0.89(3)	418(30) b	339(18) b	339(18) b	49(2) b	9424.1(12)	9423.89(7)
124Te	4.74(14)	6.8(13) b	7.73(25) b	7.73(25) b	4.18(20) b	6575.9(14)	6569.39(14)
124Te(145)		40(25) mb	770(70) mb				
125Te	7.07(15)	1.55(16) b	0.70(7) b	0.70(7) b	0	9113.8(4)	
126Te(0)	18.84(25)	900(150) mb	28(7) mb	28(7) mb	12(4) mb	6291(3)	6287.8(4)
126Te(88)		135(23) mb					
128Te(0)	31.74(8)	200(8) mb	195(9) mb	157(10) mb	195(9) mb	6083(3)	6082.36(14)
128Te(106)		15(1) mb	29.0(22) mb				
130Te(0)	34.08(62)	270(6) mb	132(10) mb	132(10) mb	79(9) mb	5929.7(5)	5930.16(15)
130Te(182)		20(10) mb					
127I	100	6.2(2) b	4.4(3) b	4.4(3) b	0.98(5) b	6826.07(5)	6826.215(4)

Isotope and (E), (mode)	Percent Abundance[8]	σ_γ (mb or b) Mughabghab[1-3]	This work	Secondary	Primary	Sn (keV) Audi[4]	This work
124Xe	0.09(1)	165(20) b	11(2) b	11(2)	0	7603.3(4)	
124Xe(253)		28(5) b	5.0(5) b				
126Xe	0.09(1)	3.8(5) b				7223(6)	
126Xe(297)		450(130) mb					
128Xe	1.92(3)	5.2(13) b	1.23(15) b	1.23(15) b	0.57(12) b	6907.6(16)	
128Xe(236)		480(100) mb	190(40) mb				
129Xe	26.44(24)	21(5) b	7.2(9) b	7.2(9) b	1.95(14) b	9255.2(9)	9255.57(23)
130Xe	4.08(2)	4.8(12) b	0.76(9) b	0.76(9) b	0.23(6) b	6605.2(19)	
130Xe(164)		450(100) mb					
131Xe	21.18(3)	85(10) b	35.7(24) b	35.7(24) b	10.7(9) b	8936.0(9)	8936.65(12)
132Xe	26.89(6)	415(50) mb				6440(4)	
132Xe(233)		50(10) mb					
134Xe	10.44(10)	265(20) mb				8548(4)	
134Xe(527)		3.0(3) mb					
136Xe	8.87(16)	260(20) mb	130(30) mb	130(30) mb	102(16) mb	4025.5(3)	4025.53(8)
133Cs	100	30.3(11) b	23.3(7) b	23.3(7) b	3.58(8) b	6891.540(10)	6891.3909(23)
133Cs(139)		2.5(2) b	2.47(4) b				
130Ba(0)	0.106(1)	8.7(9) b				6493.5(3)	
130Ba(187)		2.5(3) b	4.4(4) b				
132Ba(0)	0.101(1)	6.5(8) b				7189.9(4)	
132Ba(288)		500(200) mb					
134Ba	2.417(18)	1.5(3) b	1.07(4) b	1.07(4) b	0.457(17) b	6971.97(12)	6971.87(12)
134Ba(268)		158(24) mb	46(3) mb				
135Ba	6.592(12)	5.8(9) b	4.02(7) b	4.02(7) b	0.69(6) b	9107.74(4)	9107.73(4)
135Ba(2030)		13.9(7) mb	35(15) mb				
136Ba	7.854(24)	680(170) mb	735(24) mb	735(24) mb	613(19) mb	6905.76(3)	6905.74(8)
136Ba(662)		10(1) mb	20(4) mb				
137Ba	11.232(24)	3.6(2) b	4.06(8) b	4.06(8) b	2.05(3) b	8611.72(4)	8611.63(5)
138Ba	71.698(42)	400(40) mb	435(12) mb	435(12) mb	366(10) mb	4723.43(4)	4723.20(10)

Isotope and (E), (mode)	**Percent Abundance[8]**	**σγ (mb or b) Mughabghab[1-3]**	**This work**	**Secondary**	**Primary**	**Sn (keV) Audi[4]**	**This work**
138La	0.090(1)	57(6) b	57(6) b	57(6) b	10(3) b	8778(3)	
139La	99.910(1)	9.04(4) b	6.13(24) b	6.13(24) b	5.76(5) b	5160.97(5)	5161.004(6)
136Ce(0)	0.185(2)	6.5(10) b	3.8(4) b	3.8(4) b	0.070(6) b	7480.7(4)	7481.58(9)
136Ce(254)		950(250) mb	200(60) mb				
138Ce(0)	0.251(2)	1.00(24) b	6.1(4) b	6.1(4) b	0.87(12) b	7456(12)	
138Ce(754)		15 mb 5					
140Ce	88.450(51)	580(20) mb	284(17) mb	284(17) mb	250(10) mb	5428.6(7)	5428.19(6)
142Ce	11.114(51)	970(20) mb	732(23) mb	732(23) mb	422(20) mb	5145.1(3)	5144.81(6)
141Pr	100	11.5(3) b	7.72(15) b	7.72(15) b	3.65(4) b	5843.06(10)	5843.155(5)
141Pr(3.7)		3.9(3) b	3.45(13) b				
142Nd	27.2(5)	18.7(7) b	17.6(15) b	17.6(15) b	7.8(4) b	6123.59(13)	6123.41(7)
143Nd	12.2(2)	325(10) b	288(19) b	288(19) b	38(2) b	7817.02(7)	7816.94(17)
144Nd	23.8(3)	3.6(3) b	5.3(3) b	5.3(3) b	2.02(18) b	5755.5(6)	5755.26(22)
145Nd	8.3(1)	42(2) b	39.9(10) b	39.9(10) b	18.8(6) b	7565.25(14)	7565.05(9)
146Nd	17.2(3)	1.41(5) b	1.21(11) b	1.21(11) b	0.178(6) b	5292.07(15)	5292.19(4)
148Nd	5.7(1)	2.58(14) b	1.9(3) b	1.9(3) b	0.37(6) b	5038.68(10)	5038.82(3)
150Nd	5.6(2)	1.03(8) b	1.8(5) b	1.8(5) b	0.6(1) b	5334.43(20)	5334.552(24)
144Sm	3.07(7)	1.64(10) b				6757.1(3)	
147Sm	14.99(18)	57(3) b	67(4) b	67(4) b	338(17) b	8141.5(6)	8141.3(3)
148Sm	11.24(10)	2.4(6) b				5871.6(9)	
149Sm	13.82(7)	40140(600) b	37970(150) b	37970(150) b	18223(70) b	7985.7(7)	7986.7(4)
150Sm	7.38(1)	100(4) b	105(8) b	105(8) b	46(2) b	5596.44(10)	5596.44(6)
152Sm	26.75(16)	206(6) b	167(10) b	167(10) b	36(2) b	5867.73(23)	5868.40(10)
154Sm	22.75(29)	8.3(5) b		8.4(9) b	0	5807.2(3)	
151Eu(0)	47.81(3)	5900(200) b	6700(300) b	6700(300) b	243(9) b	6306.72(10)	6307.11(6)
151Eu(46)		3300(200) b	4500(2200) b				
151Eu(148)		4(2) b					
153Eu	52.19(3)	312(7) b	387(70) b	387(70) b	18(5) b	6442.0(3)	6442.2(4)
152Gd	0.20(1)	735(20) b	>370 b	734(30) b	46(3) b	6247.3(3)	6247.48(17)

Isotope and (E), (mode)	Percent Abundance[8]	σγ (mb or b) Mughabghab[1-3]	This work	Secondary	Primary	Sn (keV) Audi[4]	This work
154Gd	2.18(3)	85(12) b		85(7) b	17(1) b	6435.1(3)	6435.29(19)
154Gd(122)		49(15) mb					
155Gd	14.80(12)	60900(500) b	51700(1800) b	51700(1800) b	8680(400) b	8536.37(12)	8536.04(9)
156Gd	20.47(9)	1.8(7) b				6360.05(15)	
157Gd	15.65(2)	254000(800) b	210000(5000) b	210000(5000) b	41000(500) b	7937.33(12)	7937.39(5)
158Gd	24.84(7)	2.2(2) b				5943.29(15)	
160Gd	21.86(19)	1.4(3) b				5635.4(10)	
159Tb	100	23.3(4) b	30(3) b	30(3) b	2.09(7) b	6375.2(3)	6375.13(7)
156Dy	0.06(1)	33(3) b				6969(6)	
158Dy	0.10(1)	43(6) b				6831.5(24)	
160Dy	2.34(8)	55(3) b	2910 b 200	56(4) b	66(4) b	6454.36(9)	6454.34(6)
161Dy	18.91(24)	600(25) b	560(15) b	560(15) b	9(2) b	8196.95(12)	8193(3)
162Dy	25.51(26)	194(10) b	154(6) b	154(6) b	44(4) b	6270.93(7)	6271.14(3)
163Dy	24.90(16)	134(7) b	68(8) b	68(8) b	5.0(4) b	7658.08(12)	7655.0(9)
164Dy(0)	28.18(37)	1040(140) b	770(50) b	770(50) b	696(15) b	5715.89(10)	5715.95(3)
164Dy(108)		1610(240) b	1514(40) b				
165Ho(0)	100	61.2(11) b	52.8(13) b	54.6(13) b	9.82(14) b	6243.640(20)	6243.677(6)
165Ho(6)		3.5(4) b	1.85(11) b				
162Er	0.14(1)	19(2) b				6903(5)	
164Er	1.61(3)	13(2) b				6650.0(7)	
166Er	33.61(35)	16.9(16) b	20.8(14) b	20.8(14) b	9.8(8) b	6436.1(4)	6436.46(18)
166Er(208)		15(2) b	11.6(13) b				
167Er	22.93(17)	649(8) b	688(30) b	688(30) b	271(7) b	7771.07(25)	7771.45(3)
168Er	26.78(26)	2.74(8) b	17.4(24) b	17.4(24) b	8.3(9) b	6003.1(3)	6003.16(14)
170Er	14.93(27)	8.85(30) b	5.5(10) b	5.5(10) b	4.0(6) b	5681.5(5)	5681.6(5)
169Tm	100	92(4) b	110.7(12) b	110.7(12) b	16.2(4) b	6593.3(11)	6591.95(11)
169Tm(183)		8.2(17) b	2.3(7) b				
168Yb	0.13(1)	2300(170) b	1640(160) b	1640(160 b	149(18) b	6867.2(3)	6866.97(11)
170Yb	3.04(15)	9.9(18) b	18(3) b	18(3) b	1.8(3) b	6614.8(7)	6616.6(4)

Isotope and (E), (mode)	Percent Abundance[8]	Mughabghab[1-3]	σ_γ (mb or b) This work	Secondary	Primary	Sn (keV) Audi[4]	This work
171Yb	14.28(57)	58(4) b	50(7) b	50(7) b	3.63(18) b	8019.7(3)	8019.27(4)
172Yb	21.83(67)	1.3(8) b	0.92(10) b	0.92(10) b	0.18(2) b	6367.6(5)	6367.2(6)
173Yb	16.13(27)	15.5(15) b	25(3) b	25(3) b	0.97(11) b	7464.60(10)	7465.5(4)
174Yb	31.83(92)	63.2(15) b	55(8) b	55(8) b	13.5(21) b	5822.33(12)	5822.5(4)
175Yb(515)			40(8) b				
176Yb	12.76(41)	2.85(5) b	0.39(4) b	0.39(4) b	0.24(3) b	5566.8(12)	5566.40(19)
176Yb(332)			300(30) mb				
175Lu(0)	97.41(2)	6.9(13) b	2.71(22) b	23.5(10) b	1.05(7) b	6287.98(15)	6289.78(20)
175Lu(123)		16.2(5) b	20.8(10) b				
176Lu	2.59(2)	2090(70) b	1864(30) b	1864(30) b	222(6) b	7072.2(7)	7072.85(9)
176Lu(150)		317(58) b	597(17) b				
176Lu(970)		2.8(7) b					
174Hf	0.16(1)	549(7) b	411(7) b	411(7) b	72(6) b	6708.7(5)	6708.8(6)
176Hf	5.26(7)	24(3) b	24.8(15) b	24.8(15) b	4.4(8) b	6378.8(15)	6385.8(8)
177Hf	18.60(9)	373(10) b	450(30) b	450(30) b	25.3(10) b	7626.3(3)	7625.80(16)
177Hf(1147)		960(50) mb	790(180) mb				
177Hf(2446)		0.2(1) mb					
178Hf	27.28(7)	84(4) b	105(5) b	105(5) b	34.9(11) b	6099.03(10)	6098.946(22)
178Hf(375)		53(6) b	69(4) b				
179Hf	13.629(6)	41(3) b	39.2(21) b	39.2(21) b	14.7(8) b	7388.2(4)	7387.85(9)
179Hf(1142)		445(3) mb					
180Hf	35.08(16)	13.04(7) b	12.2(13) b	12.2(13) b	8.9(8) b	5695.7(7)	5695.58(17)
180Ta	0.012(2)	563(60) b				7577.0(13)	
181Ta(0)	99.988(2)	20.5(5) b	9.01(22) b	9.01(22) b	1.54(3) b	6062.96(16)	6062.89(6)
181Ta(520)		11(2) mb					
180W	0.12(1)	<150 b	19.3(18) b	19.3(18) b	0	6681(6)	
182W	26.50(16)	19.9(2) b	12.6(5) b	12.6(5) b	4.66(20) b	6190.7(10)	6190.89(3)
182W(309)			88(18) mb				
183W	14.31(4)	10.3(2) b	7.21(17) b	7.21(17) b	4.12(11) b	7411.7(3)	7411.15(7)

Isotope and (E), (mode)	Percent Abundance[8]	σγ (mb or b) Mughabghab[1-3]	This work	Secondary	Primary	Sn (keV) Audi[4]	This work
184W	30.64(2)	1.7(1) b	2.0(4) b	2.0(4) b	1.58(21) b	5753.7(3)	5754.62(21)
184W(197)		2(1) mb					
186W	28.42(19)	38.5(5) b	20.3(3) b	20.3(3) b	14.21(24) b	5466.72(21)	5466.59(6)
185Re	37.40(2)	112(2) b	113(12) b	113(12) b	17.6(5) b	6179.7(7)	6179.34(13)
187Re	62.60(2)	76.4(5) b	79(10) b	79(10) b	7.16(24) b	5871.6(3)	5871.75(6)
187Re(172)		2.8(1) b	1.73(18) b				
184Os	0.02(1)	3000(150) b	4410(60) b	4410(60) b	1175(80) b	6625.4(9)	6624.52(25)
186Os	1.59(3)	80(13) b	16.4(16) b	16.4(16) b	3.3(5) b	6292.6(13)	6289.4(8)
187Os	1.96(2)	245(40) b	169(3) b	169(3) b	45.9(13) b	7989.3(3)	7989.58(7)
188Os	13.24(8)	4.7(5) b	5.5(11) b	5.5(11) b	2.4(3) b	5920.6(5)	5922.0(4)
189Os	16.15(5)	25(4) b	25.1(5) b	25.1(5) b	4.56(18) b	7791.6(9)	7792.31(11)
189Os(1705)		0.26(3) mb					
190Os(0)	26.26(2)	3.9(6) b	0.85(4) b	17.5(11) b	3.11(12) b	5758.67(16)	5758.81(9)
190Os(74)		9.2(7) b	16.6(11) b				
192Os	40.78(19)	3.12(16) b	2.69(12) b	2.69(12) b	0.83(5) b	5585.1(9)	5584.01(12)
191Ir(0)	37.3(2)	309(30) b	630(70) b	1080(70) b	154(3) b	6198.08(20)	6198.14(3)
191Ir(57)		645(32) b	450(20) b				
191Ir(155)		160(70) mb					
193Ir	62.7(2)	111(5) b	97(17) b	97(17) b	23.0(4) b	6066.8(4)	6066.71(7)
193Ir(112+y)		5.8(2) b					
190Pt	0.014(1)	122(4) b				6437(6)	
192Pt	0.782(7)	10.0(25) b				6255.5(19)	
192Pt(150)		2.2(8) b					
194Pt	32.967(99)	580(190) mb	745(25) mb	745(25) mb	231(22) mb	6105.06(12)	6109.17(4)
194Pt(259)		98(11) mb	65(4) mb				
195Pt	33.832(10)	28.5(12) b	22.37(22) b	22.37(22) b	8.25(21) b	7921.88(15)	7921.92(7)
196Pt(0)	25.242(41)	410(40) mb	550(40) mb		630(30) mb	5846.4(3)	5846.0(7)
196Pt(400)		44(4) mb					
198Pt	7.163(55)	3.66(19) b	2.69(12) b			5556.1(5)	

Isotope and (E), (mode)	Percent Abundance[8]	σγ (mb or b) Mughabghab[1-3]	This work	Secondary	Primary	Sn (keV) Audi[4]	This work
198Pt(424)		350(40) mb					
197Au	100	98.65(9) b	108(5) b	108(5) b	12.8(5) b	6512.17(22)	6512.32(10)
196Hg(0)	0.15(1)	3080(180) b	1240(120) b	1240(120) b	578(50) b	6785.4(15)	
196Hg(299)		109(6) b					
198Hg	9.97(20)	2.0(3) b				6664.0(6)	
198Hg(532)		18(4) mb					
199Hg	16.87(22)	2150(50) b	2215(30) b	2215(30)	1571(14)	8028.26(25)	8028.37(4)
200Hg	23.10(19)	<60 b				6230.2(6)	
201Hg	13.18(9)	5.7(12) b	4.9(6) b	4.9(6) b	2.17(13) b	7754.31(23)	7753.93(15)
202Hg	29.86(26)	4.42(7) b				5992.9(17)	
204Hg	6.87(15)	430(100) mb				5668(4)	
203Tl	29.524(14)	11.4(2) b	12.09(12) b	12.09(12) b	10.58(9) b	6655.8(3)	6654.88(4)
205Tl	70.476(14)	104(17) mb	101(3) mb	101(3) mb	44(4) mb	6503.7(4)	6502.87(24)
204Pb	1.4(1)	660(70) mb	397(11) mb	388(7) mb	419(11) mb	6731.50(15)	6731.80(9)
206Pb	24.1(1)	26.6(12) mb	29.2(8) mb	29.5(8)	28.9(8)	6737.79(11)	6737.74(10)
206Pb(1633)		6.3(13) mb					
207Pb	22.1(1)	620(14) mb	622(14) mb	622(14) mb	622(14) mb	7367.82(9)	7367.92(7)
208Pb	52.4(1)	0.23(3) mb				3935.9(13)	
209Bi(0)	100	24.2(4) mb	21.3(23) mb	21.3(23) mb	61(3) mb	4604.58(13)	4604.63(5)
209Bi(271)		9.6(8) mb	17(6) mb				
232Th	100	7.35(3) b	9.5(12) b	9.5 (12) b	0.91(2) b	4786.35(25)	4786.34(3)
234U	0.0055(5)	99.8(13) b				5297.84(23)	
235U	0.7200(51)	98.3(8) b	28 b	28 b	0.44(6) b	6544.8(5)	
238U	99.274(11)	2.68(19) b	2.34(4) b	2.3(4) b	0.491(12) b	4806.26(21)	

Note: y in 193Ir(112+y) means that the absolute isotope level energy is not known but is above 112 keV by some value y.

Table 5.2 Comparison of thermal neutron-capture cross-section measurements on ^{12}C with the value adopted by Mughabghab [5.1] and the results of this evaluation.

Measurement Method	**^{12}C Cross Section (millibarns)**	**Reference**
Diffusion length	3.44 ± 0.8	Hendrie [5.9]
Mass spectrometry	3.30 ± 0.15	Henning [5.10]
Pile oscillator	3.5 ± 0.3	Muehlhause [5.11]
Pile oscillator	3.65 ± 0.15	[5.12]
Pile oscillator	3.85 ± 0.15	Koechlin [5.13]
Pulsed neutrons	3.72 ± 0.15	Sagot [5.14]
Pulsed neutrons	3.83 ± 0.06	Starr [5.15]
Reactivity	3.57 ± 0.03	Nichols [5.16]
Capture	3.8 ± 0.4	Jurney [5.17]
Capture	3.53 ± 0.07	Jurney [5.18]
Capture	3.50 ± 0.16	Prestwich [5.19]
Adopted value	3.53 ± 0.07 mb	Mughabghab [5.1]
This work	3.89 ± 0.06 mb	

Table 5.3 Nitrogen thermal neutron-capture cross-section measurements measured by the capture gamma-ray level scheme intensity balance. Column 1 shows the comparator standard that was used; column 2 lists the reported capture cross section; and column 3 gives the cross section renormalized to the new adopted standard value [5.1].

	Cross Section σ_γ (millibarns)		
Standard	**Measured**	**Renormalized**	**Reference**
^{12}C (3.53 ± 0.07)	79.7 ± 2.4	79.7 ± 2.4	Islam [5.22]
^{35}Cl(43.6 ± 0.4 b)	80.1 ± 2.0	80.0 ± 2.0	Islam [5.22]
^{207}Pb(712 ± 10)	79.6 ± 1.6	69.3 ± 1.4	Islam [5.22]
^{27}Al(230 ± 3)	76.7 ± 2.7	77.0 ± 2.7	Islam [5.23]
^{35}Cl(43.6 ± 0.5 b)	79.7 ± 2.4	79.6 ± 2.4	Islam [5.23]
^{1}H(332 ± 2)	75.0 ± 7.5	75.1 ± 7.5	Jurney[5.17]
Adopted Value	79.8 ± 1.4 mb		Mughabgab[5.1]
This work	79.0 ± 0.9 mb		

6. DATA SOURCES AND EVALUATION METHODOLOGY

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6.1. Prompt gamma-ray source databases

Four primary databases were used in this evaluation.

6.1.1. Lone database

Database of Lone et al [6.1] was based primarily on measurements of elemental spectra by Orphan and Rasmussen using small Ge(Li) detectors [6.2, 6.3]. These data were not constrained by nuclear structure information, so the gamma-ray assignments were often unreliable.

6.1.2. ENSDF database

Evaluated Nuclear Structure Data File (ENSDF) is a comprehensive nuclear structure and decay database evaluated internationally under the auspices of the IAEA Nuclear Structure and Decay Data Evaluators Network [6.4]. ENSDF contains experimental data compiled from literature sources and organized by isotope with separate datasets for each reaction type including thermal neutron capture. Intensity data are generally normalized per 100 neutron captures. Primary emphasis of ENSDF evaluations is the determination of nuclear structure properties, i.e., these datasets were not evaluated for use in applications. ENSDF capture gamma-ray datasets are often intermixed with information from epithermal reactions, and sometimes the gamma-ray intensity scale has multiple normalization factors for different energy regions. Updated ENSDF datasets for A = 1 - 44 and some nuclides with A > 190 were provided by Chunmei [6.5-6.8]. The primary ENSDF thermal neutron capture gamma-ray literature references are listed in Appendix B.

6.1.3. Reedy and Frankle database

The database of Reedy and Frankle encompasses essentially the same literature as ENSDF for the isotopes of elements from Z = 1-30 [6.9, 6.10]. These data are normalized per 100 neutron captures, but have been carefully evaluated for use in various important applications.

6.1.4. Budapest database

The largest amount of new data and the only complete source of radiative neutron capture gamma-ray cross sections came from the Institute of Isotope and Surface Chemistry, Budapest, Hungary. Neutron capture reactions on all naturally occurring elements except four noble gases (He, Ne, Ar, Kr), i.e., 79 elements from H to U, were studied on the PGAA guided thermal-neutron beam facility of the Budapest Research Reactor.

Capture gamma ray spectra were measured with natural targets using a Compton suppression spectrometer [6.11]. All elemental targets were measured together with a chlorine target in order to achieve a consistent energy calibration. The precise energies of two peaks from the 35Cl(n, γ) reaction [6.12] were used to determine the energies of two distinct peaks, which were then used for the energy calibration of elemental spectra after non-linearity correction. The accurate new energy and intensity data were sufficient to identify over 13,000 gamma rays from 79 elements. The data for transitions with cross sections greater than 5% of the largest cross section for each element are reported in Appendix A, and the complete Budapest measurements are included on the accompanying CD-ROM.

Measurements with composite targets (stoichiometric compounds, mixtures, or solutions) yielded accurate normalizing factors, with respect to the H(n, γ) cross section, by means of internal k_0 standardization [6.13]. Thus, very accurate determinations of the partial gamma-ray production cross sections and related k_0-factors became possible. Energies and k_0-factors for the most important gamma lines have been published [6.14, 6.15], and the data library has been discussed in Refs. [6.16-6.18]. Partial cross sections and k_0-factors for the best lines for each element were remeasured [6.19], often with several targets, and complemented with gamma-rays from short-lived decay products [6.20], as summarized in Table 6.1.

Table 6.1. Partial γ-ray cross sections for the elements as measured by internal standardization at the Budapest thermal guide [6.19]. Decay gamma rays are denoted by d in the energy column.

Z	El	Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
1	**H**	2223.2590(10)	0.3326(7)
3	**Li**	2032.300(20)	0.038(1)
4	**Be**	6809.58(10)	0.0054(5)
5	**B**	478(3)	713(5)
6	**C**	1261.71(6)	0.00120(2)
		4945.30(7)	0.00262(3)
7	**N**	1884.85(3)	0.01458(6)
8	**O**	870.68(3)	0.000175(8)
9	**F**	1633.53(3)d	0.0093(3)
11	**Na**	472.222(13)	0.497(5)
12	**Mg**	584.936(24)	0.0327(7)
13	**Al**	1778.92(3)d	0.233(4)
14	**Si**	3538.98(5)	0.119(2)
15	**P**	636.570(17)	0.031(1)
16	**S**	841.013(14)	0.357(7)
17	**Cl**	1951.150(15)	6.51(4)
19	**K**	770.325(23)	0.91(2)
20	**Ca**	1942.68(3)	0.34(1)
21	**Sc**	584.80(3)	1.83(3)
22	**Ti**	1381.74(3)	5.18(5)
23	**V**	1434.10(3)d	5.2(1)
24	**Cr**	834.80(3)	1.38(2)
25	**Mn**	846.829(1)d	13.3(2)
26	**Fe**	7631.05(9)	0.68(1)
27	**Co**	229.811(12)	7.18(7)
28	**Ni**	464.972(18)	0.843(9)
29	**Cu**	277.993(25)	0.893(9)
30	**Zn**	1077.336(17)	0.358(4)
31	**Ga**	690.943(24)	0.26(3)
32	**Ge**	595.879(20)	1.59(4)
33	**As**	165.09(3)	1.00(1)
34	**Se**	6600.67(12)	0.57(3)
35	**Br**	1248.78(12)	0.054(1)
37	**Rb**	556+557	0.132(2)
38	**Sr**	1836.05(3)	1.02(1)
39	**Y**	6080.12(7)	0.85(2)
40	**Zr**	213+214	0.125(6)
41	**Nb**	499.48(3)	0.065(5)
42	**Mo**	778.221(10)	2.04(5)
44	**Ru**	539.522(11)	1.5(1)
45	**Rh**	470.41(3)	2.50(7)
46	**Pd**	616.219(15)	0.638(6)
47	**Ag**	657.741(22)	1.93(4)
48	**Cd**	558.32(3)	1866(21)
49	**In**	5892.38(15)	2.1(2)
50	**Sn**	1293.53(6)	0.134(2)
51	**Sb**	921.04(4)	0.086(4)
52	**Te**	602.723(12)	2.4(2)
53	**I**	133.59(4)	1.42(5)
54	**Xe**	667.87(9)	6.9(10)
55	**Cs**	5505.46(20)	0.306(4)
56	**Ba**	1435.65(6)	0.308(6)
57	**La**	567.413(23)	0.333(7)
58	**Ce**	662.03(5)	0.233(18)
59	**Pr**	176.95(3)	1.06(2)
60	**Nd**	696.487(20)	33.2(7)
62	**Sm**	334.02(5)	4900(60)
63	**Eu**	89.97(8)	1450(20)
64	**Gd**	182.12(6)	7680(170)
65	**Tb**	74.89(8)	0.35(4)
66	**Dy**	184.34(7)	146(3)
67	**Ho**	136.67(4)	14.5(7)
68	**Er**	184.301(25)	57(2)
69	**Tm**	204.41(5)	8.7(1)
70	**Yb**	639.73(3)	1.5(1)
71	**Lu**	150.34(6)	13.7(4)
72	**Hf**	213+214	1.97(4)
73	**Ta**	270.48(6)	2.60(4)
74	**W**	145.74(9)	0.97(2)
75	**Re**	207.92(4)	4.5(2)
76	**Os**	186.85(3)	2.08(4)
77	**Ir**	351.59(5)	2.42(8)
78	**Pt**	355.54(4)	6.17(5)
79	**Au**	215.01(3)	7.77(5)
80	**Hg**	5967.00(10)	53(2)
81	**Tl**	873.16(8)	0.168(6)
82	**Pb**	7367.83(12)	0.137(3)
83	**Bi**	319.83(4)	0.017(2)
90	**Th**	256.25(11)	0.093(4)
92	**U**	4060.35(5)	0.186(3)

6.2. Evaluation databases

Two ENSDF-formatted datasets were created for each isotope, one from the Budapest experimental data, and another combining isotopic data from the above sources. The Budapest measurements were elemental, and gamma rays were assigned to an isotope and placed in the level scheme by comparing the energies and relative intensities with those in ENSDF. Additional, new gamma-ray placements were determined for some transitions by comparing the experimental data with the ENSDF Adopted Levels, and Gammas dataset. The gamma-ray energies and intensities from the literature and experimental datasets were then averaged to determine the adopted energies and cross sections.

The isotopic ENSDF database combines data from ENSDF, Reedy and Frankle, and additional references retrieved from the Nuclear Sciences Reference file (NSR) [6.21]. This dataset was evaluated further for the consistency of the normalization factors and the completeness of the data. Additional gamma-ray branches, internal conversion coefficients and other data were added from the ENSDF Adopted Levels and Gammas dataset.

6.3. Adopted gamma-ray energies

Gamma-ray energies were determined by a weighted least-squares fit of both the isotopic and experimental database gamma-ray energies to the level energies. Since the adopted gamma-ray energies are the level energy differences after correction for recoil, weak transitions could be determined to good precision. A chi-squared analysis was performed by comparing the input to the adopted data, and the uncertainties of individual outliers with $\chi^2/f > 4$ and/or all data in datasets with $\chi^2/f > 1$ were increased and the fit repeated until $\chi^2/f = 1$. Badly discrepant outliers were discarded, particularly when more accurate data were available. A typical fit of gamma-ray energies is shown in Table 6.2 for ^{24}Mg(n, γ).

6.4. Adopted gamma-ray cross sections

Measured experimental gamma-ray intensities were reported as elemental cross sections, whereas the corresponding literature values were typically compiled per 100 neutron captures of the isotope. These data were averaged by one of two methods:

- If a well-defined gamma-ray cross section existed in the literature, the gamma-ray intensities in the literature dataset were renormalized to that value, converted to an elemental cross section by means of the isotopic abundance [6.22], and averaged with the experimental values.
- If no precise normalization factor existed for most cross sections, the intensities in the literature dataset were renormalized by a factor chosen to minimize the weighted average difference between the literature and experimental intensity data. The renormalized intensities were then averaged with the experimental data to obtain the adopted cross sections.

A similar chi-squared analysis to that described for the energies was performed to handle outliers and discrepant data. The skew in the chi-squared distribution as a function of energy was used to probe systematic differences in the underlying efficiency curves, and discrepant data were adjusted or removed as necessary. A typical fit of gamma-ray intensities is shown in Table 6.3 for ^{24}Mg(n, γ).

Table 6.2 First iteration of a least squares fit of gamma-ray energies to the level scheme for ^{24}Mg(n, γ). Numbers in parentheses represent the discrepancy in the number to the right, compared to the adopted value, expressed in terms of the number of standard deviations. The uncertainties in each dataset were increased and additional iterations were performed until $\chi^2/f = 1$.

FITTED LEVEL ENERGIES – ^{24}Mg

1.	0.0		7.	3413.341	23
2.	585.001	16	8.	4276.32	3
3.	974.689	18	9.	4358.2	5
4.	1964.69	9	10.	5116.36	14
5.	2563.32	3	11.	7330.52	3
6.	2801.53	9			

	ENSDF		BUDAPEST	ADOPTED	Level-1	Level-2
	389.69 5	(1)	389.64 3	389.685 18	3	2
(2)	585.06 3	(2)	584.936 24	584.994 16	2	1
	611.8 10			611.80 9	7	6
(1)	836.95 10)		836.75 8	836.82 6	6	4
	849.9 3		849.93 16	850.01 3	7	5
(2)	863.09 5	(2)	862.88 4	862.962 23	8	7
(3)	974.84 5	(1)	974.61 3	974.669 18	3	1
	989.7 4			989.98 9	4	3
	1379.7 3		1379.69 19	1379.65 9	4	2
	1448.7 10			1448.61 9	7	4
	1474.8 10			1474.74 9	8	6
	1588.65 9	(1)	1588.40 9	1588.58 3	5	3
	1702.6 7			1702.96 14	10	7
	1713.05	(1)	1712.85 6	1712.94 3	8	5
	1964.7 4		1964.63 25	1964.61 9	4	1
	1978.25 5	(1)	1978.14 8	1978.24 3	5	2
	2213.8 5		2214.29 25	2214.05 14	11	10
	2216.5 6		2216.8 4	2216.42 9	6	2
(1)	2438.48 4	(1)	2438.42 9	2438.524 22	7	3
	2553.7 8			2552.90 14	10	5
	2563.6 5			2563.18 3	5	1
(1)	2801.0 3		2801.5 4	2801.36 9	6	1
(1)	2828.21 4		2828.12 10	2828.168 22	7	2
	2972.4 8			2972.2 5	11	9
	3053.99 4	(1)	3053.85 12	3054.00 3	11	8
	3301.42 5		3301.29 13	3301.40 3	8	3
(1)	3413.15 5		3413.04 14	3413.091 23	7	1
	3691.07		3690.98 18	3691.03 3	8	2
	3916.86 4	(1)	3916.65 16	3916.85 3	11	7
	4141.4 3		4141.38 24	4141.31 14	10	3
			4357.9 6	4357.8 5	9	1
	4528.47		4528.66 22	4528.55 9	11	6
	4766.86		4766.68 25	4766.71 4	11	5
	6355.02		6354.9 3	6354.96 3	11	3
(1)	6744.9 3			6744.54 3	11	2
(1)	7330.6 9			7329.37 3	11	1

ENSDF: $\chi^2/f = 1.561$, f = 25; Budapest: $\chi^2/f = 1.907$, f = 17

Total $\chi^2/f = 1.429$ (fit of 61 gamma transitions to 10 levels)

Table 6.3 First iteration of a least squares fit of gamma-ray intensities for ^{24}Mg(n, γ). Numbers between asterisks represent the discrepancy in the data to the left expressed in terms of the number of standard deviations. The uncertainties in each dataset were increased and additional iterations were performed until $\chi^2/f = 1$. Fitted cross sections from the Budapest reactor measurements were adopted.

	I_γ-ENSDF		**σ_γ-Budapest**		
E_γ	**I_γ(input)**	**I_γ(fit)**	**input**	**fit**	**Relative I_γ**
389.670 21	7.5 4	7.4 3	0.0058 3	0.00585 24	18.3 7
585.00 3	39.8 12	39.9 11	0.0316 15	0.0314 11	98.1 25
611.81 9	0.015 15	0.015 15		1.2E-05 12	0.04 4
836.83 6	0.21 3	0.200 19	1.52E-04 18	1.57E-04 15	0.49 5
849.99 4	0.070 20	0.084 14	7.2E-05 15	6.6E-05 11	0.21 4
862.96 3	0.48 5	0.52 3	0 .000420 25	0.000410 21	1.28 7
974.66 3	8.3 4	8.4 3	0.0067 3	0.00662 24	20.7 7
989.99 10	0.050 10	0.050 10		3.9E-05 8	0.123 25
1379.64 9	0.100 20	0.107 14	8.8E-05 14	8.4E-05 11	0.26 3
1448.62 10	0.015 15	0.015 15		1.2E-05 12	0.04 4
1474.75 10	0.015 15	0.015 15		1.2E-05 12	0.04 4
1588.61 4	0.37 4	0.316 22 ***1***	2.22E-04 19	2.49E-04 17 ***1***	0.78 5
1702.95 15	0.040 10	0.040 10		3.1E-05 10	0.098 25
1712.92 4	1.5 3	1.50 10	0.00118 7	0.00118 7	3.69 21
1964.61 10	0.060 20	0.092 18 ***1***	8.5E-05 20	7.2E-05 14	0.23 4
1978.25 3	1.42 11	1.41 7	0.00110 6	0.00111 5	3.46 15
2214.06 15	0.40 5	0.36 4	2.3E-04 4	0.00029 3 ***1***	0.89 9
2216.42 9	0.25 4	0.22 3	1.3E-04 3	1.75E-04 23 ***1***	0.55 7
2438.54 3	6.3 4	6.0 3	0.00459 22	0.00472 19	14.8 6
2552.88 15	0.030 10	0.030 10		2.4E-05 9	0.074 25
2563.21 4	0.070 20	0.070 20		5.5E-05 16	0.17 5
2801.37 9	0.170 20	0.158 17	8.2E-05 20	1.24E-04 14 ***2***	0.39 4
2828.172 25	30.5 10	30.5 9	0.0239 11	0.0240 8	74.9 20
2972.2 5	0.090 20	0.090 20		7.1E-05 17	0.22 5
3054.00 3	10.4 5	10.5 4	0.0083 4	0.0082 3	25.8 9
3301.41 3	7.7 4	7.9 3	0.0063 3	0.00619 24	19.3 7
3413.10 3	5.1 3	5.09 21	0.00400 20	0.00400 16	12.5 5
3691.02 3	0.90 8	0.86 5	0.00065 5	0.00067 4	2.11 12
3916.84 3	41.0 13	40.7 11	0.0314 15	0.0320 11	100 3
4141.31 14	0.21 3	0.195 20	1.42E-04 20	1.53E-04 16	0.48 5
4528.55 9	0.46 4	0.44 3	0.00029 5	0.00035 3 ***1***	1.09 8
4766.69 4	0.41 4	0.42 3	0.00033 3	0.000326 22	1.02 7
6354.98 3	1.31 9	1.35 7	0.00109 8	0.00106 6	3.31 17
6744.54 3	0.18 3	0.18 3		1.42E-04 25	0.44 7
7329.38 4	0.018 4	0.018 4		1.4E-05 3	0.044 10

ENSDF: $\chi^2/f = 0.266$ skew = – 0.214, f = 35.
Budapest: $\chi^2/f = 0.595$ skew = – 1.780, f = 25.

Gamma-ray intensity balances through the level scheme were used to determine the quality and completeness of the evaluated data. The total gamma-ray cross section feeding the ground state was compared with the corresponding values from Mughabghab et al [6.23-6.25], and the ratio of the total primary gamma-ray cross section to the cross section feeding the ground state indicated the completeness of the dataset. Intensity balances through intermediary levels indicate missing or anomalous intensities, and such problems were corrected whenever possible. An example of an intensity balance analysis with no important discrepancies is shown in Table 6.4 Level schemes are complete for the more abundant isotopes of the light nuclei, but significant inconsistencies in the intensity balance may arise for heavier nuclei and remain unresolved in the continuum.

Table 6.4 Cross-section balance for $^{24}Mg(n, \gamma)$ adopted data.

E(Level)	**σ(in)**	**σ(out)**	**Δσ**
0	0.0536(14)	0.0	0
585.01(3)	0.0406(11)	0.0398(14)	0.0008(18)
974.68(3)	0.0157(4)	0.0158(4)	0.0001(6)
1964.69(10)	0.00022(2)	0.00026(3)	0.00004(4)
2563.35(4)	0.00202(10)	0.00179(7)	0.00023(12)
2801.54(9)	0.00047(4)	0.00061(5)	0.00013(6)
3413.35(3)	0.0411(14)	0.0416(11)	0.0005(18)
4276.33(4)	0.0105(4)	0.0107(3)	0.0002(5)
4358.2(5)	0.00009(2)	0.0	0.00009(2)
5116.37(15)	0.00038(4)	0.00027(3)	0.00011(5)
7330.53(4)	0.0	0.0539(14)	0.0539(14)

σ(Mughabghab [6.23]) 0.0536(15) b
σ(Measured, average) 0.0538(14) b

6.5. Radioactive decay data

Gamma rays emitted by radioactive decay from isomers and activation products were observed simultaneously with the prompt gamma rays and have been included in this evaluation. Decay data were taken from the relevant ENSDF datasets and renormalized using the total cross sections from Mughabghab et al. [6.23-6.25], other literature, or the Budapest experimental data (only used when corrections for bombardment time were negligible). These data must be corrected for decay and saturation as described in Chapter 7.

Several naturally abundant isotopes emit gamma rays that can be used for quantitative analysis. Data are included for ^{40}K (1.265×10^9 y), ^{50}V (1.4×10^{14} y), ^{138}La (1.05×10^{11} y), ^{176}Lu (4.00×10^{10} y), ^{232}Th (1.405×10^{10} y), and ^{235}U (7.038×10^8 y). These gamma-ray intensities are provided in units of disintegrations per second per gram of the element.

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7. ADOPTED DATABASE AND USER TABLES

R.B. Firestone

The Evaluated Gamma-ray Activation File (EGAF) is a database of ≈ 32,000 adopted prompt gamma rays and ≈ 3000 gamma rays emitted by radioactive decay, and has been created for all stable isotopes of the elements from hydrogen to uranium. This complete EGAF database is available on the accompanying CD-ROM in both tabulated and Evaluated Nuclear Structure Data File (ENSDF) format [7.1]. Selected gamma rays with partial cross sections >1% of the most intense transitions are presented in the following tables, in which at least one prompt gamma ray and at least one decay gamma ray (when applicable) are listed for each isotope regardless of intensity. Energy-ordered gamma rays are given for each element with isotopic identification, energy and uncertainty in keV, and partial elemental cross section and k_0 and their uncertainties.

7.1. Numerical uncertainty presentation

Uncertainties in the tables are contained within parentheses, and expressed in terms of the last digit or digits of the recommended value without a decimal point. These uncertainties are defined as standard deviations corresponding to the 1σ confidence level, for example:

$$1234.5(12) \equiv 1234.5 \pm 1.2$$

$$1.234(5) \equiv 1.234 \pm 0.005$$

$$1.23(4) \times 10^{-5} \equiv (1.23 \pm 0.04) \times 10^{-5}$$

7.2. Isotopic data

The isotopic data are presented in Table 7.1. The first three columns give the atomic number *Z,* element symbol El, and mass number *A*, respectively. The natural abundances (θ) quoted in column 4 are representative isotopic compositions (Atom %) from the 1997 IUPAC values listed by Rosman and Taylor [7.2]. Thermal radiative cross sections (σ_γ) are listed in column 5 and discussed in Chapter 5 [7.3-7.5], while Trkov calculated the Westcott g-factors for 293K as listed in column 6 [7.6]. The number of prompt gamma rays reported for each isotope is given in column 7 (N_γ), and the most intense prompt capture gamma rays for that element is quantified in column 8.

7.3. Radioactive decay data

Gamma rays emitted by the radioactive decay of isomers and activation products are observed simultaneously with the prompt gamma rays and have been included in this evaluation. Decay data were taken from the ENSDF file and renormalized to the total radiative cross sections of Mughabghab [7.3-7.5] or to Budapest experimental data if corrections for the bombardment time were negligible. Radioactive decay data are presented in Table 7.2. The first column gives the mass number *A* and element symbol *El.* The decay mode is given in column 2 and the half-life in column 3. Column 4 indicates the %BR branching intensity for the indicated decay mode and column 5 gives the number of decay gamma rays N_γ reported for each parent and decay mode. Column 6 shows the energies E_γ and partial elemental gamma ray cross sections $\sigma_\gamma^z(E_\gamma)$ for the principal decay gammas. The naturally abundant radioisotopes ^{40}K, ^{50}V, ^{138}La, ^{176}Lu, ^{232}Th, and ^{235}U are indicated by *(nat)* next to the element symbol and the principal decay gamma ray activity in disintegrations per second per gram of the element is shown instead of the partial elemental gamma ray cross section $\sigma_\gamma^z(E_\gamma)$.

7.4. k_0 formulation

The k_0 formulation is commonly used in activation analysis because the product of the yield and cross section can usually be measured with greater accuracy than either parameter alone. A value of k_0 for a gamma ray emitted from isotope *i* is defined relative to the hydrogen standard on a mass scale:

$$k_0(E_\gamma) = k_z(E_\gamma) / k_H(2223)$$
$$= [\sigma_\gamma^z(E_\gamma) / A_r(Z)] / [\sigma_\gamma^H(2223)/ A_r(H)]$$
$$= 3.03 \times [\sigma_\gamma^z(E_\gamma) / A_r(Z)]$$

where $\sigma_\gamma^z(E_\gamma)$ is the partial elemental cross section in barns for the production of gamma ray E_γ from element *Z,* assuming natural abundance, and $A_r(Z)$ is the relative atomic weight of element *Z*. The partial elemental cross section for neutron capture on hydrogen is $\sigma_\gamma^H(2223) = 0.3326(7)$ and the $A_r(H) = 1.00794$, and $k_0(2223) \equiv 1$ by definition. For example, consider the 841.0-keV gamma ray from $^{32}S(n, \gamma)$ with $\sigma(841) = 0.347$ b and $A_r(S) = 32.066$:

$k_0(841) = 3.03 \times 0.347 / 32.066 = 0.0328$

7.5. PGAA data tables

Adopted PGAA database of prompt and delayed gamma rays is presented in Table 7.3.

7.5.1. Prompt gamma rays

Only k_0 values that are >1% of the largest value for each element are listed in Table 7.3, while those that are >10% are shown in bold type. Gamma rays with k_0 < 1% of the largest value are included in the full database on the CD-ROM. Both $\sigma_\gamma^z(E_\gamma)$ and $k_0(E_\gamma)$ values presented in this evaluation have the same percentage uncertainties because they are measured with respect to the very precise hydrogen value.

The 477.6-keV gamma ray from the $^{10}B(n, \alpha)$ reaction is uniquely identified in Table 7.3 because this emission undergoes Doppler broadening to a width of ≈ 15 keV.

The IUPAC atomic weight values [7.7] were used in the calculation of k_0, and the elemental cross section are shown in the header for each element in Table 7.3.

7.5.2. Radioactive decay gamma rays

Gamma rays from radioactive decay are denoted in Table 7.3 by *d* immediately after the energy and uncertainty. Saturation values for k_0 are listed, but many half-lives are too long for saturation to occur under normal experimental conditions. Percent saturation has been calculated, assuming 1-hour irradiation:

$$\% \text{ Saturation} = 100 \times [1.0 - (1.0 - e^{-\lambda t}) / \lambda t]$$

where $\lambda = \ln(2) / t_{1/2}$ and t = 3600 s. They are given in parentheses after the $k_0(E_\gamma)$ decay values in Table 7.3. Only decay gamma rays with $k_0(E_\gamma)$ > 10% of the largest k_0 values or the most intense gamma ray are listed in Table 7.3.

Gamma rays from several naturally abundant radioisotopes are included in Table 7.3 and indicated as “abundant” in the k_0 column. Instead of k_0 and $\sigma_\gamma^z(E_\gamma)$, the gamma emission rate per second per gram of the element is given as calculated by:

Gamma Emission Rate ($s^{-1}g^{-1}$) = $\lambda N P_\gamma$

$$= [\ln(2) / t_{1/2}] \times [N_A / A_r(Z)] \times \theta \times P_\gamma$$

where $t_{1/2}$ is the half-life, $N_A = 6.022 \times 10^{23}$ mol^{-1}, θ is the isotopic abundance (atom %), and P_γ is the absolute gamma-ray intensity per decay.

7.5.3. Energy-ordered gamma-ray table

Table 7.4 presents a list of energy-ordered gamma rays with $\sigma_\gamma^Z(E_\gamma)$ and $k_0(E_\gamma)$ values and the most intense gamma rays associated with these transitions. This table was abbreviated to include only those gamma rays with $k_0(E_\gamma) > 10\%$ of the largest value for each element (total of ≈ 1300 transitions). Radioactive decay transitions are also included, and have been appended with *d* immediately after the gamma-ray energy and uncertainty.

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Table 7.1 Isotopic data. Abundances are from Rosman and Taylor [7.2], σ_γ from Mughabab et al [7.3-5], and g-factors are from Trkov [7.6]. The number of prompt gamma rays (N_γ) reported for each isotope and the most intense gamma rays for each element are shown.

Z	El	A	Abundance(%)	σ_γ(total)	g(293K)	N_γ	E_γ, $\sigma_\gamma^z(E_\gamma)$ for most intense capture gammas for each element
1	H	1	99.9885(70)	0.3326(7)	0.999	1	2223.24835(0.3326)
	H	2	0.0115(70)	0.000519(7)	1.000	1	
2	He	3	0.000137(3)	0.000031(9)	1.000	1	
	He	4	99.999863(3)	0	1.000	0	
3	Li	6	7.59(4)	0.039(4)	1.000	3	
	Li	7	92.41(4)	0.045(3)	1.000	3	2032.30(0.0381), 980.53(0.00415), 1051.90(0.00414)
4	Be	9	100	0.0088(4)	1.000	13	6809.61(0.0058), 3367.448(0.00285), 853.630(0.00208)
5	B	10	19.9(7)	0.5(1)	1.000	10	477.595(716)
	B	11	80.1(7)	0.005(3)	1.000	0	
6	C	12	98.93(8)	0.00353(5)	1.000	6	4945.301(0.00261), 1261.765(0.00124), 3683.920(0.00122)
	C	13	1.07(8)	0.00137(4)	0.998	7	
7	N	14	99.632(7)	0.0798(14)	1.000	60	5269.159(0.0236), 5297.821(0.01680), 5533.395(0.0155)
	N	15	0.368(7)	0.000024(8)	1.003	12	
8	O	16	99.757(16)	0.000190(19)	1.000	4	
	O	17	0.038(1)	0.00054(7)	0.999	20	
	O	18	0.205(14)	0.00016(1)	1.000	13	
9	F	19	100	0.0096(5)	1.000	168	1633.53(0.0096)d, 583.561(0.00356), 656.006(0.00197)
10	Ne	20	90.48(3)	0.037(4)	1.000	27	2035.67(0.0245), 350.72(0.0198), 4374.13(0.01910)
	Ne	21	0.27(1)	0.67(11)	1.000	11	
	Ne	22	9.25(3)	0.045(6)	1.000	15	1979.89(0.00306), 1017.00(0.0030)
11	Na	23	100	0.530(5)	1.000	240	1368.66(0.530)d, 2754.13(0.530)d, 472.202(0.478)d
12	Mg	24	78.99(4)	0.0536(15)	1.001	35	3916.84(0.0320), 585.00(0.0314), 2828.172(0.0240)
	Mg	25	10.00(1)	0.200(5)	1.001	206	1808.668(0.0180), 1129.575(0.00891), 3831.480(0.00418)
	Mg	26	11.01(3)	0.0386(6)	1.001	44	
13	Al	27	100	0.231(3)	1.000	216	1778.92(0.232)d, 30.6380(0.0798), 7724.027(0.0493)
14	Si	28	92.2297(7)	0.177(5)	1.001	46	3538.966(0.1190), 4933.889(0.1120), 2092.902(0.0331)
	Si	29	4.6832(5)	0.119(3)	1.003	99	
	Si	30	3.0872(5)	0.107(2)	1.007	39	
15	P	31	100	0.172(6)	1.001	158	512.646(0.079), 78.083(0.059), 636.663(0.0311)
16	S	32	94.93(31)	0.548(10)	1.000	101	840.993(0.347), 5420.574(0.308), 2379.661(0.208)

Z	El	A	Abundance(%)	σ_γ(total)	g(293K)	N_γ	E_γ, $\sigma_\gamma^z(E_\gamma)$ for most intense capture gammas for each element
	S	33	0.76(2)	0.454(25)	1.001	249	
	S	34	4.29(28)	0.235(5)	1.001	55	
	S	36	0.02(1)	0.23(2)	1.014	22	
17	Cl	35	75.78(4)	43.5(4)	1.000	384	1164.8650(8.91), 517.0730(7.58), 6110.842(6.59)
	Cl	37	24.22(4)	0.430(6)	1.000	71	
18	Ar	36	0.3365(30)	5.2(5)	1.016	10	
	Ar	38	0.0632(5)	0.8(2)	1.040	0	
	Ar	40	99.6003(30)	0.66(1)	1.002	40	167.30(0.53), 4745.3(0.36), 1186.8(0.34)
19	K	39	93.2581(44)	2.1(2)	1.001	308	29.8300(1.380), 770.3050(0.903), 1158.887(0.1600)
	K	40	0.0117(1)	30(4)	1.000	490	
	K	41	6.7302(44)	1.45(3)	1.001	638	
20	Ca	40	96.94(16)	0.41(2)	1.001	49	1942.67(0.352), 6419.59(0.176), 4418.52(0.0708)
	Ca	42	0.647(23)	0.68(7)	1.001	44	
	Ca	43	0.135(10)	6.2(6)	1.001	129	
	Ca	44	2.09(11)	0.88(5)	1.001	41	
	Ca	46	0.004(3)	0.72(3)	1.000	10	
	Ca	48	0.187(21)	1.09(14)	1.001	15	
21	Sc	45	100	27.2(2)	1.002	440	227.773(7.13), 147.011(6.08), 142.528(4.88)d
22	Ti	46	8.25(3)	0.59(18)	1.001	23	
	Ti	47	7.44(2)	1.52(11)	1.001	175	
	Ti	48	73.72(3)	7.88(25)	1.002	92	1381.745(5.18), 6760.084(2.97), 6418.426(1.96)
	Ti	49	5.41(2)	1.79(12)	1.001	88	
	Ti	50	5.18(2)	0.179(3)	1.001	19	
23	V	50	0.250(4)	21(4)	0.999	328	
	V	51	99.750(4)	4.92(4)	1.001	309	1434.10(4.81)d, 125.082(1.61), 6517.282(0.78)
24	Cr	50	4.345(13)	15.9(2)	1.000	64	749.09(0.569), 8510.77(0.233), 8482.80(0.169)
	Cr	52	83.789(18)	0.76(6)	1.000	16	7938.46(0.424)
	Cr	53	9.501(17)	18.2(15)	1.000	90	834.849(1.38), 8884.36(0.78), 9719.06(0.260)
	Cr	54	2.365(7)	0.36(4)	1.000	38	
25	Mn	55	100	13.36(5)	1.000	126	846.754(13.10)d, 1810.72(3.62)d, 26.560(3.42)
26	Fe	54	5.845(35)	2.25(18)	1.001	33	9297.68(0.0747)
	Fe	56	91.754(36)	2.59(14)	1.000	193	7631.136(0.653), 7645.5450(0.549), 352.347(0.273)
	Fe	57	2.119(10)	2.5(3)	1.001	35	

Z	El	A	Abundance(%)	σ_γ(total)	g(293K)	N_γ	E_γ, $\sigma_\gamma^z(E_\gamma)$ for most intense capture gammas for each element
76	Fe	58	0.282(4)	1.30(3)	1.002	67	
27	Co	59	100	37.18(6)	1.000	340	229.879(7.18), 277.161(6.77), 555.972(5.76)
28	Ni	58	68.0769(89)	4.5(2)	1.000	236	8998.414(1.49), 464.978(0.843), 8533.509(0.721)
	Ni	60	26.2231(77)	2.9(2)	1.000	137	7819.517(0.336), 282.917(0.211), 7536.637(0.190)
	Ni	61	1.1399(6)	2.5(8)	1.000	64	
	Ni	62	3.6345(17)	14.5(3)	1.000	53	6837.50(0.458)
	Ni	64	0.9256(9)	1.63(7)	1.000	35	
29	Cu	63	69.17(3)	4.52(2)	1.001	306	278.250(0.893), 7915.62(0.869), 159.281(0.648)
	Cu	65	30.83(3)	2.17(3)	1.002	350	185.96(0.244), 465.14(0.1350), 385.77(0.1310)
30	Zn	64	48.63(60)	1.1(1)	1.001	78	115.225(0.167), 7863.55(0.1410), 855.69(0.066)
	Zn	66	27.90(27)	0.62(6)	1.000	17	6958.8(0.043)
	Zn	67	4.10(13)	9.5(14)	1.000	175	1077.335(0.356), 1883.12(0.0718), 1340.14(0.0457)
	Zn	68	18.75(51)	1.07(10)	1.000	33	1007.809(0.056), 5474.02(0.042), 834.77(0.037)
	Zn	70	0.62(3)	0.091(5)	1.000	79	
31	Ga	69	60.108(9)	1.68(7)	1.000	68	508.19(0.349), 690.943(0.305), 187.84(0.1080)
	Ga	71	39.892(9)	4.73(15)	1.001	245	834.08(1.65)d, 2201.91(0.52)d, 629.96(0.490)d
32	Ge	70	20.84(87)	3.45(16)	1.000	84	175.05(0.164), 499.87(0.162)
	Ge	72	27.54(34)	0.95(11)	1.000	48	
	Ge	73	7.73(5)	14.4(4)	1.000	603	595.851(1.100), 867.899(0.553), 608.353(0.250)
	Ge	74	36.28(73)	0.53(5)	1.000	47	
	Ge	76	7.61(38)	0.14(2)	1.000	196	
33	As	75	100	4.23(8)	1.000	348	559.10(2.00)d, 165.0490(0.996), 86.7880(0.579)
34	Se	74	0.89(4)	51.8(12)	1.001	142	286.5710(0.280)
	Se	76	9.37(29)	85(7)	1.000	456	238.9980(2.06), 520.6370(1.260), 161.9220(0.855)d
	Se	77	7.63(16)	42(4)	1.000	215	613.724(2.14), 694.914(0.443), 1308.632(0.317)
	Se	78	23.77(28)	0.430(22)	1.000	37	
	Se	80	49.61(41)	0.61(5)	1.000	71	
	Se	82	8.73(22)	0.044(3)	1.000	0	
35	Br	79	50.69(7)	10.32(13)	1.000	257	245.203(0.80), 271.374(0.462), 314.982(0.460)
	Br	81	49.31(7)	2.36(5)	1.000	181	776.517(0.990)d, 554.3480(0.838)d, 619.106(0.515)d
36	Kr	78	0.35(1)	4.7(7)	1.000	1	
	Kr	80	2.28(6)	11.5(5)	1.000	1	
	Kr	82	11.58(14)	19(4)	1.000	2	

Z	El	A	Abundance(%)	σ_γ(total)	g(293K)	N_γ	E_γ, $\sigma_\gamma^z(E_\gamma)$ for most intense capture gammas for each element
	Kr	83	11.49(6)	202(10)	0.995	75	881.74(20.8), 1213.42(8.28), 1463.86(7.10)
	Kr	84	57.00(4)	0.111(15)	1.000	7	
	Kr	86	17.30(22)	0.003(2)	1.000	38	
37	Rb	85	72.17(2)	0.48(9)	1.000	90	556.82(0.0913), 487.89(0.0494), 555.61(0.0407)d
	Rb	87	27.83(2)	0.12(3)	1.000	86	196.34(0.00964)
38	Sr	84	0.56(1)	0.62(6)	1.000	5	
	Sr	86	9.86(1)	1.04(7)	1.000	375	
	Sr	87	7.00(1)	17(3)	1.006	210	1836.067(1.030), 898.055(0.702), 850.657(0.275)
	Sr	88	82.58(1)	0.0058(4)	1.000	57	
39	Y	89	100	1.28(2)	1.005	397	6080.171(0.76), 776.613(0.659), 202.53(0.289)
40	Zr	90	51.45(40)	0.011(5)	1.000	15	1465.7(0.037), 1205.6(0.025), 2042.2(0.019)
	Zr	91	11.22(5)	1.24(25)	1.000	81	934.4640(0.0737), 1405.159(0.0178), 560.958(0.0169)
	Zr	92	17.15(8)	0.22(6)	1.000	18	
	Zr	94	17.38(28)	0.0499(24)	1.000	14	
	Zr	96	2.80(9)	0.020(1)	1.000	34	1102.67(0.0139)
41	Nb	93	100	1.15(5)	1.002	535	99.4070(0.211), 255.9290(0.190), 253.115(0.1420)
42	Mo	92	14.84(35)	0.019	1.000	5	
	Mo	94	9.25(12)	0.015	1.001	13	
	Mo	95	15.92(13)	13.4(3)	0.998	139	778.221(2.02), 849.85(0.43), 847.603(0.324)
	Mo	96	16.68(2)	0.5(2)	1.001	36	
	Mo	97	9.55(8)	2.5(2)	0.998	110	
	Mo	98	24.13(31)	0.137(5)	1.000	56	
	Mo	100	9.63(23)	0.199(3)	1.000	332	
44	Ru	96	5.54(14)	0.22(2)	1.001	2	
	Ru	98	1.87(3)	<8.0	1.002	1	
	Ru	99	12.76(14)	7.1(10)	1.002	134	539.538(1.53), 686.907(0.52)
	Ru	100	12.60(7)	5.0(6)	1.000	32	
	Ru	101	17.06(2)	3.4(9)	1.001	60	475.0950(0.98), 631.22(0.30), 627.970(0.176)
	Ru	102	31.55(14)	1.21(7)	1.000	173	1959.30(0.210)
	Ru	104	18.62(27)	0.47(2)	1.000	183	
45	Rh	103	100	145(2)	1.023	264	180.87(22.6), 97.14(19.5), 51.50(16.0)
46	Pd	102	1.02(1)	3.4(3)	0.997	4	
	Pd	104	11.14(8)	0.6(3)	1.000	11	

Z	El	A	Abundance(%)	σ_γ(total)	g(293K)	N_γ	E_γ, $\sigma_\gamma^z(E_\gamma)$ for most intense capture gammas for each element
	Pd	105	22.33(8)	21.0(15)	0.995	114	511.843(4.00), 717.356(0.777), 616.192(0.629)
	Pd	106	27.33(3)	0.31(3)	0.999	7	
	Pd	108	26.46(9)	7.6(4)	1.000	140	
	Pd	110	11.72(9)	0.23(3)	1.000	87	
47	Ag	107	51.839(8)	37.6(12)	0.998	172	78.91(3.90), 206.46(3.58), 192.90(2.20)
	Ag	109	48.161(8)	91(1)	1.005	130	198.72(7.75), 235.62(4.62), 117.45(3.85)
48	Cd	106	1.25(6)	~1.0	1.000	0	
	Cd	108	0.89(3)	0.72(13)	1.001	0	
	Cd	110	12.49(18)	11(1)	1.000	191	245.3(274)
	Cd	111	12.80(12)	24(3)	0.995	5	
	Cd	112	24.13(21)	2.2(5)	1.000	0	
	Cd	113	12.22(12)	20600(400)	1.337	135	558.32(1860), 651.19(358)
	Cd	114	28.73(42)	0.34(2)	1.000	0	
	Cd	116	7.49(18)	0.075(20)	1.000	0	
49	In	113	4.29(5)	15.1(13)	1.012	232	
	In	115	95.71(5)	283(8)	1.019	199	1293.54(131)d, 1097.30(87.3)d, 416.86(43.0)d
50	Sn	112	0.97(1)	0.86(9)	1.000	0	
	Sn	114	0.66(1)	0.12(3)	1.001	0	
	Sn	115	0.34(1)	30(7)	1.000	395	1293.591(0.1340), 972.619(0.0158), 2112.302(0.0152)
	Sn	116	14.54(9)	0.14(3)	1.000	9	158.65(0.0145)
	Sn	117	7.68(7)	1.32(18)	1.000	19	1229.64(0.0673)
	Sn	118	24.22(9)	0.23(5)	1.000	9	
	Sn	119	8.59(4)	2.2(5)	1.000	9	1171.28(0.0879)
	Sn	120	32.58(9)	0.14(3)	1.000	10	
	Sn	122	4.63(3)	0.139(15)	1.000	9	
	Sn	124	5.79(5)	0.134(5)	1.000	25	
51	Sb	121	57.21(5)	5.9(2)	1.003	151	564.24(2.700)d, 61.4130(0.75), 78.0910(0.48)
	Sb	123	42.79(5)	4.1(1)	1.001	175	87.6010(0.212), 40.8040(0.10), 155.1780(0.081)
52	Te	120	0.09(1)	2.3(3)	1.000	0	
	Te	122	2.55(12)	3.9(5)	1.000	113	
	Te	123	0.89(3)	418(30)	1.011	162	602.729(2.46), 722.772(0.52), 645.819(0.263)
	Te	124	4.74(14)	6.8(13)	1.000	280	
	Te	125	7.07(15)	1.55(16)	1.000	8	

Z	El	A	Abundance(%)	σ_γ(total)	g(293K)	N_γ	E_γ, $\sigma_\gamma^z(E_\gamma)$ for most intense capture gammas for each element
	Te	126	18.84(25)	1.0(15)	1.000	2	
	Te	128	31.74(8)	0.215(8)	1.000	23	
	Te	130	34.08(62)	0.29(6)	1.000	258	
53	I	127	100	6.2(2)	0.999	348	133.6110(1.42), 442.901(0.595)d, 27.3620(0.43)
54	Xe	124	0.09(1)	165(11)	1.004	4	
	Xe	126	0.09(1)	3.8(8)	1.000	0	
	Xe	128	1.92(3)	5.2(13)	0.998	7	
	Xe	129	26.44(24)	21(7)	1.001	59	536.17(1.71)
	Xe	130	4.08(2)	4.8(12)	0.998	13	
	Xe	131	21.18(3)	85(10)	1.002	72	667.79(6.7), 772.72(1.78), 630.29(1.41)
	Xe	132	26.89(6)	0.41(5)	1.000	0	
	Xe	134	10.44(10)	0.265(20)	0.999	0	
	Xe	136	8.87(16)	0.26(2)	1.000	113	
55	Cs	133	100	30.3(11)	1.002	384	176.4040(2.47), 205.615(1.560), 510.795(1.54)
56	Ba	130	0.106(1)	8.7(9)	1.000	2	
	Ba	132	0.101(1)	7.0(8)	0.979	2	
	Ba	134	2.417(18)	1.5(3)	1.000	120	
	Ba	135	6.592(12)	5.8(9)	1.000	87	818.514(0.212), 1261.52(0.095)
	Ba	136	7.854(24)	0.68(17)	1.000	96	283.58(0.0404)
	Ba	137	11.232(24)	3.6(2)	1.000	210	1435.77(0.308), 1444.91(0.0801), 462.78(0.0660)
	Ba	138	71.698(42)	0.40(4)	1.000	48	627.29(0.294), 4095.84(0.155), 454.73(0.0853)
57	La	138	0.090(1)	57(6)	1.003	6	
	La	139	99.910(1)	9.04(4)	0.999	308	1596.21(5.84)d, 487.021(2.79)d, 815.772(1.430)d
58	Ce	136	0.185(2)	6.5(10)	0.999	109	
	Ce	138	0.251(2)	1.02(24)	0.991	1	
	Ce	140	88.450(51)	0.58(2)	0.999	29	661.99(0.241), 4766.10(0.113), 475.04(0.082)
	Ce	142	11.114(51)	0.97(2)	0.998	48	1107.66(0.040), 737.43(0.026), 4336.46(0.0251)
59	Pr	141	100	11.5(3)	0.999	213	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)d
60	Nd	142	27.2(5)	18.7(7)	0.998	208	742.106(3.8)
	Nd	143	12.2(2)	325(10)	0.996	119	696.499(33.3), 618.062(13.4), 814.12(4.98)
	Nd	144	23.8(3)	3.6(3)	1.000	16	
	Nd	145	8.3(1)	42(2)	1.000	123	
	Nd	146	17.2(3)	1.41(5)	0.999	73	

Z	El	A	Abundance(%)	σ_γ(total)	g(293K)	N_γ	E_γ, $\sigma_\gamma^z(E_\gamma)$ for most intense capture gammas for each element
	Nd	148	5.7(1)	2.58(14)	1.000	298	
	Nd	150	5.6(2)	1.03(8)	0.999	581	
62	Sm	144	3.07(7)	1.64(10)	0.999	0	
	Sm	147	14.99(18)	57(3)	1.001	22	
	Sm	148	11.24(10)	2.4(6)	1.000	0	
	Sm	149	13.82(7)	40100(600)	1.718	160	333.97(4790), 439.40(28601), 737.44(597)
	Sm	150	7.38(1)	100(4)	0.998	301	
	Sm	152	26.75(16)	206(6)	1.003	160	
	Sm	154	22.75(29)	8.3(5)	1.000	136	
63	Eu	151	47.81(3)	9200(300)	0.900	148	89.847(1430), 77.23(187), 48.31(181)
	Eu	153	52.19(3)	312(7)	0.966	64	
64	Gd	152	0.20(1)	735(20)	0.998	503	
	Gd	154	2.18(3)	85(12)	1.000	329	
	Gd	155	14.80(12)	60900(500)	0.843	324	199.2130(2020), 88.9670(1380)
	Gd	156	20.47(9)	1.8(7)	1.001	0	
	Gd	157	15.65(2)	254000(800)	0.852	390	181.931(72003), 79.5100(40101), 944.174(3090)
	Gd	158	24.84(7)	2.2(2)	1.000	20	
	Gd	160	21.86(19)	1.4(3)	1.000	98	
65	Tb	159	100	23.3(4)	1.000	224	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
66	Dy	156	0.06(1)	33(3)	1.009	25	
	Dy	158	0.10(1)	43(6)	0.989	0	
	Dy	160	2.34(8)	55(3)	1.009	100	
	Dy	161	18.91(24)	600(25)	0.991	78	185.19(31.6), 882.27(14.8), 80.64(13.3)
	Dy	162	25.51(26)	194(10)	1.005	328	
	Dy	163	24.90(16)	134(7)	1.003	45	
	Dy	164	28.18(37)	2650(70)	0.988	271	184.257(118), 538.609(55.9), 496.931(36.3)
67	Ho	165	100	64.7(12)	1.002	550	136.6650(14.5), 116.8360(8.1), 80.574(3.87)d
68	Er	162	0.14(1)	19(2)	1.001	1	
	Er	164	1.61(3)	13(2)	1.000	0	
	Er	166	33.61(35)	16.9(16)	1.000	87	
	Er	167	22.93(17)	649(8)	1.069	805	184.2850(56), 815.9890(42.5), 198.2440(29.9)
	Er	168	26.78(26)	2.74(8)	1.000	102	
	Er	170	14.93(27)	8.9(3)	1.000	97	

Z	El	A	Abundance(%)	σ_γ(total)	g(293K)	N_γ	E_γ, $\sigma_\gamma^z(E_\gamma)$ for most intense capture gammas for each element
69	Tm	169	100	105(2)	1.005	303	204.4480(8.72), 149.7180(7.11), 144.4800(5.96)
70	Yb	168	0.13(1)	2300(170)	1.057	233	191.2140(0.22)
	Yb	170	3.04(15)	9.9(18)	1.001	24	
	Yb	171	14.28(57)	58(4)	0.999	266	78.7430(0.67), 181.529(0.53), 1076.246(0.52)
	Yb	172	21.83(67)	1.3(8)	1.000	25	
	Yb	173	16.13(27)	15.5(15)	1.001	47	175.30(0.58), 102.60(0.44), 76.9960(0.40)
	Yb	174	31.83(92)	63.2(15)	0.999	176	514.868(9.0)d, 639.261(1.43), 396.329(1.42)d
	Yb	176	12.76(41)	2.85(5)	1.000	129	
71	Lu	175	97.41(2)	23.1(14)	0.976	304	71.5170(3.96), 225.4030(1.73), 310.1870(1.49)
	Lu	176	2.59(2)	2090(70)	1.752	184	150.392(13.8), 457.944(8.3), 138.607(6.79)
72	Hf	174	0.16(1)	549(7)	0.986	23	
	Hf	176	5.26(7)	24(3)	1.002	5	
	Hf	177	18.60(9)	373(10)	1.020	308	213.439(29.3), 93.182(13.3), 325.559(6.69)
	Hf	178	27.28(7)	137(7)	1.003	347	214.3410(17.7)d, 214.3410(7.2), 303.9880(4.27)
	Hf	179	13.629(6)	41(3)	0.997	339	
	Hf	180	35.08(16)	13.04(7)	0.997	105	
73	Ta	180	0.012(2)	563(60)	1.358	0	
	Ta	181	99.988(2)	20.5(5)	1.004	262	270.4030(2.60), 173.2050(1.210), 402.623(1.180)
74	W	180	0.12(1)	<150	0.997	3	
	W	182	26.50(16)	19.9(2)	1.003	131	6190.78(0.45), 46.4840(0.192), 5164.43(0.19)
	W	183	14.31(4)	10.3(2)	0.999	211	111.216(0.195), 792.059(0.119), 903.274(0.115)
	W	184	30.64(2)	1.7(1)	0.999	75	4573.7(0.104)
	W	186	28.42(19)	38.5(5)	1.001	225	685.73(3.24)d, 479.550(2.59)d, 72.002(1.32)d
75	Re	185	37.40(2)	112(2)	1.004	188	59.0100(5.5), 137.157(5.29)d, 214.647(2.53)
	Re	187	62.60(2)	79.2(10)	0.982	218	63.5820(8.0), 155.041(7.16)d, 207.853(4.44)
76	Os	184	0.02(1)	3000(150)	1.000	72	
	Os	186	1.59(3)	80(13)	0.998	38	
	Os	187	1.96(2)	245(40)	0.983	174	155.10(1.19), 633.14(0.585), 478.04(0.523)
	Os	188	13.24(8)	4.7(5)	1.002	163	272.82(0.242)
	Os	189	16.15(5)	25(4)	1.004	147	186.7180(2.08), 557.978(0.84), 569.344(0.694)
	Os	190	26.26(2)	13.1(9)	0.997	76	5146.63(0.409), 527.60(0.300)
	Os	192	40.78(19)	3.12(16)	1.000	95	
77	Ir	191	37.3(2)	954(10)	0.996	286	351.689(10.9), 84.2740(7.7), 136.1250(6.5)

Z	El	A	Abundance(%)	σ_γ(total)	g(293K)	N_γ	E_γ, $\sigma_\gamma^z(E_\gamma)$ for most intense capture gammas for each element
	Ir	193	62.7(2)	111(5)	1.017	303	328.448(9.1)d, 371.5020(2.11), 278.5040(1.8)
78	Pt	190	0.014(1)	142(4)	0.998	0	
	Pt	192	0.782(7)	10.0(25)	1.001	0	
	Pt	194	32.967(99)	0.58(19)	1.000	64	
	Pt	195	33.832(10)	28.5(12)	1.000	235	355.6840(6.17), 332.985(2.580)
	Pt	196	25.242(41)	0.45(4)	1.000	36	
	Pt	198	7.163(55)	3.66(19)	1.000	44	
79	Au	197	100	98.65(9)	1.005	737	411.8020(94.29)d, 214.9710(9.0), 247.5730(5.56)
80	Hg	196	0.15(1)	3190(180)	0.988	10	
	Hg	198	9.97(20)	2.0(3)	1.001	3	
	Hg	199	16.87(22)	2150(50)	0.989	425	367.947(251), 5967.02(62.5), 1693.296(56.2)
	Hg	200	23.10(19)	<60	1.000	0	
	Hg	201	13.18(9)	5.7(12)	1.000	97	
	Hg	202	29.86(26)	4.42(7)	1.000	0	
	Hg	204	6.87(15)	0.43(10)	1.000	13	
81	Tl	203	29.524(14)	11.4(2)	1.000	115	139.94(0.400), 347.96(0.361), 318.88(0.325)
	Tl	205	70.476(14)	0.104(17)	1.000	13	
82	Pb	204	1.4(1)	0.66(7)	1.001	35	
	Pb	206	24.1(1)	0.0266(12)	1.001	6	
	Pb	207	22.1(1)	0.63(3)	1.001	23	7367.78(0.137)
	Pb	208	52.4(1)	0.00023(3)	1.003	0	
83	Bi	209	100	0.0338(7)	0.999	230	4171.05(0.0131), 4054.57(0.0105), 319.78(0.0088)
90	Th	232	100	7.35(3)	0.995	196	583.27(0.279), 566.63(0.19), 472.30(0.165)
92	U	234	0.0055(5)	99.8(13)	0.990	49	
	U	235	0.7200(51)	98.3(8)	0.985	8	297.00(0.220), 1279.01(0.200), 943.14(0.082)
	U	238	99.274(11)	2.680(19)	1.002	267	74.6640(1.30000)d, 106.1230(0.723)d, 277.5990(0.382)d

Table 7.2 Summary of Data for Radioactive Isotopes Produced by Thermal Neutron Activation.

Isotope	Mode	Half-life	%BR	N_γ	E_γ, $\sigma_\gamma^z(E_\gamma)$ for principal decay gammas
^{16}N	β–	7.13(2) s	100	12	6128.63(5.90x10^{-8})
^{19}O	β–	26.88(5) s	100	13	197.142(3.15x10^{-7}), 1356.843(1.66x10^{-7})
^{20}F	β–	11.163(8) s	100	3	1633.53(0.0096)
^{23}Ne	β–	37.24(12) s	100	5	440.0(0.00140)
^{24}Na	β–	14.9590(12) h	100	6	2754.13(0.530), 1368.66(0.530)
^{24}Na	IT	20.20(7) ms	99.95(1)	1	472.202(0.478)
^{27}Mg	β–	9.462(11) m	100	3	843.71(0.00298), 1014.30(0.00117)
^{28}Al	β–	2.2414(1) m	100	1	1778.92(0.232)
^{31}Si	β–	157.3(3) m	100	1	1266.15(2.5x10^{-6})
^{37}S	β–	5.05(2) m	100	7	3103.4(2.8x10^{-5})
^{38}Cl	β–	37.24(5) m	100	2	2166.90(0.0568), 1642.5(0.0427)
^{38}Cl	IT	715(3) ms	100	1	671.355(0.0122)
^{40}K(nat)	EC	1.265(13) x 10^{9} y	10.86(13)	1	1460.822(3.24 cps/g)
^{42}K	β–	12.360(12) h	100	8	1524.6(0.0200)
^{49}Ca	β–	8.718(6) m	100	12	3084.40(0.00190)
^{46}Sc	IT	18.75(4) s	100	1	142.528(4.88)
^{51}Ti	β–	5.76(1) m	100	3	320.076(0.00860)
^{50}V(nat)	β–	1.4(4) x 10^{17} y	17(11)	1	783.29(8x10^{-7} cps/g)
^{50}V(nat)	EC	1.4(4) x 10^{17} y	83(11)	1	1553.77(3.8x10^{-6} cps/g)
^{52}V	β–	3.75(1) m	100	13	1434.10(4.81)
^{55}Cr	β–	3.497(3) m	100	7	1528.00(3.80x10^{-6})
^{56}Mn	β–	2.5789(1) h	100	10	846.754(13.1), 1810.72(3.62), 2113.05(1.91)
^{60}Co	IT	10.467(6) m	99.76(3)	1	58.603(0.411)
^{60}Co	β–	10.467(6) m	0.24(3)	3	1332.89(0.068)
^{65}Ni	β–	2.51719(3) h	100	10	1481.84(0.00330), 1115.53(0.00219), 366.27(0.000680)
^{64}Cu	EC	12.700(2) h	61.0(3)	1	1345.77(0.0155)
^{66}Cu	β–	5.120(14) m	100	3	1038.97(0.0598)
^{69}Zn	β–	13.76(2) h	0.033(3)	1	573.90(4.2x10^{-6})
^{69}Zn	β–	56.4(9) m	100	2	318.40(2.6x10^{-6}), 871.70(5.5x10^{-7})
^{69}Zn	IT	13.76(2) h	99.967(3)	1	438.634(0.0128)
^{71}Zn	β–	2.45(10) m	100	23	511.60(1.60x10^{-4}), 910.30(4.0x10^{-5}), 390.0(1.97x10^{-5})
^{71}Zn	β–	3.96(5) h	100	56	487.34(3.34x10^{-5}), 620.19(3.04x10^{-5}), 511.55(1.52x10^{-5})
^{70}Ga	β–	21.14(3) m	99.59(6)	2	1039.20(0.0070), 176.170(0.0030)
^{72}Ga	β–	14.10(1) h	100	82	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{72}Ga	IT	39.68(13) ms	100	2	103.25(0.0526), 16.43(0.0125)
^{71}Ge	IT	20.40(17) ms	100	2	175.05(0.078)
^{73}Ge	IT	0.499(11) s	100	2	53.440(0.0134)
^{75}Ge	β–	82.78(4) m	100	10	264.60(0.0180), 198.60(0.00190)
^{75}Ge	IT	47.7(5) s	99.970(6)	1	139.68(0.0232)
^{77}Ge	β–	11.30(1) h	100	169	264.44(0.00640), 211.03(0.00367), 215.50(0.00341)
^{77}Ge	IT	52.9(6) s	19(2)	1	159.61(0.00100)
^{77}Ge	β–	52.9(6) s	81(2)	17	215.53(0.0025)
^{76}As	β–	26.24(9) h	100	50	559.10(2.00), 657.05(0.279)
^{77}Se	IT	17.36(5) s	100	1	161.9220(0.855)
^{79}Se	IT	3.92(1) m	100	1	95.73(0.0031)
^{81}Se	β–	18.45(12) m	100	10	275.93(0.00160), 290.04(0.00135), 828.27(0.00069)
^{81}Se	IT	57.28(2) m	99.949(13)	1	102.89(0.0065)
^{80}Br	β–	17.68(2) m	91.7(2)	4	616.3(0.39)
^{80}Br	EC	17.68(2) m	8.3(2)	2	665.80(0.0628)
^{80}Br	IT	4.4205(8) h	100	2	37.0520(0.428)
^{82}Br	β–	35.30(2) h	100	31	776.517(0.990), 554.3480(0.838), 619.106(0.515)

Isotope	Mode	Half-life	%BR	N_γ	E_γ, $\sigma_\gamma^z(E_\gamma)$ for principal decay gammas
^{82}Br	IT	6.13(5) m	97.6(3)	1	45.949(0.00285)
^{82}Br	β–	6.13(5) m	2.4(3)	16	776.50(0.00250), 1474.83(0.00090), 698.21(0.00053)
^{79}Kr	IT	50(3) s	100	1	130.010(1.60x10^{-4})
^{81}Kr	IT	13.10(3) s	99.9975(4)	1	190.46(0.072)
^{83}Kr	IT	1.83(2) h	100	2	9.4050(0.122)
^{85}Kr	β–	4.480(8) h	78.6(4)	6	151.195(0.0385)
^{85}Kr	IT	4.480(8) h	21.4(4)	1	304.870(0.0071)
^{87}Kr	β–	76.3(6) m	100	28	402.587(0.000257), 2554.80(4.78x10^{-5}), 845.44(3.80x10^{-5})
^{86}Rb	β–	18.631(18) d	99.9948(5)	1	1076.64(0.0301)
^{86}Rb	IT	1.017(3) m	100	1	555.61(0.0407)
^{88}Rb	β–	17.78(11) m	100	30	1836.00(0.00714), 898.03(0.00468)
^{85}Sr	EC	67.63(4) m	13.4(4)	1	150.75(0.00046)
^{85}Sr	IT	67.63(4) m	86.6(4)	2	231.68(0.0029)
^{87}Sr	IT	2.803(3) h	99.70(8)	1	388.526(0.0785)
^{90}Y	IT	3.19(6) h	99.9979(2)	2	202.53(0.0018), 479.60(0.0016)
^{97}Zr	β–	16.744(11) h	100	31	743.36(0.00101)
^{94}Nb	β–	6.26(1) m	0.50(6)	1	871.1(0.00390)
^{94}Nb	IT	6.26(1) m	99.50(6)	1	40.887(0.000574)
^{101}Mo	β–	14.61(3) m	100	163	590.10(0.00380), 191.920(0.00360), 1012.47(0.00258)
^{99}Mo	β–	65.94(1) h	100	30	140.5110(0.0276), 739.500(0.00405)
^{103}Ru	IT	1.69(7) ms	100	2	210.519(0.033)
^{105}Ru	β–	4.44(2) h	100	84	724.30(0.0760), 469.37(0.0281), 676.36(0.0251)
^{104}Rh	β–	42.3(4) s	99.55	14	555.81(3.14)
^{104}Rh	IT	4.34(5) m	99.87(1)	4	51.50(5.2)
^{107}Pd	IT	21.3( ) s	100	1	214.9(0.0024)
^{109}Pd	IT	4.69(1) m	100	1	188.9900(0.0273)
^{111}Pd	β–	23.4(2) m	100	76	580.00(1.90x10^{-4}), 70.43(1.68x10^{-4}), 1459.0(1.25x10^{-4})
^{111}Pd	IT	5.5(1) h	73(3)	1	172.18(0.0015)
^{108}Ag	β–	2.37(1) m	97.15(20)	1	632.98(0.369)
^{108}Ag	EC	2.37(1) m	2.85(20)	11	433.96(0.0990), 618.86(0.052)
^{110}Ag	β–	24.6(2) s	99.70(6)	13	657.50(1.86)
^{114}In	β–	71.9(1) s	99.50(15)	1	1299.83(2.4x10-4)
^{114}In	IT	43.1(6) ms	100	1	311.646(0.13)
^{116}In	β–	54.41(6) m	100	30	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{116}In	IT	2.18(4) s	100	1	162.393(15.8)
^{116}In	β–	14.10(3) s	100	10	1293.4(0.470), 463.3(0.0930)
^{123}Sn	β–	40.06(1) m	100	5	160.32(0.00580)
^{125}Sn	β–	9.52(5) m	100	23	331.90(0.00830)
^{122}Sb	β–	2.7238(2) d	97.59(12)	7	564.24(2.70)
^{122}Sb	IT	4.191(3) m	97.59(12)	3	61.4130(0.0200), 76.0590(0.0081)
^{124}Sb	β–	93(5) s	25(5)	4	498.40(0.068), 645.82(0.068), 602.72(0.068)
^{124}Sb	IT	93(5) s	75(5)	1	10.8630(1.40x10^{-5})
^{124}Sb	IT	20.2(2) m	100	2	10.8630(6.04x10^{-6}), 25.9820(4.45x10^{-6})
^{131}Te	β–	25.0(1) m	100	78	149.716(0.0630), 452.3230(0.0168)
^{131}Te	β–	30(2) h	77.8(16)	171	773.67(0.00355), 852.21(0.00192), 793.75(0.00129)
^{131}Te	IT	30(2) h	22.2(16)	1	182.250(0.00026)
^{128}I	β–	24.99(2) m	93.1(6)	7	442.901(0.595)
^{128}I	EC	24.99(2) m	6.9(1)	1	743.50(0.0051)
^{125}Xe	IT	56.9(9) s	100	2	111.3(0.0027), 141.4(0.00091)
^{129}Xe	IT	8.88(2) d	100	2	39.578(0.00069), 196.56(0.00042)
^{137}Xe	β–	3.818(13) m	100	83	455.490(0.00350)
^{134}Cs	IT	2.903(8) h	100	3	127.500(0.310)
^{131}Ba	IT	14.6(2) m	100	2	108.45(0.00150)

Isotope	Mode	Half-life	%BR	N_γ	E_γ, $\sigma_\gamma^z(E_\gamma)$ for principal decay gammas
^{133}Ba	IT	38.9(1) h	99.99	2	275.925(9.00x10-5)
^{135}Ba	IT	28.7(2) h	100	1	268.218(0.00060)
^{136}Ba	IT	0.3084(19) s	100	3	1048.073(0.000919), 818.514(0.000916), 163.920(0.000280)
^{137}Ba	IT	2.552(1) m	100	1	661.657(0.00071)
^{139}Ba	β–	83.06(3) m	100	28	165.8570(0.074)
^{140}Ba	β–	12.752(3) d	100	16	537.261(0.066), 29.966(0.0381), 162.660(0.0168)
^{138}La(nat)	β–	1.05(3) x 10^{11} y	33.6(5)	1	788.7(0.273 cps/g)
^{138}La(nat)	EC	1.05(3) x 10^{11} y	66.4(5)	1	1435.795(0.539 cps/g)
^{140}La	β–	1.6781(7) d	100	38	1596.21(5.84), 487.021(2.79), 815.772(1.43)
^{137}Ce	EC	9.0(3) h	100	20	447.15(1.30x10^{-4}), 10.61(5.6x10^{-5}), 436.59(1.86x10^{-5})
^{137}Ce	IT	34.4(3) h	99.22(3)	1	254.29(2.0x10^{-4})
^{139}Ce	IT	54.8(10) s	100	1	754.24(3.5x10^{-5})
^{142}Pr	β–	19.12(4) h	99.98	2	1575.6(0.426)
^{149}Nd	β–	1.728(1) h	100	213	211.309(0.0370), 114.314(0.0274), 270.166(0.0153)
^{151}Nd	β–	12.44(7) m	100	471	116.800(0.0262), 255.680(0.0099), 1180.890(0.0089)
^{155}Sm	β–	22.3(2) m	100	50	104.320(1.43)
^{152}Eu	IT	96(1) m	100	4	89.847(1.30)
^{155}Gd	IT	31.97(3) ms	100	3	86.545(0.00074), 13.47(7.6x10^{-5})
^{159}Gd	β–	18.56(8) h	100	20	363.5430(0.063), 58.000(0.0118)
^{161}Gd	β–	3.66(5) m	100	98	360.940(0.199), 314.920(0.075), 102.315(0.046)
^{157}Dy	EC	8.14(4) h	100	25	326.16(0.018)
^{165}Dy	β–	2.334(6) h	100	55	94.700(10.6), 361.680(2.50), 633.415(1.69)
^{165}Dy	β–	1.257(6) m	2.24(11)	11	515.467(6.93), 361.471(2.42), 153.803(1.10)
^{165}Dy	IT	1.257(6) m	97.76(11)	1	108.159(13.6)
^{166}Ho	β–	26.80(2) h	100	14	80.574(3.87), 1379.40(0.537)
^{167}Er	IT	2.269(6) s	100	1	207.801(2.15)
^{171}Er	β–	7.516(2) h	100	58	308.291(0.559), 295.901(0.251), 111.621(0.178)
^{169}Yb	IT	46(2) s	100	1	24.200(5.6x10^{-6})
^{175}Yb	β–	4.185(1) d	100	6	396.329(1.42), 282.522(0.666), 113.805(0.417)
^{175}Yb	IT	68.2(3) ms	100	1	514.868(9.0)
^{177}Yb	β–	1.911(3) h	100	24	150.6(0.073), 1080.20(0.0201), 1241.20(0.0125)
^{177}Yb	IT	6.41(3) s	100	2	104.50(0.029), 227.02(0.0047)
^{176}Lu(nat)	β–	4.00(22) x 10^{10} y	100	4	306.84(45.2 cps/g), 201.83(37.9 cps/g)
^{177}Lu	β–	6.73(1) d	100	6	208.366(6.0), 112.9500(3.47)
^{178}Hf	IT	4.0(2) s	100	6	426.380(0.175), 325.559(0.170), 213.439(0.1470)
^{179}Hf	IT	18.67(4) s	100	2	214.341(16.3)
^{180}Hf	IT	5.5(1) h	99.7(1)	6	332.275(0.0586), 443.163(0.0509), 215.426(0.0506)
^{182}Ta	IT	15.84(10) m	100	5	171.580(0.00540), 146.7740(0.00408), 184.951(0.00268)
^{183}W	IT	5.2(3) s	100	6	107.932(0.00438), 99.079(0.00189), 52.595(0.00157)
^{185}W	IT	1.67(3) m	100	12	65.86(3.44x10^{-5}), 131.550(2.56x10^{-5}), 173.680(1.93x10^{-5})
^{187}W	β–	23.72(6) h	100	74	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{186}Re	β–	3.7183(11) d	92.53(10)	8	137.157(5.29)
^{186}Re	EC	3.7183(11) d	7.47(10)	1	122.640(0.250)
^{188}Re	β–	17.005(4) h	100	51	155.041(7.16)
^{188}Re	IT	18.6(1) m	100	5	63.582(0.279), 105.862(0.140), 92.4640(0.066)
^{191}Os	IT	13.10(5) h	100	1	74.380(0.0032)
^{193}Os	β–	30.11(1) h	100	63	138.92(0.0467), 460.49(0.0432), 73.040(0.035)
^{192}Ir	IT	1.45(5) m	99.9825	1	56.719(0.085)
^{194}Ir	β–	19.28(13) h	100	65	328.448(9.1), 293.541(1.76)
^{194}Ir	IT	31.85(24) ms	100	9	112.231(0.302), 84.2840(0.168)
^{197}Pt	β–	19.8915(19) h	100	3	77.35(0.031), 191.437(0.00660)
^{197}Pt	IT	95.41(18) m	96.7(4)	2	346.50(0.00132)
^{199}Pt	β–	30.8(4) m	100	42	542.98(0.0390), 493.75(0.0147), 317.03(0.0130)

Isotope	Mode	Half-life	%BR	N_γ	E_γ, $\sigma_\gamma^z(E_\gamma)$ for principal decay gammas
^{199}Pt	IT	13.6(4) s	100	2	391.93(0.0212)
^{198}Au	β–	2.69517(21) d	100	3	411.8(94.29)
^{197}Hg	EC	23.8(1) h	8.6(7)	5	279.00(0.00330)
^{197}Hg	IT	23.8(1) h	91.4(7)	2	133.98(0.0155)
^{199}Hg	IT	42.6(2) m	100	3	158.30(0.000940), 374.10(2.47x10^{-4})
^{205}Hg	β–	5.2(1) m	100	13	203.750(0.00064)
^{206}Tl	β–	4.200(17) m	100	2	803.30(3.5x10^{-6})
^{207}Pb	IT	0.806(6) s	100	2	569.7(0.0014), 1063.662(0.0013)
^{232}Th(nat)	α	14.05(6) x 10^9 y	100	2	63.810(10.7 cps/g)
^{235}U(nat)	α	7.038(5) x 10^8 y	100	49	185.715(329 cps/g), 143.760(63.0 cps/g)
^{239}Np	β–	2.3565(4) d	100	36	106.1230(0.723), 277.5990(0.382), 228.1830(0.286)
^{239}U	β–	23.45(2) m	100	97	74.664(1.30)

Table 7.3 Adopted Prompt and Decay Gamma Rays from Thermal Neutron Capture for all Elements.

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
Hydrogen (Z=1), *At.Wt.*=1.00794(7), σ_γ^z =0.3326(7)			
^{1}H	**2223.24835(9)**	**0.3326(7)**	**1.0000(21)**
^{2}H	6250.243(3)	0.000519(7)(a)	0.001560(21)
Helium (Z=2), *At.Wt.*=4.002602(2), σ_γ^z =4.2E-11(12)			
^{3}He	**20520.46**	**4.2(12)E-11**	**3.2(9)E-11**
Lithium (Z=3), *At.Wt.*=6.941(2), σ_γ^z =0.045(3)			
σ_α^z (^{6}Li)=71.3(5)			
^{6}Li	477.595(3)	0.00153(8)	0.00067(4)
^{7}Li	**980.53(7)**	**0.00415(13)**	**0.00181(6)**
^{7}Li	**1051.90(7)**	**0.00414(12)**	**0.00181(5)**
^{7}Li	**2032.30(4)**	**0.0381(8)**	**0.0166(4)**
^{6}Li	6768.81(4)	0.00151(9)	0.00066(4)
^{6}Li	7245.91(4)	0.00247(14)	0.00108(6)
Beryllium (Z=4), *At.Wt.*=9.012182(3), σ_γ^z =0.0088(4)			
^{9}Be	**853.630(12)**	**0.00208(24)**	**0.00070(8)**
^{9}Be	**2590.014(19)**	**0.00191(15)**	**0.00064(5)**
^{9}Be	**3367.448(25)**	**0.00285(22)**	**0.00096(7)**
^{9}Be	**3443.406(20)**	**0.00098(7)**	**0.000330(24)**
^{9}Be	5956.53(3)	1.46(12)E-4	4.9(4)E-5
^{9}Be	**6809.61(3)**	**0.0058(5)**	**0.00195(17)**
Boron (Z=5), *At.Wt.*=10.811(7), σ_γ^z =0.104(20)			
σ_α^z (^{10}B)=764(25)			
^{10}B(n,α)	**477.595(3)**	**716(25)**	**201(7)**
^{10}B	6739.67(17)	0.0113(10)	0.0032(3)
Carbon (Z=6), *At.Wt.*=12.0107(8), σ_γ^z =0.00351(5)			
^{12}C	**1261.765(9)**	**0.00124(3)**	**0.000313(8)**
^{12}C	**3683.920(9)**	**0.00122(3)**	**0.000308(8)**
^{12}C	**4945.301(3)**	**0.00261(5)**	**0.000659(13)**
^{13}C	8174.04(18)	1.09(6)E-5	2.75(15)E-6
Nitrogen (Z=7), *At.Wt.*=14.0067(2), σ_γ^z =0.0795(14)			
σ_p^z(^{14}N)=1.82(3)			
^{14}N	583.59(3)	0.000429(14)	9.3(3)E-5
^{14}N	**1678.281(14)**	**0.0063(3)**	**0.00136(7)**
^{14}N	1681.24(5)	0.00129(8)	0.000279(17)
^{14}N	1853.922(19)	0.000508(10)	1.099(22)E-4
^{14}N	**1884.821(16)**	**0.01470(18)**	**0.00318(4)**
^{14}N	1988.632(20)	0.000289(16)	6.3(4)E-5
^{14}N	**1999.690(16)**	**0.00323(4)**	**0.000699(9)**
^{14}N	**2520.457(17)**	**0.00441(24)**	**0.00095(5)**
^{14}N	2830.789(17)	0.00134(3)	0.000290(7)
^{14}N	3013.482(21)	0.00057(5)	1.23(11)E-4
^{14}N	**3531.981(15)**	**0.0071(4)**	**0.00154(9)**
^{14}N	**3677.732(13)**	**0.0115(6)**	**0.00249(13)**
^{14}N	3855.577(19)	0.000626(16)	1.35(4)E-4
^{14}N	3884.242(18)	0.000436(13)	9.4(3)E-5
^{14}N	**4508.731(12)**	**0.0132(7)**	**0.00286(15)**
^{14}N	**5269.159(13)**	**0.0236(3)**	**0.00511(7)**
^{14}N	**5297.821(15)**	**0.01680(23)**	**0.00363(5)**
^{14}N	**5533.395(14)**	**0.0155(8)**	**0.00335(17)**
^{14}N	**5562.057(13)**	**0.0084(5)**	**0.00182(11)**
^{15}N	6128.63(4)d	5.90(12)E-8	1.28E-8[100%]
^{14}N	**6322.428(12)**	**0.01450(22)**	**0.00314(5)**
^{14}N	**7298.983(17)**	**0.00746(12)**	**0.00161(3)**
^{14}N	**8310.161(19)**	**0.00330(6)**	**0.000714(13)**
^{14}N	9148.98(5)	0.00129(6)	0.000279(13)
^{14}N	**10829.120(12)**	**0.0113(8)**	**0.00244(17)**
Oxygen (Z=8), *At.Wt.*=15.9994(3), σ_γ^z =1.90E-4(19)			
^{18}O	197.142(4)d	3.15(22)E-7	6.0E-8[99%]
(a) Total Deuterium isotopic cross section			
^{16}O	**870.68(6)**	**1.77(11)E-4**	**3.35(21)E-5**

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{16}O	**1087.75(6)**	**1.58(7)E-4**	**2.99(13)E-5**
^{17}O	1981.95(9)	2.0(4)E-7	3.8(8)E-8
^{16}O	**2184.42(7)**	**1.64(7)E-4**	**3.11(13)E-5**
^{16}O	**3272.02(8)**	**3.53(23)E-5**	**6.7(4)E-6**
Fluorine (Z=9), *At.Wt.*=18.9984032(5), σ_γ^z =0.0096(5)			
^{19}F	**166.700(20)**	**0.000413(18)**	**6.6(3)E-5**
^{19}F	325.606(24)	4.0(3)E-5	6.4(5)E-6
^{19}F	556.40(4)	2.01(8)E-4	3.21(13)E-5
^{19}F	**583.561(16)**	**0.00356(12)**	**0.000568(19)**
^{19}F	**656.006(18)**	**0.00197(7)**	**0.000314(11)**
^{19}F	661.647(21)	2.24(14)E-4	3.57(22)E-5
^{19}F	662.25(10)	1.02(15)E-4	1.63(24)E-5
^{19}F	**665.207(18)**	**0.00149(6)**	**2.38(10)E-4**
^{19}F	822.700(19)	2.20(9)E-4	3.51(14)E-5
^{19}F	978.19(5)	6.8(6)E-5	1.08(10)E-5
^{19}F	**983.538(20)**	**0.00116(4)**	**1.85(6)E-4**
^{19}F	1045.98(3)	1.79(8)E-4	2.86(13)E-5
^{19}F	**1056.776(17)**	**0.00095(3)**	**1.52(5)E-4**
^{19}F	1148.077(20)	0.000258(12)	4.12(19)E-5
^{19}F	1187.725(25)	4.5(3)E-5	7.2(5)E-6
^{19}F	1282.15(4)	8.5(5)E-5	1.36(8)E-5
^{19}F	**1309.126(17)**	**0.00076(3)**	**1.21(5)E-4**
^{19}F	1371.520(24)	1.44(7)E-4	2.30(11)E-5
^{19}F	**1387.901(20)**	**0.00082(3)**	**1.31(5)E-4**
^{19}F	1392.191(23)	8.3(5)E-5	1.32(8)E-5
^{19}F	1542.498(20)	0.000271(11)	4.32(18)E-5
^{19}F	**1633.53(3)d**	**0.0096(4)**	**0.00153[100%]**
^{19}F	1644.538(25)	7.3(6)E-5	1.16(10)E-5
^{19}F	**1843.688(20)**	**0.000600(23)**	**9.6(4)E-5**
^{19}F	1935.52(3)	7.3(5)E-5	1.16(8)E-5
^{19}F	1970.726(20)	8.5(6)E-5	1.36(10)E-5
^{19}F	2009.52(6)	4.6(4)E-5	7.3(6)E-6
^{19}F	2043.858(20)	7.0(4)E-5	1.12(6)E-5
^{19}F	2143.248(21)	1.95(8)E-4	3.11(13)E-5
^{19}F	2179.091(20)	8.9(6)E-5	1.42(10)E-5
^{19}F	2194.159(21)	1.32(6)E-4	2.11(10)E-5
^{19}F	2229.75(9)	5.3(5)E-5	8.5(8)E-6
^{19}F	2255.83(3)	8.5(5)E-5	1.36(8)E-5
^{19}F	2309.929(25)	4.5(3)E-5	7.2(5)E-6
^{19}F	2324.12(3)	1.18(5)E-4	1.88(8)E-5
^{19}F	2427.82(3)	1.89(8)E-4	3.01(13)E-5
^{19}F	**2431.084(10)**	**0.000392(24)**	**6.3(4)E-5**
^{19}F	2431.425(19)	7(3)E-5	1.1(5)E-5
^{19}F	2447.574(21)	1.44(7)E-4	2.30(11)E-5
^{19}F	2469.34(3)	1.94(9)E-4	3.09(14)E-5
^{19}F	2504.658(25)	3.8(4)E-5	6.1(6)E-6
^{19}F	2519.02(3)	6.8(5)E-5	1.08(8)E-5
^{19}F	**2529.212(18)**	**0.00061(3)**	**9.7(5)E-5**
^{19}F	2529.553(18)	9(3)E-5	1.4(5)E-5
^{19}F	2623.16(3)	4.5(3)E-5	7.2(5)E-6
^{19}F	2636.09(3)	9.6(5)E-5	1.53(8)E-5
^{19}F	2655.70(3)	7.6(6)E-5	1.21(10)E-5
^{19}F	2920.96(3)	9.6(5)E-5	1.53(8)E-5
^{19}F	2930.284(21)	8.5(5)E-5	1.36(8)E-5
^{19}F	2965.854(22)	9.3(5)E-5	1.48(8)E-5
^{19}F	**3014.568(10)**	**0.000405(15)**	**6.46(24)E-5**
^{19}F	3025.10(3)	8.4(9)E-5	1.34(14)E-5
^{19}F	3051.435(20)	0.000297(12)	4.74(19)E-5
^{19}F	3074.78(3)	1.86(8)E-4	2.97(13)E-5
^{19}F	3112.693(18)	2.36(9)E-4	3.76(14)E-5
^{19}F	3220.00(3)	6.1(4)E-5	9.7(6)E-6
^{19}F	3293.23(4)	3.8(8)E-5	6.1(13)E-6
^{19}F	3387.58(9)	6.1(5)E-5	9.7(8)E-6
^{19}F	**3488.064(18)**	**0.00073(3)**	**1.16(5)E-4**
^{19}F	3586.186(10)	0.000286(13)	4.56(21)E-5

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{19}F	3589.45(3)	1.79(8)E-4	2.86(13)E-5
^{19}F	3679.79(3)	8.7(8)E-5	1.39(13)E-5
^{19}F	3741.46(3)	5.7(5)E-5	9.1(8)E-6
^{19}F	3823.093(24)	1.07(6)E-4	1.71(10)E-5
^{19}F	**3964.872(20)**	**0.000435(18)**	**6.9(3)E-5**
^{19}F	4046.504(23)	6.0(16)E-5	1.0(3)E-5
^{19}F	4081.71(3)	5.6(4)E-5	8.9(6)E-6
^{19}F	4094.85(10)	5.1(17)E-5	8(3)E-6
^{19}F	4173.527(23)	1.66(7)E-4	2.65(11)E-5
^{19}F	4200.68(4)	1.11(6)E-4	1.77(10)E-5
^{19}F	4245.68(3)	9.5(5)E-5	1.52(8)E-5
^{19}F	4335.08(4)	4.6(4)E-5	7.3(6)E-6
^{19}F	**4556.817(20)**	**0.000517(23)**	**8.2(4)E-5**
^{19}F	4708.007(20)	5.1(4)E-5	8.1(6)E-6
^{19}F	4735.16(4)	5.6(4)E-5	8.9(6)E-6
^{19}F	4756.957(23)	1.86(9)E-4	2.97(14)E-5
^{19}F	4951.90(3)	6.2(6)E-5	9.9(10)E-6
^{19}F	**5033.530(23)**	**0.00063(3)**	**1.00(5)E-4**
^{19}F	**5279.360(20)**	**0.000421(20)**	**6.7(3)E-5**
^{19}F	5291.420(19)	2.35(11)E-4	3.75(18)E-5
^{19}F	5360.986(21)	1.17(5)E-4	1.87(8)E-5
^{19}F	**5543.713(10)**	**0.000407(17)**	**6.5(3)E-5**
^{19}F	5554.51(3)	5.1(4)E-5	8.1(6)E-6
^{19}F	5616.933(23)	1.41(8)E-4	2.25(13)E-5
^{19}F	5935.179(20)	9.1(8)E-5	1.45(13)E-5
^{19}F	**6016.802(16)**	**0.00094(4)**	**1.50(6)E-4**
^{19}F	**6600.175(16)**	**0.00096(3)**	**1.53(5)E-4**
Neon (Z=10), *At.Wt.*=20.1797(6), σ_γ^Z=0.039(4)			
^{20}Ne	**350.72(6)**	**0.0198(4)**	**0.00297(6)**
^{22}Ne	439.986d	0.001400(5)	2.102E-4[99%]
^{20}Ne	768.55(7)	2.5(4)E-4	3.8(6)E-5
^{20}Ne	964.41(7)	0.00029(11)	4.4(17)E-5
^{22}Ne	**1017.00(20)**	**0.0030(5)**	**0.00045(8)**
^{20}Ne	**1071.34(7)**	**0.0054(4)**	**0.00081(6)**
^{21}Ne	1274.542(7)	0.0018(5)	0.00027(8)
^{22}Ne	1364.8(3)	0.00091(12)	1.37(18)E-4
^{22}Ne	1822.40(20)	0.00052(5)	7.8(8)E-5
^{20}Ne	**1931.08(6)**	**0.00591(22)**	**0.00089(3)**
^{22}Ne	**1979.89(6)**	**0.00306(17)**	**0.00046(3)**
^{22}Ne	2013.8(4)	0.00040(5)	6.0(8)E-5
^{20}Ne	**2035.67(20)**	**0.0245(25)**	**0.0037(4)**
^{21}Ne	2082.5(4)	0.0011(3)	1.7(5)E-4
^{21}Ne	2165.9(7)	0.00084(21)	1.3(3)E-4
^{22}Ne	2203.58(6)	0.00238(23)	0.00036(4)
^{20}Ne	2437.84(25)	0.00036(7)	5.4(11)E-5
^{20}Ne	**2793.94(5)**	**0.00900(11)**	**0.001352(17)**
^{22}Ne	2819.22(16)	0.00052(5)	7.8(8)E-5
^{20}Ne	**2895.32(10)**	**0.00252(7)**	**0.000378(11)**
^{21}Ne	2987.8(5)	0.00086(22)	1.3(3)E-4
^{21}Ne	3181.8(16)	0.00048(12)	7.2(18)E-5
^{22}Ne	3220.42(16)	0.00057(23)	9(4)E-5
^{20}Ne	3971.98(15)	0.00039(3)	5.9(5)E-5
^{21}Ne	4018.3(5)	0.00090(23)	1.4(4)E-4
^{20}Ne	**4374.13(6)**	**0.01910(22)**	**0.00287(3)**
^{21}Ne	4634.83	0.00042(11)	6.3(17)E-5
^{21}Ne	4840.1(5)	0.00038(10)	5.7(15)E-5
^{20}Ne	5688.97(6)	0.00214(3)	0.000321(5)
^{20}Ne	6760.06(6)	0.002100(25)	0.000315(4)
^{21}Ne	9087.3(5)	0.00028(7)	4.2(11)E-5
Sodium (Z=11), *At.Wt.*=22.989770(2), σ_γ^Z=0.530(5)			
^{23}Na	**90.9920(10)**	**0.235(3)**	**0.0310(4)**
^{23}Na	**472.202(9)d**	**0.478(4)**	**0.0630[100%]**
^{23}Na	499.381(5)	0.0143(3)	0.00189(4)
^{23}Na	501.347(13)	0.00314(13)	0.000414(17)
^{23}Na	563.1920(20)	0.0085(3)	0.00112(4)
^{23}Na	711.967(10)	0.00430(22)	0.00057(3)
^{23}Na	778.221(9)	0.0058(3)	0.00076(4)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{23}Na	781.435(11)	0.0175(5)	0.00231(7)
^{23}Na	835.292(18)	0.0109(3)	0.00144(4)
^{23}Na	**869.210(9)**	**0.1080(13)**	**0.01424(17)**
^{23}Na	**874.389(6)**	**0.0760(11)**	**0.01002(15)**
^{23}Na	886.749(11)	0.00402(16)	0.000530(21)
^{23}Na	1006.23(4)	0.00370(18)	0.000488(24)
^{23}Na	1150.002(17)	0.00528(21)	0.00070(3)
^{23}Na	1282.764(8)	0.0055(3)	0.00073(4)
^{23}Na	1322.262(14)	0.0062(3)	0.00082(4)
^{23}Na	1337.73(4)	0.00313(20)	0.00041(3)
^{23}Na	1344.607(11)	0.0217(5)	0.00286(7)
^{23}Na	**1368.66(3)d**	**0.530(8)**	**0.0699[2.3%]**
^{23}Na	1373.751(8)	0.0079(19)	0.00104(25)
^{23}Na	1504.92(7)	0.00293(23)	0.00039(3)
^{23}Na	1562.470(21)	0.00256(20)	0.00034(3)
^{23}Na	1620.49(4)	0.00294(22)	0.00039(3)
^{23}Na	1633.080(23)	0.0074(4)	0.00098(5)
^{23}Na	**1636.293(21)**	**0.0250(7)**	**0.00330(9)**
^{23}Na	1712.43(20)	0.0112(6)	0.00148(8)
^{23}Na	1885.421(14)	0.0039(3)	0.00051(4)
^{23}Na	1899.06(4)	0.0081(4)	0.00107(5)
^{23}Na	1899.86(3)	0.0036(16)	0.00047(21)
^{23}Na	1914.44(3)	0.00606(21)	0.00080(3)
^{23}Na	1928.16(4)	0.00480(19)	0.000633(25)
^{23}Na	1928.37(4)	0.0055(5)	0.00073(7)
^{23}Na	1950.112(23)	0.0087(3)	0.00115(4)
^{23}Na	2019.50(8)	0.0025(3)	0.00033(4)
^{23}Na	**2025.139(22)**	**0.0341(8)**	**0.00450(11)**
^{23}Na	2027.104(25)	0.0038(5)	0.00050(7)
^{23}Na	2030.318(23)	0.0219(7)	0.00289(9)
^{23}Na	2071.78(3)	0.0059(3)	0.00078(4)
^{23}Na	**2208.40(3)**	**0.0259(9)**	**0.00341(12)**
^{23}Na	2361.026(21)	0.0084(3)	0.00111(4)
^{23}Na	2397.433(25)	0.0069(4)	0.00091(5)
^{23}Na	**2414.457(21)**	**0.0237(5)**	**0.00312(7)**
^{23}Na	2505.439(21)	0.0167(5)	0.00220(7)
^{23}Na	**2517.81(3)**	**0.0699(15)**	**0.00921(20)**
^{23}Na	2595.49(3)	0.0052(3)	0.00069(4)
^{23}Na	2630.66(3)	0.00289(14)	0.000381(18)
^{23}Na	2715.87(3)	0.00306(16)	0.000403(21)
^{23}Na	**2752.271(23)**	**0.0654(12)**	**0.00862(16)**
^{23}Na	**2754.13(6)d**	**0.530(8)**	**0.0699[2.3%]**
^{23}Na	2763.17(7)	0.0053(12)	0.00070(16)
^{23}Na	2808.468(22)	0.0168(7)	0.00221(9)
^{23}Na	2860.355(20)	0.0177(5)	0.00233(7)
^{23}Na	2865.534(22)	0.0130(4)	0.00171(5)
^{23}Na	2904.89(3)	0.0059(3)	0.00078(4)
^{23}Na	2940.91(3)	0.00347(18)	0.000457(24)
^{23}Na	2981.97(3)	0.0142(6)	0.00187(8)
^{23}Na	3025.99(4)	0.0146(6)	0.00192(8)
^{23}Na	3092.50(5)	0.0025(4)	0.00033(5)
^{23}Na	3093.79(8)	0.00280(20)	0.00037(3)
^{23}Na	3096.78(3)	0.0199(7)	0.00262(9)
^{23}Na	3099.99(3)	0.0160(9)	0.00211(12)
^{23}Na	3116.97(4)	0.00523(24)	0.00069(3)
^{23}Na	3209.59(10)	0.00381(20)	0.00050(3)
^{23}Na	3214.22(4)	0.0054(4)	0.00071(5)
^{23}Na	3277.32(10)	0.00377(17)	0.000497(22)
^{23}Na	3369.94(4)	0.0133(4)	0.00175(5)
^{23}Na	3409.39(3)	0.00237(11)	0.000312(15)
^{23}Na	3413.97(3)	0.00441(18)	0.000581(24)
^{23}Na	3504.94(3)	0.00676(23)	0.00089(3)
^{23}Na	3546.00(3)	0.00454(22)	0.00060(3)
^{23}Na	**3587.460(25)**	**0.0596(11)**	**0.00786(15)**
^{23}Na	3643.655(20)	0.0067(3)	0.00088(4)
^{23}Na	3878.10(3)	0.0218(6)	0.00287(8)
^{23}Na	**3981.450(25)**	**0.0677(11)**	**0.00892(15)**
^{23}Na	4187.49(3)	0.0073(5)	0.00096(7)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{23}Na	5113.007(16)	0.00250(14)	0.000330(18)
^{23}Na	5612.274(16)	0.0026(11)	0.00034(15)
^{23}Na	5614.239(18)	0.005(3)	0.0007(4)
^{23}Na	5617.452(17)	0.016(5)	0.0021(7)
^{23}Na	**6395.478(15)**	**0.1000(20)**	**0.0132(3)**
Magnesium (Z=12), *At.Wt.*=24.3050(6), σ_γ^z =0.0666(13)			
^{24}Mg	**389.670(21)**	**0.00586(24)**	**0.00073(3)**
^{24}Mg	**585.00(3)**	**0.0314(11)**	**0.00392(14)**
^{26}Mg	843.71(3)d	0.00298(14)	0.000372[78%]
^{24}Mg	862.96(3)	0.000410(21)	5.1(3)E-5
^{24}Mg	**974.66(3)**	**0.00663(24)**	**0.00083(3)**
^{26}Mg	984.88(4)	0.00064(4)	8.0(5)E-5
^{25}Mg	1003.14(3)	0.00161(6)	2.01(8)E-4
^{25}Mg	**1129.575(23)**	**0.00891(25)**	**0.00111(3)**
^{25}Mg	1411.70(3)	0.00130(5)	1.62(6)E-4
^{26}Mg	1615.11(4)	0.00070(4)	8.7(5)E-5
^{24}Mg	1712.92(4)	0.00118(7)	1.47(9)E-4
^{25}Mg	1775.31(3)	0.00129(5)	1.61(6)E-4
^{25}Mg	**1808.668(22)**	**0.0180(5)**	**0.00224(6)**
^{25}Mg	1896.72(3)	0.00094(4)	1.17(5)E-4
^{24}Mg	1978.25(3)	0.00111(5)	1.38(6)E-4
^{25}Mg	2132.67(3)	0.00089(4)	1.11(5)E-4
^{25}Mg	2189.57(4)	0.000592(22)	7.4(3)E-5
^{25}Mg	2353.27(4)	0.000447(21)	5.6(3)E-5
^{25}Mg	2426.12(3)	0.000519(20)	6.47(25)E-5
^{24}Mg	**2438.54(3)**	**0.00473(19)**	**0.000590(24)**
^{25}Mg	2510.02(4)	0.00058(3)	7.2(4)E-5
^{25}Mg	2523.65(4)	0.00100(4)	1.25(5)E-4
^{25}Mg	2541.21(3)	0.00148(7)	1.85(9)E-4
^{24}Mg	**2828.172(25)**	**0.0240(8)**	**0.00299(10)**
^{26}Mg	2881.64(3)	0.00272(14)	0.000339(17)
^{25}Mg	2938.159(25)	0.00094(4)	1.17(5)E-4
^{24}Mg	**3054.00(3)**	**0.0083(3)**	**0.00103(4)**
^{25}Mg	3208.97(4)	0.000398(19)	4.96(24)E-5
^{24}Mg	**3301.41(3)**	**0.00620(24)**	**0.00077(3)**
^{25}Mg	3319.65(3)	0.00100(4)	1.25(5)E-4
^{25}Mg	3341.00(4)	0.00046(3)	5.7(4)E-5
^{25}Mg	3406.41(16)	0.0014(5)	1.7(6)E-4
^{24}Mg	**3413.10(3)**	**0.00401(16)**	**0.000500(20)**
^{25}Mg	3551.19(3)	0.00109(4)	1.36(5)E-4
^{26}Mg	3561.29(3)	0.00249(12)	0.000310(15)
^{24}Mg	3691.02(3)	0.00068(4)	8.5(5)E-5
^{25}Mg	3744.00(3)	0.00136(5)	1.70(6)E-4
^{25}Mg	3810.13(4)	0.00097(4)	1.21(5)E-4
^{25}Mg	**3831.480(24)**	**0.00418(14)**	**0.000521(17)**
^{26}Mg	3843.00(5)	0.00033(3)	4.1(4)E-5
^{24}Mg	**3916.84(3)**	**0.0320(11)**	**0.00399(14)**
^{25}Mg	4216.38(3)	0.00145(5)	1.81(6)E-4
^{25}Mg	4410.13(3)	0.00067(4)	8.4(5)E-5
^{24}Mg	4528.55(9)	0.00035(3)	4.4(4)E-5
^{25}Mg	4602.93(3)	0.000363(17)	4.53(21)E-5
^{24}Mg	4766.69(4)	0.000327(22)	4.1(3)E-5
^{25}Mg	4967.19(3)	0.00162(7)	2.02(9)E-4
^{25}Mg	5067.14(3)	0.00096(4)	1.20(5)E-4
^{25}Mg	5452.025(25)	0.00206(7)	0.000257(9)
^{24}Mg	6354.98(3)	0.00106(6)	1.32(8)E-4
^{26}Mg	6442.52(3)	0.00039(4)	4.9(5)E-5
^{25}Mg	6742.14(3)	0.000411(19)	5.12(24)E-5
^{25}Mg	8153.448(21)	0.00285(11)	0.000355(14)
^{25}Mg	9282.642(20)	0.000438(18)	5.46(22)E-5
Aluminum (Z=13), *At.Wt.*=26.981538(2), σ_γ^z =0.231(3)			
^{27}Al	**30.6380(10)**	**0.0798(20)**	**0.00896(22)**
^{27}Al	400.589(25)	0.00141(4)	1.58(5)E-4
^{27}Al	831.426(22)	0.00269(7)	0.000302(8)
^{27}Al	865.84(3)	0.00087(3)	9.8(3)E-5
^{27}Al	941.75(3)	0.00246(5)	0.000276(6)
^{27}Al	**982.951(10)**	**0.00902(14)**	**0.001013(16)**
^{27}Al	1013.588(10)	0.00555(10)	0.000623(11)
^{27}Al	1073.94(4)	0.00100(4)	1.12(5)E-4
^{27}Al	1102.06(4)	0.00103(4)	1.16(5)E-4
^{27}Al	1125.289(14)	0.00083(4)	9.3(5)E-5
^{27}Al	1193.476(22)	0.00097(4)	1.09(5)E-4
^{27}Al	1283.693(12)	0.00222(6)	2.49(7)E-4
^{27}Al	1342.320(20)	0.00209(6)	2.35(7)E-4
^{27}Al	1408.344(9)	0.00640(13)	0.000719(15)
^{27}Al	1526.246(12)	0.00339(9)	0.000381(10)
^{27}Al	1589.62(3)	0.00247(7)	0.000277(8)
^{27}Al	**1622.877(18)**	**0.00989(15)**	**0.001111(17)**
^{27}Al	1705.509(22)	0.00080(5)	9.0(6)E-5
^{27}Al	**1778.92(3)d**	**0.232(4)**	**0.0261[95%]**
^{27}Al	1864.33(3)	0.00091(4)	1.02(5)E-4
^{27}Al	1927.527(25)	0.00262(7)	0.000294(8)
^{27}Al	1983.978(14)	0.00207(8)	2.32(9)E-4
^{27}Al	2108.197(10)	0.00549(11)	0.000617(12)
^{27}Al	2138.833(10)	0.00424(9)	0.000476(10)
^{27}Al	2170.70(3)	0.00082(5)	9.2(6)E-5
^{27}Al	2255.37(3)	0.00109(5)	1.22(6)E-4
^{27}Al	2271.686(21)	0.00396(10)	0.000445(11)
^{27}Al	**2282.794(9)**	**0.00890(17)**	**0.001000(19)**
^{27}Al	2451.565(11)	0.00106(7)	1.19(8)E-4
^{27}Al	2577.701(12)	0.00412(10)	0.000463(11)
^{27}Al	**2590.193(9)**	**0.00807(16)**	**0.000906(18)**
^{27}Al	2625.859(14)	0.00264(6)	0.000297(7)
^{27}Al	2709.62(3)	0.00140(7)	1.57(8)E-4
^{27}Al	2821.444(7)	0.00752(15)	0.000845(17)
^{27}Al	2954.47(7)	0.00098(5)	1.10(6)E-4
^{27}Al	**3033.896(6)**	**0.0179(3)**	**0.00201(3)**
^{27}Al	3265.538(13)	0.00082(6)	9.2(7)E-5
^{27}Al	3303.146(10)	0.00241(7)	0.000271(8)
^{27}Al	3346.970(13)	0.00111(5)	1.25(6)E-4
^{27}Al	3391.699(23)	0.00117(5)	1.31(6)E-4
^{27}Al	**3465.058(7)**	**0.0146(3)**	**0.00164(3)**
^{27}Al	3560.555(8)	0.00206(8)	2.31(9)E-4
^{27}Al	**3591.189(8)**	**0.01000(21)**	**0.001123(24)**
^{27}Al	3708.939(14)	0.00088(8)	9.9(9)E-5
^{27}Al	3789.326(12)	0.00191(8)	2.15(9)E-4
^{27}Al	3823.909(23)	0.00114(7)	1.28(8)E-4
^{27}Al	3849.111(8)	0.00699(17)	0.000785(19)
^{27}Al	3875.487(8)	0.00618(14)	0.000694(16)
^{27}Al	4015.658(13)	0.00166(7)	1.86(8)E-4
^{27}Al	**4133.407(7)**	**0.0149(3)**	**0.00167(3)**
^{27}Al	**4259.534(7)**	**0.0153(3)**	**0.00172(3)**
^{27}Al	4377.618(12)	0.00103(8)	1.16(9)E-4
^{27}Al	4428.414(13)	0.00185(8)	2.08(9)E-4
^{27}Al	4660.043(5)	0.00605(16)	0.000680(18)
^{27}Al	**4690.676(5)**	**0.01090(24)**	**0.00122(3)**
^{27}Al	**4733.844(11)**	**0.0126(3)**	**0.00142(3)**
^{27}Al	4736.92(10)	0.00100(22)	1.12(25)E-4
^{27}Al	4754.377(24)	0.00080(7)	9.0(8)E-5
^{27}Al	4764.477(11)	0.00210(10)	2.36(11)E-4
^{27}Al	4903.113(6)	0.00716(18)	0.000804(20)
^{27}Al	5103.711(8)	0.00097(6)	1.09(7)E-4
^{27}Al	5134.343(8)	0.00722(23)	0.00081(3)
^{27}Al	5302.642(11)	0.00124(9)	1.39(10)E-4
^{27}Al	5411.077(8)	0.00481(19)	0.000540(21)
^{27}Al	5585.651(11)	0.00279(12)	0.000313(13)
^{27}Al	5709.853(13)	0.00148(8)	1.66(9)E-4
^{27}Al	5766.296(25)	0.00091(8)	1.02(9)E-4
^{27}Al	6101.529(18)	0.00570(21)	0.000640(24)
^{27}Al	6198.143(11)	0.00210(14)	2.36(16)E-4
^{27}Al	6316.024(9)	0.00500(20)	0.000562(22)
^{27}Al	6440.650(11)	0.00147(8)	1.65(9)E-4
^{27}Al	6619.73(4)	0.00093(7)	1.04(8)E-4
^{27}Al	6710.699(10)	0.00220(12)	2.47(13)E-4
^{27}Al	**7693.397(4)**	**0.0081(3)**	**0.00091(3)**
^{27}Al	**7724.027(4)**	**0.0493(15)**	**0.00554(17)**

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
Silicon (Z=14), *At.Wt.*=28.0855(3), σ_γ^z =0.172(5)			
^{30}Si	752.215(23)	0.00316(10)	0.000341(11)
^{30}Si	1266.15(10)d	2.5(4)E-6	2.7E-7[12%]
^{28}Si	**1273.349(17)**	**0.0289(6)**	**0.00312(7)**
^{28}Si	1446.176(22)	0.00134(13)	1.45(14)E-4
^{28}Si	1867.32(3)	0.00129(14)	1.39(15)E-4
^{28}Si	**2092.902(18)**	**0.0331(6)**	**0.00357(7)**
^{29}Si	2235.227(22)	0.00250(11)	0.000270(12)
^{28}Si	2425.767(23)	0.00494(15)	0.000533(16)
^{30}Si	2780.552(22)	0.00241(13)	0.000260(14)
^{30}Si	3054.321(23)	0.00245(14)	0.000264(15)
^{29}Si	3101.19(3)	0.00149(8)	1.61(9)E-4
^{28}Si	**3538.966(22)**	**0.1190(20)**	**0.01284(22)**
^{28}Si	3660.713(23)	0.00703(21)	0.000759(23)
^{29}Si	3864.900(23)	0.00166(9)	1.79(10)E-4
^{28}Si	3954.39(3)	0.00449(19)	0.000484(21)
^{28}Si	**4933.889(24)**	**0.1120(23)**	**0.01209(25)**
^{28}Si	5106.693(22)	0.0064(3)	0.00069(3)
^{28}Si	**6379.801(21)**	**0.0207(6)**	**0.00223(7)**
^{29}Si	6743.25(3)	0.00170(9)	1.83(10)E-4
^{28}Si	**7199.199(23)**	**0.0125(4)**	**0.00135(4)**
^{28}Si	8472.209(23)	0.00381(18)	0.000411(19)
Phosphorus (Z=15), *At.Wt.*=30.973761(2), σ_γ^z =0.172(6)			
^{31}P	**78.083(20)**	**0.059(3)**	**0.0058(3)**
^{31}P	**512.646(19)**	**0.079(4)**	**0.0077(4)**
^{31}P	558.46(7)	0.0010(3)	1.0(3)E-4
^{31}P	**636.663(21)**	**0.0311(14)**	**0.00304(14)**
^{31}P	744.99(5)	0.00101(5)	9.9(5)E-5
^{31}P	1034.16(4)	0.00206(11)	2.02(11)E-4
^{31}P	**1071.217(23)**	**0.0249(12)**	**0.00244(12)**
^{31}P	1149.298(19)	0.00380(19)	0.000372(19)
^{31}P	1244.64(3)	0.00357(17)	0.000349(17)
^{31}P	1322.72(3)	0.00529(25)	0.000518(24)
^{31}P	1353.56(5)	0.00126(7)	1.23(7)E-4
^{31}P	1508.85(3)	0.00318(16)	0.000311(16)
^{31}P	1676.84(3)	0.00405(20)	0.000396(20)
^{31}P	1739.14(5)	0.00201(10)	1.97(10)E-4
^{31}P	1873.52(4)	0.00320(16)	0.000313(16)
^{31}P	1941.05(3)	0.00413(20)	0.000404(20)
^{31}P	**2114.47(3)**	**0.0115(5)**	**0.00113(5)**
^{31}P	**2151.52(4)**	**0.0100(5)**	**0.00098(5)**
^{31}P	**2156.90(4)**	**0.0128(6)**	**0.00125(6)**
^{31}P	2227.50(5)	0.00248(15)	2.43(15)E-4
^{31}P	2229.59(3)	0.00080(9)	7.8(9)E-5
^{31}P	2234.07(6)	0.00123(8)	1.20(8)E-4
^{31}P	2426.29(3)	0.00265(13)	0.000259(13)
^{31}P	2514.65(4)	0.00156(9)	1.53(9)E-4
^{31}P	2579.27(6)	0.00082(6)	8.0(6)E-5
^{31}P	**2586.00(4)**	**0.0089(4)**	**0.00087(4)**
^{31}P	2657.35(6)	0.00252(14)	2.47(14)E-4
^{31}P	2740.11(5)	0.00085(5)	8.3(5)E-5
^{31}P	2863.01(7)	0.00359(18)	0.000351(18)
^{31}P	2885.99(3)	0.0064(3)	0.00063(3)
^{31}P	**3058.17(4)**	**0.0110(4)**	**0.00108(4)**
^{31}P	3185.61(3)	0.00326(12)	0.000319(12)
^{31}P	**3273.98(4)**	**0.0083(3)**	**0.00081(3)**
^{31}P	3365.98(5)	0.00112(5)	1.10(5)E-4
^{31}P	3444.06(5)	0.00121(5)	1.18(5)E-4
^{31}P	**3522.59(3)**	**0.0219(8)**	**0.00214(8)**
^{31}P	3548.73(4)	0.00135(6)	1.32(6)E-4
^{31}P	3554.31(5)	0.00084(4)	8.2(4)E-5
^{31}P	**3899.89(3)**	**0.0294(10)**	**0.00288(10)**
^{31}P	3922.87(7)	0.00302(12)	0.000295(12)
^{31}P	3926.48(5)	0.00368(14)	0.000360(14)
^{31}P	3930.52(5)	0.00108(5)	1.06(5)E-4
^{31}P	3957.10(3)	0.00102(5)	9.98(5)E-5
^{31}P	4008.59(5)	0.00122(5)	1.19(5)E-4
^{31}P	4199.87(4)	0.0055(3)	0.00054(3)
^{31}P	4359.57(3)	0.00195(7)	1.91(7)E-4
^{31}P	4364.30(4)	0.0073(3)	0.00071(3)
^{31}P	4491.00(4)	0.00323(12)	0.000316(12)
^{31}P	4628.94(4)	0.00082(10)	8.0(10)E-5
^{31}P	4661.07(4)	0.00568(21)	0.000556(21)
^{31}P	**4671.37(3)**	**0.0194(7)**	**0.00190(7)**
^{31}P	4876.87(4)	0.00111(9)	1.09(9)E-4
^{31}P	4912.30(5)	0.00114(5)	1.12(5)E-4
^{31}P	5194.91(5)	0.00236(23)	2.31(23)E-4
^{31}P	5265.51(4)	0.0058(4)	0.00057(4)
^{31}P	5277.66(6)	0.00188(9)	1.84(9)E-4
^{31}P	5699.99(4)	0.00102(4)	9.98(4)E-5
^{31}P	5705.37(3)	0.00428(16)	0.000419(16)
^{31}P	5778.06(4)	0.00152(6)	1.49(6)E-4
^{31}P	**6785.504(24)**	**0.0267(15)**	**0.00261(15)**
^{31}P	**7422.022(25)**	**0.0082(3)**	**0.00080(3)**
^{31}P	7856.48(3)	0.00150(8)	1.47(8)E-4
Sulfur (Z=16), *At.Wt.*=32.065(5), σ_γ^z =0.534(10)			
^{36}S	646.171(14)	4.5(5)E-5	4.3(5)E-6
^{32}S	**840.993(13)**	**0.347(6)**	**0.0328(6)**
^{32}S	1472.401(14)	0.00870(19)	0.000822(18)
^{34}S	1572.333(6)	0.00408(12)	0.000386(11)
^{32}S	1697.24(3)	0.01250(25)	0.001181(24)
^{32}S	1964.86(3)	0.00659(22)	0.000623(21)
^{32}S	1967.11(3)	0.00357(18)	0.000337(17)
^{33}S	2127.491(12)	0.00246(10)	2.32(10)E-4
^{32}S	2216.722(17)	0.01210(23)	0.001144(22)
^{32}S	2313.354(17)	0.00366(13)	0.000346(12)
^{34}S	2347.695(7)	0.0060(3)	0.00057(3)
^{32}S	**2379.661(14)**	**0.208(5)**	**0.0197(5)**
^{32}S	2490.14(3)	0.0125(3)	0.00118(3)
^{32}S	2753.16(3)	0.0277(5)	0.00262(5)
^{32}S	2867.580(23)	0.00425(15)	0.000402(14)
^{32}S	**2930.67(3)**	**0.0832(13)**	**0.00786(12)**
^{36}S	3103.36d	2.8(14)E-5	2.7E-6[88%]
^{32}S	**3220.588(17)**	**0.117(5)**	**0.0111(5)**
^{32}S	3369.70(4)	0.0271(5)	0.00256(5)
^{32}S	3397.37(3)	0.00544(15)	0.000514(14)
^{32}S	3723.54(4)	0.0133(3)	0.00126(3)
^{32}S	4430.60(4)	0.0262(6)	0.00248(6)
^{34}S	4637.981(14)	0.00734(22)	0.000694(21)
^{32}S	**4869.61(3)**	**0.0650(13)**	**0.00614(12)**
^{32}S	5047.10(3)	0.0163(4)	0.00154(4)
^{32}S	**5420.574(24)**	**0.308(7)**	**0.0291(7)**
^{32}S	5583.50(3)	0.0086(3)	0.00081(3)
^{32}S	5887.96(3)	0.00373(17)	0.000353(16)
^{32}S	7799.815(24)	0.0144(5)	0.00136(5)
^{32}S	8640.594(25)	0.0098(7)	0.00093(7)
Chlorine (Z=17), *At.Wt.*=35.453(2), σ_γ^z =33.1(3)			
^{35}Cl	292.177(8)	0.0893(10)	0.00763(9)
^{35}Cl	436.222(4)	0.3090(20)	0.02641(17)
^{35}Cl	508.866(4)	0.108(17)	0.0092(15)
^{35}Cl	**517.0730(10)**	**7.58(5)**	**0.648(4)**
^{35}Cl	632.437(5)	0.1110(16)	0.00949(14)
^{35}Cl	**786.3020(10)**	**3.420(7)**	**0.2923(6)**
^{35}Cl	**788.4280(10)**	**5.42(5)**	**0.463(4)**
^{35}Cl	936.920(8)	0.1720(13)	0.01470(11)
^{35}Cl	1034.27(22)	0.100(16)	0.0085(14)
^{35}Cl	1131.250(9)	0.626(3)	0.0535(3)
^{35}Cl	1162.7390(20)	0.76(3)	0.065(3)
^{35}Cl	**1164.8650(10)**	**8.91(4)**	**0.762(3)**
^{35}Cl	1170.946(4)	0.154(5)	0.0132(4)
^{35}Cl	1327.405(9)	0.4020(23)	0.03436(20)
^{35}Cl	1372.872(12)	0.105(4)	0.0090(3)
^{35}Cl	**1601.072(4)**	**1.210(7)**	**0.1034(6)**
^{35}Cl	1627.04(8)	0.094(5)	0.0080(4)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{35}Cl	1640.099(10)	0.158(17)	0.0135(15)
^{35}Cl	1648.306(9)	0.174(5)	0.0149(4)
^{35}Cl	1729.929(9)	0.107(12)	0.0091(10)
^{35}Cl	1787.82(8)	0.177(6)	0.0151(5)
^{35}Cl	1828.49(4)	0.111(5)	0.0095(4)
^{35}Cl	1936.97(5)	0.153(9)	0.0131(8)
^{35}Cl	**1951.1400(20)**	**6.33(4)**	**0.541(3)**
^{35}Cl	**1959.346(4)**	**4.10(3)**	**0.350(3)**
^{35}Cl	1975.22(7)	0.214(22)	0.0183(19)
^{37}Cl	1980.94(7)	0.045(4)	0.0038(3)
^{35}Cl	2022.091(7)	0.161(6)	0.0138(5)
^{35}Cl	2034.63(3)	0.239(5)	0.0204(4)
^{35}Cl	2041.40(6)	0.121(5)	0.0103(4)
^{35}Cl	2075.440(13)	0.252(7)	0.0215(6)
^{35}Cl	2104(5)	0.105(7)	0.0090(6)
^{35}Cl	2156.19(4)	0.205(7)	0.0175(6)
^{37}Cl	2166.90(20)d	0.0568(15)	0.00486[40%]
^{35}Cl	2179.51(4)	0.12(5)	0.010(4)
^{35}Cl	2200.10(4)	0.123(5)	0.0105(4)
^{35}Cl	2289.78(16)	0.102(14)	0.0087(12)
^{35}Cl	2311.38(4)	0.35(10)	0.030(9)
^{35}Cl	2468.1830(20)	0.097(8)	0.0083(7)
^{35}Cl	2469.97(3)	0.24(3)	0.021(3)
^{35}Cl	2478(5)	0.101(20)	0.0086(17)
^{35}Cl	2489.74(9)	0.141(6)	0.0121(5)
^{35}Cl	2492.223(9)	0.11(4)	0.009(3)
^{35}Cl	2529.2(11)	0.121(13)	0.0103(11)
^{35}Cl	2537.25(7)	0.135(14)	0.0115(12)
^{35}Cl	2549.74(7)	0.090(15)	0.0077(13)
^{35}Cl	2622.86(5)	0.178(6)	0.0152(5)
^{35}Cl	2676.31(3)	0.533(4)	0.0456(3)
^{35}Cl	2797.90(4)	0.095(10)	0.0081(9)
^{35}Cl	2800.96(12)	0.183(7)	0.0156(6)
^{35}Cl	2808.86(7)	0.10(5)	0.009(4)
^{35}Cl	2810.988(9)	0.144(7)	0.0123(6)
^{35}Cl	2845.50(3)	0.349(3)	0.0298(3)
^{35}Cl	**2863.819(12)**	**1.820(10)**	**0.1556(9)**
^{35}Cl	2866.9(5)	0.192(12)	0.0164(10)
^{35}Cl	2876.49(5)	0.164(7)	0.0140(6)
^{35}Cl	2896.212(8)	0.146(6)	0.0125(5)
^{35}Cl	2975.21(7)	0.377(4)	0.0322(3)
^{35}Cl	2994.548(15)	0.279(8)	0.0238(7)
^{35}Cl	3001.07(5)	0.216(7)	0.0185(6)
^{35}Cl	3015.97(4)	0.328(3)	0.0280(3)
^{35}Cl	**3061.82(4)**	**1.130(7)**	**0.0966(6)**
^{35}Cl	3116.04(5)	0.297(3)	0.0254(3)
^{35}Cl	3332.87(8)	0.241(7)	0.0206(6)
^{35}Cl	3374.7(11)	0.179(7)	0.0153(6)
^{35}Cl	3428.83(5)	0.271(3)	0.0232(3)
^{35}Cl	3500.35(9)	0.100(6)	0.0085(5)
^{35}Cl	3561.37(7)	0.21(4)	0.018(3)
^{35}Cl	3566.32(4)	0.093(24)	0.0079(21)
^{35}Cl	3589.16(13)	0.18(5)	0.015(4)
^{35}Cl	3599.350(9)	0.164(6)	0.0140(5)
^{35}Cl	3604.14(17)	0.119(6)	0.0102(5)
^{35}Cl	3634.75(3)	0.098(6)	0.0084(5)
^{35}Cl	3749.91(10)	0.096(5)	0.0082(4)
^{35}Cl	3821.33(16)	0.320(10)	0.0274(9)
^{35}Cl	3825.22(13)	0.250(9)	0.0214(8)
^{35}Cl	3827.06(12)	0.238(17)	0.0203(15)
^{35}Cl	3962.67(4)	0.118(8)	0.0101(7)
^{35}Cl	3980.98(8)	0.331(7)	0.0283(6)
^{35}Cl	4054.25(5)	0.194(8)	0.0166(7)
^{35}Cl	4082.67(7)	0.263(5)	0.0225(4)
^{35}Cl	4138.39(9)	0.113(17)	0.0097(15)
^{35}Cl	4138.73(4)	0.095(10)	0.0081(9)
^{35}Cl	4298.33(4)	0.122(10)	0.0104(9)
^{35}Cl	4440.39(4)	0.377(4)	0.0322(3)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{35}Cl	4524.87(4)	0.148(7)	0.0127(6)
^{35}Cl	4547.5(5)	0.146(8)	0.0125(7)
^{35}Cl	4616.45(9)	0.210(10)	0.0180(9)
^{35}Cl	4728.94(4)	0.223(9)	0.0191(8)
^{35}Cl	4944.36(4)	0.379(8)	0.0324(7)
^{35}Cl	4945.25(3)	0.194(18)	0.0166(15)
^{35}Cl	**4979.759(20)**	**1.230(10)**	**0.1051(9)**
^{35}Cl	4989.66(12)	0.10(6)	0.009(5)
^{35}Cl	5017.74(7)	0.161(8)	0.0138(7)
^{35}Cl	5246.958(21)	0.195(10)	0.0167(9)
^{35}Cl	5517.25(4)	0.560(5)	0.0479(4)
^{35}Cl	5584.525(23)	0.158(11)	0.0135(9)
^{35}Cl	5603.76(9)	0.11(3)	0.009(3)
^{35}Cl	5702.58(6)	0.127(10)	0.0109(9)
^{35}Cl	**5715.244(21)**	**1.820(16)**	**0.1556(14)**
^{35}Cl	5733.56(3)	0.161(11)	0.0138(9)
^{35}Cl	5902.74(3)	0.372(4)	0.0318(3)
^{35}Cl	6086.804(20)	0.295(15)	0.0252(13)
^{35}Cl	**6110.842(18)**	**6.59(6)**	**0.563(5)**
^{35}Cl	6267.63(4)	0.13(4)	0.011(3)
^{35}Cl	**6619.615(19)**	**2.530(23)**	**0.2163(20)**
^{35}Cl	**6627.821(18)**	**1.470(16)**	**0.1257(14)**
^{35}Cl	6977.836(19)	0.741(10)	0.0633(9)
^{35}Cl	**7413.968(18)**	**3.29(5)**	**0.281(4)**
^{35}Cl	**7790.330(18)**	**2.66(3)**	**0.227(3)**
^{35}Cl	8578.575(18)	0.883(13)	0.0755(11)
Argon (Z=18), *At.Wt.*=39.948(1), σ_γ^z =0.675(10)			
^{40}Ar	**167.30(20)**	**0.53(5)**	**0.040(4)**
^{40}Ar	348.7(3)	0.044(9)	0.0033(7)
^{40}Ar	**516.0(3)**	**0.167(17)**	**0.0127(13)**
^{40}Ar	518.7	0.0060(20)	0.00046(15)
^{40}Ar	**837.7(3)**	**0.063(7)**	**0.0048(5)**
^{40}Ar	867.3(6)	0.0070(20)	0.00053(15)
^{40}Ar	1044.3(4)	0.040(8)	0.0030(6)
^{40}Ar	**1186.8(3)**	**0.34(3)**	**0.0258(23)**
^{40}Ar	1354.0(4)	0.015(4)	0.0011(3)
^{36}Ar	1409.7(10)	0.0060(12)	0.00046(9)
^{40}Ar	1828.8(12)	0.0070(20)	0.00053(15)
^{40}Ar	1881.5(10)	0.009(3)	0.00068(23)
^{40}Ar	2130.8(8)	0.029(5)	0.0022(4)
^{40}Ar	2432.5(8)	0.0055(14)	0.00042(11)
^{36}Ar	2490.8(8)	0.0088(22)	0.00067(17)
^{40}Ar	2566.1(8)	0.018(4)	0.0014(3)
^{40}Ar	2614.4(8)	0.019(4)	0.0014(3)
^{40}Ar	**2771.9(8)**	**0.057(9)**	**0.0043(7)**
^{40}Ar	2781.8(15)	0.011(3)	0.00083(23)
^{40}Ar	2810.6(8)	0.039(8)	0.0030(6)
^{40}Ar	2842.6(10)	0.0058(14)	0.00044(11)
^{40}Ar	3089.5(10)	0.0070(20)	0.00053(15)
^{40}Ar	3150.3(10)	0.026(5)	0.0020(4)
^{40}Ar	3365.6(10)	0.028(6)	0.0021(5)
^{40}Ar	3452.0(10)	0.013(3)	0.00099(23)
^{40}Ar	**3700.6(8)**	**0.065(7)**	**0.0049(5)**
^{40}Ar	**4745.3(8)**	**0.36(4)**	**0.027(3)**
^{40}Ar	**5582.4(8)**	**0.077(8)**	**0.0058(6)**
^{36}Ar	6298.9(10)	0.0076(19)	0.00058(14)
Potassium (Z=19), *At.Wt.*=39.0983(1), σ_γ^z =2.06(19)			
^{39}K	**29.8300(10)**	**1.380(20)**	**0.1070(16)**
^{41}K	106.836(7)	0.0320(6)	0.00248(5)
^{39}K	522.319(7)	0.0347(7)	0.00269(5)
^{39}K	646.222(5)	0.0451(8)	0.00350(6)
^{41}K	681.937(8)	0.0149(5)	0.00115(4)
^{39}K	**770.3050(20)**	**0.903(12)**	**0.0700(9)**
^{39}K	843.468(10)	0.0197(5)	0.00153(4)
^{39}K	891.385(13)	0.019(4)	0.0015(3)
^{39}K	1086.707(16)	0.0222(7)	0.00172(5)
^{39}K	**1158.887(10)**	**0.1600(25)**	**0.01240(19)**
^{39}K	1247.193(11)	0.0784(13)	0.00608(10)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
40 K	1293.589(5)	0.0041(8)	0.00032(6)
39 K	1303.515(19)	0.0550(12)	0.00426(9)
39 K	1373.227(18)	0.0251(7)	0.00195(5)
40 K	**1460.822(6)**	**3.24(5) $s^{-1}g^{-1}$**	**Abundant**
39 K	1480.024(24)	0.0353(9)	0.00274(7)
39 K	1489.676(10)	0.0277(8)	0.00215(6)
41 K	1524.6(3)d	0.02000(4)	0.001550[2.8%]
39 K	1613.756(10)	0.1190(20)	0.00922(16)
39 K	1618.973(10)	0.1300(21)	0.01008(16)
39 K	1704.656(23)	0.0244(8)	0.00189(6)
39 K	1795.438(24)	0.0292(8)	0.00226(6)
39 K	1825.815(19)	0.0147(7)	0.00114(5)
39 K	1929.169(10)	0.0397(9)	0.00308(7)
39 K	1956.515(24)	0.0406(11)	0.00315(9)
39 K	2007.69(3)	0.0513(12)	0.00398(9)
39 K	2017.472(11)	0.0540(12)	0.00419(9)
39 K	2039.924(18)	0.0519(13)	0.00402(10)
39 K	2047.301(11)	0.0537(13)	0.00416(10)
39 K	2069.752(18)	0.0363(10)	0.00281(8)
39 K	2073.793(19)	0.1370(24)	0.01062(19)
39 K	2153.86(3)	0.0158(7)	0.00122(5)
39 K	2206.22(4)	0.0166(12)	0.00129(9)
39 K	2206.26(3)	0.0157(17)	0.00122(13)
39 K	2230.54(3)	0.0202(10)	0.00157(8)
39 K	2290.420(19)	0.0582(13)	0.00451(10)
39 K	2346.22(4)	0.0138(7)	0.00107(5)
39 K	2367.30(3)	0.0157(7)	0.00122(5)
39 K	2389.245(10)	0.0301(10)	0.00233(8)
39 K	2545.99(3)	0.0536(12)	0.00415(9)
39 K	2609.97(3)	0.0213(7)	0.00165(5)
39 K	2614.18(3)	0.0165(6)	0.00128(5)
39 K	2638.866(24)	0.0144(6)	0.00112(5)
39 K	2726.780(24)	0.0225(9)	0.00174(7)
39 K	2756.678(17)	0.0404(22)	0.00313(17)
39 K	2799.04(3)	0.0145(7)	0.00112(5)
39 K	2806.42(3)	0.0256(9)	0.00198(7)
39 K	2938.17(3)	0.0140(9)	0.00109(7)
39 K	3055.30(3)	0.0464(12)	0.00360(9)
39 K	3262.28(4)	0.0376(11)	0.00291(9)
39 K	3304.17(4)	0.0146(7)	0.00113(5)
39 K	3338.05(6)	0.036(17)	0.0028(13)
39 K	3348.72(3)	0.0172(8)	0.00133(6)
39 K	3403.58(3)	0.0167(8)	0.00129(6)
39 K	3453.38(3)	0.0247(14)	0.00191(11)
39 K	3518.77(6)	0.0186(9)	0.00144(7)
39 K	3526.97(3)	0.0170(9)	0.00132(7)
39 K	3545.71(3)	0.0746(18)	0.00578(14)
39 K	3650.37(3)	0.0355(13)	0.00275(10)
39 K	3688.54(3)	0.0276(11)	0.00214(9)
39 K	3694.91(4)	0.0231(10)	0.00179(8)
39 K	3736.81(3)	0.0193(6)	0.00150(5)
39 K	3778.97(4)	0.0143(7)	0.00111(5)
39 K	3911.43(5)	0.0168(9)	0.00130(7)
39 K	3930.63(4)	0.0275(11)	0.00213(9)
39 K	3943.78(3)	0.0205(11)	0.00159(9)
39 K	3959.10(3)	0.0252(10)	0.00195(8)
39 K	3977.89(3)	0.0219(10)	0.00170(8)
39 K	4001.80(3)	0.0263(11)	0.00204(9)
39 K	4060.91(3)	0.0244(10)	0.00189(8)
39 K	4135.586(23)	0.0563(17)	0.00436(13)
39 K	4200.04(3)	0.0398(14)	0.00308(11)
39 K	4360.201(25)	0.0776(21)	0.00601(16)
39 K	4384.88(3)	0.0247(11)	0.00191(9)
39 K	4507.03(3)	0.0159(9)	0.00123(7)
39 K	4670.76(3)	0.0138(9)	0.00107(7)
39 K	4991.34(3)	0.0432(14)	0.00335(11)
39 K	5012.48(3)	0.0226(11)	0.00175(9)
39 K	5042.507(25)	0.0351(15)	0.00272(12)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
39 K	5068.870(21)	0.0224(12)	0.00174(9)
39 K	5173.196(21)	0.048(3)	0.00372(23)
39 K	**5380.018(16)**	**0.146(4)**	**0.0113(3)**
39 K	5508.660(21)	0.066(4)	0.0051(3)
39 K	5695.442(20)	0.114(3)	0.00884(23)
39 K	5729.308(22)	0.0437(18)	0.00339(14)
39 K	5751.758(17)	0.108(3)	0.00837(23)
39 K	6998.758(14)	0.0447(20)	0.00346(16)
39 K	7768.919(14)	0.117(7)	0.0091(5)
Calcium (Z=20), *At.Wt.*=40.078(4), σ_γ^z =0.431(19)			
44 Ca	174.12(7)	0.0168(4)	0.00127(3)
40 Ca	**519.66(5)**	**0.0503(13)**	**0.00380(10)**
40 Ca	660.00(5)	0.00487(18)	0.000368(14)
40 Ca	727.17(5)	0.0117(4)	0.00088(3)
43 Ca	1126.12(10)	0.00471(23)	0.000356(17)
40 Ca	1150.95(5)	0.0052(3)	0.000393(23)
43 Ca	1156.94(12)	0.0088(4)	0.00067(3)
44 Ca	1260.62(6)	0.00394(24)	0.000298(18)
40 Ca	1389.82(5)	0.0106(4)	0.00080(3)
40 Ca	1481.67(5)	0.0051(3)	0.000386(23)
40 Ca	1670.60(6)	0.0069(3)	0.000522(23)
44 Ca	1725.71(7)	0.0090(4)	0.00068(3)
40 Ca	**1942.67(3)**	**0.352(7)**	**0.0266(5)**
40 Ca	**2001.31(3)**	**0.0659(15)**	**0.00498(11)**
40 Ca	**2009.84(3)**	**0.0409(10)**	**0.00309(8)**
46 Ca	2013.57(20)	2.90E-05	2.20E-06
40 Ca	2290.43(5)	0.0077(4)	0.00058(3)
40 Ca	2605.34(6)	0.0061(4)	0.00046(3)
40 Ca	2660.37(7)	0.0074(4)	0.00056(3)
40 Ca	2767.92(7)	0.0070(15)	0.00053(11)
40 Ca	2810.06(5)	0.0167(5)	0.00126(4)
48 Ca	3084.40(10)d	0.00190(21)	1.44E-4[79%]
40 Ca	3584.77(7)	0.0100(5)	0.00076(4)
40 Ca	3609.80(6)	0.0283(9)	0.00214(7)
40 Ca	3759.48(7)	0.0117(5)	0.00088(4)
40 Ca	**4418.52(5)**	**0.0708(18)**	**0.00535(14)**
40 Ca	4516.54(17)	0.0049(3)	0.000371(23)
40 Ca	4749.21(7)	0.0134(7)	0.00101(5)
40 Ca	4962.79(7)	0.0067(4)	0.00051(3)
48 Ca	5146.19(21)	0.00147(20)	1.11(15)E-4
44 Ca	5514.55(14)	0.0104(8)	0.00079(6)
40 Ca	5692.53(6)	0.0067(5)	0.00051(4)
42 Ca	5885.87(16)	0.0024(4)	1.8(3)E-4
40 Ca	5900.02(6)	0.0258(12)	0.00195(9)
40 Ca	**6419.59(5)**	**0.176(5)**	**0.0133(4)**
Scandium (Z=21), *At.Wt.*=44.955910(8), σ_γ^z =27.20(20)			
45 Sc	**52.0110(10)**	**0.87(3)**	**0.0586(20)**
45 Sc	**142.528(8)d**	**4.88(7)**	**0.329[99%]**
45 Sc	**147.011(10)**	**6.08(9)**	**0.410(6)**
45 Sc	**216.44(4)**	**2.49(4)**	**0.168(3)**
45 Sc	**227.773(12)**	**7.13(11)**	**0.481(7)**
45 Sc	**228.716(12)**	**3.31(5)**	**0.223(3)**
45 Sc	280.726(12)	0.248(7)	0.0167(5)
45 Sc	**295.243(10)**	**3.97(11)**	**0.268(7)**
45 Sc	399.691(19)	0.202(7)	0.0136(5)
45 Sc	402.87(5)	0.107(6)	0.0072(4)
45 Sc	442.254(13)	0.096(6)	0.0065(4)
45 Sc	478.14(13)	0.073(10)	0.0049(7)
45 Sc	486.026(21)	0.593(14)	0.0400(9)
45 Sc	**539.437(20)**	**0.738(19)**	**0.0497(13)**
45 Sc	547.15(4)	0.373(12)	0.0251(8)
45 Sc	**554.44(4)**	**1.82(4)**	**0.123(3)**
45 Sc	**584.785(13)**	**1.77(3)**	**0.1193(20)**
45 Sc	**627.462(18)**	**2.23(5)**	**0.150(3)**
45 Sc	643.037(25)	0.259(9)	0.0175(6)
45 Sc	685.71(3)	0.149(9)	0.0100(6)
45 Sc	711.21(6)	0.104(8)	0.0070(5)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{45}Sc	721.841(17)	0.487(15)	0.0328(10)
^{45}Sc	773.851(17)	0.572(13)	0.0386(9)
^{45}Sc	807.754(20)	0.523(13)	0.0353(9)
^{45}Sc	835.16(4)	0.265(8)	0.0179(5)
^{45}Sc	843.494(23)	0.138(6)	0.0093(4)
^{45}Sc	860.707(19)	0.396(13)	0.0267(9)
^{45}Sc	899.27(5)	0.133(9)	0.0090(6)
^{45}Sc	941.95(5)	0.107(24)	0.0072(16)
^{45}Sc	1015.22(3)	0.256(12)	0.0173(8)
^{45}Sc	1057.89(3)	0.322(14)	0.0217(9)
^{45}Sc	1082.52(4)	0.160(11)	0.0108(7)
^{45}Sc	1123.17(5)	0.380(14)	0.0256(9)
^{45}Sc	1134.43(8)	0.132(9)	0.0089(6)
^{45}Sc	1166.45(6)	0.386(14)	0.0260(9)
^{45}Sc	1227.77(4)	0.332(13)	0.0224(9)
^{45}Sc	1251.68(6)	0.101(9)	0.0068(6)
^{45}Sc	1251.69(6)	0.129(23)	0.0087(16)
^{45}Sc	1268.87(6)	0.10(3)	0.0067(20)
^{45}Sc	1270.49(3)	0.269(13)	0.0181(9)
^{45}Sc	1285.34(4)	0.373(19)	0.0251(13)
^{45}Sc	1321.18(4)	0.206(23)	0.0139(16)
^{45}Sc	1321.96(4)	0.139(9)	0.0094(6)
^{45}Sc	1335.05(3)	0.640(22)	0.0431(15)
^{45}Sc	1510.13(6)	0.13(4)	0.009(3)
^{45}Sc	1575.27(3)	0.317(13)	0.0214(9)
^{45}Sc	1592.71(17)	0.11(3)	0.0074(20)
^{45}Sc	1618.36(6)	0.362(19)	0.0244(13)
^{45}Sc	1658.21(7)	0.107(12)	0.0072(8)
^{45}Sc	1693.30(4)	0.465(19)	0.0313(13)
^{45}Sc	1707.94(5)	0.077(10)	0.0052(7)
^{45}Sc	1753.85(4)	0.170(12)	0.0115(8)
^{45}Sc	1763.12(10)	0.077(10)	0.0052(7)
^{45}Sc	1777.43(11)	0.125(12)	0.0084(8)
^{45}Sc	1803.69(12)	0.075(9)	0.0051(6)
^{45}Sc	1814.92(4)	0.271(13)	0.0183(9)
^{45}Sc	1829.68(6)	0.152(10)	0.0102(7)
^{45}Sc	1857.59(4)	0.393(17)	0.0265(11)
^{45}Sc	1870.06(5)	0.206(13)	0.0139(9)
^{45}Sc	1885.97(7)	0.090(11)	0.0061(7)
^{45}Sc	1900.85(4)	0.274(11)	0.0185(7)
^{45}Sc	1913.59(6)	0.077(7)	0.0052(5)
^{45}Sc	1966.59(8)	0.080(8)	0.0054(5)
^{45}Sc	1975.36(6)	0.078(8)	0.0053(5)
^{45}Sc	2005.24(4)	0.351(11)	0.0237(7)
^{45}Sc	2058.84(9)	0.097(10)	0.0065(7)
^{45}Sc	2106.25(8)	0.143(11)	0.0096(7)
^{45}Sc	2110.20(10)	0.117(11)	0.0079(7)
^{45}Sc	2114.14(6)	0.210(13)	0.0142(9)
^{45}Sc	2129.69(4)	0.101(10)	0.0068(7)
^{45}Sc	2203.45(13)	0.102(10)	0.0069(7)
^{45}Sc	2243.06(6)	0.110(11)	0.0074(7)
^{45}Sc	2351.59(15)	0.074(9)	0.0050(6)
^{45}Sc	2362.36(9)	0.085(9)	0.0057(6)
^{45}Sc	2373.41(17)	0.086(9)	0.0058(6)
^{45}Sc	2404.82(7)	0.127(10)	0.0086(7)
^{45}Sc	2410.40(4)	0.087(9)	0.0059(6)
^{45}Sc	2477.42(6)	0.145(14)	0.0098(9)
^{45}Sc	2502.20(10)	0.082(12)	0.0055(8)
^{45}Sc	2635.55(8)	0.301(15)	0.0203(10)
^{45}Sc	2667.03(11)	0.127(14)	0.0086(9)
^{45}Sc	2693.90(9)	0.107(14)	0.0072(9)
^{45}Sc	2697.12(8)	0.084(14)	0.0057(9)
^{45}Sc	2721.37(16)	0.096(8)	0.0065(5)
^{45}Sc	2797.52(10)	0.105(11)	0.0071(7)
^{45}Sc	2991.04(11)	0.092(14)	0.0062(9)
^{45}Sc	2995.96(11)	0.079(13)	0.0053(9)
^{45}Sc	3011.73(8)	0.278(19)	0.0187(13)
^{45}Sc	3049.06(7)	0.106(12)	0.0071(8)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{45}Sc	3080.8(5)	0.087(12)	0.0059(8)
^{45}Sc	3265.48(7)	0.146(14)	0.0098(9)
^{45}Sc	3281.87(8)	0.08(4)	0.005(3)
^{45}Sc	3309.70(9)	0.08(3)	0.0054(20)
^{45}Sc	3351.10(12)	0.121(14)	0.0082(9)
^{45}Sc	3458.45(19)	0.156(15)	0.0105(10)
^{45}Sc	3596.86(10)	0.077(14)	0.0052(9)
^{45}Sc	3623.19(10)	0.13(6)	0.009(4)
^{45}Sc	3799.13(8)	0.125(13)	0.0084(9)
^{45}Sc	3878.05(12)	0.088(11)	0.0059(7)
^{45}Sc	3999.48(12)	0.086(17)	0.0058(11)
^{45}Sc	4006.31(10)	0.091(17)	0.0061(11)
^{45}Sc	4021.46(9)	0.092(17)	0.0062(11)
^{45}Sc	4059.52(8)	0.18(3)	0.0121(20)
^{45}Sc	4065.97(9)	0.079(19)	0.0053(13)
^{45}Sc	4109.60(9)	0.073(10)	0.0049(7)
^{45}Sc	4173.36(17)	0.11(3)	0.0074(20)
^{45}Sc	4231.81(16)	0.073(9)	0.0049(6)
^{45}Sc	4237.72(10)	0.096(17)	0.0065(11)
^{45}Sc	4293.30(21)	0.073(11)	0.0049(7)
^{45}Sc	4377.46(8)	0.127(15)	0.0086(10)
^{45}Sc	4465.89(13)	0.106(13)	0.0071(9)
^{45}Sc	4498.85(11)	0.149(15)	0.0100(10)
^{45}Sc	4617.93(9)	0.089(15)	0.0060(10)
^{45}Sc	4679.04(18)	0.112(14)	0.0075(9)
^{45}Sc	4720.86(11)	0.171(16)	0.0115(11)
^{45}Sc	4823.18(9)	0.078(11)	0.0053(7)
^{45}Sc	4883.71(13)	0.128(13)	0.0086(9)
^{45}Sc	4891.84(10)	0.094(12)	0.0063(8)
^{45}Sc	4919.38(11)	0.092(13)	0.0062(9)
^{45}Sc	4974.76(9)	0.498(24)	0.0336(16)
^{45}Sc	4993.58(10)	0.177(15)	0.0119(10)
^{45}Sc	5085.09(10)	0.103(14)	0.0069(9)
^{45}Sc	5128.48(12)	0.093(15)	0.0063(10)
^{45}Sc	5163.42(10)	0.149(20)	0.0100(13)
^{45}Sc	5210.11(12)	0.085(15)	0.0057(10)
^{45}Sc	5267.04(7)	0.38(3)	0.0256(20)
^{45}Sc	5286.20(8)	0.123(15)	0.0083(10)
^{45}Sc	5335.89(8)	0.20(3)	0.0135(20)
^{45}Sc	5346.19(10)	0.094(19)	0.0063(13)
^{45}Sc	5445.75(8)	0.170(19)	0.0115(13)
^{45}Sc	5481.62(9)	0.142(19)	0.0096(13)
^{45}Sc	5555.57(10)	0.079(14)	0.0053(9)
^{45}Sc	5583.82(10)	0.118(16)	0.0080(11)
^{45}Sc	5624.09(8)	0.198(20)	0.0133(13)
^{45}Sc	5665.71(9)	0.145(19)	0.0098(13)
^{45}Sc	5678.79(13)	0.077(16)	0.0052(11)
^{45}Sc	5743.38(7)	0.184(17)	0.0124(11)
^{45}Sc	5781.24(15)	0.072(15)	0.0049(10)
^{45}Sc	5896.94(8)	0.42(3)	0.0283(20)
^{45}Sc	5904.31(12)	0.084(17)	0.0057(11)
^{45}Sc	5977.32(10)	0.075(12)	0.0051(8)
^{45}Sc	6046.15(9)	0.144(19)	0.0097(13)
^{45}Sc	6055.05(5)	0.265(24)	0.0179(16)
^{45}Sc	6097.64(10)	0.082(12)	0.0055(8)
^{45}Sc	6170.22(4)	0.47(5)	0.032(3)
^{45}Sc	6201.40(13)	0.073(8)	0.0049(5)
^{45}Sc	6300.79(8)	0.183(25)	0.0123(17)
^{45}Sc	6309.27(11)	0.075(8)	0.0051(5)
^{45}Sc	6317.86(4)	0.58(4)	0.039(3)
^{45}Sc	6329.00(13)	0.185(22)	0.0125(15)
^{45}Sc	6349.80(4)	0.53(4)	0.036(3)
^{45}Sc	6364.43(9)	0.119(20)	0.0080(13)
^{45}Sc	6457.68(7)	0.099(14)	0.0067(9)
^{45}Sc	6468.55(13)	0.122(21)	0.0082(14)
^{45}Sc	6507.47(10)	0.107(12)	0.0072(8)
^{45}Sc	6557.06(6)	0.384(24)	0.0259(16)
^{45}Sc	6640.96(6)	0.150(23)	0.0101(16)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{45}Sc	6646.04(6)	0.113(12)	0.0076(8)
^{45}Sc	6716.79(4)	0.312(22)	0.0210(15)
^{45}Sc	**6839.09(4)**	**0.95(4)**	**0.064(3)**
^{45}Sc	**6840.34(4)**	**0.76(11)**	**0.051(7)**
^{45}Sc	6874.18(7)	0.125(14)	0.0084(9)
^{45}Sc	7117.46(3)	0.39(3)	0.0263(20)
^{45}Sc	7233.39(5)	0.110(14)	0.0074(9)
^{45}Sc	7489.58(3)	0.077(12)	0.0052(8)
^{45}Sc	7635.84(3)	0.40(3)	0.0270(20)
^{45}Sc	7924.84(4)	0.095(18)	0.0064(12)
^{45}Sc	8132.507(25)	0.48(3)	0.0324(20)
^{45}Sc	**8175.176(21)**	**1.80(6)**	**0.121(4)**
^{45}Sc	8315.73(4)	0.41(3)	0.0276(20)
^{45}Sc	8470.363(20)	0.120(14)	0.0081(9)
^{45}Sc	**8532.122(20)**	**0.89(4)**	**0.060(3)**
^{45}Sc	8759.850(20)	0.168(16)	0.0113(11)
Titanium (Z=22), *At.Wt.*=47.867(1), σ_γ^z =6.08(19)			
^{48}Ti	137.504(8)	0.0542(9)	0.00343(6)
^{46}Ti	159.376(14)	0.0090(8)	0.00057(5)
^{50}Ti	320.076(6)d	0.00860(9)	0.000544[86%]
^{48}Ti	**341.706(5)**	**1.840(21)**	**0.1165(13)**
^{47}Ti	983.517(4)	0.1140(16)	0.00722(10)
^{49}Ti	1121.130(6)	0.0630(14)	0.00399(9)
^{50}Ti	1166.6(4)	3.90E-03	2.50E-04
^{48}Ti	**1381.745(5)**	**5.18(12)**	**0.328(8)**
^{48}Ti	1498.663(7)	0.297(5)	0.0188(3)
^{49}Ti	1553.786(6)	0.0967(22)	0.00612(14)
^{48}Ti	**1585.941(5)**	**0.624(8)**	**0.0395(5)**
^{48}Ti	1589.282(10)	0.0524(16)	0.00332(10)
^{48}Ti	1761.974(7)	0.311(4)	0.01969(25)
^{48}Ti	1793.476(8)	0.1530(24)	0.00969(15)
^{48}Ti	2836.1(7)	0.055(12)	0.0035(8)
^{48}Ti	2836.9(7)	0.055(12)	0.0035(8)
^{48}Ti	2943.07(3)	0.0614(18)	0.00389(11)
^{48}Ti	3026.704(20)	0.145(3)	0.00918(19)
^{48}Ti	3027.0(7)	0.13(3)	0.0082(19)
^{48}Ti	3475.58(3)	0.1020(25)	0.00646(16)
^{48}Ti	3733.627(20)	0.0873(25)	0.00553(16)
^{48}Ti	3920.404(22)	0.0839(23)	0.00531(15)
^{48}Ti	3923.4(7)	0.13(3)	0.0082(19)
^{48}Ti	4713.859(25)	0.0661(21)	0.00418(13)
^{48}Ti	4881.394(15)	0.308(7)	0.0195(4)
^{48}Ti	4966.802(15)	0.196(5)	0.0124(3)
^{48}Ti	**6418.426(14)**	**1.96(6)**	**0.124(4)**
^{48}Ti	6555.911(14)	0.334(8)	0.0211(5)
^{48}Ti	**6760.084(14)**	**2.97(9)**	**0.188(6)**
Vanadium (Z=23), *At.Wt.*=50.9415(1), σ_γ^z =4.96(4)			
^{51}V	**17.152(6)**	**0.260(20)**	**0.0155(12)**
^{51}V	22.764(3)	0.0700(20)	0.00416(12)
^{51}V	**124.453(4)**	**0.23(5)**	**0.014(3)**
^{51}V	**125.082(3)**	**1.61(4)**	**0.0958(24)**
^{51}V	**147.846(3)**	**0.253(6)**	**0.0151(4)**
^{51}V	**295.023(14)**	**0.164(4)**	**0.00976(24)**
^{51}V	**419.475(13)**	**0.249(6)**	**0.0148(4)**
^{51}V	**436.627(13)**	**0.397(9)**	**0.0236(5)**
^{51}V	**645.703(13)**	**0.769(17)**	**0.0457(10)**
^{51}V	682.031(17)	0.0180(10)	0.00107(6)
^{51}V	698.104(13)	0.049(4)	0.00291(24)
^{51}V	712.907(19)	0.0597(23)	0.00355(14)
^{51}V	**793.546(13)**	**0.199(5)**	**0.0118(3)**
^{51}V	**823.184(13)**	**0.320(8)**	**0.0190(5)**
^{51}V	**845.948(13)**	**0.252(7)**	**0.0150(4)**
^{51}V	886.631(21)	0.0171(7)	0.00102(4)
^{51}V	982.175(19)	0.0307(17)	0.00183(10)
^{51}V	1001.583(21)	0.0651(21)	0.00387(12)
^{51}V	1254.878(17)	0.0257(13)	0.00153(8)
^{51}V	1270.951(15)	0.022(5)	0.0013(3)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{51}V	1272.67(3)	0.0291(21)	0.00173(12)
^{51}V	1307.279(17)	0.0410(19)	0.00244(11)
^{51}V	1322.664(22)	0.047(10)	0.0028(6)
^{51}V	1322.98(3)	0.0260(21)	0.00155(12)
^{51}V	1333.52(3)	0.0345(21)	0.00205(12)
^{51}V	1358.498(19)	0.151(5)	0.0090(3)
^{51}V	1401.641(16)	0.070(4)	0.00416(24)
^{51}V	1418.793(15)	0.068(4)	0.00405(24)
^{51}V	**1434.10(3)d**	**4.81(10)**	**0.286[91%]**
^{51}V	**1558.843(18)**	**0.323(8)**	**0.0192(5)**
^{50}V	1609.220(20)	0.0359(17)	0.00214(10)
^{51}V	1611.758(25)	0.0236(15)	0.00140(9)
^{51}V	1622.296(25)	0.0206(7)	0.00123(4)
^{51}V	1634.068(22)	0.0359(19)	0.00214(11)
^{51}V	1635.382(24)	0.020(4)	0.00119(24)
^{51}V	1664.192(17)	0.0519(24)	0.00309(14)
^{51}V	1732.563(20)	0.0161(16)	0.00096(10)
^{51}V	1775.431(21)	0.027(6)	0.0016(4)
^{51}V	**1777.961(19)**	**0.169(13)**	**0.0101(8)**
^{51}V	1952.964(14)	0.0677(25)	0.00403(15)
^{51}V	2020.749(18)	0.0214(17)	0.00127(10)
^{51}V	2083.652(14)	0.0339(19)	0.00202(11)
^{51}V	2100.804(14)	0.0239(15)	0.00142(9)
^{51}V	2145.826(18)	0.140(4)	0.00833(24)
^{51}V	2168.589(18)	0.0166(12)	0.00099(7)
^{51}V	2410.436(21)	0.0253(17)	0.00151(10)
^{51}V	2422.18(3)	0.112(24)	0.0067(14)
^{51}V	2841.64(3)	0.0333(19)	0.00198(11)
^{51}V	3032.60(9)	0.0249(20)	0.00148(12)
^{51}V	3502.64(4)	0.0306(18)	0.00182(11)
^{51}V	3534.07(3)	0.0243(21)	0.00145(12)
^{51}V	3577.98(3)	0.0271(20)	0.00161(12)
^{51}V	3715.86(3)	0.0256(21)	0.00152(12)
^{51}V	4116.821(23)	0.094(4)	0.00559(24)
^{51}V	4452.20(3)	0.050(10)	0.0030(6)
^{51}V	4486.46(3)	0.0187(20)	0.00111(12)
^{51}V	4772.17(3)	0.018(6)	0.0011(4)
^{51}V	4883.379(24)	0.073(4)	0.00434(24)
^{51}V	4992.94(4)	0.036(3)	0.00214(18)
^{51}V	**5142.363(23)**	**0.200(6)**	**0.0119(4)**
^{51}V	**5210.143(19)**	**0.244(20)**	**0.0145(12)**
^{51}V	**5515.813(23)**	**0.39(4)**	**0.0232(24)**
^{51}V	5551.32(3)	0.027(3)	0.00161(18)
^{51}V	5578.358(24)	0.019(3)	0.00113(18)
^{51}V	**5752.064(22)**	**0.366(24)**	**0.0218(14)**
^{51}V	5892.101(20)	0.126(7)	0.0075(4)
^{51}V	**6464.887(18)**	**0.43(4)**	**0.0256(24)**
^{51}V	**6517.282(19)**	**0.78(4)**	**0.0464(24)**
^{51}V	**6874.157(19)**	**0.49(6)**	**0.029(4)**
^{51}V	**7162.898(15)**	**0.59(4)**	**0.0351(24)**
^{51}V	7287.961(15)	0.056(4)	0.00333(24)
^{51}V	7293.572(16)	0.089(5)	0.0053(3)
^{51}V	**7310.721(15)**	**0.227(9)**	**0.0135(5)**
Chromium (Z=24), *At.Wt.*=51.9961(6), σ_γ^z =3.07(15)			
^{50}Cr	27.97(7)	0.124(4)	0.00723(23)
^{52}Cr	564.05(12)	0.1130(20)	0.00659(12)
^{50}Cr	**749.09(3)**	**0.569(9)**	**0.0332(5)**
^{53}Cr	**834.849(22)**	**1.38(3)**	**0.0804(17)**
^{50}Cr	888.95(7)	0.015(5)	0.0009(3)
^{53}Cr	989.074(23)	0.0139(5)	0.00081(3)
^{50}Cr	1149.83(3)	0.0214(4)	0.001247(23)
^{53}Cr	1241.33(7)	0.0140(5)	0.00082(3)
^{54}Cr	1528.00(20)d	3.800(12)E-6	2.215E-7[92%]
^{53}Cr	**1784.70(4)**	**0.1760(20)**	**0.01026(12)**
^{50}Cr	1898.90(3)	0.0852(21)	0.00497(12)
^{53}Cr	1994.52(6)	0.0545(14)	0.00318(8)
^{50}Cr	2001.05(5)	0.0199(10)	0.00116(6)
^{52}Cr	2105.8(5)	0.021(4)	0.00122(23)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{53}Cr	**2239.04(8)**	**0.186(3)**	**0.01084(17)**
^{52}Cr	2320.8(3)	0.136(3)	0.00793(17)
^{50}Cr	2348.52(7)	0.0164(10)	0.00096(6)
^{50}Cr	2376.49(5)	0.0362(9)	0.00211(5)
^{53}Cr	2558.19(11)	0.0197(7)	0.00115(4)
^{53}Cr	2601.79(8)	0.0404(12)	0.00235(7)
^{52}Cr	2669.8(5)	0.0263(12)	0.00153(7)
^{50}Cr	3021.27(12)	0.0139(8)	0.00081(5)
^{53}Cr	3177.78(15)	0.0234(8)	0.00136(5)
^{52}Cr	3616.7(4)	0.0260(12)	0.00152(7)
^{53}Cr	3719.70(6)	0.0675(24)	0.00393(14)
^{52}Cr	4322.1(3)	0.0269(15)	0.00157(9)
^{53}Cr	4847.56(8)	0.0346(15)	0.00202(9)
^{53}Cr	4871.96(8)	0.0180(10)	0.00105(6)
^{50}Cr	5220.72(12)	0.0184(17)	0.00107(10)
^{53}Cr	5268.15(11)	0.0465(25)	0.00271(15)
^{52}Cr	5268.9(5)	0.050(6)	0.0029(4)
^{50}Cr	5489.85(14)	0.024(4)	0.00140(23)
^{50}Cr	5493.99(12)	0.016(3)	0.00093(17)
^{52}Cr	5617.9(3)	0.132(5)	0.0077(3)
^{53}Cr	5706.94(16)	0.024(4)	0.00140(23)
^{53}Cr	5858.72(9)	0.0266(21)	0.00155(12)
^{53}Cr	5999.80(7)	0.085(7)	0.0050(4)
^{50}Cr	6134.58(9)	0.078(4)	0.00455(23)
^{54}Cr	6245.89(17)	0.0056(9)	0.00033(5)
^{53}Cr	6282.90(9)	0.036(3)	0.00210(17)
^{53}Cr	6326.49(12)	0.0212(23)	0.00124(13)
^{50}Cr	6370.15(10)	0.028(17)	0.0016(10)
^{53}Cr	**6645.61(8)**	**0.183(13)**	**0.0107(8)**
^{53}Cr	6890.11(7)	0.042(3)	0.00245(17)
^{53}Cr	**7099.91(6)**	**0.146(9)**	**0.0085(5)**
^{50}Cr	7361.12(8)	0.092(4)	0.00536(23)
^{52}Cr	7374.49(22)	0.080(4)	0.00466(23)
^{52}Cr	**7938.46(23)**	**0.424(11)**	**0.0247(6)**
^{50}Cr	**8482.80(9)**	**0.169(7)**	**0.0098(4)**
^{50}Cr	**8510.77(8)**	**0.233(8)**	**0.0136(5)**
^{53}Cr	**8884.36(5)**	**0.78(5)**	**0.045(3)**
^{53}Cr	**9719.06(5)**	**0.260(18)**	**0.0152(10)**

Manganese (Z=25), *At.Wt.*=54.938049(9), σ_γ^z =13.36(5)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{55}Mn	**26.560(20)**	**3.42(4)**	**0.1887(22)**
^{55}Mn	**83.884(23)**	**3.11(5)**	**0.172(3)**
^{55}Mn	**104.611(23)**	**1.74(3)**	**0.0960(17)**
^{55}Mn	118.77(4)	0.0526(22)	0.00290(12)
^{55}Mn	123.46(4)	0.0612(23)	0.00338(13)
^{55}Mn	188.521(22)	0.330(6)	0.0182(3)
^{55}Mn	**212.039(21)**	**2.13(3)**	**0.1175(17)**
^{55}Mn	215.150(22)	0.168(3)	0.00927(17)
^{55}Mn	230.096(24)	0.193(4)	0.01065(22)
^{55}Mn	**271.198(22)**	**0.94(6)**	**0.052(3)**
^{55}Mn	274.32(5)	0.075(6)	0.0041(3)
^{55}Mn	**314.398(20)**	**1.460(20)**	**0.0805(11)**
^{55}Mn	335.502(24)	0.147(3)	0.00811(17)
^{55}Mn	341.01(3)	0.0912(25)	0.00503(14)
^{55}Mn	354.12(4)	0.093(4)	0.00513(22)
^{55}Mn	375.192(22)	0.124(3)	0.00684(17)
^{55}Mn	**454.378(21)**	**0.388(7)**	**0.0214(4)**
^{55}Mn	459.754(23)	0.210(5)	0.0116(3)
^{55}Mn	499.57(4)	0.0402(20)	0.00222(11)
^{55}Mn	504.74(4)	0.096(4)	0.00530(22)
^{55}Mn	716.20(5)	0.055(3)	0.00303(17)
^{55}Mn	**846.754(20)d**	**13.10(4)**	**0.7226[12%]**
^{55}Mn	**1810.72(4)d**	**3.62(11)**	**0.200[12%]**
^{55}Mn	2016.47(5)	0.0527(25)	0.00291(14)
^{55}Mn	2043.99(5)	0.243(5)	0.0134(3)
^{55}Mn	2045.76(15)	0.0384(23)	0.00212(13)
^{55}Mn	2062.81(4)	0.179(5)	0.0099(3)
^{55}Mn	**2113.05(4)d**	**1.91(5)**	**0.105[12%]**
^{55}Mn	2175.91(5)	0.111(4)	0.00612(22)
^{55}Mn	2210.29(9)	0.080(5)	0.0044(3)
^{55}Mn	2294.42(7)	0.112(6)	0.0062(3)
^{55}Mn	2330.55(7)	0.191(8)	0.0105(4)
^{55}Mn	2469.99(12)	0.083(6)	0.0046(3)
^{55}Mn	2677.20(19)	0.068(10)	0.0038(6)
^{55}Mn	2873.23(11)	0.070(4)	0.00386(22)
^{55}Mn	2953.77(11)	0.069(5)	0.0038(3)
^{55}Mn	3002.85(15)	0.055(5)	0.0030(3)
^{55}Mn	3267.17(7)	0.188(6)	0.0104(3)
^{55}Mn	3408.61(5)	0.303(10)	0.0167(6)
^{55}Mn	3641.21(13)	0.061(5)	0.0034(3)
^{55}Mn	3751.50(15)	0.054(5)	0.0030(3)
^{55}Mn	3813.99(9)	0.088(8)	0.0049(4)
^{55}Mn	3820.48(16)	0.042(5)	0.0023(3)
^{55}Mn	3927.8(3)	0.044(6)	0.0024(3)
^{55}Mn	3979.0(3)	0.039(5)	0.0022(3)
^{55}Mn	4222.85(17)	0.066(5)	0.0036(3)
^{55}Mn	4267.69(12)	0.078(6)	0.0043(3)
^{55}Mn	4379.90(16)	0.073(6)	0.0040(3)
^{55}Mn	4445.06(20)	0.077(8)	0.0042(4)
^{55}Mn	4549.70(23)	0.056(6)	0.0031(3)
^{55}Mn	4566.56(10)	0.197(9)	0.0109(5)
^{55}Mn	4588.23(18)	0.053(5)	0.0029(3)
^{55}Mn	4643.40(13)	0.073(10)	0.0040(6)
^{55}Mn	4689.14(11)	0.120(9)	0.0066(5)
^{55}Mn	4724.84(8)	0.281(10)	0.0155(6)
^{55}Mn	4840.72(16)	0.064(6)	0.0035(3)
^{55}Mn	4874.52(13)	0.069(5)	0.0038(3)
^{55}Mn	4907.36(19)	0.070(7)	0.0039(4)
^{55}Mn	4934.09(18)	0.055(6)	0.0030(3)
^{55}Mn	4949.21(8)	0.274(10)	0.0151(6)
^{55}Mn	4969.28(21)	0.043(5)	0.0024(3)
^{55}Mn	**5014.37(7)**	**0.737(20)**	**0.0407(11)**
^{55}Mn	5034.60(15)	0.108(8)	0.0060(4)
^{55}Mn	5067.87(9)	0.265(12)	0.0146(7)
^{55}Mn	5110.97(22)	0.050(5)	0.0028(3)
^{55}Mn	**5180.89(8)**	**0.412(13)**	**0.0227(7)**
^{55}Mn	5198.52(13)	0.095(7)	0.0052(4)
^{55}Mn	5253.98(12)	0.132(13)	0.0073(7)
^{55}Mn	5403.7(3)	0.050(6)	0.0028(3)
^{55}Mn	5437.71(15)	0.087(7)	0.0048(4)
^{55}Mn	**5527.08(8)**	**0.788(22)**	**0.0435(12)**
^{55}Mn	5761.23(11)	0.200(12)	0.0110(7)
^{55}Mn	**5920.39(8)**	**1.06(3)**	**0.0585(17)**
^{55}Mn	6031.03(18)	0.067(7)	0.0037(4)
^{55}Mn	6104.29(12)	0.213(10)	0.0117(6)
^{55}Mn	6430.04(19)	0.088(7)	0.0049(4)
^{55}Mn	**6783.74(12)**	**0.378(17)**	**0.0209(9)**
^{55}Mn	6929.22(13)	0.248(12)	0.0137(7)
^{55}Mn	**7057.89(9)**	**1.22(3)**	**0.0673(17)**
^{55}Mn	**7159.63(10)**	**0.643(24)**	**0.0355(13)**
^{55}Mn	**7243.52(9)**	**1.36(3)**	**0.0750(17)**
^{55}Mn	**7270.14(12)**	**0.362(15)**	**0.0200(8)**

Iron (Z=26), *At.Wt.*=55.845(2), σ_γ^z =2.56(13)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{56}Fe	**14.411(14)**	**0.149(3)**	**0.00809(16)**
^{56}Fe	**122.077(14)**	**0.096(3)**	**0.00521(16)**
^{56}Fe	136.488(14)	0.0118(3)	0.000640(16)
^{56}Fe	230.270(13)	0.0274(5)	0.00149(3)
^{58}Fe	287.025(19)	0.00218(15)	1.18(8)E-4
^{56}Fe	**352.347(12)**	**0.273(3)**	**0.01481(16)**
^{56}Fe	366.758(10)	0.0497(7)	0.00270(4)
^{54}Fe	411.57(21)	0.022(5)	0.0012(3)
^{56}Fe	569.885(19)	0.0139(3)	0.000754(16)
^{56}Fe	657.46(11)	0.0067(18)	0.00036(10)
^{56}Fe	**691.960(19)**	**0.1370(18)**	**0.00743(10)**
^{57}Fe	810.71(3)	0.0274(9)	0.00149(5)
^{57}Fe	863.80(5)	0.0072(4)	0.000391(22)
^{57}Fe	867.4(4)	~0.007	~0.0004

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{56}Fe	898.27(3)	0.0540(10)	0.00293(5)
^{56}Fe	920.839(19)	0.0199(6)	0.00108(3)
^{56}Fe	1018.93(3)	0.0507(11)	0.00275(6)
^{56}Fe	**1260.448(19)**	**0.0684(11)**	**0.00371(6)**
^{56}Fe	1358.540(22)	0.0211(6)	0.00115(3)
^{56}Fe	**1612.786(18)**	**0.1530(22)**	**0.00830(12)**
^{56}Fe	1627.197(20)	0.0100(5)	0.00054(3)
^{57}Fe	1674.31(21)	~0.007	~0.0004
^{57}Fe	1674.49(6)	~0.007	~0.0004
^{56}Fe	1722.38(10)	0.0074(6)	0.00040(3)
^{56}Fe	**1725.288(21)**	**0.181(3)**	**0.00982(16)**
^{56}Fe	1810.54(16)	0.0067(7)	0.00036(4)
^{56}Fe	1965.39(15)	0.0078(14)	0.00042(8)
^{56}Fe	2066.08(6)	0.0146(7)	0.00079(4)
^{56}Fe	2129.47(7)	0.0206(7)	0.00112(4)
^{54}Fe	2469.24(13)	0.0116(7)	0.00063(4)
^{56}Fe	2526.34(7)	0.0112(5)	0.00061(3)
^{56}Fe	2682.69(11)	0.0114(9)	0.00062(5)
^{56}Fe	2697.10(11)	0.0090(9)	0.00049(5)
^{56}Fe	2721.21(4)	0.0384(13)	0.00208(7)
^{56}Fe	2755.93(19)	0.015(5)	0.0008(3)
^{56}Fe	2832.84(10)	0.0142(22)	0.00077(12)
^{56}Fe	2835.82(7)	0.0067(14)	0.00036(8)
^{56}Fe	2873.00(7)	0.0099(14)	0.00054(8)
^{56}Fe	2954.12(10)	0.0110(7)	0.00060(4)
^{56}Fe	3103.26(7)	0.0172(7)	0.00093(4)
^{56}Fe	3168.40(10)	0.0092(7)	0.00050(4)
^{56}Fe	3185.86(9)	0.0183(8)	0.00099(4)
^{56}Fe	3225.33(7)	0.0105(7)	0.00057(4)
^{56}Fe	3239.74(7)	0.0094(13)	0.00051(7)
^{56}Fe	3267.25(8)	0.0367(13)	0.00199(7)
^{56}Fe	3291.06(5)	0.0072(6)	0.00039(3)
^{56}Fe	3356.67(12)	0.0098(6)	0.00053(3)
^{56}Fe	3413.13(5)	0.0449(14)	0.00244(8)
^{56}Fe	3436.66(9)	0.045(4)	0.00244(22)
^{57}Fe	3486.74(11)	0.0114(6)	0.00062(3)
^{56}Fe	3776.90(6)	0.0075(7)	0.00041(4)
^{54}Fe	3790.80(25)	0.0075(7)	0.00041(4)
^{56}Fe	3842.43(9)	0.0086(7)	0.00047(4)
^{56}Fe	3854.51(6)	0.0333(12)	0.00181(7)
^{56}Fe	3921.5(8)	0.036(4)	0.00195(22)
^{56}Fe	**4218.27(5)**	**0.099(3)**	**0.00537(16)**
^{56}Fe	4274.74(12)	0.0141(8)	0.00077(4)
^{56}Fe	4378.56(8)	0.0067(6)	0.00036(3)
^{56}Fe	4406.07(7)	0.0453(13)	0.00246(7)
^{56}Fe	4463.01(10)	0.0162(11)	0.00088(6)
^{56}Fe	4674.99(11)	0.0125(11)	0.00068(6)
^{56}Fe	4724.54(10)	0.0075(11)	0.00041(6)
^{56}Fe	4809.99(7)	0.0416(13)	0.00226(7)
^{56}Fe	4948.70(11)	0.0173(10)	0.00094(5)
^{54}Fe	5507.29(19)	0.0247(15)	0.00134(8)
^{56}Fe	**5920.449(21)**	**0.225(5)**	**0.0122(3)**
^{56}Fe	**6018.532(20)**	**0.227(5)**	**0.0123(3)**
^{56}Fe	6380.67(3)	0.0187(20)	0.00101(11)
^{56}Fe	**7278.838(10)**	**0.137(4)**	**0.00743(22)**
^{56}Fe	**7631.136(14)**	**0.653(13)**	**0.0354(7)**
^{56}Fe	**7645.5450(10)**	**0.549(11)**	**0.0298(6)**
^{54}Fe	8886.18(23)	0.0162(12)	0.00088(7)
^{54}Fe	**9297.68(19)**	**0.0747(25)**	**0.00405(14)**

Cobalt (Z=27), ***At.Wt.*****=58.933200(9), σ_γ^z =37.18(6)**

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{59}Co	58.603(7)d	0.411(4)	0.02113[75%]
^{59}Co	**158.517(17)**	**1.200(15)**	**0.0617(8)**
^{59}Co	195.90(3)	0.190(4)	0.00977(21)
^{59}Co	224.12(7)	0.106(23)	0.0055(12)
^{59}Co	**229.879(17)**	**7.18(8)**	**0.369(4)**
^{59}Co	**254.379(17)**	**1.290(16)**	**0.0663(8)**
^{59}Co	**277.161(17)**	**6.77(8)**	**0.348(4)**
^{59}Co	337.296(18)	0.226(4)	0.01162(21)
^{59}Co	349.954(24)	0.124(4)	0.00638(21)
^{59}Co	**391.218(15)**	**1.080(14)**	**0.0555(7)**
^{59}Co	**435.677(17)**	**0.789(10)**	**0.0406(5)**
^{59}Co	**447.711(19)**	**3.41(4)**	**0.1754(21)**
^{59}Co	461.061(18)	0.519(9)	0.0267(5)
^{59}Co	**484.257(16)**	**0.804(11)**	**0.0413(6)**
^{59}Co	**497.269(16)**	**2.16(4)**	**0.1111(21)**
^{59}Co	**555.972(13)**	**5.76(6)**	**0.296(3)**
^{59}Co	602.71(4)	0.132(7)	0.0068(4)
^{59}Co	665.48(3)	0.0769(24)	0.00395(12)
^{59}Co	680.15(3)	0.273(5)	0.0140(3)
^{59}Co	**717.310(18)**	**0.845(14)**	**0.0435(7)**
^{59}Co	726.640(21)	0.448(10)	0.0230(5)
^{59}Co	781.79(4)	0.146(6)	0.0075(3)
^{59}Co	**785.628(21)**	**2.41(7)**	**0.124(4)**
^{59}Co	798.97(7)	0.120(10)	0.0062(5)
^{59}Co	854.06(4)	0.187(6)	0.0096(3)
^{59}Co	862.30(6)	0.079(8)	0.0041(4)
^{59}Co	883.11(4)	0.075(5)	0.0039(3)
^{59}Co	884.98(4)	0.156(6)	0.0080(3)
^{59}Co	901.28(3)	0.418(9)	0.0215(5)
^{59}Co	908.37(3)	0.100(4)	0.00514(21)
^{59}Co	928.48(3)	0.145(9)	0.0075(5)
^{59}Co	930.612(23)	0.408(22)	0.0210(11)
^{59}Co	944.07(6)	0.18(7)	0.009(4)
^{59}Co	**945.314(17)**	**0.98(4)**	**0.0504(21)**
^{59}Co	947.41(6)	0.121(7)	0.0062(4)
^{59}Co	963.58(3)	0.191(11)	0.0098(6)
^{59}Co	972.82(16)	0.082(8)	0.0042(4)
^{59}Co	1005.668(22)	0.127(6)	0.0065(3)
^{59}Co	1023.64(3)	0.22(3)	0.0113(15)
^{59}Co	1075.66(10)	0.099(7)	0.0051(4)
^{59}Co	1103.73(6)	0.277(12)	0.0142(6)
^{59}Co	1117.76(8)	0.106(5)	0.0055(3)
^{59}Co	1206.47(3)	0.072(11)	0.0037(6)
^{59}Co	1207.77(3)	0.202(12)	0.0104(6)
^{59}Co	1215.96(3)	0.520(9)	0.0267(5)
^{59}Co	1216.44(18)	0.24(22)	0.012(11)
^{59}Co	1226.78(5)	0.100(4)	0.00514(21)
^{59}Co	1238.566(24)	0.290(7)	0.0149(4)
^{59}Co	1274.32(4)	0.205(6)	0.0105(3)
^{59}Co	1277.46(3)	0.175(6)	0.0090(3)
^{59}Co	1283.22(7)	0.194(6)	0.0100(3)
^{59}Co	1334.74(6)	0.155(9)	0.0080(5)
^{59}Co	1362.53(4)	0.092(6)	0.0047(3)
^{59}Co	1419.30(8)	0.077(6)	0.0040(3)
^{59}Co	1472.04(3)	0.195(8)	0.0100(4)
^{59}Co	1507.33(3)	0.463(9)	0.0238(5)
^{59}Co	**1515.720(25)**	**1.740(25)**	**0.0895(13)**
^{59}Co	1553.65(3)	0.120(6)	0.0062(3)
^{59}Co	1556.08(9)	0.099(6)	0.0051(3)
^{59}Co	1690.72(3)	0.215(14)	0.0111(7)
^{59}Co	1692.83(5)	0.214(14)	0.0110(7)
^{59}Co	1703.91(10)	0.074(5)	0.0038(3)
^{59}Co	1774.65(4)	0.30(8)	0.015(4)
^{59}Co	1786.01(17)	0.157(9)	0.0081(5)
^{59}Co	1787.45(4)	0.08(5)	0.004(3)
^{59}Co	1799.92(4)	0.269(7)	0.0138(4)
^{59}Co	1808.82(7)	0.211(7)	0.0109(4)
^{59}Co	1808.98(10)	0.15(8)	0.008(4)
^{59}Co	1818.58(5)	0.179(7)	0.0092(4)
^{59}Co	**1830.800(25)**	**1.700(23)**	**0.0874(12)**
^{59}Co	1844.96(8)	0.092(5)	0.0047(3)
^{59}Co	1852.70(3)	0.456(10)	0.0234(5)
^{59}Co	1888.77(4)	0.089(6)	0.0046(3)
^{59}Co	1933.82(8)	0.094(6)	0.0048(3)
^{59}Co	2022.51(16)	0.082(6)	0.0042(3)
^{59}Co	2032.83(7)	0.393(11)	0.0202(6)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{59}Co	2074.83(8)	0.102(9)	0.0052(5)
^{59}Co	2099.19(7)	0.089(8)	0.0046(4)
^{59}Co	2221.61(4)	0.261(8)	0.0134(4)
^{59}Co	2279.78(6)	0.079(11)	0.0041(6)
^{59}Co	2281.57(9)	0.123(11)	0.0063(6)
^{59}Co	2309.66(10)	0.087(6)	0.0045(3)
^{59}Co	2319.46(10)	0.122(7)	0.0063(4)
^{59}Co	2453.82(20)	0.072(5)	0.0037(3)
^{59}Co	2527.12(7)	0.146(8)	0.0075(4)
^{59}Co	2557.46(21)	0.086(6)	0.0044(3)
^{59}Co	2569.92(9)	0.154(7)	0.0079(4)
^{59}Co	2607.47(10)	0.165(8)	0.0085(4)
^{59}Co	2680.64(24)	0.11(3)	0.0057(15)
^{59}Co	2692.02(15)	0.076(7)	0.0039(4)
^{59}Co	2727.19(13)	0.100(7)	0.0051(4)
^{59}Co	2740.06(18)	0.103(7)	0.0053(4)
^{59}Co	2790.22(20)	0.080(19)	0.0041(10)
^{59}Co	2900.50(24)	0.076(20)	0.0039(10)
^{59}Co	2926.19(18)	0.116(8)	0.0060(4)
^{59}Co	2978.11(17)	0.075(7)	0.0039(4)
^{59}Co	2995.43(13)	0.097(7)	0.0050(4)
^{59}Co	3193.65(16)	0.089(6)	0.0046(3)
^{59}Co	3216.43(19)	0.105(13)	0.0054(7)
^{59}Co	3238.16(19)	0.089(8)	0.0046(4)
^{59}Co	3283.78(13)	0.101(8)	0.0052(4)
^{59}Co	3335.29(14)	0.104(7)	0.0053(4)
^{59}Co	3380.22(14)	0.210(10)	0.0108(5)
^{59}Co	3664.13(21)	0.080(9)	0.0041(5)
^{59}Co	3677.05(13)	0.109(8)	0.0056(4)
^{59}Co	3749.21(7)	0.415(13)	0.0213(7)
^{59}Co	3815.20(19)	0.081(7)	0.0042(4)
^{59}Co	3823.54(19)	0.073(7)	0.0038(4)
^{59}Co	3840.83(15)	0.129(8)	0.0066(4)
^{59}Co	3897.02(17)	0.092(7)	0.0047(4)
^{59}Co	3929.84(12)	0.272(11)	0.0140(6)
^{59}Co	3966.15(18)	0.239(11)	0.0123(6)
^{59}Co	3994.92(24)	0.095(17)	0.0049(9)
^{59}Co	4026.26(12)	0.272(10)	0.0140(5)
^{59}Co	4032.03(18)	0.208(9)	0.0107(5)
^{59}Co	4148.74(21)	0.086(21)	0.0044(11)
^{59}Co	4155.64(24)	0.128(8)	0.0066(4)
^{59}Co	4208.01(12)	0.255(13)	0.0131(7)
^{59}Co	4212.56(14)	0.082(9)	0.0042(5)
^{59}Co	4329.00(18)	0.105(8)	0.0054(4)
^{59}Co	4350.40(12)	0.091(13)	0.0047(7)
^{59}Co	4370.46(19)	0.078(12)	0.0040(6)
^{59}Co	4377.29(19)	0.119(10)	0.0061(5)
^{59}Co	4395.62(11)	0.128(11)	0.0066(6)
^{59}Co	4547.05(11)	0.115(9)	0.0059(5)
^{59}Co	4607.00(7)	0.311(13)	0.0160(7)
^{59}Co	4624.29(16)	0.104(8)	0.0053(4)
^{59}Co	4646.83(15)	0.081(10)	0.0042(5)
^{59}Co	4666.15(10)	0.085(8)	0.0044(4)
^{59}Co	4706.11(13)	0.137(9)	0.0070(5)
^{59}Co	4731.06(17)	0.089(8)	0.0046(4)
^{59}Co	4884.30(10)	0.237(10)	0.0122(5)
^{59}Co	4893.76(10)	0.217(11)	0.0112(6)
^{59}Co	4906.17(7)	0.43(3)	0.0221(15)
^{59}Co	4921.85(9)	0.285(13)	0.0147(7)
^{59}Co	5003.24(8)	0.264(11)	0.0136(6)
^{59}Co	5040.76(16)	0.086(8)	0.0044(4)
^{59}Co	5068.69(9)	0.109(10)	0.0056(5)
^{59}Co	5127.84(9)	0.205(12)	0.0105(6)
^{59}Co	5150.08(9)	0.302(13)	0.0155(7)
^{59}Co	**5181.77(7)**	**0.912(23)**	**0.0469(12)**
^{59}Co	5211.98(6)	0.072(11)	0.0037(6)
^{59}Co	5217.09(20)	0.081(10)	0.0042(5)
^{59}Co	5270.15(4)	0.404(11)	0.0208(6)
^{59}Co	5358.44(8)	0.160(8)	0.0082(4)
^{59}Co	5370.21(8)	0.188(9)	0.0097(5)
^{59}Co	5510.56(6)	0.163(11)	0.0084(6)
^{59}Co	5602.97(4)	0.434(16)	0.0223(8)
^{59}Co	5614.67(5)	0.399(15)	0.0205(8)
^{59}Co	5639.03(4)	0.379(15)	0.0195(8)
^{59}Co	**5660.93(4)**	**1.89(6)**	**0.097(3)**
^{59}Co	5704.28(5)	0.177(9)	0.0091(5)
^{59}Co	**5742.53(4)**	**0.766(23)**	**0.0394(12)**
^{59}Co	5852.04(5)	0.110(10)	0.0057(5)
^{59}Co	5925.89(4)	0.643(18)	0.0331(9)
^{59}Co	**5975.98(4)**	**2.9(4)**	**0.149(21)**
^{59}Co	6040.60(4)	0.166(13)	0.0085(7)
^{59}Co	6110.81(6)	0.213(11)	0.0110(6)
^{59}Co	6149.99(7)	0.186(9)	0.0096(5)
^{59}Co	6274.84(3)	0.222(11)	0.0114(6)
^{59}Co	6283.91(4)	0.204(11)	0.0105(6)
^{59}Co	**6485.99(3)**	**2.32(5)**	**0.119(3)**
^{59}Co	**6706.01(3)**	**3.02(6)**	**0.155(3)**
^{59}Co	**6877.16(3)**	**3.02(6)**	**0.155(3)**
^{59}Co	6948.87(3)	0.249(11)	0.0128(6)
^{59}Co	**6985.41(3)**	**1.05(13)**	**0.054(7)**
^{59}Co	7055.92(3)	0.666(19)	0.0342(10)
^{59}Co	7203.22(3)	0.369(16)	0.0190(8)
^{59}Co	**7214.42(3)**	**1.38(3)**	**0.0710(15)**
^{59}Co	7433.07(3)	0.083(7)	0.0043(4)
^{59}Co	**7491.54(3)**	**1.16(3)**	**0.0596(15)**
	Nickel (Z=28), *At.Wt.*=58.6934(2), σ_γ^z =4.39(15)		
^{62}Ni	155.500(16)	0.0666(12)	0.00344(6)
^{60}Ni	**282.917(18)**	**0.211(3)**	**0.01089(15)**
^{58}Ni	**339.420(11)**	**0.1670(21)**	**0.00862(11)**
^{62}Ni	362.385(18)	0.0342(5)	0.00177(3)
^{58}Ni	**464.978(12)**	**0.843(10)**	**0.0435(5)**
^{62}Ni	483.351(20)	0.0156(3)	0.000805(15)
^{62}Ni	845.733(18)	0.0184(3)	0.000950(15)
^{58}Ni	**877.977(11)**	**0.236(3)**	**0.01219(15)**
^{61}Ni	1172.84(5)	0.0122(4)	0.000630(21)
^{58}Ni	1188.781(13)	0.0559(9)	0.00289(5)
^{58}Ni	1301.434(13)	0.052(3)	0.00268(15)
^{58}Ni	1340.230(20)	0.0200(5)	0.00103(3)
^{64}Ni	1481.84(5)d	0.003300(7)	1.704E-4[13%]
^{60}Ni	1502.04(6)	0.0154(4)	0.000795(21)
^{58}Ni	1536.920(16)	0.0194(5)	0.00100(3)
^{58}Ni	1734.687(16)	0.0172(4)	0.000888(21)
^{58}Ni	1949.911(17)	0.0476(10)	0.00246(5)
^{60}Ni	2123.93(3)	0.0379(10)	0.00196(5)
^{58}Ni	2554.116(19)	0.0431(9)	0.00223(5)
^{58}Ni	2842.130(17)	0.0463(10)	0.00239(5)
^{58}Ni	3221.146(23)	0.0157(11)	0.00081(6)
^{58}Ni	3675.24(3)	0.0281(7)	0.00145(4)
^{58}Ni	4858.59(3)	0.0442(10)	0.00228(5)
^{58}Ni	5312.674(24)	0.0536(13)	0.00277(7)
^{58}Ni	5435.77(4)	0.0188(6)	0.00097(3)
^{60}Ni	5695.80(3)	0.0416(12)	0.00215(6)
^{58}Ni	5817.219(20)	0.1090(22)	0.00563(11)
^{62}Ni	5836.37(3)	0.0348(10)	0.00180(5)
^{58}Ni	5973.06(3)	0.0258(8)	0.00133(4)
^{64}Ni	6034.60(11)	0.013(3)	0.00067(15)
^{58}Ni	6105.215(22)	0.0706(17)	0.00365(9)
^{62}Ni	6319.67(3)	0.0236(9)	0.00122(5)
^{58}Ni	6583.831(19)	0.0830(20)	0.00429(10)
^{62}Ni	**6837.50(3)**	**0.458(8)**	**0.0236(4)**
^{60}Ni	**7536.637(25)**	**0.190(4)**	**0.00981(21)**
^{58}Ni	7697.163(18)	0.0374(14)	0.00193(7)
^{60}Ni	**7819.517(21)**	**0.336(6)**	**0.0173(3)**
^{58}Ni	8120.567(16)	0.133(3)	0.00687(15)
^{58}Ni	**8533.509(17)**	**0.721(13)**	**0.0372(7)**
^{58}Ni	**8998.414(15)**	**1.49(3)**	**0.0769(15)**

^{A}Z	E_{γ}-keV	$\sigma_{\gamma}^{z}(E_{\gamma})$-barns	k_0
Copper (Z=29), *At.Wt.*=63.546(3), σ_{γ}^{z} =3.795(17)			
^{65}Cu	**89.08(4)**	**0.0970(17)**	**0.00463(8)**
^{63}Cu	**159.281(5)**	**0.648(10)**	**0.0309(5)**
^{63}Cu	184.618(13)	0.0106(9)	0.00051(4)
^{65}Cu	**185.96(4)**	**0.244(3)**	**0.01164(14)**
^{63}Cu	**202.950(8)**	**0.193(3)**	**0.00920(14)**
^{63}Cu	212.389(15)	0.0362(9)	0.00173(4)
^{63}Cu	214.99(7)	0.0112(14)	0.00053(7)
^{65}Cu	237.80(4)	0.0230(4)	0.001097(19)
^{63}Cu	247.58(6)	0.0119(15)	0.00057(7)
^{63}Cu	261.33(8)	0.0095(14)	0.00045(7)
^{63}Cu	264.869(22)	0.0289(7)	0.00138(3)
^{63}Cu	**278.250(14)**	**0.893(15)**	**0.0426(7)**
^{65}Cu	315.69(4)	0.0250(4)	0.001192(19)
^{63}Cu	318.80(4)	0.0120(4)	0.000572(19)
^{63}Cu	330.52(3)	0.0107(8)	0.00051(4)
^{63}Cu	**343.898(14)**	**0.215(4)**	**0.01025(19)**
^{63}Cu	376.80(3)	0.0250(6)	0.00119(3)
^{63}Cu	384.45(5)	0.0700(14)	0.00334(7)
^{65}Cu	**385.77(3)**	**0.1310(18)**	**0.00625(9)**
^{65}Cu	436.909(20)	0.0112(4)	0.000534(19)
^{63}Cu	449.486(22)	0.0382(10)	0.00182(5)
^{63}Cu	460.78(3)	0.0143(5)	0.000682(24)
^{65}Cu	**465.14(3)**	**0.1350(21)**	**0.00644(10)**
^{63}Cu	467.95(5)	0.0668(14)	0.00319(7)
^{63}Cu	494.81(5)	0.0242(6)	0.00115(3)
^{63}Cu	503.41(4)	0.0596(13)	0.00284(6)
^{63}Cu	533.25(11)	0.0148(8)	0.00071(4)
^{63}Cu	534.28(5)	0.021(6)	0.0010(3)
^{65}Cu	543.86(3)	0.0256(5)	0.001221(24)
^{63}Cu	**579.75(3)**	**0.0898(15)**	**0.00428(7)**
^{63}Cu	**608.766(23)**	**0.270(6)**	**0.0129(3)**
^{63}Cu	617.47(6)	0.0270(4)	0.001288(19)
^{63}Cu	632.24(4)	0.0092(4)	0.000439(19)
^{63}Cu	**648.80(3)**	**0.102(3)**	**0.00486(14)**
^{63}Cu	662.69(4)	0.072(3)	0.00343(14)
^{63}Cu	739.03(3)	0.0096(3)	0.000458(14)
^{63}Cu	767.77(3)	0.0254(17)	0.00121(8)
^{65}Cu	822.673(24)	0.0238(17)	0.00114(8)
^{65}Cu	831.14(4)	0.0160(10)	0.00076(5)
^{63}Cu	878.17(5)	0.0421(20)	0.00201(10)
^{63}Cu	897.07(17)	0.0102(4)	0.000486(19)
^{63}Cu	927.05(3)	0.0119(3)	0.000568(14)
^{63}Cu	946.65(7)	0.0091(8)	0.00043(4)
^{63}Cu	962.76(4)	0.0152(9)	0.00072(4)
^{65}Cu	972.11(3)	0.0115(7)	0.00055(3)
^{65}Cu	997.63(3)	0.0093(11)	0.00044(5)
^{63}Cu	1019.59(4)	0.0141(12)	0.00067(6)
^{65}Cu	1038.97(3)d	0.0598(13)	0.00285[88%]
^{65}Cu	1052.01(5)	0.0117(8)	0.00056(4)
^{63}Cu	1076.44(4)	0.0097(5)	0.000463(24)
^{63}Cu	1081.72(3)	0.0117(3)	0.000558(14)
^{63}Cu	1138.82(3)	0.0296(10)	0.00141(5)
^{63}Cu	1158.833(15)	0.0267(6)	0.00127(3)
^{63}Cu	1194.92(4)	0.0106(3)	0.000506(14)
^{65}Cu	1212.53(4)	0.0105(5)	0.000501(24)
^{63}Cu	1231.98(4)	0.0110(3)	0.000525(14)
^{63}Cu	1241.52(9)	0.0345(16)	0.00165(8)
^{63}Cu	1242.61(9)	0.0181(22)	0.00086(10)
^{63}Cu	1298.10(3)	0.0147(7)	0.00070(3)
^{63}Cu	1320.25(8)	0.0263(10)	0.00125(5)
^{65}Cu	1355.16(3)	0.0133(16)	0.00063(8)
^{63}Cu	1361.75(4)	0.0167(5)	0.000796(24)
^{63}Cu	1417.27(6)	0.0097(4)	0.000463(19)
^{63}Cu	1438.66(4)	0.013(6)	0.0006(3)
^{65}Cu	1439.37(5)	0.0111(16)	0.00053(8)
^{63}Cu	1521.03(4)	0.0143(5)	0.000682(24)
^{65}Cu	1559.84(7)	0.0305(10)	0.00145(5)

^{A}Z	E_{γ}-keV	$\sigma_{\gamma}^{z}(E_{\gamma})$-barns	k_0
^{65}Cu	1582.50(4)	0.0094(7)	0.00045(3)
^{65}Cu	1637.46(5)	0.0135(15)	0.00064(7)
^{63}Cu	1682.98(7)	0.0167(8)	0.00080(4)
^{65}Cu	1743.30(7)	0.014(4)	0.00067(19)
^{63}Cu	1852.57(8)	0.0141(10)	0.00067(5)
^{63}Cu	2141.61(12)	0.0091(5)	0.000434(24)
^{63}Cu	2153.51(5)	0.0105(11)	0.00050(5)
^{63}Cu	2291.40(10)	0.0115(8)	0.00055(4)
^{63}Cu	2497.85(7)	0.0252(13)	0.00120(6)
^{63}Cu	2932.30(13)	0.0101(7)	0.00048(3)
^{63}Cu	3152.95(16)	0.0099(9)	0.00047(4)
^{63}Cu	3315.5(3)	0.0097(7)	0.00046(3)
^{63}Cu	3464.49(14)	0.0094(15)	0.00045(7)
^{63}Cu	3588.50(9)	0.0122(14)	0.00058(7)
^{63}Cu	3844.49(15)	0.0176(11)	0.00084(5)
^{63}Cu	4089.19(14)	0.0090(5)	0.000429(24)
^{63}Cu	4133.04(12)	0.0138(10)	0.00066(5)
^{63}Cu	4204.26(19)	0.0091(5)	0.000434(24)
^{63}Cu	4286.55(15)	0.0121(6)	0.00058(3)
^{63}Cu	4312.76(24)	0.0104(8)	0.00050(4)
^{63}Cu	4319.92(9)	0.047(5)	0.00224(24)
^{65}Cu	4384.92(9)	0.0206(12)	0.00098(6)
^{63}Cu	4404.91(18)	0.0111(5)	0.000529(24)
^{63}Cu	4443.9(3)	0.0110(11)	0.00052(5)
^{63}Cu	4475.88(13)	0.0171(6)	0.00082(3)
^{63}Cu	4503.94(12)	0.0174(7)	0.00083(3)
^{63}Cu	4563.20(7)	0.0112(5)	0.000534(24)
^{63}Cu	4603.01(20)	0.0196(6)	0.00093(3)
^{63}Cu	4658.55(9)	0.0278(7)	0.00133(3)
^{63}Cu	5019.16(12)	0.0100(15)	0.00048(7)
^{65}Cu	5042.68(6)	0.0346(14)	0.00165(7)
^{65}Cu	5047.56(7)	0.0206(14)	0.00098(7)
^{63}Cu	5085.54(11)	0.0118(5)	0.000563(24)
^{63}Cu	5151.98(15)	0.0096(4)	0.000458(19)
^{63}Cu	5183.55(17)	0.0132(6)	0.00063(3)
^{63}Cu	5189.81(11)	0.0241(7)	0.00115(3)
^{65}Cu	5245.59(4)	0.043(3)	0.00205(14)
^{63}Cu	5258.73(7)	0.0372(9)	0.00177(4)
^{65}Cu	5320.08(8)	0.0362(21)	0.00173(10)
^{63}Cu	5408.64(17)	0.0144(6)	0.00069(3)
^{63}Cu	5418.45(5)	0.0668(12)	0.00319(6)
^{63}Cu	5555.38(19)	0.0098(5)	0.000467(24)
^{63}Cu	5614.96(12)	0.0178(6)	0.00085(3)
^{63}Cu	5636.11(7)	0.0147(5)	0.000701(24)
^{63}Cu	5771.47(9)	0.0183(8)	0.00087(4)
^{63}Cu	5823.60(20)	0.0108(22)	0.00052(10)
^{63}Cu	6010.80(5)	0.0574(12)	0.00274(6)
^{65}Cu	6048.73(5)	0.0101(6)	0.00048(3)
^{63}Cu	6063.24(9)	0.0218(6)	0.00104(3)
^{63}Cu	6166.7(3)	0.0133(21)	0.00063(10)
^{65}Cu	6243.14(4)	0.0144(9)	0.00069(4)
^{63}Cu	6321.58(6)	0.0130(5)	0.000620(24)
^{63}Cu	6394.76(5)	0.0503(10)	0.00240(5)
^{63}Cu	6595.52(8)	0.0227(8)	0.00108(4)
^{65}Cu	6600.63(4)	0.085(5)	0.00405(24)
^{63}Cu	6617.66(5)	0.0407(11)	0.00194(5)
^{63}Cu	6673.15(9)	0.053(3)	0.00253(14)
^{63}Cu	6674.76(5)	0.0719(21)	0.00343(10)
^{65}Cu	6680.00(4)	0.081(6)	0.0039(3)
^{65}Cu	6790.72(4)	0.0155(10)	0.00074(5)
^{63}Cu	**6988.68(5)**	**0.126(6)**	**0.0060(3)**
^{63}Cu	7037.55(5)	0.0140(7)	0.00067(3)
^{65}Cu	7065.72(4)	0.0132(8)	0.00063(4)
^{63}Cu	7169.51(5)	0.0109(7)	0.00052(3)
^{63}Cu	**7176.68(5)**	**0.0925(17)**	**0.00441(8)**
^{63}Cu	**7253.01(5)**	**0.1500(23)**	**0.00715(11)**
^{63}Cu	**7306.93(4)**	**0.321(17)**	**0.0153(8)**
^{63}Cu	7571.77(4)	0.0629(12)	0.00300(6)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{63}Cu	**7637.40(4)**	**0.54(7)**	**0.026(3)**
^{63}Cu	7756.36(4)	0.0571(12)	0.00272(6)
^{63}Cu	**7915.62(4)**	**0.869(20)**	**0.0414(10)**

Zinc (Z=30), *At.Wt.*=65.39(2), σ_γ^z =1.30(8)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{64}Zn	53.972(17)	0.0109(6)	0.00051(3)
^{64}Zn	61.2530(20)	0.0290(9)	0.00134(4)
^{66}Zn	91.267(5)	0.0046(3)	2.13(14)E-4
^{66}Zn	93.311(5)	0.0344(8)	0.00159(4)
^{64}Zn	**115.225(18)**	**0.167(3)**	**0.00774(14)**
^{64}Zn	153.095(21)	0.0322(6)	0.00149(3)
^{66}Zn	184.578(6)	0.0321(4)	0.001488(19)
^{64}Zn	207.067(22)	0.0101(3)	0.000468(14)
^{66}Zn	300.219(7)	0.0201(6)	0.00093(3)
^{66}Zn	393.530(7)	0.00486(22)	2.25(10)E-4
^{68}Zn	417.30(4)	0.0043(5)	1.99(23)E-4
^{68}Zn	434.03(3)	0.0128(16)	0.00059(7)
^{68}Zn	438.634(18)d	0.0128(5)	0.000593[2.5%]
^{68}Zn	531.44(3)	0.0163(20)	0.00076(9)
^{67}Zn	578.48(5)	0.0121(5)	0.000561(23)
^{64}Zn	653.51(7)	0.0050(14)	2.3(7)E-4
^{66}Zn	749.29(7)	0.0058(13)	0.00027(6)
^{64}Zn	751.69(3)	0.0307(10)	0.00142(5)
^{68}Zn	759.29(9)	0.0039(5)	1.81(23)E-4
^{64}Zn	768.74(7)	0.0040(4)	1.85(19)E-4
^{64}Zn	794.44(3)	0.0089(5)	0.000412(23)
^{67}Zn	**805.79(3)**	**0.045(3)**	**0.00209(14)**
^{68}Zn	**834.77(3)**	**0.037(5)**	**0.00171(23)**
^{64}Zn	**855.69(3)**	**0.066(6)**	**0.0031(3)**
^{64}Zn	864.43(6)	0.0094(6)	0.00044(3)
^{64}Zn	909.66(3)	0.0187(8)	0.00087(4)
^{64}Zn	932.10(6)	0.0047(4)	2.18(19)E-4
^{66}Zn	958.24(7)	0.0058(5)	0.000269(23)
^{64}Zn	993.35(6)	0.0059(6)	0.00027(3)
^{68}Zn	**1007.809(25)**	**0.056(7)**	**0.0026(3)**
^{64}Zn	1047.32(7)	0.0036(5)	1.67(23)E-4
^{67}Zn	**1077.335(16)**	**0.356(5)**	**0.01650(23)**
^{67}Zn	1126.100(25)	0.0229(6)	0.00106(3)
^{68}Zn	1178.55(9)	0.0102(13)	0.00047(6)
^{68}Zn	1252.07(5)	0.0073(9)	0.00034(4)
^{67}Zn	**1261.15(3)**	**0.0431(10)**	**0.00200(5)**
^{64}Zn	1262.58(6)	0.0053(15)	2.5(7)E-4
^{64}Zn	1293.02(8)	0.0061(6)	0.00028(3)
^{67}Zn	1300.96(6)	0.010(4)	0.00046(19)
^{67}Zn	**1340.14(3)**	**0.0457(16)**	**0.00212(7)**
^{64}Zn	1354.42(5)	0.0103(9)	0.00048(4)
^{64}Zn	1415.67(5)	0.0043(7)	2.0(3)E-4
^{67}Zn	1546.33(8)	0.0082(7)	0.00038(3)
^{64}Zn	1593.0(3)	0.0053(13)	2.5(6)E-4
^{68}Zn	1594.05(9)	0.0051(6)	2.4(3)E-4
^{67}Zn	1673.46(4)	0.0260(10)	0.00120(5)
^{67}Zn	1744.47(5)	0.0147(7)	0.00068(3)
^{68}Zn	1813.18(8)	0.0051(6)	2.4(3)E-4
^{64}Zn	1826.45(6)	0.0161(10)	0.00075(5)
^{67}Zn	1882.09(10)	0.0056(15)	0.00026(7)
^{67}Zn	**1883.12(3)**	**0.0718(18)**	**0.00333(8)**
^{64}Zn	2087.44(9)	0.0047(6)	2.2(3)E-4
^{67}Zn	2106.74(6)	0.0071(7)	0.00033(3)
^{67}Zn	2209.73(9)	0.0269(13)	0.00125(6)
^{64}Zn	2212.10(16)	0.0071(17)	0.00033(8)
^{68}Zn	2344.60(8)	0.0100(12)	0.00046(6)
^{67}Zn	2347.58(14)	0.0048(7)	2.2(3)E-4
^{67}Zn	2352.10(8)	0.0059(9)	0.00027(4)
^{68}Zn	2378.6(3)	0.0039(5)	1.81(23)E-4
^{67}Zn	2418.53(10)	0.0095(7)	0.00044(3)
^{64}Zn	2432.3(5)	0.0037(8)	1.7(4)E-4
^{67}Zn	2648.75(21)	0.0056(10)	0.00026(5)
^{67}Zn	2698.91(17)	0.0061(9)	0.00028(4)
^{67}Zn	2857.91(10)	0.0070(8)	0.00032(4)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{64}Zn	3109.05(25)	0.0073(10)	0.00034(5)
^{67}Zn	3287.02(9)	0.0088(9)	0.00041(4)
^{67}Zn	3331.21(20)	0.0049(5)	2.27(23)E-4
^{67}Zn	3458.14(17)	0.0048(4)	2.22(19)E-4
^{67}Zn	3832.94(25)	0.0048(5)	2.22(23)E-4
^{68}Zn	4071.4(4)	0.0036(5)	1.67(23)E-4
^{68}Zn	4103.3(3)	0.0089(21)	0.00041(10)
^{68}Zn	4137.29(10)	0.0205(25)	0.00095(12)
^{68}Zn	4430.69(14)	0.0055(13)	0.00025(6)
^{67}Zn	4504.5(4)	0.0042(13)	1.9(6)E-4
^{64}Zn	4582.9(4)	0.00507(10)	2.35(5)E-4
^{68}Zn	4652.3(4)	0.0059(7)	0.00027(3)
^{67}Zn	4782.8(3)	0.0045(4)	2.09(19)E-4
^{67}Zn	4795.0(11)	0.0037(9)	1.7(4)E-4
^{64}Zn	4828.4(3)	0.00676(11)	0.000313(5)
^{64}Zn	4870.0(3)	0.00380(10)	1.76(5)E-4
^{68}Zn	4887.82(13)	0.0080(10)	0.00037(5)
^{67}Zn	4899.63(19)	0.0053(5)	2.46(23)E-4
^{67}Zn	4914.15(20)	0.0044(4)	2.04(19)E-4
^{68}Zn	5229.78(11)	0.0044(5)	2.04(23)E-4
^{67}Zn	5245.84(15)	0.0058(6)	0.00027(3)
^{67}Zn	5287.4(3)	0.0048(6)	2.2(3)E-4
^{67}Zn	5346.37(21)	0.0039(6)	1.8(3)E-4
^{67}Zn	5402.8(5)	0.0043(24)	2.0(11)E-4
^{68}Zn	**5474.02(10)**	**0.042(5)**	**0.00195(23)**
^{64}Zn	5521.5(3)	0.0076(11)	0.00035(5)
^{64}Zn	5541.0(5)	0.0047(7)	2.2(3)E-4
^{64}Zn	5559.82(15)	0.01110(15)	0.000514(7)
^{68}Zn	5647.05(10)	0.0082(10)	0.00038(5)
^{67}Zn	5662.23(18)	0.0066(8)	0.00031(4)
^{67}Zn	5677.3(3)	0.0053(7)	2.5(3)E-4
^{67}Zn	5685.90(19)	0.0051(4)	2.36(19)E-4
^{64}Zn	5776.31(10)	0.01360(17)	0.000630(8)
^{67}Zn	5789.15(21)	0.0045(6)	2.1(3)E-4
^{66}Zn	5909.4(3)	0.0110(11)	0.00051(5)
^{64}Zn	6037.28(8)	0.01490(20)	0.000691(9)
^{67}Zn	6262.43(12)	0.0085(6)	0.00039(3)
^{68}Zn	6481.75(10)	0.0100(12)	0.00046(6)
^{64}Zn	6509.27(8)	0.01190(16)	0.000552(7)
^{66}Zn	6658.6(3)	0.019(4)	0.00088(19)
^{67}Zn	6701.79(12)	0.0066(4)	0.000306(19)
^{67}Zn	6768.21(10)	0.0112(9)	0.00052(4)
^{66}Zn	6867.5(3)	0.0254(17)	0.00118(8)
^{67}Zn	6910.58(11)	0.0194(14)	0.00090(7)
^{66}Zn	**6958.8(3)**	**0.043(3)**	**0.00199(14)**
^{64}Zn	7069.20(7)	0.0204(3)	0.000945(14)
^{64}Zn	7111.95(7)	0.0198(3)	0.000918(14)
^{67}Zn	7188.40(8)	0.0131(7)	0.00061(3)
^{67}Zn	7859.07(8)	0.0084(7)	0.00039(3)
^{64}Zn	**7863.55(7)**	**0.1410(19)**	**0.00653(9)**
^{67}Zn	8314.37(8)	0.0105(5)	0.000487(23)
^{67}Zn	9120.06(7)	0.0136(6)	0.00063(3)

Gallium (Z=31), *At.Wt.*=69.723(1), σ_γ^z =2.90(7)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{71}Ga	**16.43(3)**	**0.078(5)**	**0.00339(22)**
^{71}Ga	41.89(4)	0.0050(4)	2.17(17)E-4
^{71}Ga	46.97(4)	0.013(3)	0.00057(13)
^{71}Ga	79.75(4)	0.0224(10)	0.00097(4)
^{71}Ga	88.86(4)	0.0305(9)	0.00133(4)
^{71}Ga	**103.25(3)d**	**0.0526(11)**	**0.00229[100%]**
^{71}Ga	110.06(4)	0.0118(8)	0.00051(4)
^{71}Ga	**112.36(3)**	**0.155(3)**	**0.00674(13)**
^{71}Ga	121.01(3)	0.0142(6)	0.00062(3)
^{71}Ga	128.76(4)	0.0063(9)	0.00027(4)
^{71}Ga	132.07(11)	0.013(3)	0.00057(13)
^{71}Ga	**145.14(3)**	**0.466(7)**	**0.0203(3)**
^{71}Ga	153.78(3)	0.0319(8)	0.00139(4)
^{71}Ga	162.90(4)	0.021(5)	0.00091(22)
^{71}Ga	181.54(4)	0.040(3)	0.00174(13)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{71}Ga	**184.09(3)**	**0.1040(21)**	**0.00452(9)**
^{69}Ga	**187.84(3)**	**0.1080(21)**	**0.00469(9)**
^{71}Ga	**192.11(3)**	**0.194(3)**	**0.00843(13)**
^{71}Ga	**194.66(4)**	**0.1070(21)**	**0.00465(9)**
^{71}Ga	**197.94(5)**	**0.1330(24)**	**0.00578(10)**
^{71}Ga	210.37(11)	0.019(7)	0.0008(3)
^{71}Ga	210.50(20)	0.0343(8)	0.00149(4)
^{71}Ga	**212.58(4)**	**0.0583(12)**	**0.00253(5)**
^{71}Ga	228.97(4)	0.0379(10)	0.00165(4)
^{71}Ga	231.06(4)	0.0111(6)	0.00048(3)
^{71}Ga	246.91(20)	0.0118(19)	0.00051(8)
^{71}Ga	**248.89(4)**	**0.136(8)**	**0.0059(4)**
^{71}Ga	264.03(4)	0.0238(9)	0.00103(4)
^{71}Ga	266.14(3)	0.0361(11)	0.00157(5)
^{71}Ga	306.11(14)	0.015(4)	0.00065(17)
^{71}Ga	306.62(12)	0.0097(8)	0.00042(4)
^{71}Ga	313.62(11)	0.0209(8)	0.00091(4)
^{71}Ga	315.40(6)	0.0275(9)	0.00120(4)
^{69}Ga	**318.87(3)**	**0.0592(14)**	**0.00257(6)**
^{69}Ga	344.79(7)	0.0070(6)	0.00030(3)
^{69}Ga	363.93(13)	0.0048(6)	2.1(3)E-4
^{69}Ga	374.37(4)	0.0303(10)	0.00132(4)
^{71}Ga	384.17(5)	0.0058(6)	0.00025(3)
^{71}Ga	**390.66(4)**	**0.0476(12)**	**0.00207(5)**
^{69}Ga	393.26(3)	0.021(3)	0.00091(13)
^{71}Ga	**393.28(3)**	**0.1340(23)**	**0.00582(10)**
^{71}Ga	402.86(4)	0.0172(8)	0.00075(4)
^{71}Ga	408.44(20)	0.0179(9)	0.00078(4)
^{71}Ga	411.07(14)	0.019(5)	0.00083(22)
^{71}Ga	411.13(4)	0.0384(11)	0.00167(5)
^{71}Ga	439.26(6)	0.0154(7)	0.00067(3)
^{71}Ga	444.65(6)	0.021(5)	0.00091(22)
^{71}Ga	458.54(12)	0.0092(7)	0.00040(3)
^{71}Ga	488.81(4)	0.0227(8)	0.00099(4)
^{71}Ga	488.81(4)	0.017(4)	0.00074(17)
^{69}Ga	**508.19(3)**	**0.349(6)**	**0.0152(3)**
^{69}Ga	516.564(25)	0.012(4)	0.00052(17)
^{71}Ga	547.90(5)	0.0090(8)	0.00039(4)
^{69}Ga	561.97(5)	0.0078(3)	0.000339(13)
^{71}Ga	564.29(5)	0.0097(3)	0.000422(13)
^{71}Ga	579.55(12)	0.0068(9)	0.00030(4)
^{71}Ga	**601.21(6)d**	**0.471(22)**	**0.0205[2.4%]**
^{71}Ga	603.24(4)	0.0155(7)	0.00067(3)
^{71}Ga	619.63(5)	0.0053(12)	2.3(5)E-4
^{71}Ga	620.23(14)	0.0052(11)	2.3(5)E-4
^{71}Ga	**629.96(5)d**	**0.490(22)**	**0.0213[2.4%]**
^{69}Ga	632.34(4)	0.0183(7)	0.00080(3)
^{69}Ga	**651.09(3)**	**0.1030(22)**	**0.00448(10)**
^{69}Ga	**690.943(24)**	**0.305(4)**	**0.01326(17)**
^{71}Ga	**786.17(16)d**	**0.160(22)**	**0.0070[2.4%]**
^{71}Ga	**834.08(3)d**	**1.65(5)**	**0.0717[2.4%]**
^{69}Ga	851.34(7)	0.0127(9)	0.00055(4)
^{69}Ga	868.3(3)	0.0071(15)	0.00031(7)
^{71}Ga	894.84(20)	0.0111(9)	0.00048(4)
^{71}Ga	**894.91(11)d**	**0.35(3)**	**0.0152[2.4%]**
^{69}Ga	904.91(7)	0.0149(10)	0.00065(4)
^{71}Ga	976.37(13)	0.0101(8)	0.00044(4)
^{69}Ga	995.68(5)	0.0173(9)	0.00075(4)
^{71}Ga	1002.71(25)	0.0073(8)	0.00032(4)
^{69}Ga	1010.34(6)	0.0146(8)	0.00063(4)
^{69}Ga	1014.99(8)	0.0077(7)	0.00033(3)
^{69}Ga	1044.90(15)	0.0107(11)	0.00047(5)
^{71}Ga	**1050.69(5)d**	**0.119(13)**	**0.0052[2.4%]**
^{71}Ga	1051.25(17)	0.0114(10)	0.00050(4)
^{71}Ga	1075.6(5)	0.0053(8)	2.3(4)E-4
^{69}Ga	1140.37(4)	0.0422(16)	0.00183(7)
^{71}Ga	1200.3(3)	0.0078(9)	0.00034(4)
^{69}Ga	1203.40(6)	0.0286(14)	0.00124(6)
^{71}Ga	1217.5(9)	0.0075(21)	0.00033(9)
^{71}Ga	1296.9(7)	0.0065(9)	0.00028(4)
^{69}Ga	1306.73(12)	0.0140(20)	0.00061(9)
^{69}Ga	1311.89(6)	0.0259(12)	0.00113(5)
^{69}Ga	1359.50(9)	0.0148(11)	0.00064(5)
^{71}Ga	1359.53(17)	0.0148(11)	0.00064(5)
^{69}Ga	1456.39(7)	0.0168(11)	0.00073(5)
^{71}Ga	**1464.00(7)d**	**0.0609(19)**	**0.00265[2.4%]**
^{69}Ga	1518.21(8)	0.0219(13)	0.00095(6)
^{71}Ga	1532.91(17)	0.0172(12)	0.00075(5)
^{71}Ga	**1596.68(8)d**	**0.0732(16)**	**0.00318[2.4%]**
^{69}Ga	1621.55(12)	0.0096(10)	0.00042(4)
^{69}Ga	1725.48(8)	0.0108(7)	0.00047(3)
^{69}Ga	1794.15(13)	0.0088(9)	0.00038(4)
^{69}Ga	1846.5(3)	0.0053(10)	2.3(4)E-4
^{71}Ga	**1861.09(6)d**	**0.0904(19)**	**0.00393[2.4%]**
^{69}Ga	1866.6(5)	0.0060(17)	0.00026(7)
^{69}Ga	1907.63(13)	0.0089(11)	0.00039(5)
^{69}Ga	1930.5(3)	0.0058(11)	0.00025(5)
^{69}Ga	2115.98(17)	0.0066(8)	0.00029(4)
^{69}Ga	2142.88(14)	0.0085(9)	0.00037(4)
^{69}Ga	2164.1(7)	0.0056(13)	2.4(6)E-4
^{71}Ga	**2201.91(13)d**	**0.52(4)**	**0.0226[2.4%]**
^{71}Ga	**2491.6(3)d**	**0.17(4)**	**0.0074[2.4%]**
^{71}Ga	**2507.40(12)d**	**0.28(4)**	**0.0122[2.4%]**
^{71}Ga	**3034.6(4)d**	**0.15(3)**	**0.0065[2.4%]**
^{71}Ga	4543.3(5)	0.0104(11)	0.00045(5)
^{71}Ga	4578.2(7)	0.0058(12)	0.00025(5)
^{71}Ga	4595.4(5)	0.0093(13)	0.00040(6)
^{71}Ga	4686.8(5)	0.0066(9)	0.00029(4)
^{71}Ga	4719.2(9)	0.0052(8)	2.3(4)E-4
^{71}Ga	4761.5(4)	0.0078(9)	0.00034(4)
^{71}Ga	4792.6(3)	0.0207(17)	0.00090(7)
^{71}Ga	4839.89(23)	0.040(3)	0.00174(13)
^{71}Ga	4868.2(3)	0.0189(14)	0.00082(6)
^{71}Ga	4890.5(3)	0.0191(14)	0.00083(6)
^{69}Ga	4955.2(4)	0.0095(13)	0.00041(6)
^{71}Ga	5054.0(4)	0.0094(11)	0.00041(5)
^{71}Ga	5091.8(9)	0.0070(9)	0.00030(4)
^{69}Ga	5133.6(6)	0.0051(11)	2.2(5)E-4
^{71}Ga	5160.69(21)	0.0154(13)	0.00067(6)
^{69}Ga	5189.2(9)	0.0074(20)	0.00032(9)
^{71}Ga	5195.1(5)	0.034(3)	0.00148(13)
^{71}Ga	5223.3(7)	0.0157(13)	0.00068(6)
^{71}Ga	5233.57(25)	0.0344(19)	0.00150(8)
^{71}Ga	5272.7(6)	0.0057(15)	2.5(7)E-4
^{71}Ga	5313.3(8)	0.0049(10)	2.1(4)E-4
^{69}Ga	5334.13(18)	0.0271(18)	0.00118(8)
^{71}Ga	5334.9(5)	0.020(7)	0.0009(3)
^{71}Ga	5340.45(25)	0.0406(21)	0.00176(9)
^{71}Ga	5390.2(5)	0.0049(10)	2.1(4)E-4
^{71}Ga	5487.2(13)	0.0090(25)	0.00039(11)
^{69}Ga	5488.31(17)	0.0296(19)	0.00129(8)
^{71}Ga	5497.6(5)	0.0091(13)	0.00040(6)
^{69}Ga	5510.0(4)	0.0047(9)	2.0(4)E-4
^{71}Ga	5543.83(19)	0.0142(17)	0.00062(7)
^{71}Ga	5577.0(6)	0.0058(18)	0.00025(8)
^{71}Ga	**5601.75(25)**	**0.063(4)**	**0.00274(17)**
^{71}Ga	5625.35(24)	0.0077(16)	0.00033(7)
^{71}Ga	5644.8(7)	0.0065(21)	0.00028(9)
^{71}Ga	5651.3(4)	0.0134(20)	0.00058(9)
^{71}Ga	5664.0(5)	0.0099(11)	0.00043(5)
^{71}Ga	5692.2(3)	0.0211(13)	0.00092(6)
^{71}Ga	5721.1(13)	0.020(4)	0.00087(17)
^{69}Ga	5722.9(3)	0.0067(25)	0.00029(11)
^{71}Ga	5779.11(18)	0.022(4)	0.00096(17)
^{69}Ga	5783.8(4)	0.0114(13)	0.00050(6)
^{69}Ga	5806.4(3)	0.0152(15)	0.00066(7)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{71}Ga	5883.55(19)	0.0096(4)	0.000417(17)
^{71}Ga	5900.55(14)	0.0173(14)	0.00075(6)
^{71}Ga	5919.38(15)	0.0131(12)	0.00057(5)
^{71}Ga	**6007.25(14)**	**0.069(5)**	**0.00300(22)**
^{71}Ga	**6111.72(24)**	**0.055(4)**	**0.00239(17)**
^{71}Ga	6127.57(14)	0.0227(23)	0.00099(10)
^{69}Ga	6134.5(5)	0.0058(14)	0.00025(6)
^{71}Ga	6190.14(17)	0.0218(19)	0.00095(8)
^{69}Ga	6238.6(4)	0.0067(10)	0.00029(4)
^{71}Ga	6311.64(14)	0.0194(16)	0.00084(7)
^{71}Ga	6322.20(14)	0.0186(16)	0.00081(7)
^{69}Ga	6346.4(3)	0.0140(15)	0.00061(7)
^{71}Ga	**6358.61(14)**	**0.138(5)**	**0.00600(22)**
^{69}Ga	6513.06(18)	0.0325(20)	0.00141(9)
^{71}Ga	6520.12(14)	0.017(3)	0.00074(13)
^{69}Ga	7002.30(16)	0.0203(12)	0.00088(5)
Germanium (Z=32), *At.Wt.*=72.64(1), σ_γ^z =2.30(6)			
^{72}Ge	68.750(17)	0.0201(7)	0.00084(3)
^{70}Ge	**175.05(3)**	**0.164(4)**	**0.00684(17)**
^{70}Ge	175.05(3)d	0.078(5)	0.00325[100%]
^{74}Ge	177.49(4)	0.0118(5)	0.000492(21)
^{70}Ge	247.27(5)	0.0123(6)	0.000513(25)
^{74}Ge	253.21(5)	0.0609(16)	0.00254(7)
^{72}Ge	284.98(5)	0.0164(7)	0.00068(3)
^{72}Ge	297.41(3)	0.0414(12)	0.00173(5)
^{70}Ge	306.18(4)	0.0136(8)	0.00057(3)
^{72}Ge	325.74(3)	0.0649(18)	0.00271(8)
^{70}Ge	326.83(3)	0.058(5)	0.00242(21)
^{70}Ge	391.43(4)	0.0253(10)	0.00106(4)
^{72}Ge	430.34(5)	0.0161(7)	0.00067(3)
^{72}Ge	432.86(5)	0.0125(6)	0.000521(25)
^{73}Ge	**492.933(5)**	**0.133(3)**	**0.00555(13)**
^{70}Ge	**499.87(3)**	**0.162(6)**	**0.00676(25)**
^{73}Ge	516.19(4)	~0.02	~0.0008
^{70}Ge	517.78(8)	0.0114(10)	0.00048(4)
^{73}Ge	531.654(7)	0.0133(7)	0.00055(3)
^{72}Ge	541.77(4)	0.0154(6)	0.000642(25)
^{70}Ge	572.27(5)	0.018(4)	0.00075(17)
^{74}Ge	574.91(3)	0.0306(12)	0.00128(5)
^{73}Ge	**595.851(5)**	**1.100(24)**	**0.0459(10)**
^{73}Ge	606.80(4)	0.015(12)	0.0006(5)
^{73}Ge	**608.353(4)**	**0.250(6)**	**0.01043(25)**
^{73}Ge	701.509(8)	0.0642(19)	0.00268(8)
^{70}Ge	708.15(3)	0.0825(24)	0.00344(10)
^{73}Ge	770.211(8)	0.0135(8)	0.00056(3)
^{70}Ge	788.60(7)	0.014(3)	0.00058(13)
^{70}Ge	808.14(4)	0.030(5)	0.00125(21)
^{73}Ge	808.218(10)	0.0197(18)	0.00082(8)
^{70}Ge	831.30(3)	0.0445(16)	0.00186(7)
^{70}Ge	851.70(13)	0.012(7)	0.0005(3)
^{73}Ge	**867.899(5)**	**0.553(12)**	**0.0231(5)**
^{73}Ge	878.130(19)	0.0112(8)	0.00047(3)
^{73}Ge	939.249(11)	0.0315(13)	0.00131(5)
^{73}Ge	**961.055(7)**	**0.129(4)**	**0.00538(17)**
^{73}Ge	999.775(8)	0.0581(19)	0.00242(8)
^{70}Ge	1095.42(5)	0.053(5)	0.00221(21)
^{70}Ge	1098.62(5)	0.0165(10)	0.00069(4)
^{73}Ge	**1101.282(6)**	**0.134(3)**	**0.00559(13)**
^{73}Ge	1105.557(10)	0.0708(20)	0.00295(8)
^{73}Ge	1131.360(8)	0.0487(15)	0.00203(6)
^{70}Ge	1139.27(6)	0.0441(23)	0.00184(10)
^{73}Ge	1150.441(22)	0.0127(8)	0.00053(3)
^{73}Ge	1200.75(10)	~0.01	~0.0005
^{73}Ge	1200.89(18)	~0.01	~0.0005
^{73}Ge	1200.94(3)	~0.01	~0.0005
^{73}Ge	**1204.199(6)**	**0.141(4)**	**0.00588(17)**
^{73}Ge	1205.862(13)	0.0114(21)	0.00048(9)
^{73}Ge	1228.20(9)	0.0116(9)	0.00048(4)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{76}Ge	1250.55(10)	0.0110(21)	0.00046(9)
^{72}Ge	1251.30(7)	0.032(9)	0.0013(4)
^{70}Ge	1298.61(6)	0.049(4)	0.00204(17)
^{73}Ge	1332.081(11)	0.0122(10)	0.00051(4)
^{70}Ge	1378.73(6)	0.017(4)	0.00071(17)
^{73}Ge	1471.712(10)	0.083(3)	0.00346(13)
^{73}Ge	1489.491(24)	0.0234(12)	0.00098(5)
^{73}Ge	1509.719(11)	0.0422(17)	0.00176(7)
^{73}Ge	1513.41(8)	~0.01	~0.0005
^{73}Ge	1513.74(9)	~0.01	~0.0005
^{73}Ge	1573.87(3)	0.0115(9)	0.00048(4)
^{73}Ge	1617.539(14)	0.0197(12)	0.00082(5)
^{70}Ge	1631.1(3)	0.0189(13)	0.00079(5)
^{73}Ge	1631.83(7)	0.0175(12)	0.00073(5)
^{73}Ge	1635.84(7)	0.0138(11)	0.00058(5)
^{73}Ge	1640.749(12)	0.0128(10)	0.00053(4)
^{73}Ge	1712.780(20)	0.0129(9)	0.00054(4)
^{73}Ge	1755.86(3)	0.014(4)	0.00058(17)
^{73}Ge	1940.422(12)	0.0382(16)	0.00159(7)
^{70}Ge	1964.98(5)	0.0112(11)	0.00047(5)
^{73}Ge	2014.478(24)	0.0127(12)	0.00053(5)
^{73}Ge	2073.746(14)	0.0205(14)	0.00086(6)
^{73}Ge	4423.23(6)	0.014(3)	0.00058(13)
^{73}Ge	4423.81(8)	0.014(4)	0.00058(17)
^{74}Ge	4706.98(23)	0.0151(13)	0.00063(5)
^{70}Ge	4881.79(4)	0.017(3)	0.00071(13)
^{73}Ge	5165.56(5)	0.013(9)	0.0005(4)
^{73}Ge	5361.77(6)	0.0111(12)	0.00046(5)
^{70}Ge	5383.85(7)	0.0131(15)	0.00055(6)
^{70}Ge	5450.69(5)	0.028(4)	0.00117(17)
^{72}Ge	5518.30(4)	0.0290(17)	0.00121(7)
^{72}Ge	5650.80(6)	0.0115(12)	0.00048(5)
^{72}Ge	5740.07(10)	0.0151(15)	0.00063(6)
^{70}Ge	5817.17(4)	0.028(3)	0.00117(13)
^{70}Ge	6036.90(6)	0.045(3)	0.00188(13)
^{70}Ge	6117.02(7)	0.043(6)	0.00179(25)
^{73}Ge	6199.96(5)	0.0120(13)	0.00050(5)
^{74}Ge	6251.97(6)	0.0188(18)	0.00078(8)
^{73}Ge	6265.84(6)	0.015(4)	0.00063(17)
^{70}Ge	6276.35(6)	0.0214(21)	0.00089(9)
^{70}Ge	6320.19(5)	0.0153(14)	0.00064(6)
^{72}Ge	6390.29(5)	0.0299(19)	0.00125(8)
^{72}Ge	6418.62(4)	0.0178(15)	0.00074(6)
^{70}Ge	6707.43(3)	0.0388(25)	0.00162(10)
^{72}Ge	6716.00(4)	0.0160(15)	0.00067(6)
^{73}Ge	6717.462(23)	0.020(5)	0.00083(21)
^{70}Ge	6915.69(3)	0.031(5)	0.00129(21)
^{73}Ge	7091.164(15)	0.0170(11)	0.00071(5)
^{73}Ge	7260.187(14)	0.0270(15)	0.00113(6)
^{70}Ge	7415.510(23)	0.016(5)	0.00067(21)
^{73}Ge	8030.317(13)	0.0117(9)	0.00049(4)
^{73}Ge	8498.388(13)	0.0120(9)	0.00050(4)
^{73}Ge	8731.744(13)	0.0128(8)	0.00053(3)
Arsenic (Z=33), *At.Wt.*=74.92160(2), σ_γ^z =4.23(8)			
^{75}As	**44.4250(10)**	**0.560(20)**	**0.0227(8)**
^{75}As	**46.0980(10)**	**0.337(15)**	**0.0136(6)**
^{75}As	**74.8720(10)**	**0.12(3)**	**0.0049(12)**
^{75}As	81.4110(20)	0.0107(15)	0.00043(6)
^{75}As	83.2840(10)	0.0142(16)	0.00057(7)
^{75}As	**86.7880(10)**	**0.579(11)**	**0.0234(4)**
^{75}As	91.3670(10)	0.0218(17)	0.00088(7)
^{75}As	**116.7550(10)**	**0.107(18)**	**0.0043(7)**
^{75}As	117.3320(10)	0.071(18)	0.0029(7)
^{75}As	118.680(3)	0.0140(10)	0.00057(4)
^{75}As	**120.2580(10)**	**0.402(8)**	**0.0163(3)**
^{75}As	**122.2470(10)**	**0.227(5)**	**0.00918(20)**
^{75}As	127.5090(20)	0.096(3)	0.00388(12)
^{75}As	**135.4110(10)**	**0.156(4)**	**0.00631(16)**

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{75}As	136.3430(10)	0.031(3)	0.00125(12)
^{75}As	137.0270(10)	0.0391(19)	0.00158(8)
^{75}As	141.2150(20)	0.0625(21)	0.00253(9)
^{75}As	142.4590(10)	0.0211(16)	0.00085(7)
^{75}As	**144.5480(10)**	**0.1000(22)**	**0.00404(9)**
^{75}As	152.8430(20)	0.0114(13)	0.00046(5)
^{75}As	155.0830(10)	0.0423(19)	0.00171(8)
^{75}As	156.8900(20)	0.0136(18)	0.00055(7)
^{75}As	**157.7450(10)**	**0.117(24)**	**0.0047(10)**
^{75}As	162.6820(10)	0.0257(19)	0.00104(8)
^{75}As	**165.0490(10)**	**0.996(16)**	**0.0403(7)**
^{75}As	178.0190(10)	0.0979(23)	0.00396(9)
^{75}As	178.831(3)	0.0169(11)	0.00068(4)
^{75}As	180.121(3)	0.0136(7)	0.00055(3)
^{75}As	180.2100(10)	0.0157(8)	0.00064(3)
^{75}As	186.0720(10)	0.0285(17)	0.00115(7)
^{75}As	186.734(3)	0.0103(6)	0.000417(24)
^{75}As	187.3130(20)	0.0152(8)	0.00061(3)
^{75}As	188.0620(10)	0.090(3)	0.00364(12)
^{75}As	191.2620(20)	0.0117(17)	0.00047(7)
^{75}As	193.273(3)	0.0119(15)	0.00048(6)
^{75}As	198.8550(10)	0.089(3)	0.00360(12)
^{75}As	200.446(3)	0.011(3)	0.00044(12)
^{75}As	201.1800(20)	0.0140(18)	0.00057(7)
^{75}As	**211.1470(10)**	**0.113(3)**	**0.00457(12)**
^{75}As	220.3810(10)	0.0373(23)	0.00151(9)
^{75}As	221.5320(10)	0.0534(25)	0.00216(10)
^{75}As	224.004(4)	0.0126(12)	0.00051(5)
^{75}As	225.7020(10)	0.0803(24)	0.00325(10)
^{75}As	**235.8770(10)**	**0.181(4)**	**0.00732(16)**
^{75}As	238.9960(10)	0.023(10)	0.0009(4)
^{75}As	241.6580(10)	0.0262(13)	0.00106(5)
^{75}As	246.2030(20)	0.0223(14)	0.00090(6)
^{75}As	256.0350(10)	0.045(11)	0.0018(4)
^{75}As	**263.8940(10)**	**0.18(4)**	**0.0073(16)**
^{75}As	271.7540(10)	0.013(4)	0.00053(16)
^{75}As	281.5750(10)	0.085(20)	0.0034(8)
^{75}As	297.248(10)	0.010(4)	0.00040(16)
^{75}As	297.5420(10)	0.055(3)	0.00222(12)
^{75}As	300.4610(10)	0.051(3)	0.00206(12)
^{75}As	301.654(7)	0.0109(24)	0.00044(10)
^{75}As	306.639(9)	0.011(3)	0.00044(12)
^{75}As	308.3190(10)	0.018(3)	0.00073(12)
^{75}As	311.004(5)	0.0161(25)	0.00065(10)
^{75}As	314.243(3)	0.031(3)	0.00125(12)
^{75}As	322.572(4)	0.016(3)	0.00065(12)
^{75}As	326.9120(20)	0.015(3)	0.00061(12)
^{75}As	330.100(7)	0.023(3)	0.00093(12)
^{75}As	340.1560(20)	0.0413(21)	0.00167(9)
^{75}As	352.3620(20)	0.071(3)	0.00287(12)
^{75}As	357.4070(10)	0.074(3)	0.00299(12)
^{75}As	360.3830(20)	0.0228(14)	0.00092(6)
^{75}As	363.9040(10)	0.059(3)	0.00239(12)
^{75}As	378.976(3)	0.030(3)	0.00121(12)
^{75}As	379.3230(20)	0.0231(20)	0.00093(8)
^{75}As	384.002(5)	0.0186(18)	0.00075(7)
^{75}As	394.231(8)	0.0131(20)	0.00053(8)
^{75}As	399.3490(20)	0.0465(23)	0.00188(9)
^{75}As	402.7440(20)	0.061(3)	0.00247(12)
^{75}As	412.7930(20)	0.0117(12)	0.00047(5)
^{75}As	**426.5750(10)**	**0.100(3)**	**0.00404(12)**
^{75}As	428.187(3)	0.0130(14)	0.00053(6)
^{75}As	430.7920(20)	0.0134(12)	0.00054(5)
^{75}As	436.8030(10)	0.0113(12)	0.00046(5)
^{75}As	460.7790(20)	0.0111(10)	0.00045(4)
^{75}As	463.647(3)	0.0333(23)	0.00135(9)
^{75}As	467.965(13)	0.0165(19)	0.00067(8)
^{75}As	**471.0000(10)**	**0.203(5)**	**0.00821(20)**

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{75}As	**473.1540(10)**	**0.176(5)**	**0.00712(20)**
^{75}As	477.584(9)	0.0124(18)	0.00050(7)
^{75}As	479.102(5)	0.0115(17)	0.00047(7)
^{75}As	480.137(6)	0.0126(18)	0.00051(7)
^{75}As	487.393(4)	0.0139(20)	0.00056(8)
^{75}As	494.105(7)	0.0100(17)	0.00040(7)
^{75}As	506.4970(20)	0.0283(23)	0.00114(9)
^{75}As	517.873(10)	0.024(3)	0.00097(12)
^{75}As	529.907(8)	0.0111(18)	0.00045(7)
^{75}As	550.460(3)	0.071(3)	0.00287(12)
^{75}As	554.937(24)	0.0230(24)	0.00093(10)
^{75}As	**559.10(5)d**	**2.00(10)**	**0.081[1.3%]**
^{75}As	565.547(7)	0.0463(25)	0.00187(10)
^{75}As	582.291(5)	0.0115(15)	0.00047(6)
^{75}As	585.492(8)	0.0161(17)	0.00065(7)
^{75}As	624.685(6)	0.0225(20)	0.00091(8)
^{75}As	628.7440(10)	0.0116(17)	0.00047(7)
^{75}As	632.396(24)	0.0219(20)	0.00089(8)
^{75}As	640.119(10)	0.0141(20)	0.00057(8)
^{75}As	644.329(23)	0.015(3)	0.00061(12)
^{75}As	**657.05(5)d**	**0.279(14)**	**0.0113[1.3%]**
^{75}As	669.113(4)	0.0278(13)	0.00112(5)
^{75}As	687.103(8)	0.010(5)	0.00040(20)
^{75}As	687.618(7)	0.0126(15)	0.00051(6)
^{75}As	706.783(4)	0.0339(22)	0.00137(9)
^{75}As	725.909(24)	0.0118(18)	0.00048(7)
^{75}As	731.840(9)	0.0102(17)	0.00041(7)
^{75}As	822.346(23)	0.0303(22)	0.00123(9)
^{75}As	848.593(9)	0.0282(21)	0.00114(9)
^{75}As	859.76(22)	0.0210(21)	0.00085(9)
^{75}As	880.326(9)	0.0234(21)	0.00095(9)
^{75}As	941.116(13)	0.0194(19)	0.00078(8)
^{75}As	942.240(8)	0.0161(8)	0.00065(3)
^{75}As	944.229(8)	0.0146(19)	0.00059(8)
^{75}As	**1216.08(5)d**	**0.155(8)**	**0.0063[1.3%]**
^{75}As	5527.02(12)	0.0112(7)	0.00045(3)
^{75}As	**5533.94(3)**	**0.151(7)**	**0.0061(3)**
^{75}As	5540.51(15)	0.0131(9)	0.00053(4)
^{75}As	5546.04(8)	0.0181(11)	0.00073(4)
^{75}As	5568.99(5)	0.0354(18)	0.00143(7)
^{75}As	5580.21(3)	0.019(3)	0.00077(12)
^{75}As	5601.37(7)	0.0138(8)	0.00056(3)
^{75}As	5612.9(4)	0.0103(21)	0.00042(9)
^{75}As	5614.99(13)	0.015(3)	0.00061(12)
^{75}As	5629.53(7)	0.0181(11)	0.00073(4)
^{75}As	5645.75(8)	0.0119(7)	0.00048(3)
^{75}As	5655.22(6)	0.0172(9)	0.00070(4)
^{75}As	5663.81(3)	0.019(4)	0.00077(16)
^{75}As	5675.89(3)	0.026(4)	0.00105(16)
^{75}As	5684.20(4)	0.0414(19)	0.00167(8)
^{75}As	5690.54(3)	0.023(4)	0.00093(16)
^{75}As	5698.05(3)	0.0479(22)	0.00194(9)
^{75}As	5723.39(7)	0.0160(9)	0.00065(4)
^{75}As	5757.22(3)	0.015(3)	0.00061(12)
^{75}As	5778.12(3)	0.0482(23)	0.00195(9)
^{75}As	5786.82(3)	0.026(4)	0.00105(16)
^{75}As	5816.39(5)	0.0247(12)	0.00100(5)
^{75}As	5834.21(7)	0.0210(11)	0.00085(4)
^{75}As	5854.92(13)	0.0218(16)	0.00088(7)
^{75}As	5869.65(7)	0.015(4)	0.00061(16)
^{75}As	5877.68(6)	0.0276(14)	0.00112(6)
^{75}As	5884.72(3)	0.0504(24)	0.00204(10)
^{75}As	5906.24(8)	0.0128(8)	0.00052(3)
^{75}As	5931.22(9)	0.0143(9)	0.00058(4)
^{75}As	5942.97(9)	0.0119(7)	0.00048(3)
^{75}As	5970.12(5)	0.0210(10)	0.00085(4)
^{75}As	5976.18(5)	0.0199(10)	0.00080(4)
^{75}As	6006.34(5)	0.0297(15)	0.00120(6)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{75}As	6014.00(8)	0.0224(12)	0.00091(5)
^{75}As	6019.17(11)	0.0161(10)	0.00065(4)
^{75}As	6027.524(22)	0.020(3)	0.00081(12)
^{75}As	6059.483(22)	0.026(3)	0.00105(12)
^{75}As	6142.79(3)	0.014(3)	0.00057(12)
^{75}As	6171.99(9)	0.0105(6)	0.000425(24)
^{75}As	6180.14(5)	0.0264(13)	0.00107(5)
^{75}As	6203.57(4)	0.016(3)	0.00065(12)
^{75}As	6223.06(3)	0.012(3)	0.00049(12)
^{75}As	6231.24(4)	0.0413(19)	0.00167(8)
^{75}As	6294.295(25)	0.064(6)	0.00259(24)
^{75}As	6303.71(22)	0.024(4)	0.00097(16)
^{75}As	6305.37(3)	0.085(4)	0.00344(16)
^{75}As	6342.976(15)	0.010(3)	0.00040(12)
^{75}As	6357.58(7)	0.0204(10)	0.00083(4)
^{75}As	6370.124(9)	0.0274(13)	0.00111(5)
^{75}As	6388.768(10)	0.0329(18)	0.00133(7)
^{75}As	6393.133(12)	0.032(4)	0.00129(16)
^{75}As	6403.761(12)	0.022(3)	0.00089(12)
^{75}As	6419.378(23)	0.031(4)	0.00125(16)
^{75}As	6465.17(12)	0.0111(24)	0.00045(10)
^{75}As	6526.051(13)	0.0123(7)	0.00050(3)
^{75}As	6534.932(9)	0.0316(15)	0.00128(6)
^{75}As	6542.669(10)	0.0408(19)	0.00165(8)
^{75}As	6583.556(10)	0.027(3)	0.00109(12)
^{75}As	6587.038(13)	0.045(3)	0.00182(12)
^{75}As	6600.71(3)	0.0372(17)	0.00150(7)
^{75}As	6620.59(5)	0.0304(15)	0.00123(6)
^{75}As	6659.378(9)	0.0227(11)	0.00092(4)
^{75}As	6691.241(9)	0.0246(12)	0.00100(5)
^{75}As	6699.744(8)	0.0109(7)	0.00044(3)
^{75}As	6718.514(11)	0.0101(6)	0.000409(24)
^{75}As	6778.047(9)	0.0143(9)	0.00058(4)
^{75}As	6784.456(9)	0.0133(25)	0.00054(10)
^{75}As	**6808.872(8)**	**0.160(8)**	**0.0065(3)**
^{75}As	**6810.898(8)**	**0.56(3)**	**0.0227(12)**
^{75}As	6823.272(8)	0.0133(8)	0.00054(3)
^{75}As	6828.896(9)	0.0161(9)	0.00065(4)
^{75}As	6857.474(8)	0.0168(10)	0.00068(4)
^{75}As	6881.302(8)	0.0162(9)	0.00066(4)
^{75}As	6926.635(8)	0.061(4)	0.00247(16)
^{75}As	6976.101(9)	0.0130(21)	0.00053(9)
^{75}As	**7020.139(8)**	**0.104(7)**	**0.0042(3)**
^{75}As	7027.998(8)	0.0534(25)	0.00216(10)
^{75}As	7048.154(8)	0.0103(21)	0.00042(9)
^{75}As	7063.648(8)	0.045(3)	0.00182(12)
^{75}As	7163.396(8)	0.0181(9)	0.00073(4)
^{75}As	7208.183(8)	0.0127(7)	0.00051(3)
^{75}As	7241.649(8)	0.0167(20)	0.00068(8)
^{75}As	7284.007(8)	0.036(3)	0.00146(12)
	Selenium (Z=34), *At.Wt.*=78.96(3), σ_γ^z =12.0(7)		
^{76}Se	51.3610(10)	~0.03	~0.001
^{76}Se	87.8660(10)	0.210(4)	0.00806(15)
^{74}Se	112.3880(10)	0.0317(15)	0.00122(6)
^{76}Se	125.8440(10)	0.074(17)	0.0028(7)
^{76}Se	**139.2270(10)**	**0.543(9)**	**0.0208(4)**
^{74}Se	141.3140(20)	0.0246(21)	0.00094(8)
^{76}Se	**161.9220(10)d**	**0.855(23)**	**0.0328[99%]**
^{76}Se	180.751(3)	0.0291(12)	0.00112(5)
^{76}Se	**200.4530(20)**	**0.233(9)**	**0.0089(4)**
^{76}Se	231.4270(20)	0.105(3)	0.00403(12)
^{76}Se	**238.9980(10)**	**2.06(3)**	**0.0791(12)**
^{77}Se	248.43(8)	0.023(5)	0.00088(19)
^{76}Se	**249.7880(10)**	**0.538(9)**	**0.0206(4)**
^{76}Se	281.6400(20)	0.124(5)	0.00476(19)
^{74}Se	**286.5710(20)**	**0.280(6)**	**0.01075(23)**
^{74}Se	292.8430(20)	0.0297(21)	0.00114(8)
^{76}Se	**297.2160(20)**	**0.337(7)**	**0.0129(3)**

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{76}Se	303.7930(20)	0.052(3)	0.00200(12)
^{76}Se	331.2210(20)	0.0526(25)	0.00202(10)
^{76}Se	368.733(4)	0.026(3)	0.00100(12)
^{76}Se	378.9540(20)	0.022(3)	0.00084(12)
^{76}Se	384.9800(20)	0.032(5)	0.00123(19)
^{76}Se	390.8920(20)	0.029(4)	0.00111(15)
^{78}Se	432.12(14)	0.0227(15)	0.00087(6)
^{76}Se	**439.4510(20)**	**0.319(8)**	**0.0122(3)**
^{80}Se	467.81(10)	0.128(4)	0.00491(15)
^{76}Se	484.5440(20)	0.125(4)	0.00480(15)
^{80}Se	491.46(22)	0.022(3)	0.00084(12)
^{76}Se	504.7970(20)	0.024(5)	0.00092(19)
^{76}Se	**518.1810(20)**	**0.273(7)**	**0.0105(3)**
^{76}Se	**520.6370(20)**	**1.260(18)**	**0.0484(7)**
^{77}Se	545.297(12)	0.0635(25)	0.00244(10)
^{76}Se	565.7300(20)	0.0398(23)	0.00153(9)
^{76}Se	568.0660(20)	0.103(8)	0.0040(3)
^{76}Se	569.185(4)	0.024(8)	0.0009(3)
^{76}Se	574.6420(20)	0.054(3)	0.00207(12)
^{76}Se	**578.8550(20)**	**0.243(5)**	**0.00933(19)**
^{76}Se	585.4320(20)	0.077(4)	0.00296(15)
^{76}Se	607.471(4)	0.027(5)	0.00104(19)
^{76}Se	610.3800(20)	0.0345(21)	0.00132(8)
^{74}Se	610.7130(20)	0.0316(22)	0.00121(8)
^{77}Se	**613.724(3)**	**2.14(5)**	**0.0821(19)**
^{76}Se	645.8300(20)	0.099(3)	0.00380(12)
^{77}Se	687.251(5)	0.063(5)	0.00242(19)
^{77}Se	**694.914(4)**	**0.443(10)**	**0.0170(4)**
^{76}Se	707.9800(20)	0.0281(20)	0.00108(8)
^{76}Se	749.6060(20)	0.042(3)	0.00161(12)
^{76}Se	755.3920(20)	0.186(4)	0.00714(15)
^{76}Se	817.8520(20)	0.174(5)	0.00668(19)
^{77}Se	828.188(12)	0.0300(17)	0.00115(7)
^{76}Se	881.840(4)	0.040(3)	0.00154(12)
^{77}Se	884.867(7)	0.100(6)	0.00384(23)
^{76}Se	**885.8270(20)**	**0.262(7)**	**0.0101(3)**
^{77}Se	889.095(9)	0.096(6)	0.00368(23)
^{76}Se	889.108(4)	0.180(5)	0.00691(19)
^{76}Se	890.981(5)	0.083(4)	0.00319(15)
^{76}Se	946.9760(20)	0.089(4)	0.00342(15)
^{76}Se	951.809(6)	0.047(3)	0.00180(12)
^{76}Se	990.377(4)	0.028(3)	0.00107(12)
^{76}Se	991.629(6)	0.057(5)	0.00219(19)
^{76}Se	1005.1770(20)	0.117(5)	0.00449(19)
^{76}Se	1091.64(3)	0.026(5)	0.00100(19)
^{76}Se	1128.104(4)	0.023(4)	0.00088(15)
^{77}Se	1144.952(16)	0.076(3)	0.00292(12)
^{76}Se	1161.828(5)	0.079(4)	0.00303(15)
^{76}Se	1163.476(4)	0.087(4)	0.00334(15)
^{76}Se	1172.617(5)	0.058(3)	0.00223(12)
^{76}Se	1186.973(3)	0.033(3)	0.00127(12)
^{76}Se	1194.111(10)	0.022(3)	0.00084(12)
^{77}Se	1198.72(10)	0.0379(23)	0.00145(9)
^{80}Se	1202.0(3)	0.037(3)	0.00142(12)
^{77}Se	1240.206(12)	0.106(4)	0.00407(15)
^{76}Se	**1296.986(7)**	**0.240(7)**	**0.0092(3)**
^{76}Se	1306.540(10)	0.061(6)	0.00234(23)
^{77}Se	**1308.632(5)**	**0.317(8)**	**0.0122(3)**
^{77}Se	1338.817(12)	0.0354(19)	0.00136(7)
^{76}Se	1378.172(7)	0.048(4)	0.00184(15)
^{77}Se	1382.159(6)	0.069(3)	0.00265(12)
^{76}Se	1384.131(6)	0.080(4)	0.00307(15)
^{76}Se	1395.42(3)	0.024(6)	0.00092(23)
^{76}Se	1402.471(4)	0.032(4)	0.00123(15)
^{76}Se	1411.612(5)	0.115(6)	0.00441(23)
^{76}Se	1475.746(10)	0.030(20)	0.0012(8)
^{76}Se	1529.27(15)	0.034(6)	0.00130(23)
^{77}Se	1529.71(5)	0.061(13)	0.0023(5)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
76 Se	1578.621(7)	0.042(4)	0.00161(15)
76 Se	1623.124(6)	0.063(5)	0.00242(19)
76 Se	1677.06(3)	0.023(4)	0.00088(15)
76 Se	1712.75(5)	0.023(3)	0.00088(12)
77 Se	1713.544(22)	0.163(8)	0.0063(3)
76 Se	1714.739(10)	0.033(3)	0.00127(12)
77 Se	1721.43(8)	0.078(4)	0.00299(15)
80 Se	1724.88(18)	0.044(5)	0.00169(19)
76 Se	1790.24(7)	0.036(4)	0.00138(15)
76 Se	1847.93(5)	0.046(4)	0.00177(15)
76 Se	1872.21(5)	0.048(4)	0.00184(15)
77 Se	1923.32(10)	0.068(5)	0.00261(19)
76 Se	1963.15(7)	0.034(4)	0.00130(15)
76 Se	1980.40(5)	0.022(16)	0.0008(6)
77 Se	1995.871(6)	0.119(5)	0.00457(19)
76 Se	2035.26(5)	0.043(5)	0.00165(19)
76 Se	2074.08(5)	0.033(20)	0.0013(8)
76 Se	2142.65(8)	0.040(4)	0.00154(15)
76 Se	2212.02(9)	0.033(3)	0.00127(12)
76 Se	2249.88(12)	0.0221(21)	0.00085(8)
77 Se	2257.48(13)	0.022(3)	0.00084(12)
76 Se	2264.68(17)	0.031(4)	0.00119(15)
77 Se	2284.36(6)	0.054(5)	0.00207(19)
77 Se	2319.4(4)	0.025(10)	0.0010(4)
77 Se	2391.87(10)	0.043(4)	0.00165(15)
77 Se	2391.89(9)	0.038(7)	0.0015(3)
76 Se	2417.59(12)	0.024(17)	0.0009(7)
77 Se	2572.70(8)	0.025(4)	0.00096(15)
76 Se	2590.77(5)	0.039(13)	0.0015(5)
76 Se	2600.85(8)	0.0221(21)	0.00085(8)
76 Se	2614.09(5)	0.047(5)	0.00180(19)
77 Se	2674.47(6)	0.060(5)	0.00230(19)
76 Se	2749.78(15)	0.023(5)	0.00088(19)
77 Se	2769.87(8)	0.035(3)	0.00134(12)
76 Se	2809.08(7)	0.034(24)	0.0013(9)
76 Se	2872.93(9)	0.046(3)	0.00177(12)
77 Se	2873.47(9)	0.061(8)	0.0023(3)
76 Se	2922.68(11)	0.0214(21)	0.00082(8)
76 Se	2982.82(11)	0.030(9)	0.0012(4)
76 Se	3039.95(11)	0.038(16)	0.0015(6)
77 Se	3072.64(13)	0.0257(17)	0.00099(7)
76 Se	3206.54(17)	0.027(14)	0.0010(5)
77 Se	3242.39(12)	0.033(7)	0.0013(3)
76 Se	3279.09(12)	0.023(4)	0.00088(15)
76 Se	3296.55(13)	0.028(4)	0.00107(15)
77 Se	3385.13(12)	0.038(11)	0.0015(4)
77 Se	3439.40(13)	0.028(3)	0.00107(12)
76 Se	3466.82(17)	0.022(4)	0.00084(15)
76 Se	3517.60(17)	0.032(5)	0.00123(19)
76 Se	3550.31(20)	0.042(17)	0.0016(7)
76 Se	3620.46(17)	0.028(4)	0.00107(15)
76 Se	3636.29(17)	0.030(4)	0.00115(15)
76 Se	3693.06(20)	0.024(9)	0.0009(4)
76 Se	3700.14(12)	0.034(24)	0.0013(9)
76 Se	3858.09(11)	0.037(6)	0.00142(23)
76 Se	3866.33(10)	0.024(5)	0.00092(19)
76 Se	3873.00(12)	0.025(4)	0.00096(15)
76 Se	3901.06(17)	0.073(8)	0.0028(3)
76 Se	3945.94(17)	0.033(5)	0.00127(19)
76 Se	3968.30(13)	0.040(4)	0.00154(15)
76 Se	4003.78(5)	0.025(4)	0.00096(15)
76 Se	4020.78(7)	0.0225(16)	0.00086(6)
76 Se	4056.54(11)	0.031(5)	0.00119(19)
76 Se	4064.52(11)	0.0229(14)	0.00088(5)
76 Se	4174.76(12)	0.037(7)	0.0014(3)
76 Se	4185.94(13)	0.042(10)	0.0016(4)
76 Se	4243.49(13)	0.0220(13)	0.00084(5)
76 Se	4354.79(9)	0.040(5)	0.00154(19)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
76 Se	4367.73(15)	0.024(3)	0.00092(12)
76 Se	4378.36(8)	0.085(16)	0.0033(6)
76 Se	4435.83(11)	0.032(7)	0.0012(3)
76 Se	4526.75(5)	0.115(8)	0.0044(3)
76 Se	4545.72(9)	0.049(5)	0.00188(19)
76 Se	4565.56(5)	0.156(11)	0.0060(4)
76 Se	4609.57(7)	0.058(9)	0.0022(4)
76 Se	4641.97(5)	0.027(6)	0.00104(23)
76 Se	4702.43(15)	0.023(4)	0.00088(15)
76 Se	4926.78(7)	0.048(8)	0.0018(3)
76 Se	4963.217(24)	0.039(5)	0.00150(19)
76 Se	5025.80(5)	0.150(12)	0.0058(5)
76 Se	5078.75(5)	0.033(11)	0.0013(4)
76 Se	5098.56(10)	0.031(8)	0.0012(3)
76 Se	5154.33(7)	0.053(5)	0.00203(19)
76 Se	5169.734(22)	0.031(4)	0.00119(15)
76 Se	5206.60(9)	0.045(5)	0.00173(19)
76 Se	5275.98(9)	0.024(9)	0.0009(4)
76 Se	**5600.995(21)**	**0.301(14)**	**0.0116(5)**
76 Se	5703.864(23)	0.029(5)	0.00111(19)
76 Se	5795.473(21)	0.127(16)	0.0049(6)
77 Se	5813.24(10)	0.0269(13)	0.00103(5)
76 Se	**6006.973(21)**	**0.289(20)**	**0.0111(8)**
76 Se	6016.113(21)	0.101(10)	0.0039(4)
77 Se	6049.20(13)	0.0291(13)	0.00112(5)
76 Se	6231.597(21)	0.10(4)	0.0038(15)
80 Se	6232.9(5)	0.10(3)	0.0038(12)
77 Se	6244.07(13)	0.043(3)	0.00165(12)
77 Se	6315.30(9)	0.044(3)	0.00169(12)
76 Se	6413.379(21)	0.192(15)	0.0074(6)
77 Se	6498.52(12)	0.047(4)	0.00180(15)
76 Se	**6600.690(21)**	**0.623(20)**	**0.0239(8)**
77 Se	6811.00(13)	0.0257(22)	0.00099(8)
77 Se	6905.75(8)	0.0234(22)	0.00090(8)
77 Se	7113.76(8)	0.037(3)	0.00142(12)
76 Se	**7179.492(21)**	**0.261(25)**	**0.0100(10)**
77 Se	7209.15(6)	0.056(3)	0.00215(12)
76 Se	**7418.467(21)**	**0.350(13)**	**0.0134(5)**
77 Se	7491.71(9)	0.0295(15)	0.00113(6)
74 Se	7734.052(18)	0.13(6)	0.0050(23)
77 Se	8162.11(9)	0.058(3)	0.00223(12)
77 Se	8170.00(4)	0.054(4)	0.00207(15)
77 Se	8501.35(3)	0.048(3)	0.00184(12)
77 Se	9188.52(3)	0.150(8)	0.0058(3)
77 Se	**9883.35(3)**	**0.220(22)**	**0.0084(8)**
77 Se	10496.99(3)	0.0221(25)	0.00085(10)
	Bromine (Z=35), *At.Wt.*=79.904(1), σ_γ^z =6.39(7)		
81 Br	**29.1130(10)**	**0.1680(20)**	**0.00637(8)**
79 Br	**37.0520(20)d**	**0.428(12)**	**0.0162[7.5%]**
79 Br	**37.054(3)**	**0.160(10)**	**0.0061(4)**
79 Br	50.112(3)	0.0081(6)	0.000307(23)
79 Br	**59.471(4)**	**0.202(5)**	**0.00766(19)**
81 Br	72.0210(20)	0.0121(4)	0.000459(15)
79 Br	74.972(3)	0.0323(7)	0.00123(3)
81 Br	85.267(7)	0.0096(4)	0.000364(15)
79 Br	124.028(3)	0.0268(5)	0.001016(19)
79 Br	126.280(3)	0.0174(4)	0.000660(15)
79 Br	146.904(3)	0.0184(7)	0.00070(3)
79 Br	159.044(4)	0.0171(7)	0.00065(3)
79 Br	159.800(4)	0.0232(7)	0.00088(3)
79 Br	175.084(3)	0.0173(12)	0.00066(5)
81 Br	184.6440(10)	0.0258(12)	0.00098(5)
79 Br	**195.602(4)**	**0.434(14)**	**0.0165(5)**
79 Br	197.607(3)	0.0175(11)	0.00066(4)
79 Br	211.594(3)	0.0454(21)	0.00172(8)
79 Br	213.816(5)	0.0104(11)	0.00039(4)
79 Br	218.785(4)	0.019(8)	0.0007(3)
79 Br	**219.377(3)**	**0.399(14)**	**0.0151(5)**

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{81}Br	221.0950(20)	0.0123(14)	0.00047(5)
^{79}Br	**223.627(3)**	**0.153(5)**	**0.00580(19)**
^{79}Br	226.53(5)	0.0080(20)	0.00030(8)
^{79}Br	**234.320(3)**	**0.205(10)**	**0.0078(4)**
^{79}Br	236.454(3)	0.0372(23)	0.00141(9)
^{79}Br	**244.237(3)**	**0.45(3)**	**0.0171(11)**
^{81}Br	**244.8310(10)**	**0.15(5)**	**0.0057(19)**
^{79}Br	**245.203(4)**	**0.80(3)**	**0.0303(11)**
^{81}Br	245.54(3)	0.018(4)	0.00068(15)
^{81}Br	250.2080(20)	0.0145(19)	0.00055(7)
^{79}Br	263.460(8)	0.0105(25)	0.00040(10)
^{81}Br	264.4350(10)	0.035(3)	0.00133(11)
^{79}Br	**271.374(3)**	**0.462(7)**	**0.0175(3)**
^{79}Br	**274.532(5)**	**0.158(3)**	**0.00599(11)**
^{79}Br	278.186(3)	0.0238(14)	0.00090(5)
^{81}Br	278.3620(20)	0.014(5)	0.00053(19)
^{81}Br	**287.7390(20)**	**0.253(4)**	**0.00960(15)**
^{79}Br	**294.349(3)**	**0.1160(22)**	**0.00440(8)**
^{79}Br	296.908(4)	0.0307(15)	0.00116(6)
^{79}Br	**299.886(4)**	**8.00E-02**	**3.00E-03**
^{79}Br	303.02(5)	0.008(3)	0.00030(11)
^{79}Br	311.090(6)	0.0080(12)	0.00030(5)
^{79}Br	**314.982(3)**	**0.460(9)**	**0.0174(3)**
^{79}Br	315.524(17)	0.030(8)	0.0011(3)
^{81}Br	315.770(5)	0.022(8)	0.0008(3)
^{81}Br	316.8510(20)	0.017(5)	0.00064(19)
^{79}Br	321.937(8)	0.0262(18)	0.00099(7)
^{79}Br	329.551(4)	0.0213(16)	0.00081(6)
^{81}Br	339.881(3)	0.0134(14)	0.00051(5)
^{79}Br	**343.405(3)**	**0.118(4)**	**0.00448(15)**
^{81}Br	**345.0060(10)**	**0.154(4)**	**0.00584(15)**
^{79}Br	345.580(4)	0.023(4)	0.00087(15)
^{81}Br	346.986(4)	0.0122(18)	0.00046(7)
^{81}Br	350.3830(20)	0.0188(15)	0.00071(6)
^{79}Br	**366.604(4)**	**0.233(6)**	**0.00884(23)**
^{79}Br	370.530(5)	0.0171(19)	0.00065(7)
^{79}Br	370.531(3)	0.0171(9)	0.00065(3)
^{79}Br	373.44(5)	0.0140(19)	0.00053(7)
^{81}Br	374.1180(10)	0.011(3)	0.00042(11)
^{79}Br	377.397(14)	0.0100(19)	0.00038(7)
^{81}Br	379.988(12)	0.0190(11)	0.00072(4)
^{79}Br	385.598(11)	0.0232(9)	0.00088(3)
^{79}Br	389.189(4)	0.0486(13)	0.00184(5)
^{81}Br	397.147(3)	0.0125(18)	0.00047(7)
^{81}Br	400.906(20)	0.0234(16)	0.00089(6)
^{81}Br	402.743(3)	0.0170(16)	0.00064(6)
^{79}Br	408.55(8)	0.0116(20)	0.00044(8)
^{79}Br	409.002(6)	0.0150(20)	0.00057(8)
^{79}Br	414.04(7)	0.0332(17)	0.00126(6)
^{79}Br	432.216(4)	0.0783(14)	0.00297(5)
^{79}Br	450.906(5)	0.0170(13)	0.00064(5)
^{79}Br	452.611(5)	0.0679(24)	0.00258(9)
^{79}Br	455.830(3)	0.0230(13)	0.00087(5)
^{79}Br	459.775(4)	0.0455(19)	0.00173(7)
^{81}Br	465.89(3)	0.026(4)	0.00099(15)
^{81}Br	466.63(3)	0.008(4)	0.00030(15)
^{79}Br	**468.980(3)**	**0.29(3)**	**0.0110(11)**
^{79}Br	470.619(16)	0.018(3)	0.00068(11)
^{79}Br	479.082(10)	0.018(9)	0.0007(3)
^{79}Br	482.813(21)	0.0120(20)	0.00046(8)
^{81}Br	483.886(3)	0.042(18)	0.0016(7)
^{79}Br	492.884(4)	0.0292(10)	0.00111(4)
^{79}Br	494.045(7)	0.009(5)	0.00034(19)
^{81}Br	495.0380(20)	0.0342(14)	0.00130(5)
^{79}Br	498.19(3)	0.0336(13)	0.00127(5)
^{81}Br	**512.488(20)**	**0.21(3)**	**0.0080(11)**
^{79}Br	529.247(7)	0.0321(9)	0.00122(3)
^{81}Br	538.219(20)	0.0109(10)	0.00041(4)
^{81}Br	541.856(9)	0.0151(23)	0.00057(9)
^{79}Br	**542.515(6)**	**0.114(5)**	**0.00432(19)**
^{79}Br	545.667(7)	0.0094(14)	0.00036(5)
^{79}Br	549.559(3)	0.0593(14)	0.00225(5)
^{81}Br	552.1730(20)	0.0161(11)	0.00061(4)
^{81}Br	**554.3480(20)d**	**0.838(8)**	**0.0318(3)**
^{79}Br	557.257(21)	0.0315(23)	0.00119(9)
^{81}Br	566.0990(20)	0.0551(12)	0.00209(5)
^{81}Br	581.2860(20)	0.0231(11)	0.00088(4)
^{81}Br	595.2120(20)	0.0177(11)	0.00067(4)
^{81}Br	599.27(3)	0.0124(9)	0.00047(3)
^{79}Br	604.61(5)	0.013(5)	0.00049(19)
^{81}Br	608.115(19)	0.0438(13)	0.00166(5)
^{79}Br	**616.3(5)d**	**0.39(4)**	**0.0148[62%]**
^{81}Br	**619.106(4)d**	**0.515(5)**	**0.01953(19)**
^{79}Br	619.17(3)	0.0308(12)	0.00117(5)
^{79}Br	630.710(12)	0.0224(13)	0.00085(5)
^{79}Br	636.681(8)	0.018(4)	0.00068(15)
^{81}Br	643.291(6)	0.0373(20)	0.00141(8)
^{79}Br	**660.561(4)**	**0.082(3)**	**0.00311(11)**
^{79}Br	678.69(4)	0.0089(19)	0.00034(7)
^{81}Br	684.885(3)	0.050(3)	0.00190(11)
^{79}Br	684.94(5)	0.0120(20)	0.00046(8)
^{79}Br	686.930(5)	0.014(3)	0.00053(11)
^{81}Br	687.02(8)	0.0157(20)	0.00060(8)
^{79}Br	**689.994(16)**	**0.083(4)**	**0.00315(15)**
^{81}Br	**698.374(5)d**	**0.337(3)**	**0.01278(12)**
^{79}Br	702.025(9)	0.0648(14)	0.00246(5)
^{81}Br	716.14(8)	0.0420(23)	0.00159(9)
^{81}Br	717.756(20)	0.0373(8)	0.00141(3)
^{79}Br	721.417(12)	0.026(6)	0.00099(23)
^{79}Br	723.983(5)	0.019(3)	0.00072(11)
^{79}Br	731.147(4)	0.0139(6)	0.000527(23)
^{81}Br	746.970(23)	0.0091(14)	0.00035(5)
^{79}Br	751.014(10)	0.029(3)	0.00110(11)
^{79}Br	755.728(11)	0.0126(17)	0.00048(6)
^{79}Br	765.957(10)	0.0537(16)	0.00204(6)
^{81}Br	**776.517(3)d**	**0.990(10)**	**0.0375(4)**
^{79}Br	809.28(3)	0.0084(22)	0.00032(8)
^{81}Br	816.578(20)	0.0191(15)	0.00072(6)
^{79}Br	827.31(4)	0.015(3)	0.00057(11)
^{81}Br	**827.828(6)d**	**0.285(3)**	**0.01081(11)**
^{79}Br	830.856(14)	0.0413(12)	0.00157(5)
^{79}Br	845.70(3)	0.0257(21)	0.00097(8)
^{79}Br	850.93(4)	0.0082(14)	0.00031(5)
^{81}Br	856.13(3)	0.0081(11)	0.00031(4)
^{79}Br	860.488(18)	0.0450(19)	0.00171(7)
^{79}Br	876.59(4)	0.0111(7)	0.00042(3)
^{79}Br	883.60(6)	0.0278(10)	0.00105(4)
^{81}Br	888.599(20)	0.0224(15)	0.00085(6)
^{79}Br	889.949(11)	0.0128(17)	0.00049(6)
^{81}Br	895.87(5)	0.0213(10)	0.00081(4)
^{79}Br	908.97(9)	0.0144(9)	0.00055(3)
^{81}Br	910.73(3)	0.0400(12)	0.00152(5)
^{79}Br	914.574(7)	0.0508(14)	0.00193(5)
^{79}Br	919.36(5)	0.016(3)	0.00061(11)
^{81}Br	932.794(25)	0.0216(10)	0.00082(4)
^{79}Br	933.823(12)	0.010(3)	0.00038(11)
^{79}Br	952.58(9)	0.0182(8)	0.00069(3)
^{81}Br	976.508(24)	0.0459(13)	0.00174(5)
^{79}Br	977.431(12)	0.013(3)	0.00049(11)
^{81}Br	1013.03(3)	0.023(3)	0.00087(11)
^{79}Br	1022.385(10)	0.0167(14)	0.00063(5)
^{81}Br	1034.706(23)	0.0231(9)	0.00088(3)
^{81}Br	1036.890(9)	0.0081(7)	0.00031(3)
^{81}Br	**1044.002(5)d**	**0.323(3)**	**0.01225(12)**
^{81}Br	1079.99(5)	0.0350(19)	0.00133(7)
^{79}Br	1087.46(3)	0.0092(10)	0.00035(4)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{81}Br	1133.427(20)	0.0110(15)	0.00042(6)
^{79}Br	1143.370(21)	0.0225(18)	0.00085(7)
^{79}Br	1147.96(4)	0.0205(17)	0.00078(6)
^{81}Br	1157.506(25)	0.0210(17)	0.00080(6)
^{79}Br	1175.25(3)	0.0116(11)	0.00044(4)
^{79}Br	1190.73(5)	0.0216(10)	0.00082(4)
^{81}Br	1201.13(3)	0.0185(8)	0.00070(3)
^{79}Br	1248.801(12)	0.0527(22)	0.00200(8)
^{81}Br	**1317.473(10)d**	**0.314(3)**	**0.01191(12)**
^{79}Br	1320.19(4)	0.012(5)	0.00046(19)
^{79}Br	1321.96(11)	0.0152(14)	0.00058(5)
^{81}Br	**1474.880(10)d**	**0.1930(20)**	**0.00732(8)**
^{81}Br	6349.19(4)	0.0168(12)	0.00064(5)
^{81}Br	6360.18(3)	0.015(5)	0.00057(19)
^{81}Br	6413.36(3)	0.0136(11)	0.00052(4)
^{81}Br	6437.69(5)	0.0328(17)	0.00124(6)
^{79}Br	6533.28(8)	0.0196(14)	0.00074(5)
^{79}Br	6570.15(13)	0.0285(13)	0.00108(5)
^{81}Br	6570.27(3)	0.008(3)	0.00030(11)
^{81}Br	6621.81(3)	0.0104(22)	0.00039(8)
^{79}Br	6643.30(8)	0.0318(18)	0.00121(7)
^{79}Br	6668.16(11)	0.0306(18)	0.00116(7)
^{79}Br	6689.13(9)	0.0321(14)	0.00122(5)
^{79}Br	6701.38(9)	0.0168(10)	0.00064(4)
^{81}Br	6746.030(22)	0.0386(16)	0.00146(6)
^{79}Br	6894.78(8)	0.0101(7)	0.00038(3)
^{79}Br	6977.51(8)	0.0110(8)	0.00042(3)
^{79}Br	7031.43(8)	0.0447(22)	0.00170(8)
^{79}Br	7078.18(8)	0.0566(24)	0.00215(9)
^{79}Br	7126.18(8)	0.0154(15)	0.00058(6)
^{79}Br	7168.08(8)	0.0103(8)	0.00039(3)
^{81}Br	7172.612(22)	0.0238(12)	0.00090(5)
^{81}Br	7229.873(22)	0.0250(14)	0.00095(5)
^{81}Br	7301.888(22)	0.0101(8)	0.00038(3)
^{79}Br	7422.77(8)	0.0495(18)	0.00188(7)
^{79}Br	7511.57(8)	0.0108(9)	0.00041(3)
^{79}Br	**7577.04(8)**	**0.108(3)**	**0.00410(11)**
^{79}Br	7610.73(8)	0.0093(8)	0.00035(3)

Krypton (Z=36), *At.Wt.*=83.80(1), σ_γ^z =25.8(12)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{82}Kr	9.4050(10)d	0.122(24)	0.0044[17%]
^{83}Kr	367.7(5)	0.532(10)	0.0192(4)
^{83}Kr	419.4(5)	0.630(10)	0.0228(4)
^{83}Kr	**425.30(11)**	**2.960(19)**	**0.1070(7)**
^{83}Kr	448.11(11)	0.590(19)	0.0213(7)
^{83}Kr	541.50(12)	0.295(12)	0.0107(4)
^{83}Kr	546.98(12)	0.328(12)	0.0119(4)
^{83}Kr	605.5(4)	0.398(25)	0.0144(9)
^{83}Kr	612.0(3)	0.42(3)	0.0152(11)
^{83}Kr	637.13(18)	0.251(22)	0.0091(8)
^{83}Kr	708.24(21)	0.220(21)	0.0080(8)
^{83}Kr	737.0(9)	0.31(6)	0.0112(22)
^{83}Kr	802.62(8)	1.520(22)	0.0550(8)
^{83}Kr	**881.74(11)**	**20.8(3)**	**0.752(11)**
^{83}Kr	919.79(19)	0.222(17)	0.0080(6)
^{83}Kr	938.12(13)	0.449(21)	0.0162(8)
^{83}Kr	943.36(14)	0.713(8)	0.0258(3)
^{83}Kr	946.5(5)	0.447(19)	0.0162(7)
^{83}Kr	963.44(13)	0.660(22)	0.0239(8)
^{83}Kr	987.69(19)	0.256(25)	0.0093(9)
^{83}Kr	1016.2(3)	1.08(7)	0.0391(25)
^{83}Kr	1077.55(25)	0.47(3)	0.0170(11)
^{83}Kr	1124.44(6)	1.420(21)	0.0514(8)
^{83}Kr	**1213.42(12)**	**8.28(17)**	**0.299(6)**
^{83}Kr	1230.82(11)	0.310(12)	0.0112(4)
^{83}Kr	1293.20(13)	0.383(25)	0.0139(9)
^{83}Kr	1331.89(13)	0.39(6)	0.0141(22)
^{83}Kr	1443.43(11)	0.237(10)	0.0086(4)
^{83}Kr	**1463.86(6)**	**7.10(8)**	**0.257(3)**
^{86}Kr	1475.94(17)	2.4(4)E-4	8.7(14)E-6
^{83}Kr	1543.27(19)	0.486(17)	0.0176(6)
^{83}Kr	1623.20(20)	0.327(15)	0.0118(5)
^{83}Kr	1656.15(18)	0.28(5)	0.0101(18)
^{83}Kr	1682.0(3)	0.212(17)	0.0077(6)
^{83}Kr	1741.7(3)	0.437(19)	0.0158(7)
^{83}Kr	**1897.79(8)**	**2.24(3)**	**0.0810(11)**
^{83}Kr	1979.34(11)	1.070(22)	0.0387(8)
^{83}Kr	2160.48(7)	0.577(15)	0.0209(5)
^{83}Kr	2200.86(11)	0.241(10)	0.0087(4)
^{83}Kr	2544.72(19)	0.27(3)	0.0098(11)
^{83}Kr	6281.4(7)	2.70E-01	9.80E-03
^{83}Kr	6306.8(7)	4.80E-01	1.70E-02
^{83}Kr	6519.1(7)	8.80E-01	3.20E-02
^{83}Kr	6803.5(8)	6.40E-01	2.30E-02
^{83}Kr	6880.7(7)	1.30E+00	4.70E-02
^{83}Kr	6931.7(8)	5.40E-01	2.00E-02
^{83}Kr	7207.5(9)	2.50E-01	9.00E-03

Rubidium (Z=37), *At.Wt.*=85.4678(3), σ_γ^z =0.38(7)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{85}Rb	54.01(6)	0.006(3)	2.1(11)E-4
^{85}Rb	**59.75(6)**	**0.010(4)**	**0.00035(14)**
^{85}Rb	84.85(8)	0.0052(22)	1.8(8)E-4
^{85}Rb	96.87(10)	0.0026(9)	9(3)E-5
^{85}Rb	113.76(4)	0.00535(14)	1.90(5)E-4
^{85}Rb	119.94(4)	0.00267(9)	9.5(3)E-5
^{87}Rb	166.01(3)	0.00215(8)	7.6(3)E-5
^{85}Rb	176.2(9)	0.0031(13)	1.1(5)E-4
^{87}Rb	**196.34(3)**	**0.00964(19)**	**0.000342(7)**
^{85}Rb	198.96(10)	0.00266(9)	9.4(3)E-5
^{85}Rb	224.31(6)	0.00132(7)	4.68(25)E-5
^{87}Rb	240.76(3)	0.00224(8)	7.9(3)E-5
^{85}Rb	283.80(8)	0.00092(6)	3.26(21)E-5
^{85}Rb	316.13(4)	0.00138(8)	4.9(3)E-5
^{85}Rb	322.80(4)	0.00254(10)	9.0(4)E-5
^{87}Rb	362.62(5)	0.00314(12)	1.11(4)E-4
^{85}Rb	362.78(9)	0.0061(22)	2.2(8)E-4
^{87}Rb	390.60(4)	0.00179(8)	6.3(3)E-5
^{85}Rb	**421.50(3)**	**0.0259(5)**	**0.000918(18)**
^{85}Rb	**487.89(4)**	**0.0494(12)**	**0.00175(4)**
^{85}Rb	514.57(4)	0.00653(20)	2.32(7)E-4
^{85}Rb	529.9(9)	0.0031(13)	1.1(5)E-4
^{85}Rb	**536.48(4)**	**0.0167(5)**	**0.000592(18)**
^{85}Rb	**538.66(4)**	**0.0169(5)**	**0.000599(18)**
^{85}Rb	**555.61(3)d**	**0.0407(10)**	**0.00144[98%]**
^{85}Rb	**556.82(3)**	**0.0913(24)**	**0.00324(9)**
^{85}Rb	565.37(4)	0.00383(10)	1.36(4)E-4
^{85}Rb	**638.93(5)**	**0.0101(13)**	**0.00036(5)**
^{85}Rb	640.20(10)	0.0032(7)	1.13(25)E-4
^{85}Rb	668.76(7)	0.00211(10)	7.5(4)E-5
^{85}Rb	691.57(5)	0.00725(18)	0.000257(6)
^{85}Rb	726.98(5)	0.00421(15)	1.49(5)E-4
^{85}Rb	747.67(4)	0.00268(12)	9.5(4)E-5
^{85}Rb	816.59(6)	0.0031(9)	1.1(3)E-4
^{87}Rb	834.79(6)	0.00197(13)	7.0(5)E-5
^{85}Rb	**872.94(4)**	**0.0321(5)**	**0.001138(18)**
^{85}Rb	881.50(4)	0.00480(17)	1.70(6)E-4
^{85}Rb	913.12(6)	0.00497(15)	1.76(5)E-4
^{85}Rb	944.49(9)	0.0035(13)	1.2(5)E-4
^{85}Rb	945.72(7)	0.00390(15)	1.38(5)E-4
^{85}Rb	**1026.55(6)**	**0.0218(4)**	**0.000773(14)**
^{85}Rb	**1032.32(5)**	**0.0227(4)**	**0.000805(14)**
^{85}Rb	**1076.64(20)d**	**0.0301(5)**	**0.001067[<0.1%]**
^{85}Rb	**1105.52(10)**	**0.0151(3)**	**0.000535(11)**
^{87}Rb	1141.49(15)	0.00113(11)	4.0(4)E-5
^{85}Rb	1178.86(10)	0.0044(13)	1.6(5)E-4
^{85}Rb	1219.80(9)	0.00446(21)	1.58(7)E-4
^{87}Rb	1245.20(6)	0.00253(12)	9.0(4)E-5
^{85}Rb	**1304.48(4)**	**0.0204(5)**	**0.000723(18)**

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{85}Rb	1389.32(7)	0.00809(21)	0.000287(7)
^{85}Rb	1438.31(4)	0.00200(15)	7.1(5)E-5
^{85}Rb	1666.74(9)	0.00774(23)	0.000274(8)
^{85}Rb	**1890.7(4)**	**0.017(4)**	**0.00060(14)**
^{85}Rb	2130.59(17)	0.0031(5)	1.10(18)E-4
^{85}Rb	2149.4(7)	0.00153(19)	5.4(7)E-5
^{85}Rb	2179.33(16)	0.00168(17)	6.0(6)E-5
^{85}Rb	2353.43(17)	0.00122(9)	4.3(3)E-5
^{87}Rb	2391.86(21)	0.00094(12)	3.3(4)E-5
^{85}Rb	2461.41(17)	0.00251(17)	8.9(6)E-5
^{85}Rb	2476.2(7)	0.0013(4)	4.6(14)E-5
^{85}Rb	2568.8(5)	0.0017(4)	6.0(14)E-5
^{85}Rb	2585.58(16)	0.00240(18)	8.5(6)E-5
^{87}Rb	3690.17(20)	0.00184(18)	6.5(6)E-5
^{87}Rb	4640.79(25)	0.00292(19)	1.04(7)E-4
^{87}Rb	5220.8(3)	0.00176(18)	6.2(6)E-5
^{87}Rb	5886.30(24)	0.00217(17)	7.7(6)E-5
^{85}Rb	6065.13(17)	0.0047(3)	1.67(11)E-4
^{85}Rb	6081.9(5)	0.00097(16)	3.4(6)E-5
^{87}Rb	6082.4(4)	0.00097(16)	3.4(6)E-5
^{85}Rb	6143.2(4)	0.00132(19)	4.7(7)E-5
^{85}Rb	6189.29(18)	0.0036(3)	1.28(11)E-4
^{85}Rb	6319.4(8)	0.00107(18)	3.8(6)E-5
^{85}Rb	6351.44(17)	0.00173(16)	6.1(6)E-5
^{85}Rb	6385.11(25)	0.00148(19)	5.2(7)E-5
^{85}Rb	6471.37(17)	0.0049(3)	1.74(11)E-4
^{85}Rb	6501.3(7)	0.00165(19)	5.9(7)E-5
^{85}Rb	6520.11(18)	0.0064(4)	2.27(14)E-4
^{85}Rb	6831.64(10)	0.0064(4)	2.27(14)E-4
^{85}Rb	6942.98(13)	0.00161(15)	5.7(5)E-5
^{85}Rb	7212.34(10)	0.00129(17)	4.6(6)E-5
^{85}Rb	7346.16(10)	0.0059(3)	2.09(11)E-4
^{85}Rb	7545.10(13)	0.00099(14)	3.5(5)E-5
^{85}Rb	**7624.07(11)**	**0.0114(5)**	**0.000404(18)**
^{85}Rb	8093.76(10)	0.00211(20)	7.5(7)E-5
^{85}Rb	8650.52(10)	0.0022(4)	7.8(14)E-5
Strontium (Z=38), *At.Wt.*=87.62(1), σ_γ^z =1.30(21)			
^{84}Sr	231.68(4)	0.0017(3)	5.9(10)E-5
^{86}Sr	388.526(22)d	0.0785(23)	0.00272[11%]
^{87}Sr	434.925(20)	0.0346(8)	0.00120(3)
^{86}Sr	484.822(14)	0.0315(12)	0.00109(4)
^{87}Sr	585.613(14)	0.0703(14)	0.00243(5)
^{87}Sr	**850.657(12)**	**0.275(4)**	**0.00951(14)**
^{87}Sr	**898.055(11)**	**0.702(10)**	**0.0243(4)**
^{87}Sr	934.49(3)	0.024(4)	0.00083(14)
^{87}Sr	1218.523(16)	0.0599(13)	0.00207(5)
^{87}Sr	1323.92(6)	0.013(3)	0.00045(10)
^{87}Sr	1368.677(25)	0.038(8)	0.0013(3)
^{87}Sr	1382.44(4)	0.0239(8)	0.00083(3)
^{87}Sr	1407.89(5)	0.0104(20)	0.00036(7)
^{87}Sr	1436.264(17)	0.0124(6)	0.000429(21)
^{87}Sr	1493.06(3)	0.0130(8)	0.00045(3)
^{87}Sr	1534.561(22)	0.0317(9)	0.00110(3)
^{87}Sr	1565.48(5)	0.0136(12)	0.00047(4)
^{87}Sr	1565.54(5)	0.027(4)	0.00093(14)
^{87}Sr	1706.62(4)	0.0231(8)	0.00080(3)
^{87}Sr	1717.804(23)	0.0674(15)	0.00233(5)
^{87}Sr	1736.33(7)	0.0140(14)	0.00048(5)
^{87}Sr	1736.54(3)	0.018(3)	0.00062(10)
^{87}Sr	1799.06(3)	0.0356(11)	0.00123(4)
^{87}Sr	**1836.067(21)**	**1.030(18)**	**0.0356(6)**
^{87}Sr	2111.36(3)	0.0279(10)	0.00096(4)
^{87}Sr	2202.92(3)	0.0341(10)	0.00118(4)
^{87}Sr	2276.52(3)	0.0431(13)	0.00149(5)
^{87}Sr	2391.09(3)	0.0471(15)	0.00163(5)
^{87}Sr	2463.52(4)	0.0131(6)	0.000453(21)
^{87}Sr	2577.85(4)	0.0246(9)	0.00085(3)
^{87}Sr	3009.39(3)	0.0575(15)	0.00199(5)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{88}Sr	4078.39(5)	0.0055(9)	1.9(3)E-4
^{87}Sr	4604.81(6)	0.0169(7)	0.000585(24)
^{87}Sr	5161.37(5)	0.0138(6)	0.000477(21)
^{86}Sr	5361.652(25)	0.0104(6)	0.000360(21)
^{87}Sr	5423.43(8)	0.0146(7)	0.000505(24)
^{87}Sr	5684.81(4)	0.0131(9)	0.00045(3)
^{87}Sr	5791.07(4)	0.0196(9)	0.00068(3)
^{87}Sr	5999.31(5)	0.0109(6)	0.000377(21)
^{87}Sr	6101.72(4)	0.0477(17)	0.00165(6)
^{87}Sr	6266.87(4)	0.077(3)	0.00266(10)
^{87}Sr	6660.40(3)	0.0644(23)	0.00223(8)
^{87}Sr	6671.58(4)	0.0132(7)	0.000457(24)
^{87}Sr	6698.39(5)	0.0127(6)	0.000439(21)
^{87}Sr	6885.14(3)	0.0478(20)	0.00165(7)
^{87}Sr	6941.93(3)	0.0502(20)	0.00174(7)
^{87}Sr	7527.490(25)	0.0687(24)	0.00238(8)
^{86}Sr	8039.250(19)	0.0260(14)	0.00090(5)
^{87}Sr	8378.069(23)	0.0197(7)	0.000681(24)
Yttrium (Z=39), *At.Wt.*=88.90585(2), σ_γ^z =1.280(20)			
^{89}Y	176.923(22)	0.0129(7)	0.000440(24)
^{89}Y	**202.53(3)**	**0.289(7)**	**0.00985(24)**
^{89}Y	202.53(3)d	0.0018(5)	6.1E-5[10%]
^{89}Y	**574.106(20)**	**0.174(7)**	**0.00593(24)**
^{89}Y	604.99(3)	0.0084(7)	0.000286(24)
^{89}Y	**776.613(18)**	**0.659(9)**	**0.0225(3)**
^{89}Y	953.534(21)	0.0135(11)	0.00046(4)
^{89}Y	1211.573(22)	0.0453(22)	0.00154(8)
^{89}Y	1214.060(23)	0.0096(12)	0.00033(4)
^{89}Y	1369.099(23)	0.0087(12)	0.00030(4)
^{89}Y	1371.124(20)	0.0404(22)	0.00138(8)
^{89}Y	1416.566(22)	0.0173(13)	0.00059(4)
^{89}Y	1558.459(23)	0.0163(11)	0.00056(4)
^{89}Y	1571.604(22)	0.0148(11)	0.00050(4)
^{89}Y	1640.913(22)	0.0146(15)	0.00050(5)
^{89}Y	1760.964(23)	0.0086(10)	0.00029(3)
^{89}Y	1780.70(6)	0.0082(18)	0.00028(6)
^{89}Y	1815.15(3)	0.0223(15)	0.00076(5)
^{89}Y	2139.11(4)	0.0101(12)	0.00034(4)
^{89}Y	2196.10(3)	0.0107(10)	0.00036(3)
^{89}Y	2273.38(4)	0.0121(24)	0.00041(8)
^{89}Y	2327.31(5)	0.0108(18)	0.00037(6)
^{89}Y	2405.36(4)	0.0095(18)	0.00032(6)
^{89}Y	2504.60(4)	0.0139(17)	0.00047(6)
^{89}Y	2546.68(3)	0.0219(17)	0.00075(6)
^{89}Y	2589.56(5)	0.0137(15)	0.00047(5)
^{89}Y	2749.181(24)	0.0246(19)	0.00084(7)
^{89}Y	2756.47(5)	0.0103(12)	0.00035(4)
^{89}Y	2819.38(5)	0.0096(9)	0.00033(3)
^{89}Y	2847.23(7)	0.0096(9)	0.00033(3)
^{89}Y	2922.48(3)	0.0090(9)	0.00031(3)
^{89}Y	3160.17(4)	0.0109(6)	0.000372(20)
^{89}Y	3164.64(5)	0.0120(6)	0.000409(20)
^{89}Y	3229.29(3)	0.0116(6)	0.000395(20)
^{89}Y	3254.87(4)	0.0119(6)	0.000406(20)
^{89}Y	3282.41(4)	0.0192(10)	0.00065(3)
^{89}Y	3301.23(3)	0.0276(18)	0.00094(6)
^{89}Y	3380.87(4)	0.0159(8)	0.00054(3)
^{89}Y	3544.52(4)	0.0163(10)	0.00056(3)
^{89}Y	3696.70(4)	0.0138(8)	0.00047(3)
^{89}Y	3713.08(4)	0.0078(4)	0.000266(14)
^{89}Y	3870.79(5)	0.0089(5)	0.000303(17)
^{89}Y	4009.64(7)	0.0089(6)	0.000303(20)
^{89}Y	4098.82(3)	0.0108(6)	0.000368(20)
^{89}Y	4107.68(3)	0.067(12)	0.0023(4)
^{89}Y	4352.26(4)	0.0207(16)	0.00071(6)
^{89}Y	4380.97(4)	0.0085(5)	0.000290(17)
^{89}Y	4490.91(3)	0.0093(6)	0.000317(20)
^{89}Y	4660.75(3)	0.0088(5)	0.000300(17)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{89}Y	5645.236(25)	0.029(3)	0.00099(10)
^{89}Y	**6080.171(22)**	**0.76(4)**	**0.0259(14)**
Zirconium (Z=40), *At.Wt.*=91.224(2), σ_γ^z =0.19(3)			
^{94}Zr	101.17(9)	0.0026(3)	8.6(10)E-5
^{96}Zr	160.94(10)	0.0111(7)	0.000369(23)
^{92}Zr	266.78(16)	0.0091(5)	0.000302(17)
^{91}Zr	273.036(5)	0.0029(4)	9.6(13)E-5
^{91}Zr	403.898(13)	0.00137(25)	4.6(8)E-5
^{91}Zr	448.217(5)	0.0067(3)	2.23(10)E-4
^{91}Zr	492.398(8)	0.0027(3)	9.0(10)E-5
^{91}Zr	**560.958(3)**	**0.0285(5)**	**0.000947(17)**
^{94}Zr	569.5(3)	0.0013(3)	4.3(10)E-5
^{91}Zr	571.171(5)	0.0022(3)	7.3(10)E-5
^{90}Zr	652.8(4)	0.0029(14)	1.0(5)E-4
^{96}Zr	743.36(3)d	0.00101(6)	3.36E-5[2.0%]
^{91}Zr	844.206(4)	0.0095(4)	0.000316(13)
^{91}Zr	902.861(8)	0.0047(5)	1.56(17)E-4
^{91}Zr	912.766(7)	0.0117(5)	0.000389(17)
^{91}Zr	**934.4640(10)**	**0.125(5)**	**0.00415(17)**
^{94}Zr	939.11(10)	0.0017(5)	5.6(17)E-5
^{92}Zr	946.6(5)	0.0020(5)	6.6(17)E-5
^{94}Zr	953.77(15)	0.0030(5)	9.97(17)E-5
^{91}Zr	972.332(10)	0.0025(17)	8(6)E-5
^{91}Zr	990.540(7)	0.0029(5)	9.6(17)E-5
^{94}Zr	1030.83(24)	0.0013(4)	4.3(13)E-5
^{94}Zr	1054.75(16)	0.0037(5)	1.23(17)E-4
^{90}Zr	1067.5(7)	0.0017(8)	6(3)E-5
^{96}Zr	**1102.67(6)**	**0.0235(8)**	**0.00078(3)**
^{91}Zr	1132.126(4)	0.0100(7)	0.000332(23)
^{94}Zr	1198.25(19)	0.0042(5)	1.40(17)E-4
^{90}Zr	**1205.6(7)**	**0.042(5)**	**0.00140(17)**
^{91}Zr	1222.44(4)	0.0018(4)	6.0(13)E-5
^{91}Zr	1248.100(12)	0.0038(4)	1.26(13)E-4
^{94}Zr	1300.1(5)	0.0015(5)	5.0(17)E-5
^{94}Zr	1323.20(25)	0.0025(5)	8.3(17)E-5
^{91}Zr	**1405.159(3)**	**0.0301(10)**	**0.00100(3)**
^{92}Zr	1425.2(4)	0.00287(20)	9.5(7)E-5
^{91}Zr	1463.814(8)	0.0017(7)	5.6(23)E-5
^{90}Zr	**1465.7(7)**	**0.063(15)**	**0.0021(5)**
^{92}Zr	1650.1(5)	0.0029(12)	1.0(4)E-4
^{91}Zr	1847.220(7)	0.0084(8)	0.00028(3)
^{90}Zr	**1880.4(4)**	**0.016(4)**	**0.00053(13)**
^{94}Zr	1892.9(4)	0.0034(7)	1.13(23)E-4
^{92}Zr	1917.2(9)	0.0017(8)	6(3)E-5
^{91}Zr	1956.66(4)	0.0035(5)	1.16(17)E-4
^{91}Zr	1974.91(4)	0.0024(5)	8.0(17)E-5
^{91}Zr	1988.71(3)	0.0049(5)	1.63(17)E-4
^{90}Zr	**2042.2(4)**	**0.032(8)**	**0.0011(3)**
^{91}Zr	2105.16(5)	0.0025(5)	8.3(17)E-5
^{91}Zr	2132.84(3)	0.0014(3)	4.7(10)E-5
^{92}Zr	2190.2(5)	0.0044(5)	1.46(17)E-4
^{91}Zr	2328.10(4)	0.0019(8)	6(3)E-5
^{91}Zr	2436.92(3)	0.0015(7)	5.0(23)E-5
^{90}Zr	2533.2(5)	0.0037(14)	1.2(5)E-4
^{91}Zr	2537.17(19)	0.0014(5)	4.7(17)E-5
^{90}Zr	**2557.8(8)**	**0.016(4)**	**0.00053(13)**
^{90}Zr	**2577.3(14)**	**0.016(4)**	**0.00053(13)**
^{90}Zr	2640.1(8)	0.0105(25)	0.00035(8)
^{91}Zr	2693.79(3)	0.006(3)	2.0(10)E-4
^{91}Zr	2705.74(9)	0.0019(8)	6(3)E-5
^{90}Zr	3082.6(12)	0.0096(25)	0.00032(8)
^{91}Zr	3371.36(3)	0.0020(5)	6.6(17)E-5
^{92}Zr	3459.4(15)	0.00137(17)	4.6(6)E-5
^{90}Zr	**3475.8(15)**	**0.019(5)**	**0.00063(17)**
^{91}Zr	3830.13(8)	0.0017(5)	5.6(17)E-5
^{90}Zr	**3982.3(15)**	**0.015(4)**	**0.00050(13)**
^{94}Zr	4104.3(3)	0.0029(5)	9.6(17)E-5
^{92}Zr	4278.1(7)	0.00147(10)	4.9(3)E-5
^{91}Zr	4994.61(18)	0.0027(5)	9.0(17)E-5
^{91}Zr	5006.56(16)	0.0049(7)	1.63(23)E-4
^{90}Zr	5150.3(9)	0.0017(12)	6(4)E-5
^{91}Zr	5182.73(17)	0.0019(4)	6.3(13)E-5
^{91}Zr	5263.42(17)	0.0064(8)	2.1(3)E-4
^{92}Zr	5309.9(7)	0.0024(4)	8.0(13)E-5
^{91}Zr	5372.23(17)	0.0016(4)	5.3(13)E-5
^{96}Zr	5574.9(4)	0.0023(4)	7.6(13)E-5
^{91}Zr	**6295.13(16)**	**0.0279(20)**	**0.00093(7)**
^{94}Zr	6357.8(4)	0.0026(4)	8.6(13)E-5
Niobium (Z=41), *At.Wt.*=92.90638(2), σ_γ^z =1.15(5)			
^{93}Nb	**17.810(7)**	**0.0579(14)**	**0.00189(5)**
^{93}Nb	54.704(7)	0.0058(7)	1.89(23)E-4
^{93}Nb	78.6680(10)	0.0169(3)	0.000551(10)
^{93}Nb	**99.4070(10)**	**0.196(9)**	**0.0064(3)**
^{93}Nb	**113.4010(10)**	**0.117(3)**	**0.00382(10)**
^{93}Nb	135.47(6)	0.0029(9)	9(3)E-5
^{93}Nb	136.21(12)	0.0027(7)	8.8(23)E-5
^{93}Nb	138.614(8)	0.0089(19)	0.00029(6)
^{93}Nb	140.10(3)	0.00226(21)	7.4(7)E-5
^{93}Nb	150.711(22)	0.00201(21)	6.6(7)E-5
^{93}Nb	161.2610(20)	0.0190(5)	0.000620(16)
^{93}Nb	193.96(13)	0.0022(4)	7.2(13)E-5
^{93}Nb	**253.115(5)**	**0.1320(19)**	**0.00431(6)**
^{93}Nb	**255.9290(20)**	**0.176(3)**	**0.00574(10)**
^{93}Nb	270.45(4)	0.0046(3)	1.50(10)E-4
^{93}Nb	**293.206(4)**	**0.0651(16)**	**0.00212(5)**
^{93}Nb	**309.915(8)**	**0.0690(17)**	**0.00225(6)**
^{93}Nb	319.703(14)	0.00320(23)	1.04(8)E-4
^{93}Nb	329.178(12)	0.0108(4)	0.000352(13)
^{93}Nb	329.185(10)	0.0080(9)	0.00026(3)
^{93}Nb	**337.527(7)**	**0.054(6)**	**0.00176(20)**
^{93}Nb	338.661(19)	0.0080(19)	0.00026(6)
^{93}Nb	355.3360(20)	0.0056(3)	1.83(10)E-4
^{93}Nb	450.98(9)	0.00238(20)	7.8(7)E-5
^{93}Nb	454.60(5)	0.00328(22)	1.07(7)E-4
^{93}Nb	456.20(10)	0.0058(7)	1.89(23)E-4
^{93}Nb	**458.467(10)**	**0.0240(5)**	**0.000783(16)**
^{93}Nb	482.72(3)	0.0032(5)	1.04(16)E-4
^{93}Nb	484.14(5)	0.0073(6)	2.38(20)E-4
^{93}Nb	**499.426(8)**	**0.0648(18)**	**0.00211(6)**
^{93}Nb	**518.113(12)**	**0.0579(13)**	**0.00189(4)**
^{93}Nb	525.81(3)	0.0074(6)	2.41(20)E-4
^{93}Nb	527.595(9)	0.0127(7)	0.000414(23)
^{93}Nb	547.73(7)	0.0045(4)	1.47(13)E-4
^{93}Nb	**562.328(9)**	**0.0293(11)**	**0.00096(4)**
^{93}Nb	573.07(4)	0.0020(3)	6.5(10)E-5
^{93}Nb	583.837(11)	0.0022(3)	7.2(10)E-5
^{93}Nb	590.627(14)	0.0086(5)	0.000281(16)
^{93}Nb	600.43(3)	0.0035(5)	1.14(16)E-4
^{93}Nb	635.80(5)	0.0059(5)	1.92(16)E-4
^{93}Nb	636.081(16)	0.0043(5)	1.40(16)E-4
^{93}Nb	640.995(9)	0.0048(5)	1.57(16)E-4
^{93}Nb	642.62(4)	0.0069(5)	2.25(16)E-4
^{93}Nb	645.40(5)	0.0022(7)	7.2(23)E-5
^{93}Nb	672.30(5)	0.0023(4)	7.5(13)E-5
^{93}Nb	689.79(5)	0.0164(6)	0.000535(20)
^{93}Nb	693.74(4)	0.0085(4)	0.000277(13)
^{93}Nb	711.47(4)	0.0024(3)	7.8(10)E-5
^{93}Nb	748.71(11)	0.0028(4)	9.1(13)E-5
^{93}Nb	751.671(11)	0.0143(6)	0.000466(20)
^{93}Nb	755.354(8)	0.0123(6)	0.000401(20)
^{93}Nb	775.93(3)	0.0158(6)	0.000515(20)
^{93}Nb	782.247(11)	0.0042(6)	1.37(20)E-4
^{93}Nb	783.02(7)	0.0065(5)	2.12(16)E-4
^{93}Nb	801.91(18)	0.0020(4)	6.5(13)E-5
^{93}Nb	812.64(7)	0.0084(5)	0.000274(16)
^{93}Nb	**835.72(3)**	**0.0376(8)**	**0.00123(3)**

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{93}Nb	850.93(5)	0.0025(5)	8.2(16)E-5
^{93}Nb	853.98(3)	0.0028(5)	9.1(16)E-5
^{93}Nb	871.06d	0.00390(8)	1.27E-4[85%]
^{93}Nb	876.64(11)	0.0077(5)	0.000251(16)
^{93}Nb	878.61(5)	0.0191(17)	0.00062(6)
^{93}Nb	883.42(5)	0.0192(7)	0.000626(23)
^{93}Nb	894.45(11)	0.0185(7)	0.000603(23)
^{93}Nb	898.58(5)	0.0144(7)	0.000470(23)
^{93}Nb	911.476(15)	0.0176(7)	0.000574(23)
^{93}Nb	932.65(3)	0.0020(4)	6.5(13)E-5
^{93}Nb	944.61(4)	0.0056(4)	1.83(13)E-4
^{93}Nb	**957.28(5)**	**0.0248(7)**	**0.000809(23)**
^{93}Nb	976.71(4)	0.0021(5)	6.8(16)E-5
^{93}Nb	1001.82(11)	0.0037(5)	1.21(16)E-4
^{93}Nb	1100.05(5)	0.0067(6)	2.19(20)E-4
^{93}Nb	1106.86(5)	0.0076(7)	2.48(23)E-4
^{93}Nb	1117.85(5)	0.0080(11)	0.00026(4)
^{93}Nb	**1118.54(3)**	**0.022(7)**	**0.00072(23)**
^{93}Nb	1120.54(7)	0.0062(8)	2.0(3)E-4
^{93}Nb	1122.55(7)	0.0106(13)	0.00035(4)
^{93}Nb	1128.97(6)	0.0175(15)	0.00057(5)
^{93}Nb	1151.47(7)	0.0071(6)	2.32(20)E-4
^{93}Nb	1159.61(10)	0.0066(6)	2.15(20)E-4
^{93}Nb	1188.45(5)	0.0074(6)	2.41(20)E-4
^{93}Nb	1191.06(3)	0.0137(7)	0.000447(23)
^{93}Nb	**1206.26(5)**	**0.0284(10)**	**0.00093(3)**
^{93}Nb	1214.31(10)	0.0073(7)	2.38(23)E-4
^{93}Nb	1216.09(9)	0.0021(5)	6.8(16)E-5
^{93}Nb	1219.01(7)	0.0050(6)	1.63(20)E-4
^{93}Nb	1222.41(9)	0.0121(7)	0.000395(23)
^{93}Nb	1227.8(4)	0.0114(7)	0.000372(23)
^{93}Nb	1230.13(7)	0.0051(7)	1.66(23)E-4
^{93}Nb	1240.22(9)	0.0096(7)	0.000313(23)
^{93}Nb	1256.97(9)	0.0059(8)	1.9(3)E-4
^{93}Nb	1258.90(8)	0.0039(8)	1.3(3)E-4
^{93}Nb	1264.5(7)	0.0021(5)	6.8(16)E-5
^{93}Nb	1273.72(7)	0.0052(12)	1.7(4)E-4
^{93}Nb	1291.52(7)	0.0097(7)	0.000316(23)
^{93}Nb	1308.1(4)	0.0068(13)	2.2(4)E-4
^{93}Nb	1361.66(19)	0.0043(5)	1.40(16)E-4
^{93}Nb	1392.73(7)	0.0105(8)	0.00034(3)
^{93}Nb	1394.0(4)	0.0058(13)	1.9(4)E-4
^{93}Nb	1419.39(11)	0.0048(6)	1.57(20)E-4
^{93}Nb	1440.05(9)	0.0068(15)	2.2(5)E-4
^{93}Nb	1442.0(4)	0.0061(6)	1.99(20)E-4
^{93}Nb	1459.6(7)	0.0095(6)	0.000310(20)
^{93}Nb	1460.02(9)	0.0097(22)	0.00032(7)
^{93}Nb	1478.58(14)	0.0029(6)	9.5(20)E-5
^{93}Nb	1481.19(13)	0.0039(8)	1.3(3)E-4
^{93}Nb	1487.9(4)	0.0039(8)	1.3(3)E-4
^{93}Nb	1492.55(24)	0.0022(5)	7.2(16)E-5
^{93}Nb	1614.72(8)	0.0028(5)	9.1(16)E-5
^{93}Nb	1620.12(8)	0.0022(5)	7.2(16)E-5
^{93}Nb	1678.05(17)	0.0033(5)	1.08(16)E-4
^{93}Nb	1716.16(8)	0.0034(5)	1.11(16)E-4
^{93}Nb	1763.20(10)	0.0034(5)	1.11(16)E-4
^{93}Nb	1863.63(8)	0.0028(6)	9.1(20)E-5
^{93}Nb	1878.88(8)	0.0081(7)	0.000264(23)
^{93}Nb	1881.96(10)	0.0036(7)	1.17(23)E-4
^{93}Nb	1919.51(8)	0.0024(4)	7.8(13)E-5
^{93}Nb	1974.93(9)	0.0052(6)	1.70(20)E-4
^{93}Nb	2001.4(3)	0.0025(6)	8.2(20)E-5
^{93}Nb	2019.49(9)	0.0021(5)	6.8(16)E-5
^{93}Nb	2285.80(21)	0.0026(5)	8.5(16)E-5
^{93}Nb	2313.81(9)	0.0046(8)	1.5(3)E-4
^{93}Nb	2319.95(12)	0.0022(9)	7(3)E-5
^{93}Nb	2896.68(12)	0.0025(5)	8.2(16)E-5
^{93}Nb	2922.70(12)	0.0021(6)	6.8(20)E-5

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{93}Nb	3194.65(19)	0.0021(5)	6.8(16)E-5
^{93}Nb	3241.04(12)	0.0026(3)	8.5(10)E-5
^{93}Nb	3260.34(12)	0.0041(5)	1.34(16)E-4
^{93}Nb	3266.45(12)	0.0042(5)	1.37(16)E-4
^{93}Nb	3267.12(20)	0.0021(6)	6.8(20)E-5
^{93}Nb	3319.93(12)	0.0028(6)	9.1(20)E-5
^{93}Nb	3343.94(12)	0.0023(6)	7.5(20)E-5
^{93}Nb	3353.64(12)	0.0028(6)	9.1(20)E-5
^{93}Nb	3361.64(12)	0.0027(3)	8.8(10)E-5
^{93}Nb	3367.05(12)	0.0020(6)	6.5(20)E-5
^{93}Nb	3383.54(12)	0.0022(6)	7.2(20)E-5
^{93}Nb	3388.53(12)	0.0034(6)	1.11(20)E-4
^{93}Nb	3428.34(12)	0.0020(3)	6.5(10)E-5
^{93}Nb	3430.66(20)	0.0031(6)	1.01(20)E-4
^{93}Nb	3431.74(12)	0.0030(4)	9.8(13)E-5
^{93}Nb	3458.34(12)	0.0030(6)	9.8(20)E-5
^{93}Nb	3465.55(14)	0.0025(3)	8.2(10)E-5
^{93}Nb	3502.64(12)	0.0022(3)	7.2(10)E-5
^{93}Nb	3508.04(12)	0.0041(5)	1.34(16)E-4
^{93}Nb	3538.94(12)	0.00198(22)	6.5(7)E-5
^{93}Nb	3543.43(12)	0.0021(6)	6.8(20)E-5
^{93}Nb	3561.54(12)	0.0027(3)	8.8(10)E-5
^{93}Nb	3634.02(12)	0.0027(5)	8.8(16)E-5
^{93}Nb	3646.03(12)	0.0022(3)	7.2(10)E-5
^{93}Nb	3651.22(12)	0.0023(5)	7.5(16)E-5
^{93}Nb	3658.53(12)	0.0023(3)	7.5(10)E-5
^{93}Nb	3676.62(12)	0.0028(6)	9.1(20)E-5
^{93}Nb	3680.54(12)	0.0028(3)	9.1(10)E-5
^{93}Nb	3720.63(12)	0.0033(6)	1.08(20)E-4
^{93}Nb	3740.94(12)	0.0021(3)	6.8(10)E-5
^{93}Nb	3745.55(14)	0.0033(4)	1.08(13)E-4
^{93}Nb	3760.94(12)	0.00200(22)	6.5(7)E-5
^{93}Nb	3773.94(12)	0.0045(5)	1.47(16)E-4
^{93}Nb	3837.12(12)	0.0020(5)	6.5(16)E-5
^{93}Nb	3867.53(12)	0.0026(3)	8.5(10)E-5
^{93}Nb	3879.13(12)	0.0048(6)	1.57(20)E-4
^{93}Nb	3888.74(12)	0.0051(6)	1.66(20)E-4
^{93}Nb	3892.83(12)	0.0039(5)	1.27(16)E-4
^{93}Nb	3907.03(12)	0.00207(23)	6.8(8)E-5
^{93}Nb	3912.73(12)	0.0022(3)	7.2(10)E-5
^{93}Nb	3919.65(12)	0.0038(7)	1.24(23)E-4
^{93}Nb	3927.83(12)	0.0026(3)	8.5(10)E-5
^{93}Nb	3931.73(12)	0.0024(3)	7.8(10)E-5
^{93}Nb	3936.72(12)	0.0033(7)	1.08(23)E-4
^{93}Nb	3972.03(12)	0.0030(4)	9.8(13)E-5
^{93}Nb	3978.62(12)	0.0024(3)	7.8(10)E-5
^{93}Nb	4000.22(12)	0.0033(4)	1.08(13)E-4
^{93}Nb	4010.72(12)	0.0033(4)	1.08(13)E-4
^{93}Nb	4015.91(12)	0.0055(7)	1.79(23)E-4
^{93}Nb	4090.53(12)	0.0021(4)	6.8(13)E-5
^{93}Nb	4109.13(12)	0.0027(3)	8.8(10)E-5
^{93}Nb	4115.32(12)	0.0026(3)	8.5(10)E-5
^{93}Nb	4130.33(12)	0.0063(7)	2.05(23)E-4
^{93}Nb	4143.52(12)	0.0021(3)	6.8(10)E-5
^{93}Nb	4153.82(12)	0.0028(6)	9.1(20)E-5
^{93}Nb	4191.06(12)	0.00196(21)	6.4(7)E-5
^{93}Nb	4196.68(11)	0.0027(6)	8.8(20)E-5
^{93}Nb	4208.36(11)	0.0029(6)	9.5(20)E-5
^{93}Nb	4237.17(13)	0.0020(5)	6.5(16)E-5
^{93}Nb	4260.84(12)	0.0036(6)	1.17(20)E-4
^{93}Nb	4304.78(12)	0.0049(8)	1.6(3)E-4
^{93}Nb	4314.26(12)	0.0022(6)	7.2(20)E-5
^{93}Nb	4327.32(11)	0.0027(3)	8.8(10)E-5
^{93}Nb	4330.80(12)	0.0043(7)	1.40(23)E-4
^{93}Nb	4347.62(11)	0.0027(7)	8.8(23)E-5
^{93}Nb	4384.27(11)	0.0029(3)	9.5(10)E-5
^{93}Nb	4389.04(11)	0.00196(21)	6.4(7)E-5
^{93}Nb	4395.07(9)	0.0044(12)	1.4(4)E-4

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{93}Nb	4431.97(9)	0.0043(9)	1.4(3)E-4
^{93}Nb	4455.30(10)	0.0027(3)	8.8(10)E-5
^{93}Nb	4459.03(11)	0.0030(6)	9.8(20)E-5
^{93}Nb	4466.50(10)	0.0028(3)	9.1(10)E-5
^{93}Nb	4470.69(11)	0.0033(7)	1.08(23)E-4
^{93}Nb	4501.43(10)	0.0056(7)	1.83(23)E-4
^{93}Nb	4505.78(10)	0.0029(3)	9.5(10)E-5
^{93}Nb	4524.10(9)	0.0038(6)	1.24(20)E-4
^{93}Nb	4538.64(9)	0.0058(7)	1.89(23)E-4
^{93}Nb	4553.99(10)	0.0033(4)	1.08(13)E-4
^{93}Nb	4558.53(11)	0.0049(7)	1.60(23)E-4
^{93}Nb	4594.44(9)	0.0047(7)	1.53(23)E-4
^{93}Nb	4606.89(13)	0.0046(6)	1.50(20)E-4
^{93}Nb	4629.91(9)	0.0049(7)	1.60(23)E-4
^{93}Nb	4635.44(9)	0.0047(6)	1.53(20)E-4
^{93}Nb	4662.32(9)	0.0028(6)	9.1(20)E-5
^{93}Nb	4672.16(9)	0.0065(7)	2.12(23)E-4
^{93}Nb	4681.99(9)	0.0059(7)	1.92(23)E-4
^{93}Nb	4711.67(10)	0.0052(7)	1.70(23)E-4
^{93}Nb	4739.00(8)	0.0153(9)	0.00050(3)
^{93}Nb	4749.12(9)	0.0038(6)	1.24(20)E-4
^{93}Nb	4756.28(9)	0.0039(6)	1.27(20)E-4
^{93}Nb	4772.35(8)	0.0045(7)	1.47(23)E-4
^{93}Nb	4791.62(13)	0.0071(7)	2.32(23)E-4
^{93}Nb	4828.2(4)	0.0057(6)	1.86(20)E-4
^{93}Nb	4913.65(9)	0.0078(7)	0.000254(23)
^{93}Nb	4927.94(8)	0.0027(6)	8.8(20)E-5
^{93}Nb	4942.7(4)	0.0029(3)	9.5(10)E-5
^{93}Nb	4949.70(10)	0.0051(7)	1.66(23)E-4
^{93}Nb	4982.53(9)	0.0078(7)	0.000254(23)
^{93}Nb	4997.97(8)	0.0033(6)	1.08(20)E-4
^{93}Nb	5032.08(8)	0.0058(7)	1.89(23)E-4
^{93}Nb	5052.89(9)	0.0022(5)	7.2(16)E-5
^{93}Nb	5065.65(8)	0.0034(6)	1.11(20)E-4
^{93}Nb	5070.27(7)	0.0102(8)	0.00033(3)
^{93}Nb	5087.36(8)	0.0030(5)	9.8(16)E-5
^{93}Nb	**5103.34(7)**	**0.0232(12)**	**0.00076(4)**
^{93}Nb	5129.16(8)	0.0034(5)	1.11(16)E-4
^{93}Nb	5179.99(7)	0.0072(7)	2.35(23)E-4
^{93}Nb	5193.62(18)	0.0114(8)	0.00037(3)
^{93}Nb	5207.96(9)	0.0072(7)	2.35(23)E-4
^{93}Nb	5213.75(9)	0.00196(21)	6.4(7)E-5
^{93}Nb	5252.52(9)	0.0080(8)	0.00026(3)
^{93}Nb	5257.70(9)	0.00214(23)	7.0(8)E-5
^{93}Nb	5284.14(8)	0.0050(7)	1.63(23)E-4
^{93}Nb	5290.46(8)	0.0022(3)	7.2(10)E-5
^{93}Nb	5301.22(8)	0.0031(6)	1.01(20)E-4
^{93}Nb	5307.94(8)	0.0063(7)	2.05(23)E-4
^{93}Nb	5348.57(8)	0.0082(7)	0.000267(23)
^{93}Nb	5363.82(8)	0.0073(7)	2.38(23)E-4
^{93}Nb	5368.1(4)	0.0039(6)	1.27(20)E-4
^{93}Nb	5399.86(7)	0.0050(7)	1.63(23)E-4
^{93}Nb	5447.70(7)	0.0026(3)	8.5(10)E-5
^{93}Nb	5450.96(7)	0.0053(7)	1.73(23)E-4
^{93}Nb	**5496.24(10)**	**0.0205(14)**	**0.00067(5)**
^{93}Nb	5507.79(7)	0.0041(5)	1.34(16)E-4
^{93}Nb	5511.28(8)	0.0053(7)	1.73(23)E-4
^{93}Nb	5532.16(8)	0.0027(5)	8.8(16)E-5
^{93}Nb	5572.33(8)	0.0037(5)	1.21(16)E-4
^{93}Nb	5591.31(6)	0.0080(7)	0.000261(23)
^{93}Nb	5607.32(8)	0.0041(5)	1.34(16)E-4
^{93}Nb	5612.72(8)	0.0037(5)	1.21(16)E-4
^{93}Nb	5645.93(7)	0.0026(4)	8.5(13)E-5
^{93}Nb	5769.77(7)	0.0054(6)	1.76(20)E-4
^{93}Nb	5880.80(9)	0.0035(4)	1.14(13)E-4
^{93}Nb	5895.01(7)	0.0183(8)	0.00060(3)
^{93}Nb	5946.31(9)	0.0045(6)	1.47(20)E-4
^{93}Nb	5954.41(10)	0.0025(3)	8.2(10)E-5
^{93}Nb	5964.58(7)	0.0055(6)	1.79(20)E-4
^{93}Nb	5980.27(5)	0.0029(5)	9.5(16)E-5
^{93}Nb	5995.47(3)	0.0033(5)	1.08(16)E-4
^{93}Nb	6068.67(5)	0.0026(4)	8.5(13)E-5
^{93}Nb	6292.06(11)	0.0033(4)	1.08(13)E-4
^{93}Nb	6331.751(16)	0.0029(4)	9.5(13)E-5
^{93}Nb	6434.833(18)	0.0047(4)	1.53(13)E-4
^{93}Nb	6595.867(18)	0.0020(3)	6.5(10)E-5
^{93}Nb	6831.141(14)	0.0175(8)	0.00057(3)
^{93}Nb	6915.546(15)	0.0024(3)	7.8(10)E-5
^{93}Nb	7186.449(14)	0.0089(6)	0.000290(20)

Molybdenum (Z=42), *At.Wt.*=95.94(1), σ_γ^z =2.51(6)

^{98}Mo	140.5110(10)d	0.0276(7)	0.000872[<0.1%]
^{100}Mo	180.711(15)	0.0017(4)	5.4(13)E-5
^{98}Mo	198.38(11)	0.0108(9)	0.00034(3)
^{94}Mo	204.20(5)	0.0117(6)	0.000370(19)
^{95}Mo	349.77(4)	0.0327(13)	0.00103(4)
^{95}Mo	369.68(9)	0.0319(19)	0.00101(6)
^{95}Mo	480.57(3)	0.028(5)	0.00088(16)
^{96}Mo	480.97(13)	0.0604(23)	0.00191(7)
^{95}Mo	568.88(3)	0.0280(11)	0.00088(4)
^{95}Mo	591.21(3)	0.0315(14)	0.00100(4)
^{95}Mo	608.744(14)	0.121(4)	0.00382(13)
^{95}Mo	**719.528(14)**	**0.310(10)**	**0.0098(3)**
^{95}Mo	721.54(4)	0.025(3)	0.00079(10)
^{97}Mo	723.338(19)	0.051(11)	0.0016(4)
^{95}Mo	736.820(14)	0.119(4)	0.00376(13)
^{95}Mo	**778.221(10)**	**2.02(6)**	**0.0638(19)**
^{97}Mo	787.39(3)	0.168(6)	0.00531(19)
^{95}Mo	812.26(5)	0.0264(15)	0.00083(5)
^{95}Mo	**847.603(11)**	**0.324(9)**	**0.0102(3)**
^{95}Mo	**849.85(3)**	**0.43(3)**	**0.0136(10)**
^{95}Mo	852.93(3)	0.0444(17)	0.00140(5)
^{92}Mo	943.6(3)	0.0075(9)	2.4(3)E-4
^{95}Mo	968.46(5)	0.0323(19)	0.00102(6)
^{95}Mo	1091.289(20)	0.201(6)	0.00635(19)
^{95}Mo	1106.36(4)	0.0309(18)	0.00098(6)
^{95}Mo	1190.28(6)	0.0240(14)	0.00076(4)
^{95}Mo	1200.10(3)	0.124(4)	0.00392(13)
^{97}Mo	1230.13(5)	0.0253(15)	0.00080(5)
^{95}Mo	1317.35(8)	0.091(6)	0.00287(19)
^{95}Mo	1497.742(17)	0.122(4)	0.00385(13)
^{95}Mo	1625.817(15)	0.0264(15)	0.00083(5)
^{95}Mo	1702.78(4)	0.0220(15)	0.00069(5)
^{95}Mo	1846.26(15)	0.022(3)	0.00069(10)
^{95}Mo	1923.47(13)	0.0250(18)	0.00079(6)
^{95}Mo	2011.87(5)	0.0226(16)	0.00071(5)
^{95}Mo	2663.47(9)	0.0455(21)	0.00144(7)
^{95}Mo	5602.15(15)	0.0242(17)	0.00076(5)
^{95}Mo	5711.98(12)	0.048(4)	0.00152(13)
^{95}Mo	6363.55(10)	0.0235(17)	0.00074(5)
^{97}Mo	6624.801(20)	0.027(10)	0.0009(3)
^{95}Mo	6919.05(9)	0.106(6)	0.00335(19)
^{95}Mo	7527.75(9)	0.0264(20)	0.00083(6)

Ruthenium (Z=44), *At.Wt.*=101.07(2), σ_γ^z =2.75(21)

^{104}Ru	75.251(25)	0.0233(22)	0.00070(7)
^{98}Ru	89.69(10)	0.0036(7)	1.08(21)E-4
^{104}Ru	107.917(14)	0.0153(14)	0.00046(4)
^{100}Ru	127.18(8)	0.049(4)	0.00147(12)
^{102}Ru	136.05(4)	0.066(6)	0.00198(18)
^{104}Ru	143.206(9)	0.0206(20)	0.00062(6)
^{104}Ru	159.303(16)	0.0179(20)	0.00054(6)
^{102}Ru	174.27(3)	0.076(7)	0.00228(21)
^{96}Ru	189.24(4)	0.0099(11)	0.00030(3)
^{102}Ru	250.78(6)	0.0238(23)	0.00071(7)
^{102}Ru	270.58(8)	0.034(3)	0.00102(9)
^{102}Ru	294.66(4)	0.071(6)	0.00213(18)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{104}Ru	301.75(5)	0.0192(19)	0.00058(6)
^{104}Ru	321.526(24)	0.0175(18)	0.00052(5)
^{102}Ru	346.23(6)	0.030(3)	0.00090(9)
^{104}Ru	358.57(7)	0.0173(24)	0.00052(7)
^{102}Ru	403.10(5)	0.062(6)	0.00186(18)
^{99}Ru	403.18(8)	0.050(10)	0.0015(3)
^{101}Ru	418.531(22)	0.033(4)	0.00099(12)
^{99}Ru	424.87(5)	0.0170(21)	0.00051(6)
^{102}Ru	432.00(6)	0.0267(25)	0.00080(8)
^{104}Ru	462.93(7)	0.025(3)	0.00075(9)
^{101}Ru	468.69(4)	0.049(5)	0.00147(15)
^{101}Ru	**475.0950(20)**	**0.98(9)**	**0.029(3)**
^{102}Ru	500.96(10)	0.0175(19)	0.00052(6)
^{99}Ru	518.92(4)	0.026(3)	0.00078(9)
^{99}Ru	**539.538(15)**	**1.53(13)**	**0.046(4)**
^{102}Ru	545.44(5)	0.0253(25)	0.00076(8)
^{102}Ru	554.54(7)	0.027(3)	0.00081(9)
^{104}Ru	562.70(6)	0.028(3)	0.00084(9)
^{102}Ru	562.86(12)	0.017(4)	0.00051(12)
^{99}Ru	590.91(6)	0.053(5)	0.00159(15)
^{101}Ru	**627.970(22)**	**0.176(16)**	**0.0053(5)**
^{101}Ru	**631.22(4)**	**0.30(3)**	**0.0090(9)**
^{99}Ru	631.48(6)	0.017(5)	0.00051(15)
^{101}Ru	636.86(6)	0.033(3)	0.00099(9)
^{104}Ru	640.16(7)	0.0171(22)	0.00051(7)
^{101}Ru	680.57(6)	0.0162(22)	0.00049(7)
^{99}Ru	**686.907(17)**	**0.52(5)**	**0.0156(15)**
^{101}Ru	692.28(9)	0.025(3)	0.00075(9)
^{101}Ru	695.53(9)	0.039(5)	0.00117(15)
^{101}Ru	697.31(15)	0.020(3)	0.00060(9)
^{99}Ru	700.53(3)	0.018(3)	0.00054(9)
^{99}Ru	710.70(4)	0.034(3)	0.00102(9)
^{104}Ru	724.30(3)d	0.0760(11)	0.00228[7.4%]
^{99}Ru	734.60(6)	0.0254(25)	0.00076(8)
^{101}Ru	739.614(21)	0.0196(20)	0.00059(6)
^{101}Ru	766.82(10)	0.019(3)	0.00057(9)
^{99}Ru	822.579(22)	0.137(12)	0.0041(4)
^{99}Ru	836.20(3)	0.029(5)	0.00087(15)
^{99}Ru	849.23(4)	0.030(3)	0.00090(9)
^{101}Ru	940.42(3)	0.038(4)	0.00114(12)
^{101}Ru	1046.498(3)	0.103(9)	0.0031(3)
^{102}Ru	1075.37(14)	0.0188(21)	0.00056(6)
^{101}Ru	1103.062(22)	0.100(9)	0.0030(3)
^{101}Ru	1105.54(6)	0.055(5)	0.00165(15)
^{99}Ru	1107.20(5)	0.0236(24)	0.00071(7)
^{99}Ru	1207.93(8)	0.022(6)	0.00066(18)
^{99}Ru	1266.58(4)	0.0178(20)	0.00053(6)
^{99}Ru	1325.51(4)	0.034(4)	0.00102(12)
^{99}Ru	1341.50(3)	0.137(12)	0.0041(4)
^{99}Ru	1362.111(24)	0.111(13)	0.0033(4)
^{99}Ru	1365.29(4)	0.023(3)	0.00069(9)
^{99}Ru	1520.71(8)	0.022(3)	0.00066(9)
^{99}Ru	1523.10(3)	0.034(4)	0.00102(12)
^{99}Ru	1535.75(19)	0.0155(21)	0.00046(6)
^{99}Ru	1559.51(6)	0.027(3)	0.00081(9)
^{101}Ru	1568.383(20)	0.044(4)	0.00132(12)
^{99}Ru	1627.32(3)	0.129(12)	0.0039(4)
^{99}Ru	1701.11(7)	0.032(3)	0.00096(9)
^{102}Ru	1730.6(3)	0.0176(23)	0.00053(7)
^{99}Ru	1827.09(5)	0.045(4)	0.00135(12)
^{99}Ru	1865.04(4)	0.028(3)	0.00084(9)
^{99}Ru	1929.77(4)	0.025(3)	0.00075(9)
^{102}Ru	**1959.30(7)**	**0.210(19)**	**0.0063(6)**
^{99}Ru	1996.62(6)	0.0223(25)	0.00067(8)
^{102}Ru	2074.98(20)	0.022(3)	0.00066(9)
^{99}Ru	3016.61(9)	0.0175(21)	0.00052(6)
^{99}Ru	3981.1(3)	0.0186(24)	0.00056(7)
^{102}Ru	4627.38(14)	0.0187(24)	0.00056(7)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{104}Ru	4943.1(3)	0.020(3)	0.00060(9)
^{100}Ru	6266.6(3)	0.0180(13)	0.00054(4)
^{101}Ru	6274.68(4)	0.017(3)	0.00051(9)
^{99}Ru	6340.59(6)	0.024(4)	0.00072(12)
^{101}Ru	6627.200(20)	0.093(9)	0.0028(3)
^{101}Ru	6978.81(16)	0.041(5)	0.00123(15)
^{99}Ru	7103.08(8)	0.018(3)	0.00054(9)
^{99}Ru	7792.04(3)	0.132(13)	0.0040(4)
Rhodium (Z=45), *At.Wt.*=102.90550(2), σ_γ^z =145.0(20)			
^{103}Rh	32.18(4)	0.25(5)	0.0074(15)
^{103}Rh	35.56(13)	0.65(7)	0.0191(21)
^{103}Rh	46.20(5)	0.37(5)	0.0109(15)
^{103}Rh	**51.50(3)d**	**5.2(3)**	**0.153[90%]**
^{103}Rh	**51.50(3)**	**16.0(4)**	**0.471(12)**
^{103}Rh	55.46(4)	0.76(15)	0.022(4)
^{103}Rh	80.80(3)	0.73(16)	0.021(5)
^{103}Rh	83.74(3)	0.63(14)	0.019(4)
^{103}Rh	**85.19(3)**	**3.2(3)**	**0.094(9)**
^{103}Rh	85.97(4)	0.30(6)	0.0088(18)
^{103}Rh	**97.14(3)**	**19.5(4)**	**0.574(12)**
^{103}Rh	**100.74(4)**	**4.96(10)**	**0.146(3)**
^{103}Rh	105.40(6)	0.47(4)	0.0138(12)
^{103}Rh	118.10(3)	0.570(15)	0.0168(4)
^{103}Rh	119.50(3)	1.5(3)	0.044(9)
^{103}Rh	**127.20(3)**	**5.27(21)**	**0.155(6)**
^{103}Rh	129.37(3)	0.465(20)	0.0137(6)
^{103}Rh	131.86(6)	0.437(24)	0.0129(7)
^{103}Rh	**134.54(3)**	**6.8(4)**	**0.200(12)**
^{103}Rh	135.16(4)	0.66(16)	0.019(5)
^{103}Rh	137.65(3)	0.45(4)	0.0133(12)
^{103}Rh	138.74(4)	0.54(4)	0.0159(12)
^{103}Rh	146.72(3)	1.5(3)	0.044(9)
^{103}Rh	157.00(3)	1.05(3)	0.0309(9)
^{103}Rh	159.49(3)	0.380(16)	0.0112(5)
^{103}Rh	161.55(4)	1.00(3)	0.0294(9)
^{103}Rh	165.20(4)	0.89(4)	0.0262(12)
^{103}Rh	168.21(5)	0.45(10)	0.013(3)
^{103}Rh	**169.16(5)**	**2.88(19)**	**0.085(6)**
^{103}Rh	170.08(6)	0.64(19)	0.019(6)
^{103}Rh	177.64(4)	1.85(12)	0.054(4)
^{103}Rh	**178.66(4)**	**3.27(14)**	**0.096(4)**
^{103}Rh	**180.87(3)**	**22.6(15)**	**0.67(4)**
^{103}Rh	186.04(3)	1.50(5)	0.0442(15)
^{103}Rh	196.55(5)	0.80(16)	0.024(5)
^{103}Rh	198.89(4)	0.52(10)	0.015(3)
^{103}Rh	202.85(6)	1.6(3)	0.047(9)
^{103}Rh	213.05(3)	1.27(3)	0.0374(9)
^{103}Rh	**215.340(22)**	**5.20(12)**	**0.153(4)**
^{103}Rh	215.36(3)	1.54(12)	0.045(4)
^{103}Rh	**216.54(8)**	**5.0(10)**	**0.15(3)**
^{103}Rh	**217.82(3)**	**7.38(13)**	**0.217(4)**
^{103}Rh	218.44(4)	0.30(6)	0.0088(18)
^{103}Rh	219.85(4)	0.480(19)	0.0141(6)
^{103}Rh	222.74(5)	0.26(3)	0.0077(9)
^{103}Rh	235.93(6)	0.345(10)	0.0102(3)
^{103}Rh	245.07(5)	0.29(4)	0.0085(12)
^{103}Rh	245.45(4)	0.387(17)	0.0114(5)
^{103}Rh	246.61(5)	0.27(5)	0.0080(15)
^{103}Rh	247.55(5)	0.387(17)	0.0114(5)
^{103}Rh	261.38(5)	1.09(3)	0.0321(9)
^{103}Rh	**266.84(3)**	**2.66(17)**	**0.078(5)**
^{103}Rh	269.18(3)	1.42(11)	0.042(3)
^{103}Rh	273.62(3)	0.814(18)	0.0240(5)
^{103}Rh	284.36(4)	0.26(3)	0.0077(9)
^{103}Rh	286.18(8)	0.42(4)	0.0124(12)
^{103}Rh	303.59(5)	0.794(17)	0.0234(5)
^{103}Rh	305.7(3)	1.070(21)	0.0315(6)
^{103}Rh	317.07(4)	0.74(3)	0.0218(9)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{103}Rh	323.48(4)	1.54(19)	0.045(6)
^{103}Rh	324.64(4)	0.57(9)	0.017(3)
^{103}Rh	**333.44(3)**	**3.27(8)**	**0.0963(24)**
^{103}Rh	352.99(3)	0.668(19)	0.0197(6)
^{103}Rh	352.99(3)	0.668(19)	0.0197(6)
^{103}Rh	356.82(3)	0.668(19)	0.0197(6)
^{103}Rh	370.48(7)	0.429(18)	0.0126(5)
^{103}Rh	374.826(23)	1.300(25)	0.0383(7)
^{103}Rh	379.823(5)	0.301(21)	0.0089(6)
^{103}Rh	382.24(3)	0.374(25)	0.0110(7)
^{103}Rh	385.10(3)	0.819(19)	0.0241(6)
^{103}Rh	391.18(5)	0.358(17)	0.0105(5)
^{103}Rh	403.96(11)	0.350(15)	0.0103(4)
^{103}Rh	408.16(4)	0.293(18)	0.0086(5)
^{103}Rh	420.62(3)	2.06(4)	0.0607(12)
^{103}Rh	427.44(3)	1.12(3)	0.0330(9)
^{103}Rh	431.91(12)	0.461(23)	0.0136(7)
^{103}Rh	440.55(3)	2.23(10)	0.066(3)
^{103}Rh	459.69(6)	0.555(17)	0.0163(5)
^{103}Rh	**470.40(3)**	**2.61(7)**	**0.0769(21)**
^{103}Rh	482.230(25)	1.78(6)	0.0524(18)
^{103}Rh	497.80(4)	0.88(4)	0.0259(12)
^{103}Rh	503.00(13)	0.23(6)	0.0068(18)
^{103}Rh	529.98(5)	0.885(21)	0.0261(6)
^{103}Rh	**538.04(3)**	**2.43(7)**	**0.0716(21)**
^{103}Rh	542.31(8)	0.48(3)	0.0141(9)
^{103}Rh	550.87(8)	0.31(3)	0.0091(9)
^{103}Rh	**555.81(4)d**	**3.14(9)**	**0.092[98%]**
^{103}Rh	562.78(4)	0.299(22)	0.0088(7)
^{103}Rh	574.07(5)	0.539(20)	0.0159(6)
^{103}Rh	577.92(5)	0.342(19)	0.0101(6)
^{103}Rh	597.65(3)	0.997(23)	0.0294(7)
^{103}Rh	609.55(12)	0.58(3)	0.0171(9)
^{103}Rh	633.45(6)	0.239(17)	0.0070(5)
^{103}Rh	680.61(6)	0.25(5)	0.0074(15)
^{103}Rh	689.47(5)	0.35(8)	0.0103(24)
^{103}Rh	695.38(7)	1.07(3)	0.0315(9)
^{103}Rh	702.72(7)	0.869(25)	0.0256(7)
^{103}Rh	707.67(6)	0.843(25)	0.0248(7)
^{103}Rh	710.69(5)	0.46(4)	0.0135(12)
^{103}Rh	718.26(6)	0.267(10)	0.0079(3)
^{103}Rh	720.58(9)	0.297(9)	0.0087(3)
^{103}Rh	722.81(4)	0.255(11)	0.0075(3)
^{103}Rh	734.90(7)	0.68(5)	0.0200(15)
^{103}Rh	762.83(6)	0.339(21)	0.0100(6)
^{103}Rh	787.12(4)	1.16(3)	0.0342(9)
^{103}Rh	790.43(12)	0.7(4)	0.021(12)
^{103}Rh	791.41(7)	0.84(5)	0.0247(15)
^{103}Rh	817.71(8)	0.5(3)	0.015(9)
^{103}Rh	834.94(7)	0.277(13)	0.0082(4)
^{103}Rh	868.28(6)	0.56(3)	0.0165(9)
^{103}Rh	872.24(4)	0.440(16)	0.0130(5)
^{103}Rh	907.66(7)	0.28(6)	0.0082(18)
^{103}Rh	951.96(6)	1.090(24)	0.0321(7)
^{103}Rh	5798.18(14)	0.59(3)	0.0174(9)
^{103}Rh	5917.43(5)	1.31(4)	0.0386(12)
^{103}Rh	6046.79(6)	0.88(4)	0.0259(12)
^{103}Rh	6082.98(7)	0.58(4)	0.0171(12)
^{103}Rh	6110.21(6)	0.278(19)	0.0082(6)
^{103}Rh	6172.33(5)	0.75(3)	0.0221(9)
^{103}Rh	6211.62(4)	0.89(3)	0.0262(9)
^{103}Rh	6354.87(7)	0.46(3)	0.0135(9)
^{103}Rh	6785.66(4)	0.470(20)	0.0138(6)

Palladium (Z=46), *At.Wt.*=106.42(1), σ_γ^z =6.9(4)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{108}Pd	113.4010(10)	0.335(5)	0.00954(14)
^{106}Pd	115.86(7)	0.0141(13)	0.00040(4)
^{102}Pd	118.68(3)	0.0042(11)	1.2(3)E-4
^{108}Pd	152.9420(10)	0.1450(22)	0.00413(6)
^{108}Pd	178.0340(10)	0.1090(22)	0.00310(6)
^{108}Pd	188.9900(10)d	0.0273(15)	0.00078[89%]
^{108}Pd	197.346(5)	0.0650(20)	0.00185(6)
^{108}Pd	211.8840(20)	0.0540(18)	0.00154(5)
^{108}Pd	245.0790(20)	0.250(4)	0.00712(11)
^{108}Pd	266.3430(20)	0.0515(12)	0.00147(3)
^{108}Pd	276.289(6)	0.0562(18)	0.00160(5)
^{104}Pd	280.65(6)	0.0158(14)	0.00045(4)
^{108}Pd	291.4350(20)	0.1040(20)	0.00296(6)
^{108}Pd	325.2840(20)	0.208(3)	0.00592(9)
^{108}Pd	326.8690(20)	0.0793(20)	0.00226(6)
^{108}Pd	333.960(4)	0.1110(25)	0.00316(7)
^{108}Pd	339.5290(20)	0.195(3)	0.00555(9)
^{108}Pd	359.4290(20)	0.120(3)	0.00342(9)
^{108}Pd	378.1890(20)	0.0411(20)	0.00117(6)
^{108}Pd	428.409(4)	0.0504(21)	0.00144(6)
^{105}Pd	429.63(4)	0.145(3)	0.00413(9)
^{108}Pd	433.5640(20)	0.097(3)	0.00276(9)
^{105}Pd	**511.843(20)**	**4.00(4)**	**0.1139(11)**
^{105}Pd	**616.192(20)**	**0.629(9)**	**0.0179(3)**
^{105}Pd	621.95(6)	0.126(7)	0.00359(20)
^{108}Pd	685.914(8)	0.042(7)	0.00120(20)
^{105}Pd	**717.356(22)**	**0.777(9)**	**0.0221(3)**
^{105}Pd	748.34(5)	0.0802(23)	0.00228(7)
^{108}Pd	754.894(9)	0.0474(18)	0.00135(5)
^{105}Pd	804.33(4)	0.091(3)	0.00259(9)
^{105}Pd	846.29(10)	0.0452(18)	0.00129(5)
^{105}Pd	848.16(6)	0.1000(25)	0.00285(7)
^{108}Pd	1019.872(9)	0.0467(25)	0.00133(7)
^{105}Pd	1045.82(3)	0.321(7)	0.00914(20)
^{105}Pd	1050.31(4)	0.360(8)	0.01025(23)
^{105}Pd	1053.68(9)	0.057(3)	0.00162(9)
^{105}Pd	1128.03(3)	0.323(6)	0.00920(17)
^{105}Pd	1168.16(8)	0.0588(22)	0.00167(6)
^{105}Pd	1397.54(7)	0.089(3)	0.00253(9)
^{105}Pd	1572.54(7)	0.207(25)	0.0059(7)
^{105}Pd	1909.40(11)	0.0423(20)	0.00120(6)
^{105}Pd	1927.25(10)	0.041(3)	0.00117(9)
^{105}Pd	1988.14(12)	0.060(4)	0.00171(11)
^{105}Pd	2484.73(25)	0.052(4)	0.00148(11)
^{108}Pd	4794.02(12)	0.112(10)	0.0032(3)
^{108}Pd	5212.31(12)	0.061(5)	0.00174(14)
^{110}Pd	5531.9(4)	0.0120(20)	0.00034(6)

Silver (Z=47), *At.Wt.*=107.8682(2), σ_γ^z =63.3(8)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{109}Ag	68.36(4)	0.113(8)	0.00317(22)
^{109}Ag	**72.67(5)**	**~0.9**	**~0.03**
^{107}Ag	**78.91(4)**	**3.90(12)**	**0.110(3)**
^{109}Ag	**79.91(6)**	**~1.0**	**~0.03**
^{109}Ag	93.34(5)	0.5(3)	0.014(8)
^{107}Ag	101.55(8)	0.189(20)	0.0053(6)
^{109}Ag	**105.95(6)**	**0.87(13)**	**0.024(4)**
^{107}Ag	110.24(7)	0.273(22)	0.0077(6)
^{107}Ag	113.51(6)	0.52(3)	0.0146(8)
^{109}Ag	**117.45(8)**	**3.85(7)**	**0.1082(20)**
^{109}Ag	124.86(5)	0.158(12)	0.0044(3)
^{107}Ag	143.94(4)	0.121(5)	0.00340(14)
^{107}Ag	147.11(4)	0.114(5)	0.00320(14)
^{107}Ag	148.79(3)	0.214(6)	0.00601(17)
^{109}Ag	152.58(4)	0.326(6)	0.00916(17)
^{107}Ag	155.22(11)	0.081(13)	0.0023(4)
^{109}Ag	161.69(5)	0.217(8)	0.00610(22)
^{109}Ag	166.62(4)	0.295(10)	0.0083(3)
^{107}Ag	178.32(4)	0.208(8)	0.00584(22)
^{107}Ag	**191.39(3)**	**1.81(5)**	**0.0509(14)**
^{107}Ag	**192.90(3)**	**2.20(6)**	**0.0618(17)**
^{109}Ag	194.56(14)	~0.2	~0.006
^{109}Ag	195.33(6)	0.50(3)	0.0140(8)
^{109}Ag	195.74(8)	~0.2	~0.006

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{109}Ag	**198.72(4)**	**7.75(13)**	**0.218(4)**
^{107}Ag	201.31(6)	0.45(3)	0.0126(8)
^{107}Ag	204.02(9)	0.088(22)	0.0025(6)
^{107}Ag	**206.46(3)**	**3.58(7)**	**0.1006(20)**
^{107}Ag	212.30(4)	0.26(4)	0.0073(11)
^{107}Ag	**215.15(4)**	**1.55(3)**	**0.0435(8)**
^{109}Ag	220.77(10)	~0.08	~0.002
^{109}Ag	231.46(5)	0.224(12)	0.0063(3)
^{109}Ag	**235.62(4)**	**4.62(7)**	**0.1298(20)**
^{107}Ag	**236.85(4)**	**1.95(3)**	**0.0548(8)**
^{109}Ag	**236.89(7)**	**1.3(9)**	**0.037(25)**
^{107}Ag	237.63(3)	0.26(5)	0.0073(14)
^{107}Ag	239.10(4)	0.327(11)	0.0092(3)
^{107}Ag	244.56(6)	0.146(20)	0.0041(6)
^{107}Ag	249.15(6)	0.087(7)	0.00244(20)
^{109}Ag	252.17(5)	0.096(6)	0.00270(17)
^{107}Ag	**259.17(3)**	**1.560(25)**	**0.0438(7)**
^{107}Ag	262.31(6)	0.161(11)	0.0045(3)
^{109}Ag	**267.08(3)**	**2.73(6)**	**0.0767(17)**
^{109}Ag	269.05(4)	0.6(5)	0.017(14)
^{109}Ag	269.97(4)	0.565(25)	0.0159(7)
^{109}Ag	282.66(6)	0.079(10)	0.0022(3)
^{107}Ag	286.91(4)	0.400(25)	0.0112(7)
^{107}Ag	**294.39(3)**	**2.05(12)**	**0.058(3)**
^{107}Ag	295.22(18)	0.10(4)	0.0028(11)
^{107}Ag	**299.95(3)**	**1.15(5)**	**0.0323(14)**
^{107}Ag	301.75(7)	0.187(15)	0.0053(4)
^{109}Ag	302.83(13)	0.129(14)	0.0036(4)
^{109}Ag	304.43(15)	0.135(9)	0.00379(25)
^{109}Ag	316.88(3)	0.206(7)	0.00579(20)
^{107}Ag	320.36(6)	0.091(7)	0.00256(20)
^{107}Ag	**328.99(3)**	**0.795(12)**	**0.0223(3)**
^{109}Ag	338.74(3)	0.595(10)	0.0167(3)
^{107}Ag	349.95(3)	0.70(4)	0.0197(11)
^{107}Ag	350.99(9)	0.145(12)	0.0041(3)
^{109}Ag	357.82(5)	0.561(22)	0.0158(6)
^{109}Ag	**360.41(3)**	**1.55(3)**	**0.0435(8)**
^{107}Ag	365.41(23)	0.16(4)	0.0045(11)
^{109}Ag	366.97(10)	0.21(4)	0.0059(11)
^{107}Ag	372.1(3)	0.09(3)	0.0025(8)
^{107}Ag	376.71(9)	0.294(13)	0.0083(4)
^{109}Ag	378.11(6)	0.744(20)	0.0209(6)
^{107}Ag	**380.90(3)**	**1.59(3)**	**0.0447(8)**
^{109}Ag	380.97(15)	0.7(5)	0.020(14)
^{107}Ag	384.31(13)	0.128(22)	0.0036(6)
^{107}Ag	386.18(13)	0.192(24)	0.0054(7)
^{109}Ag	387.99(7)	0.121(21)	0.0034(6)
^{107}Ag	396.25(4)	0.138(6)	0.00388(17)
^{107}Ag	399.87(7)	0.093(6)	0.00261(17)
^{109}Ag	408.61(4)	0.459(9)	0.01290(25)
^{107}Ag	410.31(6)	0.142(6)	0.00399(17)
^{109}Ag	416.93(5)	0.243(13)	0.0068(4)
^{109}Ag	427.96(16)	0.273(11)	0.0077(3)
^{107}Ag	429.09(7)	0.253(11)	0.0071(3)
^{109}Ag	431.36(7)	0.248(13)	0.0070(4)
^{107}Ag	437.713(15)	0.079(10)	0.0022(3)
^{107}Ag	438.26(12)	0.191(11)	0.0054(3)
^{107}Ag	439.69(12)	0.216(11)	0.0061(3)
^{107}Ag	441.79(8)	0.181(21)	0.0051(6)
^{109}Ag	446.10(7)	0.183(10)	0.0051(3)
^{109}Ag	450.80(7)	0.098(16)	0.0028(5)
^{109}Ag	461.56(6)	0.265(16)	0.0074(5)
^{107}Ag	464.04(12)	0.236(20)	0.0066(6)
^{107}Ag	465.37(6)	0.46(3)	0.0129(8)
^{109}Ag	468.65(7)	0.166(9)	0.00466(25)
^{107}Ag	479.36(7)	0.095(12)	0.0027(3)
^{109}Ag	484.18(8)	0.253(18)	0.0071(5)
^{107}Ag	485.68(13)	0.098(7)	0.00275(20)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{109}Ag	488.66(6)	0.149(12)	0.0042(3)
^{109}Ag	**495.71(3)**	**1.080(18)**	**0.0303(5)**
^{107}Ag	497.57(8)	0.157(9)	0.00441(25)
^{107}Ag	499.97(4)	0.265(13)	0.0074(4)
^{107}Ag	522.43(9)	0.125(7)	0.00351(20)
^{109}Ag	**524.47(3)**	**0.804(11)**	**0.0226(3)**
^{109}Ag	526.07(8)	0.364(7)	0.01023(20)
^{107}Ag	527.23(5)	0.371(10)	0.0104(3)
^{109}Ag	**536.13(3)**	**1.090(16)**	**0.0306(5)**
^{109}Ag	544.14(5)	0.34(3)	0.0096(8)
^{109}Ag	**549.56(3)**	**1.540(24)**	**0.0433(7)**
^{107}Ag	563.91(5)	0.191(6)	0.00537(17)
^{107}Ag	572.10(6)	0.080(6)	0.00225(17)
^{107}Ag	574.77(3)	0.299(7)	0.00840(20)
^{109}Ag	586.85(3)	0.459(8)	0.01290(22)
^{109}Ag	593.86(4)	0.484(11)	0.0136(3)
^{107}Ag	599.87(4)	0.37(3)	0.0104(8)
^{109}Ag	610.33(15)	0.105(25)	0.0029(7)
^{107}Ag	611.98(18)	0.09(3)	0.0025(8)
^{109}Ag	614.15(8)	0.20(5)	0.0056(14)
^{107}Ag	616.89(4)	0.20(4)	0.0056(11)
^{109}Ag	620.07(5)	0.40(5)	0.0112(14)
^{107}Ag	626.41(4)	0.39(6)	0.0110(17)
^{107}Ag	629.499(20)	0.12(3)	0.0034(8)
^{109}Ag	632.47(10)	0.42(12)	0.012(3)
^{107}Ag	636.53(4)	0.31(11)	0.009(3)
^{107}Ag	640.18(4)	0.24(6)	0.0067(17)
^{107}Ag	652.041(20)	0.117(19)	0.0033(5)
^{109}Ag	652.96(5)	0.255(12)	0.0072(3)
^{109}Ag	655.02(11)	0.107(14)	0.0030(4)
^{109}Ag	**657.50(10)d**	**1.86(5)**	**0.0523[99%]**
^{107}Ag	662.55(11)	0.088(12)	0.0025(3)
^{107}Ag	664.91(3)	0.329(22)	0.0092(6)
^{107}Ag	670.53(7)	0.104(17)	0.0029(5)
^{107}Ag	674.07(6)	0.094(16)	0.0026(5)
^{107}Ag	685.8(3)	0.081(20)	0.0023(6)
^{107}Ag	687.48(8)	0.35(5)	0.0098(14)
^{109}Ag	698.44(6)	0.158(6)	0.00444(17)
^{107}Ag	718.17(6)	0.199(12)	0.0056(3)
^{109}Ag	724.75(5)	0.393(14)	0.0110(4)
^{107}Ag	746.21(19)	0.088(10)	0.0025(3)
^{109}Ag	748.40(6)	0.328(9)	0.00921(25)
^{109}Ag	750.77(4)	0.529(11)	0.0149(3)
^{109}Ag	767.01(5)	0.31(4)	0.0087(11)
^{109}Ag	773.32(8)	0.22(3)	0.0062(8)
^{107}Ag	781.21(11)	0.094(22)	0.0026(6)
^{109}Ag	785.57(5)	0.34(4)	0.0096(11)
^{107}Ag	796.15(8)	0.38(4)	0.0107(11)
^{107}Ag	812.10(6)	0.131(5)	0.00368(14)
^{107}Ag	819.26(8)	0.291(6)	0.00818(17)
^{107}Ag	845.19(14)	0.085(19)	0.0024(5)
^{107}Ag	881.01(7)	0.178(7)	0.00500(20)
^{107}Ag	895.48(3)	0.376(8)	0.01056(22)
^{107}Ag	918.97(11)	0.124(22)	0.0035(6)
^{107}Ag	938.04(5)	0.186(6)	0.00523(17)
^{107}Ag	960.13(4)	0.199(10)	0.0056(3)
^{107}Ag	972.69(7)	0.078(9)	0.00219(25)
^{107}Ag	1013.11(3)	0.698(13)	0.0196(4)
^{107}Ag	1051.36(5)	0.225(8)	0.00632(22)
^{107}Ag	1079.68(13)	0.165(15)	0.0046(4)
^{109}Ag	5539.17(21)	0.106(9)	0.00298(25)
^{109}Ag	5545.6(3)	0.106(12)	0.0030(3)
^{109}Ag	5554.8(3)	0.111(10)	0.0031(3)
^{109}Ag	5580.62(19)	0.302(14)	0.0085(4)
^{109}Ag	5615.11(20)	0.208(11)	0.0058(3)
^{109}Ag	5642.24(22)	0.199(12)	0.0056(3)
^{109}Ag	5701.49(19)	0.716(18)	0.0201(5)
^{109}Ag	5710.22(20)	0.229(10)	0.0064(3)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{109}Ag	5773.12(21)	0.225(9)	0.00632(25)
^{109}Ag	5795.0(3)	0.513(14)	0.0144(4)
^{109}Ag	5913.3(5)	0.084(7)	0.00236(20)
^{109}Ag	5996.81(10)	0.154(7)	0.00433(20)
^{109}Ag	6022.46(10)	0.250(10)	0.0070(3)
^{109}Ag	6034.70(11)	0.080(6)	0.00225(17)
^{109}Ag	6057.25(9)	0.663(19)	0.0186(5)
^{109}Ag	6101.98(11)	0.080(5)	0.00225(14)
^{107}Ag	6268.80(24)	0.146(7)	0.00410(20)
^{107}Ag	6372.7(9)	0.11(4)	0.0031(11)
^{109}Ag	6540.92(9)	0.259(11)	0.0073(3)
^{107}Ag	6707.6(3)	0.083(7)	0.00233(20)
^{109}Ag	6807.13(11)	0.083(3)	0.00233(8)
^{107}Ag	6892.1(3)	0.079(6)	0.00222(17)
^{107}Ag	6977.2(3)	0.121(8)	0.00340(22)
^{107}Ag	7065.3(3)	0.103(8)	0.00289(22)
^{107}Ag	7078.5(3)	0.291(13)	0.0082(4)
^{107}Ag	7271.8(3)	0.284(14)	0.0080(4)

Cadmium (Z=48), *At.Wt.*=112.411(8), σ_γ^z =2522(50)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{113}Cd	95.88(4)	21.2(6)	0.572(16)
^{110}Cd	171.3(3)	57(6)	1.54(16)
^{110}Cd	**245.3(3)**	**274(25)**	**7.4(7)**
^{110}Cd	284.3(3)	29(3)	0.78(8)
^{110}Cd	342.2(3)	1.00E+02	2.70E+00
^{113}Cd	**558.32(3)**	**1860(30)**	**50.1(8)**
^{113}Cd	576.04(3)	107.0(17)	2.88(5)
^{111}Cd	617.54(15)	2.9(4)	0.078(11)
^{110}Cd	620.3(3)	38(4)	1.02(11)
^{113}Cd	648.79(10)	34.1(9)	0.919(24)
^{113}Cd	**651.19(3)**	**358(5)**	**9.65(13)**
^{113}Cd	654.47(4)	34.1(9)	0.919(24)
^{113}Cd	707.39(3)	29.3(5)	0.790(13)
^{113}Cd	725.19(3)	107.0(13)	2.88(4)
^{113}Cd	748.04(6)	37(3)	1.00(8)
^{113}Cd	805.85(3)	134.0(18)	3.61(5)
^{113}Cd	1209.65(4)	122.0(19)	3.29(5)
^{113}Cd	1283.45(4)	47.5(9)	1.281(24)
^{113}Cd	1300.98(5)	31.1(11)	0.84(3)
^{113}Cd	1364.30(4)	123.0(21)	3.32(6)
^{113}Cd	1370.55(5)	30.2(9)	0.814(24)
^{113}Cd	1399.54(4)	97.7(15)	2.63(4)
^{113}Cd	1489.53(4)	68.5(11)	1.85(3)
^{113}Cd	1660.36(5)	66.7(13)	1.80(4)
^{113}Cd	1826.19(7)	25.2(7)	0.679(19)
^{113}Cd	2102.39(8)	24.0(9)	0.647(24)
^{113}Cd	2398.27(12)	22.4(8)	0.604(22)
^{113}Cd	2455.93(7)	87.3(18)	2.35(5)
^{113}Cd	2550.30(8)	38.7(11)	1.04(3)
^{113}Cd	2659.96(7)	64.0(15)	1.73(4)
^{113}Cd	2767.67(13)	22.4(13)	0.60(4)
^{113}Cd	2799.98(9)	27.6(9)	0.744(24)
^{113}Cd	2999.69(12)	29.1(14)	0.78(4)
^{113}Cd	3109.08(12)	28.6(12)	0.77(3)
^{113}Cd	3218.96(12)	19.0(9)	0.512(24)
^{113}Cd	5824.31(16)	69.1(18)	1.86(5)
^{113}Cd	5934.39(20)	19.3(10)	0.52(3)

Indium (Z=49), *At.Wt.*=114.818(3), σ_γ^z =272(8)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{115}In	**22.796(7)**	**7(3)**	**0.18(8)**
^{115}In	**60.9160(10)**	**15.8(11)**	**0.42(3)**
^{115}In	76.7580(20)	0.41(3)	0.0108(8)
^{115}In	84.3080(20)	1.32(9)	0.0348(24)
^{115}In	**85.5690(20)**	**22.1(16)**	**0.58(4)**
^{115}In	95.380(4)	1.0(4)	0.026(11)
^{115}In	**96.036(5)**	**11.4(14)**	**0.30(4)**
^{115}In	**96.062(3)**	**24.6(18)**	**0.65(5)**
^{115}In	112.4540(20)	1.38(9)	0.0364(24)
^{115}In	114.997(3)	0.47(3)	0.0124(8)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{115}In	**126.3720(20)**	**4.0(3)**	**0.106(8)**
^{115}In	**138.326(8)d**	**5.11(18)**	**0.135[30%]**
^{115}In	140.4560(20)	1.58(11)	0.042(3)
^{115}In	141.1700(20)	2.63(18)	0.069(5)
^{115}In	149.6700(20)	0.69(5)	0.0182(13)
^{115}In	155.272(3)	2.48(18)	0.065(5)
^{115}In	159.932(4)	1.07(7)	0.0282(18)
^{115}In	**162.393(3)d**	**15.8(8)**	**0.417[100%]**
^{115}In	163.802(8)	0.67(5)	0.0177(13)
^{115}In	**171.059(5)**	**3.44(25)**	**0.091(7)**
^{115}In	**173.886(6)**	**4.1(3)**	**0.108(8)**
^{115}In	175.066(4)	1.12(7)	0.0296(18)
^{115}In	**186.2100(20)**	**26.6(18)**	**0.70(5)**
^{115}In	196.738(5)	0.89(7)	0.0235(18)
^{115}In	202.602(3)	2.70(20)	0.071(5)
^{115}In	213.625(12)	0.64(5)	0.0169(13)
^{115}In	234.618(11)	0.71(25)	0.019(7)
^{115}In	**235.275(4)**	**4.9(3)**	**0.129(8)**
^{115}In	240.30(3)	0.44(3)	0.0116(8)
^{115}In	267.960(20)	0.52(4)	0.0137(11)
^{115}In	**272.9660(20)**	**33.1(24)**	**0.87(6)**
^{115}In	**284.914(4)**	**4.5(3)**	**0.119(8)**
^{113}In	287.726(19)	0.20(5)	0.0053(13)
^{115}In	290.952(15)	2.55(18)	0.067(5)
^{115}In	293.393(15)	0.40(16)	0.011(4)
^{115}In	293.644(14)	1.38(11)	0.036(3)
^{115}In	295.515(17)	2.86(20)	0.075(5)
^{115}In	**298.664(3)**	**9.4(7)**	**0.248(18)**
^{115}In	300.388(4)	0.45(3)	0.0119(8)
^{115}In	305.108(8)	1.30(9)	0.0343(24)
^{115}In	315.053(12)	0.69(5)	0.0182(13)
^{115}In	318.48(4)	0.60(4)	0.0158(11)
^{115}In	320.895(8)	2.30(16)	0.061(4)
^{115}In	321.653(18)	0.7(3)	0.018(8)
^{115}In	**335.450(10)**	**9.1(7)**	**0.240(18)**
^{115}In	337.687(8)	2.52(18)	0.067(5)
^{115}In	339.15(4)	0.47(11)	0.012(3)
^{115}In	364.995(20)	0.53(4)	0.0140(11)
^{115}In	373.149(24)	0.38(3)	0.0100(8)
^{115}In	375.969(12)	2.66(20)	0.070(5)
^{115}In	384.421(11)	2.9(7)	0.077(18)
^{115}In	**385.111(8)**	**12.1(9)**	**0.319(24)**
^{115}In	387.636(13)	0.344(25)	0.0091(7)
^{115}In	393.09(11)	0.39(3)	0.0103(8)
^{115}In	396.496(12)	0.51(4)	0.0135(11)
^{115}In	410.433(11)	0.69(5)	0.0182(13)
^{115}In	**416.86(3)d**	**43.0(18)**	**1.13[30%]**
^{115}In	422.213(11)	1.70(13)	0.045(3)
^{115}In	**433.723(8)**	**6.0(4)**	**0.158(11)**
^{115}In	443.229(13)	0.58(4)	0.0153(11)
^{115}In	447.531(11)	0.39(3)	0.0103(8)
^{115}In	**471.349(11)**	**4.3(3)**	**0.113(8)**
^{115}In	475.906(10)	1.88(13)	0.050(3)
^{115}In	489.314(10)	0.63(5)	0.0166(13)
^{115}In	490.374(12)	0.80(11)	0.021(3)
^{115}In	**492.532(11)**	**3.31(24)**	**0.087(6)**
^{115}In	497.670(19)	0.67(5)	0.0177(13)
^{115}In	499.875(8)	0.37(3)	0.0098(8)
^{115}In	515.661(8)	0.60(4)	0.0158(11)
^{115}In	517.957(20)	2.8(4)	0.074(11)
^{115}In	518.119(12)	3.15(22)	0.083(6)
^{115}In	521.501(9)	1.97(14)	0.052(4)
^{115}In	540.382(8)	0.60(4)	0.0158(11)
^{115}In	548.720(9)	2.01(14)	0.053(4)
^{115}In	555.47(11)	0.7(5)	0.018(13)
^{115}In	556.169(8)	1.6(9)	0.042(24)
^{115}In	**556.845(21)**	**4.7(3)**	**0.124(8)**
^{115}In	560.095(9)	0.85(5)	0.0224(13)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{115}In	567.596(20)	0.94(7)	0.0248(18)
^{115}In	577.523(18)	1.92(14)	0.051(4)
^{115}In	602.36(4)	2.86(20)	0.075(5)
^{115}In	**608.422(11)**	**3.51(25)**	**0.093(7)**
^{115}In	622.57(11)	0.83(5)	0.0219(13)
^{115}In	633.740(11)	1.54(11)	0.041(3)
^{115}In	634.288(9)	1.68(13)	0.044(3)
^{115}In	647.72(8)	1.18(9)	0.0311(24)
^{115}In	654.95(7)	0.47(3)	0.0124(8)
^{115}In	657.084(11)	1.52(11)	0.040(3)
^{115}In	662.115(10)	0.44(3)	0.0116(8)
^{115}In	693.29(9)	1.83(13)	0.048(3)
^{115}In	706.21(10)	0.40(9)	0.0106(24)
^{115}In	746.978(9)	0.71(5)	0.0187(13)
^{115}In	771.01(8)	1.52(11)	0.040(3)
^{115}In	792.16(6)	1.34(9)	0.0354(24)
^{115}In	807.897(25)	0.44(3)	0.0116(8)
^{115}In	**818.70(20)d**	**17.8(7)**	**0.470[30%]**
^{115}In	819.04(11)	2.59(18)	0.068(5)
^{115}In	847.54(8)	2.15(16)	0.057(4)
^{115}In	992.10(10)	0.91(7)	0.0240(18)
^{115}In	**1097.30(20)d**	**87.3(17)**	**2.30[30%]**
^{115}In	**1293.54(15)d**	**131(3)**	**3.46[30%]**
^{115}In	**1507.40(20)d**	**15.5(5)**	**0.409[30%]**
^{115}In	**1753.8(6)d**	**3.82(12)**	**0.101[30%]**
^{115}In	**2112.1(4)d**	**24.1(7)**	**0.636[30%]**
^{115}In	5333.54(18)	0.89(7)	0.0235(18)
^{115}In	5347.4(6)	0.362(25)	0.0096(7)
^{115}In	5358.9(5)	0.51(4)	0.0135(11)
^{115}In	5410.56(19)	0.53(4)	0.0140(11)
^{115}In	5891.89(17)	2.10(14)	0.055(4)

Tin (Z=50), *At.Wt.*=118.710(7), σ_γ^z =0.54(5)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{120}Sn	60.66(15)	0.0052(7)	1.33(18)E-4
^{122}Sn	125.80(7)	0.00178(9)	4.54(23)E-5
^{116}Sn	**158.65(6)**	**0.0145(3)**	**0.000370(8)**
^{124}Sn	187.67(7)	0.00363(12)	9.3(3)E-5
^{124}Sn	331.90(20)d	0.00830(20)	2.12E-4[77%]
^{115}Sn	416.99(4)	0.00251(11)	6.4(3)E-5
^{115}Sn	463.242(17)	0.0128(3)	0.000327(8)
^{117}Sn	528.85(6)	0.00425(14)	1.08(4)E-4
^{116}Sn	552.90(9)	0.00137(13)	3.5(3)E-5
^{119}Sn	703.87(7)	0.0078(3)	1.99(8)E-4
^{115}Sn	733.89(3)	0.00925(21)	2.36(5)E-4
^{117}Sn	813.26(7)	0.0071(3)	1.81(8)E-4
^{115}Sn	818.721(14)	0.0128(4)	0.000327(10)
^{117}Sn	827.37(8)	0.00361(23)	9.2(6)E-5
^{116}Sn	861.39(10)	0.00191(19)	4.9(5)E-5
^{120}Sn	869.38(8)	0.00320(22)	8.2(6)E-5
^{118}Sn	897.28(8)	0.00368(21)	9.4(5)E-5
^{120}Sn	908.89(8)	0.00307(19)	7.8(5)E-5
^{122}Sn	920.87(7)	0.00404(21)	1.03(5)E-4
^{118}Sn	920.87(7)	0.00404(21)	1.03(5)E-4
^{119}Sn	925.90(6)	0.0097(3)	2.48(8)E-4
^{120}Sn	925.90(6)	0.0097(3)	2.48(8)E-4
^{115}Sn	931.819(23)	0.0111(3)	0.000283(8)
^{120}Sn	943.20(12)	0.00150(17)	3.8(4)E-5
^{115}Sn	**972.619(17)**	**0.0158(5)**	**0.000403(13)**
^{119}Sn	988.67(7)	0.00668(22)	1.71(6)E-4
^{116}Sn	1004.49(8)	0.00388(18)	9.9(5)E-5
^{120}Sn	1041.60(14)	0.00189(20)	4.8(5)E-5
^{117}Sn	1050.66(9)	0.00293(22)	7.5(6)E-5
^{118}Sn	1065.17(13)	0.00214(21)	5.5(5)E-5
^{117}Sn	1095.18(10)	0.0067(3)	1.71(8)E-4
^{115}Sn	1097.323(18)	0.0039(5)	9.96(13)E-5
^{120}Sn	1101.25(16)	0.00322(25)	8.2(6)E-5
^{115}Sn	1115.15(4)	0.00150(16)	3.8(4)E-5
^{115}Sn	1118.95(5)	0.00155(22)	4.0(6)E-5
^{119}Sn	**1171.28(6)**	**0.0879(13)**	**0.00224(3)**
^{117}Sn	1173.66(8)	0.0050(3)	1.28(8)E-4
^{119}Sn	1184.19(8)	0.0051(3)	1.30(8)E-4
^{115}Sn	1200.56(12)	0.00163(22)	4.2(6)E-5
^{115}Sn	1202.70(12)	0.0022(3)	5.6(8)E-5
^{117}Sn	**1229.64(6)**	**0.0673(13)**	**0.00172(3)**
^{118}Sn	1249.62(7)	0.0052(3)	1.33(8)E-4
^{115}Sn	1252.119(23)	0.00348(19)	8.9(5)E-5
^{115}Sn	1291.99(3)	0.0050(10)	1.3(3)E-4
^{115}Sn	**1293.591(15)**	**0.1340(21)**	**0.00342(5)**
^{115}Sn	1356.846(20)	0.0075(3)	1.91(8)E-4
^{119}Sn	1415.76(10)	0.00291(19)	7.4(5)E-5
^{117}Sn	1447.09(14)	0.00212(21)	5.4(5)E-5
^{117}Sn	1508.43(11)	0.0058(3)	1.48(8)E-4
^{115}Sn	1546.40(6)	0.00140(15)	3.6(4)E-5
^{115}Sn	1550.71(18)	0.00170(16)	4.3(4)E-5
^{115}Sn	1650.72(6)	0.0021(3)	5.4(8)E-5
^{118}Sn	1695.0(3)	0.00138(22)	3.5(6)E-5
^{115}Sn	1702.67(3)	0.00169(17)	4.3(4)E-5
^{115}Sn	1711.17(7)	0.00151(19)	3.9(5)E-5
^{115}Sn	1886.09(7)	0.0026(3)	6.6(8)E-5
^{115}Sn	1900.72(5)	0.0025(3)	6.4(8)E-5
^{115}Sn	1926.02(19)	0.0014(6)	3.6(15)E-5
^{115}Sn	1934.93(18)	0.0027(4)	6.9(10)E-5
^{115}Sn	1975.73(18)	0.0016(3)	4.1(8)E-5
^{117}Sn	2042.74(10)	0.0067(4)	1.71(10)E-4
^{115}Sn	2050.76(5)	0.0025(4)	6.4(10)E-5
^{115}Sn	2077.80(8)	0.0016(6)	4.1(15)E-5
^{119}Sn	2097.01(9)	0.0048(3)	1.23(8)E-4
^{115}Sn	**2112.302(16)**	**0.0152(5)**	**0.000388(13)**
^{115}Sn	2148.03(5)	0.0021(4)	5.4(10)E-5
^{115}Sn	2211.69(8)	0.0018(6)	4.6(15)E-5
^{115}Sn	2220.00(23)	0.0019(5)	4.9(13)E-5
^{115}Sn	2225.40(3)	0.0082(5)	2.09(13)E-4
^{115}Sn	2244.19(6)	0.0029(10)	7(3)E-5
^{119}Sn	2355.3	1.80E-03	4.60E-05
^{119}Sn	2420.83(15)	0.0029(3)	7.4(8)E-5
^{115}Sn	2585.57(3)	0.0047(4)	1.20(10)E-4
^{117}Sn	2677.47(20)	0.0022(3)	5.6(8)E-5
^{115}Sn	2707.43(6)	0.0024(6)	6.1(15)E-5
^{117}Sn	2738.1	2.00E-03	5.10E-05
^{115}Sn	2843.82(5)	0.0032(4)	8.2(10)E-5
^{115}Sn	2907.53(18)	0.0027(5)	6.9(13)E-5
^{115}Sn	2960.03(4)	0.0023(3)	5.9(8)E-5
^{115}Sn	2985.00(25)	0.0025(8)	6.4(20)E-5
^{115}Sn	3088.55(5)	0.00184(19)	4.7(5)E-5
^{115}Sn	3330.6(4)	0.0016(5)	4.1(13)E-5
^{115}Sn	3333.75(5)	0.0061(5)	1.56(13)E-4
^{115}Sn	3658.30(17)	0.0022(4)	5.6(10)E-5
^{115}Sn	4013.00(11)	0.00169(16)	4.3(4)E-5
^{115}Sn	4392.56(8)	0.00148(16)	3.8(4)E-5
^{115}Sn	4695.80(8)	0.0031(3)	7.9(8)E-5
^{115}Sn	4780.1(4)	0.0048(5)	1.23(13)E-4
^{115}Sn	4809.43(9)	0.00165(16)	4.2(4)E-5
^{115}Sn	5173.5(7)	0.0016(4)	4.1(10)E-5
^{115}Sn	5361.91(6)	0.0043(4)	1.10(10)E-4
^{115}Sn	5423.57(11)	0.00188(21)	4.8(5)E-5
^{115}Sn	5449.51(5)	0.00191(19)	4.9(5)E-5
^{115}Sn	5562.35(6)	0.0021(5)	5.4(13)E-5
^{115}Sn	5904.65(6)	0.00223(17)	5.7(4)E-5
^{115}Sn	6229.57(6)	0.00159(16)	4.1(4)E-5
^{115}Sn	6335.30(12)	0.0023(3)	5.9(8)E-5
^{115}Sn	6335.89(5)	0.0014(3)	3.6(8)E-5
^{115}Sn	6603.27(4)	0.00168(19)	4.3(5)E-5
^{115}Sn	7450.97(3)	0.00137(14)	3.5(4)E-5
^{117}Sn	9327.5(11)	0.00204(20)	5.2(5)E-5

Antimony (Z=51), *At.Wt.*=121.760(1), σ_γ^z =5.13(12)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{123}Sb	39.96	0.028(6)	0.00070(15)
^{123}Sb	**40.8040(10)**	**0.10(3)**	**0.0025(8)**

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{123}Sb	44.0910(10)	0.016(3)	0.00040(8)
^{121}Sb	45.7330(10)	0.027(7)	0.00067(17)
^{121}Sb	45.8480(10)	0.0076(21)	1.9(5)E-4
^{121}Sb	46.8350(10)	0.0082(25)	2.0(6)E-4
^{121}Sb	**61.4130(10)**	**0.75(18)**	**0.019(5)**
^{121}Sb	67.5940(10)	0.0082(22)	2.0(6)E-4
^{121}Sb	**71.4670(10)**	**0.095(22)**	**0.0024(6)**
^{121}Sb	76.0590(10)	0.039(9)	0.00097(22)
^{121}Sb	**78.0910(10)**	**0.48(11)**	**0.012(3)**
^{121}Sb	86.7140(10)	0.0080(19)	2.0(5)E-4
^{123}Sb	**87.601**	**0.212(8)**	**0.00528(20)**
^{121}Sb	**88.2690(10)**	**0.083(19)**	**0.0021(5)**
^{123}Sb	88.3850(10)	0.0196(11)	0.00049(3)
^{121}Sb	101.5520(10)	0.028(6)	0.00070(15)
^{123}Sb	103.6510(10)	0.063(5)	0.00157(12)
^{121}Sb	**105.8160(10)**	**0.21(5)**	**0.0052(12)**
^{121}Sb	113.8870(10)	0.014(3)	0.00035(8)
^{121}Sb	**114.8680(10)**	**0.31(7)**	**0.0077(17)**
^{121}Sb	115.4210(10)	0.0110(25)	0.00027(6)
^{121}Sb	**121.4970(10)**	**0.40(9)**	**0.0100(22)**
^{121}Sb	124.0290(10)	0.037(9)	0.00092(22)
^{123}Sb	133.8390(10)	0.056(4)	0.00139(10)
^{123}Sb	137.9190(10)	0.0207(10)	0.000515(25)
^{121}Sb	141.4390(10)	0.060(14)	0.0015(4)
^{123}Sb	143.2080(10)	0.028(4)	0.00070(10)
^{121}Sb	**148.238**	**0.26(6)**	**0.0065(15)**
^{121}Sb	148.6540(10)	0.016(4)	0.00040(10)
^{121}Sb	149.9720(10)	0.013(3)	0.00032(8)
^{121}Sb	153.3850(10)	0.0085(11)	2.1(3)E-4
^{123}Sb	**155.1780(10)**	**0.081(9)**	**0.00202(22)**
^{121}Sb	166.4510(10)	0.074(4)	0.00184(10)
^{123}Sb	167.6050(10)	0.046(4)	0.00114(10)
^{121}Sb	173.7880(20)	0.0192(11)	0.00048(3)
^{123}Sb	173.7990(10)	0.0171(9)	0.000426(22)
^{121}Sb	177.4070(10)	0.0085(20)	2.1(5)E-4
^{121}Sb	184.0480(10)	0.031(7)	0.00077(17)
^{123}Sb	185.1190(10)	0.0116(17)	0.00029(4)
^{121}Sb	194.0850(10)	0.0534(18)	0.00133(5)
^{121}Sb	**201.5950(10)**	**0.091(3)**	**0.00226(8)**
^{121}Sb	204.5580(10)	0.0354(15)	0.00088(4)
^{121}Sb	217.4170(20)	0.0118(8)	0.000294(20)
^{121}Sb	229.7080(10)	0.021(5)	0.00052(12)
^{121}Sb	232.1880(10)	0.039(3)	0.00097(8)
^{121}Sb	**233.1690(10)**	**0.0996(24)**	**0.00248(6)**
^{123}Sb	246.3260(20)	0.0586(21)	0.00146(5)
^{123}Sb	252.841(3)	0.0468(24)	0.00116(6)
^{121}Sb	255.4980(10)	0.030(4)	0.00075(10)
^{121}Sb	256.2270(10)	0.019(6)	0.00047(15)
^{121}Sb	261.6790(10)	0.0087(16)	2.2(4)E-4
^{123}Sb	265.629(6)	0.024(4)	0.00060(10)
^{123}Sb	269.3960(20)	0.0093(25)	2.3(6)E-4
^{121}Sb	272.2670(10)	0.019(3)	0.00047(8)
^{121}Sb	274.0010(10)	0.031(6)	0.00077(15)
^{123}Sb	275.2780(20)	0.0135(8)	0.000336(20)
^{121}Sb	275.4400(10)	0.0306(16)	0.00076(4)
^{123}Sb	276.2670(20)	0.0095(5)	2.36(12)E-4
^{121}Sb	**282.6500(10)**	**0.274(7)**	**0.00682(17)**
^{121}Sb	286.5180(20)	0.034(3)	0.00085(8)
^{123}Sb	288.0170(20)	0.018(6)	0.00045(15)
^{123}Sb	313.938(3)	0.015(4)	0.00037(10)
^{123}Sb	313.990(6)	0.0317(24)	0.00079(6)
^{123}Sb	322.1140(20)	0.036(3)	0.00090(8)
^{121}Sb	330.555(3)	0.058(3)	0.00144(8)
^{121}Sb	331.3030(20)	0.011(3)	0.00027(8)
^{123}Sb	331.4600(20)	0.048(3)	0.00119(8)
^{121}Sb	**332.2860(10)**	**0.101(3)**	**0.00251(8)**
^{123}Sb	334.980(3)	0.028(3)	0.00070(8)
^{123}Sb	338.2980(20)	0.0142(16)	0.00035(4)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{123}Sb	351.567(3)	0.0344(20)	0.00086(5)
^{121}Sb	378.1380(20)	0.0500(18)	0.00124(5)
^{123}Sb	384.533(3)	0.069(3)	0.00172(8)
^{123}Sb	390.4960(20)	0.008(3)	2.0(8)E-4
^{121}Sb	392.3340(20)	0.0121(25)	0.00030(6)
^{123}Sb	410.285(7)	0.0127(20)	0.00032(5)
^{121}Sb	418.8240(20)	0.013(3)	0.00032(8)
^{121}Sb	419.925(5)	0.064(7)	0.00159(17)
^{121}Sb	422.231(3)	0.022(5)	0.00055(12)
^{121}Sb	437.601(18)	0.0175(18)	0.00044(5)
^{123}Sb	441.9270(20)	0.0101(7)	0.000251(17)
^{121}Sb	453.7470(20)	0.011(3)	0.00027(8)
^{123}Sb	455.240(13)	0.0095(7)	2.36(17)E-4
^{123}Sb	462.001(4)	0.0097(23)	2.4(6)E-4
^{123}Sb	466.964(3)	0.0115(23)	0.00029(6)
^{123}Sb	473.1350(20)	0.013(4)	0.00032(10)
^{121}Sb	485.35(4)	0.0212(21)	0.00053(5)
^{121}Sb	491.215(5)	0.0344(16)	0.00086(4)
^{121}Sb	501.034(3)	0.0076(21)	1.9(5)E-4
^{123}Sb	501.151(4)	0.0129(10)	0.000321(25)
^{121}Sb	513.96(4)	0.0356(21)	0.00089(5)
^{121}Sb	542.304(17)	0.0267(20)	0.00066(5)
^{121}Sb	546.056(10)	0.0313(20)	0.00078(5)
^{123}Sb	555.057(5)	0.021(5)	0.00052(12)
^{121}Sb	**564.24(4)d**	**2.700(5)**	**0.06720[<0.1%]**
^{121}Sb	564.4720(20)	0.0532(25)	0.00132(6)
^{123}Sb	571.051(4)	0.0080(20)	2.0(5)E-4
^{123}Sb	598.656(3)	0.055(4)	0.00137(10)
^{121}Sb	603.65(4)	0.019(3)	0.00047(8)
^{121}Sb	631.82(3)	0.0586(16)	0.00146(4)
^{123}Sb	634.003(15)	0.0101(14)	0.00025(4)
^{123}Sb	647.012(13)	0.0113(24)	0.00028(6)
^{121}Sb	**692.65(4)d**	**0.146(5)**	**0.00363[<0.1%]**
^{123}Sb	695.372(13)	0.008(3)	2.0(8)E-4
^{123}Sb	704.145(6)	0.009(3)	2.2(8)E-4
^{121}Sb	718.52(4)	0.015(6)	0.00037(15)
^{123}Sb	723.49(3)	0.016(3)	0.00040(8)
^{123}Sb	737.717(7)	0.012(3)	0.00030(8)
^{121}Sb	746.861(17)	0.030(3)	0.00075(8)
^{123}Sb	763.44(3)	0.0169(24)	0.00042(6)
^{123}Sb	768.364(6)	0.0114(24)	0.00028(6)
^{123}Sb	775.395(7)	0.015(6)	0.00037(15)
^{121}Sb	796.61(4)	0.015(4)	0.00037(10)
^{121}Sb	824.952(17)	0.040(3)	0.00100(8)
^{121}Sb	842.91(7)	0.017(10)	0.00042(25)
^{123}Sb	862.996(7)	0.009(4)	2.2(10)E-4
^{121}Sb	**921.00(7)**	**0.075(4)**	**0.00187(10)**
^{123}Sb	972.024(17)	0.015(3)	0.00037(8)
^{123}Sb	1020.942(10)	0.015(5)	0.00037(12)
^{123}Sb	5224.99(24)	0.0083(23)	2.1(6)E-4
^{123}Sb	5338.31(23)	0.0078(25)	1.9(6)E-4
^{123}Sb	5407.83(6)	0.014(5)	0.00035(12)
^{123}Sb	5446.51(5)	0.008(3)	2.0(8)E-4
^{121}Sb	5558.3(4)	0.0149(21)	0.00037(5)
^{121}Sb	5563.43(24)	0.0210(25)	0.00052(6)
^{121}Sb	5600.4(3)	0.016(3)	0.00040(8)
^{123}Sb	5604.45(5)	0.012(3)	0.00030(8)
^{121}Sb	5619.2(4)	0.015(3)	0.00037(8)
^{121}Sb	5685.1(3)	0.0141(21)	0.00035(5)
^{121}Sb	5775.50(25)	0.011(7)	0.00027(17)
^{121}Sb	5787.62(25)	0.0093(17)	2.3(4)E-4
^{121}Sb	5800.65(24)	0.0107(19)	0.00027(5)
^{123}Sb	5868.78(5)	0.034(4)	0.00085(10)
^{121}Sb	5885.19(9)	0.054(4)	0.00134(10)
^{121}Sb	6009.58(8)	0.020(3)	0.00050(8)
^{123}Sb	6048.36(5)	0.018(3)	0.00045(8)
^{123}Sb	6082.89(5)	0.018(3)	0.00045(8)
^{121}Sb	6163.62(7)	0.0121(18)	0.00030(5)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{123}Sb	6335.72(5)	0.017(3)	0.00042(8)
^{123}Sb	6363.76(5)	0.025(4)	0.00062(10)
^{123}Sb	6379.80(5)	0.044(6)	0.00110(15)
^{123}Sb	6456.54(5)	0.0077(20)	1.9(5)E-4
^{123}Sb	6467.40(5)	0.021(4)	0.00052(10)
^{121}Sb	6494.91(7)	0.0076(24)	1.9(6)E-4
^{121}Sb	**6523.52(7)**	**0.075(3)**	**0.00187(8)**
^{121}Sb	6728.06(7)	0.044(4)	0.00110(10)
^{121}Sb	6744.74(7)	0.0090(16)	2.2(4)E-4
^{121}Sb	6806.15(7)	0.0102(11)	0.00025(3)

Tellurium (Z=52), *At.Wt.*=127.60(3), σ_γ^z =4.6(4)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{130}Te	149.716(5)d	0.0630(11)	0.00150[51%]
^{130}Te	296.017(16)	0.029(3)	0.00069(7)
^{123}Te	353.820(23)	0.100(8)	0.00237(19)
^{122}Te	440.04(4)	0.0100(14)	2.4(3)E-4
^{124}Te	443.53(4)	0.030(3)	0.00071(7)
^{123}Te	557.46(4)	0.038(4)	0.00090(10)
^{123}Te	**602.729(17)**	**2.46(16)**	**0.058(4)**
^{123}Te	**645.819(20)**	**0.263(22)**	**0.0062(5)**
^{125}Te	666.3100(20)	0.045(5)	0.00107(12)
^{123}Te	709.18(6)	0.026(3)	0.00062(7)
^{123}Te	713.79(3)	0.058(5)	0.00138(12)
^{123}Te	**722.772(25)**	**0.52(4)**	**0.0123(10)**
^{123}Te	790.74(3)	0.025(4)	0.00059(10)
^{123}Te	1054.51(4)	0.063(5)	0.00150(12)
^{123}Te	1325.50(3)	0.074(6)	0.00176(14)
^{123}Te	1355.00(6)	0.025(3)	0.00059(7)
^{123}Te	1376.09(6)	0.039(4)	0.00093(10)
^{123}Te	1436.55(3)	0.098(9)	0.00233(21)
^{123}Te	1461.82(13)	0.028(7)	0.00066(17)
^{123}Te	1488.88(5)	0.120(9)	0.00285(21)
^{123}Te	1579.50(8)	0.072(10)	0.00171(24)
^{123}Te	1691.06(6)	0.073(7)	0.00173(17)
^{123}Te	1720.15(5)	0.083(8)	0.00197(19)
^{124}Te	1851.37(10)	0.030(3)	0.00071(7)
^{123}Te	1918.71(7)	0.047(4)	0.00112(10)
^{123}Te	1998.24(7)	0.035(4)	0.00083(10)
^{123}Te	2038.91(6)	0.064(7)	0.00152(17)
^{123}Te	2078.76(9)	0.031(3)	0.00074(7)
^{123}Te	2091.21(8)	0.031(3)	0.00074(7)
^{123}Te	2144.20(5)	0.034(4)	0.00081(10)
^{123}Te	2214.56(10)	0.027(3)	0.00064(7)
^{123}Te	2385.57(5)	0.034(4)	0.00081(10)
^{123}Te	2609.36(10)	0.039(4)	0.00093(10)
^{123}Te	2746.92(5)	0.138(11)	0.0033(3)
^{123}Te	2783.15(10)	0.035(3)	0.00083(7)
^{123}Te	2974.83(14)	0.025(3)	0.00059(7)
^{123}Te	3152.85(12)	0.026(3)	0.00062(7)
^{130}Te	3347.35(10)	0.027(3)	0.00064(7)
^{123}Te	3543.10(10)	0.039(4)	0.00093(10)
^{128}Te	3721.75(12)	0.0209(21)	0.00050(5)
^{123}Te	5668.13(13)	0.037(3)	0.00088(7)
^{123}Te	5880.59(11)	0.034(4)	0.00081(10)
^{123}Te	6211.61(12)	0.0262(25)	0.00062(6)
^{126}Te	6287.6(4)	0.0023(7)	5.5(17)E-5
^{123}Te	6322.95(8)	0.099(8)	0.00235(19)
^{123}Te	7332.04(8)	0.027(4)	0.00064(10)

Iodine (Z=53), *At.Wt.*=126.90447(3), σ_γ^z =6.20(20)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{127}I	**27.3620(10)**	**0.43(4)**	**0.0103(10)**
^{127}I	42.767(4)	0.038(5)	0.00091(12)
^{127}I	**52.385(3)**	**0.167(19)**	**0.0040(5)**
^{127}I	**58.1100(20)**	**0.28(4)**	**0.0067(10)**
^{127}I	58.734(4)	0.028(3)	0.00067(7)
^{127}I	67.120(3)	~0.1	~0.002
^{127}I	68.256(4)	0.023(13)	0.0005(3)
^{127}I	96.637(3)	0.0156(22)	0.00037(5)
^{127}I	102.344(5)	0.0165(21)	0.00039(5)
^{127}I	106.2490(10)	0.066(5)	0.00158(12)
^{127}I	**124.2810(20)**	**0.180(13)**	**0.0043(3)**
^{127}I	126.989(3)	0.031(3)	0.00074(7)
^{127}I	131.8640(20)	0.016(3)	0.00038(7)
^{127}I	133.3940(10)	0.049(6)	0.00117(14)
^{127}I	**133.6110(10)**	**1.42(10)**	**0.0339(24)**
^{127}I	134.911(3)	0.015(11)	0.0004(3)
^{127}I	142.1370(20)	0.140(14)	0.0033(3)
^{127}I	144.025(3)	0.0157(24)	0.00037(6)
^{127}I	147.105(3)	0.101(8)	0.00241(19)
^{127}I	**153.011(3)**	**0.209(14)**	**0.0050(3)**
^{127}I	156.5060(20)	0.116(10)	0.00277(24)
^{127}I	**160.7570(10)**	**0.187(16)**	**0.0045(4)**
^{127}I	164.1390(20)	0.040(4)	0.00096(10)
^{127}I	193.5630(20)	0.124(12)	0.0030(3)
^{127}I	205.412(3)	0.0227(20)	0.00054(5)
^{127}I	224.098(3)	0.07(3)	0.0017(7)
^{127}I	231.245(3)	0.017(4)	0.00041(10)
^{127}I	235.900(4)	0.028(3)	0.00067(7)
^{127}I	248.7410(20)	0.11(4)	0.0026(10)
^{127}I	251.534(5)	0.025(3)	0.00060(7)
^{127}I	255.517(5)	0.028(3)	0.00067(7)
^{127}I	259.040(4)	0.0251(24)	0.00060(6)
^{127}I	268.305(3)	0.080(8)	0.00191(19)
^{127}I	282.611(12)	0.0193(20)	0.00046(5)
^{127}I	283.968(4)	0.028(3)	0.00067(7)
^{127}I	291.511(7)	0.0172(21)	0.00041(5)
^{127}I	297.393(17)	0.0155(25)	0.00037(6)
^{127}I	**301.906(5)**	**0.17(6)**	**0.0041(14)**
^{127}I	310.419(6)	0.0166(18)	0.00040(4)
^{127}I	314.349(4)	0.060(5)	0.00143(12)
^{127}I	325.35(4)	0.020(3)	0.00048(7)
^{127}I	330.801(5)	0.0146(21)	0.00035(5)
^{127}I	344.758(7)	0.100(9)	0.00239(21)
^{127}I	364.640(3)	0.0211(25)	0.00050(6)
^{127}I	369.358(17)	0.0170(21)	0.00041(5)
^{127}I	374.218(5)	0.041(7)	0.00098(17)
^{127}I	374.456(7)	0.028(6)	0.00067(14)
^{127}I	385.447(5)	0.086(7)	0.00205(17)
^{127}I	388.911(5)	0.022(3)	0.00053(7)
^{127}I	392.002(3)	0.045(14)	0.0011(3)
^{127}I	392.687(6)	0.028(9)	0.00067(21)
^{127}I	398.975(4)	0.018(3)	0.00043(7)
^{127}I	416.579(6)	0.065(5)	0.00155(12)
^{127}I	420.826(7)	0.139(18)	0.0033(4)
^{127}I	**442.901(10)d**	**0.595(4)**	**0.0140(1)**
^{127}I	458.056(9)	0.0266(23)	0.00064(6)
^{127}I	502.607(18)	0.061(5)	0.00146(12)
^{127}I	528.91(9)	0.054(5)	0.00129(12)
^{127}I	557.43(4)	0.027(3)	0.00064(7)
^{127}I	4950.10(7)	0.037(10)	0.00088(24)
^{127}I	5018.648(17)	0.024(11)	0.0006(3)
^{127}I	5091.988(12)	0.015(7)	0.00036(17)
^{127}I	5096.357(17)	0.024(8)	0.00057(19)
^{127}I	5197.957(12)	0.032(14)	0.0008(3)
^{127}I	5298.245(12)	0.031(7)	0.00074(17)
^{127}I	5463.453(12)	0.018(6)	0.00043(14)
^{127}I	5482.853(12)	0.018(13)	0.0004(3)
^{127}I	5524.28(5)	0.015(5)	0.00036(12)
^{127}I	5559.662(12)	0.044(22)	0.0011(5)
^{127}I	5574.501(12)	0.021(5)	0.00050(12)
^{127}I	5725.929(12)	0.020(13)	0.0005(3)
^{127}I	6307.586(6)	0.024(8)	0.00057(19)
^{127}I	6692.417(5)	0.037(8)	0.00088(19)

Xenon (Z=54), *At.Wt.*=131.293(6), σ_γ^z =24(3)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{131}Xe	324.80(16)	0.09(5)	0.0021(12)
^{124}Xe	335.46(16)	0.0054(12)	1.2(3)E-4
^{128}Xe	403.1(3)	0.0106(23)	2.4(5)E-4
^{130}Xe	404.8(3)	0.0096(23)	2.2(5)E-4

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{136}Xe	455.490(3)d	0.00350(6)	8.08E-5[91%]
^{131}Xe	471.72(12)	0.19(3)	0.0044(7)
^{131}Xe	483.66(10)	0.55(4)	0.0127(9)
^{131}Xe	505.84(8)	0.40(3)	0.0092(7)
^{129}Xe	510.33(8)	0.33(7)	0.0076(16)
^{131}Xe	522.78(7)	0.273(22)	0.0063(5)
^{129}Xe	**536.17(9)**	**1.71(24)**	**0.039(6)**
^{131}Xe	546.95(11)	0.094(16)	0.0022(4)
^{131}Xe	570.13(7)	0.188(15)	0.0043(4)
^{129}Xe	586.17(5)	0.48(7)	0.0111(16)
^{131}Xe	600.19(8)	0.52(4)	0.0120(9)
^{136}Xe	600.99(8)	0.010(3)	2.3(7)E-4
^{131}Xe	621.13(10)	0.085(8)	0.00196(18)
^{131}Xe	**630.29(4)**	**1.41(11)**	**0.0325(25)**
^{131}Xe	**667.79(6)**	**6.7(5)**	**0.155(12)**
^{129}Xe	668.59(15)	0.17(9)	0.0039(21)
^{131}Xe	670.02(10)	0.22(3)	0.0051(7)
^{131}Xe	**772.72(4)**	**1.78(14)**	**0.041(3)**
^{131}Xe	812.45(10)	0.082(8)	0.00189(18)
^{131}Xe	832.43(12)	0.108(15)	0.0025(4)
^{131}Xe	889.54(8)	0.084(8)	0.00194(18)
^{131}Xe	954.65(12)	0.076(8)	0.00175(18)
^{131}Xe	984.54(9)	0.093(18)	0.0021(4)
^{131}Xe	1028.86(6)	0.40(3)	0.0092(7)
^{129}Xe	1096.49(7)	0.087(12)	0.0020(3)
^{131}Xe	1115.34(9)	0.149(20)	0.0034(5)
^{129}Xe	1122.33(10)	0.119(17)	0.0027(4)
^{131}Xe	1136.13(7)	0.45(4)	0.0104(9)
^{131}Xe	1140.84(11)	0.067(9)	0.00155(21)
^{131}Xe	1171.29(6)	0.217(19)	0.0050(4)
^{131}Xe	1298.09(7)	0.12(3)	0.0028(7)
^{131}Xe	**1317.93(8)**	**0.89(7)**	**0.0205(16)**
^{129}Xe	1482.06(9)	0.112(16)	0.0026(4)
^{131}Xe	1519.83(8)	0.131(25)	0.0030(6)
^{131}Xe	1801.58(6)	0.272(22)	0.0063(5)
^{131}Xe	1888.05(8)	0.225(23)	0.0052(5)
^{131}Xe	1985.71(10)	0.54(5)	0.0125(12)
^{131}Xe	2713.93(10)	0.079(9)	0.00182(21)
^{131}Xe	3699.40(15)	0.082(16)	0.0019(4)
^{131}Xe	4734.85(17)	0.071(10)	0.00164(23)
^{131}Xe	4841.70(14)	0.107(15)	0.0025(4)
^{131}Xe	5078.91(18)	0.106(16)	0.0024(4)
^{129}Xe	5956.18(18)	0.16(3)	0.0037(7)
^{131}Xe	6380.62(13)	0.21(3)	0.0048(7)
^{131}Xe	**6467.09(12)**	**1.33(19)**	**0.031(4)**

Cesium (Z=55), *At.Wt.*=132.90545(2), σ_γ^z =30.3(11)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{133}Cs	11.2450(20)	0.142(7)	0.00324(16)
^{133}Cs	17.2130(20)	0.110(18)	0.0025(4)
^{133}Cs	38.6240(20)	0.080(12)	0.0018(3)
^{133}Cs	**48.790(20)**	**0.345(10)**	**0.00787(23)**
^{133}Cs	**60.0300(10)**	**0.443(14)**	**0.0101(3)**
^{133}Cs	67.2540(20)	0.088(5)	0.00201(11)
^{133}Cs	73.5660(20)	0.117(19)	0.0027(4)
^{133}Cs	74.0460(20)	0.14(3)	0.0032(7)
^{133}Cs	87.2520(20)	0.107(4)	0.00244(9)
^{133}Cs	93.1850(20)	0.043(3)	0.00098(7)
^{133}Cs	**113.7650(20)**	**0.777(15)**	**0.0177(3)**
^{133}Cs	114.3270(20)	0.05(3)	0.0011(7)
^{133}Cs	**116.3740(20)**	**1.39(12)**	**0.032(3)**
^{133}Cs	**116.612(4)**	**1.44(12)**	**0.033(3)**
^{133}Cs	117.1730(20)	0.04(3)	0.0009(7)
^{133}Cs	118.3630(20)	0.230(7)	0.00524(16)
^{133}Cs	**120.588(3)**	**0.414(10)**	**0.00944(23)**
^{133}Cs	**127.5000(20)d**	**0.310(11)**	**0.0071(3)**
^{133}Cs	**130.2320(20)**	**1.410(21)**	**0.0322(5)**
^{133}Cs	131.171(3)	0.054(5)	0.00123(11)
^{133}Cs	133.5860(20)	0.038(3)	0.00087(7)
^{133}Cs	137.7530(20)	0.030(4)	0.00068(9)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{133}Cs	142.7680(20)	0.073(4)	0.00166(9)
^{133}Cs	**174.3040(20)**	**0.420(11)**	**0.00958(25)**
^{133}Cs	**176.4040(20)**	**2.47(4)**	**0.0563(9)**
^{133}Cs	177.068(3)	0.098(16)	0.0022(4)
^{133}Cs	179.0180(20)	0.15(5)	0.0034(11)
^{133}Cs	180.0770(20)	0.087(7)	0.00198(16)
^{133}Cs	**186.8400(20)**	**0.282(9)**	**0.00643(21)**
^{133}Cs	189.8320(20)	0.093(10)	0.00212(23)
^{133}Cs	193.7250(20)	0.042(9)	0.00096(21)
^{133}Cs	194.724(3)	0.045(9)	0.00103(21)
^{133}Cs	**198.3010(20)**	**1.100(19)**	**0.0251(4)**
^{133}Cs	200.847(4)	0.135(10)	0.00308(23)
^{133}Cs	**205.615(3)**	**1.560(25)**	**0.0356(6)**
^{133}Cs	207.675(4)	0.093(6)	0.00212(14)
^{133}Cs	209.5460(20)	0.073(6)	0.00166(14)
^{133}Cs	211.3190(10)	0.223(10)	0.00508(23)
^{133}Cs	**218.341(3)**	**0.309(9)**	**0.00705(21)**
^{133}Cs	**219.7530(20)**	**0.344(9)**	**0.00784(21)**
^{133}Cs	232.165(3)	0.125(9)	0.00285(21)
^{133}Cs	**234.3340(20)**	**1.070(23)**	**0.0244(5)**
^{133}Cs	**245.8620(20)**	**0.740(15)**	**0.0169(3)**
^{133}Cs	254.740(3)	0.069(7)	0.00157(16)
^{133}Cs	256.6210(20)	0.235(8)	0.00536(18)
^{133}Cs	**261.1640(20)**	**0.401(11)**	**0.00914(25)**
^{133}Cs	263.8260(20)	0.079(7)	0.00180(16)
^{133}Cs	268.987(3)	0.199(6)	0.00454(14)
^{133}Cs	271.3490(20)	0.127(15)	0.0029(3)
^{133}Cs	272.212(4)	0.069(12)	0.0016(3)
^{133}Cs	277.6310(20)	0.066(5)	0.00150(11)
^{133}Cs	279.648(3)	0.065(5)	0.00148(11)
^{133}Cs	284.987(3)	0.044(5)	0.00100(11)
^{133}Cs	293.295(3)	0.185(9)	0.00422(21)
^{133}Cs	295.431(3)	0.231(10)	0.00527(23)
^{133}Cs	302.463(3)	0.13(4)	0.0030(9)
^{133}Cs	303.164(3)	0.055(6)	0.00125(14)
^{133}Cs	305.058(3)	0.061(7)	0.00139(16)
^{133}Cs	**307.015(4)**	**1.45(3)**	**0.0331(7)**
^{133}Cs	309.776(3)	0.237(9)	0.00540(21)
^{133}Cs	317.0720(20)	0.149(10)	0.00340(23)
^{133}Cs	329.060(3)	0.055(6)	0.00125(14)
^{133}Cs	338.027(6)	0.043(6)	0.00098(14)
^{133}Cs	345.358(5)	0.075(7)	0.00171(16)
^{133}Cs	347.148(7)	0.073(6)	0.00166(14)
^{133}Cs	347.152(4)	0.030(4)	0.00068(9)
^{133}Cs	349.846(3)	0.030(6)	0.00068(14)
^{133}Cs	**356.157(4)**	**0.445(12)**	**0.0101(3)**
^{133}Cs	356.345(3)	0.14(7)	0.0032(16)
^{133}Cs	365.8570(20)	0.04(3)	0.0009(7)
^{133}Cs	365.859(6)	0.103(6)	0.00235(14)
^{133}Cs	367.870(5)	0.173(8)	0.00394(18)
^{133}Cs	371.7380(20)	0.131(7)	0.00299(16)
^{133}Cs	**377.311(5)**	**0.310(9)**	**0.00707(21)**
^{133}Cs	381.628(5)	0.066(7)	0.00150(16)
^{133}Cs	384.290(5)	0.034(7)	0.00078(16)
^{133}Cs	386.855(3)	0.163(9)	0.00372(21)
^{133}Cs	391.3960(20)	0.080(7)	0.00182(16)
^{133}Cs	393.535(5)	0.065(8)	0.00148(18)
^{133}Cs	402.491(4)	0.051(10)	0.00116(23)
^{133}Cs	405.484(4)	0.079(12)	0.0018(3)
^{133}Cs	408.483(7)	0.032(12)	0.0007(3)
^{133}Cs	412.448(5)	0.051(13)	0.0012(3)
^{133}Cs	417.277(4)	0.095(17)	0.0022(4)
^{133}Cs	421.052(5)	0.086(8)	0.00196(18)
^{133}Cs	422.491(6)	0.029(6)	0.00066(14)
^{133}Cs	426.258(4)	0.041(7)	0.00093(16)
^{133}Cs	434.334(3)	0.066(7)	0.00150(16)
^{133}Cs	438.9920(20)	0.140(9)	0.00319(21)
^{133}Cs	**442.8430(20)**	**0.316(12)**	**0.0072(3)**

^{A}Z	E_{γ}-keV	$\sigma_{\gamma}^{z}(E_{\gamma})$-barns	k_0
^{133}Cs	444.465(7)	0.114(9)	0.00260(21)
^{133}Cs	450.2370(20)	0.07(3)	0.0016(7)
^{133}Cs	**450.345(3)**	**0.99(5)**	**0.0226(11)**
^{133}Cs	451.4250(20)	0.058(10)	0.00132(23)
^{133}Cs	454.0870(20)	0.056(11)	0.00128(25)
^{133}Cs	458.357(6)	0.072(5)	0.00164(11)
^{133}Cs	461.180(5)	0.099(5)	0.00226(11)
^{133}Cs	464.481(4)	0.095(5)	0.00217(11)
^{133}Cs	479.624(6)	0.030(10)	0.00068(23)
^{133}Cs	485.038(3)	0.094(10)	0.00214(23)
^{133}Cs	486.200(5)	0.08(3)	0.0018(7)
^{133}Cs	487.388(4)	0.047(6)	0.00107(14)
^{133}Cs	490.843(4)	0.042(10)	0.00096(23)
^{133}Cs	495.593(3)	0.077(11)	0.00176(25)
^{133}Cs	**502.840(3)**	**0.256(13)**	**0.0058(3)**
^{133}Cs	508.077(3)	0.057(10)	0.00130(23)
^{133}Cs	508.380(3)	0.053(10)	0.00121(23)
^{133}Cs	**510.795(3)**	**1.54(3)**	**0.0351(7)**
^{133}Cs	517.601(7)	0.028(21)	0.0006(5)
^{133}Cs	**519.101(4)**	**0.349(18)**	**0.0080(4)**
^{133}Cs	519.321(3)	0.086(14)	0.0020(3)
^{133}Cs	524.1500(20)	0.151(23)	0.0034(5)
^{133}Cs	**525.356(4)**	**0.39(3)**	**0.0089(7)**
^{133}Cs	525.592(3)	0.13(6)	0.0030(14)
^{133}Cs	526.072(4)	0.03(3)	0.0007(7)
^{133}Cs	528.409(6)	0.08(3)	0.0018(7)
^{133}Cs	**529.504(6)**	**0.519(23)**	**0.0118(5)**
^{133}Cs	529.891(4)	~0.03	~0.0007
^{133}Cs	**539.180(4)**	**0.360(11)**	**0.00821(25)**
^{133}Cs	539.416(4)	0.18(7)	0.0041(16)
^{133}Cs	540.679(9)	0.134(8)	0.00306(18)
^{133}Cs	554.642(5)	0.206(9)	0.00470(21)
^{133}Cs	559.084(3)	0.076(10)	0.00173(23)
^{133}Cs	561.964(5)	0.130(10)	0.00296(23)
^{133}Cs	564.019(4)	0.040(8)	0.00091(18)
^{133}Cs	567.483(4)	0.052(9)	0.00119(21)
^{133}Cs	570.825(3)	0.221(12)	0.0050(3)
^{133}Cs	574.574(4)	0.061(12)	0.0014(3)
^{133}Cs	576.060(4)	0.073(14)	0.0017(3)
^{133}Cs	576.296(3)	0.038(21)	0.0009(5)
^{133}Cs	579.131(4)	0.038(10)	0.00087(23)
^{133}Cs	584.180(3)	0.027(14)	0.0006(3)
^{133}Cs	591.680(5)	0.031(8)	0.00071(18)
^{133}Cs	601.381(5)	0.080(9)	0.00182(21)
^{133}Cs	601.775(5)	0.034(11)	0.00078(25)
^{133}Cs	603.457(5)	0.061(8)	0.00139(18)
^{133}Cs	610.896(4)	0.068(6)	0.00155(14)
^{133}Cs	623.831(9)	0.055(8)	0.00125(18)
^{133}Cs	628.595(4)	0.097(7)	0.00221(16)
^{133}Cs	633.809(6)	0.112(7)	0.00255(16)
^{133}Cs	**645.453(5)**	**0.248(13)**	**0.0057(3)**
^{133}Cs	646.195(3)	0.064(11)	0.00146(25)
^{133}Cs	648.511(4)	0.233(13)	0.0053(3)
^{133}Cs	663.171(4)	0.155(9)	0.00353(21)
^{133}Cs	663.407(3)	0.07(3)	0.0016(7)
^{133}Cs	666.017(4)	0.089(8)	0.00203(18)
^{133}Cs	678.271(5)	0.078(13)	0.0018(3)
^{133}Cs	681.247(4)	0.110(24)	0.0025(6)
^{133}Cs	682.562(4)	0.12(3)	0.0027(7)
^{133}Cs	688.625(4)	0.058(10)	0.00132(23)
^{133}Cs	691.434(5)	0.030(10)	0.00068(23)
^{133}Cs	692.670(3)	0.037(6)	0.00084(14)
^{133}Cs	695.340(6)	0.039(10)	0.00089(23)
^{133}Cs	701.38(21)	0.036(10)	0.00082(23)
^{133}Cs	703.290(5)	0.043(10)	0.00098(23)
^{133}Cs	708.417(5)	0.220(11)	0.00502(25)
^{133}Cs	708.646(4)	0.105(14)	0.0024(3)
^{133}Cs	712.268(5)	0.113(9)	0.00258(21)

^{A}Z	E_{γ}-keV	$\sigma_{\gamma}^{z}(E_{\gamma})$-barns	k_0
^{133}Cs	722.343(5)	0.116(11)	0.00265(25)
^{133}Cs	730.033(4)	0.045(8)	0.00103(18)
^{133}Cs	741.277(4)	0.071(9)	0.00162(21)
^{133}Cs	770.544(5)	0.104(11)	0.00237(25)
^{133}Cs	799.668(4)	0.075(10)	0.00171(23)
^{133}Cs	799.904(4)	0.029(6)	0.00066(14)
^{133}Cs	814.739(6)	0.056(13)	0.0013(3)
^{133}Cs	820.763(7)	0.059(11)	0.00135(25)
^{133}Cs	852.574(5)	0.034(8)	0.00078(18)
^{133}Cs	861.766(7)	0.070(9)	0.00160(21)
^{133}Cs	868.99(10)	0.140(11)	0.00319(25)
^{133}Cs	869.099(4)	0.140(11)	0.00319(25)
^{133}Cs	880.343(4)	0.114(14)	0.0026(3)
^{133}Cs	894.509(7)	0.103(12)	0.0023(3)
^{133}Cs	894.808(7)	0.052(16)	0.0012(4)
^{133}Cs	901.360(5)	0.053(11)	0.00121(25)
^{133}Cs	904.288(4)	0.040(11)	0.00091(25)
^{133}Cs	911.784(7)	0.177(14)	0.0040(3)
^{133}Cs	912.021(7)	0.057(8)	0.00130(18)
^{133}Cs	930.112(15)	0.126(9)	0.00287(21)
^{133}Cs	931.72(15)	0.073(8)	0.00166(18)
^{133}Cs	935.69(11)	0.130(9)	0.00296(21)
^{133}Cs	966.454(5)	0.168(13)	0.0038(3)
^{133}Cs	985.863(5)	0.078(12)	0.0018(3)
^{133}Cs	986.100(5)	0.027(9)	0.00062(21)
^{133}Cs	998.502(7)	0.103(11)	0.00235(25)
^{133}Cs	1009.2(5)	0.05(3)	0.0011(7)
^{133}Cs	1028.394(7)	0.038(15)	0.0009(3)
^{133}Cs	1034.519(4)	0.028(8)	0.00064(18)
^{133}Cs	1045.251(7)	0.120(11)	0.00274(25)
^{133}Cs	1072.547(6)	0.066(19)	0.0015(4)
^{133}Cs	1077.557(6)	0.209(12)	0.0048(3)
^{133}Cs	1077.794(5)	0.088(12)	0.0020(3)
^{133}Cs	1102.473(5)	0.047(8)	0.00107(18)
^{133}Cs	1114.65(21)	0.049(10)	0.00112(23)
^{133}Cs	1118.04(16)	0.069(9)	0.00157(21)
^{133}Cs	1209.54(11)	0.138(11)	0.00315(25)
^{133}Cs	5493.52(23)	0.230(19)	0.0052(4)
^{133}Cs	**5505.46(20)**	**0.333(22)**	**0.0076(5)**
^{133}Cs	**5572.00(25)**	**0.249(20)**	**0.0057(5)**
^{133}Cs	5625.091(17)	0.111(13)	0.0025(3)
^{133}Cs	**5637.056(17)**	**0.277(21)**	**0.0063(5)**
^{133}Cs	5728.747(17)	0.087(16)	0.0020(4)
^{133}Cs	5748.392(17)	0.146(15)	0.0033(3)
^{133}Cs	5790.920(17)	0.137(13)	0.0031(3)
^{133}Cs	5802.823(18)	0.120(13)	0.0027(3)
^{133}Cs	5899.368(17)	0.116(12)	0.0026(3)
^{133}Cs	5914.935(17)	0.047(8)	0.00107(18)
^{133}Cs	5949.884(22)	0.045(10)	0.00103(23)
^{133}Cs	5975.068(17)	0.027(10)	0.00062(23)
^{133}Cs	5978.636(17)	0.099(14)	0.0023(3)
^{133}Cs	6051.426(17)	0.240(20)	0.0055(5)
^{133}Cs	6138.534(17)	0.061(8)	0.00139(18)
^{133}Cs	6149.955(17)	0.038(6)	0.00087(14)
^{133}Cs	**6175.412(17)**	**0.252(16)**	**0.0057(4)**
^{133}Cs	6189.235(17)	0.191(14)	0.0044(3)
^{133}Cs	6197.392(17)	0.035(8)	0.00080(18)
^{133}Cs	6247.267(17)	0.038(6)	0.00087(14)
^{133}Cs	6307.046(17)	0.044(10)	0.00100(23)
^{133}Cs	6320.400(17)	0.050(8)	0.00114(18)
^{133}Cs	6439.794(16)	0.082(8)	0.00187(18)
^{133}Cs	6514.114(16)	0.044(7)	0.00100(16)
^{133}Cs	6697.590(16)	0.224(17)	0.0051(4)
^{133}Cs	6714.802(16)	0.090(11)	0.00205(25)
^{133}Cs	6831.169(16)	0.035(4)	0.00080(9)
	Barium (Z=56), *At.Wt.*=137.327(7), σ_{γ}^{z} =1.18(7)		
^{135}Ba	66.32(16)	0.0067(6)	1.48(13)E-4
^{135}Ba	87.08(13)	0.0093(6)	2.05(13)E-4

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{135}Ba	157.3(4)	0.0057(11)	1.26(24)E-4
^{135}Ba	158.58(12)	0.0077(4)	1.70(9)E-4
^{138}Ba	**165.8570(10)d**	**0.074(8)**	**0.00163[21%]**
^{137}Ba	191.65(10)	0.0081(3)	1.79(7)E-4
^{134}Ba	220.969(17)	0.0067(5)	1.48(11)E-4
^{135}Ba	273.77(11)	0.0079(5)	1.74(11)E-4
^{136}Ba	**283.58(6)**	**0.0404(12)**	**0.00089(3)**
^{137}Ba	325.11(7)	0.00368(19)	8.1(4)E-5
^{137}Ba	364.32(13)	0.00407(20)	9.0(4)E-5
^{137}Ba	408.88(7)	0.0096(6)	2.12(13)E-4
^{138}Ba	**454.73(5)**	**0.0853(22)**	**0.00188(5)**
^{137}Ba	**462.78(4)**	**0.0660(16)**	**0.00146(4)**
^{136}Ba	480.41(6)	0.00350(16)	7.7(4)E-5
^{134}Ba	480.543(24)	0.00320(20)	7.1(4)E-5
^{137}Ba	516.76(8)	0.0083(6)	1.83(13)E-4
^{137}Ba	546.95(5)	0.00604(23)	1.33(5)E-4
^{138}Ba	**627.29(5)**	**0.294(6)**	**0.00649(13)**
^{138}Ba	665.98(9)	0.0053(3)	1.17(7)E-4
^{135}Ba	671.60(9)	0.0045(3)	9.9(7)E-5
^{135}Ba	732.49(7)	0.0238(8)	0.000525(18)
^{135}Ba	746.6(4)	0.0031(3)	6.8(7)E-5
^{137}Ba	754.03(7)	0.0067(3)	1.48(7)E-4
^{135}Ba	760.31(11)	0.0073(5)	1.61(11)E-4
^{135}Ba	**818.514(12)**	**0.212(4)**	**0.00468(9)**
^{137}Ba	871.66(6)	0.0124(4)	0.000274(9)
^{135}Ba	880.01(17)	0.0042(5)	9.3(11)E-5
^{135}Ba	981.61(9)	0.0040(3)	8.8(7)E-5
^{137}Ba	1009.73(5)	0.0167(5)	0.000369(11)
^{137}Ba	1041.42(8)	0.00422(22)	9.3(5)E-5
^{138}Ba	**1047.73(6)**	**0.0319(10)**	**0.000704(22)**
^{135}Ba	1048.0730(20)	0.025(4)	0.00055(9)
^{138}Ba	1103.43(8)	0.0044(4)	9.7(9)E-5
^{137}Ba	1147.11(7)	0.0150(5)	0.000331(11)
^{135}Ba	1235.29(12)	0.0148(7)	0.000327(15)
^{135}Ba	**1261.52(7)**	**0.095(5)**	**0.00210(11)**
^{137}Ba	1264.54(10)	0.00352(22)	7.8(5)E-5
^{135}Ba	1310.21(9)	0.0094(7)	2.07(15)E-4
^{137}Ba	1343.53(8)	0.0087(4)	1.92(9)E-4
^{135}Ba	1404.08(9)	0.0051(5)	1.13(11)E-4
^{134}Ba	1415.30(19)	0.0067(5)	1.48(11)E-4
^{138}Ba	1420.41(9)	0.0090(5)	1.99(11)E-4
^{137}Ba	**1435.77(4)**	**0.308(7)**	**0.00680(15)**
^{137}Ba	**1444.91(5)**	**0.0801(20)**	**0.00177(4)**
^{137}Ba	1495.58(9)	0.0104(7)	2.30(15)E-4
^{135}Ba	1537.0(5)	0.0049(13)	1.1(3)E-4
^{135}Ba	1551.01(6)	0.0231(9)	0.000510(20)
^{137}Ba	1555.32(11)	0.00433(23)	9.6(5)E-5
^{138}Ba	1558.16(8)	0.0078(5)	1.72(11)E-4
^{135}Ba	1572.12(18)	0.0055(10)	1.21(22)E-4
^{135}Ba	1581.46(6)	0.0096(7)	2.12(15)E-4
^{137}Ba	1614.18(11)	0.015(7)	0.00033(15)
^{137}Ba	1614.68(10)	0.0147(10)	0.000324(22)
^{137}Ba	1619.88(15)	0.00328(24)	7.2(5)E-5
^{135}Ba	1666.69(9)	0.0047(5)	1.04(11)E-4
^{135}Ba	1714.09(9)	0.0076(12)	1.7(3)E-4
^{137}Ba	1717.16(20)	0.0071(8)	1.57(18)E-4
^{137}Ba	1727.32(10)	0.0056(4)	1.24(9)E-4
^{137}Ba	1745.07(6)	0.0035(4)	7.7(9)E-5
^{135}Ba	1842.90(11)	0.0054(7)	1.19(15)E-4
^{138}Ba	1853.30(12)	0.0074(6)	1.63(13)E-4
^{136}Ba	1898.68(5)	0.0305(10)	0.000673(22)
^{138}Ba	1951.9(5)	0.009(6)	2.0(13)E-4
^{135}Ba	1955.19(19)	0.0031(9)	6.8(20)E-5
^{135}Ba	1993.15(16)	0.0044(11)	9.7(24)E-5
^{137}Ba	2023.55(8)	0.0091(6)	2.01(13)E-4
^{135}Ba	2080.04(5)	0.0074(5)	1.63(11)E-4
^{135}Ba	2128.73(9)	0.0114(6)	0.000252(13)
^{137}Ba	2207.85(5)	0.0038(6)	8.4(13)E-5

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{137}Ba	2210.82(16)	0.0038(8)	8.4(18)E-5
^{137}Ba	**2217.84(8)**	**0.044(5)**	**0.00097(11)**
^{138}Ba	2242.58(13)	0.0116(13)	0.00026(3)
^{137}Ba	2401.96(15)	0.0031(3)	6.8(7)E-5
^{135}Ba	2485.20(8)	0.00349(24)	7.7(5)E-5
^{138}Ba	2537.72(10)	0.0102(7)	2.25(15)E-4
^{138}Ba	2566.0(11)	0.009(5)	2.0(11)E-4
^{137}Ba	2582.87(8)	0.0033(3)	7.3(7)E-5
^{138}Ba	2593.42(11)	0.0187(8)	0.000413(18)
^{137}Ba	2639.20(7)	0.0184(16)	0.00041(4)
^{136}Ba	2662.66(5)	0.00401(16)	8.8(4)E-5
^{137}Ba	2806.29(11)	0.0032(4)	7.1(9)E-5
^{135}Ba	2976.64(17)	0.0181(7)	0.000399(15)
^{135}Ba	3045.19(23)	0.00336(16)	7.4(4)E-5
^{137}Ba	3049.93(12)	0.0037(3)	8.2(7)E-5
^{137}Ba	3099.89(14)	0.0032(5)	7.1(11)E-5
^{137}Ba	3338.60(10)	0.0090(5)	1.99(11)E-4
^{135}Ba	3435.5(4)	0.0043(5)	9.5(11)E-5
^{137}Ba	3503.94(17)	0.0046(4)	1.02(9)E-4
^{138}Ba	**3641.12(9)**	**0.0562(16)**	**0.00124(4)**
^{137}Ba	3643.59(3)	0.0033(17)	7(4)E-5
^{134}Ba	3676.5(5)	0.0045(3)	9.9(7)E-5
^{137}Ba	3739.50(12)	0.0042(5)	9.3(11)E-5
^{137}Ba	3965.98(13)	0.00342(22)	7.5(5)E-5
^{137}Ba	4025.52(14)	0.0038(4)	8.4(9)E-5
^{137}Ba	4025.70(14)	0.0038(8)	8.4(18)E-5
^{137}Ba	4083.64(16)	0.0067(6)	1.48(13)E-4
^{138}Ba	**4095.84(9)**	**0.155(4)**	**0.00342(9)**
^{137}Ba	4103.50(19)	0.0032(5)	7.1(11)E-5
^{137}Ba	4114.45(19)	0.00329(24)	7.3(5)E-5
^{137}Ba	4166.05(12)	0.0052(3)	1.15(7)E-4
^{136}Ba	4242.98(8)	0.0087(10)	1.92(22)E-4
^{137}Ba	4251.82(13)	0.0057(4)	1.26(9)E-4
^{137}Ba	4279.55(14)	0.0039(5)	8.6(11)E-5
^{137}Ba	4280.25(16)	0.0038(3)	8.4(7)E-5
^{137}Ba	4288.15(14)	0.0059(3)	1.30(7)E-4
^{137}Ba	4323.34(14)	0.0079(4)	1.74(9)E-4
^{137}Ba	4331.24(16)	0.0091(12)	2.0(3)E-4
^{137}Ba	4331.94(14)	0.0090(6)	1.99(13)E-4
^{137}Ba	4369.47(10)	0.0069(5)	1.52(11)E-4
^{137}Ba	4445.44(12)	0.0039(3)	8.6(7)E-5
^{137}Ba	4597.95(22)	0.0044(4)	9.7(9)E-5
^{137}Ba	4689.43(9)	0.0140(8)	0.000309(18)
^{136}Ba	4723.38(8)	0.0264(8)	0.000583(18)
^{137}Ba	4773.79(15)	0.0063(4)	1.39(9)E-4
^{137}Ba	4967.90(6)	0.0098(7)	2.16(15)E-4
^{137}Ba	5107.54(17)	0.0060(4)	1.32(9)E-4
^{137}Ba	5272.88(10)	0.0088(10)	1.94(22)E-4
^{135}Ba	5312.42(17)	0.0082(3)	1.81(7)E-4
^{137}Ba	5448.42(11)	0.0053(6)	1.17(13)E-4
^{137}Ba	**5730.81(6)**	**0.0617(20)**	**0.00136(4)**
^{137}Ba	5972.26(9)	0.0044(3)	9.7(7)E-5
^{137}Ba	6028.60(8)	0.0093(6)	2.05(13)E-4
^{135}Ba	6062.37(23)	0.00516(14)	1.14(3)E-4
^{137}Ba	6421.67(8)	0.00337(19)	7.4(4)E-5
^{136}Ba	6621.99(8)	0.0034(6)	7.5(13)E-5
^{135}Ba	8288.93(5)	0.00349(11)	7.70(24)E-5
^{135}Ba	9107.41(4)	0.00635(23)	1.40(5)E-4

Lanthanum (Z=57), *At.Wt.*=138.9055(2), σ_γ^z=9.08(4)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{139}La	14.2380(20)	0.028(6)	0.00061(13)
^{139}La	28.5330(10)	0.0103(11)	2.25(24)E-4
^{139}La	**29.9640(10)**	**0.169(8)**	**0.00369(17)**
^{139}La	34.6460(10)	0.0220(20)	0.00048(4)
^{139}La	45.913(6)	0.0120(7)	0.000262(15)
^{139}La	**54.9440(10)**	**0.143(7)**	**0.00312(15)**
^{139}La	**63.1790(10)**	**0.208(8)**	**0.00454(17)**
^{139}La	69.1830(20)	0.0137(5)	0.000299(11)
^{139}La	132.695(3)	0.0146(6)	0.000319(13)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
139 La	**155.560(5)**	**0.192(7)**	**0.00419(15)**
139 La	**162.659(3)**	**0.489(18)**	**0.0107(4)**
138 La	166.04(7)	0.0119(12)	0.00026(3)
139 La	169.392(10)	0.0382(14)	0.00083(3)
139 La	209.127(4)	0.0431(16)	0.00094(4)
139 La	215.02(16)	0.025(6)	0.00055(13)
139 La	**218.225(22)**	**0.78(3)**	**0.0170(7)**
139 La	**235.771(8)**	**0.111(4)**	**0.00242(9)**
139 La	**237.660(4)**	**0.320(12)**	**0.0070(3)**
139 La	255.040(5)	0.017(4)	0.00037(9)
139 La	258.875(22)	0.0233(9)	0.000508(20)
139 La	**272.306(4)**	**0.502(19)**	**0.0110(4)**
139 La	279.979(22)	0.0640(24)	0.00140(5)
139 La	283.617(16)	0.0409(15)	0.00089(3)
139 La	287.408(22)	0.013(4)	0.00028(9)
139 La	**288.255(5)**	**0.73(3)**	**0.0159(7)**
139 La	290.92(3)	0.0167(6)	0.000364(13)
139 La	305.04(8)	0.0147(6)	0.000321(13)
139 La	310.14(3)	0.0184(7)	0.000401(15)
139 La	**328.762(8)d**	**1.250(18)**	**0.0273[<0.1%]**
139 La	329.727(12)	0.0140(5)	0.000305(11)
139 La	**422.66(4)**	**0.370(14)**	**0.0081(3)**
139 La	426.49(3)	0.0435(16)	0.00095(4)
139 La	**432.493(12)d**	**0.1780(18)**	**0.00388[<0.1%]**
139 La	478.05(5)	0.0407(15)	0.00089(3)
139 La	**487.021(12)d**	**2.79(4)**	**0.0609[<0.1%]**
139 La	**495.620(13)**	**0.081(3)**	**0.00177(7)**
139 La	528.34(11)	0.0197(7)	0.000430(15)
139 La	538.854(12)	0.0455(17)	0.00099(4)
139 La	**549.01(3)**	**0.098(4)**	**0.00214(9)**
139 La	553.148(12)	0.0602(23)	0.00131(5)
139 La	**567.386(12)**	**0.335(13)**	**0.0073(3)**
139 La	592.05(18)	0.0128(5)	0.000279(11)
139 La	**595.099(12)**	**0.103(4)**	**0.00225(9)**
139 La	602.032(12)	0.0522(20)	0.00114(4)
139 La	623.632(12)	0.0517(20)	0.00113(4)
139 La	628.314(12)	0.0284(11)	0.000620(24)
139 La	640.88(3)	0.0534(20)	0.00117(4)
139 La	**658.278(12)**	**0.103(4)**	**0.00225(9)**
139 La	667.594(14)	0.0580(22)	0.00127(5)
139 La	**708.244(14)**	**0.134(5)**	**0.00292(11)**
139 La	710.07(3)	0.0668(25)	0.00146(6)
139 La	711.22(20)	0.0164(6)	0.000358(13)
139 La	**722.538(14)**	**0.212(8)**	**0.00463(17)**
139 La	725.11(20)	0.0125(5)	0.000273(11)
139 La	736.777(14)	0.0388(15)	0.00085(3)
139 La	744.71(3)	0.010(4)	2.2(9)E-4
139 La	**751.637(18)d**	**0.2650(23)**	**0.00578[<0.1%]**
139 La	766.30(5)	0.0127(5)	0.000277(11)
139 La	782.733(20)	0.0396(15)	0.00086(3)
139 La	787.3(4)	0.008(4)	1.7(9)E-4
138 La	**788.742**	**0.273(5) $s^{-1}g^{-1}$**	**Abundant**
139 La	796.27(5)	0.0162(6)	0.000353(13)
139 La	**815.772(19)d**	**1.430(12)**	**0.0312[<0.1%]**
139 La	848.99(3)	0.0290(11)	0.000633(24)
139 La	863.28(3)	0.0149(6)	0.000325(13)
139 La	**867.846(20)d**	**0.337(4)**	**0.00735[<0.1%]**
139 La	868.32(5)	0.0558(21)	0.00122(5)
139 La	882.21(3)	0.0343(13)	0.00075(3)
139 La	887.70(11)	0.0222(8)	0.000484(17)
139 La	**919.550(23)d**	**0.1630(18)**	**0.00356[<0.1%]**
139 La	**925.189(21)d**	**0.422(4)**	**0.00921[<0.1%]**
139 La	941.79(17)	0.0236(9)	0.000515(20)
139 La	986.74(3)	0.008(4)	1.7(9)E-4
139 La	991.859(20)	0.0487(18)	0.00106(4)
139 La	1006.153(20)	0.0347(13)	0.00076(3)
139 La	1020.392(20)	0.0535(20)	0.00117(4)
139 La	1055.038(20)	0.015(5)	0.00033(11)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
138 La	1215.72(22)	0.019(4)	0.00041(9)
138 La	1219.79(17)	0.026(4)	0.00057(9)
138 La	**1435.795(10)**	**0.539(7) $s^{-1}g^{-1}$**	**Abundant**
138 La	1537.7(3)	0.009(3)	2.0(7)E-4
139 La	**1596.21(4)d**	**5.84(9)**	**0.1274[<0.1%]**
139 La	2345.21(6)	0.0164(6)	0.000358(13)
139 La	2512.55(17)	0.0194(7)	0.000423(15)
139 La	2517.04(8)	0.0353(13)	0.00077(3)
139 La	**2521.40(5)d**	**0.2120(23)**	**0.00463[<0.1%]**
139 La	2532.39(4)	0.0188(7)	0.000410(15)
139 La	2538.82(7)	0.0119(5)	0.000260(11)
139 La	2555.76(4)	0.0231(9)	0.000504(20)
139 La	2561.85(3)	0.0259(10)	0.000565(22)
139 La	2564.79(3)	0.0373(14)	0.00081(3)
139 La	2598.16(4)	0.0231(9)	0.000504(20)
139 La	2607.17(3)	0.0344(13)	0.00075(3)
139 La	2611.6(3)	0.0086(3)	1.88(7)E-4
139 La	2617.76(4)	0.0149(6)	0.000325(13)
139 La	2637.97(6)	0.0084(5)	1.83(11)E-4
139 La	2640.00(3)	0.0160(6)	0.000349(13)
139 La	2661.55(4)	0.0263(10)	0.000574(22)
139 La	2668.00(4)	0.0247(9)	0.000539(20)
139 La	2677.63(12)	0.0100(4)	2.18(9)E-4
139 La	2688.09(3)	0.0254(10)	0.000554(22)
139 La	2692.30(6)	0.0115(7)	0.000251(15)
139 La	2698.19(4)	0.0185(7)	0.000404(15)
139 La	2702.38(6)	0.0109(4)	2.38(9)E-4
139 La	2710.62(4)	0.0117(4)	0.000255(9)
139 La	2714.63(3)	0.0141(5)	0.000308(11)
139 La	2724.26(4)	0.0151(6)	0.000329(13)
139 La	2735.13(4)	0.0188(7)	0.000410(15)
139 La	2739.00(4)	0.0200(8)	0.000436(17)
139 La	2747.65(4)	0.0198(8)	0.000432(17)
139 La	2757.726(24)	0.0515(19)	0.00112(4)
139 La	2764.51(4)	0.0289(11)	0.000631(24)
139 La	2767.58(4)	0.0287(11)	0.000626(24)
139 La	2799.65(6)	0.0109(4)	2.38(9)E-4
139 La	2804.82(4)	0.0203(8)	0.000443(17)
139 La	2837.50(4)	0.0195(7)	0.000425(15)
139 La	2852.55(4)	0.0139(5)	0.000303(11)
139 La	2863.06(3)	0.073(3)	0.00159(7)
139 La	2880.60(6)	0.0101(4)	2.20(9)E-4
139 La	2896.63(6)	0.0081(5)	1.77(11)E-4
139 La	2903.65(5)	0.0112(4)	2.44(9)E-4
139 La	2913.16(4)	0.0124(5)	0.000271(11)
139 La	2916.89(4)	0.0130(8)	0.000284(17)
139 La	2919.73(6)	0.0086(3)	1.88(7)E-4
139 La	2925.00(3)	0.0435(16)	0.00095(4)
139 La	2961.34(4)	0.0262(10)	0.000572(22)
139 La	2969.27(4)	0.0409(15)	0.00089(3)
139 La	2977.35(5)	0.0164(6)	0.000358(13)
139 La	2985.02(6)	0.0100(4)	2.18(9)E-4
139 La	2988.53(3)	0.0458(17)	0.00100(4)
139 La	2998.36(5)	0.0136(5)	0.000297(11)
139 La	3017.070(24)	0.0671(25)	0.00146(6)
139 La	3031.27(4)	0.0330(12)	0.00072(3)
139 La	3035.56(3)	0.0518(20)	0.00113(4)
139 La	3040.94(4)	0.0294(11)	0.000641(24)
139 La	3051.49(5)	0.0183(7)	0.000399(15)
139 La	3057.66(6)	0.0194(7)	0.000423(15)
139 La	3078.80(6)	0.0130(5)	0.000284(11)
139 La	**3082.979(24)**	**0.140(5)**	**0.00305(11)**
139 La	3091.30(6)	0.0114(4)	2.49(9)E-4
139 La	3095.50(4)	0.0191(7)	0.000417(15)
139 La	3112.38(3)	0.0320(12)	0.00070(3)
139 La	3115.94(3)	0.0176(7)	0.000384(15)
139 La	3119.05(4)	0.0118(8)	0.000257(17)
139 La	3137.21(4)	0.0239(9)	0.000521(20)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{139}La	3142.75(3)	0.0320(12)	0.00070(3)
^{139}La	3155.06(6)	0.0090(3)	1.96(7)E-4
^{139}La	3163.792(24)	0.0324(12)	0.00071(3)
^{139}La	3174.77(4)	0.0135(5)	0.000295(11)
^{139}La	3189.09(3)	0.0538(20)	0.00117(4)
^{139}La	3197.52(6)	0.0213(8)	0.000465(17)
^{139}La	3213.35(4)	0.0144(5)	0.000314(11)
^{139}La	3219.80(3)	0.0300(11)	0.000655(24)
^{139}La	3265.263(24)	0.0532(20)	0.00116(4)
^{139}La	3281.248(24)	0.0506(19)	0.00110(4)
^{139}La	3318.99(4)	0.0319(12)	0.00070(3)
^{139}La	3341.48(4)	0.0090(5)	1.96(11)E-4
^{139}La	3359.88(3)	0.0120(7)	0.000262(15)
^{139}La	3383.39(3)	0.0242(9)	0.000528(20)
^{139}La	3395.44(4)	0.0161(6)	0.000351(13)
^{139}La	3404.81(4)	0.0171(6)	0.000373(13)
^{139}La	3417.24(4)	0.0181(7)	0.000395(15)
^{139}La	3424.29(3)	0.0232(14)	0.00051(3)
^{139}La	3425.399(24)	0.058(3)	0.00127(7)
^{139}La	3437.83(4)	0.0247(9)	0.000539(20)
^{139}La	3442.20(3)	0.0410(15)	0.00089(3)
^{139}La	3459.91(3)	0.0199(8)	0.000434(17)
^{139}La	3477.14(3)	0.0444(17)	0.00097(4)
^{139}La	3488.77(3)	0.0170(6)	0.000371(13)
^{139}La	3564.87(4)	0.0130(5)	0.000284(11)
^{139}La	3580.90(4)	0.0129(5)	0.000281(11)
^{139}La	3596.45(4)	0.0157(6)	0.000343(13)
^{139}La	3606.467(24)	0.0556(21)	0.00121(5)
^{139}La	3610.026(24)	0.0548(21)	0.00120(5)
^{139}La	**3665.631(24)**	**0.135(5)**	**0.00295(11)**
^{139}La	**3679.641(24)**	**0.139(5)**	**0.00303(11)**
^{139}La	3683.89(3)	0.0322(21)	0.00070(5)
^{139}La	3691.35(3)	0.0350(13)	0.00076(3)
^{139}La	3718.321(24)	0.0384(15)	0.00084(3)
^{139}La	3727.700(24)	0.073(3)	0.00159(7)
^{139}La	3735.30(4)	0.0170(6)	0.000371(13)
^{139}La	3738.56(4)	0.0352(13)	0.00077(3)
^{139}La	3744.87(4)	0.0234(9)	0.000511(20)
^{139}La	3821.40(4)	0.0131(9)	0.000286(20)
^{139}La	3900.979(24)	0.0531(20)	0.00116(4)
^{139}La	3951.14(3)	0.0198(8)	0.000432(17)
^{139}La	3973.56(4)	0.0120(5)	0.000262(11)
^{139}La	4044.182(21)	0.0297(11)	0.000648(24)
^{139}La	4060.007(20)	0.0297(11)	0.000648(24)
^{139}La	4105.897(20)	0.0238(9)	0.000519(20)
^{139}La	4125.31(3)	0.0183(7)	0.000399(15)
^{139}La	**4389.505(14)**	**0.255(10)**	**0.00556(22)**
^{139}La	**4416.22(3)**	**0.247(9)**	**0.00539(20)**
^{139}La	**4502.647(13)**	**0.164(6)**	**0.00358(13)**
^{139}La	4558.891(13)	0.0488(18)	0.00106(4)
^{139}La	**4842.695(7)**	**0.661(25)**	**0.0144(6)**
^{139}La	**4888.606(7)**	**0.150(6)**	**0.00327(13)**
^{139}La	4998.250(6)	0.0145(8)	0.000316(17)
^{139}La	**5097.726(6)**	**0.68(3)**	**0.0148(7)**
^{139}La	**5126.257(6)**	**0.114(4)**	**0.00249(9)**
^{139}La	5130.939(6)	0.0159(9)	0.000347(20)
^{139}La	**5160.902(6)**	**0.089(5)**	**0.00194(11)**

Cerium (Z=58), *At.Wt.*=140.116(1), σ_γ^z =0.635(18)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{136}Ce	254.29(5)d	2.0(6)E-4	4.3E-6[1.0%]
^{138}Ce	255.65(6)	0.0082(7)	1.77(15)E-4
^{140}Ce	**475.04(4)**	**0.082(7)**	**0.00177(15)**
^{136}Ce	513.7(4)	0.0021(5)	4.5(11)E-5
^{140}Ce	**661.99(5)**	**0.241(15)**	**0.0052(3)**
^{140}Ce	671.64(5)	0.0057(5)	1.23(11)E-4
^{142}Ce	**737.43(7)**	**0.026(3)**	**0.00056(7)**
^{142}Ce	765.97(5)	0.0145(12)	0.00031(3)
^{142}Ce	789.40(8)	0.0050(6)	1.08(13)E-4
^{142}Ce	808.35(6)	0.0102(9)	2.21(19)E-4
^{142}Ce	820.07(8)	0.0026(3)	5.6(7)E-5
^{142}Ce	862.23(7)	0.0044(4)	9.5(9)E-5
^{142}Ce	915.03(7)	0.0086(11)	1.86(24)E-4
^{142}Ce	987.69(9)	0.0040(5)	8.7(11)E-5
^{140}Ce	1052.58(5)	0.0051(5)	1.10(11)E-4
^{142}Ce	**1107.66(5)**	**0.040(3)**	**0.00087(7)**
^{140}Ce	1146.68(4)	0.0096(9)	2.08(19)E-4
^{142}Ce	1153.97(5)	0.0146(12)	0.00032(3)
^{142}Ce	1165.71(8)	0.0040(4)	8.7(9)E-5
^{140}Ce	1288.69(5)	0.0076(6)	1.64(13)E-4
^{140}Ce	1331.63(7)	0.0058(5)	1.25(11)E-4
^{138}Ce	1347.24(13)	0.0028(3)	6.1(7)E-5
^{140}Ce	1385.74(6)	0.0060(6)	1.30(13)E-4
^{140}Ce	1497.03(12)	0.0062(9)	1.34(19)E-4
^{140}Ce	1527.61(6)	0.0027(3)	5.8(7)E-5
^{142}Ce	1587.90(11)	0.0028(3)	6.1(7)E-5
^{140}Ce	1673.95(9)	0.0033(4)	7.1(9)E-5
^{140}Ce	1747.90(7)	0.0078(7)	1.69(15)E-4
^{140}Ce	1808.67(6)	0.0038(4)	8.2(9)E-5
^{142}Ce	2203.36(10)	0.0039(5)	8.4(11)E-5
^{140}Ce	2905.37(7)	0.0058(5)	1.25(11)E-4
^{142}Ce	2931.94(14)	0.0029(3)	6.3(7)E-5
^{140}Ce	3002.41(6)	0.0104(8)	2.25(17)E-4
^{140}Ce	3018.24(7)	0.0114(10)	2.47(22)E-4
^{140}Ce	3092.19(8)	0.0072(6)	1.56(13)E-4
^{140}Ce	3238.52(6)	0.0066(6)	1.43(13)E-4
^{140}Ce	3434.50(8)	0.0039(4)	8.4(9)E-5
^{140}Ce	3619.46(5)	0.0095(8)	2.05(17)E-4
^{142}Ce	3990.70(15)	0.0038(4)	8.2(9)E-5
^{142}Ce	4282.22(12)	0.0037(4)	8.0(9)E-5
^{140}Ce	**4291.08(4)**	**0.053(4)**	**0.00115(9)**
^{142}Ce	**4336.46(8)**	**0.0251(20)**	**0.00054(4)**
^{140}Ce	**4766.10(5)**	**0.113(8)**	**0.00244(17)**

Praseodymium (Z=59), *At.Wt.*=140.90765(2), σ_γ^z =11.5(3)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{141}Pr	32.276(3)	0.055(11)	0.00118(24)
^{141}Pr	54.5530(20)	0.022(4)	0.00047(9)
^{141}Pr	55.957(3)	0.014(3)	0.00030(7)
^{141}Pr	**60.0630(20)**	**0.134(14)**	**0.0029(3)**
^{141}Pr	**64.5050(20)**	**0.137(6)**	**0.00295(13)**
^{141}Pr	**68.6110(20)**	**0.116(6)**	**0.00249(13)**
^{141}Pr	**84.998(3)**	**0.207(11)**	**0.00445(24)**
^{141}Pr	86.37(7)	0.085(7)	0.00183(15)
^{141}Pr	104.570(3)	0.0397(13)	0.00085(3)
^{141}Pr	115.528(4)	0.0419(13)	0.00090(3)
^{141}Pr	124.5680(20)	0.0339(18)	0.00073(4)
^{141}Pr	**126.8460(20)**	**0.307(15)**	**0.0066(3)**
^{141}Pr	**140.9050(20)**	**0.479(10)**	**0.01030(22)**
^{141}Pr	153.28(3)	0.0135(7)	0.000290(15)
^{141}Pr	159.1230(20)	0.0122(7)	0.000262(15)
^{141}Pr	**176.8630(20)**	**1.06(4)**	**0.0228(9)**
^{141}Pr	**182.786(4)**	**0.377(14)**	**0.0081(3)**
^{141}Pr	185.62(7)	0.017(4)	0.00037(9)
^{141}Pr	187.85(5)	0.048(12)	0.0010(3)
^{141}Pr	200.526(4)	0.0379(12)	0.00082(3)
^{141}Pr	231.18(4)	0.0127(10)	0.000273(22)
^{141}Pr	251.53(4)	0.0172(19)	0.00037(4)
^{141}Pr	268.38(4)	0.0166(8)	0.000357(17)
^{141}Pr	294.87(3)	0.0275(18)	0.00059(4)
^{141}Pr	360.64(3)	0.0342(19)	0.00074(4)
^{141}Pr	403.976(24)	0.0322(14)	0.00069(3)
^{141}Pr	415.17(5)	0.0122(10)	0.000262(22)
^{141}Pr	460.16(4)	0.057(3)	0.00123(7)
^{141}Pr	508.78(4)	0.104(10)	0.00224(22)
^{141}Pr	528.219(23)	0.0579(19)	0.00125(4)
^{141}Pr	**546.448(15)**	**0.148(4)**	**0.00318(9)**
^{141}Pr	**557.75(3)**	**0.15(4)**	**0.0032(9)**
^{141}Pr	**560.495(23)**	**0.150(7)**	**0.00323(15)**
^{141}Pr	**570.111(14)**	**0.112(5)**	**0.00241(11)**

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{141}Pr	**573.28(4)**	**0.12(3)**	**0.0026(7)**
^{141}Pr	**619.29(4)**	**0.152(4)**	**0.00327(9)**
^{141}Pr	**630.04(3)**	**0.16(6)**	**0.0034(13)**
^{141}Pr	**633.34(4)**	**0.113(4)**	**0.00243(9)**
^{141}Pr	**645.720(24)**	**0.311(7)**	**0.00669(15)**
^{141}Pr	684.59(3)	0.098(22)	0.0021(5)
^{141}Pr	**698.65(3)**	**0.22(6)**	**0.0047(13)**
^{141}Pr	705.309(24)	0.0399(20)	0.00086(4)
^{141}Pr	718.014(24)	0.0435(21)	0.00094(5)
^{141}Pr	729.233(14)	0.0712(23)	0.00153(5)
^{141}Pr	737.65(7)	0.0396(17)	0.00085(4)
^{141}Pr	**746.973(14)**	**0.146(4)**	**0.00314(9)**
^{141}Pr	772.566(24)	0.044(16)	0.0009(3)
^{141}Pr	790.306(24)	0.051(3)	0.00110(7)
^{141}Pr	801.29(4)	0.10(3)	0.0022(7)
^{141}Pr	804.91(7)	0.0455(25)	0.00098(5)
^{141}Pr	822.65(7)	0.0179(15)	0.00038(3)
^{141}Pr	**864.98(3)**	**0.14(3)**	**0.0030(7)**
^{141}Pr	893.16(4)	0.053(3)	0.00114(7)
^{141}Pr	956.84(3)	0.091(7)	0.00196(15)
^{141}Pr	974.47(4)	0.076(22)	0.0016(5)
^{141}Pr	**992.00(4)**	**0.138(10)**	**0.00297(22)**
^{141}Pr	**1006.361(22)**	**0.153(8)**	**0.00329(17)**
^{141}Pr	1024.10(3)	0.048(3)	0.00103(7)
^{141}Pr	1102.51(4)	0.056(3)	0.00120(7)
^{141}Pr	**1150.946(21)**	**0.141(5)**	**0.00303(11)**
^{141}Pr	**1575.6(5)d**	**0.426(12)**	**0.0092[1.8%]**
^{141}Pr	3532.83(3)	0.026(3)	0.00056(7)
^{141}Pr	3535.33(3)	0.026(3)	0.00056(7)
^{141}Pr	3549.71(3)	0.0288(24)	0.00062(5)
^{141}Pr	3556.85(3)	0.0127(17)	0.00027(4)
^{141}Pr	3563.23(3)	0.0110(23)	2.4(5)E-4
^{141}Pr	3582.48(3)	0.0236(21)	0.00051(5)
^{141}Pr	3587.84(3)	0.0128(17)	0.00028(4)
^{141}Pr	3591.03(3)	0.0139(19)	0.00030(4)
^{141}Pr	3599.14(3)	0.0234(24)	0.00050(5)
^{141}Pr	3602.51(3)	0.054(3)	0.00116(7)
^{141}Pr	3620.02(3)	0.024(3)	0.00052(7)
^{141}Pr	3629.19(3)	0.020(4)	0.00043(9)
^{141}Pr	3645.82(3)	0.015(3)	0.00032(7)
^{141}Pr	3650.20(3)	0.061(3)	0.00131(7)
^{141}Pr	3651.73(3)	0.0127(8)	0.000273(17)
^{141}Pr	3654.47(3)	0.060(4)	0.00129(9)
^{141}Pr	3664.35(3)	0.0193(25)	0.00042(5)
^{141}Pr	3678.37(3)	0.034(3)	0.00073(7)
^{141}Pr	3690.27(3)	0.0107(19)	2.3(4)E-4
^{141}Pr	3713.73(3)	0.047(3)	0.00101(7)
^{141}Pr	3742.46(3)	0.0191(24)	0.00041(5)
^{141}Pr	3762.26(3)	0.0177(24)	0.00038(5)
^{141}Pr	3771.88(3)	0.023(3)	0.00049(7)
^{141}Pr	3776.46(3)	0.0117(8)	0.000252(17)
^{141}Pr	**3790.37(3)**	**0.140(6)**	**0.00301(13)**
^{141}Pr	3800.04(3)	0.0144(23)	0.00031(5)
^{141}Pr	3811.64(3)	0.0231(23)	0.00050(5)
^{141}Pr	3862.86(3)	0.0199(25)	0.00043(5)
^{141}Pr	3871.70(3)	0.0164(23)	0.00035(5)
^{141}Pr	3892.63(3)	0.039(3)	0.00084(7)
^{141}Pr	3902.50(3)	0.0117(20)	0.00025(4)
^{141}Pr	3911.07(3)	0.042(3)	0.00090(7)
^{141}Pr	3923.07(3)	0.023(3)	0.00049(7)
^{141}Pr	3941.19(3)	0.0153(25)	0.00033(5)
^{141}Pr	3947.09(3)	0.0169(23)	0.00036(5)
^{141}Pr	4000.97(3)	0.0187(24)	0.00040(5)
^{141}Pr	4012.20(3)	0.027(3)	0.00058(7)
^{141}Pr	4058.05(3)	0.0133(16)	0.00029(3)
^{141}Pr	4090.15(3)	0.0137(16)	0.00029(3)
^{141}Pr	4120.77(3)	0.0130(16)	0.00028(3)
^{141}Pr	4134.04(3)	0.0408(25)	0.00088(5)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{141}Pr	4163.89(3)	0.035(3)	0.00075(7)
^{141}Pr	4177.00(3)	0.0387(25)	0.00083(5)
^{141}Pr	4252.14(3)	0.032(3)	0.00069(7)
^{141}Pr	4276.54(3)	0.044(4)	0.00095(9)
^{141}Pr	4325.50(3)	0.0124(17)	0.00027(4)
^{141}Pr	4347.62(3)	0.0166(18)	0.00036(4)
^{141}Pr	4372.53(3)	0.0269(22)	0.00058(5)
^{141}Pr	4440.54(3)	0.0252(20)	0.00054(4)
^{141}Pr	4449.26(3)	0.0228(19)	0.00049(4)
^{141}Pr	4496.44(3)	0.098(6)	0.00211(13)
^{141}Pr	4579.64(3)	0.0126(17)	0.00027(4)
^{141}Pr	4592.28(3)	0.0165(19)	0.00035(4)
^{141}Pr	**4692.120(22)**	**0.291(10)**	**0.00626(22)**
^{141}Pr	4722.82(4)	0.083(4)	0.00179(9)
^{141}Pr	4731.284(9)	0.0149(18)	0.00032(4)
^{141}Pr	**4801.22(3)**	**0.140(8)**	**0.00301(17)**
^{141}Pr	4864.91(4)	0.0112(16)	2.4(3)E-4
^{141}Pr	5020.41(7)	0.0135(17)	0.00029(4)
^{141}Pr	5052.750(24)	0.0329(21)	0.00071(5)
^{141}Pr	**5096.081(15)**	**0.208(8)**	**0.00447(17)**
^{141}Pr	5137.972(24)	0.098(4)	0.00211(9)
^{141}Pr	**5140.72(3)**	**0.269(11)**	**0.00579(24)**
^{141}Pr	5206.03(4)	0.033(3)	0.00071(7)
^{141}Pr	**5666.170(6)**	**0.379(15)**	**0.0082(3)**
^{141}Pr	5698.445(6)	0.0117(14)	0.00025(3)
^{141}Pr	5770.736(6)	0.0371(23)	0.00080(5)
^{141}Pr	5825.286(5)	0.040(3)	0.00086(7)
^{141}Pr	**5843.026(5)**	**0.147(6)**	**0.00316(13)**

Neodymium (Z=60), *At.Wt.*=144.24(3), σ_γ^z =49.5(12)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{148}Nd	165.0870(10)	0.032(8)	0.00067(17)
^{150}Nd	189.0530(10)	0.020(7)	0.00042(15)
^{143}Nd	201.86(7)	0.343(23)	0.0072(5)
^{148}Nd	211.309(7)d	0.0370(16)	0.00078[18%]
^{146}Nd	314.675(4)	0.0280(24)	0.00059(5)
^{143}Nd	426.73(5)	0.574(15)	0.0121(3)
^{145}Nd	453.89(5)	3.03(8)	0.0637(17)
^{143}Nd	476.82(5)	1.93(5)	0.0405(11)
^{142}Nd	563.87(3)	0.74(3)	0.0155(6)
^{145}Nd	589.46(6)	0.97(4)	0.0204(8)
^{143}Nd	**618.062(19)**	**13.4(3)**	**0.282(6)**
^{143}Nd	**696.499(10)**	**33.3(23)**	**0.70(5)**
^{145}Nd	735.85(9)	0.479(13)	0.0101(3)
^{142}Nd	**742.106(22)**	**3.8(4)**	**0.080(8)**
^{143}Nd	778.58(4)	0.791(20)	0.0166(4)
^{143}Nd	**814.12(3)**	**4.98(12)**	**0.1046(25)**
^{143}Nd	834.9(5)	0.333(24)	0.0070(5)
^{143}Nd	863.89(8)	1.07(4)	0.0225(8)
^{143}Nd	**864.301(10)**	**4.27(11)**	**0.0897(23)**
^{143}Nd	980.60(4)	1.21(3)	0.0254(6)
^{143}Nd	1136.92(6)	0.669(18)	0.0141(4)
^{143}Nd	1357.04(8)	0.337(9)	0.00708(19)
^{143}Nd	1376.19(7)	0.751(20)	0.0158(4)
^{143}Nd	1413.16(4)	1.90(5)	0.0399(11)
^{143}Nd	1418.07(10)	0.353(11)	0.00742(23)
^{143}Nd	1481.95(8)	0.608(21)	0.0128(4)
^{143}Nd	1515.84(9)	0.455(13)	0.0096(3)
^{143}Nd	1560.796(14)	0.404(11)	0.00849(23)
^{143}Nd	1671.74(10)	0.97(8)	0.0204(17)
^{143}Nd	1895.74(16)	0.387(12)	0.00813(25)
^{144}Nd	4836.36(25)	0.32(3)	0.0067(6)
^{142}Nd	5381.19(7)	0.49(4)	0.0103(8)
^{143}Nd	6255.99(17)	1.50(12)	0.0315(25)
^{143}Nd	6502.22(17)	3.18(17)	0.067(4)
^{145}Nd	7110.98(8)	0.368(11)	0.00773(23)

Samarium (Z=62), *At.Wt.*=150.36(3), σ_γ^z =5621(80)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{154}Sm	104.320(5)d	1.43(4)	0.0288[55%]
^{152}Sm	127.297(3)	4.1(3)	0.083(6)
^{150}Sm	167.77(5)	0.73(13)	0.015(3)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{149}Sm	**333.97(4)**	**4790(60)**	**96.5(12)**
^{149}Sm	403.02(3)	85.2(16)	1.72(3)
^{149}Sm	**439.40(4)**	**2860(150)**	**58(3)**
^{149}Sm	485.95(7)	72(3)	1.45(6)
^{149}Sm	**505.51(3)**	**528(80)**	**10.6(16)**
^{147}Sm	550.10(9)	9.6(6)	0.193(12)
^{149}Sm	**584.27(3)**	**480(70)**	**9.7(14)**
^{149}Sm	675.83(3)	172(7)	3.47(14)
^{149}Sm	712.20(3)	267(4)	5.38(8)
^{149}Sm	731.20(4)	54(4)	1.09(8)
^{149}Sm	**737.44(4)**	**597(8)**	**12.03(16)**
^{149}Sm	748.13(4)	67.9(20)	1.37(4)
^{154}Sm	819.880(5)	0.153(10)	0.00308(20)
^{149}Sm	831.78(5)	62.7(17)	1.26(3)
^{149}Sm	859.86(4)	88(4)	1.77(8)
^{149}Sm	869.29(3)	119(6)	2.40(12)
^{149}Sm	1165.76(5)	61(3)	1.23(6)
^{149}Sm	1170.59(4)	230(10)	4.64(20)
^{149}Sm	1177.3(4)	57(3)	1.15(6)
^{149}Sm	1193.84(4)	106(3)	2.14(6)
^{149}Sm	1247.04(8)	51(3)	1.03(6)
^{149}Sm	1262.07(10)	62(5)	1.25(10)
^{149}Sm	1321.95(7)	76(9)	1.53(18)
^{149}Sm	1350.39(5)	94(12)	1.89(24)

Europium (Z=63), *At.Wt.*=151.964(1), σ_γ^z =4560(140)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{151}Eu	19.700(10)	59(30)	1.2(6)
^{151}Eu	**48.31(17)**	**181(70)**	**3.6(14)**
^{151}Eu	52.39(9)	55(3)	1.10(6)
^{151}Eu	65.1(3)	16(8)	0.32(16)
^{153}Eu	68.23(9)	69(20)	1.4(4)
^{153}Eu	71.24(12)	45(14)	0.9(3)
^{151}Eu	73.21(9)	106(22)	2.1(4)
^{153}Eu	74.86(12)	43(12)	0.86(24)
^{151}Eu	**77.23(4)**	**187(13)**	**3.7(3)**
^{151}Eu	87.13(11)	29(3)	0.58(6)
^{151}Eu	88.31(12)	42(5)	0.84(10)
^{151}Eu	**89.847(6)**	**1430(30)**	**28.5(6)**
^{151}Eu	89.847(6)d	1.300(3)	0.02592[19%]
^{151}Eu	91.20(10)	20(10)	0.40(20)
^{153}Eu	100.86(23)	24(5)	0.48(10)
^{151}Eu	103.34(13)	48(5)	0.96(10)
^{153}Eu	106.57(14)	42(6)	0.84(12)
^{151}Eu	111.0(3)	22(6)	0.44(12)
^{151}Eu	113.1(3)	15(5)	0.30(10)
^{151}Eu	117.54(10)	14.7(22)	0.29(4)
^{151}Eu	121.71(11)	17.7(25)	0.35(5)
^{151}Eu	124.01(16)	25(3)	0.50(6)
^{153}Eu	125.19(16)	25(3)	0.50(6)
^{153}Eu	129.06(12)	14.7(16)	0.29(3)
^{151}Eu	132.71(10)	20.7(13)	0.41(3)
^{151}Eu	135.42(9)	27.8(14)	0.55(3)
^{151}Eu	140.19(9)	21(4)	0.42(8)
^{151}Eu	143.54(8)	43(3)	0.86(6)
^{153}Eu	154.14(9)	22(3)	0.44(6)
^{151}Eu	167.01(13)	18.9(19)	0.38(4)
^{151}Eu	169.28(9)	54.8(22)	1.09(4)
^{151}Eu	171.95(9)	40(3)	0.80(6)
^{153}Eu	179.83(13)	20(3)	0.40(6)
^{151}Eu	182.38(11)	23(3)	0.46(6)
^{153}Eu	187.37(8)	31.2(14)	0.62(3)
^{151}Eu	190.96(11)	19.7(14)	0.39(3)
^{151}Eu	193.11(13)	28.3(20)	0.56(4)
^{151}Eu	199.12(10)	25.5(15)	0.51(3)
^{151}Eu	203.63(10)	18.4(14)	0.37(3)
^{151}Eu	206.53(8)	58.7(20)	1.17(4)
^{151}Eu	208.51(18)	16.1(21)	0.32(4)
^{151}Eu	221.30(8)	73(3)	1.46(6)
^{151}Eu	233.22(14)	15.9(23)	0.32(5)
^{151}Eu	244.88(24)	26.3(22)	0.52(4)
^{151}Eu	246.5(3)	15(3)	0.30(6)
^{151}Eu	260.66(9)	15.9(18)	0.32(4)
^{151}Eu	273.65(8)	17.3(12)	0.345(24)
^{153}Eu	281.78(9)	20.4(8)	0.407(16)
^{151}Eu	285.10(9)	23.2(18)	0.46(4)
^{153}Eu	299.83(8)	24.0(6)	0.479(12)

Gadolinium (Z=64), *At.Wt.*=157.25(3), σ_γ^z =48770(150)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{157}Gd	**79.5100(10)**	**4010(100)**	**77.3(19)**
^{154}Gd	86.5470(10)	0.57(9)	0.0110(17)
^{155}Gd	**88.9670(10)**	**1380(40)**	**26.6(8)**
^{152}Gd	109.7600(10)	0.089(4)	0.00172(8)
^{157}Gd	**181.931(4)**	**7200(300)**	**139(6)**
^{155}Gd	**199.2130(10)**	**2020(60)**	**38.9(12)**
^{157}Gd	255.654(4)	350(19)	6.7(4)
^{157}Gd	277.544(7)	493(12)	9.50(23)
^{155}Gd	296.526(3)	187(5)	3.60(10)
^{160}Gd	360.940(20)d	0.199(5)	0.00384[91%]
^{157}Gd	528.024(8)	97(11)	1.87(21)
^{157}Gd	539.608(5)	144(5)	2.78(10)
^{157}Gd	595.728(7)	75(3)	1.45(6)
^{157}Gd	606.400(8)	271(8)	5.22(15)
^{155}Gd	626.275(8)	73(22)	1.4(4)
^{157}Gd	637.474(12)	114(4)	2.20(8)
^{157}Gd	675.43(3)	76(5)	1.46(10)
^{157}Gd	688.892(11)	122(7)	2.35(13)
^{157}Gd	743.066(21)	177(5)	3.41(10)
^{157}Gd	750.109(10)	118(11)	2.27(21)
^{157}Gd	768.37(3)	221(11)	4.26(21)
^{157}Gd	**780.174(10)**	**1010(22)**	**19.5(4)**
^{157}Gd	782.28(3)	134(5)	2.58(10)
^{157}Gd	814.602(10)	89(8)	1.72(15)
^{157}Gd	820.107(24)	118(7)	2.27(13)
^{157}Gd	824.127(24)	133(8)	2.56(15)
^{155}Gd	841.218(12)	80(24)	1.5(5)
^{157}Gd	852.885(25)	194(5)	3.74(10)
^{157}Gd	852.947(9)	202(30)	3.9(6)
^{157}Gd	867.682(11)	83(4)	1.60(8)
^{157}Gd	870.690(25)	127(19)	2.4(4)
^{157}Gd	870.815(25)	434(11)	8.36(21)
^{157}Gd	870.877(9)	216(40)	4.2(8)
^{157}Gd	874.93(3)	151(5)	2.91(10)
^{157}Gd	879.29(3)	139(5)	2.68(10)
^{157}Gd	**897.502(10)**	**1200(50)**	**23.1(10)**
^{157}Gd	**897.611(10)**	**1090(50)**	**21.0(10)**
^{157}Gd	915.017(10)	394(10)	7.59(19)
^{157}Gd	917.378(25)	262(16)	5.0(3)
^{157}Gd	917.54(3)	268(7)	5.16(13)
^{157}Gd	922.466(20)	98(8)	1.89(15)
^{157}Gd	942.404(11)	120(11)	2.31(21)
^{157}Gd	**944.174(10)**	**3090(70)**	**59.5(13)**
^{157}Gd	953.067(21)	73(6)	1.41(12)
^{157}Gd	954.296(10)	89(15)	1.7(3)
^{155}Gd	959.774(12)	147(50)	2.8(10)
^{157}Gd	960.082(11)	216(17)	4.2(3)
^{155}Gd	960.553(14)	84(40)	1.6(8)
^{157}Gd	**962.104(10)**	**2050(130)**	**39.5(25)**
^{155}Gd	969.877(18)	172(50)	3.3(10)
^{157}Gd	**977.121(10)**	**1440(21)**	**27.8(4)**
^{155}Gd	987.908(21)	144(40)	2.8(8)
^{157}Gd	998.398(9)	559(40)	10.8(8)
^{157}Gd	1000.859(10)	93(4)	1.79(8)
^{157}Gd	1004.058(9)	404(22)	7.8(4)
^{157}Gd	1007.340(20)	105(4)	2.02(8)
^{157}Gd	1010.19(3)	232(7)	4.47(13)
^{157}Gd	1034.45(4)	142(5)	2.74(10)
^{155}Gd	1040.430(12)	209(60)	4.0(12)
^{155}Gd	1065.136(12)	410(120)	7.9(23)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{155}Gd	1067.185(12)	160(50)	3.1(10)
^{155}Gd	1079.25(3)	87(30)	1.7(6)
^{157}Gd	1097.002(10)	662(15)	12.8(3)
^{157}Gd	**1107.612(9)**	**1830(40)**	**35.3(8)**
^{157}Gd	1116.624(12)	419(9)	8.07(17)
^{157}Gd	**1119.163(10)**	**1180(30)**	**22.7(6)**
^{157}Gd	1141.458(10)	530(30)	10.2(6)
^{157}Gd	1145.225(9)	82(9)	1.58(17)
^{155}Gd	1154.102(12)	290(170)	6(3)
^{155}Gd	1158.986(12)	490(150)	9(3)
^{155}Gd	1168.874(13)	140(40)	2.7(8)
^{155}Gd	1174.058(13)	110(30)	2.1(6)
^{157}Gd	1180.328(9)	223(21)	4.3(4)
^{155}Gd	1180.36(4)	189(60)	3.6(12)
^{157}Gd	**1183.968(10)**	**958(60)**	**18.5(12)**
^{157}Gd	**1185.988(9)**	**1600(90)**	**30.8(17)**
^{155}Gd	1187.120(21)	340(100)	6.6(19)
^{157}Gd	**1187.122(9)**	**1420(90)**	**27.4(17)**
^{157}Gd	1219.947(9)	242(12)	4.66(23)
^{155}Gd	1222.349(12)	139(40)	2.7(8)
^{155}Gd	1230.789(23)	390(120)	7.5(23)
^{157}Gd	1237.625(9)	208(9)	4.01(17)
^{155}Gd	1242.481(17)	204(60)	3.9(12)
^{155}Gd	1250.637(21)	113(30)	2.2(6)
^{157}Gd	1255.980(10)	109(4)	2.10(8)
^{157}Gd	1259.837(9)	417(10)	8.04(19)
^{157}Gd	1263.478(10)	641(15)	12.4(3)
^{155}Gd	1277.508(18)	180(50)	3.5(10)
^{157}Gd	1278.932(9)	228(12)	4.39(23)
^{157}Gd	1301.093(9)	213(6)	4.10(12)
^{157}Gd	1323.387(10)	641(16)	12.4(3)
^{157}Gd	1327.154(9)	294(9)	5.67(17)
^{155}Gd	1366.473(18)	97(30)	1.9(6)
^{157}Gd	1372.805(10)	195(15)	3.8(3)
^{157}Gd	1377.86(8)	87(5)	1.68(10)
^{157}Gd	1405.877(10)	101(4)	1.95(8)
^{157}Gd	1437.910(10)	276(10)	5.32(19)
^{155}Gd	1449.849(21)	106(30)	2.0(6)
^{157}Gd	1517.419(10)	219(18)	4.2(4)
^{157}Gd	1530.279(12)	107(8)	2.06(15)
^{157}Gd	1587.806(10)	105(4)	2.02(8)
^{157}Gd	1663.561(11)	105(8)	2.02(15)
^{155}Gd	1682.081(19)	108(30)	2.1(6)
^{157}Gd	1692.30(6)	88(13)	1.70(25)
^{157}Gd	1774.37(12)	122(40)	2.4(8)
^{157}Gd	1781.711(10)	91(22)	1.8(4)
^{157}Gd	1815.045(11)	92(20)	1.8(4)
^{157}Gd	1856.41(3)	147(50)	2.8(10)
^{157}Gd	1944.269(20)	181(24)	3.5(5)
^{157}Gd	1956.29(12)	175(21)	3.4(4)
^{155}Gd	1965.970(25)	80(25)	1.5(5)
^{157}Gd	2023.778(20)	114(30)	2.2(6)
^{157}Gd	2073.593(11)	84(7)	1.62(13)
^{157}Gd	2180.474(22)	159(50)	3.1(10)
^{157}Gd	2196.56(16)	120(12)	2.31(23)
^{157}Gd	2203.51(11)	151(10)	2.91(19)
^{157}Gd	2259.983(23)	92(6)	1.77(12)
^{157}Gd	2314.82(12)	142(6)	2.74(12)
^{157}Gd	2459.07(18)	75(6)	1.45(12)
^{157}Gd	2515.41(20)	88(6)	1.70(12)
^{157}Gd	2577.32(15)	100(6)	1.93(12)
^{157}Gd	2617.93(16)	100(6)	1.93(12)
^{157}Gd	2678.60(16)	101(20)	1.9(4)
^{157}Gd	2702.34(14)	116(5)	2.24(10)
^{157}Gd	2799.39(17)	87(7)	1.68(13)
^{157}Gd	3520.6(3)	83(9)	1.60(17)
^{157}Gd	3700.3(4)	99(17)	1.9(3)
^{157}Gd	3989.3(4)	103(22)	2.0(4)
^{157}Gd	4058.48(18)	74(5)	1.43(10)
^{157}Gd	4310.0(3)	76(5)	1.46(10)
^{157}Gd	4925.25(13)	235(8)	4.53(15)
^{157}Gd	5058.37(17)	105(5)	2.02(10)
^{157}Gd	5179.16(16)	110(6)	2.12(12)
^{157}Gd	5239.83(17)	83(10)	1.60(19)
^{157}Gd	5250.2(4)	103(17)	2.0(3)
^{157}Gd	5403.38(20)	120(5)	2.31(10)
^{157}Gd	5542.93(12)	112(5)	2.16(10)
^{157}Gd	5582.26(15)	155(6)	2.99(12)
^{157}Gd	5592.95(21)	91(4)	1.75(8)
^{157}Gd	5609.80(20)	75(4)	1.45(8)
^{157}Gd	5661.19(16)	124(5)	2.39(10)
^{157}Gd	5677.28(5)	138(15)	2.7(3)
^{157}Gd	5784.15(5)	105(5)	2.02(10)
^{157}Gd	5903.39(6)	457(14)	8.8(3)
^{157}Gd	6419.82(5)	131(6)	2.52(12)
^{157}Gd	6671.73(5)	83(4)	1.60(8)
^{157}Gd	**6750.11(5)**	**965(30)**	**18.6(6)**
Terbium (Z=65), *At.Wt.*=158.92534(2), σ_γ^z =23.3(4)			
^{159}Tb	15.413(6)	0.071(12)	0.00135(23)
^{159}Tb	**29.0170(20)**	**0.21(4)**	**0.0040(8)**
^{159}Tb	**32.652(3)**	**0.19(3)**	**0.0036(6)**
^{159}Tb	**33.1590(10)**	**0.22(4)**	**0.0042(8)**
^{159}Tb	**41.8900(10)**	**0.64(10)**	**0.0122(19)**
^{159}Tb	**50.8690(10)**	**0.60(15)**	**0.011(3)**
^{159}Tb	**54.1290(10)**	**0.60(15)**	**0.011(3)**
^{159}Tb	**59.6430(10)**	**0.48(6)**	**0.0092(11)**
^{159}Tb	62.374(6)	0.052(15)	0.0010(3)
^{159}Tb	**63.6860(10)**	**1.46(16)**	**0.028(3)**
^{159}Tb	**64.1100(20)**	**1.2(3)**	**0.023(6)**
^{159}Tb	64.8240(20)	0.13(4)	0.0025(8)
^{159}Tb	68.413(3)	0.035(14)	0.0007(3)
^{159}Tb	**75.0500(10)**	**1.78(18)**	**0.034(3)**
^{159}Tb	75.7880(10)	0.14(4)	0.0027(8)
^{159}Tb	78.137(7)	0.034(18)	0.0006(3)
^{159}Tb	**78.8670(10)**	**0.19(4)**	**0.0036(8)**
^{159}Tb	**79.099(6)**	**0.43(6)**	**0.0082(11)**
^{159}Tb	83.8940(20)	0.050(10)	0.00095(19)
^{159}Tb	87.7150(10)	0.160(19)	0.0031(4)
^{159}Tb	**89.4080(20)**	**0.21(3)**	**0.0040(6)**
^{159}Tb	92.7590(10)	0.052(16)	0.0010(3)
^{159}Tb	**93.3060(20)**	**0.218(25)**	**0.0042(5)**
^{159}Tb	94.0440(20)	0.052(14)	0.0010(3)
^{159}Tb	94.829(3)	0.071(11)	0.00135(21)
^{159}Tb	97.194(10)	0.024(8)	0.00046(15)
^{159}Tb	**97.503(3)**	**0.50(6)**	**0.0095(11)**
^{159}Tb	97.967(3)	0.077(19)	0.0015(4)
^{159}Tb	101.0660(20)	0.023(5)	0.00044(10)
^{159}Tb	104.0670(20)	0.15(3)	0.0029(6)
^{159}Tb	108.943(5)	0.026(5)	0.00050(10)
^{159}Tb	112.3730(20)	0.089(10)	0.00170(19)
^{159}Tb	117.950(4)	0.028(5)	0.00053(10)
^{159}Tb	131.058(5)	0.064(8)	0.00122(15)
^{159}Tb	**135.5970(20)**	**0.39(4)**	**0.0074(8)**
^{159}Tb	138.5840(10)	0.052(6)	0.00099(11)
^{159}Tb	140.784(6)	0.107(12)	0.00204(23)
^{159}Tb	150.603(3)	0.144(15)	0.0027(3)
^{159}Tb	**153.6870(20)**	**0.44(5)**	**0.0084(10)**
^{159}Tb	158.9430(20)	0.111(12)	0.00212(23)
^{159}Tb	163.2420(20)	0.105(11)	0.00200(21)
^{159}Tb	176.833(3)	0.070(9)	0.00133(17)
^{159}Tb	178.674(5)	0.049(8)	0.00093(15)
^{159}Tb	**178.881(3)**	**0.42(8)**	**0.0080(15)**
^{159}Tb	179.832(7)	0.023(4)	0.00044(8)
^{159}Tb	181.864(5)	0.072(13)	0.00137(25)
^{159}Tb	184.456(5)	0.11(3)	0.0021(6)
^{159}Tb	185.187(7)	0.094(17)	0.0018(3)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{159}Tb	**193.431(4)**	**0.37(4)**	**0.0071(8)**
^{159}Tb	209.738(6)	0.055(6)	0.00105(11)
^{159}Tb	215.026(6)	0.036(5)	0.00069(10)
^{159}Tb	221.029(6)	0.022(4)	0.00042(8)
^{159}Tb	228.252(11)	0.032(4)	0.00061(8)
^{159}Tb	234.724(7)	0.026(5)	0.00050(10)
^{159}Tb	236.094(6)	0.032(6)	0.00061(11)
^{159}Tb	238.653(7)	0.023(5)	0.00044(10)
^{159}Tb	241.809(5)	0.035(8)	0.00067(15)
^{159}Tb	242.548(5)	0.018(4)	0.00034(8)
^{159}Tb	**242.973(12)**	**0.219(24)**	**0.0042(5)**
^{159}Tb	243.277(6)	0.16(3)	0.0031(6)
^{159}Tb	**248.062(5)**	**0.30(3)**	**0.0057(6)**
^{159}Tb	255.038(6)	0.112(16)	0.0021(3)
^{159}Tb	255.927(6)	0.052(9)	0.00099(17)
^{159}Tb	257.541(4)	0.045(7)	0.00086(13)
^{159}Tb	258.565(9)	0.033(6)	0.00063(11)
^{159}Tb	262.964(11)	0.022(6)	0.00042(11)
^{159}Tb	264.989(5)	0.031(7)	0.00059(13)
^{159}Tb	270.762(7)	0.102(12)	0.00194(23)
^{159}Tb	274.385(11)	0.021(4)	0.00040(8)
^{159}Tb	275.707(5)	0.124(14)	0.0024(3)
^{159}Tb	277.818(6)	0.093(11)	0.00177(21)
^{159}Tb	278.152(7)	0.025(6)	0.00048(11)
^{159}Tb	278.803(7)	0.083(11)	0.00158(21)
^{159}Tb	282.698(5)	0.049(8)	0.00093(15)
^{159}Tb	283.289(7)	0.052(9)	0.00099(17)
^{159}Tb	284.148(9)	0.087(11)	0.00166(21)
^{159}Tb	287.738(9)	0.029(5)	0.00055(10)
^{159}Tb	288.212(5)	0.126(14)	0.0024(3)
^{159}Tb	290.625(10)	0.052(7)	0.00099(13)
^{159}Tb	295.757(9)	0.062(8)	0.00118(15)
^{159}Tb	302.735(13)	0.086(10)	0.00164(19)
^{159}Tb	303.114(10)	0.042(8)	0.00080(15)
^{159}Tb	308.102(9)	0.056(8)	0.00107(15)
^{159}Tb	310.470(5)	0.177(21)	0.0034(4)
^{159}Tb	310.804(6)	0.019(5)	0.00036(10)
^{159}Tb	315.857(5)	0.118(14)	0.0023(3)
^{159}Tb	316.564(9)	0.027(5)	0.00051(10)
^{159}Tb	317.597(5)	0.121(15)	0.0023(3)
^{159}Tb	319.862(6)	0.132(15)	0.0025(3)
^{159}Tb	323.809(6)	0.022(4)	0.00042(8)
^{159}Tb	**339.487(5)**	**0.35(4)**	**0.0067(8)**
^{159}Tb	339.821(6)	0.040(9)	0.00076(17)
^{159}Tb	340.780(6)	0.069(9)	0.00132(17)
^{159}Tb	341.731(6)	0.089(15)	0.0017(3)
^{159}Tb	345.581(8)	0.041(8)	0.00078(15)
^{159}Tb	347.032(6)	0.020(4)	0.00038(8)
^{159}Tb	348.924(13)	0.053(10)	0.00101(19)
^{159}Tb	351.095(9)	0.176(22)	0.0034(4)
^{159}Tb	352.027(10)	0.020(4)	0.00038(8)
^{159}Tb	352.514(6)	0.160(21)	0.0031(4)
^{159}Tb	356.224(10)	0.117(17)	0.0022(3)
^{159}Tb	**357.748(5)**	**0.26(3)**	**0.0050(6)**
^{159}Tb	359.960(10)	0.048(9)	0.00092(17)
^{159}Tb	361.680(14)	0.095(12)	0.00181(23)
^{159}Tb	363.821(6)	0.120(15)	0.0023(3)
^{159}Tb	370.320(7)	0.057(7)	0.00109(13)
^{159}Tb	372.980(6)	0.070(8)	0.00133(15)
^{159}Tb	373.055(12)	0.074(13)	0.00141(25)
^{159}Tb	374.678(6)	0.099(11)	0.00189(21)
^{159}Tb	376.515(9)	0.039(9)	0.00074(17)
^{159}Tb	378.740(8)	0.024(8)	0.00046(15)
^{159}Tb	398.252(14)	0.024(5)	0.00046(10)
^{159}Tb	399.512(9)	0.074(11)	0.00141(21)
^{159}Tb	403.800(13)	0.028(6)	0.00053(11)
^{159}Tb	406.214(12)	0.027(6)	0.00051(11)
^{159}Tb	413.492(9)	0.066(12)	0.00126(23)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{159}Tb	414.870(6)	0.132(24)	0.0025(5)
^{159}Tb	420.630(8)	0.092(12)	0.00175(23)
^{159}Tb	427.158(9)	0.147(17)	0.0028(3)
^{159}Tb	430.905(14)	0.023(4)	0.00044(8)
^{159}Tb	432.079(13)	0.021(8)	0.00040(15)
^{159}Tb	437.445(9)	0.077(16)	0.0015(3)
^{159}Tb	442.212(14)	0.077(12)	0.00147(23)
^{159}Tb	447.390(9)	0.10(3)	0.0019(6)
^{159}Tb	448.105(12)	0.054(10)	0.00103(19)
^{159}Tb	**451.617(10)**	**0.21(3)**	**0.0040(6)**
^{159}Tb	453.266(10)	0.033(12)	0.00063(23)
^{159}Tb	455.783(10)	0.029(12)	0.00055(23)
^{159}Tb	459.519(10)	0.085(12)	0.00162(23)
^{159}Tb	**464.264(17)**	**0.192(21)**	**0.0037(4)**
^{159}Tb	492.460(13)	0.024(6)	0.00046(11)
^{159}Tb	496.916(17)	0.041(9)	0.00078(17)
^{159}Tb	519.790(14)	0.059(13)	0.00113(25)
^{159}Tb	521.308(21)	0.046(12)	0.00088(23)
^{159}Tb	525.194(17)	0.080(17)	0.0015(3)
^{159}Tb	**525.933(17)**	**0.22(3)**	**0.0042(6)**
^{159}Tb	529.054(10)	0.022(8)	0.00042(15)
^{159}Tb	530.981(24)	0.037(10)	0.00071(19)
^{159}Tb	532.689(21)	0.129(16)	0.0025(3)
^{159}Tb	532.733(9)	0.15(3)	0.0029(6)
^{159}Tb	542.840(21)	0.034(8)	0.00065(15)
^{159}Tb	544.922(10)	0.064(10)	0.00122(19)
^{159}Tb	545.661(10)	0.056(11)	0.00107(21)
^{159}Tb	554.509(6)	0.021(7)	0.00040(13)
^{159}Tb	585.575(17)	0.054(8)	0.00103(15)
^{159}Tb	598.656(14)	0.020(6)	0.00038(11)
^{159}Tb	600.206(24)	0.155(18)	0.0030(3)
^{159}Tb	611.513(24)	0.034(9)	0.00065(17)
^{159}Tb	625.994(21)	0.027(7)	0.00051(13)
^{159}Tb	634.737(24)	0.037(7)	0.00071(13)
^{159}Tb	5184.2(3)	0.023(9)	0.00044(17)
^{159}Tb	5199.9(3)	0.033(8)	0.00063(15)
^{159}Tb	5204.5(3)	0.040(9)	0.00076(17)
^{159}Tb	5225.0(3)	0.040(13)	0.00076(25)
^{159}Tb	5228.45(25)	0.052(12)	0.00099(23)
^{159}Tb	5238.1(3)	0.026(10)	0.00050(19)
^{159}Tb	5245.6(3)	0.061(13)	0.00116(25)
^{159}Tb	5250.2(3)	0.064(12)	0.00122(23)
^{159}Tb	5259.2(3)	0.022(5)	0.00042(10)
^{159}Tb	5288.99(25)	0.027(7)	0.00051(13)
^{159}Tb	5306.9(3)	0.021(6)	0.00040(11)
^{159}Tb	5373.1(4)	0.024(5)	0.00046(10)
^{159}Tb	5461.09(25)	0.029(7)	0.00055(13)
^{159}Tb	5516.2(5)	0.019(7)	0.00036(13)
^{159}Tb	5524.2(3)	0.051(13)	0.00097(25)
^{159}Tb	5551.8(3)	0.029(5)	0.00055(10)
^{159}Tb	5607.07(7)	0.042(9)	0.00080(17)
^{159}Tb	5611.6(3)	0.025(5)	0.00048(10)
^{159}Tb	5661.8(5)	0.037(7)	0.00071(13)
^{159}Tb	5682.5(3)	0.027(7)	0.00051(13)
^{159}Tb	5696.8(3)	0.034(6)	0.00065(11)
^{159}Tb	5710.36(7)	0.029(5)	0.00055(10)
^{159}Tb	5754.34(21)	0.031(8)	0.00059(15)
^{159}Tb	5776.37(7)	0.120(17)	0.0023(3)
^{159}Tb	5782.28(7)	0.041(9)	0.00078(17)
^{159}Tb	5842.29(7)	0.054(10)	0.00103(19)
^{159}Tb	5860.03(23)	0.036(8)	0.00069(15)
^{159}Tb	5890.70(7)	0.137(19)	0.0026(4)
^{159}Tb	5896.46(7)	0.023(7)	0.00044(13)
^{159}Tb	5953.58(7)	0.103(13)	0.00196(25)
^{159}Tb	5993.73(7)	0.114(15)	0.0022(3)
^{159}Tb	6138.03(7)	0.110(15)	0.0021(3)
^{159}Tb	**6218.56(7)**	**0.190(22)**	**0.0036(4)**
^{159}Tb	6235.53(7)	0.020(6)	0.00038(11)

^{A}Z	E_{γ}-keV	$\sigma_{\gamma}^{Z}(E_{\gamma})$-barns	k_0
^{159}Tb	6241.78(7)	0.072(10)	0.00137(19)
^{159}Tb	6269.43(7)	0.029(6)	0.00055(11)
^{159}Tb	6311.32(7)	0.028(6)	0.00053(11)
Dysprosium (Z=66), *At.Wt.*=162.50(3), σ_{γ}^{z} =944(21)			
^{164}Dy	**50.4310(20)**	**33.9(15)**	**0.63(3)**
^{164}Dy	72.765(3)	7.1(3)	0.132(6)
^{163}Dy	73.392(8)	1.70(24)	0.032(5)
^{164}Dy	77.520(3)	2.7(5)	0.050(9)
^{161}Dy	**80.64(7)**	**16.5(5)**	**0.308(9)**
^{164}Dy	83.395(3)	3.51(20)	0.065(4)
^{164}Dy	108.159(3)d	13.6(5)	0.254[97%]
^{164}Dy	116.768(4)	3.28(17)	0.061(3)
^{164}Dy	139.102(4)	6.16(19)	0.115(4)
^{164}Dy	156.245(5)	1.82(10)	0.0339(19)
^{163}Dy	168.838(5)	4.7(6)	0.088(11)
^{164}Dy	178.382(5)	1.8(3)	0.034(6)
^{164}Dy	**184.257(4)**	**146(15)**	**2.7(3)**
^{161}Dy	**185.19(9)**	**39.1(12)**	**0.729(22)**
^{163}Dy	215.082(21)	3.07(17)	0.057(3)
^{162}Dy	250.8900(20)	5.2(6)	0.097(11)
^{161}Dy	260.11(7)	8.3(3)	0.155(6)
^{164}Dy	271.727(9)	2.90(17)	0.054(3)
^{163}Dy	277.500(16)	1.51(16)	0.028(3)
^{161}Dy	282.89(7)	7.8(3)	0.145(6)
^{163}Dy	294.575(13)	2.78(19)	0.052(4)
^{161}Dy	311.39(15)	2.1(4)	0.039(8)
^{162}Dy	316.3090(10)	3.0(4)	0.056(8)
^{161}Dy	321.84(12)	1.74(25)	0.032(5)
^{164}Dy	331.126(8)	4.5(4)	0.084(8)
^{161}Dy	334.08(8)	4.9(4)	0.091(8)
^{162}Dy	338.5310(20)	1.50(17)	0.028(3)
^{164}Dy	343.312(4)	3.2(4)	0.060(8)
^{164}Dy	345.860(12)	1.8(3)	0.034(6)
^{162}Dy	347.9050(20)	1.84(22)	0.034(4)
^{164}Dy	**349.248(10)**	**14.7(6)**	**0.274(11)**
^{162}Dy	351.1490(10)	10.9(9)	0.203(17)
^{164}Dy	352.581(10)	1.7(4)	0.032(8)
^{162}Dy	354.2360(10)	3.5(21)	0.07(4)
^{164}Dy	354.353(8)	3.3(10)	0.062(19)
^{164}Dy	357.686(8)	2.4(4)	0.045(8)
^{161}Dy	361.70(10)	4.1(4)	0.076(8)
^{164}Dy	368.727(8)	1.6(3)	0.030(6)
^{164}Dy	380.020(8)	4.1(4)	0.076(8)
^{164}Dy	**385.9840(20)**	**34.8(10)**	**0.649(19)**
^{162}Dy	389.7530(10)	7.7(7)	0.144(13)
^{164}Dy	392.651(7)	11.3(5)	0.211(9)
^{164}Dy	396.208(4)	2.4(9)	0.045(17)
^{164}Dy	399.726(6)	2.0(4)	0.037(8)
^{162}Dy	401.9440(10)	1.62(19)	0.030(4)
^{164}Dy	403.059(6)	3.5(4)	0.065(8)
^{164}Dy	**411.651(5)**	**35.1(10)**	**0.655(19)**
^{164}Dy	**414.985(7)**	**31(5)**	**0.58(9)**
^{162}Dy	415.0610(20)	1.57(19)	0.029(4)
^{164}Dy	420.833(3)	11.8(11)	0.220(21)
^{162}Dy	421.8440(10)	7.1(9)	0.132(17)
^{164}Dy	425.346(10)	2.4(7)	0.045(13)
^{161}Dy	427.57(13)	1.66(25)	0.031(5)
^{162}Dy	427.6800(10)	1.86(22)	0.035(4)
^{164}Dy	430.451(8)	4.2(3)	0.078(6)
^{164}Dy	**447.893(7)**	**17.4(5)**	**0.324(9)**
^{164}Dy	**465.416(6)**	**38.0(10)**	**0.709(19)**
^{164}Dy	470.227(7)	9.3(6)	0.173(11)
^{164}Dy	474.22(7)	6.4(4)	0.119(8)
^{164}Dy	474.95(4)	3.3(10)	0.062(19)
^{162}Dy	475.3880(10)	1.71(21)	0.032(4)
^{164}Dy	**477.061(6)**	**22(7)**	**0.41(13)**
^{164}Dy	**477.08(4)**	**15.8(5)**	**0.295(9)**
^{164}Dy	**496.931(5)**	**44.9(11)**	**0.837(21)**
^{164}Dy	499.395(6)	13.0(10)	0.242(19)
^{164}Dy	500.37(8)	10.3(5)	0.192(9)
^{164}Dy	500.587(6)	10(3)	0.19(6)
^{164}Dy	506.47(4)	6.4(4)	0.119(8)
^{164}Dy	508.96(4)	9.5(6)	0.177(11)
^{164}Dy	519.05(7)	1.5(3)	0.028(6)
^{164}Dy	524.41(6)	4.7(5)	0.088(9)
^{164}Dy	529.46(7)	3.0(10)	0.056(19)
^{164}Dy	529.54(8)	2.5(4)	0.047(8)
^{164}Dy	**538.609(8)**	**69.2(19)**	**1.29(4)**
^{164}Dy	546.54(4)	3.7(4)	0.069(8)
^{164}Dy	556.932(7)	2.2(4)	0.041(8)
^{164}Dy	565.567(4)	5.1(5)	0.095(9)
^{164}Dy	569.53(7)	8.3(25)	0.15(5)
^{164}Dy	569.79(6)	9.7(5)	0.181(9)
^{161}Dy	572.7(4)	2.2(9)	0.041(17)
^{161}Dy	572.88(7)	1.65(12)	0.0308(22)
^{164}Dy	**583.982(5)**	**24(7)**	**0.45(13)**
^{164}Dy	596.71(4)	5.1(3)	0.095(6)
^{164}Dy	613.13(9)	2.5(3)	0.047(6)
^{161}Dy	647.50(12)	3.11(21)	0.058(4)
^{163}Dy	673.71(4)	1.7(4)	0.032(8)
^{163}Dy	688.36(4)	4.7(4)	0.088(8)
^{161}Dy	697.16(9)	3.3(3)	0.062(6)
^{161}Dy	711.41(12)	2.28(22)	0.043(4)
^{163}Dy	754.75(4)	6.4(4)	0.119(8)
^{163}Dy	761.76(4)	4.1(3)	0.076(6)
^{161}Dy	795.27(8)	6.8(4)	0.127(8)
^{161}Dy	807.46(7)	12.1(5)	0.226(9)
^{161}Dy	842.48(22)	1.6(4)	0.030(8)
^{161}Dy	842.5(4)	1.48(25)	0.028(5)
^{161}Dy	**882.27(6)**	**18.3(6)**	**0.341(11)**
^{161}Dy	888.13(7)	10.4(5)	0.194(9)
^{161}Dy	917.16(10)	5.4(5)	0.101(9)
^{164}Dy	922.11(7)	1.6(6)	0.030(11)
^{161}Dy	933.70(23)	3.1(7)	0.058(13)
^{164}Dy	933.94(8)	4.6(7)	0.086(13)
^{161}Dy	944.40(7)	7.2(3)	0.134(6)
^{161}Dy	976.83(13)	3.4(3)	0.063(6)
^{161}Dy	979.98(9)	8.5(4)	0.159(8)
^{161}Dy	994.64(7)	9.2(4)	0.172(8)
^{164}Dy	994.87(7)	5.6(17)	0.10(3)
^{161}Dy	1008.42(22)	2.0(3)	0.037(6)
^{164}Dy	1018.35(8)	3.7(12)	0.069(22)
^{161}Dy	1025.5(3)	1.7(4)	0.032(8)
^{161}Dy	1058.41(9)	5.9(4)	0.110(8)
^{164}Dy	1059.63(9)	2.2(7)	0.041(13)
^{164}Dy	1064.18(9)	2.2(6)	0.041(11)
^{164}Dy	1074.59(9)	4.5(14)	0.08(3)
^{161}Dy	1091.99(13)	2.7(4)	0.050(8)
^{161}Dy	1108.53(10)	5.1(4)	0.095(8)
^{164}Dy	1110.06(9)	2.6(7)	0.048(13)
^{161}Dy	1124.81(9)	4.0(3)	0.075(6)
^{161}Dy	1129.40(9)	5.7(4)	0.106(8)
^{161}Dy	1158.2(3)	2.1(4)	0.039(8)
^{161}Dy	1185.0(3)	1.5(4)	0.028(8)
^{161}Dy	1187.7(3)	1.6(4)	0.030(8)
^{161}Dy	1195.37(12)	3.6(4)	0.067(8)
^{161}Dy	1219.6(3)	2.7(10)	0.050(19)
^{164}Dy	1260.19(13)	2.0(6)	0.037(11)
^{161}Dy	1260.66(21)	3.2(5)	0.060(9)
^{161}Dy	1276.3(6)	1.9(4)	0.035(8)
^{161}Dy	1276.78(12)	6.3(6)	0.117(11)
^{161}Dy	1308.5(3)	1.7(4)	0.032(8)
^{161}Dy	1316.7(5)	1.5(4)	0.028(8)
^{161}Dy	1371.4(3)	2.4(4)	0.045(8)
^{164}Dy	1410.99(8)	4.6(5)	0.086(9)
^{164}Dy	1433.33(8)	1.9(4)	0.035(8)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{164}Dy	1483.76(8)	3.6(4)	0.067(8)
^{161}Dy	1573.95(23)	1.7(3)	0.032(6)
^{164}Dy	1596.37(15)	2.5(4)	0.047(8)
^{164}Dy	1604.4(3)	1.7(4)	0.032(8)
^{164}Dy	1616.1(3)	1.5(4)	0.028(8)
^{164}Dy	1646.80(15)	2.2(3)	0.041(6)
^{164}Dy	1671.84(13)	3.6(5)	0.067(9)
^{161}Dy	1717.18(13)	3.0(4)	0.056(8)
^{164}Dy	1722.27(13)	3.2(4)	0.060(8)
^{164}Dy	1737.35(15)	3.8(4)	0.071(8)
^{161}Dy	1781.5(3)	3.5(6)	0.065(11)
^{164}Dy	1806.00(25)	2.4(5)	0.045(9)
^{161}Dy	1823.7(7)	1.9(5)	0.035(9)
^{164}Dy	1835.40(18)	3.2(6)	0.060(11)
^{164}Dy	1866.28(13)	2.6(4)	0.048(8)
^{164}Dy	2019.4(3)	2.5(5)	0.047(9)
^{164}Dy	2091.58(11)	2.6(5)	0.048(9)
^{161}Dy	2110.01(16)	3.6(4)	0.067(8)
^{164}Dy	2113.91(11)	4.0(4)	0.075(8)
^{164}Dy	2164.34(11)	3.1(4)	0.058(8)
^{164}Dy	2226.92(19)	2.7(5)	0.050(9)
^{164}Dy	2242.3(3)	3.3(5)	0.062(9)
^{164}Dy	2259.3(3)	2.8(5)	0.052(9)
^{164}Dy	2272.0(6)	3.6(7)	0.067(13)
^{164}Dy	2305.5(3)	2.2(5)	0.041(9)
^{164}Dy	2313.8(4)	7.2(6)	0.134(11)
^{164}Dy	2369.89(24)	4.2(6)	0.078(11)
^{164}Dy	2412.2(4)	2.6(6)	0.048(11)
^{164}Dy	2552.64(19)	5.3(6)	0.099(11)
^{164}Dy	2593.02(19)	3.0(5)	0.056(9)
^{164}Dy	2606.94(19)	4.1(5)	0.076(9)
^{164}Dy	2635.0(3)	3.0(5)	0.056(9)
^{162}Dy	2660.1(4)	6.6(11)	0.123(21)
^{164}Dy	2683.54(24)	2.4(5)	0.045(9)
^{164}Dy	2702.83(21)	6.9(22)	0.13(4)
^{164}Dy	2823.8(4)	1.7(5)	0.032(9)
^{164}Dy	2832.15(21)	1.9(5)	0.035(9)
^{164}Dy	2840.1(3)	3.8(5)	0.071(9)
^{164}Dy	2854.48(21)	4.0(5)	0.075(9)
^{164}Dy	2863.5(4)	5.1(5)	0.095(9)
^{164}Dy	2872.20(21)	4.5(5)	0.084(9)
^{164}Dy	2931.8(3)	2.7(5)	0.050(9)
^{164}Dy	2950.37(19)	4.5(5)	0.084(9)
^{164}Dy	2999.9(4)	1.7(4)	0.032(8)
^{164}Dy	3012.42(17)	7.8(5)	0.145(9)
^{164}Dy	3035.55(15)	10.9(6)	0.203(11)
^{164}Dy	3071.02(24)	3.8(5)	0.071(9)
^{164}Dy	3098.52(24)	2.1(4)	0.039(8)
^{164}Dy	3105.83(21)	5.8(5)	0.108(9)
^{164}Dy	3114.06(19)	7.4(6)	0.138(11)
^{164}Dy	3169.10(24)	3.3(4)	0.062(8)
^{164}Dy	3198.3(3)	1.6(3)	0.030(6)
^{164}Dy	3238.1(3)	4.7(5)	0.088(9)
^{164}Dy	3276.05(13)	6.1(5)	0.114(9)
^{164}Dy	3315.0(3)	3.0(4)	0.056(8)
^{164}Dy	3443.39(11)	10.6(16)	0.20(3)
^{164}Dy	3537.9(3)	3.2(5)	0.060(9)
^{164}Dy	3555.71(20)	4.7(5)	0.088(9)
^{164}Dy	3608.5(4)	3.1(4)	0.058(8)
^{164}Dy	3628.2(3)	1.9(4)	0.035(8)
^{164}Dy	3772.33(18)	3.1(4)	0.058(8)
^{164}Dy	3819.95(15)	2.7(5)	0.050(9)
^{164}Dy	3840.49(24)	4.9(6)	0.091(11)
^{164}Dy	3885.46(13)	5.2(4)	0.097(8)
^{164}Dy	3944.8(3)	2.2(3)	0.041(6)
^{164}Dy	3960.93(15)	4.7(4)	0.088(8)
^{164}Dy	4067.73(9)	2.5(4)	0.047(8)
^{164}Dy	4083.81(14)	4.3(4)	0.080(8)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{164}Dy	4123.97(8)	13.1(9)	0.244(17)
^{164}Dy	4155.82(8)	2.1(3)	0.039(6)
^{164}Dy	4459.45(8)	1.6(3)	0.030(6)
^{164}Dy	4607.48(6)	1.9(4)	0.035(8)
^{164}Dy	4612.84(7)	5.7(5)	0.106(9)
^{164}Dy	4635.84(5)	2.6(4)	0.048(8)
^{164}Dy	5110.77(3)	6.1(9)	0.114(17)
^{164}Dy	**5142.29(3)**	**15.7(10)**	**0.293(19)**
^{164}Dy	5145.62(3)	8.4(24)	0.16(5)
^{164}Dy	5177.25(3)	6.6(5)	0.123(9)
^{161}Dy	5450.27(25)	2.1(4)	0.039(8)
^{164}Dy	**5557.26(3)**	**28.7(14)**	**0.54(3)**
^{164}Dy	**5607.69(3)**	**35.9(16)**	**0.67(3)**
^{160}Dy	6087.25(13)	0.85(5)	0.0159(9)
Holmium (Z=67), *At.Wt.*=164.93032(2), σ_γ^z=64.7(12)			
^{165}Ho	19.8290(20)	0.57(8)	0.0105(15)
^{165}Ho	38.494(5)	0.179(20)	0.0033(4)
^{165}Ho	54.2400(10)	1.41(4)	0.0259(7)
^{165}Ho	57.521(6)	0.17(3)	0.0031(6)
^{165}Ho	69.7610(10)	1.09(6)	0.0200(11)
^{165}Ho	72.8870(10)	0.17(3)	0.0031(6)
^{165}Ho	76.4670(10)	0.179(20)	0.0033(4)
^{165}Ho	76.7270(10)	0.33(3)	0.0061(6)
^{165}Ho	**80.574(8)d**	**3.87(5)**	**0.0711[1.3%]**
^{165}Ho	82.4710(20)	0.42(3)	0.0077(6)
^{165}Ho	87.5950(20)	0.71(4)	0.0130(7)
^{165}Ho	94.628(6)	0.156(23)	0.0029(4)
^{165}Ho	98.8590(10)	0.270(17)	0.0050(3)
^{165}Ho	105.516(3)	0.234(16)	0.0043(3)
^{165}Ho	108.2000(20)	0.40(3)	0.0073(6)
^{165}Ho	111.3260(20)	0.294(20)	0.0054(4)
^{165}Ho	**116.8360(10)**	**8.1(4)**	**0.149(7)**
^{165}Ho	126.230(3)	0.55(4)	0.0101(7)
^{165}Ho	**136.6650(20)**	**14.5(7)**	**0.266(13)**
^{165}Ho	140.122(5)	0.27(3)	0.0050(6)
^{165}Ho	**149.309(3)**	**2.25(12)**	**0.0413(22)**
^{165}Ho	163.353(7)	0.223(15)	0.0041(3)
^{165}Ho	167.453(5)	0.55(3)	0.0101(6)
^{165}Ho	169.715(5)	0.150(14)	0.0028(3)
^{165}Ho	179.036(5)	0.220(16)	0.0040(3)
^{165}Ho	181.0870(20)	0.94(5)	0.0173(9)
^{165}Ho	186.579(4)	0.197(22)	0.0036(4)
^{165}Ho	197.342(3)	0.34(3)	0.0062(6)
^{165}Ho	199.700(5)	0.48(3)	0.0088(6)
^{165}Ho	210.309(4)	0.180(15)	0.0033(3)
^{165}Ho	**221.186(4)**	**2.05(11)**	**0.0377(20)**
^{165}Ho	231.960(7)	0.23(5)	0.0042(9)
^{165}Ho	233.116(8)	0.38(4)	0.0070(7)
^{165}Ho	**239.132(4)**	**2.25(12)**	**0.0413(22)**
^{165}Ho	245.010(5)	0.47(5)	0.0086(9)
^{165}Ho	257.806(11)	0.18(4)	0.0033(7)
^{165}Ho	265.983(10)	0.170(14)	0.0031(3)
^{165}Ho	267.241(6)	0.199(15)	0.0037(3)
^{165}Ho	289.124(14)	1.16(6)	0.0213(11)
^{165}Ho	290.617(7)	0.96(5)	0.0176(9)
^{165}Ho	297.905(4)	0.188(14)	0.0035(3)
^{165}Ho	304.617(6)	1.34(7)	0.0246(13)
^{165}Ho	328.239(10)	0.391(23)	0.0072(4)
^{165}Ho	333.614(5)	1.04(6)	0.0191(11)
^{165}Ho	335.585(6)	0.33(7)	0.0061(13)
^{165}Ho	343.540(6)	0.203(13)	0.00373(24)
^{165}Ho	357.056(5)	0.162(12)	0.00298(22)
^{165}Ho	**371.772(5)**	**1.56(8)**	**0.0287(15)**
^{165}Ho	391.819(7)	0.51(5)	0.0094(9)
^{165}Ho	401.595(8)	1.07(9)	0.0197(17)
^{165}Ho	410.265(6)	1.23(7)	0.0226(13)
^{165}Ho	411.087(12)	0.40(12)	0.0073(22)
^{165}Ho	412.030(8)	0.32(7)	0.0059(13)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{165}Ho	416.550(5)	0.42(4)	0.0077(7)
^{165}Ho	425.300(21)	0.69(17)	0.013(3)
^{165}Ho	**426.012(5)**	**2.88(15)**	**0.053(3)**
^{165}Ho	427.196(6)	0.21(5)	0.0039(9)
^{165}Ho	442.231(21)	0.22(3)	0.0040(6)
^{165}Ho	443.148(8)	0.164(12)	0.00301(22)
^{165}Ho	455.567(11)	0.78(4)	0.0143(7)
^{165}Ho	457.349(11)	0.213(17)	0.0039(3)
^{165}Ho	463.927(6)	0.245(18)	0.0045(3)
^{165}Ho	467.227(5)	0.162(17)	0.0030(3)
^{165}Ho	481.354(18)	0.45(7)	0.0083(13)
^{165}Ho	487.538(6)	0.394(24)	0.0072(4)
^{165}Ho	489.436(4)	1.15(6)	0.0211(11)
^{165}Ho	496.932(6)	0.16(3)	0.0029(6)
^{165}Ho	509.094(24)	0.332(22)	0.0061(4)
^{165}Ho	512.770(6)	0.323(22)	0.0059(4)
^{165}Ho	524.250(22)	0.260(17)	0.0048(3)
^{165}Ho	533.644(21)	0.303(20)	0.0056(4)
^{165}Ho	534.572(11)	0.16(3)	0.0029(6)
^{165}Ho	538.259(8)	0.152(21)	0.0028(4)
^{165}Ho	**542.780(4)**	**1.94(13)**	**0.0356(24)**
^{165}Ho	543.676(5)	1.00(5)	0.0184(9)
^{165}Ho	554.400(11)	0.32(7)	0.0059(13)
^{165}Ho	576.902(16)	0.203(17)	0.0037(3)
^{165}Ho	577.141(11)	0.37(6)	0.0068(11)
^{165}Ho	613.768(6)	0.332(22)	0.0061(4)
^{165}Ho	624.234(8)	0.212(16)	0.0039(3)
^{165}Ho	633.641(8)	0.36(3)	0.0066(6)
^{165}Ho	689.72(3)	0.44(3)	0.0081(6)
^{165}Ho	734.258(16)	0.253(18)	0.0046(3)
^{165}Ho	4855.89(3)	0.146(18)	0.0027(3)
^{165}Ho	4945.18(5)	0.214(19)	0.0039(4)
^{165}Ho	5108.66(7)	0.33(3)	0.0061(6)
^{165}Ho	5128.946(13)	0.171(17)	0.0031(3)
^{165}Ho	5181.841(20)	0.253(20)	0.0046(4)
^{165}Ho	5213.240(21)	0.260(24)	0.0048(4)
^{165}Ho	5428.441(9)	0.223(23)	0.0041(4)
^{165}Ho	5524.219(11)	0.192(20)	0.0035(4)
^{165}Ho	5813.531(7)	0.54(4)	0.0099(7)
^{165}Ho	5870.477(9)	0.224(20)	0.0041(4)
^{165}Ho	5871.573(6)	0.196(18)	0.0036(3)
^{165}Ho	6052.654(6)	0.188(19)	0.0035(4)
Erbium (Z=68), *At.Wt.*=167.259(3), σ_γ^z =156.8(19)			
^{162}Er	69.4(6)	0.35(14)	0.0063(25)
^{167}Er	**79.8040(10)**	**18.2(8)**	**0.330(14)**
^{167}Er	98.9850(10)	3.73(14)	0.0676(25)
^{167}Er	99.2910(10)	2.2(3)	0.040(5)
^{167}Er	**184.2850(10)**	**56(5)**	**1.01(9)**
^{170}Er	198.0(6)	0.36(9)	0.0065(16)
^{167}Er	**198.2440(10)**	**29.9(16)**	**0.54(3)**
^{166}Er	207.801(3)d	2.15(8)	0.0390[100%]
^{167}Er	217.4220(10)	2.66(10)	0.0482(18)
^{167}Er	255.9310(10)	0.76(3)	0.0138(5)
^{167}Er	**284.6560(20)**	**13.7(12)**	**0.248(22)**
^{166}Er	346.553(10)	0.83(4)	0.0150(7)
^{167}Er	396.5320(10)	0.69(4)	0.0125(7)
^{167}Er	422.3180(10)	1.56(6)	0.0283(11)
^{167}Er	447.5170(20)	3.07(11)	0.0556(20)
^{167}Er	457.6660(20)	0.80(4)	0.0145(7)
^{167}Er	527.8840(10)	0.88(5)	0.0159(9)
^{166}Er	531.46(3)	0.92(7)	0.0167(13)
^{167}Er	543.6620(20)	2.01(9)	0.0364(16)
^{167}Er	546.9600(20)	1.02(5)	0.0185(9)
^{167}Er	559.5080(20)	2.36(10)	0.0428(18)
^{167}Er	568.8260(20)	1.20(6)	0.0217(11)
^{167}Er	601.6060(20)	0.70(4)	0.0127(7)
^{167}Er	**631.7050(20)**	**7.9(3)**	**0.143(5)**
^{167}Er	638.711(3)	1.04(6)	0.0188(11)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{167}Er	645.7600(20)	0.96(5)	0.0174(9)
^{167}Er	673.655(3)	0.56(3)	0.0101(5)
^{167}Er	713.2440(10)	0.69(5)	0.0125(9)
^{167}Er	715.1610(20)	1.92(8)	0.0348(14)
^{167}Er	719.5460(20)	1.09(20)	0.020(4)
^{167}Er	720.3850(20)	1.54(16)	0.028(3)
^{167}Er	**730.6580(10)**	**11.6(4)**	**0.210(7)**
^{167}Er	737.664(3)	1.20(6)	0.0217(11)
^{167}Er	**741.3650(20)**	**6.72(24)**	**0.122(4)**
^{167}Er	748.280(3)	1.35(7)	0.0245(13)
^{167}Er	790.0140(20)	0.68(4)	0.0123(7)
^{167}Er	798.8940(20)	2.18(9)	0.0395(16)
^{167}Er	808.927(3)	0.81(10)	0.0147(18)
^{167}Er	811.0500(20)	1.72(22)	0.031(4)
^{167}Er	812.289(3)	1.4(3)	0.025(5)
^{167}Er	**815.9890(20)**	**42.5(15)**	**0.77(3)**
^{167}Er	**821.1680(20)**	**6.2(3)**	**0.112(5)**
^{167}Er	823.3810(20)	1.34(10)	0.0243(18)
^{167}Er	825.727(3)	0.89(9)	0.0161(16)
^{167}Er	829.9480(10)	4.12(19)	0.075(3)
^{167}Er	**853.4810(10)**	**7.5(3)**	**0.136(5)**
^{167}Er	862.3500(20)	1.16(6)	0.0210(11)
^{167}Er	**914.9420(10)**	**6.99(24)**	**0.127(4)**
^{167}Er	928.9330(20)	1.55(8)	0.0281(14)
^{167}Er	932.2660(20)	0.83(5)	0.0150(9)
^{167}Er	965.9330(20)	0.83(5)	0.0150(9)
^{167}Er	999.8150(20)	0.99(6)	0.0179(11)
^{167}Er	1012.1810(20)	1.42(7)	0.0257(13)
^{167}Er	1025.368(4)	0.97(6)	0.0176(11)
^{167}Er	1144.133(3)	0.58(5)	0.0105(9)
^{167}Er	1147.0040(20)	0.92(6)	0.0167(11)
^{167}Er	1167.373(4)	1.98(8)	0.0359(14)
^{167}Er	1173.577(4)	0.71(5)	0.0129(9)
^{167}Er	1196.4640(20)	0.82(5)	0.0149(9)
^{167}Er	1229.045(4)	0.63(5)	0.0114(9)
^{167}Er	1274.530(6)	0.69(10)	0.0125(18)
^{167}Er	1276.2680(20)	0.73(11)	0.0132(20)
^{167}Er	1277.6150(20)	2.82(16)	0.051(3)
^{167}Er	1279.088(6)	0.97(13)	0.0176(24)
^{167}Er	1310.022(3)	1.65(8)	0.0299(14)
^{167}Er	1323.9270(20)	1.69(8)	0.0306(14)
^{167}Er	1331.2870(20)	1.36(7)	0.0246(13)
^{167}Er	1351.656(4)	1.94(9)	0.0351(16)
^{167}Er	1353.805(6)	0.56(5)	0.0101(9)
^{167}Er	1355.1(3)	0.94(12)	0.0170(22)
^{167}Er	1392.181(4)	1.27(6)	0.0230(11)
^{167}Er	1515.93(4)	0.57(5)	0.0103(9)
^{167}Er	1515.948(20)	0.72(12)	0.0130(22)
^{167}Er	1581.18(6)	0.57(6)	0.0103(11)
^{167}Er	1649.803(7)	0.58(6)	0.0105(11)
^{167}Er	1767.00(3)	0.91(7)	0.0165(13)
^{167}Er	1834.085(7)	1.45(9)	0.0263(16)
^{167}Er	1835.690(4)	0.65(6)	0.0118(11)
^{167}Er	1942.513(6)	0.88(7)	0.0159(13)
^{167}Er	2046.97(3)	0.56(6)	0.0101(11)
^{167}Er	2522.76(6)	0.59(9)	0.0107(16)
^{167}Er	4628.7(3)	1.02(21)	0.018(4)
^{167}Er	4643.4(3)	1.7(4)	0.031(7)
^{167}Er	4647.4(3)	0.87(18)	0.016(3)
^{167}Er	4653.2(3)	1.18(24)	0.021(4)
^{167}Er	4671.4(3)	0.95(20)	0.017(4)
^{167}Er	4715.4(3)	0.98(20)	0.018(4)
^{167}Er	4745.4(3)	1.3(3)	0.024(5)
^{167}Er	4752.2(3)	0.58(12)	0.0105(22)
^{167}Er	4759.5(3)	0.74(15)	0.013(3)
^{167}Er	4800.76(7)	1.4(4)	0.025(7)
^{168}Er	4908.73(17)	0.41(14)	0.0074(25)
^{167}Er	4921.42(22)	0.61(6)	0.0111(11)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{167}Er	5001.79(6)	0.88(25)	0.016(5)
^{167}Er	5031.73(19)	0.84(24)	0.015(4)
^{167}Er	5114.2(3)	1.02(24)	0.018(4)
^{167}Er	5169.82(18)	0.56(5)	0.0101(9)
^{167}Er	5200.0(3)	0.67(16)	0.012(3)
^{167}Er	5213.15(15)	1.4(3)	0.025(5)
^{167}Er	5292.80(6)	0.63(7)	0.0114(13)
^{167}Er	5297.19(3)	0.6(3)	0.011(5)
^{167}Er	5359.62(5)	0.62(7)	0.0112(13)
^{167}Er	5372.79(6)	0.9(4)	0.016(7)
^{167}Er	5378.65(17)	0.8(4)	0.014(7)
^{167}Er	5406.02(9)	0.8(4)	0.014(7)
^{167}Er	5468.71(3)	0.73(15)	0.013(3)
^{167}Er	5508.66(3)	0.66(14)	0.0120(25)
^{167}Er	5866.25(3)	0.77(16)	0.014(3)
^{167}Er	5878.24(3)	0.78(7)	0.0141(13)
^{167}Er	5943.28(3)	0.95(20)	0.017(4)
^{167}Er	5950.86(3)	0.87(18)	0.016(3)
^{167}Er	6137.87(3)	0.57(6)	0.0103(11)
^{167}Er	6155.99(3)	1.5(3)	0.027(5)
^{167}Er	6201.88(3)	0.73(15)	0.013(3)
^{166}Er	6228.54(18)	1.41(15)	0.026(3)
^{167}Er	6229.62(3)	1.54(9)	0.0279(16)
^{167}Er	6360.23(3)	1.3(3)	0.024(5)
^{167}Er	6677.27(3)	1.02(6)	0.0185(11)
Thulium (Z=69), *At.Wt.*=168.93421(2), σ_γ^z =105.0(20)			
^{169}Tm	38.713	0.279(6)	0.00500(11)
^{169}Tm	63.9550(20)	0.17(8)	0.0030(14)
^{169}Tm	66.098	0.51(10)	0.0091(18)
^{169}Tm	**68.649**	**1.75(23)**	**0.031(4)**
^{169}Tm	69.9880(10)	0.19(7)	0.0034(13)
^{169}Tm	**75.83**	**0.94(8)**	**0.0169(14)**
^{169}Tm	**87.5210(10)**	**1.29(3)**	**0.0231(5)**
^{169}Tm	87.5700(10)	0.29(6)	0.0052(11)
^{169}Tm	89.905	0.116(21)	0.0021(4)
^{169}Tm	105.162	0.780(23)	0.0140(4)
^{169}Tm	107.9560(10)	0.110(13)	0.00197(23)
^{169}Tm	111.0050(10)	0.327(16)	0.0059(3)
^{169}Tm	**114.544**	**3.19(6)**	**0.0572(11)**
^{169}Tm	**130.027**	**0.940(25)**	**0.0169(5)**
^{169}Tm	**144.4790(10)**	**1.2(4)**	**0.022(7)**
^{169}Tm	**144.48**	**5.96(11)**	**0.1069(20)**
^{169}Tm	**149.7180(10)**	**7.11(12)**	**0.1275(22)**
^{169}Tm	153.6680(10)	0.098(15)	0.0018(3)
^{169}Tm	156.0030(10)	0.119(17)	0.0021(3)
^{169}Tm	161.7200(10)	0.270(17)	0.0048(3)
^{169}Tm	**165.735**	**3.29(6)**	**0.0590(11)**
^{169}Tm	171.8550(10)	0.391(18)	0.0070(3)
^{169}Tm	176.5240(10)	0.34(3)	0.0061(5)
^{169}Tm	**180.993**	**3.85(14)**	**0.0691(25)**
^{169}Tm	198.2340(10)	0.094(21)	0.0017(4)
^{169}Tm	**198.5260(10)**	**0.96(3)**	**0.0172(5)**
^{169}Tm	**204.448**	**8.72(19)**	**0.156(3)**
^{169}Tm	204.7820(10)	0.25(7)	0.0045(13)
^{169}Tm	**219.706**	**3.64(6)**	**0.0653(11)**
^{169}Tm	231.8330(10)	0.60(3)	0.0108(5)
^{169}Tm	**235.1890(10)**	**1.18(4)**	**0.0212(7)**
^{169}Tm	**237.2390(10)**	**5.52(10)**	**0.0990(18)**
^{169}Tm	**242.6220(10)**	**1.28(4)**	**0.0230(7)**
^{169}Tm	256.4550(10)	0.096(15)	0.0017(3)
^{169}Tm	260.3410(10)	0.103(14)	0.00185(25)
^{169}Tm	266.8830(10)	0.134(15)	0.0024(3)
^{169}Tm	268.5510(10)	0.210(17)	0.0038(3)
^{169}Tm	288.1840(20)	0.172(10)	0.00309(18)
^{169}Tm	303.6180(20)	0.137(13)	0.00246(23)
^{169}Tm	**311.0190(10)**	**2.50(5)**	**0.0448(9)**
^{169}Tm	342.7130(10)	0.14(3)	0.0025(5)
^{169}Tm	343.5520(10)	0.360(16)	0.0065(3)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{169}Tm	352.9890(20)	0.547(23)	0.0098(4)
^{169}Tm	359.3570(20)	0.14(3)	0.0025(5)
^{169}Tm	360.8270(20)	0.089(24)	0.0016(4)
^{169}Tm	367.5560(20)	0.185(18)	0.0033(3)
^{169}Tm	370.5220(20)	0.16(3)	0.0029(5)
^{169}Tm	371.1720(20)	0.153(22)	0.0027(4)
^{169}Tm	**384.0790(20)**	**1.95(5)**	**0.0350(9)**
^{169}Tm	384.2850(20)	0.19(4)	0.0034(7)
^{169}Tm	388.1810(20)	0.099(16)	0.0018(3)
^{169}Tm	396.758(4)	0.099(10)	0.00178(18)
^{169}Tm	400.1150(20)	0.717(19)	0.0129(3)
^{169}Tm	400.6640(20)	0.20(5)	0.0036(9)
^{169}Tm	408.3570(10)	0.239(13)	0.00429(23)
^{169}Tm	**411.5060(20)**	**2.37(5)**	**0.0425(9)**
^{169}Tm	413.1330(10)	0.162(17)	0.0029(3)
^{169}Tm	424.6940(20)	0.556(25)	0.0100(5)
^{169}Tm	426.783(3)	0.186(18)	0.0033(3)
^{169}Tm	429.0390(20)	0.308(24)	0.0055(4)
^{169}Tm	440.5100(20)	0.13(3)	0.0023(5)
^{169}Tm	442.1490(10)	0.51(4)	0.0091(7)
^{169}Tm	**446.328(3)**	**1.62(4)**	**0.0291(7)**
^{169}Tm	454.2720(20)	0.295(20)	0.0053(4)
^{169}Tm	**456.0460(10)**	**1.16(4)**	**0.0208(7)**
^{169}Tm	457.4070(10)	0.48(12)	0.0086(22)
^{169}Tm	457.4100(20)	0.557(25)	0.0100(5)
^{169}Tm	468.4740(20)	0.45(4)	0.0081(7)
^{169}Tm	468.7760(20)	0.41(8)	0.0074(14)
^{169}Tm	472.6610(10)	0.60(5)	0.0108(9)
^{169}Tm	473.5790(10)	0.15(4)	0.0027(7)
^{169}Tm	477.027(4)	0.240(25)	0.0043(5)
^{169}Tm	481.3490(20)	0.109(22)	0.0020(4)
^{169}Tm	485.210(4)	0.140(22)	0.0025(4)
^{169}Tm	496.5720(20)	0.80(3)	0.0144(5)
^{169}Tm	499.0260(20)	0.40(8)	0.0072(14)
^{169}Tm	**499.5560(20)**	**0.88(3)**	**0.0158(5)**
^{169}Tm	**505.018(7)**	**0.90(3)**	**0.0161(5)**
^{169}Tm	505.341(9)	0.84(3)	0.0151(5)
^{169}Tm	**512.1370(20)**	**1.96(5)**	**0.0352(9)**
^{169}Tm	512.6080(20)	0.108(22)	0.0019(4)
^{169}Tm	517.053(4)	0.15(3)	0.0027(5)
^{169}Tm	523.3590(20)	0.48(3)	0.0086(5)
^{169}Tm	532.4280(20)	0.59(3)	0.0106(5)
^{169}Tm	532.858(3)	0.12(3)	0.0022(5)
^{169}Tm	**535.8280(10)**	**1.18(4)**	**0.0212(7)**
^{169}Tm	**537.9910(20)**	**1.00(4)**	**0.0179(7)**
^{169}Tm	**551.5140(20)**	**1.29(25)**	**0.023(5)**
^{169}Tm	562.4440(20)	0.85(3)	0.0152(5)
^{169}Tm	**565.2770(20)**	**1.58(4)**	**0.0283(7)**
^{169}Tm	**569.1730(20)**	**1.02(3)**	**0.0183(5)**
^{169}Tm	569.5440(20)	0.44(9)	0.0079(16)
^{169}Tm	573.017(4)	0.39(7)	0.0070(13)
^{169}Tm	573.017(4)	0.30(9)	0.0054(16)
^{169}Tm	581.2690(20)	0.32(7)	0.0057(13)
^{169}Tm	585.1540(10)	0.60(4)	0.0108(7)
^{169}Tm	589.0850(10)	0.58(10)	0.0104(18)
^{169}Tm	**590.2270(20)**	**1.27(10)**	**0.0228(18)**
^{169}Tm	599.1890(20)	0.155(25)	0.0028(5)
^{169}Tm	601.9780(20)	0.13(3)	0.0023(5)
^{169}Tm	**603.9900(20)**	**1.40(5)**	**0.0251(9)**
^{169}Tm	610.0310(20)	0.18(4)	0.0032(7)
^{169}Tm	611.6590(10)	0.83(4)	0.0149(7)
^{169}Tm	619.423(3)	0.23(4)	0.0041(7)
^{169}Tm	621.812(3)	0.12(3)	0.0022(5)
^{169}Tm	623.1420(10)	0.27(4)	0.0048(7)
^{169}Tm	632.4310(20)	0.74(3)	0.0133(5)
^{169}Tm	**637.900(3)**	**1.25(4)**	**0.0224(7)**
^{169}Tm	**637.9020(20)**	**1.8(3)**	**0.032(5)**
^{169}Tm	640.7790(20)	0.70(3)	0.0126(5)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{169}Tm	648.7440(20)	0.24(4)	0.0043(7)
^{169}Tm	**650.3720(10)**	**1.45(5)**	**0.0260(9)**
^{169}Tm	**658.913(5)**	**1.56(5)**	**0.0280(9)**
^{169}Tm	664.9160(10)	0.30(4)	0.0054(7)
^{169}Tm	669.656(4)	0.31(4)	0.0056(7)
^{169}Tm	670.753(7)	0.12(4)	0.0022(7)
^{169}Tm	679.5820(20)	0.15(3)	0.0027(5)
^{169}Tm	680.5480(20)	0.41(3)	0.0074(5)
^{169}Tm	693.2840(10)	0.30(3)	0.0054(5)
^{169}Tm	694.085(13)	~0.1	~0.002
^{169}Tm	**703.6280(10)**	**1.32(4)**	**0.0237(7)**
^{169}Tm	707.8490(10)	0.50(10)	0.0090(18)
^{169}Tm	709.381(3)	0.107(21)	0.0019(4)
^{169}Tm	710.7670(20)	0.60(3)	0.0108(5)
^{169}Tm	711.1330(20)	0.33(7)	0.0059(13)
^{169}Tm	714.433(5)	0.089(20)	0.0016(4)
^{169}Tm	**719.2610(20)**	**1.01(3)**	**0.0181(5)**
^{169}Tm	720.8210(20)	0.57(3)	0.0102(5)
^{169}Tm	724.585(3)	0.68(3)	0.0122(5)
^{169}Tm	739.794(4)	0.108(18)	0.0019(3)
^{169}Tm	744.765(7)	0.124(19)	0.0022(3)
^{169}Tm	748.2310(20)	0.102(20)	0.0018(4)
^{169}Tm	781.278(7)	0.20(4)	0.0036(7)
^{169}Tm	781.279(7)	0.19(4)	0.0034(7)
^{169}Tm	781.832(4)	0.090(20)	0.0016(4)
^{169}Tm	784.900(4)	0.18(4)	0.0032(7)
^{169}Tm	790.216(4)	0.17(3)	0.0030(5)
^{169}Tm	800.424(6)	0.122(23)	0.0022(4)
^{169}Tm	810.7260(20)	0.157(21)	0.0028(4)
^{169}Tm	815.624(4)	0.76(3)	0.0136(5)
^{169}Tm	818.5070(20)	0.233(20)	0.0042(4)
^{169}Tm	824.0610(20)	0.318(22)	0.0057(4)
^{169}Tm	844.677(9)	0.147(18)	0.0026(3)
^{169}Tm	**854.337(4)**	**1.41(4)**	**0.0253(7)**
^{169}Tm	866.522(6)	0.353(24)	0.0063(4)
^{169}Tm	869.401(4)	0.235(23)	0.0042(4)
^{169}Tm	886.5560(20)	0.230(24)	0.0041(4)
^{169}Tm	890.047(3)	0.17(4)	0.0030(7)
^{169}Tm	920.507(9)	0.113(24)	0.0020(4)
^{169}Tm	928.265(4)	0.37(3)	0.0066(5)
^{169}Tm	943.522(4)	0.24(3)	0.0043(5)
^{169}Tm	956.145(3)	0.33(6)	0.0059(11)
^{169}Tm	959.201(4)	0.28(3)	0.0050(5)
^{169}Tm	959.220(9)	0.45(9)	0.0081(16)
^{169}Tm	973.121(12)	0.10(4)	0.0018(7)
^{169}Tm	987.453(3)	0.30(3)	0.0054(5)
^{169}Tm	995.714(4)	0.106(23)	0.0019(4)
^{169}Tm	998.253(4)	0.200(25)	0.0036(5)
^{169}Tm	1000.898(10)	0.23(4)	0.0041(7)
^{169}Tm	1018.431(10)	0.28(6)	0.0050(11)
^{169}Tm	1027.820(12)	0.26(4)	0.0047(7)
^{169}Tm	1040.1330(10)	0.25(7)	0.0045(13)
^{169}Tm	1043.108(12)	0.19(4)	0.0034(7)
^{169}Tm	1045.353(12)	0.18(4)	0.0032(7)
^{169}Tm	1061.868(14)	0.49(10)	0.0088(18)
^{169}Tm	1070.969(6)	0.30(6)	0.0054(11)
^{169}Tm	1101.996(3)	0.10(3)	0.0018(5)
^{169}Tm	1140.192(4)	0.62(12)	0.0111(22)
^{169}Tm	1154.112(12)	0.18(4)	0.0032(7)
^{169}Tm	1171.966(11)	0.14(3)	0.0025(5)
^{169}Tm	1178.905(4)	0.56(4)	0.0100(7)
^{169}Tm	1184.563(14)	0.20(3)	0.0036(5)
^{169}Tm	1210.678(11)	0.36(7)	0.0065(13)
^{169}Tm	1226.345(12)	0.120(22)	0.0022(4)
^{169}Tm	1238.136(10)	0.107(21)	0.0019(4)
^{169}Tm	1265.057(12)	0.210(24)	0.0038(4)
^{169}Tm	1354.71(7)	0.128(23)	0.0023(4)
^{169}Tm	4641.4(4)	0.32(3)	0.0057(5)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{169}Tm	4732.6(4)	0.58(5)	0.0104(9)
^{169}Tm	4773.8(8)	0.16(3)	0.0029(5)
^{169}Tm	4922.1(5)	0.26(3)	0.0047(5)
^{169}Tm	4987.0(6)	0.16(3)	0.0029(5)
^{169}Tm	5061.6(8)	0.103(21)	0.0018(4)
^{169}Tm	5075.3(5)	0.39(4)	0.0070(7)
^{169}Tm	5124.1(5)	0.28(4)	0.0050(7)
^{169}Tm	5149.1(6)	0.31(4)	0.0056(7)
^{169}Tm	5158.2(6)	0.47(5)	0.0084(9)
^{169}Tm	5216.5(9)	0.092(25)	0.0017(5)
^{169}Tm	5326.80(11)	0.18(3)	0.0032(5)
^{169}Tm	5353.72(11)	0.19(3)	0.0034(5)
^{169}Tm	5381.18(11)	0.18(3)	0.0032(5)
^{169}Tm	5399.03(11)	0.143(25)	0.0026(5)
^{169}Tm	5412.95(11)	0.39(5)	0.0070(9)
^{169}Tm	5423.08(11)	0.24(3)	0.0043(5)
^{169}Tm	5431.26(11)	0.23(3)	0.0041(5)
^{169}Tm	5443.88(11)	0.150(25)	0.0027(5)
^{169}Tm	5451.91(11)	0.148(25)	0.0027(5)
^{169}Tm	5513.01(11)	0.16(5)	0.0029(9)
^{169}Tm	5683.40(11)	0.104(21)	0.0019(4)
^{169}Tm	5728.48(11)	0.26(3)	0.0047(5)
^{169}Tm	**5731.36(11)**	**1.17(22)**	**0.021(4)**
^{169}Tm	**5737.51(11)**	**1.42(7)**	**0.0255(13)**
^{169}Tm	5809.69(11)	0.147(20)	0.0026(4)
^{169}Tm	5858.03(11)	0.41(4)	0.0074(7)
^{169}Tm	5898.56(11)	0.35(4)	0.0063(7)
^{169}Tm	5908.27(11)	0.49(4)	0.0088(7)
^{169}Tm	**5941.47(11)**	**1.51(7)**	**0.0271(13)**
^{169}Tm	**5943.09(11)**	**1.03(20)**	**0.018(4)**
^{169}Tm	**6001.61(11)**	**0.99(10)**	**0.0178(18)**
^{169}Tm	6354.59(11)	0.42(4)	0.0075(7)
^{169}Tm	**6387.37(11)**	**1.48(7)**	**0.0265(13)**
^{169}Tm	6442.10(11)	0.47(3)	0.0084(5)
^{169}Tm	6553.10(11)	0.65(13)	0.0117(23)

Ytterbium (Z=70), *At.Wt.*=173.04(3), σ_γ^z =34.9(8)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{170}Yb	19.3940(20)	0.021(5)	0.00037(9)
^{174}Yb	**41.2180(20)**	**1.1(3)**	**0.019(5)**
^{174}Yb	**46.7510(20)**	**0.25(8)**	**0.0044(14)**
^{168}Yb	62.7190(10)	0.064(12)	0.00112(21)
^{170}Yb	66.720(10)	0.024(6)	0.00042(11)
^{168}Yb	75.0400(10)	0.015(3)	0.00026(5)
^{173}Yb	**76.996**	**0.40(4)**	**0.0070(7)**
^{171}Yb	**78.7430(10)**	**0.67(10)**	**0.0117(18)**
^{173}Yb	**86.11(7)**	**0.164(18)**	**0.0029(3)**
^{168}Yb	87.3840(10)	0.016(3)	0.00028(5)
^{174}Yb	**87.9690(20)**	**0.26(6)**	**0.0046(11)**
^{173}Yb	88.26(11)	0.044(8)	0.00077(14)
^{174}Yb	89.9570(20)	0.066(16)	0.0012(3)
^{173}Yb	93.60(6)	0.109(13)	0.00191(23)
^{174}Yb	**95.2730(20)**	**0.20(5)**	**0.0035(9)**
^{174}Yb	100.759(4)	0.019(7)	0.00033(12)
^{173}Yb	**102.60(5)**	**0.44(5)**	**0.0077(9)**
^{174}Yb	**104.5260(20)**	**0.43(11)**	**0.0075(19)**
^{174}Yb	**113.805(4)d**	**0.417(14)**	**0.00730[<0.1%]**
^{176}Yb	125.23(18)	0.007(3)	1.2(5)E-4
^{173}Yb	138.27(6)	0.058(7)	0.00102(12)
^{174}Yb	142.0240(20)	0.032(8)	0.00056(14)
^{174}Yb	142.478(3)	0.021(5)	0.00037(9)
^{168}Yb	144.5760(10)	0.016(3)	0.00028(5)
^{173}Yb	148.72(9)	0.031(5)	0.00054(9)
^{168}Yb	156.8980(10)	0.038(7)	0.00067(12)
^{174}Yb	163.012(5)	0.132(25)	0.0023(4)
^{174}Yb	172.167(4)	0.118(22)	0.0021(4)
^{173}Yb	**175.30(5)**	**0.58(6)**	**0.0102(11)**
^{171}Yb	**181.529(3)**	**0.53(6)**	**0.0093(11)**
^{168}Yb	**191.2140(10)**	**0.22(4)**	**0.0039(7)**
^{173}Yb	198.29(12)	0.023(4)	0.00040(7)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{173}Yb	223.00(8)	0.029(4)	0.00051(7)
^{174}Yb	231.502(6)	0.060(8)	0.00105(14)
^{174}Yb	232.435(3)	0.025(4)	0.00044(7)
^{173}Yb	243.68(19)	0.018(4)	0.00032(7)
^{174}Yb	246.778(14)	0.024(7)	0.00042(12)
^{174}Yb	255.338(5)	0.033(10)	0.00058(18)
^{174}Yb	267.538(5)	0.073(10)	0.00128(18)
^{173}Yb	274.90(7)	0.044(6)	0.00077(11)
^{174}Yb	**282.522(14)d**	**0.666(22)**	**0.0117[<0.1%]**
^{171}Yb	287.138(3)	0.062(11)	0.00109(19)
^{174}Yb	288.626(17)	0.016(3)	0.00028(5)
^{174}Yb	**311.276(5)**	**0.26(4)**	**0.0046(7)**
^{173}Yb	341.27(16)	0.026(5)	0.00046(9)
^{174}Yb	**363.938(6)**	**0.80(12)**	**0.0140(21)**
^{168}Yb	378.616(3)	0.033(6)	0.00058(11)
^{174}Yb	389.422(5)	0.032(5)	0.00056(9)
^{174}Yb	392.114(11)	0.097(12)	0.00170(21)
^{174}Yb	**396.329(20)d**	**1.42(5)**	**0.0249[<0.1%]**
^{172}Yb	399.17(4)	0.111(12)	0.00194(21)
^{174}Yb	400.996(15)	0.015(4)	0.00026(7)
^{174}Yb	405.156(6)	0.040(6)	0.00070(11)
^{174}Yb	406.05(14)	0.111(14)	0.00194(25)
^{174}Yb	406.548(5)	0.118(18)	0.0021(3)
^{173}Yb	409.38(7)	0.031(5)	0.00054(9)
^{173}Yb	411.48(11)	0.021(4)	0.00037(7)
^{174}Yb	423.219(11)	0.045(7)	0.00079(12)
^{174}Yb	**428.613(12)**	**0.61(7)**	**0.0107(12)**
^{174}Yb	**436.173(5)**	**0.52(6)**	**0.0091(11)**
^{174}Yb	436.472(16)	0.037(8)	0.00065(14)
^{174}Yb	452.80(14)	0.019(3)	0.00033(5)
^{174}Yb	453.299(6)	0.031(6)	0.00054(11)
^{174}Yb	465.033(11)	0.06(4)	0.0011(7)
^{174}Yb	468.079(19)	0.022(4)	0.00039(7)
^{174}Yb	476.606(11)	0.015(4)	0.00026(7)
^{174}Yb	476.643(8)	0.015(4)	0.00026(7)
^{174}Yb	**477.391(5)**	**0.75(8)**	**0.0131(14)**
^{174}Yb	**482.071(11)**	**0.23(3)**	**0.0040(5)**
^{171}Yb	490.444(8)	0.0172(24)	0.00030(4)
^{174}Yb	496.414(11)	0.023(7)	0.00040(12)
^{174}Yb	497.717(10)	0.022(5)	0.00039(9)
^{174}Yb	498.315(9)	0.076(11)	0.00133(19)
^{174}Yb	505.05(5)	0.030(8)	0.00053(14)
^{174}Yb	**511.784(11)**	**0.34(5)**	**0.0060(9)**
^{174}Yb	**514.868(7)d**	**9.0(9)**	**0.158[100%]**
^{174}Yb	518.491(11)	0.037(9)	0.00065(16)
^{171}Yb	528.289(7)	0.024(3)	0.00042(5)
^{174}Yb	**534.735(9)**	**0.50(6)**	**0.0088(11)**
^{174}Yb	548.841(12)	0.020(7)	0.00035(12)
^{174}Yb	553.002(11)	0.091(13)	0.00159(23)
^{174}Yb	556.090(8)	0.066(11)	0.00116(19)
^{171}Yb	558.935(8)	0.020(3)	0.00035(5)
^{174}Yb	565.242(11)	0.039(8)	0.00068(14)
^{173}Yb	570.30(19)	0.028(6)	0.00049(11)
^{174}Yb	571.915(8)	0.047(7)	0.00082(12)
^{168}Yb	572.700(7)	0.049(8)	0.00086(14)
^{168}Yb	576.398(10)	0.024(4)	0.00042(7)
^{171}Yb	576.4(3)	0.020(3)	0.00035(5)
^{174}Yb	577.28(5)	0.046(8)	0.00081(14)
^{168}Yb	590.695(10)	0.090(15)	0.0016(3)
^{171}Yb	602.469(5)	0.030(4)	0.00053(7)
^{174}Yb	602.841(8)	0.072(10)	0.00126(18)
^{174}Yb	618.09(4)	0.020(4)	0.00035(7)
^{168}Yb	622.127(11)	0.034(6)	0.00060(11)
^{168}Yb	623.026(7)	0.035(6)	0.00061(11)
^{174}Yb	624.692(9)	0.026(4)	0.00046(7)
^{174}Yb	635.22(4)	0.078(13)	0.00137(23)
^{168}Yb	635.348(7)	0.103(17)	0.0018(3)
^{168}Yb	635.418(7)	0.103(17)	0.0018(3)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{174}Yb	**639.261(9)**	**1.43(17)**	**0.025(3)**
^{174}Yb	657.441(11)	0.031(8)	0.00054(14)
^{168}Yb	660.180(11)	0.016(3)	0.00028(5)
^{173}Yb	661.5(3)	0.024(6)	0.00042(11)
^{170}Yb	669.95(7)	0.120(15)	0.0021(3)
^{174}Yb	680.17(4)	0.034(6)	0.00060(11)
^{174}Yb	680.67(14)	0.031(7)	0.00054(12)
^{173}Yb	684.74(10)	0.052(8)	0.00091(14)
^{173}Yb	689.8(4)	0.015(5)	0.00026(9)
^{168}Yb	690.968(10)	0.037(6)	0.00065(11)
^{170}Yb	691.62(13)	0.045(8)	0.00079(14)
^{174}Yb	697.29(4)	0.034(8)	0.00060(14)
^{170}Yb	698.36(11)	0.052(7)	0.00091(12)
^{174}Yb	707.45(4)	0.121(19)	0.0021(3)
^{168}Yb	719.969(22)	0.141(15)	0.0025(3)
^{174}Yb	725.975(21)	0.015(5)	0.00026(9)
^{168}Yb	726.422(11)	0.049(6)	0.00086(11)
^{174}Yb	729.218(9)	0.128(16)	0.0022(3)
^{174}Yb	740.17(5)	0.038(11)	0.00067(19)
^{174}Yb	742.0(4)	0.076(12)	0.00133(21)
^{168}Yb	761.850(10)	0.039(7)	0.00068(12)
^{173}Yb	762.65(8)	0.069(9)	0.00121(16)
^{174}Yb	**767.169(9)**	**0.151(25)**	**0.0026(4)**
^{170}Yb	774.42(9)	0.042(6)	0.00074(11)
^{174}Yb	800.409(16)	0.111(16)	0.0019(3)
^{174}Yb	**811.427(9)**	**0.92(16)**	**0.016(3)**
^{174}Yb	812.019(11)	0.10(3)	0.0018(5)
^{174}Yb	816.14(4)	0.132(21)	0.0023(4)
^{174}Yb	**825.22(7)**	**0.154(24)**	**0.0027(4)**
^{168}Yb	827.193(11)	0.023(4)	0.00040(7)
^{174}Yb	841.627(16)	0.138(17)	0.0024(3)
^{174}Yb	852.951(20)	0.049(13)	0.00086(23)
^{171}Yb	854.504(22)	0.020(4)	0.00035(7)
^{171}Yb	**857.621(7)**	**0.208(25)**	**0.0036(4)**
^{174}Yb	858.05(5)	0.045(10)	0.00079(18)
^{174}Yb	866.027(11)	0.017(7)	0.00030(12)
^{174}Yb	869.60(4)	0.100(18)	0.0018(3)
^{170}Yb	869.7(15)	0.026(6)	0.00046(11)
^{174}Yb	**871.695(9)**	**0.24(4)**	**0.0042(7)**
^{174}Yb	894.47(5)	0.066(13)	0.00116(23)
^{174}Yb	905.0(4)	0.045(12)	0.00079(21)
^{170}Yb	906.15(14)	0.040(7)	0.00070(12)
^{171}Yb	912.145(9)	0.049(8)	0.00086(14)
^{170}Yb	923.4(3)	0.019(6)	0.00033(11)
^{174}Yb	941.22(5)	0.082(15)	0.0014(3)
^{174}Yb	945.21(4)	0.069(15)	0.0012(3)
^{174}Yb	947.01(23)	0.076(12)	0.00133(21)
^{174}Yb	953.996(11)	0.095(24)	0.0017(4)
^{174}Yb	957.477(20)	0.017(7)	0.00030(12)
^{174}Yb	960.34(4)	0.015(7)	0.00026(12)
^{171}Yb	961.489(8)	0.120(17)	0.0021(3)
^{170}Yb	963.15(9)	0.117(14)	0.00205(25)
^{171}Yb	**964.197(10)**	**0.229(25)**	**0.0040(4)**
^{174}Yb	982.44(5)	0.129(23)	0.0023(4)
^{174}Yb	988.22(4)	0.088(19)	0.0015(3)
^{170}Yb	990.18(15)	0.051(11)	0.00089(19)
^{171}Yb	995.79(4)	0.020(3)	0.00035(5)
^{174}Yb	1005.49(23)	0.033(10)	0.00058(18)
^{174}Yb	1006.00(25)	0.054(17)	0.0009(3)
^{174}Yb	1009.5(4)	0.082(17)	0.0014(3)
^{171}Yb	1021.4(3)	0.0182(25)	0.00032(4)
^{174}Yb	1022.62(23)	0.035(13)	0.00061(23)
^{171}Yb	1026.315(17)	0.0151(19)	0.00026(3)
^{171}Yb	**1039.150(7)**	**0.22(3)**	**0.0039(5)**
^{173}Yb	1055.83(18)	0.037(7)	0.00065(12)
^{171}Yb	1070.475(15)	0.025(3)	0.00044(5)
^{171}Yb	**1076.246(6)**	**0.52(6)**	**0.0091(11)**
^{171}Yb	**1093.674(9)**	**0.24(3)**	**0.0042(5)**

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{170}Yb	1099.82(19)	0.040(7)	0.00070(12)
^{174}Yb	1115.5(3)	0.11(3)	0.0019(5)
^{171}Yb	1117.892(7)	0.086(14)	0.00151(25)
^{171}Yb	**1119.780(8)**	**0.46(6)**	**0.0081(11)**
^{174}Yb	1122.3(10)	0.09(3)	0.0016(5)
^{173}Yb	1129.81(17)	0.128(17)	0.0022(3)
^{170}Yb	1138.9(3)	0.042(13)	0.00074(23)
^{171}Yb	1143.017(8)	0.106(13)	0.00186(23)
^{171}Yb	1152.16(5)	0.021(3)	0.00037(5)
^{171}Yb	1154.989(6)	0.099(13)	0.00173(23)
^{174}Yb	1187.7(3)	0.054(17)	0.0009(3)
^{168}Yb	1207.44(7)	0.018(4)	0.00032(7)
^{168}Yb	1221.20(3)	0.015(3)	0.00026(5)
^{168}Yb	1232.902(13)	0.018(3)	0.00032(5)
^{168}Yb	1263.261(19)	0.024(5)	0.00042(9)
^{170}Yb	1265.10(22)	0.081(12)	0.00142(21)
^{171}Yb	1288.873(12)	0.019(3)	0.00033(5)
^{173}Yb	1292.2(4)	0.036(9)	0.00063(16)
^{168}Yb	1295.620(13)	0.017(3)	0.00030(5)
^{174}Yb	1296.3(3)	0.046(17)	0.0008(3)
^{173}Yb	**1308.53(11)**	**0.168(19)**	**0.0029(3)**
^{171}Yb	1326.286(7)	0.055(7)	0.00096(12)
^{173}Yb	1353.21(22)	0.041(9)	0.00072(16)
^{170}Yb	1371.3(4)	0.023(8)	0.00040(14)
^{168}Yb	1374.45(7)	0.021(4)	0.00037(7)
^{174}Yb	**1378.22(7)**	**0.42(12)**	**0.0074(21)**
^{174}Yb	1378.7(10)	0.046(17)	0.0008(3)
^{173}Yb	1381.48(14)	0.129(16)	0.0023(3)
^{171}Yb	1387.243(7)	0.142(18)	0.0025(3)
^{171}Yb	1398.07(4)	0.134(16)	0.0023(3)
^{168}Yb	1410.40(14)	0.015(8)	0.00026(14)
^{168}Yb	1432.33(7)	0.016(4)	0.00028(7)
^{171}Yb	1450.264(20)	0.032(5)	0.00056(9)
^{173}Yb	1456.65(23)	0.083(15)	0.0015(3)
^{171}Yb	1465.985(7)	0.095(11)	0.00166(19)
^{170}Yb	1469.79(17)	0.096(16)	0.0017(3)
^{171}Yb	1470.401(12)	0.058(7)	0.00102(12)
^{171}Yb	1476.81(4)	0.048(6)	0.00084(11)
^{173}Yb	1480.63(24)	0.050(12)	0.00088(21)
^{170}Yb	1493.3(4)	0.027(10)	0.00047(18)
^{168}Yb	1505.32(6)	0.018(4)	0.00032(7)
^{171}Yb	**1521.197(16)**	**0.193(24)**	**0.0034(4)**
^{173}Yb	1529.19(15)	0.070(10)	0.00123(18)
^{171}Yb	1529.779(9)	0.095(12)	0.00166(21)
^{173}Yb	1533.99(14)	0.103(13)	0.00180(23)
^{173}Yb	1552.0(3)	0.032(9)	0.00056(16)
^{171}Yb	1553.54(25)	0.026(5)	0.00046(9)
^{171}Yb	1584.114(12)	0.037(6)	0.00065(11)
^{171}Yb	1589.06(4)	0.037(5)	0.00065(9)
^{171}Yb	1599.939(16)	0.125(16)	0.0022(3)
^{171}Yb	1608.522(9)	0.081(11)	0.00142(19)
^{171}Yb	1621.960(12)	0.030(4)	0.00053(7)
^{171}Yb	1631.792(20)	0.054(7)	0.00095(12)
^{173}Yb	**1638.36(17)**	**0.22(3)**	**0.0039(5)**
^{173}Yb	**1679.70(14)**	**0.161(19)**	**0.0028(3)**
^{171}Yb	1696.12(3)	0.029(4)	0.00051(7)
^{171}Yb	1715.35(4)	0.090(11)	0.00158(19)
^{173}Yb	1730.9(3)	0.030(8)	0.00053(14)
^{171}Yb	1742.889(10)	0.024(5)	0.00042(9)
^{171}Yb	1770.58(4)	0.073(22)	0.0013(4)
^{173}Yb	1775.1(3)	0.052(11)	0.00091(19)
^{171}Yb	1786.76(3)	0.027(4)	0.00047(7)
^{171}Yb	1815.84(3)	0.073(10)	0.00128(18)
^{171}Yb	1849.32(4)	0.046(6)	0.00081(11)
^{173}Yb	1859.2(3)	0.051(10)	0.00089(18)
^{171}Yb	1877.64(3)	0.035(5)	0.00061(9)
^{173}Yb	1920.6(3)	0.040(10)	0.00070(18)
^{171}Yb	1930.76(5)	0.070(9)	0.00123(16)
^{171}Yb	1956.39(3)	0.028(4)	0.00049(7)
^{171}Yb	1968.29(3)	0.061(14)	0.00107(25)
^{171}Yb	1997.515(21)	0.044(7)	0.00077(12)
^{173}Yb	2003.14(25)	0.045(10)	0.00079(18)
^{171}Yb	2009.50(5)	0.074(12)	0.00130(21)
^{171}Yb	2024.16(3)	0.081(12)	0.00142(21)
^{173}Yb	2093.9(3)	0.026(8)	0.00046(14)
^{171}Yb	2102.90(3)	0.040(5)	0.00070(9)
^{171}Yb	2115.56(4)	0.039(7)	0.00068(12)
^{171}Yb	2133.85(7)	0.043(6)	0.00075(11)
^{173}Yb	2171.4(3)	0.059(12)	0.00103(21)
^{171}Yb	2195.09(5)	0.066(11)	0.00116(19)
^{171}Yb	2234.17(10)	0.042(11)	0.00074(19)
^{171}Yb	2238.19(3)	0.052(12)	0.00091(21)
^{171}Yb	2263.11(3)	0.042(11)	0.00074(19)
^{171}Yb	2296.47(4)	0.035(7)	0.00061(12)
^{171}Yb	2327.57(8)	0.094(19)	0.0016(3)
^{173}Yb	2388.7(4)	0.036(10)	0.00063(18)
^{171}Yb	**2401.37(3)**	**0.20(3)**	**0.0035(5)**
^{174}Yb	**3632.3(10)**	**0.40(10)**	**0.0070(18)**
^{174}Yb	3661.2(14)	0.043(10)	0.00075(18)
^{174}Yb	**3714.7(5)**	**0.23(6)**	**0.0040(11)**
^{174}Yb	3740.8(14)	0.043(10)	0.00075(18)
^{174}Yb	3776.2(23)	0.040(10)	0.00070(18)
^{174}Yb	3782.9(19)	0.057(14)	0.00100(25)
^{174}Yb	3823.8(14)	0.026(6)	0.00046(11)
^{174}Yb	3842.1(14)	0.074(18)	0.0013(3)
^{174}Yb	3854.4(11)	0.085(16)	0.0015(3)
^{173}Yb	3868.0(4)	0.103(14)	0.00180(25)
^{174}Yb	**3885.0(4)**	**0.72(17)**	**0.013(3)**
^{174}Yb	**3929.3(4)**	**0.38(9)**	**0.0067(16)**
^{174}Yb	3978.2(19)	0.020(5)	0.00035(9)
^{174}Yb	4129.6(19)	0.026(6)	0.00046(11)
^{174}Yb	4138.6(19)	0.023(6)	0.00040(11)
^{174}Yb	4174.9(13)	0.088(21)	0.0015(4)
^{174}Yb	4195.0(4)	0.058(14)	0.00102(25)
^{174}Yb	4454.3(4)	0.026(6)	0.00046(11)
^{174}Yb	4465.9(4)	0.040(10)	0.00070(18)
^{173}Yb	4716.5(7)	0.027(8)	0.00047(14)
^{174}Yb	**4830.2(4)**	**0.25(6)**	**0.0044(11)**
^{174}Yb	**5011.0(4)**	**0.18(4)**	**0.0032(7)**
^{174}Yb	**5266.3(4)**	**1.4(6)**	**0.025(11)**
^{174}Yb	5307.5(4)	0.020(5)	0.00035(9)
^{171}Yb	5539.05(5)	0.083(11)	0.00145(19)
^{171}Yb	5691.58(9)	0.020(3)	0.00035(5)
^{170}Yb	5712.5(6)	0.056(9)	0.00098(16)
^{171}Yb	5824.85(6)	0.0172(23)	0.00030(4)
^{171}Yb	6009.65(6)	0.0148(19)	0.00026(3)
^{168}Yb	6779.90(11)	0.058(7)	0.00102(12)
	Lutetium (Z=71), *At.Wt.*=174.967(1), σ_γ^z =76.6(23)		
^{175}Lu	38.7460(10)	0.38(12)	0.0066(21)
^{175}Lu	46.4590(10)	0.26(7)	0.0045(12)
^{175}Lu	66.2400(10)	0.28(4)	0.0048(7)
^{175}Lu	**71.5170(10)**	**3.96(22)**	**0.069(4)**
^{175}Lu	73.1430(10)	0.160(20)	0.0028(4)
^{176}Lu	**88.36(4)**	**7.1(4) $s^{-1}g^{-1}$**	**Abundant**
^{176}Lu	94.129(8)	0.72(4)	0.0125(7)
^{176}Lu	111.705(12)	1.03(5)	0.0178(9)
^{175}Lu	112.9220(10)	1.15(7)	0.0199(12)
^{176}Lu	**112.9500(10)d**	**3.47(16)**	**0.060[<0.1%]**
^{176}Lu	115.651(8)	0.144(22)	0.0025(4)
^{176}Lu	119.836(3)	1.32(22)	0.023(4)
^{176}Lu	**121.620(3)**	**5.24(17)**	**0.091(3)**
^{175}Lu	129.7730(10)	0.18(3)	0.0031(5)
^{176}Lu	135.802(19)	0.37(3)	0.0064(5)
^{176}Lu	**138.607(5)**	**6.79(24)**	**0.118(4)**
^{175}Lu	139.3830(10)	0.25(4)	0.0043(7)
^{176}Lu	144.745(5)	1.33(8)	0.0230(14)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{176}Lu	**145.870(4)**	**1.52(9)**	**0.0263(16)**
^{176}Lu	**147.165(5)**	**4.96(19)**	**0.086(3)**
^{176}Lu	**147.167(5)**	**3.7(7)**	**0.064(12)**
^{176}Lu	**150.392(3)**	**13.8(4)**	**0.239(7)**
^{175}Lu	153.4670(10)	0.55(5)	0.0095(9)
^{176}Lu	**162.492(4)**	**5.32(17)**	**0.092(3)**
^{176}Lu	168.605(6)	0.97(5)	0.0168(9)
^{176}Lu	**171.869(7)**	**1.74(6)**	**0.0301(10)**
^{175}Lu	182.4220(10)	0.46(10)	0.0080(17)
^{176}Lu	**185.593(8)**	**3.42(12)**	**0.0592(21)**
^{176}Lu	**187.970(23)**	**1.39(6)**	**0.0241(10)**
^{175}Lu	188.2870(10)	0.29(4)	0.0050(7)
^{176}Lu	191.492(9)	0.62(12)	0.0107(21)
^{175}Lu	192.2120(10)	1.08(14)	0.0187(24)
^{176}Lu	195.565(8)	0.63(5)	0.0109(9)
^{175}Lu	197.550(14)	0.30(14)	0.0052(24)
^{175}Lu	201.5680(10)	0.78(12)	0.0135(21)
^{176}Lu	**201.83(4)**	**37.9(22)**	**Abundant**
^{176}Lu	207.797(8)	1.00(5)	0.0173(9)
^{176}Lu	**208.3660(10)d**	**6.0(3)**	**0.104[<0.1%]**
^{176}Lu	209.492(24)	0.298(25)	0.0052(4)
^{176}Lu	212.841(15)	0.16(3)	0.0028(5)
^{176}Lu	213.965(8)	0.34(6)	0.0059(10)
^{175}Lu	217.0030(10)	0.35(10)	0.0061(17)
^{175}Lu	219.2830(20)	0.20(8)	0.0035(14)
^{175}Lu	**225.4030(10)**	**1.73(8)**	**0.0300(14)**
^{175}Lu	227.9970(10)	0.57(7)	0.0099(12)
^{176}Lu	228.708(10)	0.178(21)	0.0031(4)
^{175}Lu	233.7410(20)	0.41(10)	0.0071(17)
^{176}Lu	235.892(15)	0.81(4)	0.0140(7)
^{175}Lu	238.6710(10)	0.20(6)	0.0035(10)
^{176}Lu	244.310(12)	0.45(8)	0.0078(14)
^{176}Lu	247.255(15)	0.247(23)	0.0043(4)
^{175}Lu	251.1990(20)	0.16(3)	0.0028(5)
^{176}Lu	**259.401(16)**	**1.89(8)**	**0.0327(14)**
^{175}Lu	263.7290(10)	0.59(10)	0.0102(17)
^{176}Lu	264.581(6)	0.76(11)	0.0132(19)
^{176}Lu	**268.788(5)**	**3.64(13)**	**0.0630(23)**
^{175}Lu	277.6830(10)	0.20(6)	0.0035(10)
^{175}Lu	284.6410(10)	0.75(6)	0.0130(10)
^{176}Lu	301.098(6)	0.73(4)	0.0126(7)
^{176}Lu	**306.84(4)**	**45.2(24) $s^{-1}g^{-1}$**	**Abundant**
^{175}Lu	**310.1870(10)**	**1.49(8)**	**0.0258(14)**
^{176}Lu	313.350(8)	0.40(3)	0.0069(5)
^{176}Lu	**319.036(8)**	**3.83(13)**	**0.0663(23)**
^{176}Lu	322.865(19)	0.31(3)	0.0054(5)
^{176}Lu	329.59(3)	0.181(21)	0.0031(4)
^{175}Lu	335.8480(20)	1.32(8)	0.0229(14)
^{176}Lu	336.323(15)	0.19(3)	0.0033(5)
^{176}Lu	346.37(3)	0.35(6)	0.0061(10)
^{176}Lu	348.084(9)	0.84(4)	0.0145(7)
^{176}Lu	360.096(10)	0.29(9)	0.0050(16)
^{176}Lu	364.58(4)	0.62(3)	0.0107(5)
^{176}Lu	**367.433(11)**	**2.23(8)**	**0.0386(14)**
^{176}Lu	393.389(11)	0.54(3)	0.0094(5)
^{176}Lu	413.665(13)	0.93(4)	0.0161(7)
^{176}Lu	430.452(15)	0.147(21)	0.0025(4)
^{176}Lu	436.505(13)	0.145(20)	0.0025(4)
^{176}Lu	**457.944(15)**	**8.3(3)**	**0.144(5)**
^{176}Lu	475.46(3)	0.287(16)	0.0050(3)
^{175}Lu	520.5500(20)	0.20(4)	0.0035(7)
^{175}Lu	527.5090(20)	0.32(5)	0.0055(9)
^{176}Lu	544.602(18)	0.210(13)	0.00364(23)
^{176}Lu	547.866(16)	0.306(17)	0.0053(3)
^{176}Lu	550.288(15)	0.490(21)	0.0085(4)
^{176}Lu	552.073(15)	0.67(3)	0.0116(5)
^{175}Lu	563.9420(20)	0.51(4)	0.0088(7)
^{175}Lu	578.198(3)	0.20(8)	0.0035(14)
^{176}Lu	606.65(7)	0.182(15)	0.0032(3)
^{176}Lu	671.908(15)	0.259(21)	0.0045(4)
^{176}Lu	689.77(6)	0.31(5)	0.0054(9)
^{176}Lu	695.033(16)	0.296(25)	0.0051(4)
^{175}Lu	709.553(4)	0.21(7)	0.0036(12)
^{176}Lu	716.470(17)	0.189(16)	0.0033(3)
^{176}Lu	**761.564(20)**	**2.60(9)**	**0.0450(16)**
^{175}Lu	834.810(3)	0.20(11)	0.0035(19)
^{175}Lu	838.643(3)	0.89(10)	0.0154(17)
^{176}Lu	864.52(8)	0.191(16)	0.0033(3)
^{176}Lu	899.12(6)	0.423(25)	0.0073(4)
^{176}Lu	907.86(6)	0.42(3)	0.0073(5)
^{176}Lu	907.961(18)	0.35(5)	0.0061(9)
^{176}Lu	916.24(4)	0.439(25)	0.0076(4)
^{175}Lu	1000.846(18)	0.15(10)	0.0026(17)
^{176}Lu	1036.39(8)	0.169(16)	0.0029(3)
^{176}Lu	1061.97(6)	0.45(4)	0.0078(7)
^{176}Lu	1080.24(6)	0.68(4)	0.0118(7)
^{176}Lu	1088.11(4)	0.83(4)	0.0144(7)
^{176}Lu	1215.36(13)	0.139(14)	0.00241(24)
^{176}Lu	1233.84(6)	0.187(19)	0.0032(3)
^{176}Lu	1305.18(8)	0.36(3)	0.0062(5)
^{176}Lu	1381.01(6)	0.30(3)	0.0052(5)
^{176}Lu	4866.8(5)	0.25(5)	0.0043(9)
^{176}Lu	5016.6(5)	0.215(18)	0.0037(3)
^{176}Lu	5023.6(3)	0.176(24)	0.0030(4)
^{176}Lu	5319.45(24)	0.167(19)	0.0029(3)
^{176}Lu	5323.12(13)	0.145(15)	0.0025(3)
^{175}Lu	5331.80(20)	0.16(4)	0.0028(7)
^{175}Lu	5331.94(20)	0.19(4)	0.0033(7)
^{176}Lu	5343.91(25)	0.26(3)	0.0045(5)
^{176}Lu	5465.7(3)	0.218(16)	0.0038(3)
^{176}Lu	5570.12(10)	0.385(24)	0.0067(4)
^{176}Lu	5601.87(25)	0.327(25)	0.0057(4)
^{176}Lu	5728.00(10)	0.23(3)	0.0040(5)
^{176}Lu	5769.72(10)	0.184(18)	0.0032(3)
^{176}Lu	6803.92(9)	0.38(8)	0.0066(14)

Hafnium (Z=72), *At.Wt.*=178.49(2), σ_γ^z =119(3)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{178}Hf	45.8570(10)	1.21(7)	0.0205(12)
^{177}Hf	**62.820(21)**	**5.26(16)**	**0.089(3)**
^{177}Hf	**93.182(6)**	**13.3(9)**	**0.226(15)**
^{179}Hf	93.3240(20)	0.80(5)	0.0136(9)
^{178}Hf	105.8940(20)	0.335(10)	0.00569(17)
^{177}Hf	122.8970(10)	0.432(16)	0.0073(3)
^{174}Hf	125.7(10)	0.2000(20)	0.00340(3)
^{177}Hf	144.530(3)	0.384(13)	0.00652(22)
^{178}Hf	161.1890(20)	0.57(10)	0.0097(17)
^{178}Hf	193.3100(10)	1.1(3)	0.019(5)
^{178}Hf	202.2840(20)	0.65(13)	0.0110(22)
^{177}Hf	**213.439(7)**	**29.3(7)**	**0.497(12)**
^{178}Hf	**214.3410(20)**	**5.7(6)**	**0.097(10)**
^{178}Hf	**214.3410(20)d**	**16.3(3)**	**0.277[99%]**
^{179}Hf	215.426(8)	2.77(17)	0.047(3)
^{179}Hf	235.020(7)	0.38(9)	0.0065(15)
^{178}Hf	239.1660(10)	0.293(24)	0.0050(4)
^{177}Hf	244.3130(20)	0.58(4)	0.0098(7)
^{177}Hf	244.544(13)	0.97(14)	0.0165(24)
^{177}Hf	245.2950(20)	0.58(4)	0.0098(7)
^{177}Hf	256.6010(20)	0.426(20)	0.0072(3)
^{178}Hf	258.6230(20)	0.44(10)	0.0075(17)
^{177}Hf	273.166(3)	0.305(16)	0.0052(3)
^{177}Hf	277.2080(20)	0.47(3)	0.0080(5)
^{177}Hf	289.5570(20)	0.67(4)	0.0114(7)
^{178}Hf	**303.9880(20)**	**3.38(9)**	**0.0574(15)**
^{177}Hf	**325.559(4)**	**6.69(17)**	**0.114(3)**
^{179}Hf	332.275(11)	0.73(17)	0.012(3)
^{177}Hf	339.1990(20)	1.28(6)	0.0217(10)
^{177}Hf	348.369(4)	0.60(8)	0.0102(14)

^{A}Z	E_{γ}-keV	$\sigma_{\gamma}^{Z}(E_{\gamma})$-barns	k_0
^{177}Hf	426.380(5)	0.35(3)	0.0059(5)
^{177}Hf	497.893(3)	1.11(11)	0.0188(19)
^{176}Hf	508.29(9)	1.05(6)	0.0178(10)
^{177}Hf	547.374(5)	0.40(4)	0.0068(7)
^{177}Hf	596.894(4)	0.34(13)	0.0058(22)
^{178}Hf	729.515(4)	0.53(5)	0.0090(9)
^{177}Hf	921.822(5)	0.84(5)	0.0143(9)
^{177}Hf	961.919(5)	0.76(7)	0.0129(12)
^{177}Hf	970.066(7)	0.32(8)	0.0054(14)
^{178}Hf	1003.650(4)	0.89(5)	0.0151(9)
^{177}Hf	1016.663(6)	0.30(13)	0.0051(22)
^{179}Hf	1059.66(4)	0.32(3)	0.0054(5)
^{179}Hf	1065.45(3)	1.94(5)	0.0329(9)
^{177}Hf	1077.844(5)	2.40(6)	0.0407(10)
^{177}Hf	1081.454(6)	2.82(7)	0.0479(12)
^{177}Hf	**1102.824(5)**	**2.96(8)**	**0.0503(14)**
^{177}Hf	1143.737(7)	1.84(6)	0.0312(10)
^{177}Hf	**1167.072(6)**	**3.95(10)**	**0.0671(17)**
^{177}Hf	**1174.635(5)**	**4.8(7)**	**0.081(12)**
^{177}Hf	1175.357(7)	2.6(5)	0.044(9)
^{177}Hf	1183.504(8)	1.42(5)	0.0241(9)
^{179}Hf	1197.92(8)	0.44(6)	0.0075(10)
^{177}Hf	1205.975(5)	1.26(23)	0.021(4)
^{177}Hf	**1207.213(5)**	**3.9(3)**	**0.066(5)**
^{177}Hf	1226.532(6)	1.30(5)	0.0221(9)
^{177}Hf	**1229.287(8)**	**4.26(11)**	**0.0723(19)**
^{177}Hf	1232.172(5)	1.35(6)	0.0229(10)
^{177}Hf	1247.379(5)	0.49(4)	0.0083(7)
^{177}Hf	1254.913(7)	0.40(4)	0.0068(7)
^{177}Hf	1269.372(6)	2.26(7)	0.0384(12)
^{177}Hf	1291.282(6)	0.99(5)	0.0168(9)
^{177}Hf	1310.071(5)	1.45(5)	0.0246(9)
^{177}Hf	1330.109(5)	2.08(8)	0.0353(14)
^{177}Hf	1333.832(5)	1.71(9)	0.0290(15)
^{177}Hf	1340.447(6)	2.38(10)	0.0404(17)
^{177}Hf	1344.841(5)	0.59(5)	0.0100(9)
^{177}Hf	1403.267(20)	0.51(4)	0.0087(7)
^{177}Hf	1420.651(6)	1.81(8)	0.0307(14)
^{177}Hf	1496.448(21)	0.44(3)	0.0075(5)
^{177}Hf	1542.416(7)	0.55(8)	0.0093(14)
^{177}Hf	1649.794(6)	0.367(22)	0.0062(4)
^{178}Hf	1649.81(10)	0.46(4)	0.0078(7)
^{177}Hf	1725.094(10)	0.46(5)	0.0078(9)
^{177}Hf	1848.821(8)	0.46(5)	0.0078(9)
^{180}Hf	1895.38(16)	0.54(5)	0.0092(9)
^{177}Hf	1904.272(10)	0.71(6)	0.0121(10)
^{177}Hf	1927.998(7)	0.30(5)	0.0051(9)
^{177}Hf	1957.294(12)	0.31(4)	0.0053(7)
^{178}Hf	3497.81(25)	0.31(5)	0.0053(9)
^{178}Hf	4336.18(4)	0.35(4)	0.0059(7)
^{178}Hf	4343.69(4)	0.44(5)	0.0075(9)
^{179}Hf	4915.2(6)	0.35(5)	0.0059(9)
^{177}Hf	5068.3(5)	0.32(5)	0.0054(9)
^{177}Hf	5260.9(5)	0.36(6)	0.0061(10)
^{177}Hf	5294.9(5)	0.34(5)	0.0058(9)
^{177}Hf	5575.22(16)	0.41(4)	0.0070(7)
^{179}Hf	5647.71(11)	0.38(4)	0.0065(7)
^{180}Hf	5649.60(21)	0.33(18)	0.006(3)
^{180}Hf	5695.48(17)	1.09(9)	0.0185(15)
^{178}Hf	5723.809(22)	1.97(10)	0.0334(17)
^{177}Hf	5807.42(16)	0.35(5)	0.0059(9)
^{177}Hf	6111.85(16)	0.92(6)	0.0156(10)
^{177}Hf	6357.14(16)	0.32(5)	0.0054(9)

Tantalum (Z=73), *At.Wt.*=180.9479(1), σ_{γ}^{z} =20.6(5)

^{A}Z	E_{γ}-keV	$\sigma_{\gamma}^{Z}(E_{\gamma})$-barns	k_0
^{181}Ta	47.8120(20)	0.13(3)	0.0022(5)
^{181}Ta	54.4710(20)	0.052(13)	0.00087(22)
^{181}Ta	59.693(3)	0.042(13)	0.00070(22)
^{181}Ta	71.900(4)	0.060(15)	0.00100(25)
^{181}Ta	72.932(4)	0.054(15)	0.00090(25)
^{181}Ta	73.519(4)	0.06(3)	0.0010(5)
^{181}Ta	74.2680(20)	0.077(22)	0.0013(4)
^{181}Ta	76.549(6)	0.029(13)	0.00049(22)
^{181}Ta	82.876(4)	0.029(13)	0.00049(22)
^{181}Ta	92.480(3)	0.065(9)	0.00109(15)
^{181}Ta	94.1680(20)	0.051(7)	0.00085(12)
^{181}Ta	95.156(3)	0.081(9)	0.00136(15)
^{181}Ta	97.467(3)	0.065(9)	0.00109(15)
^{181}Ta	97.8320(20)	0.139(7)	0.00233(12)
^{181}Ta	99.8310(20)	0.127(7)	0.00213(12)
^{181}Ta	100.5540(20)	0.060(11)	0.00100(18)
^{181}Ta	104.1130(20)	0.037(6)	0.00062(10)
^{181}Ta	107.863(3)	0.131(14)	0.00219(23)
^{181}Ta	**114.3150(10)**	**0.280(9)**	**0.00469(15)**
^{181}Ta	114.3760(20)	0.110(20)	0.0018(3)
^{181}Ta	114.674(3)	0.193(20)	0.0032(3)
^{181}Ta	118.8950(20)	0.108(8)	0.00181(13)
^{181}Ta	119.516(3)	0.039(6)	0.00065(10)
^{181}Ta	119.6980(20)	0.038(6)	0.00064(10)
^{181}Ta	121.5340(20)	0.031(3)	0.00052(5)
^{181}Ta	122.613(3)	0.037(6)	0.00062(10)
^{181}Ta	122.675(3)	0.092(4)	0.00154(7)
^{181}Ta	122.9730(20)	0.075(9)	0.00126(15)
^{181}Ta	125.126(3)	0.030(4)	0.00050(7)
^{181}Ta	**133.8770(20)**	**0.63(7)**	**0.0106(12)**
^{181}Ta	139.4560(20)	0.094(10)	0.00157(17)
^{181}Ta	139.6610(20)	0.029(3)	0.00049(5)
^{181}Ta	141.2450(20)	0.062(9)	0.00104(15)
^{181}Ta	142.261(5)	0.042(13)	0.00070(22)
^{181}Ta	143.156(7)	0.061(9)	0.00102(15)
^{181}Ta	146.7740(20)	0.141(4)	0.00236(7)
^{181}Ta	154.0850(20)	0.082(3)	0.00137(5)
^{181}Ta	156.0880(20)	0.233(6)	0.00390(10)
^{181}Ta	156.2300(20)	0.046(3)	0.00077(5)
^{181}Ta	159.048(3)	0.0449(23)	0.00075(4)
^{181}Ta	167.413(3)	0.031(3)	0.00052(5)
^{181}Ta	168.130(4)	0.033(9)	0.00055(15)
^{181}Ta	171.580(3)d	0.005400(11)	9.044E-5[65%]
^{181}Ta	171.580(3)	0.029(4)	0.00049(7)
^{181}Ta	**173.2050(20)**	**1.210(25)**	**0.0203(4)**
^{181}Ta	178.6250(20)	0.072(6)	0.00121(10)
^{181}Ta	190.334(3)	0.183(7)	0.00306(12)
^{181}Ta	195.1080(20)	0.075(4)	0.00126(7)
^{181}Ta	210.5460(20)	0.064(4)	0.00107(7)
^{181}Ta	214.2070(20)	0.0481(23)	0.00081(4)
^{181}Ta	233.7080(20)	0.065(3)	0.00109(5)
^{181}Ta	237.2880(20)	0.050(6)	0.00084(10)
^{181}Ta	244.809(4)	0.032(3)	0.00054(5)
^{181}Ta	252.7710(20)	0.034(8)	0.00057(13)
^{181}Ta	260.094(4)	0.052(17)	0.0009(3)
^{181}Ta	267.907(3)	0.027(4)	0.00045(7)
^{181}Ta	**270.4030(20)**	**2.60(6)**	**0.0435(10)**
^{181}Ta	287.131(3)	0.054(6)	0.00090(10)
^{181}Ta	290.362(3)	0.027(7)	0.00045(12)
^{181}Ta	297.125(3)	0.17(3)	0.0028(5)
^{181}Ta	322.554(4)	0.048(3)	0.00080(5)
^{181}Ta	346.465(5)	0.110(6)	0.00184(10)
^{181}Ta	360.518(3)	0.177(7)	0.00296(12)
^{181}Ta	373.881(6)	0.052(3)	0.00087(5)
^{181}Ta	377.2460(20)	0.127(4)	0.00213(7)
^{181}Ta	382.203(3)	0.074(3)	0.00124(5)
^{181}Ta	401.238(3)	0.044(3)	0.00074(5)
^{181}Ta	**402.623(3)**	**1.180(23)**	**0.0198(4)**
^{181}Ta	443.6080(20)	0.036(3)	0.00060(5)
^{181}Ta	473.803(6)	0.032(3)	0.00054(5)
^{181}Ta	478.685(5)	0.054(3)	0.00090(5)
^{181}Ta	480.034(3)	0.091(4)	0.00152(7)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
181 Ta	489.590(4)	0.027(4)	0.00045(7)
181 Ta	499.118(6)	0.050(4)	0.00084(7)
181 Ta	501.068(3)	0.029(3)	0.00049(5)
181 Ta	509.967(5)	0.054(13)	0.00090(22)
181 Ta	512.355(4)	0.165(9)	0.00276(15)
181 Ta	514.110(4)	0.033(4)	0.00055(7)
181 Ta	530.593(4)	0.0266(23)	0.00045(4)
181 Ta	603.15(3)	0.035(3)	0.00059(5)
181 Ta	3982.2(3)	0.032(7)	0.00054(12)
181 Ta	4045.81(23)	0.030(3)	0.00050(5)
181 Ta	4053.82(22)	0.034(3)	0.00057(5)
181 Ta	4219.98(25)	0.037(4)	0.00062(7)
181 Ta	4315.43(19)	0.084(7)	0.00141(12)
181 Ta	4443.9(3)	0.031(4)	0.00052(7)
181 Ta	4482.95(25)	0.042(6)	0.00070(10)
181 Ta	4536.05(25)	0.032(4)	0.00054(7)
181 Ta	4566.6(3)	0.032(4)	0.00054(7)
181 Ta	4579.5(3)	0.035(4)	0.00059(7)
181 Ta	4618.08(22)	0.044(4)	0.00074(7)
181 Ta	4691.73(25)	0.040(4)	0.00067(7)
181 Ta	4781.95(18)	0.105(7)	0.00176(12)
181 Ta	4792.76(25)	0.048(4)	0.00080(7)
181 Ta	4802.55(25)	0.037(4)	0.00062(7)
181 Ta	4832.97(25)	0.030(3)	0.00050(5)
181 Ta	4980.12(22)	0.033(3)	0.00055(5)
181 Ta	5005.52(21)	0.042(3)	0.00070(5)
181 Ta	5245.79(6)	0.051(4)	0.00085(7)
181 Ta	5343.26(6)	0.048(4)	0.00080(7)
181 Ta	5792.39(6)	0.034(3)	0.00057(5)
181 Ta	5964.95(6)	0.138(8)	0.00231(13)
181 Ta	6062.78(6)	0.087(4)	0.00146(7)

Tungsten (Z=74), *At.Wt.*=183.84(1), σ_γ^z =18.39(16)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
182 W	**46.4840(10)**	**0.192(10)**	**0.00316(16)**
182 W	**52.5290(10)**	**0.128(11)**	**0.00211(18)**
186 W	**59.03(4)**	**0.208(7)**	**0.00343(12)**
186 W	**72.002(4)d**	**1.32(3)**	**0.0218[1.4%]**
186 W	**77.39(3)**	**0.134(5)**	**0.00221(8)**
182 W	84.7130(10)	0.0261(16)	0.00043(3)
182 W	**99.0790(10)**	**0.155(13)**	**0.00256(21)**
186 W	101.80(5)	0.0129(22)	2.1(4)E-4
182 W	**107.9320(10)**	**0.144(12)**	**0.00237(20)**
182 W	109.738(7)	0.0201(16)	0.00033(3)
183 W	**111.216(9)**	**0.195(6)**	**0.00321(10)**
186 W	124.05(5)	0.051(11)	0.00084(18)
186 W	**127.43(4)**	**0.129(5)**	**0.00213(8)**
186 W	128.92(6)	0.0207(24)	0.00034(4)
186 W	**134.247(7)d**	**1.050(20)**	**0.0173[1.4%]**
186 W	142.90(8)	0.0206(18)	0.00034(3)
186 W	**145.79(3)**	**0.970(21)**	**0.0160(4)**
186 W	149.05(7)	0.0393(22)	0.00065(4)
186 W	157.46(4)	0.0319(14)	0.000526(23)
182 W	160.5280(10)	0.0183(12)	0.000302(20)
182 W	**162.315(8)**	**0.187(5)**	**0.00308(8)**
186 W	171.69(7)	0.0097(10)	1.60(16)E-4
184 W	173.680(20)	0.0155(16)	0.00026(3)
186 W	197.56(16)	0.027(5)	0.00045(8)
186 W	**201.44(5)**	**0.319(8)**	**0.00526(13)**
186 W	**204.83(4)**	**0.148(4)**	**0.00244(7)**
182 W	208.817(7)	0.0231(25)	0.00038(4)
182 W	209.876(9)	0.014(3)	2.3(5)E-4
183 W	215.340(13)	0.0107(10)	1.76(16)E-4
186 W	**225.86(4)**	**0.113(17)**	**0.0019(3)**
183 W	226.743(10)	0.067(16)	0.0011(3)
186 W	227.34(7)	0.024(4)	0.00040(7)
182 W	246.0600(10)	0.0280(12)	0.000462(20)
183 W	**252.854(11)**	**0.101(3)**	**0.00166(5)**
186 W	**273.10(5)**	**0.272(7)**	**0.00448(12)**
186 W	289.94(5)	0.0603(22)	0.00099(4)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
182 W	291.724(7)	0.0453(19)	0.00075(3)
186 W	294.73(8)	0.0097(16)	1.6(3)E-4
183 W	294.958(14)	0.0106(11)	1.75(18)E-4
186 W	303.25(4)	0.044(3)	0.00073(5)
182 W	313.0160(10)	0.054(4)	0.00089(7)
183 W	318.015(12)	0.021(3)	0.00035(5)
186 W	354.78(6)	0.0452(24)	0.00075(4)
180 W	365.44(11)	0.0155(15)	0.000256(25)
186 W	376.70(5)	0.0453(18)	0.00075(3)
186 W	390.59(11)	0.0126(12)	2.08(20)E-4
186 W	423.75(7)	0.0497(22)	0.00082(4)
186 W	473.88(7)	0.055(5)	0.00091(8)
186 W	**479.550(22)d**	**2.59(5)**	**0.0427[1.4%]**
186 W	494.64(7)	0.0123(16)	2.0(3)E-4
186 W	500.08(6)	0.0491(23)	0.00081(4)
186 W	531.17(7)	0.052(3)	0.00086(5)
186 W	541.09(7)	0.0190(23)	0.00031(4)
186 W	547.81(17)	0.022(4)	0.00036(7)
186 W	**551.52(4)d**	**0.603(14)**	**0.00994[1.4%]**
186 W	**557.16(5)**	**0.125(5)**	**0.00206(8)**
184 W	569.65(22)	0.0166(17)	0.00027(3)
186 W	**577.30(5)**	**0.191(5)**	**0.00315(8)**
184 W	579.8(3)	0.021(10)	0.00035(16)
184 W	580.49(23)	0.021(10)	0.00035(16)
186 W	588.34(7)	0.0216(19)	0.00036(3)
183 W	607.60(5)	0.0112(16)	1.8(3)E-4
186 W	611.30(5)	0.066(3)	0.00109(5)
186 W	616.20(6)	0.059(3)	0.00097(5)
186 W	**618.26(4)d**	**0.746(17)**	**0.0123[1.4%]**
186 W	**625.519(10)d**	**0.129(3)**	**0.00213[1.4%]**
186 W	629.19(17)	0.022(3)	0.00036(5)
186 W	635.35(5)	0.036(4)	0.00059(7)
184 W	636.4(4)	0.044(20)	0.0007(3)
184 W	640.02(24)	0.055(25)	0.0009(4)
186 W	640.43(7)	0.032(3)	0.00053(5)
186 W	657.54(7)	0.083(5)	0.00137(8)
186 W	661.36(8)	0.032(4)	0.00053(7)
184 W	663.49(21)	0.029(3)	0.00048(5)
186 W	670.34(5)	0.0452(25)	0.00075(4)
184 W	674.5(3)	0.019(9)	0.00031(15)
186 W	**685.73(4)d**	**3.24(7)**	**0.0534[1.4%]**
186 W	694.38(5)	0.073(3)	0.00120(5)
182 W	694.64(4)	0.0230(19)	0.00038(3)
182 W	696.77(5)	0.022(6)	0.00036(10)
183 W	710.28(5)	0.0118(17)	1.9(3)E-4
183 W	711.59(6)	0.0108(15)	1.78(25)E-4
183 W	724.39(3)	0.0179(23)	0.00030(4)
186 W	725.94(6)	0.023(4)	0.00038(7)
186 W	738.73(5)	0.040(3)	0.00066(5)
184 W	744.86(24)	0.030(14)	0.00049(23)
186 W	745.80(6)	0.053(3)	0.00087(5)
184 W	757.2(3)	0.048(22)	0.0008(4)
183 W	757.324(23)	0.028(3)	0.00046(5)
186 W	762.78(5)	0.047(4)	0.00077(7)
184 W	768.33(22)	0.015(7)	2.5(12)E-4
186 W	**772.89(5)d**	**0.490(10)**	**0.00808[1.4%]**
186 W	**782.12(6)**	**0.22(3)**	**0.0036(5)**
186 W	788.79(7)	0.070(5)	0.00115(8)
183 W	**792.059(16)**	**0.119(6)**	**0.00196(10)**
186 W	803.33(6)	0.034(3)	0.00056(5)
186 W	814.20(6)	0.0436(25)	0.00072(4)
186 W	**816.13(5)**	**0.104(4)**	**0.00171(7)**
182 W	817.557(17)	0.0157(13)	0.000259(21)
184 W	822.76(20)	0.0176(24)	0.00029(4)
186 W	831.65(10)	0.092(16)	0.0015(3)
184 W	838.5(4)	0.014(6)	2.3(10)E-4
186 W	**840.18(5)**	**0.143(5)**	**0.00236(8)**
182 W	846.33(6)	0.0221(22)	0.00036(4)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{186}W	866.18(7)	0.068(3)	0.00112(5)
^{186}W	872.64(8)	0.040(3)	0.00066(5)
^{186}W	877.51(8)	0.030(3)	0.00049(5)
^{186}W	880.89(9)	0.045(3)	0.00074(5)
^{182}W	888.08(3)	0.076(13)	0.00125(21)
^{184}W	888.9(3)	0.026(12)	0.00043(20)
^{183}W	891.27(4)	0.063(4)	0.00104(7)
^{186}W	**891.59(6)**	**0.136(5)**	**0.00224(8)**
^{183}W	894.735(16)	0.075(4)	0.00124(7)
^{183}W	**903.274(17)**	**0.115(5)**	**0.00190(8)**
^{186}W	909.04(10)	0.092(4)	0.00152(7)
^{184}W	912.1(3)	0.028(3)	0.00046(5)
^{186}W	913.63(6)	0.030(3)	0.00049(5)
^{182}W	927.294(18)	0.0235(18)	0.00039(3)
^{186}W	930.08(8)	0.018(4)	0.00030(7)
^{186}W	933.46(7)	0.0133(11)	2.19(18)E-4
^{186}W	936.54(8)	0.0130(11)	2.14(18)E-4
^{182}W	941.02(5)	0.0117(11)	1.93(18)E-4
^{186}W	941.04(8)	0.0276(13)	0.000455(21)
^{182}W	960.29(17)	0.0101(21)	1.7(4)E-4
^{184}W	976.2(3)	0.016(7)	0.00026(12)
^{186}W	979.68(16)	0.016(16)	0.0003(3)
^{182}W	**979.871(18)**	**0.102(10)**	**0.00168(16)**
^{186}W	989.11(7)	0.036(4)	0.00059(7)
^{186}W	1004.94(8)	0.015(6)	2.5(10)E-4
^{184}W	1005.9(4)	0.022(10)	0.00036(16)
^{183}W	1010.177(23)	0.036(3)	0.00059(5)
^{186}W	1012.05(6)	0.041(5)	0.00068(8)
^{186}W	1018.43(8)	0.036(4)	0.00059(7)
^{186}W	1025.94(12)	0.033(8)	0.00054(13)
^{182}W	**1026.373(17)**	**0.161(15)**	**0.00265(25)**
^{184}W	1031.3(3)	0.031(14)	0.00051(23)
^{186}W	1057.51(7)	0.029(3)	0.00048(5)
^{186}W	1071.09(5)	0.053(3)	0.00087(5)
^{186}W	1082.34(8)	0.061(4)	0.00101(7)
^{186}W	1084.97(12)	0.022(3)	0.00036(5)
^{182}W	1100.73(13)	0.024(5)	0.00040(8)
^{186}W	1103.58(21)	0.050(13)	0.00082(21)
^{186}W	1106.96(20)	0.027(3)	0.00045(5)
^{183}W	1121.392(24)	0.0144(15)	2.37(25)E-4
^{184}W	1125.3(3)	0.046(21)	0.0008(4)
^{186}W	1134.90(7)	0.027(3)	0.00045(5)
^{186}W	1139.48(5)	0.031(3)	0.00051(5)
^{186}W	1153.37(12)	0.014(8)	2.3(13)E-4
^{184}W	1153.5(3)	0.011(5)	1.8(8)E-4
^{184}W	1180.8(3)	0.08(4)	0.0013(7)
^{184}W	1195.63(23)	0.031(14)	0.00051(23)
^{182}W	1262.10(5)	0.0179(24)	0.00030(4)
^{186}W	1269.91(9)	0.031(8)	0.00051(13)
^{183}W	1275.01(3)	0.032(6)	0.00053(10)
^{183}W	1319.77(5)	0.0134(18)	2.2(3)E-4
^{184}W	1328.3(4)	0.015(3)	2.5(5)E-4
^{182}W	1347.37(13)	0.019(11)	0.00031(18)
^{184}W	1347.6(8)	0.020(9)	0.00033(15)
^{183}W	1386.22(3)	0.025(3)	0.00041(5)
^{184}W	1408.1(3)	0.0170(22)	0.00028(4)
^{183}W	1412.03(16)	0.017(5)	0.00028(8)
^{182}W	1424.42(5)	0.030(8)	0.00049(13)
^{183}W	1430.98(5)	0.0106(15)	1.75(25)E-4
^{182}W	1470.92(5)	0.010(4)	1.6(7)E-4
^{182}W	1504.07(9)	0.0100(11)	1.65(18)E-4
^{182}W	1509.68(13)	0.022(3)	0.00036(5)
^{182}W	1556.18(13)	0.014(3)	2.3(5)E-4
^{183}W	1569.9(3)	0.013(3)	2.1(5)E-4
^{183}W	1765.47(9)	0.0105(22)	1.7(4)E-4
^{183}W	1919.4(4)	0.019(4)	0.00031(7)
^{183}W	1945.14(15)	0.020(3)	0.00033(5)
^{183}W	1949.69(7)	0.0097(21)	1.6(4)E-4
^{183}W	1995.48(21)	0.0103(20)	1.7(3)E-4
^{183}W	2014.85(5)	0.0104(15)	1.71(25)E-4
^{183}W	2035.64(17)	0.025(3)	0.00041(5)
^{183}W	2135.08(21)	0.013(3)	2.1(5)E-4
^{183}W	2183.29(8)	0.022(3)	0.00036(5)
^{183}W	2284.32(19)	0.018(4)	0.00030(7)
^{186}W	2293.1(7)	0.011(3)	1.8(5)E-4
^{186}W	2367.1(4)	0.030(16)	0.0005(3)
^{183}W	2369.9(3)	0.018(4)	0.00030(7)
^{186}W	2481.30(25)	0.031(4)	0.00051(7)
^{186}W	2556.0(3)	0.021(4)	0.00035(7)
^{186}W	2584.20(18)	0.031(4)	0.00051(7)
^{186}W	2689.5(3)	0.024(4)	0.00040(7)
^{186}W	2708.4(3)	0.026(4)	0.00043(7)
^{186}W	2727.5(4)	0.021(11)	0.00035(18)
^{186}W	2738.4(3)	0.032(4)	0.00053(7)
^{186}W	2760.3(3)	0.033(4)	0.00054(7)
^{186}W	2831.98(20)	0.023(4)	0.00038(7)
^{186}W	2849.3(3)	0.033(4)	0.00054(7)
^{186}W	2939.4(4)	0.014(4)	2.3(7)E-4
^{186}W	3055.01(20)	0.0290(25)	0.00048(4)
^{186}W	3097.3(4)	0.015(3)	2.5(5)E-4
^{186}W	3114.78(20)	0.025(3)	0.00041(5)
^{186}W	3148.2(5)	0.086(19)	0.0014(3)
^{186}W	3153.9(10)	0.061(20)	0.0010(3)
^{186}W	3191.92(25)	0.037(3)	0.00061(5)
^{186}W	3207.0(3)	0.030(4)	0.00049(7)
^{186}W	3225.15(17)	0.042(6)	0.00069(10)
^{186}W	3267.1(5)	0.0101(24)	1.7(4)E-4
^{186}W	3314.4(4)	0.015(3)	2.5(5)E-4
^{186}W	3376.15(18)	0.041(4)	0.00068(7)
^{186}W	3423.0(4)	0.030(3)	0.00049(5)
^{186}W	3443.2(4)	0.039(12)	0.00064(20)
^{186}W	3452.8(9)	0.055(10)	0.00091(16)
^{186}W	**3469.40(14)**	**0.103(6)**	**0.00170(10)**
^{186}W	3492.67(17)	0.051(4)	0.00084(7)
^{186}W	3510.72(19)	0.033(4)	0.00054(7)
^{186}W	3529.69(18)	0.040(4)	0.00066(7)
^{186}W	3534.56(17)	0.063(5)	0.00104(8)
^{186}W	3561.14(14)	0.060(4)	0.00099(7)
^{186}W	3577.2(4)	0.016(4)	0.00026(7)
^{183}W	3696.2(4)	0.011(3)	1.8(5)E-4
^{186}W	3710.1(4)	0.034(8)	0.00056(13)
^{186}W	3739.05(17)	0.069(4)	0.00114(7)
^{186}W	3760.9(3)	0.026(3)	0.00043(5)
^{186}W	3774.59(21)	0.026(3)	0.00043(5)
^{186}W	3804.7(4)	0.020(3)	0.00033(5)
^{186}W	3847.8(4)	0.051(4)	0.00084(7)
^{183}W	3864.4(4)	0.011(3)	1.8(5)E-4
^{186}W	3886.4(3)	0.014(3)	2.3(5)E-4
^{186}W	3901.8(3)	0.024(3)	0.00040(5)
^{186}W	3920.2(4)	0.017(3)	0.00028(5)
^{186}W	3964.87(18)	0.034(9)	0.00056(15)
^{182}W	4014.17(5)	0.050(10)	0.00082(16)
^{186}W	4018.1(5)	0.029(6)	0.00048(10)
^{182}W	4026.21(10)	0.019(3)	0.00031(5)
^{182}W	4064.48(9)	0.018(3)	0.00030(5)
^{186}W	4082.8(5)	0.051(11)	0.00084(18)
^{186}W	4119.24(10)	0.059(4)	0.00097(7)
^{186}W	4136.61(17)	0.034(5)	0.00056(8)
^{186}W	4158.13(21)	0.043(5)	0.00071(8)
^{182}W	4162.33(17)	0.0122(15)	2.01(25)E-4
^{184}W	4219.2(8)	0.034(16)	0.0006(3)
^{182}W	4246.61(4)	0.043(4)	0.00071(7)
^{186}W	**4249.66(7)**	**0.115(6)**	**0.00190(10)**
^{182}W	4304.65(6)	0.020(3)	0.00033(5)
^{186}W	4331.63(8)	0.040(4)	0.00066(7)
^{182}W	4367.18(4)	0.026(3)	0.00043(5)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{182}W	4379.77(5)	0.017(3)	0.00028(5)
^{186}W	4384.20(9)	0.057(5)	0.00094(8)
^{186}W	4448.10(9)	0.048(3)	0.00079(5)
^{182}W	4460.59(9)	0.0124(23)	2.0(4)E-4
^{184}W	4469.1(6)	0.022(10)	0.00036(16)
^{186}W	4491.51(10)	0.036(10)	0.00059(16)
^{182}W	4518.11(5)	0.039(5)	0.00064(8)
^{184}W	4535.5(3)	0.08(4)	0.0013(7)
^{186}W	4557.49(11)	0.025(5)	0.00041(8)
^{182}W	4562.86(14)	0.026(3)	0.00043(5)
^{184}W	**4573.7(3)**	**0.104(9)**	**0.00171(15)**
^{186}W	**4574.94(8)**	**0.152(10)**	**0.00251(16)**
^{186}W	**4626.35(7)**	**0.124(7)**	**0.00204(12)**
^{182}W	4634.64(13)	0.015(4)	2.5(7)E-4
^{186}W	4650.40(7)	0.052(5)	0.00086(8)
^{186}W	**4684.40(8)**	**0.150(7)**	**0.00247(12)**
^{182}W	4719.90(5)	0.0189(25)	0.00031(4)
^{184}W	4748.7(4)	0.06(3)	0.0010(5)
^{184}W	4931.79(25)	0.0119(23)	2.0(4)E-4
^{184}W	4980.5(9)	0.017(8)	0.00028(13)
^{184}W	4986.2(3)	0.019(9)	0.00031(15)
^{183}W	5015.52(20)	0.0162(20)	0.00027(3)
^{184}W	5091.05(25)	0.07(3)	0.0012(5)
^{183}W	5116.55(10)	0.0114(16)	1.9(3)E-4
^{182}W	**5164.43(3)**	**0.19(3)**	**0.0031(5)**
^{182}W	5256.22(4)	0.0122(12)	2.01(20)E-4
^{186}W	**5261.68(6)**	**0.86(4)**	**0.0142(7)**
^{183}W	5285.00(8)	0.0115(14)	1.90(23)E-4
^{186}W	**5320.72(6)**	**0.605(21)**	**0.0100(4)**
^{186}W	5466.50(6)	0.023(4)	0.00038(7)
^{183}W	5534.37(11)	0.011(4)	1.8(7)E-4
^{184}W	5754.53(21)	0.0112(18)	1.8(3)E-4
^{183}W	5796.19(9)	0.023(9)	0.00038(15)
^{183}W	5797.50(9)	0.0161(23)	0.00027(4)
^{183}W	6024.82(7)	0.036(3)	0.00059(5)
^{182}W	**6144.28(3)**	**0.174(11)**	**0.00287(18)**
^{183}W	6189.75(7)	0.0264(24)	0.00044(4)
^{182}W	**6190.78(3)**	**0.45(4)**	**0.0074(7)**
^{183}W	6289.64(7)	0.0235(19)	0.00039(3)
^{183}W	6408.54(8)	0.043(4)	0.00071(7)
^{183}W	6507.75(7)	0.0098(9)	1.62(15)E-4
^{183}W	7299.78(7)	0.0159(17)	0.00026(3)
^{183}W	7410.99(7)	0.071(4)	0.00117(7)

Rhenium (Z=75), *At.Wt.*=186.207(1), σ_γ^z =91.5(10)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{185}Re	40.3510(20)	0.61(11)	0.0099(18)
^{185}Re	56.408(3)	0.106(20)	0.0017(3)
^{185}Re	**59.0100(20)**	**5.5(8)**	**0.090(13)**
^{185}Re	61.927(4)	0.51(7)	0.0083(11)
^{187}Re	**63.5820(20)**	**8.0(14)**	**0.130(23)**
^{187}Re	72.047(9)	0.41(5)	0.0067(8)
^{185}Re	74.5690(20)	0.64(9)	0.0104(15)
^{187}Re	**74.8630(20)**	**1.29(8)**	**0.0210(13)**
^{187}Re	85.323(7)	0.109(21)	0.0018(3)
^{185}Re	86.83(3)	0.102(24)	0.0017(4)
^{185}Re	**87.264(3)**	**0.84(4)**	**0.0137(7)**
^{187}Re	87.4800(20)	0.113(19)	0.0018(3)
^{187}Re	92.356(3)	0.25(4)	0.0041(7)
^{187}Re	**92.4640(20)**	**1.07(6)**	**0.0174(10)**
^{185}Re	99.3610(20)	0.230(24)	0.0037(4)
^{185}Re	99.698(3)	0.115(24)	0.0019(4)
^{185}Re	103.310(4)	0.43(3)	0.0070(5)
^{187}Re	**105.8620(20)**	**1.77(8)**	**0.0288(13)**
^{185}Re	106.550(4)	0.27(4)	0.0044(7)
^{187}Re	107.425(3)	0.352(25)	0.0057(4)
^{185}Re	108.336(5)	0.085(19)	0.0014(3)
^{185}Re	110.240(4)	0.089(16)	0.0014(3)
^{185}Re	111.337(4)	0.58(9)	0.0094(15)
^{187}Re	111.590(3)	0.45(5)	0.0073(8)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{185}Re	111.679(5)	0.68(12)	0.0111(20)
^{185}Re	111.814(4)	0.37(7)	0.0060(11)
^{187}Re	115.155(3)	0.43(5)	0.0070(8)
^{187}Re	115.155(3)	0.28(3)	0.0046(5)
^{185}Re	117.94(10)	0.22(4)	0.0036(7)
^{185}Re	118.196(4)	0.106(20)	0.0017(3)
^{185}Re	122.521(4)	0.74(4)	0.0120(7)
^{185}Re	123.507(6)	0.16(3)	0.0026(5)
^{185}Re	127.354(3)	0.43(4)	0.0070(7)
^{187}Re	128.553(4)	0.105(12)	0.00171(20)
^{187}Re	129.973(4)	0.090(15)	0.00146(24)
^{187}Re	131.080(4)	0.42(5)	0.0068(8)
^{185}Re	**137.157(8)d**	**5.29(3)**	**0.0861[<0.1%]**
^{187}Re	138.725(5)	0.19(3)	0.0031(5)
^{185}Re	139.417(6)	0.136(19)	0.0022(3)
^{185}Re	140.095(5)	0.27(5)	0.0044(8)
^{185}Re	141.257(5)	0.19(3)	0.0031(5)
^{187}Re	**141.760(4)**	**1.46(8)**	**0.0238(13)**
^{187}Re	143.124(4)	0.090(15)	0.00146(24)
^{185}Re	143.917(4)	0.55(8)	0.0090(13)
^{185}Re	**144.152(5)**	**1.8(3)**	**0.029(5)**
^{185}Re	144.157(4)	0.15(15)	0.0024(24)
^{187}Re	145.155(5)	0.44(5)	0.0072(8)
^{187}Re	145.155(5)	0.28(3)	0.0046(5)
^{185}Re	147.415(5)	0.60(9)	0.0098(15)
^{185}Re	147.417(6)	0.47(5)	0.0076(8)
^{185}Re	148.989(4)	0.29(7)	0.0047(11)
^{185}Re	149.520(5)	0.44(5)	0.0072(8)
^{187}Re	150.970(4)	0.24(3)	0.0039(5)
^{185}Re	**151.688(3)**	**1.15(7)**	**0.0187(11)**
^{187}Re	**155.041(4)d**	**7.16(25)**	**0.117[2.0%]**
^{187}Re	156.424(4)	0.73(8)	0.0119(13)
^{187}Re	158.730(20)	0.15(4)	0.0024(7)
^{185}Re	164.466(8)	0.085(21)	0.0014(3)
^{187}Re	**167.327(3)**	**1.46(6)**	**0.0238(10)**
^{185}Re	167.735(4)	0.20(4)	0.0033(7)
^{185}Re	169.434(4)	0.108(23)	0.0018(4)
^{185}Re	174.267(3)	0.382(24)	0.0062(4)
^{185}Re	176.103(5)	0.18(3)	0.0029(5)
^{185}Re	176.552(8)	0.31(3)	0.0050(5)
^{187}Re	178.138(5)	0.26(3)	0.0042(5)
^{187}Re	178.839(6)	0.20(3)	0.0033(5)
^{185}Re	179.448(6)	0.115(21)	0.0019(3)
^{187}Re	181.942(5)	0.388(25)	0.0063(4)
^{187}Re	**188.813(6)**	**0.98(10)**	**0.0159(16)**
^{187}Re	189.33(11)	0.284(24)	0.0046(4)
^{185}Re	189.346(8)	0.33(5)	0.0054(8)
^{187}Re	193.342(3)	0.43(3)	0.0070(5)
^{185}Re	**199.337(16)**	**0.91(4)**	**0.0148(7)**
^{187}Re	**199.513(5)**	**1.02(10)**	**0.0166(16)**
^{185}Re	200.997(7)	0.098(16)	0.0016(3)
^{187}Re	205.342(4)	0.37(8)	0.0060(13)
^{187}Re	**207.853(4)**	**4.44(21)**	**0.072(3)**
^{187}Re	**208.843(7)**	**0.98(10)**	**0.0159(16)**
^{185}Re	209.785(4)	0.14(3)	0.0023(5)
^{185}Re	**210.698(4)**	**1.50(10)**	**0.0244(16)**
^{187}Re	211.53(3)	0.27(5)	0.0044(8)
^{185}Re	**214.647(4)**	**2.53(14)**	**0.0412(23)**
^{187}Re	216.033(4)	0.30(7)	0.0049(11)
^{187}Re	219.445(7)	0.67(9)	0.0109(15)
^{185}Re	219.74(5)	0.081(15)	0.00132(24)
^{185}Re	223.016(5)	0.24(6)	0.0039(10)
^{187}Re	223.544(5)	0.083(9)	0.00135(15)
^{187}Re	**227.083(6)**	**1.78(12)**	**0.0290(20)**
^{185}Re	232.100(16)	0.36(7)	0.0059(11)
^{185}Re	232.111(9)	0.24(4)	0.0039(7)
^{187}Re	**236.627(4)**	**1.45(10)**	**0.0236(16)**
^{187}Re	238.450(5)	0.147(24)	0.0024(4)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{187}Re	246.33(3)	0.091(14)	0.00148(23)
^{187}Re	**251.243(5)**	**1.80(23)**	**0.029(4)**
^{185}Re	251.842(15)	0.58(16)	0.009(3)
^{185}Re	**254.998(4)**	**1.15(5)**	**0.0187(8)**
^{187}Re	256.924(3)	0.66(23)	0.011(4)
^{185}Re	**257.447(9)**	**0.87(23)**	**0.014(4)**
^{185}Re	260.67(7)	0.13(3)	0.0021(5)
^{185}Re	261.264(15)	0.67(3)	0.0109(5)
^{185}Re	263.367(5)	0.106(24)	0.0017(4)
^{187}Re	266.155(20)	0.125(15)	0.00203(24)
^{187}Re	**274.298(5)**	**0.80(6)**	**0.0130(10)**
^{187}Re	275.510(9)	0.51(4)	0.0083(7)
^{187}Re	284.590(17)	0.27(5)	0.0044(8)
^{185}Re	285.095(23)	0.41(4)	0.0067(7)
^{185}Re	287.0(3)	0.12(3)	0.0020(5)
^{187}Re	**290.665(6)**	**3.5(4)**	**0.057(7)**
^{187}Re	**291.492(8)**	**0.94(7)**	**0.0153(11)**
^{187}Re	299.130(9)	0.151(14)	0.00246(23)
^{187}Re	300.210(4)	0.70(5)	0.0114(8)
^{185}Re	307.673(16)	0.34(3)	0.0055(5)
^{185}Re	**316.457(9)**	**2.21(10)**	**0.0360(16)**
^{187}Re	317.38(5)	0.083(17)	0.0014(3)
^{187}Re	318.37(3)	0.25(3)	0.0041(5)
^{185}Re	319.374(9)	0.18(3)	0.0029(5)
^{187}Re	352.11(3)	0.116(16)	0.0019(3)
^{185}Re	355.646(17)	0.115(16)	0.0019(3)
^{185}Re	358.11(10)	0.236(19)	0.0038(3)
^{185}Re	360.36(7)	0.449(25)	0.0073(4)
^{187}Re	362.712(9)	0.46(3)	0.0075(5)
^{185}Re	363.612(8)	0.16(4)	0.0026(7)
^{187}Re	376.816(10)	0.083(16)	0.0014(3)
^{185}Re	378.384(9)	0.54(3)	0.0088(5)
^{185}Re	**390.854(23)**	**1.15(5)**	**0.0187(8)**
^{187}Re	406.555(9)	0.18(4)	0.0029(7)
^{185}Re	407.05(16)	0.102(24)	0.0017(4)
^{185}Re	410.74(15)	0.10(3)	0.0016(5)
^{185}Re	411.496(10)	0.14(3)	0.0023(5)
^{185}Re	413.19(5)	0.16(4)	0.0026(7)
^{187}Re	423.525(21)	0.12(3)	0.0020(5)
^{187}Re	426.112(9)	0.13(3)	0.0021(5)
^{185}Re	439.09(23)	0.14(5)	0.0023(8)
^{185}Re	469.79(10)	0.09(3)	0.0015(5)
^{185}Re	479.6(3)	0.30(13)	0.0049(21)
^{187}Re	493.23(6)	0.10(3)	0.0016(5)
^{185}Re	496.57(14)	0.15(4)	0.0024(7)
^{187}Re	518.575(9)	0.24(6)	0.0039(10)
^{185}Re	550.77(23)	0.15(4)	0.0024(7)
^{187}Re	556.81(6)	0.13(4)	0.0021(7)
^{185}Re	585.4(3)	0.18(3)	0.0029(5)
^{185}Re	608.25(14)	0.25(3)	0.0041(5)
^{187}Re	609.04(3)	0.25(3)	0.0041(5)
^{185}Re	645.02(14)	0.18(3)	0.0029(5)
^{185}Re	680.49(10)	0.34(3)	0.0055(5)
^{185}Re	759.94(14)	0.17(5)	0.0028(8)
^{185}Re	761.47(23)	0.17(5)	0.0028(8)
^{185}Re	796.1(3)	0.31(3)	0.0050(5)
^{185}Re	3933.7(8)	0.09(4)	0.0015(7)
^{185}Re	4079.0(8)	0.14(3)	0.0023(5)
^{185}Re	4099.8(10)	0.13(3)	0.0021(5)
^{185}Re	4129.4(8)	0.100(24)	0.0016(4)
^{185}Re	4178.1(5)	0.088(22)	0.0014(4)
^{185}Re	4455.7(23)	0.11(3)	0.0018(5)
^{185}Re	4611.3(5)	0.081(20)	0.0013(3)
^{185}Re	4631.7(23)	0.085(23)	0.0014(4)
^{185}Re	4663.7(4)	0.24(3)	0.0039(5)
^{185}Re	4743.5(8)	0.113(21)	0.0018(3)
^{185}Re	4773.7(5)	0.18(3)	0.0029(5)
^{185}Re	4860.7(5)	0.37(4)	0.0060(7)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{185}Re	4871.7(8)	0.11(3)	0.0018(5)
^{187}Re	4888.6(3)	0.141(25)	0.0023(4)
^{187}Re	4893.4(3)	0.081(17)	0.0013(3)
^{187}Re	4916.3(3)	0.102(21)	0.0017(3)
^{187}Re	4958.7(5)	0.14(3)	0.0023(5)
^{187}Re	4973.1(5)	0.15(3)	0.0024(5)
^{187}Re	4987.9(4)	0.17(4)	0.0028(7)
^{187}Re	5000.8(4)	0.17(4)	0.0028(7)
^{185}Re	5007.0(5)	0.27(4)	0.0044(7)
^{187}Re	5012.60(25)	0.18(3)	0.0029(5)
^{187}Re	5020.6(4)	0.098(23)	0.0016(4)
^{185}Re	5027.9(4)	0.29(5)	0.0047(8)
^{185}Re	5048.8(6)	0.096(23)	0.0016(4)
^{187}Re	5049.3(3)	0.16(3)	0.0026(5)
^{187}Re	5073.28(23)	0.43(5)	0.0070(8)
^{187}Re	5080.3(4)	0.098(23)	0.0016(4)
^{185}Re	5080.7(8)	0.094(23)	0.0015(4)
^{187}Re	5134.8(3)	0.25(6)	0.0041(10)
^{185}Re	5137.6(6)	0.39(4)	0.0063(7)
^{187}Re	5167.6(3)	0.14(3)	0.0023(5)
^{185}Re	5176.3(5)	0.18(3)	0.0029(5)
^{187}Re	5224.37(7)	0.081(20)	0.0013(3)
^{185}Re	5276.7(5)	0.14(3)	0.0023(5)
^{187}Re	5314.86(9)	0.083(20)	0.0014(3)
^{187}Re	5348.62(6)	0.20(3)	0.0033(5)
^{185}Re	5353.10(13)	0.13(3)	0.0021(5)
^{187}Re	5371.95(6)	0.090(19)	0.0015(3)
^{185}Re	5493.19(13)	0.114(18)	0.0019(3)
^{185}Re	5601.53(13)	0.109(18)	0.0018(3)
^{187}Re	5614.74(6)	0.092(17)	0.0015(3)
^{185}Re	5644.95(15)	0.088(16)	0.0014(3)
^{187}Re	5688.91(6)	0.120(17)	0.0020(3)
^{187}Re	5702.21(6)	0.100(16)	0.0016(3)
^{185}Re	5708.74(13)	0.115(17)	0.0019(3)
^{185}Re	5709.49(20)	0.098(24)	0.0016(4)
^{187}Re	5715.61(6)	0.086(16)	0.0014(3)
^{185}Re	5856.86(13)	0.140(15)	0.00228(24)
^{187}Re	5871.65(6)	0.299(23)	0.0049(4)
^{185}Re	5910.44(13)	0.60(4)	0.0098(7)
^{185}Re	6005.30(13)	0.081(11)	0.00132(18)
^{185}Re	6032.96(13)	0.090(12)	0.00146(20)
^{185}Re	6079.87(13)	0.155(13)	0.00252(21)
^{185}Re	6120.22(13)	0.182(16)	0.0030(3)
	Osmium (Z=76), *At.Wt.*=190.23(3), σ_γ^z =16.0(11)		
^{184}Os	37.18(13)	0.034(6)	0.00054(10)
^{190}Os	57.480(10)	0.10(3)	0.0016(5)
^{190}Os	57.74(6)	0.081(6)	0.00129(10)
^{188}Os	59.079(16)	0.046(5)	0.00073(8)
^{190}Os	67.24(20)	0.021(4)	0.00033(6)
^{192}Os	73.43(4)	0.174(8)	0.00277(13)
^{184}Os	90.95(15)	0.030(15)	0.00048(24)
^{192}Os	131.26(5)	0.0291(17)	0.00046(3)
^{190}Os	138.070(10)	0.0239(16)	0.000381(25)
^{192}Os	138.92(3)d	0.0467(22)	0.00074[1.1%]
^{187}Os	**155.10(4)**	**1.19(3)**	**0.0190(5)**
^{184}Os	158.40(10)	0.025(7)	0.00040(11)
^{190}Os	172.50(10)	0.025(4)	0.00040(6)
^{190}Os	175.80(4)	0.189(8)	0.00301(13)
^{186}Os	177.42(20)	0.021(4)	0.00033(6)
^{189}Os	182.02(10)	0.027(7)	0.00043(11)
^{190}Os	182.30(10)	0.043(5)	0.00069(8)
^{189}Os	**186.7180(20)**	**2.08(5)**	**0.0331(8)**
^{190}Os	194.25(8)	0.028(3)	0.00045(5)
^{189}Os	198.084(21)	0.056(7)	0.00089(11)
^{192}Os	204.42(4)	0.081(4)	0.00129(6)
^{184}Os	222.38(14)	0.021(7)	0.00033(11)
^{189}Os	223.810(7)	0.052(4)	0.00083(6)
^{190}Os	229.93(4)	0.072(4)	0.00115(6)

^{A}Z	E_γ-keV	$\sigma_\gamma^{Z}(E_\gamma)$-barns	k_0
^{190}Os	235.24(3)	0.184(6)	0.00293(10)
^{190}Os	239.890(10)	0.080(4)	0.00127(6)
^{192}Os	242.41(4)	0.069(4)	0.00110(6)
^{192}Os	254.39(5)	0.0368(22)	0.00059(4)
^{192}Os	265.71(3)	0.101(3)	0.00161(5)
^{188}Os	**272.82(4)**	**0.242(6)**	**0.00386(10)**
^{190}Os	275.34(3)	0.173(5)	0.00276(8)
^{190}Os	291.650(10)	0.047(3)	0.00075(5)
^{190}Os	295.030(10)	0.030(5)	0.00048(8)
^{192}Os	295.41(5)	0.055(4)	0.00088(6)
^{190}Os	304.71(6)	0.073(4)	0.00116(6)
^{190}Os	305.020(10)	0.022(4)	0.00035(6)
^{192}Os	307.080(10)	0.026(3)	0.00041(5)
^{190}Os	307.21(10)	0.026(3)	0.00041(5)
^{190}Os	314.72(10)	0.039(3)	0.00062(5)
^{190}Os	316.45(11)	0.030(4)	0.00048(6)
^{187}Os	**322.98(6)**	**0.242(9)**	**0.00386(14)**
^{190}Os	332.690(10)	0.055(5)	0.00088(8)
^{190}Os	339.61(5)	0.055(3)	0.00088(5)
^{188}Os	343.473(20)	0.051(16)	0.00081(25)
^{190}Os	343.61(6)	0.046(3)	0.00073(5)
^{190}Os	345.92(10)	0.034(4)	0.00054(6)
^{188}Os	346.871(25)	0.025(8)	0.00040(13)
^{187}Os	347.24(17)	0.023(4)	0.00037(6)
^{190}Os	349.25(6)	0.051(4)	0.00081(6)
^{190}Os	352.56(9)	0.041(5)	0.00065(8)
^{189}Os	353.85(5)	0.0213(24)	0.00034(4)
^{190}Os	355.80(10)	0.025(4)	0.00040(6)
^{189}Os	358.71(5)	0.033(4)	0.00053(6)
^{190}Os	359.01(7)	0.047(4)	0.00075(6)
^{189}Os	**361.137(6)**	**0.466(15)**	**0.00742(24)**
^{190}Os	362.36(15)	0.040(9)	0.00064(14)
^{190}Os	365.04(12)	0.035(5)	0.00056(8)
^{190}Os	366.33(5)	0.097(6)	0.00155(10)
^{189}Os	**371.261(5)**	**0.574(14)**	**0.00914(22)**
^{190}Os	397.270(10)	0.038(6)	0.00061(10)
^{189}Os	397.394(14)	0.115(5)	0.00183(8)
^{186}Os	400.84(22)	0.022(6)	0.00035(10)
^{190}Os	403.25(5)	0.065(4)	0.00104(6)
^{189}Os	407.175(22)	0.060(7)	0.00096(11)
^{189}Os	407.517(15)	0.134(5)	0.00213(8)
^{188}Os	410.602(21)	0.028(9)	0.00045(14)
^{190}Os	413.23(4)	0.103(5)	0.00164(8)
^{190}Os	423.76(7)	0.044(4)	0.00070(6)
^{186}Os	427.07(17)	0.022(4)	0.00035(6)
^{184}Os	431.45(20)	0.09(3)	0.0014(5)
^{189}Os	431.68(3)	0.036(4)	0.00057(6)
^{190}Os	434.16(12)	0.032(4)	0.00051(6)
^{190}Os	442.18(12)	0.022(4)	0.00035(6)
^{189}Os	447.79(7)	0.0213(19)	0.00034(3)
^{190}Os	453.69(24)	0.022(5)	0.00035(8)
^{188}Os	454.794(21)	0.028(9)	0.00045(14)
^{192}Os	455.47(24)	0.025(5)	0.00040(8)
^{188}Os	469.682(21)	0.040(5)	0.00064(8)
^{192}Os	471.60(25)	0.021(5)	0.00033(8)
^{190}Os	475.33(16)	0.032(6)	0.00051(10)
^{187}Os	**478.04(4)**	**0.523(14)**	**0.00833(22)**
^{190}Os	480.85(12)	0.043(7)	0.00069(11)
^{190}Os	485.87(20)	0.027(7)	0.00043(11)
^{187}Os	487.62(12)	0.044(7)	0.00070(11)
^{190}Os	495.68(9)	0.035(7)	0.00056(11)
^{190}Os	499.77(8)	0.054(5)	0.00086(8)
^{188}Os	505.861(20)	0.021(4)	0.00033(6)
^{184}Os	512.84(5)	0.084(8)	0.00134(13)
^{187}Os	514.76(9)	0.038(4)	0.00061(6)
^{184}Os	521.9(3)	0.024(5)	0.00038(8)
^{190}Os	**527.60(3)**	**0.300(10)**	**0.00478(16)**
^{190}Os	537.75(4)	0.121(6)	0.00193(10)

^{A}Z	E_γ-keV	$\sigma_\gamma^{Z}(E_\gamma)$-barns	k_0
^{184}Os	538.8(4)	0.023(7)	0.00037(11)
^{184}Os	539.40(24)	0.022(4)	0.00035(6)
^{190}Os	545.29(13)	0.031(4)	0.00049(6)
^{188}Os	550.17(5)	0.021(4)	0.00033(6)
^{189}Os	**557.978(5)**	**0.84(3)**	**0.0134(5)**
^{189}Os	**569.344(20)**	**0.694(25)**	**0.0111(4)**
^{184}Os	589.87(19)	0.034(5)	0.00054(8)
^{189}Os	605.26(3)	0.113(4)	0.00180(6)
^{187}Os	623.92(11)	0.036(4)	0.00057(6)
^{189}Os	630.985(23)	0.023(4)	0.00037(6)
^{187}Os	**633.14(4)**	**0.585(16)**	**0.00932(25)**
^{187}Os	**635.02(5)**	**0.405(12)**	**0.00645(19)**
^{190}Os	636.7(3)	0.028(6)	0.00045(10)
^{192}Os	655.61(13)	0.025(3)	0.00040(5)
^{190}Os	664.18(9)	0.036(4)	0.00057(6)
^{187}Os	672.64(11)	0.045(4)	0.00072(6)
^{189}Os	725.11(5)	0.081(5)	0.00129(8)
^{189}Os	768.653(15)	0.037(3)	0.00059(5)
^{190}Os	768.67(10)	0.046(5)	0.00073(8)
^{192}Os	786.64(15)	0.033(4)	0.00053(6)
^{187}Os	810.60(11)	0.035(3)	0.00056(5)
^{187}Os	824.43(11)	0.052(4)	0.00083(6)
^{187}Os	826.79(10)	0.029(3)	0.00046(5)
^{189}Os	829.07(3)	0.056(6)	0.00089(10)
^{187}Os	829.62(12)	0.109(16)	0.00174(25)
^{187}Os	844.68(14)	0.024(4)	0.00038(6)
^{189}Os	928.06(5)	0.085(5)	0.00135(8)
^{187}Os	931.31(8)	0.073(5)	0.00116(8)
^{192}Os	951.14(5)	0.089(4)	0.00142(6)
^{187}Os	987.33(13)	0.031(4)	0.00049(6)
^{189}Os	987.41(7)	0.071(6)	0.00113(10)
^{189}Os	1011.09(10)	0.031(4)	0.00049(6)
^{187}Os	1017.84(20)	0.043(4)	0.00069(6)
^{189}Os	1103.08(8)	0.047(5)	0.00075(8)
^{189}Os	1114.77(5)	0.060(5)	0.00096(8)
^{189}Os	1117.79(8)	0.033(5)	0.00053(8)
^{187}Os	1149.77(8)	0.079(6)	0.00126(10)
^{189}Os	1154.47(16)	0.029(9)	0.00046(14)
^{190}Os	1155.76(15)	0.042(5)	0.00067(8)
^{187}Os	1174.82(20)	0.038(7)	0.00061(11)
^{189}Os	1174.95(9)	0.080(6)	0.00127(10)
^{187}Os	1191.92(17)	0.034(5)	0.00054(8)
^{189}Os	1195.95(11)	0.077(6)	0.00123(10)
^{187}Os	1209.62(13)	0.063(6)	0.00100(10)
^{189}Os	1213.91(13)	0.031(6)	0.00049(10)
^{189}Os	1249.14(6)	0.035(5)	0.00056(8)
^{189}Os	1254.76(20)	0.041(5)	0.00065(8)
^{189}Os	1265.85(12)	0.029(5)	0.00046(8)
^{189}Os	1301.17(8)	0.035(5)	0.00056(8)
^{187}Os	1307.9(3)	0.025(3)	0.00040(5)
^{189}Os	1311.29(8)	0.031(3)	0.00049(5)
^{187}Os	1322.72(14)	0.037(4)	0.00059(6)
^{187}Os	1332.35(20)	0.05(3)	0.0008(5)
^{187}Os	1332.53(25)	0.040(4)	0.00064(6)
^{189}Os	1382.66(11)	0.026(3)	0.00041(5)
^{189}Os	1383.59(23)	0.026(4)	0.00041(6)
^{189}Os	1384.7(4)	0.023(5)	0.00037(8)
^{189}Os	1412.00(13)	0.0272(22)	0.00043(4)
^{189}Os	1429.31(11)	0.028(5)	0.00045(8)
^{187}Os	1435.74(14)	0.055(10)	0.00088(16)
^{189}Os	1436.94(14)	0.045(6)	0.00072(10)
^{187}Os	1452.88(19)	0.024(4)	0.00038(6)
^{187}Os	1457.56(11)	0.059(5)	0.00094(8)
^{187}Os	1465.36(13)	0.048(5)	0.00076(8)
^{189}Os	1489.05(8)	0.031(6)	0.00049(10)
^{189}Os	1512.11(19)	0.039(7)	0.00062(11)
^{189}Os	1546.20(9)	0.049(7)	0.00078(11)
^{187}Os	1574.48(14)	0.031(6)	0.00049(10)

A Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
189 Os	1616.03(11)	0.033(6)	0.00053(10)
189 Os	1672.42(8)	0.035(6)	0.00056(10)
189 Os	1680.73(16)	0.053(6)	0.00084(10)
189 Os	1732.0(3)	0.024(5)	0.00038(8)
189 Os	1770.5(5)	0.026(3)	0.00041(5)
187 Os	1802.35(13)	0.035(5)	0.00056(8)
189 Os	1883.37(19)	0.027(9)	0.00043(14)
187 Os	1957.46(13)	0.027(6)	0.00043(10)
187 Os	2011.29(20)	0.021(5)	0.00033(8)
187 Os	2022.95(14)	0.053(6)	0.00084(10)
187 Os	2098.77(22)	0.0208(24)	0.00033(4)
187 Os	2131.44(14)	0.052(6)	0.00083(10)
187 Os	2193.17(24)	0.031(6)	0.00049(10)
187 Os	2214.6(3)	0.039(7)	0.00062(11)
187 Os	2261.21(14)	0.077(7)	0.00123(11)
187 Os	2286.54(14)	0.052(8)	0.00083(13)
187 Os	2306.04(21)	0.0215(18)	0.00034(3)
187 Os	2505.13(24)	0.040(5)	0.00064(8)
187 Os	2606.38(21)	0.023(5)	0.00037(8)
187 Os	2623.10(21)	0.023(5)	0.00037(8)
187 Os	2817.11(25)	0.026(5)	0.00041(8)
187 Os	3021.7(3)	0.026(3)	0.00041(5)
187 Os	3069.9(3)	0.028(5)	0.00045(8)
187 Os	3110.00(18)	0.0273(19)	0.00043(3)
187 Os	3176.9(3)	0.025(5)	0.00040(8)
192 Os	3980.58(25)	0.035(4)	0.00056(6)
188 Os	4222.8(5)	0.052(6)	0.00083(10)
192 Os	4530.27(22)	0.090(8)	0.00143(13)
190 Os	4556.2(3)	0.035(7)	0.00056(11)
190 Os	4666.6(3)	0.024(6)	0.00038(10)
192 Os	4694.4(3)	0.025(5)	0.00040(8)
187 Os	4749.98(22)	0.042(6)	0.00067(10)
187 Os	4812.6(3)	0.049(7)	0.00078(11)
187 Os	4919.6(3)	0.037(3)	0.00059(5)
187 Os	4959.35(25)	0.021(5)	0.00033(8)
190 Os	5010.7(3)	0.029(6)	0.00046(10)
190 Os	5036.9(3)	0.041(6)	0.00065(10)
187 Os	5096.77(22)	0.037(7)	0.00059(11)
190 Os	**5146.63(14)**	**0.409(20)**	**0.0065(3)**
187 Os	5172.38(25)	0.031(6)	0.00049(10)
187 Os	5223.66(21)	0.0215(21)	0.00034(3)
187 Os	5250.4(7)	0.029(6)	0.00046(10)
192 Os	5277.11(22)	0.116(15)	0.00185(24)
189 Os	5315.8(3)	0.024(7)	0.00038(11)
190 Os	5341.4(3)	0.074(12)	0.00118(19)
188 Os	5364.5(4)	0.028(7)	0.00045(11)
187 Os	5366.38(21)	0.028(7)	0.00045(11)
188 Os	5371.8(4)	0.023(7)	0.00037(11)
188 Os	5416.0(4)	0.053(20)	0.0008(3)
188 Os	5483.1(4)	0.049(8)	0.00078(13)
187 Os	5484.35(24)	0.049(8)	0.00078(13)
189 Os	5502.8(6)	0.021(6)	0.00033(10)
187 Os	5528.34(22)	0.038(7)	0.00061(11)
189 Os	5529.1(7)	0.045(8)	0.00072(13)
187 Os	5573.17(15)	0.052(6)	0.00083(10)
192 Os	5583.70(20)	0.076(7)	0.00121(11)
189 Os	5599.6(7)	0.024(5)	0.00038(8)
187 Os	5641.20(23)	0.023(4)	0.00037(6)
190 Os	5674.5(4)	0.038(7)	0.00061(11)
189 Os	5680.3(3)	0.045(9)	0.00072(14)
190 Os	5683.87(21)	0.167(13)	0.00266(21)
187 Os	5702.93(15)	0.050(8)	0.00080(13)
186 Os	5703.4(7)	0.050(8)	0.00080(13)
189 Os	5749.8(10)	0.026(6)	0.00041(10)
189 Os	5782.7(3)	0.024(6)	0.00038(10)
189 Os	5873.5(3)	0.030(6)	0.00048(10)
189 Os	5881.67(19)	0.035(6)	0.00056(10)
188 Os	5885.7(4)	0.041(7)	0.00065(11)

A Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
187 Os	5920.60(14)	0.044(6)	0.00070(10)
189 Os	5933.06(13)	0.096(8)	0.00153(13)
184 Os	6155.8(3)	0.044(6)	0.00070(10)
189 Os	6246.81(12)	0.026(3)	0.00041(5)
189 Os	6409.53(14)	0.026(3)	0.00041(5)
184 Os	6587.21(25)	0.093(13)	0.00148(21)
189 Os	7234.19(11)	0.044(4)	0.00070(6)
189 Os	7792.14(11)	0.034(3)	0.00054(5)
187 Os	7834.30(8)	0.0247(23)	0.00039(4)
187 Os	7989.40(7)	0.0208(14)	0.000331(22)
Iridium (Z=77), *At.Wt.*=192.217(3), σ_γ^Z =425(5)			
191 Ir	23.9670(20)	0.170(14)	0.00268(22)
191 Ir	26.2260(20)	0.132(9)	0.00208(14)
193 Ir	39.2160(10)	0.17(11)	0.0027(17)
193 Ir	43.1190(10)	0.9(3)	0.014(5)
191 Ir	**48.0570(10)**	**5.7(4)**	**0.090(6)**
191 Ir	49.379(4)	0.122(10)	0.00192(16)
191 Ir	49.9560(20)	0.115(9)	0.00181(14)
191 Ir	50.782(8)	0.132(11)	0.00208(17)
191 Ir	54.3210(20)	0.54(20)	0.009(3)
193 Ir	54.4030(10)	0.12(8)	0.0019(13)
191 Ir	**58.8440(10)**	**5.3(3)**	**0.084(5)**
191 Ir	**66.822(8)**	**1.31(13)**	**0.0207(20)**
191 Ir	69.252(3)	0.25(7)	0.0039(11)
193 Ir	69.4740(20)	0.19(14)	0.0030(22)
191 Ir	72.0240(20)	0.6(3)	0.009(5)
191 Ir	72.328(4)	0.28(9)	0.0044(14)
191 Ir	77.369(3)	0.38(11)	0.0060(17)
191 Ir	**77.9470(10)**	**4.8(4)**	**0.076(6)**
193 Ir	82.3350(10)	0.5(3)	0.008(5)
191 Ir	83.965(8)	0.18(9)	0.0028(14)
191 Ir	**84.2740(20)**	**7.7(4)**	**0.121(6)**
193 Ir	84.2840(10)	1.0(6)	0.016(10)
191 Ir	86.8340(20)	0.65(13)	0.0102(20)
191 Ir	**88.7340(10)**	**3.67(24)**	**0.058(4)**
191 Ir	**90.7030(20)**	**1.25(15)**	**0.0197(24)**
191 Ir	90.857(3)	0.20(4)	0.0032(6)
193 Ir	93.1630(10)	0.3(3)	0.005(5)
191 Ir	95.056(6)	0.24(5)	0.0038(8)
191 Ir	95.470(4)	0.9(3)	0.014(5)
193 Ir	95.5690(10)	0.8(5)	0.013(8)
191 Ir	97.347(3)	0.25(5)	0.0039(8)
191 Ir	97.348(4)	0.36(14)	0.0057(22)
191 Ir	98.524(4)	0.32(5)	0.0050(8)
191 Ir	99.603(6)	0.24(13)	0.0038(20)
193 Ir	100.4030(20)	0.13(8)	0.0020(13)
191 Ir	104.043(9)	0.13(4)	0.0020(6)
191 Ir	105.159(3)	0.14(6)	0.0022(10)
191 Ir	107.015(3)	0.20(7)	0.0032(11)
191 Ir	107.132(4)	0.23(6)	0.0036(10)
191 Ir	**108.0300(20)**	**2.62(12)**	**0.0413(19)**
191 Ir	108.658(4)	0.11(3)	0.0017(5)
191 Ir	110.352(3)	0.53(7)	0.0084(11)
191 Ir	111.025(3)	0.99(11)	0.0156(17)
193 Ir	**112.2310(10)**	**1.7(4)**	**0.027(6)**
193 Ir	115.4730(10)	0.5(3)	0.008(5)
193 Ir	117.8790(10)	0.4(3)	0.006(5)
191 Ir	118.268(3)	0.15(3)	0.0024(5)
191 Ir	118.7820(10)	0.56(7)	0.0088(11)
191 Ir	121.139(3)	0.17(7)	0.0027(11)
191 Ir	122.596(3)	0.41(7)	0.0065(11)
193 Ir	123.8450(10)	1.0(6)	0.016(10)
191 Ir	**126.958(3)**	**1.86(10)**	**0.0293(16)**
193 Ir	132.8790(20)	0.18(10)	0.0028(16)
191 Ir	133.925(6)	0.19(5)	0.0030(8)
193 Ir	136.1000(20)	0.17(11)	0.0027(17)
191 Ir	**136.1250(10)**	**6.5(9)**	**0.102(14)**
191 Ir	**136.213(3)**	**4.0(5)**	**0.063(8)**

^{A}Z	E_{γ}-keV	$\sigma_{\gamma}^{z}(E_{\gamma})$-barns	k_0
^{191}Ir	**136.7910(10)**	**2.20(21)**	**0.035(3)**
^{191}Ir	138.2480(20)	0.53(7)	0.0084(11)
^{193}Ir	138.6880(10)	0.8(5)	0.013(8)
^{191}Ir	139.736(5)	0.27(4)	0.0043(6)
^{191}Ir	140.257(6)	0.32(5)	0.0050(8)
^{191}Ir	140.814(6)	0.16(5)	0.0025(8)
^{193}Ir	143.5940(10)	0.6(3)	0.009(5)
^{191}Ir	144.849(4)	0.57(9)	0.0090(14)
^{191}Ir	**144.903(5)**	**3.1(4)**	**0.049(6)**
^{193}Ir	145.2220(10)	0.11(7)	0.0017(11)
^{191}Ir	148.821(3)	1.08(12)	0.0170(19)
^{191}Ir	148.822(3)	1.08(12)	0.0170(19)
^{193}Ir	**148.9340(10)**	**1.4(9)**	**0.022(14)**
^{191}Ir	151.450(5)	0.26(5)	0.0041(8)
^{191}Ir	**151.5640(20)**	**2.89(20)**	**0.046(3)**
^{193}Ir	152.4080(10)	0.37(23)	0.006(4)
^{193}Ir	152.942(11)	0.55(13)	0.0087(20)
^{193}Ir	153.0550(10)	0.5(3)	0.008(5)
^{191}Ir	156.0870(20)	1.02(12)	0.0161(19)
^{191}Ir	**156.654(3)**	**2.76(12)**	**0.0435(19)**
^{191}Ir	158.180(4)	0.15(4)	0.0024(6)
^{193}Ir	160.8250(20)	0.34(11)	0.0054(17)
^{193}Ir	160.9980(10)	0.4(3)	0.006(5)
^{193}Ir	162.7740(20)	0.24(15)	0.0038(24)
^{191}Ir	162.850(6)	0.14(3)	0.0022(5)
^{193}Ir	165.3800(20)	0.27(23)	0.004(4)
^{193}Ir	165.4500(20)	0.35(22)	0.006(4)
^{191}Ir	166.089(5)	0.89(10)	0.0140(16)
^{191}Ir	166.435(4)	0.24(4)	0.0038(6)
^{191}Ir	**169.196(3)**	**3.05(13)**	**0.0481(20)**
^{191}Ir	169.542(5)	0.52(7)	0.0082(11)
^{191}Ir	169.542(4)	0.52(7)	0.0082(11)
^{193}Ir	169.5660(10)	0.24(15)	0.0038(24)
^{193}Ir	169.8760(10)	0.15(9)	0.0024(14)
^{191}Ir	172.839(3)	0.53(24)	0.008(4)
^{191}Ir	174.139(8)	0.21(4)	0.0033(6)
^{193}Ir	176.6510(20)	0.15(10)	0.0024(16)
^{191}Ir	176.812(3)	0.6(4)	0.009(6)
^{191}Ir	177.919(7)	0.28(6)	0.0044(10)
^{191}Ir	**179.0380(20)**	**2.1(5)**	**0.033(8)**
^{191}Ir	183.626(3)	1.0(4)	0.016(6)
^{193}Ir	184.6870(20)	0.92(22)	0.015(4)
^{191}Ir	187.521(3)	0.43(5)	0.0068(8)
^{191}Ir	188.204(3)	0.52(23)	0.008(4)
^{191}Ir	189.100(7)	0.47(18)	0.007(3)
^{191}Ir	193.718(3)	0.83(11)	0.0131(17)
^{193}Ir	193.9300(20)	0.21(13)	0.0033(20)
^{191}Ir	195.433(4)	0.27(7)	0.0043(11)
^{193}Ir	195.5270(10)	0.21(13)	0.0033(20)
^{191}Ir	197.061(7)	0.73(19)	0.012(3)
^{193}Ir	198.8370(20)	0.15(9)	0.0024(14)
^{191}Ir	199.174(7)	1.07(18)	0.017(3)
^{191}Ir	199.418(5)	0.14(4)	0.0022(6)
^{191}Ir	201.111(5)	0.21(6)	0.0033(10)
^{191}Ir	203.015(3)	0.27(4)	0.0043(6)
^{191}Ir	**206.220(4)**	**3.70(18)**	**0.058(3)**
^{191}Ir	207.301(5)	0.50(6)	0.0079(10)
^{191}Ir	208.440(6)	0.70(9)	0.0110(14)
^{191}Ir	210.352(5)	0.75(8)	0.0118(13)
^{191}Ir	210.354(5)	0.75(8)	0.0118(13)
^{191}Ir	**210.354(5)**	**2.1(4)**	**0.033(6)**
^{193}Ir	212.3460(20)	0.15(10)	0.0024(16)
^{191}Ir	215.117(5)	0.23(4)	0.0036(6)
^{191}Ir	215.5110(20)	0.24(4)	0.0038(6)
^{191}Ir	216.1940(20)	0.65(9)	0.0102(14)
^{191}Ir	**216.905(4)**	**5.57(24)**	**0.088(4)**
^{191}Ir	221.90(10)	0.83(16)	0.0131(25)
^{191}Ir	223.176(6)	0.18(3)	0.0028(5)

^{A}Z	E_{γ}-keV	$\sigma_{\gamma}^{z}(E_{\gamma})$-barns	k_0
^{193}Ir	224.0830(20)	0.18(11)	0.0028(17)
^{193}Ir	225.4180(20)	0.12(7)	0.0019(11)
^{191}Ir	**226.2980(20)**	**4.0(4)**	**0.063(6)**
^{193}Ir	226.6390(10)	0.20(12)	0.0032(19)
^{191}Ir	226.722(5)	0.19(4)	0.0030(6)
^{193}Ir	228.0650(20)	0.12(8)	0.0019(13)
^{191}Ir	229.771(11)	0.48(11)	0.0076(17)
^{191}Ir	231.683(3)	0.95(13)	0.0150(20)
^{191}Ir	232.907(4)	0.20(4)	0.0032(6)
^{193}Ir	234.8190(20)	0.44(13)	0.0069(20)
^{191}Ir	241.867(7)	0.65(13)	0.0102(20)
^{193}Ir	245.1090(20)	0.14(9)	0.0022(14)
^{193}Ir	245.4920(20)	0.33(22)	0.005(4)
^{191}Ir	246.169(3)	0.15(4)	0.0024(6)
^{191}Ir	246.800(4)	0.32(9)	0.0050(14)
^{193}Ir	248.6000(20)	0.24(15)	0.0038(24)
^{193}Ir	252.2750(10)	0.11(7)	0.0017(11)
^{191}Ir	252.499(12)	0.5(3)	0.008(5)
^{191}Ir	254.277(4)	1.08(11)	0.0170(17)
^{193}Ir	255.3130(20)	0.36(13)	0.0057(20)
^{191}Ir	258.320(5)	0.24(5)	0.0038(8)
^{191}Ir	**261.953(6)**	**2.02(23)**	**0.032(4)**
^{191}Ir	**262.03(10)**	**3.05(18)**	**0.048(3)**
^{193}Ir	262.7290(10)	0.14(8)	0.0022(13)
^{191}Ir	263.573(6)	0.86(10)	0.0136(16)
^{191}Ir	264.008(7)	0.57(7)	0.0090(11)
^{193}Ir	264.7680(20)	0.8(5)	0.013(8)
^{191}Ir	267.415(4)	0.93(21)	0.015(3)
^{193}Ir	271.6810(20)	0.6(4)	0.009(6)
^{191}Ir	273.235(8)	0.49(8)	0.0077(13)
^{191}Ir	273.236(7)	0.72(17)	0.011(3)
^{191}Ir	273.568(5)	0.18(6)	0.0028(10)
^{191}Ir	275.0380(20)	0.74(16)	0.0117(25)
^{193}Ir	275.2990(10)	0.6(4)	0.009(6)
^{191}Ir	276.787(4)	0.55(12)	0.0087(19)
^{191}Ir	278.193(8)	0.42(5)	0.0066(8)
^{193}Ir	**278.5040(10)**	**1.8(11)**	**0.028(17)**
^{191}Ir	**284.074(6)**	**1.95(15)**	**0.0307(24)**
^{191}Ir	284.947(3)	0.52(7)	0.0082(11)
^{193}Ir	288.4310(20)	0.12(7)	0.0019(11)
^{191}Ir	292.374(4)	0.42(12)	0.0066(19)
^{193}Ir	**293.541(14)d**	**1.76(6)**	**0.0277[1.8%]**
^{193}Ir	294.5300(20)	0.41(25)	0.006(4)
^{191}Ir	296.257(8)	0.65(17)	0.010(3)
^{191}Ir	299.476(8)	0.13(4)	0.0020(6)
^{191}Ir	**302.905(8)**	**1.20(11)**	**0.0189(17)**
^{191}Ir	305.448(4)	0.45(10)	0.0071(16)
^{193}Ir	308.9740(10)	0.6(4)	0.009(6)
^{191}Ir	310.010(6)	0.26(8)	0.0041(13)
^{191}Ir	310.08(10)	0.61(10)	0.0096(16)
^{193}Ir	311.4960(10)	0.16(10)	0.0025(16)
^{191}Ir	311.630(6)	0.23(6)	0.0036(10)
^{193}Ir	314.0520(10)	0.26(17)	0.004(3)
^{191}Ir	**316.061(7)**	**2.4(4)**	**0.038(6)**
^{191}Ir	322.510(5)	0.51(11)	0.0080(17)
^{193}Ir	**328.448(14)d**	**9.1(3)**	**0.143[1.8%]**
^{191}Ir	**333.864(6)**	**1.53(10)**	**0.0241(16)**
^{193}Ir	337.5240(20)	0.62(21)	0.010(3)
^{193}Ir	340.8130(20)	0.8(5)	0.013(8)
^{191}Ir	**351.689(4)**	**10.9(4)**	**0.172(6)**
^{193}Ir	353.9610(10)	0.5(3)	0.008(5)
^{191}Ir	358.320(8)	0.34(9)	0.0054(14)
^{191}Ir	**365.440(7)**	**1.15(10)**	**0.0181(16)**
^{193}Ir	**371.5020(20)**	**2.11(12)**	**0.0333(19)**
^{191}Ir	384.659(6)	0.50(12)	0.0079(19)
^{193}Ir	390.9620(10)	0.6(4)	0.009(6)
^{193}Ir	405.3660(20)	0.11(7)	0.0017(11)
^{193}Ir	407.3150(20)	0.13(8)	0.0020(13)

^{A}Z	E_γ-keV	$\sigma_\gamma^{Z}(E_\gamma)$-barns	k_0
^{193}Ir	411.988(10)	0.12(8)	0.0019(13)
^{191}Ir	**418.138(6)**	**3.45(15)**	**0.0544(24)**
^{191}Ir	**432.716(6)**	**1.85(7)**	**0.0292(11)**
^{193}Ir	458.3070(20)	0.41(25)	0.006(4)
^{193}Ir	460.2560(20)	0.8(5)	0.013(8)
^{193}Ir	4365.1(3)	0.22(3)	0.0035(5)
^{193}Ir	4368.5(4)	0.14(3)	0.0022(5)
^{193}Ir	4383.5(4)	0.11(3)	0.0017(5)
^{193}Ir	4395.64(18)	0.39(3)	0.0061(5)
^{193}Ir	4401.28(18)	0.35(3)	0.0055(5)
^{193}Ir	4426.1(3)	0.23(3)	0.0036(5)
^{193}Ir	4442.1(8)	0.14(3)	0.0022(5)
^{193}Ir	4455.3(4)	0.13(3)	0.0020(5)
^{193}Ir	4460.5(4)	0.18(3)	0.0028(5)
^{191}Ir	4495.88(21)	0.44(4)	0.0069(6)
^{191}Ir	4505.9(4)	0.20(3)	0.0032(5)
^{191}Ir	4521.3(4)	0.12(4)	0.0019(6)
^{191}Ir	4531.28(19)	0.61(5)	0.0096(8)
^{191}Ir	4556.8(8)	0.18(7)	0.0028(11)
^{191}Ir	4563.5(9)	0.14(11)	0.0022(17)
^{191}Ir	4571.8(5)	0.23(4)	0.0036(6)
^{193}Ir	4577.9(4)	0.16(3)	0.0025(5)
^{193}Ir	4584.4(3)	0.21(4)	0.0033(6)
^{191}Ir	4591.30(17)	0.57(4)	0.0090(6)
^{191}Ir	4601.64(24)	0.22(4)	0.0035(6)
^{191}Ir	4611.6(6)	0.11(7)	0.0017(11)
^{193}Ir	4612.5(3)	0.19(3)	0.0030(5)
^{193}Ir	4618.0(4)	0.13(3)	0.0020(5)
^{191}Ir	4640.0(6)	0.15(6)	0.0024(10)
^{193}Ir	4643.2(3)	0.33(5)	0.0052(8)
^{191}Ir	4646.47(13)	0.26(5)	0.0041(8)
^{191}Ir	4663.36(21)	0.18(3)	0.0028(5)
^{191}Ir	4668.09(17)	0.36(3)	0.0057(5)
^{193}Ir	4678.7(3)	0.18(3)	0.0028(5)
^{191}Ir	4711.6(4)	0.17(3)	0.0027(5)
^{193}Ir	4712.8(3)	0.28(3)	0.0044(5)
^{191}Ir	4729.1(3)	0.167(25)	0.0026(4)
^{191}Ir	4734.2(3)	0.45(9)	0.0071(14)
^{193}Ir	4734.52(23)	0.46(3)	0.0073(5)
^{191}Ir	4750.18(15)	0.38(3)	0.0060(5)
^{191}Ir	4755.28(20)	0.39(3)	0.0061(5)
^{191}Ir	4765.66(17)	0.245(24)	0.0039(4)
^{191}Ir	4779.82(15)	0.32(3)	0.0050(5)
^{191}Ir	4801.4(3)	0.12(3)	0.0019(5)
^{191}Ir	4809.72(23)	0.44(4)	0.0069(6)
^{191}Ir	4817.3(3)	0.28(4)	0.0044(6)
^{191}Ir	4826.1(4)	0.11(3)	0.0017(5)
^{193}Ir	4826.9(4)	0.20(4)	0.0032(6)
^{191}Ir	4838.3(4)	0.15(4)	0.0024(6)
^{193}Ir	4839.34(20)	0.41(4)	0.0065(6)
^{191}Ir	4849.6(3)	0.15(3)	0.0024(5)
^{191}Ir	4854.8(5)	0.28(5)	0.0044(8)
^{193}Ir	4855.5(3)	0.48(4)	0.0076(6)
^{191}Ir	4859.30(23)	0.45(4)	0.0071(6)
^{191}Ir	4866.97(12)	0.68(4)	0.0107(6)
^{191}Ir	4875.03(18)	0.33(4)	0.0052(6)
^{191}Ir	4893.82(23)	0.35(3)	0.0055(5)
^{191}Ir	4898.53(19)	0.41(4)	0.0065(6)
^{191}Ir	4916.5(3)	0.29(5)	0.0046(8)
^{193}Ir	4921.1(4)	0.18(4)	0.0028(6)
^{191}Ir	4932.9(3)	0.11(4)	0.0017(6)
^{191}Ir	4938.9(3)	0.25(9)	0.0039(14)
^{191}Ir	4942.92(18)	0.52(4)	0.0082(6)
^{191}Ir	4949.40(24)	0.31(4)	0.0049(6)
^{191}Ir	4955.2(3)	0.15(7)	0.0024(11)
^{191}Ir	4966.5(3)	0.20(3)	0.0032(5)
^{191}Ir	4972.12(17)	0.35(3)	0.0055(5)
^{191}Ir	4980.57(15)	0.82(4)	0.0129(6)
^{191}Ir	4985.93(14)	0.58(3)	0.0091(5)
^{191}Ir	4993.32(15)	0.40(4)	0.0063(6)
^{191}Ir	5003.4(3)	0.35(4)	0.0055(6)
^{193}Ir	5013.8(5)	0.21(4)	0.0033(6)
^{191}Ir	5020.51(15)	0.66(6)	0.0104(10)
^{191}Ir	5028.52(15)	0.67(6)	0.0106(10)
^{191}Ir	5037.5(3)	0.22(4)	0.0035(6)
^{191}Ir	5042.35(23)	0.57(6)	0.0090(10)
^{191}Ir	5046.4(6)	0.12(3)	0.0019(5)
^{191}Ir	5053.15(23)	0.26(3)	0.0041(5)
^{193}Ir	5058.0(3)	0.20(3)	0.0032(5)
^{191}Ir	5066.5(3)	0.15(3)	0.0024(5)
^{193}Ir	5071.99(21)	0.28(3)	0.0044(5)
^{191}Ir	5085.45(20)	0.266(25)	0.0042(4)
^{191}Ir	5091.10(18)	0.37(5)	0.0058(8)
^{193}Ir	5091.19(17)	0.52(3)	0.0082(5)
^{191}Ir	5104.6(4)	0.14(3)	0.0022(5)
^{193}Ir	5109.0(3)	0.19(3)	0.0030(5)
^{191}Ir	5109.6(6)	0.11(7)	0.0017(11)
^{193}Ir	5117.9(4)	0.12(3)	0.0019(5)
^{191}Ir	5123.3(3)	0.20(3)	0.0032(5)
^{191}Ir	5129.21(12)	0.90(5)	0.0142(8)
^{191}Ir	5138.06(14)	0.39(4)	0.0061(6)
^{191}Ir	**5147.51(12)**	**1.29(6)**	**0.0203(10)**
^{191}Ir	5153.1(3)	0.26(3)	0.0041(5)
^{193}Ir	5158.23(22)	0.36(3)	0.0057(5)
^{191}Ir	5166.92(13)	0.96(6)	0.0151(10)
^{193}Ir	5178.4(3)	0.34(4)	0.0054(6)
^{191}Ir	5184.38(25)	0.20(6)	0.0032(10)
^{193}Ir	5185.2(4)	0.34(4)	0.0054(6)
^{191}Ir	5194.52(24)	0.34(5)	0.0054(8)
^{191}Ir	5198.64(21)	0.38(4)	0.0060(6)
^{191}Ir	5219.92(17)	0.72(5)	0.0114(8)
^{191}Ir	5248.02(23)	0.20(3)	0.0032(5)
^{191}Ir	5261.14(17)	0.51(4)	0.0080(6)
^{191}Ir	5283.60(13)	0.85(6)	0.0134(10)
^{191}Ir	5304.44(13)	0.73(5)	0.0115(8)
^{191}Ir	5313.6(3)	0.15(4)	0.0024(6)
^{193}Ir	5316.6(3)	0.20(4)	0.0032(6)
^{191}Ir	5327.53(19)	0.71(5)	0.0112(8)
^{191}Ir	5332.49(20)	0.54(5)	0.0085(8)
^{191}Ir	5347.1(3)	0.18(3)	0.0028(5)
^{191}Ir	5357.09(16)	1.03(6)	0.0162(10)
^{191}Ir	5376.11(14)	0.288(24)	0.0045(4)
^{191}Ir	5384.82(20)	0.224(22)	0.0035(4)
^{191}Ir	5400.78(16)	0.40(3)	0.0063(5)
^{191}Ir	5420.57(23)	0.201(22)	0.0032(4)
^{191}Ir	5431.34(12)	0.78(4)	0.0123(6)
^{191}Ir	5448.60(17)	0.51(4)	0.0080(6)
^{191}Ir	5458.91(18)	0.60(5)	0.0095(8)
^{191}Ir	5463.9(4)	0.31(7)	0.0049(11)
^{193}Ir	5467.0(3)	0.59(7)	0.0093(11)
^{191}Ir	5483.9(4)	0.17(6)	0.0027(10)
^{193}Ir	5487.40(21)	0.58(4)	0.0091(6)
^{191}Ir	5490.1(5)	0.19(3)	0.0030(5)
^{191}Ir	5495.27(23)	0.22(3)	0.0035(5)
^{191}Ir	5517.04(17)	0.76(4)	0.0120(6)
^{191}Ir	**5534.73(12)**	**1.39(6)**	**0.0219(10)**
^{191}Ir	5552.18(21)	0.163(22)	0.0026(4)
^{191}Ir	**5564.54(14)**	**1.71(8)**	**0.0270(13)**
^{191}Ir	5569.4(3)	0.67(4)	0.0106(6)
^{193}Ir	5576.98(7)	0.121(24)	0.0019(4)
^{191}Ir	5595.63(13)	0.72(4)	0.0114(6)
^{191}Ir	5612.55(12)	1.06(5)	0.0167(8)
^{193}Ir	5630.33(7)	0.315(24)	0.0050(4)
^{193}Ir	5642.90(7)	0.293(25)	0.0046(4)
^{191}Ir	5654.27(14)	0.39(3)	0.0061(5)
^{191}Ir	5661.00(20)	0.38(3)	0.0060(5)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{191}Ir	**5667.81(3)**	**2.68(10)**	**0.0423(16)**
^{191}Ir	5681.1(3)	0.165(19)	0.0026(3)
^{191}Ir	**5689.06(3)**	**1.73(7)**	**0.0273(11)**
^{191}Ir	5708.62(3)	0.122(17)	0.0019(3)
^{191}Ir	5727.2(3)	0.27(4)	0.0043(6)
^{193}Ir	**5728.97(7)**	**1.15(5)**	**0.0181(8)**
^{191}Ir	5746.80(3)	0.190(18)	0.0030(3)
^{191}Ir	5757.18(3)	0.49(6)	0.0077(10)
^{193}Ir	5757.65(7)	0.42(4)	0.0066(6)
^{191}Ir	**5783.01(3)**	**1.34(6)**	**0.0211(10)**
^{193}Ir	5788.12(7)	0.43(4)	0.0068(6)
^{191}Ir	5808.33(3)	0.48(3)	0.0076(5)
^{191}Ir	5817.7(4)	0.113(25)	0.0018(4)
^{193}Ir	5821.51(7)	0.48(3)	0.0076(5)
^{191}Ir	5829.70(3)	0.16(5)	0.0025(8)
^{191}Ir	5866.29(3)	0.73(6)	0.0115(10)
^{191}Ir	5866.97(3)	0.79(5)	0.0125(8)
^{191}Ir	5905.67(3)	0.45(4)	0.0071(6)
^{191}Ir	5909.64(3)	0.23(3)	0.0036(5)
^{193}Ir	5917.68(7)	0.34(3)	0.0054(5)
^{193}Ir	5927.93(7)	0.33(3)	0.0052(5)
^{193}Ir	5954.39(7)	0.74(4)	0.0117(6)
^{191}Ir	**5958.28(3)**	**1.79(8)**	**0.0282(13)**
^{191}Ir	5962.29(3)	0.75(4)	0.0118(6)
^{191}Ir	5972.13(3)	0.254(21)	0.0040(3)
^{193}Ir	5984.28(7)	0.212(21)	0.0033(3)
^{191}Ir	6004.53(3)	0.257(21)	0.0041(3)
^{193}Ir	6023.50(7)	0.171(17)	0.0027(3)
^{191}Ir	6079.26(3)	0.29(9)	0.0046(14)
^{191}Ir	**6082.48(3)**	**2.62(11)**	**0.0413(17)**
^{191}Ir	6093.26(3)	0.56(4)	0.0088(6)
	Platinum (Z=78), *At.Wt.*=195.078(2), σ_γ=10.3(4)		
^{194}Pt	211.4060(20)	0.0293(10)	0.000455(16)
^{195}Pt	326.353(3)	0.511(10)	0.00794(16)
^{195}Pt	**332.985(4)**	**2.580(25)**	**0.0401(4)**
^{195}Pt	**355.6840(20)**	**6.17(6)**	**0.0958(9)**
^{195}Pt	393.346(5)	0.066(4)	0.00103(6)
^{195}Pt	446.624(4)	0.0963(21)	0.00150(3)
^{195}Pt	521.161(5)	0.338(10)	0.00525(16)
^{198}Pt	542.98(4)d	0.0390(3)	0.000606[45%]
^{195}Pt	672.894(3)	0.179(4)	0.00278(6)
^{195}Pt	779.608(5)	0.227(3)	0.00353(5)
^{195}Pt	1005.878(5)	0.139(3)	0.00216(5)
^{195}Pt	1047.007(11)	0.181(4)	0.00281(6)
^{195}Pt	1091.334(6)	0.181(4)	0.00281(6)
^{195}Pt	1248.774(10)	0.099(3)	0.00154(5)
^{195}Pt	1305.57(3)	0.062(3)	0.00096(5)
^{195}Pt	1321.541(15)	0.081(3)	0.00126(5)
^{195}Pt	1358.31(6)	0.076(4)	0.00118(6)
^{195}Pt	1439.35(5)	0.067(3)	0.00104(5)
^{195}Pt	1491.625(16)	0.135(4)	0.00210(6)
^{195}Pt	1497.950(11)	0.084(3)	0.00130(5)
^{195}Pt	1510.75(5)	0.083(3)	0.00129(5)
^{195}Pt	1531.84(3)	0.122(4)	0.00190(6)
^{195}Pt	1532.435(12)	0.066(18)	0.0010(3)
^{195}Pt	1562.76(4)	0.083(3)	0.00129(5)
^{195}Pt	1677.223(15)	0.087(4)	0.00135(6)
^{195}Pt	1713.67(10)	0.090(4)	0.00140(6)
^{195}Pt	1737.278(16)	0.087(4)	0.00135(6)
^{195}Pt	1802.269(10)	0.146(4)	0.00227(6)
^{195}Pt	1825.685(8)	0.091(4)	0.00141(6)
^{195}Pt	1888.116(12)	0.080(4)	0.00124(6)
^{195}Pt	1968.858(13)	0.103(4)	0.00160(6)
^{195}Pt	1978.46(3)	0.163(5)	0.00253(8)
^{195}Pt	2309.20(9)	0.066(14)	0.00103(22)
^{195}Pt	2311.44(3)	0.134(4)	0.00208(6)
^{195}Pt	2527.81(3)	0.07(3)	0.0011(5)
^{195}Pt	4949.0(4)	0.069(20)	0.0011(3)
^{196}Pt	5098.1(7)	0.093(6)	0.00144(9)
^{195}Pt	5098.5(7)	0.10(3)	0.0016(5)
^{195}Pt	5173.4(3)	0.136(6)	0.00211(9)
^{195}Pt	5185.3(3)	0.085(5)	0.00132(8)
^{195}Pt	5254.70(8)	0.41(3)	0.0064(5)
^{195}Pt	5261.0(6)	0.097(14)	0.00151(22)
^{195}Pt	5306.9(3)	0.118(14)	0.00183(22)
^{195}Pt	5393.05(16)	0.113(10)	0.00176(16)
^{195}Pt	5451.93(14)	0.078(7)	0.00121(11)
^{195}Pt	5612.62(11)	0.14(3)	0.0022(5)
^{195}Pt	5722.40(9)	0.071(5)	0.00110(8)
^{195}Pt	5759.22(10)	0.084(12)	0.00130(19)
^{195}Pt	5952.95(7)	0.086(16)	0.00134(25)
^{195}Pt	6003.37(8)	0.073(4)	0.00113(6)
^{195}Pt	6033.69(7)	0.109(6)	0.00169(9)
	Gold (Z=79), *At.Wt.*=196.96655(2), σ_γ^z =98.65(9)		
^{197}Au	35.8240(10)	0.41(5)	0.0063(8)
^{197}Au	**55.1810(10)**	**2.90(12)**	**0.0446(18)**
^{197}Au	66.3950(10)	0.42(12)	0.0065(18)
^{197}Au	75.171(6)	0.390(23)	0.0060(4)
^{197}Au	**82.3560(10)**	**2.3(4)**	**0.035(6)**
^{197}Au	**82.5240(10)**	**1.4(3)**	**0.022(5)**
^{197}Au	83.144(6)	0.17(7)	0.0026(11)
^{197}Au	91.0050(10)	0.294(15)	0.00452(23)
^{197}Au	**97.2500(20)**	**2.1(5)**	**0.032(8)**
^{197}Au	**101.9390(10)**	**0.953(17)**	**0.0147(3)**
^{197}Au	103.5610(10)	0.338(15)	0.00520(23)
^{197}Au	108.9120(20)	0.270(14)	0.00415(22)
^{197}Au	122.6520(10)	0.81(13)	0.0125(20)
^{197}Au	123.7860(10)	0.83(13)	0.0128(20)
^{197}Au	131.9340(20)	0.17(6)	0.0026(9)
^{197}Au	132.850(4)	0.104(24)	0.0016(4)
^{197}Au	135.612(6)	0.10(3)	0.0015(5)
^{197}Au	137.448(6)	0.13(5)	0.0020(8)
^{197}Au	137.7630(10)	0.347(24)	0.0053(4)
^{197}Au	137.999(5)	0.17(5)	0.0026(8)
^{197}Au	142.9270(20)	0.161(16)	0.00248(25)
^{197}Au	144.6050(10)	0.18(4)	0.0028(6)
^{197}Au	145.1540(10)	0.46(13)	0.0071(20)
^{197}Au	146.3460(20)	0.43(4)	0.0066(6)
^{197}Au	146.6700(10)	0.28(5)	0.0043(8)
^{197}Au	154.7940(20)	0.38(6)	0.0058(9)
^{197}Au	154.797(5)	0.239(10)	0.00368(15)
^{197}Au	**158.4360(10)**	**1.250(18)**	**0.0192(3)**
^{197}Au	158.479(11)	0.67(9)	0.0103(14)
^{197}Au	164.7130(10)	0.21(3)	0.0032(5)
^{197}Au	166.2280(10)	0.279(11)	0.00429(17)
^{197}Au	**168.3340(10)**	**3.60(22)**	**0.055(3)**
^{197}Au	169.9550(10)	0.126(25)	0.0019(4)
^{197}Au	**170.1030(10)**	**1.66(22)**	**0.026(3)**
^{197}Au	170.3990(20)	0.38(5)	0.0058(8)
^{197}Au	175.3070(20)	0.10(8)	0.0015(12)
^{197}Au	180.8640(10)	0.63(11)	0.0097(17)
^{197}Au	188.1670(20)	0.63(15)	0.0097(23)
^{197}Au	191.1870(20)	0.18(3)	0.0028(5)
^{197}Au	**192.3920(10)**	**3.9(18)**	**0.06(3)**
^{197}Au	**192.9440(10)**	**1.70(22)**	**0.026(3)**
^{197}Au	202.9920(20)	0.229(6)	0.00352(9)
^{197}Au	204.1580(10)	0.513(10)	0.00789(15)
^{197}Au	204.1620(10)	0.59(10)	0.0091(15)
^{197}Au	206.2230(10)	0.199(6)	0.00306(9)
^{197}Au	213.0650(10)	0.094(13)	0.00145(20)
^{197}Au	214.858(3)	0.19(5)	0.0029(8)
^{197}Au	**214.9710(10)**	**9.0(12)**	**0.138(18)**
^{197}Au	215.2950(20)	0.19(3)	0.0029(5)
^{197}Au	218.8300(10)	0.141(22)	0.0022(3)
^{197}Au	219.4190(20)	0.42(4)	0.0065(6)
^{197}Au	234.6000(20)	0.091(12)	0.00140(18)

^{A}Z	E_{γ}-keV	$\sigma_{\gamma}^{z}(E_{\gamma})$-barns	k_0
^{197}Au	**236.0450(10)**	**4.1(5)**	**0.063(8)**
^{197}Au	236.1710(20)	0.26(6)	0.0040(9)
^{197}Au	245.314(6)	0.111(18)	0.0017(3)
^{197}Au	**247.5730(10)**	**5.56(8)**	**0.0855(12)**
^{197}Au	248.739(3)	0.111(16)	0.00171(25)
^{197}Au	260.8820(10)	0.83(13)	0.0128(20)
^{197}Au	**261.4040(10)**	**5.3(20)**	**0.08(3)**
^{197}Au	266.6470(10)	0.26(3)	0.0040(5)
^{197}Au	269.0730(20)	0.155(24)	0.0024(4)
^{197}Au	271.1380(20)	0.104(16)	0.00160(25)
^{197}Au	271.2280(20)	0.170(24)	0.0026(4)
^{197}Au	271.8940(10)	0.40(13)	0.0062(20)
^{197}Au	276.072(3)	0.226(5)	0.00348(8)
^{197}Au	277.2460(20)	0.277(6)	0.00426(9)
^{197}Au	284.1090(20)	0.16(3)	0.0025(5)
^{197}Au	**291.7240(20)**	**1.05(17)**	**0.016(3)**
^{197}Au	293.1210(20)	0.101(16)	0.00155(25)
^{197}Au	307.7180(10)	0.44(6)	0.0068(9)
^{197}Au	311.9040(20)	0.47(6)	0.0072(9)
^{197}Au	314.913(3)	0.27(4)	0.0042(6)
^{197}Au	324.900(5)	0.104(14)	0.00160(22)
^{197}Au	**328.4840(20)**	**1.48(19)**	**0.023(3)**
^{197}Au	328.740(10)	0.111(14)	0.00171(22)
^{197}Au	333.8380(20)	0.111(14)	0.00171(22)
^{197}Au	337.5330(10)	0.178(23)	0.0027(4)
^{197}Au	339.2910(20)	0.090(25)	0.0014(4)
^{197}Au	346.9050(20)	0.44(11)	0.0068(17)
^{197}Au	347.8800(20)	0.111(14)	0.00171(22)
^{197}Au	**350.8280(10)**	**1.0(5)**	**0.015(8)**
^{197}Au	355.5300(20)	0.31(4)	0.0048(6)
^{197}Au	364.0240(20)	0.11(3)	0.0017(5)
^{197}Au	364.030(6)	0.104(14)	0.00160(22)
^{197}Au	368.2510(20)	0.133(21)	0.0020(3)
^{197}Au	371.0790(20)	0.44(6)	0.0068(9)
^{197}Au	373.1450(20)	0.130(19)	0.0020(3)
^{197}Au	378.2990(20)	0.178(23)	0.0027(4)
^{197}Au	**381.1990(10)**	**3.0(4)**	**0.046(6)**
^{197}Au	383.284(4)	0.24(3)	0.0037(5)
^{197}Au	393.884(5)	0.22(3)	0.0034(5)
^{197}Au	396.104(4)	0.100(8)	0.00154(12)
^{197}Au	398.295(6)	0.096(13)	0.00148(20)
^{197}Au	**411.802d**	**94.29(15)**	**1.453(23)**
^{197}Au	418.8400(20)	0.70(9)	0.0108(14)
^{197}Au	**440.3290(20)**	**0.9(4)**	**0.014(6)**
^{197}Au	441.070(5)	0.7(5)	0.011(8)
^{197}Au	444.3910(20)	0.56(7)	0.0086(11)
^{197}Au	447.527(3)	0.10(4)	0.0015(6)
^{197}Au	448.562(7)	0.118(15)	0.00182(23)
^{197}Au	449.5700(20)	0.50(6)	0.0077(9)
^{197}Au	456.1570(20)	0.141(22)	0.0022(3)
^{197}Au	456.287(4)	0.47(6)	0.0072(9)
^{197}Au	458.0540(20)	0.29(4)	0.0045(6)
^{197}Au	458.370(4)	0.16(3)	0.0025(5)
^{197}Au	464.7620(20)	0.17(6)	0.0026(9)
^{197}Au	485.638(5)	0.16(3)	0.0025(5)
^{197}Au	502.407(8)	0.16(4)	0.0025(6)
^{197}Au	509.175(4)	0.37(9)	0.0057(14)
^{197}Au	510.427(6)	0.19(7)	0.0029(11)
^{197}Au	511.067(6)	0.111(22)	0.0017(3)
^{197}Au	511.5170(20)	0.68(11)	0.0105(17)
^{197}Au	512.5790(20)	0.16(6)	0.0025(9)
^{197}Au	515.132(6)	0.104(14)	0.00160(22)
^{197}Au	516.0620(10)	0.35(5)	0.0054(8)
^{197}Au	520.746(6)	0.19(8)	0.0029(12)
^{197}Au	522.351(4)	0.096(12)	0.00148(18)
^{197}Au	524.752(3)	0.27(8)	0.0042(12)
^{197}Au	525.1340(20)	0.35(4)	0.0054(6)
^{197}Au	**529.1650(20)**	**1.9(10)**	**0.029(15)**
^{197}Au	529.954(4)	0.39(5)	0.0060(8)
^{197}Au	540.3010(20)	0.49(23)	0.008(4)
^{197}Au	542.3670(20)	0.104(14)	0.00160(22)
^{197}Au	544.008(5)	0.52(5)	0.0080(8)
^{197}Au	548.9350(20)	0.67(9)	0.0103(14)
^{197}Au	552.467(3)	0.104(14)	0.00160(22)
^{197}Au	555.6890(20)	0.126(17)	0.0019(3)
^{197}Au	565.784(5)	0.38(5)	0.0058(8)
^{197}Au	565.810(3)	0.43(6)	0.0066(9)
^{197}Au	571.683(3)	0.50(7)	0.0077(11)
^{197}Au	573.388(13)	0.126(17)	0.0019(3)
^{197}Au	573.746(6)	0.096(14)	0.00148(22)
^{197}Au	573.960(4)	0.33(4)	0.0051(6)
^{197}Au	574.370(5)	0.148(20)	0.0023(3)
^{197}Au	574.381(3)	0.36(5)	0.0055(8)
^{197}Au	574.733(10)	0.104(14)	0.00160(22)
^{197}Au	577.3020(20)	0.27(3)	0.0042(5)
^{197}Au	579.297(3)	0.53(8)	0.0082(12)
^{197}Au	584.800(10)	0.121(15)	0.00186(23)
^{197}Au	593.184(8)	0.148(21)	0.0023(3)
^{197}Au	609.432(4)	0.111(9)	0.00171(14)
^{197}Au	612.7240(20)	0.104(14)	0.00160(22)
^{197}Au	612.799(6)	0.096(22)	0.0015(3)
^{197}Au	625.4280(20)	0.44(4)	0.0068(6)
^{197}Au	631.660(9)	0.144(19)	0.0022(3)
^{197}Au	632.275(3)	0.170(23)	0.0026(4)
^{197}Au	635.166(3)	0.24(3)	0.0037(5)
^{197}Au	640.669(3)	0.59(5)	0.0091(8)
^{197}Au	647.293(5)	0.126(17)	0.0019(3)
^{197}Au	655.528(4)	0.21(3)	0.0032(5)
^{197}Au	655.569(3)	0.24(5)	0.0037(8)
^{197}Au	659.2490(20)	0.25(6)	0.0038(9)
^{197}Au	661.451(10)	0.093(19)	0.0014(3)
^{197}Au	668.561(7)	0.163(22)	0.0025(3)
^{197}Au	672.6550(10)	0.55(7)	0.0085(11)
^{197}Au	673.503(8)	0.126(18)	0.0019(3)
^{197}Au	678.208(10)	0.41(12)	0.0063(18)
^{197}Au	680.391(6)	0.10(3)	0.0015(5)
^{197}Au	682.804(5)	0.111(15)	0.00171(23)
^{197}Au	686.865(5)	0.218(18)	0.0034(3)
^{197}Au	688.968(10)	0.155(24)	0.0024(4)
^{197}Au	690.046(6)	0.388(20)	0.0060(3)
^{197}Au	692.972(6)	0.094(18)	0.0014(3)
^{197}Au	698.287(4)	0.15(5)	0.0023(8)
^{197}Au	702.474(5)	0.51(7)	0.0078(11)
^{197}Au	724.623(6)	0.115(18)	0.0018(3)
^{197}Au	728.239(6)	0.161(19)	0.0025(3)
^{197}Au	728.997(6)	0.111(20)	0.0017(3)
^{197}Au	732.221(10)	0.104(14)	0.00160(22)
^{197}Au	740.0000(20)	0.310(21)	0.0048(3)
^{197}Au	744.8580(20)	0.104(15)	0.00160(23)
^{197}Au	745.220(4)	0.33(6)	0.0051(9)
^{197}Au	746.073(5)	0.133(18)	0.0020(3)
^{197}Au	764.011(3)	0.3(3)	0.005(5)
^{197}Au	765.131(6)	0.163(22)	0.0025(3)
^{197}Au	767.886(5)	0.096(14)	0.00148(22)
^{197}Au	767.960(6)	0.096(14)	0.00148(22)
^{197}Au	770.858(5)	0.206(17)	0.0032(3)
^{197}Au	776.632(6)	0.118(19)	0.0018(3)
^{197}Au	783.230(5)	0.111(23)	0.0017(4)
^{197}Au	786.793(10)	0.261(15)	0.00402(23)
^{197}Au	788.131(13)	0.104(19)	0.0016(3)
^{197}Au	794.158(7)	0.178(24)	0.0027(4)
^{197}Au	796.217(5)	0.148(22)	0.0023(3)
^{197}Au	801.7050(20)	0.19(4)	0.0029(6)
^{197}Au	806.248(8)	0.13(3)	0.0020(5)
^{197}Au	810.100(7)	0.26(3)	0.0040(5)
^{197}Au	815.954(7)	0.104(20)	0.0016(3)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{197}Au	822.572(5)	0.104(17)	0.0016(3)
^{197}Au	825.483(4)	0.31(5)	0.0048(8)
^{197}Au	831.470(5)	0.153(19)	0.0024(3)
^{197}Au	833.906(6)	0.104(16)	0.00160(25)
^{197}Au	836.432(3)	0.76(3)	0.0117(5)
^{197}Au	838.156(5)	0.13(3)	0.0020(5)
^{197}Au	839.516(5)	0.73(20)	0.011(3)
^{197}Au	846.216(7)	0.104(24)	0.0016(4)
^{197}Au	854.178(6)	0.093(18)	0.0014(3)
^{197}Au	854.650(4)	0.148(25)	0.0023(4)
^{197}Au	863.082(6)	0.148(25)	0.0023(4)
^{197}Au	868.771(4)	0.364(15)	0.00560(23)
^{197}Au	872.827(4)	0.096(18)	0.0015(3)
^{197}Au	877.308(4)	0.21(5)	0.0032(8)
^{197}Au	885.638(6)	0.17(3)	0.0026(5)
^{197}Au	891.613(3)	0.096(23)	0.0015(4)
^{197}Au	898.612(4)	0.15(3)	0.0023(5)
^{197}Au	902.478(6)	0.38(6)	0.0058(9)
^{197}Au	913.776(4)	0.30(6)	0.0046(9)
^{197}Au	916.435(6)	0.25(4)	0.0038(6)
^{197}Au	927.421(4)	0.31(12)	0.0048(18)
^{197}Au	928.995(6)	0.126(22)	0.0019(3)
^{197}Au	933.928(6)	0.47(14)	0.0072(22)
^{197}Au	946.453(5)	0.096(13)	0.00148(20)
^{197}Au	947.971(6)	0.32(4)	0.0049(6)
^{197}Au	952.503(7)	0.19(3)	0.0029(5)
^{197}Au	971.8180(20)	0.13(4)	0.0020(6)
^{197}Au	978.936(8)	0.141(20)	0.0022(3)
^{197}Au	983.082(7)	0.096(14)	0.00148(22)
^{197}Au	985.002(6)	0.104(25)	0.0016(4)
^{197}Au	993.654(6)	0.21(5)	0.0032(8)
^{197}Au	999.682(4)	0.23(3)	0.0035(5)
^{197}Au	1000.447(4)	0.104(22)	0.0016(3)
^{197}Au	1005.487(6)	0.133(24)	0.0020(4)
^{197}Au	1006.100(3)	0.096(15)	0.00148(23)
^{197}Au	1018.136(6)	0.11(3)	0.0017(5)
^{197}Au	1018.426(4)	0.18(3)	0.0028(5)
^{197}Au	1028.199(5)	0.10(3)	0.0015(5)
^{197}Au	1028.564(6)	0.46(7)	0.0071(11)
^{197}Au	1038.274(3)	0.184(14)	0.00283(22)
^{197}Au	1046.323(7)	0.111(16)	0.00171(25)
^{197}Au	1047.121(6)	0.155(20)	0.0024(3)
^{197}Au	1047.847(5)	0.096(14)	0.00148(22)
^{197}Au	1049.231(6)	0.104(17)	0.0016(3)
^{197}Au	1050.701(5)	0.28(5)	0.0043(8)
^{197}Au	1054.055(5)	0.16(3)	0.0025(5)
^{197}Au	1060.888(7)	0.19(3)	0.0029(5)
^{197}Au	1064.436(8)	0.096(13)	0.00148(20)
^{197}Au	1064.998(7)	0.15(4)	0.0023(6)
^{197}Au	1076.761(5)	0.111(21)	0.0017(3)
^{197}Au	1079.197(5)	0.24(4)	0.0037(6)
^{197}Au	1081.54(4)	0.096(25)	0.0015(4)
^{197}Au	1085.605(5)	0.19(3)	0.0029(5)
^{197}Au	1101.942(4)	0.170(23)	0.0026(4)
^{197}Au	1106.951(5)	0.19(4)	0.0029(6)
^{197}Au	1107.562(9)	0.52(10)	0.0080(15)
^{197}Au	1109.196(4)	0.49(10)	0.0075(15)
^{197}Au	1111.461(7)	0.37(6)	0.0057(9)
^{197}Au	1114.585(6)	0.178(24)	0.0027(4)
^{197}Au	1128.417(6)	0.141(19)	0.0022(3)
^{197}Au	1132.895(8)	0.25(5)	0.0038(8)
^{197}Au	1148.562(6)	0.27(4)	0.0042(6)
^{197}Au	1150.671(9)	0.25(4)	0.0038(6)
^{197}Au	1157.2330(20)	0.13(4)	0.0020(6)
^{197}Au	1179.882(7)	0.12(5)	0.0018(8)
^{197}Au	1183.796(6)	0.32(5)	0.0049(8)
^{197}Au	1187.936(4)	0.15(4)	0.0023(6)
^{197}Au	1189.904(10)	0.10(3)	0.0015(5)
^{197}Au	1195.597(6)	0.148(22)	0.0023(3)
^{197}Au	1200.827(8)	0.104(16)	0.00160(25)
^{197}Au	1210.691(4)	0.20(3)	0.0031(5)
^{197}Au	1216.453(5)	0.21(3)	0.0032(5)
^{197}Au	1225.938(6)	0.27(4)	0.0042(6)
^{197}Au	1239.572(5)	0.49(8)	0.0075(12)
^{197}Au	1252.166(9)	0.126(23)	0.0019(4)
^{197}Au	1272.140(5)	0.096(16)	0.00148(25)
^{197}Au	1274.975(5)	0.26(4)	0.0040(6)
^{197}Au	1281.377(7)	0.49(12)	0.0075(18)
^{197}Au	1283.442(7)	0.35(11)	0.0054(17)
^{197}Au	1297.124(6)	0.43(10)	0.0066(15)
^{197}Au	1301.041(6)	0.15(6)	0.0023(9)
^{197}Au	1304.825(5)	0.25(5)	0.0038(8)
^{197}Au	1306.851(5)	0.70(9)	0.0108(14)
^{197}Au	1308.164(4)	0.118(25)	0.0018(4)
^{197}Au	1316.318(5)	0.21(4)	0.0032(6)
^{197}Au	1324.356(14)	0.19(3)	0.0029(5)
^{197}Au	1335.515(12)	0.16(4)	0.0025(6)
^{197}Au	1338.164(5)	0.118(22)	0.0018(3)
^{197}Au	1344.153(6)	0.16(3)	0.0025(5)
^{197}Au	1361.477(5)	0.27(4)	0.0042(6)
^{197}Au	1363.345(4)	0.26(4)	0.0040(6)
^{197}Au	1379.390(6)	0.141(22)	0.0022(3)
^{197}Au	1396.133(6)	0.141(22)	0.0022(3)
^{197}Au	1431.641(6)	0.15(4)	0.0023(6)
^{197}Au	1431.949(4)	0.23(4)	0.0035(6)
^{197}Au	1445.373(5)	0.14(3)	0.0022(5)
^{197}Au	1487.130(4)	0.20(4)	0.0031(6)
^{197}Au	1487.599(7)	0.20(4)	0.0031(6)
^{197}Au	1530.698(6)	0.30(5)	0.0046(8)
^{197}Au	1554.420(5)	0.25(9)	0.0038(14)
^{197}Au	4951.85(10)	0.156(16)	0.00240(25)
^{197}Au	4957.83(10)	0.63(11)	0.0097(17)
^{197}Au	4975.87(10)	0.161(16)	0.00248(25)
^{197}Au	4981.55(10)	0.09(3)	0.0014(5)
^{197}Au	4998.68(10)	0.31(4)	0.0048(6)
^{197}Au	5007.08(10)	0.113(15)	0.00174(23)
^{197}Au	5025.11(10)	0.113(16)	0.00174(25)
^{197}Au	5036.63(10)	0.18(7)	0.0028(11)
^{197}Au	5040.15(10)	0.18(7)	0.0028(11)
^{197}Au	5080.60(10)	0.152(15)	0.00234(23)
^{197}Au	5088.46(10)	0.50(8)	0.0077(12)
^{197}Au	5102.85(10)	0.87(13)	0.0134(20)
^{197}Au	5110.17(10)	0.156(11)	0.00240(17)
^{197}Au	5116.11(10)	0.161(13)	0.00248(20)
^{197}Au	5140.74(10)	0.395(18)	0.0061(3)
^{197}Au	5148.90(10)	0.46(8)	0.0071(12)
^{197}Au	5153.21(10)	0.119(14)	0.00183(22)
^{197}Au	5174.08(10)	0.334(16)	0.00514(25)
^{197}Au	5205.39(10)	0.16(6)	0.0025(9)
^{197}Au	5218.35(10)	0.272(20)	0.0042(3)
^{197}Au	5225.49(10)	0.42(9)	0.0065(14)
^{197}Au	5246.72(10)	0.51(20)	0.008(3)
^{197}Au	5271.86(10)	0.38(20)	0.006(3)
^{197}Au	5279.44(10)	0.524(20)	0.0081(3)
^{197}Au	5302.86(10)	0.19(10)	0.0029(15)
^{197}Au	5355.00(10)	0.401(16)	0.00617(25)
^{197}Au	5473.96(10)	0.21(6)	0.0032(9)
^{197}Au	5493.81(10)	0.42(10)	0.0065(15)
^{197}Au	5524.66(10)	0.80(14)	0.0123(22)
^{197}Au	5540.41(10)	0.17(6)	0.0026(9)
^{197}Au	5620.62(10)	0.34(9)	0.0052(14)
^{197}Au	**5710.52(10)**	**1.27(17)**	**0.020(3)**
^{197}Au	5722.94(10)	0.55(16)	0.0085(25)
^{197}Au	5767.01(10)	0.09(3)	0.0014(5)
^{197}Au	5808.50(10)	0.24(9)	0.0037(14)
^{197}Au	5839.57(10)	0.16(8)	0.0025(12)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{197}Au	5879.74(10)	0.30(8)	0.0046(12)
Mercury (Z=80), *At.Wt.*=200.59(2), σ_γ^z =384(8)			
^{196}Hg	133.98(5)d	0.0155(4)	2.34E-4[1.4%]
^{196}Hg	308.07(11)	0.79(7)	0.0119(11)
^{199}Hg	**367.947(9)**	**251(5)**	**3.79(8)**
^{201}Hg	439.50(8)	0.52(7)	0.0079(11)
^{199}Hg	540.927(7)	2.75(9)	0.0415(14)
^{199}Hg	579.295(11)	7.64(23)	0.115(4)
^{199}Hg	661.403(11)	22.3(5)	0.337(8)
^{199}Hg	688.953(7)	2.83(11)	0.0428(17)
^{199}Hg	851.30(5)	2.69(9)	0.0406(14)
^{199}Hg	886.153(10)	13.5(11)	0.204(17)
^{199}Hg	1147.222(11)	7.79(23)	0.118(4)
^{199}Hg	1202.328(10)	12.0(3)	0.181(5)
^{199}Hg	1205.717(11)	13.5(5)	0.204(8)
^{199}Hg	1225.476(11)	12.3(3)	0.186(5)
^{199}Hg	1254.099(12)	7.56(23)	0.114(4)
^{199}Hg	1262.941(11)	21.5(5)	0.325(8)
^{199}Hg	1273.497(10)	10.6(3)	0.160(5)
^{199}Hg	1350.354(10)	4.10(16)	0.0619(24)
^{199}Hg	1362.971(10)	5.93(19)	0.090(3)
^{199}Hg	1407.942(20)	9.53(23)	0.144(4)
^{199}Hg	1467.92(5)	3.31(13)	0.0500(20)
^{199}Hg	1488.825(11)	2.92(14)	0.0441(21)
^{199}Hg	1514.903(10)	2.68(13)	0.0405(20)
^{199}Hg	1557.65(9)	2.6(8)	0.039(12)
^{199}Hg	1557.94(4)	2.87(14)	0.0434(21)
^{199}Hg	**1570.273(12)**	**29.6(7)**	**0.447(11)**
^{199}Hg	1604.322(11)	4.07(17)	0.061(3)
^{199}Hg	**1693.296(11)**	**56.2(16)**	**0.849(24)**
^{199}Hg	1718.299(12)	8.47(23)	0.128(4)
^{199}Hg	1758.97(6)	3.33(14)	0.0503(21)
^{199}Hg	2002.083(13)	24.3(9)	0.367(14)
^{199}Hg	2271.90(3)	6.05(23)	0.091(4)
^{199}Hg	2296.310(23)	2.89(17)	0.044(3)
^{199}Hg	2639.85(3)	11.6(3)	0.175(5)
^{199}Hg	2818.26(5)	3.42(16)	0.0517(24)
^{199}Hg	2901.25(5)	4.63(19)	0.070(3)
^{199}Hg	2920.90(4)	4.99(23)	0.075(4)
^{199}Hg	3186.21(5)	11.3(4)	0.171(6)
^{199}Hg	3216.63(9)	2.93(17)	0.044(3)
^{199}Hg	3269.19(5)	3.96(18)	0.060(3)
^{199}Hg	3288.85(4)	13.3(4)	0.201(6)
^{199}Hg	4373.37(8)	3.70(23)	0.056(4)
^{199}Hg	4575.36(6)	4.23(23)	0.064(4)
^{199}Hg	4675.44(9)	13.0(4)	0.196(6)
^{199}Hg	**4739.43(5)**	**30.1(8)**	**0.455(12)**
^{199}Hg	4759.09(6)	12.4(4)	0.187(6)
^{199}Hg	4811.64(9)	3.70(23)	0.056(4)
^{199}Hg	4842.07(6)	20.0(6)	0.302(9)
^{199}Hg	4954.47(5)	4.01(23)	0.061(4)
^{199}Hg	4974.98(7)	5.22(23)	0.079(4)
^{199}Hg	5050.07(5)	20.0(6)	0.302(9)
^{199}Hg	5388.43(5)	17.5(5)	0.264(8)
^{199}Hg	**5658.24(4)**	**27.5(7)**	**0.415(11)**
^{199}Hg	**5967.02(4)**	**62.5(15)**	**0.944(23)**
^{199}Hg	6309.96(4)	4.0(3)	0.060(5)
^{199}Hg	6397.37(4)	3.7(3)	0.056(5)
^{199}Hg	6457.98(4)	23.1(8)	0.349(12)
Thallium (Z=81), *At.Wt.*=204.3833(2), σ_γ^z =3.44(6)			
^{203}Tl	77.07(22)	0.011(5)	1.6(7)E-4
^{203}Tl	132.11(14)	0.0062(10)	9.2(15)E-5
^{203}Tl	**139.94(9)**	**0.400(7)**	**0.00593(10)**
^{203}Tl	145.88(10)	0.0054(5)	8.0(7)E-5
^{203}Tl	152.93(11)	0.0144(6)	2.14(9)E-4
^{203}Tl	**154.01(9)**	**0.0926(17)**	**0.001373(25)**
^{203}Tl	157.32(10)	0.0061(5)	9.0(7)E-5
^{203}Tl	171.88(9)	0.0109(5)	1.62(7)E-4

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{203}Tl	178.78(11)	0.0050(5)	7.4(7)E-5
^{203}Tl	**198.33(8)**	**0.0408(10)**	**0.000605(15)**
^{205}Tl	265.86(9)	0.0210(7)	0.000311(10)
^{203}Tl	284.81(12)	0.0052(5)	7.7(7)E-5
^{203}Tl	286.88(11)	0.0058(5)	8.6(7)E-5
^{203}Tl	**292.26(8)**	**0.0983(20)**	**0.00146(3)**
^{205}Tl	304.86(9)	0.0225(12)	0.000334(18)
^{203}Tl	310.31(9)	0.0245(12)	0.000363(18)
^{203}Tl	**318.88(8)**	**0.325(6)**	**0.00482(9)**
^{203}Tl	325.85(8)	0.0301(10)	0.000446(15)
^{203}Tl	330.09(9)	0.0267(10)	0.000396(15)
^{205}Tl	330.09(9)	0.0267(10)	0.000396(15)
^{203}Tl	331.76(9)	0.0371(10)	0.000550(15)
^{203}Tl	336.96(10)	0.0080(6)	1.19(9)E-4
^{203}Tl	**347.96(8)**	**0.361(10)**	**0.00535(15)**
^{205}Tl	369.18(7)	0.016(3)	2.4(4)E-4
^{203}Tl	369.65(24)	0.0047(12)	7.0(18)E-5
^{203}Tl	383.99(8)	0.0341(12)	0.000506(18)
^{203}Tl	389.48(11)	0.0079(7)	1.17(10)E-4
^{203}Tl	**395.62(8)**	**0.0862(20)**	**0.00128(3)**
^{203}Tl	416.91(17)	0.0069(12)	1.02(18)E-4
^{203}Tl	418.27(11)	0.0141(12)	2.09(18)E-4
^{203}Tl	**424.81(8)**	**0.1200(25)**	**0.00178(4)**
^{203}Tl	**471.90(8)**	**0.116(3)**	**0.00172(4)**
^{203}Tl	483.29(12)	0.0082(10)	1.22(15)E-4
^{203}Tl	**488.11(8)**	**0.096(4)**	**0.00142(6)**
^{203}Tl	489.26(24)	0.008(3)	1.2(4)E-4
^{203}Tl	563.21(8)	0.0356(15)	0.000528(22)
^{203}Tl	587.01(10)	0.0109(10)	1.62(15)E-4
^{203}Tl	591.13(9)	0.0225(10)	0.000334(15)
^{203}Tl	**624.46(8)**	**0.0413(10)**	**0.000612(15)**
^{203}Tl	626.54(8)	0.0388(10)	0.000575(15)
^{203}Tl	629.12(8)	0.0388(10)	0.000575(15)
^{205}Tl	649.30(15)	0.0106(10)	1.57(15)E-4
^{203}Tl	678.01(8)	0.0361(15)	0.000535(22)
^{203}Tl	714.86(24)	0.0074(12)	1.10(18)E-4
^{203}Tl	**732.09(9)**	**0.064(3)**	**0.00095(4)**
^{203}Tl	**737.12(8)**	**0.118(5)**	**0.00175(7)**
^{203}Tl	764.13(9)	0.0316(12)	0.000469(18)
^{205}Tl	803.30(20)d	3.5(6)E-6	5.2E-8[90%]
^{203}Tl	818.14(8)	0.0279(10)	0.000414(15)
^{203}Tl	**873.16(8)**	**0.168(4)**	**0.00249(6)**
^{203}Tl	931.39(8)	0.0257(12)	0.000381(18)
^{203}Tl	**949.88(8)**	**0.0479(15)**	**0.000710(22)**
^{203}Tl	1013.27(9)	0.0217(12)	0.000322(18)
^{203}Tl	1063.00(9)	0.0185(10)	0.000274(15)
^{203}Tl	1093.02(8)	0.0353(12)	0.000523(18)
^{203}Tl	**1110.37(8)**	**0.0413(12)**	**0.000612(18)**
^{203}Tl	**1121.29(7)**	**0.0600(17)**	**0.000890(25)**
^{203}Tl	1134.01(9)	0.0133(7)	1.97(10)E-4
^{203}Tl	**1155.43(7)**	**0.0605(17)**	**0.000897(25)**
^{203}Tl	1182.6(4)	0.0052(12)	7.7(18)E-5
^{203}Tl	**1234.69(7)**	**0.0746(25)**	**0.00111(4)**
^{203}Tl	**1478.77(8)**	**0.0544(22)**	**0.00081(3)**
^{203}Tl	1706.20(16)	0.0091(15)	1.35(22)E-4
^{203}Tl	**1741.01(8)**	**0.0548(25)**	**0.00081(4)**
^{203}Tl	1756.27(12)	0.027(3)	0.00040(4)
^{203}Tl	4076.7(6)	0.0072(15)	1.07(22)E-4
^{203}Tl	4101.4(4)	0.0086(25)	1.3(4)E-4
^{203}Tl	4115.08(17)	0.0222(17)	0.000329(25)
^{203}Tl	4195.98(14)	0.0373(22)	0.00055(3)
^{203}Tl	**4225.47(17)**	**0.045(3)**	**0.00067(4)**
^{203}Tl	4286.3(8)	0.0057(15)	8.5(22)E-5
^{203}Tl	4309.00(24)	0.0210(22)	0.00031(3)
^{203}Tl	4343.56(12)	0.034(3)	0.00050(4)
^{203}Tl	4402.60(15)	0.0208(15)	0.000308(22)
^{203}Tl	4439.3(3)	0.0094(15)	1.39(22)E-4
^{203}Tl	**4495.74(13)**	**0.043(4)**	**0.00064(6)**

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{203}Tl	**4540.62(15)**	**0.0413(25)**	**0.00061(4)**
^{203}Tl	4570.0(3)	0.0180(20)	0.00027(3)
^{203}Tl	4600.95(16)	0.0292(22)	0.00043(3)
^{203}Tl	**4687.58(12)**	**0.098(4)**	**0.00145(6)**
^{203}Tl	**4705.83(14)**	**0.058(3)**	**0.00086(4)**
^{203}Tl	4715.3(4)	0.0131(20)	1.9(3)E-4
^{203}Tl	**4752.24(11)**	**0.148(5)**	**0.00219(7)**
^{203}Tl	4804.4(4)	0.0138(20)	2.0(3)E-4
^{203}Tl	**4841.40(15)**	**0.090(4)**	**0.00133(6)**
^{203}Tl	4867.5(6)	0.0074(20)	1.1(3)E-4
^{203}Tl	**4913.57(11)**	**0.164(5)**	**0.00243(7)**
^{203}Tl	4980.97(20)	0.036(3)	0.00053(4)
^{203}Tl	**5014.61(15)**	**0.058(3)**	**0.00086(4)**
^{203}Tl	**5130.50(23)**	**0.058(4)**	**0.00086(6)**
^{203}Tl	**5180.38(12)**	**0.141(5)**	**0.00209(7)**
^{203}Tl	5238.4(3)	0.0156(20)	2.3(3)E-4
^{203}Tl	**5261.48(13)**	**0.084(4)**	**0.00125(6)**
^{203}Tl	**5279.86(12)**	**0.207(6)**	**0.00307(9)**
^{203}Tl	**5404.41(12)**	**0.147(5)**	**0.00218(7)**
^{203}Tl	**5451.07(14)**	**0.079(3)**	**0.00117(4)**
^{203}Tl	5520.3(4)	0.0183(25)	0.00027(4)
^{203}Tl	**5533.35(13)**	**0.131(5)**	**0.00194(7)**
^{203}Tl	**5603.28(13)**	**0.282(10)**	**0.00418(15)**
^{203}Tl	**5641.57(12)**	**0.316(7)**	**0.00469(10)**
^{205}Tl	5852.5(5)	0.0072(15)	1.07(22)E-4
^{205}Tl	5867.8(4)	0.0091(17)	1.35(25)E-4
^{203}Tl	5890.2(4)	0.0067(17)	9.9(25)E-5
^{203}Tl	**5917.48(16)**	**0.084(4)**	**0.00125(6)**
^{203}Tl	6025.21(24)	0.0222(25)	0.00033(4)
^{203}Tl	6118.79(23)	0.0232(20)	0.00034(3)
^{203}Tl	**6166.61(14)**	**0.166(6)**	**0.00246(9)**
^{203}Tl	**6183.05(15)**	**0.081(4)**	**0.00120(6)**
^{205}Tl	6197.8(4)	0.0109(17)	1.62(25)E-4
^{203}Tl	**6222.57(16)**	**0.065(4)**	**0.00096(6)**
^{203}Tl	6336.11(22)	0.0245(22)	0.00036(3)
^{205}Tl	6504.3(6)	0.0040(10)	5.9(15)E-5
^{203}Tl	**6514.57(15)**	**0.129(5)**	**0.00191(7)**
^{203}Tl	6654.71(25)	0.0104(12)	1.54(18)E-4

Lead (Z=82), *At.Wt.*=207.2(1), σ_γ^z =0.154(7)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{206}Pb	569.702d	0.0014(3)	2.0E-5[100%]
^{204}Pb	6729.38(9)	0.00320(10)	4.68(15)E-5
^{206}Pb	6737.62(10)	0.00691(19)	1.01(3)E-4
^{207}Pb	**7367.78(7)**	**0.137(3)**	**0.00200(4)**

Bismuth (Z=83), *At.Wt.*=208.98038(2), σ_γ^z =0.0338(7)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{209}Bi	46.58(12)	0.00043(9)	6.2(13)E-6
^{209}Bi	63.59(5)	1.8(4)E-4	2.6(6)E-6
^{209}Bi	64.94(6)	2.1(13)E-4	3.0(19)E-6
^{209}Bi	65.24(20)	1.8(4)E-4	2.6(6)E-6
^{209}Bi	91.29(5)	0.0005(3)	7(4)E-6
^{209}Bi	92.48(13)	2.5(4)E-4	3.6(6)E-6
^{209}Bi	116.49(9)	0.00054(21)	8(3)E-6
^{209}Bi	154.86(6)	2.5(4)E-4	3.6(6)E-6
^{209}Bi	154.89(5)	0.0013(5)	1.9(7)E-5
^{209}Bi	**162.19(11)**	**0.008(3)**	**1.2(4)E-4**
^{209}Bi	162.27(6)	0.00162(21)	2.3(3)E-5
^{209}Bi	183.04(6)	1.8(8)E-4	2.6(12)E-6
^{209}Bi	311.23(11)	2.0(4)E-4	2.9(6)E-6
^{209}Bi	**319.78(4)**	**0.0115(14)**	**1.67(20)E-4**
^{209}Bi	347.92(9)	2.1(4)E-4	3.0(6)E-6
^{209}Bi	347.93(5)	1.8(8)E-4	2.6(12)E-6
^{209}Bi	392.82(9)	2.4(4)E-4	3.5(6)E-6
^{209}Bi	408.77(7)	0.00043(7)	6.2(10)E-6
^{209}Bi	563.06(7)	2.1(8)E-4	3.0(12)E-6
^{209}Bi	563.14(7)	0.00051(7)	7.4(10)E-6
^{209}Bi	610.92(11)	1.8(4)E-4	2.6(6)E-6
^{209}Bi	644.36(8)	2.5(4)E-4	3.6(6)E-6
^{209}Bi	645.82(6)	0.00047(7)	6.8(10)E-6

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{209}Bi	**673.97(5)**	**0.0026(4)**	**3.8(6)E-5**
^{209}Bi	769.21(6)	0.00078(10)	1.13(15)E-5
^{209}Bi	774.91(10)	0.00054(21)	8(3)E-6
^{209}Bi	774.92(7)	0.00141(20)	2.0(3)E-5
^{209}Bi	808.77(7)	0.00042(16)	6.1(23)E-6
^{209}Bi	808.79(7)	0.00119(16)	1.73(23)E-5
^{209}Bi	826.98(13)	2.0(3)E-4	2.9(4)E-6
^{209}Bi	855.45(14)	1.8(4)E-4	2.6(6)E-6
^{209}Bi	900.07(7)	0.00035(13)	5.1(19)E-6
^{209}Bi	900.22(9)	0.00102(14)	1.48(20)E-5
^{209}Bi	912.77(10)	0.00034(5)	4.9(7)E-6
^{209}Bi	971.82(7)	0.00026(9)	3.8(13)E-6
^{209}Bi	971.83(9)	0.00072(9)	1.04(13)E-5
^{209}Bi	1012.53(7)	0.00064(9)	9.3(13)E-6
^{209}Bi	1013.03(13)	2.1(8)E-4	3.0(12)E-6
^{209}Bi	1118.21(19)	2.1(4)E-4	3.0(6)E-6
^{209}Bi	1156.34(14)	2.0(4)E-4	2.9(6)E-6
^{209}Bi	1175.48(12)	0.00048(7)	7.0(10)E-6
^{209}Bi	1203.52(11)	0.00077(12)	1.12(17)E-5
^{209}Bi	1203.61(8)	2.1(8)E-4	3.0(12)E-6
^{209}Bi	1203.61(10)	2.1(8)E-4	3.0(12)E-6
^{209}Bi	1211.11(15)	0.00031(5)	4.5(7)E-6
^{209}Bi	1226.30(6)	0.00042(7)	6.1(10)E-6
^{209}Bi	1337.09(6)	0.00156(21)	2.3(3)E-5
^{209}Bi	1360.16(15)	2.0(4)E-4	2.9(6)E-6
^{209}Bi	1397.83(11)	0.00033(5)	4.8(7)E-6
^{209}Bi	1430.29(14)	0.00027(4)	3.9(6)E-6
^{209}Bi	1465.52(14)	0.00026(4)	3.8(6)E-6
^{209}Bi	1484.30(8)	0.00034(5)	4.9(7)E-6
^{209}Bi	1596.43(7)	0.00073(10)	1.06(15)E-5
^{209}Bi	1625.78(17)	2.1(4)E-4	3.0(6)E-6
^{209}Bi	1658.34(7)	0.00035(5)	5.1(7)E-6
^{209}Bi	1708.84(9)	0.00071(10)	1.03(15)E-5
^{209}Bi	1708.92(10)	2.2(8)E-4	3.2(12)E-6
^{209}Bi	1756.35(14)	2.4(4)E-4	3.5(6)E-6
^{209}Bi	1824.97(15)	0.00054(8)	7.8(12)E-6
^{209}Bi	1839.74(13)	0.00046(7)	6.7(10)E-6
^{209}Bi	2026.66(15)	0.00037(7)	5.4(10)E-6
^{209}Bi	2496.69(16)	0.00034(7)	4.9(10)E-6
^{209}Bi	**2505.35(7)**	**0.0021(3)**	**3.0(4)E-5**
^{209}Bi	2570.29(7)	0.00031(5)	4.5(7)E-6
^{209}Bi	2598.33(8)	0.00166(24)	2.4(4)E-5
^{209}Bi	2614.55(12)	0.00027(5)	3.9(7)E-6
^{209}Bi	2624.34(7)	0.00154(21)	2.2(3)E-5
^{209}Bi	**2828.29(7)**	**0.00179(24)**	**2.6(4)E-5**
^{209}Bi	2898.17(8)	0.00080(12)	1.16(17)E-5
^{209}Bi	3081.27(10)	0.00145(20)	2.1(3)E-5
^{209}Bi	3141.75(8)	0.00041(7)	5.9(10)E-6
^{209}Bi	3214.64(8)	0.00061(9)	8.8(13)E-6
^{209}Bi	3230.66(10)	2.1(4)E-4	3.0(6)E-6
^{209}Bi	3268.99(9)	2.2(5)E-4	3.2(7)E-6
^{209}Bi	3356.60(8)	0.00167(24)	2.4(4)E-5
^{209}Bi	3396.16(7)	0.00170(24)	2.5(4)E-5
^{209}Bi	3407.4(3)	2.5(5)E-4	3.6(7)E-6
^{209}Bi	3610.84(6)	2.1(5)E-4	3.0(7)E-6
^{209}Bi	3632.77(7)	0.00136(20)	2.0(3)E-5
^{209}Bi	**4054.57(6)**	**0.0137(18)**	**2.0(3)E-4**
^{209}Bi	**4101.76(6)**	**0.0089(12)**	**1.29(17)E-4**
^{209}Bi	**4165.36(5)**	**0.00173(24)**	**2.5(4)E-5**
^{209}Bi	**4171.05(9)**	**0.0171(22)**	**2.5(3)E-4**
^{209}Bi	**4256.65(5)**	**0.0024(3)**	**3.5(4)E-5**
^{209}Bi	4284.80(6)	0.00042(7)	6.1(10)E-6

Thorium (Z=90), *At.Wt.*=232.0381(1), σ_γ^z =7.35(3)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{232}Th	39.92(13)	0.0029(4)	3.8(5)E-5
^{232}Th	44.36(14)	0.0031(4)	4.0(5)E-5
^{232}Th	53.71(12)	0.0139(10)	1.82(13)E-4
^{232}Th	57.41(15)	0.0068(9)	8.9(12)E-5
^{232}Th	**63.810(10)**	**10.7(5) $s^{-1}g^{-1}$**	**Abundant**

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{232}Th	**77.09(15)**	**0.09(3)**	**0.0012(4)**
^{232}Th	**140.880(10)**	**0.85(18) $s^{-1}g^{-1}$**	**Abundant**
^{232}Th	201.75(12)	0.0079(8)	1.03(10)E-4
^{232}Th	211.86(11)	0.0191(17)	2.49(22)E-4
^{232}Th	229.08(11)	0.0163(13)	2.13(17)E-4
^{232}Th	**256.25(11)**	**0.093(17)**	**0.00121(22)**
^{232}Th	263.06(14)	0.0073(17)	9.5(22)E-5
^{232}Th	**277.48(11)**	**0.0312(25)**	**0.00041(3)**
^{232}Th	281.40(11)	0.0170(14)	2.22(18)E-4
^{232}Th	286.16(25)	0.0028(7)	3.7(9)E-5
^{232}Th	311.91(10)	0.0187(10)	2.44(13)E-4
^{232}Th	**316.64(10)**	**0.0397(18)**	**0.000518(24)**
^{232}Th	**319.08(10)**	**0.082(3)**	**0.00107(4)**
^{232}Th	320.98(13)	0.0072(8)	9.4(10)E-5
^{232}Th	327.80(10)	0.0269(16)	0.000351(21)
^{232}Th	329.88(11)	0.0221(17)	0.000289(22)
^{232}Th	**331.37(11)**	**0.0291(19)**	**0.000380(25)**
^{232}Th	**335.92(10)**	**0.089(4)**	**0.00116(5)**
^{232}Th	**354.27(10)**	**0.0408(20)**	**0.00053(3)**
^{232}Th	365.28(16)	0.0060(9)	7.8(12)E-5
^{232}Th	366.79(16)	0.0061(9)	8.0(12)E-5
^{232}Th	370.35(15)	0.0044(8)	5.7(10)E-5
^{232}Th	384.7(3)	0.0030(8)	3.9(10)E-5
^{232}Th	427.24(17)	0.0040(7)	5.2(9)E-5
^{232}Th	432.15(13)	0.0076(8)	9.9(10)E-5
^{232}Th	**472.30(10)**	**0.165(8)**	**0.00215(10)**
^{232}Th	506.22(13)	0.0075(11)	9.8(14)E-5
^{232}Th	**522.73(10)**	**0.102(5)**	**0.00133(7)**
^{232}Th	**531.58(10)**	**0.0404(23)**	**0.00053(3)**
^{232}Th	535.08(17)	0.0062(11)	8.1(14)E-5
^{232}Th	**539.66(10)**	**0.061(3)**	**0.00080(4)**
^{232}Th	**548.23(11)**	**0.042(10)**	**0.00055(13)**
^{232}Th	553.36(13)	0.011(3)	1.4(4)E-4
^{232}Th	**556.93(11)**	**0.040(10)**	**0.00052(13)**
^{232}Th	**561.25(11)**	**0.033(8)**	**0.00043(10)**
^{232}Th	**566.63(10)**	**0.19(5)**	**0.0025(7)**
^{232}Th	569.15(16)	0.008(3)	1.0(4)E-4
^{232}Th	**578.02(9)**	**0.105(5)**	**0.00137(7)**
^{232}Th	580.16(19)	0.0125(21)	1.6(3)E-4
^{232}Th	**583.27(9)**	**0.279(11)**	**0.00364(14)**
^{232}Th	**586.02(10)**	**0.045(3)**	**0.00059(4)**
^{232}Th	**593.23(10)**	**0.043(3)**	**0.00056(4)**
^{232}Th	**605.41(10)**	**0.054(4)**	**0.00071(5)**
^{232}Th	612.45(9)	0.018(3)	2.4(4)E-4
^{232}Th	622.95(11)	0.0125(15)	1.63(20)E-4
^{232}Th	632.09(12)	0.0105(9)	1.37(12)E-4
^{232}Th	659.56(16)	0.0173(20)	2.3(3)E-4
^{232}Th	662.0(3)	0.0101(18)	1.32(24)E-4
^{232}Th	**665.11(10)**	**0.084(4)**	**0.00110(5)**
^{232}Th	**681.81(9)**	**0.079(4)**	**0.00103(5)**
^{232}Th	684.96(13)	0.0117(16)	1.53(21)E-4
^{232}Th	696.57(14)	0.0139(17)	1.82(22)E-4
^{232}Th	703.1(5)	0.0073(18)	9.5(24)E-5
^{232}Th	**705.17(11)**	**0.050(4)**	**0.00065(5)**
^{232}Th	**714.23(10)**	**0.052(3)**	**0.00068(4)**
^{232}Th	721.60(22)	0.0073(15)	9.5(20)E-5
^{232}Th	735.25(14)	0.0123(16)	1.61(21)E-4
^{232}Th	741.02(15)	0.0122(16)	1.59(21)E-4
^{232}Th	752.05(16)	0.0142(19)	1.85(25)E-4
^{232}Th	768.58(23)	0.0091(15)	1.19(20)E-4
^{232}Th	777.8(4)	0.0034(14)	4.4(18)E-5
^{232}Th	780.8(3)	0.0052(15)	6.8(20)E-5
^{232}Th	785.86(22)	0.0097(18)	1.27(24)E-4
^{232}Th	**797.79(9)**	**0.0416(20)**	**0.00054(3)**
^{232}Th	808.53(11)	0.0212(14)	0.000277(18)
^{232}Th	814.75(10)	0.0196(13)	0.000256(17)
^{232}Th	**834.83(14)**	**0.059(5)**	**0.00077(7)**
^{232}Th	846.0(5)	0.013(3)	1.7(4)E-4

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{232}Th	849.4(7)	0.005(3)	7(4)E-5
^{232}Th	**860.61(13)**	**0.047(5)**	**0.00061(7)**
^{232}Th	869.69(14)	0.0138(11)	1.80(14)E-4
^{232}Th	872.13(11)	0.0268(15)	0.000350(20)
^{232}Th	907.44(14)	0.0081(10)	1.06(13)E-4
^{232}Th	913.74(17)	0.0063(10)	8.2(13)E-5
^{232}Th	918.70(13)	0.0096(10)	1.25(13)E-4
^{232}Th	941.79(13)	0.0103(11)	1.35(14)E-4
^{232}Th	**968.78(9)**	**0.132(6)**	**0.00172(8)**
^{232}Th	996.7(3)	0.0067(16)	8.8(21)E-5
^{232}Th	**1013.84(11)**	**0.037(3)**	**0.00048(4)**
^{232}Th	1031.1(3)	0.0040(10)	5.2(13)E-5
^{232}Th	1034.27(11)	0.0165(14)	2.15(18)E-4
^{232}Th	1044.58(14)	0.0112(12)	1.46(16)E-4
^{232}Th	1055.60(14)	0.0105(12)	1.37(16)E-4
^{232}Th	1096.9(4)	0.0050(13)	6.5(17)E-5
^{232}Th	1100.98(11)	0.0211(16)	0.000276(21)
^{232}Th	1116.9(3)	0.0060(12)	7.8(16)E-5
^{232}Th	1125.46(19)	0.0079(13)	1.03(17)E-4
^{232}Th	1145.37(17)	0.0123(15)	1.61(20)E-4
^{232}Th	1152.1(4)	0.0052(15)	6.8(20)E-5
^{232}Th	1154.5(4)	0.0056(15)	7.3(20)E-5
^{232}Th	1164.6(4)	0.0047(13)	6.1(17)E-5
^{232}Th	1184.9(6)	0.0036(13)	4.7(17)E-5
^{232}Th	2485.2(3)	0.0090(17)	1.18(22)E-4
^{232}Th	2503.5(3)	0.0107(18)	1.40(24)E-4
^{232}Th	2524.7(4)	0.0087(16)	1.14(21)E-4
^{232}Th	2543.3(5)	0.013(3)	1.7(4)E-4
^{232}Th	2546.8(8)	0.0076(23)	1.0(3)E-4
^{232}Th	2551.9(4)	0.010(4)	1.3(5)E-4
^{232}Th	2557.8(5)	0.0069(17)	9.0(22)E-5
^{232}Th	2590.0(10)	0.0069(20)	9(3)E-5
^{232}Th	2596.76(23)	0.0118(18)	1.54(24)E-4
^{232}Th	2630.1(3)	0.0071(19)	9.3(25)E-5
^{232}Th	2640.8(4)	0.0110(18)	1.44(24)E-4
^{232}Th	2653.2(3)	0.010(4)	1.3(5)E-4
^{232}Th	2659.39(21)	0.013(4)	1.7(5)E-4
^{232}Th	2671.7(6)	0.0085(18)	1.11(24)E-4
^{232}Th	2689.4(8)	0.008(3)	1.0(4)E-4
^{232}Th	2703.55(24)	0.014(5)	1.8(7)E-4
^{232}Th	2712.56(22)	0.013(4)	1.7(5)E-4
^{232}Th	2719.67(18)	0.016(3)	2.1(4)E-4
^{232}Th	2732.7(5)	0.008(3)	1.0(4)E-4
^{232}Th	2739.8(3)	0.0072(14)	9.4(18)E-5
^{232}Th	2744.7(3)	0.0081(15)	1.06(20)E-4
^{232}Th	2758.3(4)	0.0063(14)	8.2(18)E-5
^{232}Th	2771.3(4)	0.0030(12)	3.9(16)E-5
^{232}Th	2784.5(3)	0.0075(15)	9.8(20)E-5
^{232}Th	2807.08(18)	0.0110(17)	1.44(22)E-4
^{232}Th	2821.9(3)	0.0110(20)	1.4(3)E-4
^{232}Th	2824.9(3)	0.0144(22)	1.9(3)E-4
^{232}Th	2838.0(3)	0.0059(15)	7.7(20)E-5
^{232}Th	2851.0(3)	0.0077(15)	1.01(20)E-4
^{232}Th	2880.86(17)	0.0093(14)	1.21(18)E-4
^{232}Th	2924.3(3)	0.0082(11)	1.07(14)E-4
^{232}Th	2945.0(4)	0.0033(9)	4.3(12)E-5
^{232}Th	2970.49(21)	0.0064(10)	8.4(13)E-5
^{232}Th	2980.69(18)	0.0084(11)	1.10(14)E-4
^{232}Th	2989.93(25)	0.0066(10)	8.6(13)E-5
^{232}Th	3009.9(3)	0.0051(10)	6.7(13)E-5
^{232}Th	3044.7(4)	0.0031(12)	4.0(16)E-5
^{232}Th	3056.43(23)	0.0084(12)	1.10(16)E-4
^{232}Th	3070.6(4)	0.0039(12)	5.1(16)E-5
^{232}Th	3087.34(17)	0.0086(24)	1.1(3)E-4
^{232}Th	3118.4(9)	0.0040(10)	5.2(13)E-5
^{232}Th	3127.73(25)	0.0058(11)	7.6(14)E-5
^{232}Th	3132.80(17)	0.0087(10)	1.14(13)E-4
^{232}Th	3148.23(10)	0.0208(14)	0.000272(18)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{232}Th	3173.87(19)	0.0089(10)	1.16(13)E-4
^{232}Th	3184.94(17)	0.0079(10)	1.03(13)E-4
^{232}Th	3196.66(12)	0.0171(13)	2.23(17)E-4
^{232}Th	3230.47(23)	0.0123(12)	1.61(16)E-4
^{232}Th	3245.2(5)	0.0030(8)	3.9(10)E-5
^{232}Th	3260.9(3)	0.0056(9)	7.3(12)E-5
^{232}Th	3276.3(4)	0.0063(10)	8.2(13)E-5
^{232}Th	3287.94(14)	0.0165(14)	2.15(18)E-4
^{232}Th	3294.9(3)	0.0051(9)	6.7(12)E-5
^{232}Th	3326.21(17)	0.0102(10)	1.33(13)E-4
^{232}Th	3341.90(13)	0.0168(13)	2.19(17)E-4
^{232}Th	3363.3(3)	0.0051(8)	6.7(10)E-5
^{232}Th	3377.84(13)	0.0135(12)	1.76(16)E-4
^{232}Th	3391.3(3)	0.0044(8)	5.7(10)E-5
^{232}Th	3398.09(13)	0.0191(14)	2.49(18)E-4
^{232}Th	3436.17(12)	0.0211(15)	0.000276(20)
^{232}Th	3448.42(10)	0.0233(16)	0.000304(21)
^{232}Th	3461.45(24)	0.0069(10)	9.0(13)E-5
^{232}Th	**3473.00(8)**	**0.057(3)**	**0.00074(4)**
^{232}Th	3502.4(3)	0.0049(9)	6.4(12)E-5
^{232}Th	3509.43(14)	0.0170(14)	2.22(18)E-4
^{232}Th	3524.9(5)	0.0120(12)	1.57(16)E-4
^{232}Th	**3530.96(13)**	**0.0397(24)**	**0.00052(3)**
^{232}Th	3548.5(3)	0.0038(8)	5.0(10)E-5
^{232}Th	3602.66(19)	0.0119(10)	1.55(13)E-4
^{232}Th	3614.88(23)	0.0057(7)	7.4(9)E-5
^{232}Th	3635.17(20)	0.0073(8)	9.5(10)E-5
^{232}Th	3653.0(4)	0.0034(6)	4.4(8)E-5
^{232}Th	3712.29(24)	0.0049(6)	6.4(8)E-5
^{232}Th	3724.86(16)	0.0086(8)	1.12(10)E-4
^{232}Th	3735.59(12)	0.0115(9)	1.50(12)E-4
^{232}Th	3746.40(16)	0.0072(7)	9.4(9)E-5
^{232}Th	3755.05(13)	0.0098(9)	1.28(12)E-4
^{232}Th	3802.96(17)	0.0071(7)	9.3(9)E-5
^{232}Th	3861.50(22)	0.0057(7)	7.4(9)E-5
^{232}Th	3946.42(10)	0.0268(15)	0.000350(20)
^{232}Th	3971.83(22)	0.0041(5)	5.4(7)E-5
^{232}Th	4016.6(3)	0.0037(6)	4.8(8)E-5
^{232}Th	4045.00(13)	0.0118(9)	1.54(12)E-4
^{232}Th	4073.33(19)	0.0060(7)	7.8(9)E-5
^{232}Th	4201.85(16)	0.0110(9)	1.44(12)E-4
^{232}Th	4215.0(4)	0.0033(5)	4.3(7)E-5
^{232}Th	4246.78(15)	0.0093(7)	1.21(9)E-4
^{232}Th	4450.54(21)	0.0043(5)	5.6(7)E-5
^{232}Th	4769.66(25)	0.0047(7)	6.1(9)E-5
^{232}Th	4787.0(6)	0.0037(7)	4.8(9)E-5

Uranium (Z=92), *At.Wt.*=238.02891(3), σ_γ^z =3.374(20)

^{A}Z	E_γ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0
^{139}Ba^{d}	**29.9660(10)d**	**0.0381(11)**	**0.000485[<0.1%]**
^{235}U	**31.60(5)**	**0.10(3) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**34.70(10)**	**0.2100(15) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**41.4(3)**	**0.17(12) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**41.96(15)**	**0.35(6) $s^{-1}g^{-1}$**	**Abundant**
^{238}U	**43.5330(10)d**	**0.110(3)**	**0.00140[53%]**
^{235}U	**51.22(10)**	**0.20(4) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**54.25(5)**	**0.1700(12) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**72.70(20)**	**0.630(5) $s^{-1}g^{-1}$**	**Abundant**
^{238}U	**74.6640(10)d**	**1.300(3)**	**0.01655[53%]**
^{235}U	**75.02(5)**	**0.35(6) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**76.198(4)**	**0.046(6) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**96.090(20)**	**0.52(7) $s^{-1}g^{-1}$**	**Abundant**
^{238}Np^{d}	**106.1230(20)d**	**0.723(11)**	**0.00920[<0.1%]**
^{235}U	**109.160(20)**	**8.9(3) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**115.45(5)**	**0.17(6) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**120.35(5)**	**0.1500(11) $s^{-1}g^{-1}$**	**Abundant**
^{238}U	127.301(5)	0.0099(20)	1.26(25)E-4
^{238}U	**133.7990(10)**	**0.38(8)**	**0.0048(10)**
^{235}U	**136.55(5)**	**0.0690(5) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**140.76(4)**	**1.27(12) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**143.760(20)**	**63.0(7) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**150.930(20)**	**0.46(6) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**163.330(20)**	**29.2(3) $s^{-1}g^{-1}$**	**Abundant**
^{238}U	169.089(10)	0.012(4)	1.5(5)E-4
^{235}U	**182.61(5)**	**1.96(12) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**185.715(5)**	**329(4) $s^{-1}g^{-1}$**	**Abundant**
^{238}U	193.956(15)	0.0039(20)	5.0(25)E-5
^{235}U	**194.940(10)**	**3.62(7) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**198.900(20)**	**0.24(4) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**202.110(20)**	**6.21(13) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**205.311(10)**	**28.8(4) $s^{-1}g^{-1}$**	**Abundant**
^{238}Np^{d}	**209.7530(20)d**	**0.0909(13)**	**0.001157[<0.1%]**
^{235}U	**215.28(3)**	**0.167(17) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**221.380(20)**	**0.69(6) $s^{-1}g^{-1}$**	**Abundant**
^{238}Np^{d}	**228.1830(10)d**	**0.286(5)**	**0.00364[<0.1%]**
^{235}U	**228.78(5)**	**0.0400(3) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**233.50(3)**	**0.17(3) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**240.87(3)**	**0.43(4) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	243.60(20)	0.023(3)	0.00029(4)
^{235}U	**246.84(4)**	**0.305(17) $s^{-1}g^{-1}$**	**Abundant**
^{238}U	250.062(7)	0.034(12)	0.00043(15)
^{235}U	**275.129**	**0.30(3) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**275.43(10)**	**0.040(12) $s^{-1}g^{-1}$**	**Abundant**
^{238}Np^{d}	**277.5990(10)d**	**0.382(6)**	**0.00486[<0.1%]**
^{235}U	**289.56(4)**	**0.0400(3) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**291.65(3)**	**0.23(3) $s^{-1}g^{-1}$**	**Abundant**
^{238}U	292.5870(20)	0.016(6)	2.0(8)E-4
^{235}U^{f}	**297.00(10)**	**0.220(20)**	**0.00280(25)**
^{235}U	300.00(10)	0.016(3)	2.0(4)E-4
^{238}Np^{d}	**315.880(3)d**	**0.0425(8)**	**0.000541[<0.1%]**
^{238}Np^{d}	**334.3100(20)d**	**0.0550(8)**	**0.000700[<0.1%]**
^{235}U	**345.90(3)**	**0.23(3) $s^{-1}g^{-1}$**	**Abundant**
^{235}U	**387.82(3)**	**0.23(3) $s^{-1}g^{-1}$**	**Abundant**
^{238}U	451.213(23)	0.010(4)	1.3(5)E-4
^{238}U	478.79(8)	0.012(4)	1.5(5)E-4
^{238}U	496.753(11)	0.034(8)	0.00043(10)
^{238}U	**521.849(7)**	**0.073(3)**	**0.00093(4)**
^{238}U	535.45(5)	0.028(6)	0.00036(8)
^{238}U	537.26(3)	0.0079(20)	1.01(25)E-4
^{139}Ba^{d}	**537.261(9)d**	**0.066(3)**	**0.00084[<0.1%]**
^{238}U	**539.278(12)**	**0.099(20)**	**0.00126(25)**
^{238}U	542.085(12)	0.024(6)	0.00031(8)
^{238}U	**552.069(5)**	**0.207(5)**	**0.00264(6)**
^{238}U	**554.054(8)**	**0.085(20)**	**0.00108(25)**
^{238}U	554.10(8)	0.028(6)	0.00036(8)
^{238}U	562.027(22)	0.032(10)	0.00041(13)
^{238}U	563.17(3)	0.014(4)	1.8(5)E-4
^{238}U	**580.340(13)**	**0.043(10)**	**0.00055(13)**
^{238}U	582.034(9)	0.016(4)	2.0(5)E-4
^{238}U	588.88(3)	0.024(6)	0.00031(8)
^{238}U	590.39(3)	0.034(12)	0.00043(15)
^{238}U	**592.309(13)**	**0.045(12)**	**0.00057(15)**
^{238}U	**593.612(5)**	**0.108(24)**	**0.0014(3)**
^{238}U	600.284(10)	0.030(8)	0.00038(10)
^{238}U	**605.581(9)**	**0.053(12)**	**0.00067(15)**
^{238}U	611.38(3)	0.014(4)	1.8(5)E-4
^{238}U	**612.253(5)**	**0.23(5)**	**0.0029(6)**
^{238}U	**629.722(9)**	**0.073(20)**	**0.00093(25)**
^{238}U	**638.505(12)**	**0.041(12)**	**0.00052(15)**
^{238}U	669.385(13)	0.0039(20)	5.0(25)E-5
^{238}U	673.307(12)	0.010(4)	1.3(5)E-4
^{238}U	681.355(9)	0.012(4)	1.5(5)E-4
^{238}U	687.853(8)	0.028(8)	0.00036(10)
^{238}U	**689.907(11)**	**0.043(10)**	**0.00055(13)**
^{238}U	715.832(9)	0.022(6)	0.00028(8)
^{238}U	767.86(21)	0.020(6)	0.00025(8)
^{238}U	787.15(7)	0.020(6)	0.00025(8)
^{238}U	794.21(8)	0.020(6)	0.00025(8)

^{A}Z	E_γ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0
^{238}U	799.12(7)	0.0079(20)	1.01(25)E-4
^{238}U	819.868(21)	0.010(4)	1.3(5)E-4
^{238}U	828.04(21)	0.024(6)	0.00031(8)
^{238}U	**831.837(19)**	**0.053(12)**	**0.00067(15)**
^{238}U	842.42(8)	0.024(6)	0.00031(8)
^{238}U	**853.23(4)**	**0.055(12)**	**0.00070(15)**
^{238}U	893.30(10)	0.016(4)	2.0(5)E-4
^{235}U	909.06(6)	0.026(4)	0.00033(5)
^{235}U	**943.14(7)**	**0.082(10)**	**0.00104(13)**
^{238}U	961.06(4)	0.0039(20)	5.0(25)E-5
^{238}U	990.49(3)	0.010(4)	1.3(5)E-4
^{238}U	1007.03(6)	0.0079(20)	1.01(25)E-4
^{238}U	1007.03(6)	0.0079(20)	1.01(25)E-4
^{235}U	1014.1(10)	0.026(4)	0.00033(5)
^{238}U	1021.25(4)	0.0079(20)	1.01(25)E-4
^{238}U	1021.25(4)	0.0079(20)	1.01(25)E-4
^{238}U	1029.32(5)	0.037(8)	0.00047(10)
^{238}U	1048.85(8)	0.012(4)	1.5(5)E-4
^{238}U	1060.82(8)	0.016(4)	2.0(5)E-4
^{238}U	1062.48(6)	0.0079(20)	1.01(25)E-4
^{238}U	1066.82(12)	0.030(6)	0.00038(8)
^{238}U	1089.50(5)	0.014(4)	1.8(5)E-4
^{238}U	1110.27(6)	0.010(4)	1.3(5)E-4
^{238}U	1149.8(3)	0.010(4)	1.3(5)E-4
^{238}U	1152.80(6)	0.010(4)	1.3(5)E-4
^{238}U	1155.05(4)	0.010(4)	1.3(5)E-4
^{238}U	1167.01(4)	0.020(6)	0.00025(8)
$^{235}U^f$	**1279.01(10)**	**0.200(10)**	**0.00255(13)**
^{238}U	2998.5(5)	0.012(4)	1.5(5)E-4
^{238}U	3089.4(5)	0.0071(24)	9(3)E-5
^{238}U	3114.2(5)	0.007(3)	9(4)E-5
^{238}U	3121.7(5)	0.008(3)	1.0(4)E-4
^{238}U	3175.2(5)	0.0067(22)	9(3)E-5
^{238}U	3191.7(5)	0.0047(16)	6.0(20)E-5
^{238}U	3197.2(5)	0.016(6)	2.0(8)E-4
^{238}U	3220.1(5)	0.012(4)	1.5(5)E-4
^{238}U	3233.2(5)	0.010(3)	1.3(4)E-4
^{238}U	3286.12(20)	0.0040(3)	5.1(4)E-5
^{238}U	3296.5(3)	0.0070(5)	8.9(6)E-5
^{238}U	3312.8(5)	0.0040(10)	5.1(13)E-5
^{238}U	3445.44(6)	0.0045(3)	5.7(4)E-5
^{238}U	3564.45(9)	0.0042(4)	5.3(5)E-5
^{238}U	**3583.10(7)**	**0.042(3)**	**0.00053(4)**
^{238}U	3611.78(9)	0.0146(10)	1.86(13)E-4
^{238}U	3639.39(6)	0.0122(8)	1.55(10)E-4
^{238}U	3651.36(6)	0.0069(5)	8.8(6)E-5
^{238}U	3739.59(13)	0.0038(3)	4.8(4)E-5
^{238}U	3844.56(21)	0.0068(5)	8.7(6)E-5
^{238}U	3982.69(5)	0.0259(14)	0.000330(18)
^{238}U	3991.25(5)	0.0241(12)	0.000307(15)
^{238}U	**4060.35(5)**	**0.186(3)**	**0.00237(4)**
^{238}U	4067.02(5)	0.0073(4)	9.3(5)E-5

[d] Fission or decay product
[f] Prompt fission to ^{134}Te
"**Abundan**t": See explanation on page 78 in the text

Table 7.4 Energy-Ordered Table of Most Intense Thermal Neutron Capture Gamma Rays.

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{56}Fe	14.411(14)	0.149(3)	0.00809(16)	7631.136(0.653), 7645.5450(0.549), 352.347(0.273)
^{71}Ga	16.43(3)	0.078(5)	0.00339(22)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{51}V	17.152(6)	0.260(20)	0.0155(12)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{93}Nb	17.810(7)	0.0579(14)	0.00189(5)	99.4070(0.196), 255.9290(0.176), 253.115(0.1320)
^{115}In	22.796(7)	7(3)	0.18(8)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{55}Mn	26.560(20)	3.42(4)	0.1887(22)	846.754(13.10), 1810.72(3.62), 83.884(3.11)
^{127}I	27.3620(10)	0.43(4)	0.0103(10)	133.6110(1.42), 442.901(0.600), 58.1100(0.28)
^{159}Tb	29.0170(20)	0.21(4)	0.0040(8)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{81}Br	29.1130(10)	0.1680(20)	0.00637(8)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{39}K	29.8300(10)	1.380(20)	0.1070(16)	770.3050(0.903), 1158.887(0.1600), 5380.018(0.146)
^{139}La	29.9640(10)	0.169(8)	0.00369(17)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{139}Ba	29.9660(10)d	0.0381(11)	0.000485[0.1%]	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{27}Al	30.6380(10)	0.0798(20)	0.00896(22)	1778.92(0.232), 7724.027(0.0493), 3033.896(0.0179)
^{159}Tb	32.652(3)	0.19(3)	0.0036(6)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{159}Tb	33.1590(10)	0.22(4)	0.0042(8)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{79}Br	37.0520(20)d	0.428(12)	0.0162[7.4%]	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{79}Br	37.054(3)	0.160(10)	0.0061(4)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{123}Sb	40.8040(10)	0.10(3)	0.0025(8)	564.24(2.700), 61.4130(0.75), 78.0910(0.48)
^{174}Yb	41.2180(20)	1.1(3)	0.019(5)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{159}Tb	41.8900(10)	0.64(10)	0.0122(19)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{238}U	43.5330(10)d	0.110(3)	0.00140[53%]	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{75}As	44.4250(10)	0.560(20)	0.0227(8)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{75}As	46.0980(10)	0.337(15)	0.0136(6)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{182}W	46.4840(10)	0.192(10)	0.00316(16)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{174}Yb	46.7510(20)	0.25(8)	0.0044(14)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{191}Ir	48.0570(10)	5.7(4)	0.090(6)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{151}Eu	48.31(17)	181(70)	3.6(14)	89.847(1430), 77.23(187)
^{133}Cs	48.790(20)	0.345(10)	0.00787(23)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{164}Dy	50.4310(20)	33.9(15)	0.63(3)	184.257(146), 538.609(69.2), 496.931(44.9)
^{159}Tb	50.8690(10)	0.60(15)	0.011(3)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{103}Rh	51.50(3)	16.0(4)	0.471(12)	180.87(22.6), 97.14(19.5), 217.82(7.38)
^{103}Rh	51.50(3)d	5.2(3)	0.153[90%]	180.87(22.6), 97.14(19.5), 51.50(16.0)
^{45}Sc	52.0110(10)	0.87(3)	0.0586(20)	227.773(7.13), 147.011(6.08), 142.528(4.88)
^{127}I	52.385(3)	0.167(19)	0.0040(5)	133.6110(1.42), 442.901(0.600), 27.3620(0.43)
^{182}W	52.5290(10)	0.128(11)	0.00211(18)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{159}Tb	54.1290(10)	0.60(15)	0.011(3)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{139}La	54.9440(10)	0.143(7)	0.00312(15)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{197}Au	55.1810(10)	2.90(12)	0.0446(18)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{127}I	58.1100(20)	0.28(4)	0.0067(10)	133.6110(1.42), 442.901(0.600), 27.3620(0.43)
^{191}Ir	58.8440(10)	5.3(3)	0.084(5)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{185}Re	59.0100(20)	5.5(8)	0.090(13)	63.5820(8.0), 155.041(7.16), 137.157(5.29)
^{186}W	59.03(4)	0.208(7)	0.00343(12)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{79}Br	59.471(4)	0.202(5)	0.00766(19)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{159}Tb	59.6430(10)	0.48(6)	0.0092(11)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{85}Rb	59.75(6)	0.010(4)	0.00035(14)	556.82(0.0913), 487.89(0.0494), 555.61(0.0407)
^{133}Cs	60.0300(10)	0.443(14)	0.0101(3)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{141}Pr	60.0630(20)	0.134(14)	0.0029(3)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{115}In	60.9160(10)	15.8(11)	0.42(3)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{121}Sb	61.4130(10)	0.75(18)	0.019(5)	564.24(2.700), 78.0910(0.48), 121.4970(0.40)
^{177}Hf	62.820(21)	5.26(16)	0.089(3)	213.439(29.3), 214.3410(16.3), 93.182(13.3)
^{139}La	63.1790(10)	0.208(8)	0.00454(17)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{187}Re	63.5820(20)	8.0(14)	0.130(23)	155.041(7.16), 59.0100(5.5), 137.157(5.29)
^{159}Tb	63.6860(10)	1.46(16)	0.028(3)	75.0500(1.78), 64.1100(1.2), 41.8900(0.64)
^{159}Tb	64.1100(20)	1.2(3)	0.023(6)	75.0500(1.78), 63.6860(1.46), 41.8900(0.64)
^{141}Pr	64.5050(20)	0.137(6)	0.00295(13)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{191}Ir	66.822(8)	1.31(13)	0.0207(20)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{141}Pr	68.6110(20)	0.116(6)	0.00249(13)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{169}Tm	68.649	1.75(23)	0.031(4)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{121}Sb	71.4670(10)	0.095(22)	0.0024(6)	564.24(2.700), 61.4130(0.75), 78.0910(0.48)
^{175}Lu	71.5170(10)	3.96(22)	0.069(4)	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{186}W	72.002(4)d	1.32(3)	0.0218[1.4%]	685.73(3.24), 479.550(2.59), 134.247(1.050)
^{109}Ag	72.67(5)	0.9(15)	0.03(4)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{238}U	74.6640(10)d	1.30000(14)	0.0165511[53%]	106.1230(0.723), 277.5990(0.382), 133.7990(0.38)
^{187}Re	74.8630(20)	1.29(8)	0.0210(13)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{75}As	74.8720(10)	0.12(3)	0.0049(12)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{159}Tb	75.0500(10)	1.78(18)	0.034(3)	63.6860(1.46), 64.1100(1.2), 41.8900(0.64)

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{169}Tm	75.83	0.94(8)	0.0169(14)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{173}Yb	76.996	0.40(4)	0.0070(7)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{232}Th	77.09(15)	0.09(3)	0.0012(4)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{151}Eu	77.23(4)	187(13)	3.7(3)	89.847(1430), 48.31(181)
^{186}W	77.39(3)	0.134(5)	0.00221(8)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{191}Ir	77.9470(10)	4.8(4)	0.076(6)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{31}P	78.083(20)	0.059(3)	0.0058(3)	512.646(0.079), 636.663(0.0311), 3899.89(0.0294)
^{121}Sb	78.0910(10)	0.48(11)	0.012(3)	564.24(2.700), 61.4130(0.75), 121.4970(0.40)
^{171}Yb	78.7430(10)	0.67(10)	0.0117(18)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{159}Tb	78.8670(10)	0.19(4)	0.0036(8)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{107}Ag	78.91(4)	3.90(12)	0.110(3)	198.72(7.75), 235.62(4.62), 117.45(3.85)
^{159}Tb	79.099(6)	0.43(6)	0.0082(11)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{157}Gd	79.5100(10)	4010(100)	77.3(19)	181.931(7200), 944.174(3090), 962.104(2050)
^{167}Er	79.8040(10)	18.2(8)	0.330(14)	184.2850(56), 815.9890(42.5), 198.2440(29.9)
^{109}Ag	79.91(6)	1.0(16)	0.03(5)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{165}Ho	80.574(8)d	3.87(5)	0.0711[1.3%]	136.6650(14.5), 116.8360(8.1), 426.012(2.88)
^{161}Dy	80.64(7)	16.5(5)	0.308(9)	184.257(146), 538.609(69.2), 496.931(44.9)
^{197}Au	82.3560(10)	2.3(4)	0.035(6)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{197}Au	82.5240(10)	1.4(3)	0.022(5)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{55}Mn	83.884(23)	3.11(5)	0.172(3)	846.754(13.10), 1810.72(3.62), 26.560(3.42)
^{191}Ir	84.2740(20)	7.7(4)	0.121(6)	351.689(10.9), 328.448(9.1), 136.1250(6.5)
^{141}Pr	84.998(3)	0.207(11)	0.00445(24)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{103}Rh	85.19(3)	3.2(3)	0.094(9)	180.87(22.6), 97.14(19.5), 51.50(16.0)
^{115}In	85.5690(20)	22.1(16)	0.58(4)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{173}Yb	86.11(7)	0.164(18)	0.0029(3)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{75}As	86.7880(10)	0.579(11)	0.0234(4)	559.10(2.00), 165.0490(0.996), 44.4250(0.560)
^{185}Re	87.264(3)	0.84(4)	0.0137(7)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{169}Tm	87.5210(10)	1.29(3)	0.0231(5)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{123}Sb	87.601	0.212(8)	0.00528(20)	564.24(2.700), 61.4130(0.75), 78.0910(0.48)
^{174}Yb	87.9690(20)	0.26(6)	0.0046(11)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{121}Sb	88.2690(10)	0.083(19)	0.0021(5)	564.24(2.700), 61.4130(0.75), 78.0910(0.48)
^{191}Ir	88.7340(10)	3.67(24)	0.058(4)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{155}Gd	88.9670(10)	1380(40)	26.6(8)	181.931(7200), 79.5100(4010), 944.174(3090)
^{65}Cu	89.08(4)	0.0970(17)	0.00463(8)	278.250(0.893), 7915.62(0.869), 159.281(0.648)
^{159}Tb	89.4080(20)	0.21(3)	0.0040(6)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{151}Eu	89.847(6)	1430(30)	28.5(6)	77.23(187), 48.31(181)
^{191}Ir	90.7030(20)	1.25(15)	0.0197(24)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{23}Na	90.9920(10)	0.235(3)	0.0310(4)	1368.66(0.530), 2754.13(0.530), 472.202(0.478)
^{187}Re	92.4640(20)	1.07(6)	0.0174(10)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{177}Hf	93.182(6)	13.3(9)	0.226(15)	213.439(29.3), 214.3410(16.3), 325.559(6.69)
^{159}Tb	93.3060(20)	0.218(25)	0.0042(5)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{174}Yb	95.2730(20)	0.20(5)	0.0035(9)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{115}In	96.036(5)	11.4(14)	0.30(4)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{115}In	96.062(3)	24.6(18)	0.65(5)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{103}Rh	97.14(3)	19.5(4)	0.574(12)	180.87(22.6), 51.50(16.0), 217.82(7.38)
^{197}Au	97.2500(20)	2.1(5)	0.032(8)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{159}Tb	97.503(3)	0.50(6)	0.0095(11)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{182}W	99.0790(10)	0.155(13)	0.00256(21)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{93}Nb	99.4070(10)	0.196(9)	0.0064(3)	255.9290(0.176), 253.115(0.1320), 113.4010(0.117)
^{103}Rh	100.74(4)	4.96(10)	0.146(3)	180.87(22.6), 97.14(19.5), 51.50(16.0)
^{197}Au	101.9390(10)	0.953(17)	0.0147(3)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{173}Yb	102.60(5)	0.44(5)	0.0077(9)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{71}Ga	103.25(3)d	0.0526(11)	0.00229[100%]	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{174}Yb	104.5260(20)	0.43(11)	0.0075(19)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{55}Mn	104.611(23)	1.74(3)	0.0960(17)	846.754(13.10), 1810.72(3.62), 26.560(3.42)
^{121}Sb	105.8160(10)	0.21(5)	0.0052(12)	564.24(2.700), 61.4130(0.75), 78.0910(0.48)
^{187}Re	105.8620(20)	1.77(8)	0.0288(13)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{109}Ag	105.95(6)	0.87(13)	0.024(4)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{238}Np	106.1230(20)d	0.723(11)	0.00920[0.6%]	74.6640(1.30000), 277.5990(0.382), 133.7990(0.38)
^{182}W	107.9320(10)	0.144(12)	0.00237(20)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{191}Ir	108.0300(20)	2.62(12)	0.0413(19)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{183}W	111.216(9)	0.195(6)	0.00321(10)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{193}Ir	112.2310(10)	1.7(4)	0.027(6)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{71}Ga	112.36(3)	0.155(3)	0.00674(13)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{176}Lu	112.9500(10)d	3.47(16)	0.060[0.2%]	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{93}Nb	113.4010(10)	0.117(3)	0.00382(10)	99.4070(0.196), 255.9290(0.176), 253.115(0.1320)
^{133}Cs	113.7650(20)	0.777(15)	0.0177(3)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{174}Yb	113.805(4)d	0.417(14)	0.00730[0.3%]	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{181}Ta	114.3150(10)	0.280(9)	0.00469(15)	270.4030(2.60), 173.2050(1.210), 402.623(1.180)

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{169}Tm	114.544	3.19(6)	0.0572(11)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{121}Sb	114.8680(10)	0.31(7)	0.0077(17)	564.24(2.700), 61.4130(0.75), 78.0910(0.48)
^{64}Zn	115.225(18)	0.167(3)	0.00774(14)	1077.335(0.356), 7863.55(0.1410), 1883.12(0.0718)
^{133}Cs	116.3740(20)	1.39(12)	0.032(3)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{133}Cs	116.612(4)	1.44(12)	0.033(3)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{75}As	116.7550(10)	0.107(18)	0.0043(7)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{165}Ho	116.8360(10)	8.1(4)	0.149(7)	136.6650(14.5), 80.574(3.87), 426.012(2.88)
^{109}Ag	117.45(8)	3.85(7)	0.1082(20)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{75}As	120.2580(10)	0.402(8)	0.0163(3)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{133}Cs	120.588(3)	0.414(10)	0.00944(23)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{121}Sb	121.4970(10)	0.40(9)	0.0100(22)	564.24(2.700), 61.4130(0.75), 78.0910(0.48)
^{176}Lu	121.620(3)	5.24(17)	0.091(3)	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{56}Fe	122.077(14)	0.096(3)	0.00521(16)	7631.136(0.653), 7645.5450(0.549), 352.347(0.273)
^{75}As	122.2470(10)	0.227(5)	0.00918(20)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{127}I	124.2810(20)	0.180(13)	0.0043(3)	133.6110(1.42), 442.901(0.600), 27.3620(0.43)
^{51}V	124.453(4)	0.23(5)	0.014(3)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{51}V	125.082(3)	1.61(4)	0.0958(24)	1434.10(4.81), 6517.282(0.78), 645.703(0.769)
^{115}In	126.3720(20)	4.0(3)	0.106(8)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{141}Pr	126.8460(20)	0.307(15)	0.0066(3)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{191}Ir	126.958(3)	1.86(10)	0.0293(16)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{103}Rh	127.20(3)	5.27(21)	0.155(6)	180.87(22.6), 97.14(19.5), 51.50(16.0)
^{186}W	127.43(4)	0.129(5)	0.00213(8)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{133}Cs	127.5000(20)d	0.310(11)	7.1E-03[11%]	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{169}Tm	130.027	0.940(25)	0.0169(5)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{133}Cs	130.2320(20)	1.410(21)	0.0322(5)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{127}I	133.6110(10)	1.42(10)	0.0339(24)	442.901(0.600), 27.3620(0.43), 58.1100(0.28)
^{238}U	133.7990(10)	0.38(8)	0.0048(10)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{181}Ta	133.8770(20)	0.63(7)	0.0106(12)	270.4030(2.60), 173.2050(1.210), 402.623(1.180)
^{186}W	134.247(7)d	1.050(20)	0.0173[1.4%]	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{103}Rh	134.54(3)	6.8(4)	0.200(12)	180.87(22.6), 97.14(19.5), 51.50(16.0)
^{75}As	135.4110(10)	0.156(4)	0.00631(16)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{159}Tb	135.5970(20)	0.39(4)	0.0074(8)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{191}Ir	136.1250(10)	6.5(9)	0.102(14)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{191}Ir	136.213(3)	4.0(5)	0.063(8)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{165}Ho	136.6650(20)	14.5(7)	0.266(13)	116.8360(8.1), 80.574(3.87), 426.012(2.88)
^{191}Ir	136.7910(10)	2.20(21)	0.035(3)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{185}Re	137.157(8)d	5.29(3)	0.0861[0.4%]	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{115}In	138.326(8)d	5.11(18)	0.135[30%]	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{176}Lu	138.607(5)	6.79(24)	0.118(4)	150.392(13.8), 457.944(8.3), 208.3660(6.0)
^{76}Se	139.2270(10)	0.543(9)	0.0208(4)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{203}Tl	139.94(9)	0.400(7)	0.00593(10)	347.96(0.361), 318.88(0.325), 5641.57(0.316)
^{141}Pr	140.9050(20)	0.479(10)	0.01030(22)	176.8630(1.06), 1575.6(0.426), 5666.170(0.379)
^{187}Re	141.760(4)	1.46(8)	0.0238(13)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{45}Sc	142.528(8)d	4.88(7)	0.329[99%]	227.773(7.13), 147.011(6.08), 295.243(3.97)
^{185}Re	144.152(5)	1.8(3)	0.029(5)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{169}Tm	144.4790(10)	1.2(4)	0.022(7)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{169}Tm	144.48	5.96(11)	0.1069(20)	200.(8.72), 149.7180(7.11), 237.2390(5.52)
^{75}As	144.5480(10)	0.1000(22)	0.00404(9)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{191}Ir	144.903(5)	3.1(4)	0.049(6)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{71}Ga	145.14(3)	0.466(7)	0.0203(3)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{186}W	145.79(3)	0.970(21)	0.0160(4)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{176}Lu	145.870(4)	1.52(9)	0.0263(16)	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{45}Sc	147.011(10)	6.08(9)	0.410(6)	227.773(7.13), 142.528(4.88), 295.243(3.97)
^{176}Lu	147.165(5)	4.96(19)	0.086(3)	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{176}Lu	147.167(5)	3.7(7)	0.064(12)	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{51}V	147.846(3)	0.253(6)	0.0151(4)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{121}Sb	148.238	0.26(6)	0.0065(15)	564.24(2.700), 61.4130(0.75), 78.0910(0.48)
^{193}Ir	148.9340(10)	1.4(9)	0.022(14)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{165}Ho	149.309(3)	2.25(12)	0.0413(22)	136.6650(14.5), 116.8360(8.1), 80.574(3.87)
^{169}Tm	149.7180(10)	7.11(12)	0.1275(22)	200.(8.72), 140.(5.96), 237.2390(5.52)
^{176}Lu	150.392(3)	13.8(4)	0.239(7)	457.944(8.3), 138.607(6.79), 208.3660(6.0)
^{191}Ir	151.5640(20)	2.89(20)	0.046(3)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{185}Re	151.688(3)	1.15(7)	0.0187(11)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{127}I	153.011(3)	0.209(14)	0.0050(3)	133.6110(1.42), 442.901(0.600), 27.3620(0.43)
^{159}Tb	153.6870(20)	0.44(5)	0.0084(10)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{203}Tl	154.01(9)	0.0926(17)	0.001373(25)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{187}Re	155.041(4)d	7.16(25)	0.117[2.0%]	63.5820(8.0), 59.0100(5.5), 137.157(5.29)
^{187}Os	155.10(4)	1.19(3)	0.0190(5)	186.7180(2.08), 557.978(0.84), 569.344(0.694)
^{123}Sb	155.1780(10)	0.081(9)	0.00202(22)	564.24(2.700), 61.4130(0.75), 78.0910(0.48)

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{139}La	155.560(5)	0.192(7)	0.00419(15)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{191}Ir	156.654(3)	2.76(12)	0.0435(19)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{75}As	157.7450(10)	0.117(24)	0.0047(10)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{197}Au	158.4360(10)	1.250(18)	0.0192(3)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{59}Co	158.517(17)	1.200(15)	0.0617(8)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{116}Sn	158.65(6)	0.0145(3)	0.000370(8)	1293.591(0.1340), 1171.28(0.0879), 1229.64(0.0673)
^{63}Cu	159.281(5)	0.648(10)	0.0309(5)	278.250(0.893), 7915.62(0.869), 7637.40(0.54)
^{127}I	160.7570(10)	0.187(16)	0.0045(4)	133.6110(1.42), 442.901(0.600), 27.3620(0.43)
^{76}Se	161.9220(10)d	0.855(23)	0.0328[99%]	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{209}Bi	162.19(11)	0.008(3)	1.2E-04(4)	4171.05(0.0171), 4054.57(0.0137), 319.78(0.0115)
^{182}W	162.315(8)	0.187(5)	0.00308(8)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{115}In	162.393(3)d	15.8(8)	0.417[100%]	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{176}Lu	162.492(4)	5.32(17)	0.092(3)	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{139}La	162.659(3)	0.489(18)	0.0107(4)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{75}As	165.0490(10)	0.996(16)	0.0403(7)	559.10(2.00), 86.7880(0.579), 44.4250(0.560)
^{169}Tm	165.735	3.29(6)	0.0590(11)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{138}Ba	165.8570(10)d	0.074(8)	0.00163[21%]	1435.77(0.308), 627.29(0.294), 818.514(0.212)
^{19}F	166.700(20)	0.000413(18)	6.6E-05(3)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{40}Ar	167.30(20)	0.53(5)	0.040(4)	4745.3(0.36), 1186.8(0.34), 516.0(0.167)
^{187}Re	167.327(3)	1.46(6)	0.0238(10)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{197}Au	168.3340(10)	3.60(22)	0.055(3)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{103}Rh	169.16(5)	2.88(19)	0.085(6)	180.87(22.6), 97.14(19.5), 51.50(16.0)
^{191}Ir	169.196(3)	3.05(13)	0.0481(20)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{197}Au	170.1030(10)	1.66(22)	0.026(3)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{115}In	171.059(5)	3.44(25)	0.091(7)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{176}Lu	171.869(7)	1.74(6)	0.0301(10)	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{181}Ta	173.2050(20)	1.210(25)	0.0203(4)	270.4030(2.60), 402.623(1.180), 133.8770(0.63)
^{115}In	173.886(6)	4.1(3)	0.108(8)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{133}Cs	174.3040(20)	0.420(11)	0.00958(25)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{70}Ge	175.05(3)	0.164(4)	0.00684(17)	595.851(1.100), 867.899(0.553), 608.353(0.250)
^{173}Yb	175.30(5)	0.58(6)	0.0102(11)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{133}Cs	176.4040(20)	2.47(4)	0.0563(9)	205.615(1.560), 510.795(1.54), 307.015(1.45)
^{141}Pr	176.8630(20)	1.06(4)	0.0228(9)	140.9050(0.479), 1575.6(0.426), 5666.170(0.379)
^{103}Rh	178.66(4)	3.27(14)	0.096(4)	180.87(22.6), 97.14(19.5), 51.50(16.0)
^{159}Tb	178.881(3)	0.42(8)	0.0080(15)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{191}Ir	179.0380(20)	2.1(5)	0.033(8)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{103}Rh	180.87(3)	22.6(15)	0.67(4)	97.14(19.5), 51.50(16.0), 217.82(7.38)
^{169}Tm	180.993	3.85(14)	0.0691(25)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{171}Yb	181.529(3)	0.53(6)	0.0093(11)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{157}Gd	181.931(4)	7200(300)	139(6)	79.5100(4010), 944.174(3090), 962.104(2050)
^{141}Pr	182.786(4)	0.377(14)	0.0081(3)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{71}Ga	184.09(3)	0.1040(21)	0.00452(9)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{164}Dy	184.257(4)	146(15)	2.7(3)	538.609(69.2), 496.931(44.9), 185.19(39.1)
^{167}Er	184.2850(10)	56(5)	1.01(9)	815.9890(42.5), 198.2440(29.9), 79.8040(18.2)
^{161}Dy	185.19(9)	39.1(12)	0.729(22)	184.257(146), 538.609(69.2), 496.931(44.9)
^{176}Lu	185.593(8)	3.42(12)	0.0592(21)	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{65}Cu	185.96(4)	0.244(3)	0.01164(14)	278.250(0.893), 7915.62(0.869), 159.281(0.648)
^{115}In	186.2100(20)	26.6(18)	0.70(5)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{189}Os	186.7180(20)	2.08(5)	0.0331(8)	155.10(1.19), 557.978(0.84), 569.344(0.694)
^{133}Cs	186.8400(20)	0.282(9)	0.00643(21)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{69}Ga	187.84(3)	0.1080(21)	0.00469(9)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{176}Lu	187.970(23)	1.39(6)	0.0241(10)	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{187}Re	188.813(6)	0.98(10)	0.0159(16)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{168}Yb	191.2140(10)	0.22(4)	0.0039(7)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{107}Ag	191.39(3)	1.81(5)	0.0509(14)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{71}Ga	192.11(3)	0.194(3)	0.00843(13)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{197}Au	192.3920(10)	3.9(18)	0.06(3)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{107}Ag	192.90(3)	2.20(6)	0.0618(17)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{197}Au	192.9440(10)	1.70(22)	0.026(3)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{159}Tb	193.431(4)	0.37(4)	0.0071(8)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{71}Ga	194.66(4)	0.1070(21)	0.00465(9)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{79}Br	195.602(4)	0.434(14)	0.0165(5)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{87}Rb	196.34(3)	0.00964(19)	0.000342(7)	556.82(0.0913), 487.89(0.0494), 555.61(0.0407)
^{71}Ga	197.94(5)	0.1330(24)	0.00578(10)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{167}Er	198.2440(10)	29.9(16)	0.54(3)	184.2850(56), 815.9890(42.5), 79.8040(18.2)
^{133}Cs	198.3010(20)	1.100(19)	0.0251(4)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{203}Tl	198.33(8)	0.0408(10)	0.000605(15)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{169}Tm	198.5260(10)	0.96(3)	0.0172(5)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{109}Ag	198.72(4)	7.75(13)	0.218(4)	235.62(4.62), 78.91(3.90), 117.45(3.85)

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{155}Gd	199.2130(10)	2020(60)	38.9(12)	181.931(7200), 79.5100(4010), 944.174(3090)
^{185}Re	199.337(16)	0.91(4)	0.0148(7)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{187}Re	199.513(5)	1.02(10)	0.0166(16)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{76}Se	200.4530(20)	0.233(9)	0.0089(4)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{186}W	201.44(5)	0.319(8)	0.00526(13)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{121}Sb	201.5950(10)	0.091(3)	0.00226(8)	564.24(2.700), 61.4130(0.75), 78.0910(0.48)
^{89}Y	202.53(3)	0.289(7)	0.00985(24)	6080.171(0.76), 776.613(0.659), 574.106(0.174)
^{63}Cu	202.950(8)	0.193(3)	0.00920(14)	278.250(0.893), 7915.62(0.869), 159.281(0.648)
^{169}Tm	204.448	8.72(19)	0.156(3)	149.7180(7.11), 140.(5.96), 237.2390(5.52)
^{186}W	204.83(4)	0.148(4)	0.00244(7)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{133}Cs	205.615(3)	1.560(25)	0.0356(6)	176.4040(2.47), 510.795(1.54), 307.015(1.45)
^{191}Ir	206.220(4)	3.70(18)	0.058(3)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{107}Ag	206.46(3)	3.58(7)	0.1006(20)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{187}Re	207.853(4)	4.44(21)	0.072(3)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{176}Lu	208.3660(10)d	6.0(3)	0.104[0.2%]	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{187}Re	208.843(7)	0.98(10)	0.0159(16)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{238}Np	209.7530(20)d	0.0909(13)	0.001157[0.6%]	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{191}Ir	210.354(5)	2.1(4)	0.033(6)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{185}Re	210.698(4)	1.50(10)	0.0244(16)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{75}As	211.1470(10)	0.113(3)	0.00457(12)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{55}Mn	212.039(21)	2.13(3)	0.1175(17)	846.754(13.10), 1810.72(3.62), 26.560(3.42)
^{71}Ga	212.58(4)	0.0583(12)	0.00253(5)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{177}Hf	213.439(7)	29.3(7)	0.497(12)	214.3410(16.3), 93.182(13.3), 325.559(6.69)
^{178}Hf	214.3410(20)	5.7(6)	0.097(10)	213.439(29.3), 214.3410(16.3), 93.182(13.3)
^{178}Hf	214.3410(20)d	16.3(3)	0.277[99%]	213.439(29.3), 93.182(13.3), 325.559(6.69)
^{185}Re	214.647(4)	2.53(14)	0.0412(23)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{197}Au	214.9710(10)	9.0(12)	0.138(18)	410.(94.), 247.5730(5.56), 261.4040(5.3)
^{107}Ag	215.15(4)	1.55(3)	0.0435(8)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{103}Rh	215.340(22)	5.20(12)	0.153(4)	180.87(22.6), 97.14(19.5), 51.50(16.0)
^{45}Sc	216.44(4)	2.49(4)	0.168(3)	227.773(7.13), 147.011(6.08), 142.528(4.88)
^{103}Rh	216.54(8)	5.0(10)	0.15(3)	180.87(22.6), 97.14(19.5), 51.50(16.0)
^{191}Ir	216.905(4)	5.57(24)	0.088(4)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{103}Rh	217.82(3)	7.38(13)	0.217(4)	180.87(22.6), 97.14(19.5), 51.50(16.0)
^{139}La	218.225(22)	0.78(3)	0.0170(7)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{133}Cs	218.341(3)	0.309(9)	0.00705(21)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{79}Br	219.377(3)	0.399(14)	0.0151(5)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{169}Tm	219.706	3.64(6)	0.0653(11)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{133}Cs	219.7530(20)	0.344(9)	0.00784(21)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{165}Ho	221.186(4)	2.05(11)	0.0377(20)	136.6650(14.5), 116.8360(8.1), 80.574(3.87)
^{79}Br	223.627(3)	0.153(5)	0.00580(19)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{175}Lu	225.4030(10)	1.73(8)	0.0300(14)	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{186}W	225.86(4)	0.113(17)	0.0019(3)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{191}Ir	226.2980(20)	4.0(4)	0.063(6)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{187}Re	227.083(6)	1.78(12)	0.0290(20)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{45}Sc	227.773(12)	7.13(11)	0.481(7)	147.011(6.08), 142.528(4.88), 295.243(3.97)
^{238}Np	228.1830(10)d	0.286(5)	0.00364[0.6%]	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{45}Sc	228.716(12)	3.31(5)	0.223(3)	227.773(7.13), 147.011(6.08), 142.528(4.88)
^{59}Co	229.879(17)	7.18(8)	0.369(4)	277.161(6.77), 555.972(5.76), 447.711(3.41)
^{121}Sb	233.1690(10)	0.0996(24)	0.00248(6)	564.24(2.700), 61.4130(0.75), 78.0910(0.48)
^{79}Br	234.320(3)	0.205(10)	0.0078(4)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{133}Cs	234.3340(20)	1.070(23)	0.0244(5)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{169}Tm	235.1890(10)	1.18(4)	0.0212(7)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{115}In	235.275(4)	4.9(3)	0.129(8)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{109}Ag	235.62(4)	4.62(7)	0.1298(20)	198.72(7.75), 78.91(3.90), 117.45(3.85)
^{139}La	235.771(8)	0.111(4)	0.00242(9)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{75}As	235.8770(10)	0.181(4)	0.00732(16)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{197}Au	236.0450(10)	4.1(5)	0.063(8)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{187}Re	236.627(4)	1.45(10)	0.0236(16)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{107}Ag	236.85(4)	1.95(3)	0.0548(8)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{109}Ag	236.89(7)	1.3(9)	0.037(25)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{169}Tm	237.2390(10)	5.52(10)	0.0990(18)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{139}La	237.660(4)	0.320(12)	0.0070(3)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{76}Se	238.9980(10)	2.06(3)	0.0791(12)	613.724(2.14), 520.6370(1.260), 161.9220(0.855)
^{165}Ho	239.132(4)	2.25(12)	0.0413(22)	136.6650(14.5), 116.8360(8.1), 80.574(3.87)
^{169}Tm	242.6220(10)	1.28(4)	0.0230(7)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{159}Tb	242.973(12)	0.219(24)	0.0042(5)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{79}Br	244.237(3)	0.45(3)	0.0171(11)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{81}Br	244.8310(10)	0.15(5)	0.0057(19)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{79}Br	245.203(4)	0.80(3)	0.0303(11)	776.517(0.990), 554.3480(0.838), 619.106(0.515)

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{110}Cd	245.3(3)	274(25)	7.4(7)	558.32(1860), 651.19(358)
^{133}Cs	245.8620(20)	0.740(15)	0.0169(3)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{197}Au	247.5730(10)	5.56(8)	0.0855(12)	410.(94.), 214.9710(9.0), 261.4040(5.3)
^{159}Tb	248.062(5)	0.30(3)	0.0057(6)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{71}Ga	248.89(4)	0.136(8)	0.0059(4)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{76}Se	249.7880(10)	0.538(9)	0.0206(4)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{187}Re	251.243(5)	1.80(23)	0.029(4)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{183}W	252.854(11)	0.101(3)	0.00166(5)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{93}Nb	253.115(5)	0.1320(19)	0.00431(6)	99.4070(0.196), 255.9290(0.176), 113.4010(0.117)
^{59}Co	254.379(17)	1.290(16)	0.0663(8)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{185}Re	254.998(4)	1.15(5)	0.0187(8)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{93}Nb	255.9290(20)	0.176(3)	0.00574(10)	99.4070(0.196), 253.115(0.1320), 113.4010(0.117)
^{232}Th	256.25(11)	0.093(17)	0.00121(22)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{185}Re	257.447(9)	0.87(23)	0.014(4)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{107}Ag	259.17(3)	1.560(25)	0.0438(7)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{176}Lu	259.401(16)	1.89(8)	0.0327(14)	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{133}Cs	261.1640(20)	0.401(11)	0.00914(25)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{197}Au	261.4040(10)	5.3(20)	0.08(3)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{191}Ir	261.953(6)	2.02(23)	0.032(4)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{191}Ir	262.03(10)	3.05(18)	0.048(3)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{75}As	263.8940(10)	0.18(4)	0.0073(16)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{103}Rh	266.84(3)	2.66(17)	0.078(5)	180.87(22.6), 97.14(19.5), 51.50(16.0)
^{109}Ag	267.08(3)	2.73(6)	0.0767(17)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{176}Lu	268.788(5)	3.64(13)	0.0630(23)	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{181}Ta	270.4030(20)	2.60(6)	0.0435(10)	173.2050(1.210), 402.623(1.180), 133.8770(0.63)
^{55}Mn	271.198(22)	0.94(6)	0.052(3)	846.754(13.10), 1810.72(3.62), 26.560(3.42)
^{79}Br	271.374(3)	0.462(7)	0.0175(3)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{139}La	272.306(4)	0.502(19)	0.0110(4)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{188}Os	272.82(4)	0.242(6)	0.00386(10)	186.7180(2.08), 155.10(1.19), 557.978(0.84)
^{115}In	272.9660(20)	33.1(24)	0.87(6)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{186}W	273.10(5)	0.272(7)	0.00448(12)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{187}Re	274.298(5)	0.80(6)	0.0130(10)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{79}Br	274.532(5)	0.158(3)	0.00599(11)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{59}Co	277.161(17)	6.77(8)	0.348(4)	229.879(7.18), 555.972(5.76), 447.711(3.41)
^{232}Th	277.48(11)	0.0312(25)	0.00041(3)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{238}Np	277.5990(10)d	0.382(6)	0.00486[0.6%]	74.6640(1.30000), 106.1230(0.723), 133.7990(0.38)
^{63}Cu	278.250(14)	0.893(15)	0.0426(7)	7915.62(0.869), 159.281(0.648), 7637.40(0.54)
^{193}Ir	278.5040(10)	1.8(11)	0.028(17)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{174}Yb	282.522(14)d	0.666(22)	0.0117[0.3%]	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{121}Sb	282.6500(10)	0.274(7)	0.00682(17)	564.24(2.700), 61.4130(0.75), 78.0910(0.48)
^{60}Ni	282.917(18)	0.211(3)	0.01089(15)	8998.414(1.49), 464.978(0.843), 8533.509(0.721)
^{136}Ba	283.58(6)	0.0404(12)	0.00089(3)	1435.77(0.308), 627.29(0.294), 818.514(0.212)
^{191}Ir	284.074(6)	1.95(15)	0.0307(24)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{167}Er	284.6560(20)	13.7(12)	0.248(22)	184.2850(56), 815.9890(42.5), 198.2440(29.9)
^{115}In	284.914(4)	4.5(3)	0.119(8)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{74}Se	286.5710(20)	0.280(6)	0.01075(23)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{81}Br	287.7390(20)	0.253(4)	0.00960(15)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{139}La	288.255(5)	0.73(3)	0.0159(7)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{187}Re	290.665(6)	3.5(4)	0.057(7)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{187}Re	291.492(8)	0.94(7)	0.0153(11)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{197}Au	291.7240(20)	1.05(17)	0.016(3)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{203}Tl	292.26(8)	0.0983(20)	0.00146(3)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{93}Nb	293.206(4)	0.0651(16)	0.00212(5)	99.4070(0.196), 255.9290(0.176), 253.115(0.1320)
^{193}Ir	293.541(14)d	1.76(6)	0.0277[1.8%]	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{79}Br	294.349(3)	0.1160(22)	0.00440(8)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{107}Ag	294.39(3)	2.05(12)	0.058(3)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{51}V	295.023(14)	0.164(4)	0.00976(24)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{45}Sc	295.243(10)	3.97(11)	0.268(7)	227.773(7.13), 147.011(6.08), 142.528(4.88)
^{235}U	297.00(10)	0.220(20)	0.00280(25)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{76}Se	297.2160(20)	0.337(7)	0.0129(3)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{115}In	298.664(3)	9.4(7)	0.248(18)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{107}Ag	299.95(3)	1.15(5)	0.0323(14)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{127}I	301.906(5)	0.17(6)	0.0041(14)	133.6110(1.42), 442.901(0.600), 27.3620(0.43)
^{191}Ir	302.905(8)	1.20(11)	0.0189(17)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{178}Hf	303.9880(20)	3.38(9)	0.0574(15)	213.439(29.3), 214.3410(16.3), 93.182(13.3)
^{133}Cs	307.015(4)	1.45(3)	0.0331(7)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{93}Nb	309.915(8)	0.0690(17)	0.00225(6)	99.4070(0.196), 255.9290(0.176), 253.115(0.1320)
^{175}Lu	310.1870(10)	1.49(8)	0.0258(14)	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{169}Tm	311.0190(10)	2.50(5)	0.0448(9)	200.(8.72), 149.7180(7.11), 140.(5.96)

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{174}Yb	311.276(5)	0.26(4)	0.0046(7)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{55}Mn	314.398(20)	1.460(20)	0.0805(11)	846.754(13.10), 1810.72(3.62), 26.560(3.42)
^{79}Br	314.982(3)	0.460(9)	0.0174(3)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{238}Np	315.880(3)d	0.0425(8)	0.000541[0.6%]	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{191}Ir	316.061(7)	2.4(4)	0.038(6)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{185}Re	316.457(9)	2.21(10)	0.0360(16)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{232}Th	316.64(10)	0.0397(18)	0.000518(24)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{69}Ga	318.87(3)	0.0592(14)	0.00257(6)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{203}Tl	318.88(8)	0.325(6)	0.00482(9)	139.94(0.400), 347.96(0.361), 5641.57(0.316)
^{176}Lu	319.036(8)	3.83(13)	0.0663(23)	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{232}Th	319.08(10)	0.082(3)	0.00107(4)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{209}Bi	319.78(4)	0.0115(14)	1.67E-04(20)	4171.05(0.0171), 4054.57(0.0137), 4101.76(0.0089)
^{187}Os	322.98(6)	0.242(9)	0.00386(14)	186.7180(2.08), 155.10(1.19), 557.978(0.84)
^{177}Hf	325.559(4)	6.69(17)	0.114(3)	213.439(29.3), 214.3410(16.3), 93.182(13.3)
^{193}Ir	328.448(14)d	9.1(3)	0.143[1.8%]	351.689(10.9), 84.2740(7.7), 136.1250(6.5)
^{197}Au	328.4840(20)	1.48(19)	0.023(3)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{139}La	328.762(8)d	1.250(18)	0.0273[0.9%]	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{107}Ag	328.99(3)	0.795(12)	0.0223(3)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{232}Th	331.37(11)	0.0291(19)	0.000380(25)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{121}Sb	332.2860(10)	0.101(3)	0.00251(8)	564.24(2.700), 61.4130(0.75), 78.0910(0.48)
^{195}Pt	332.985(4)	2.580(25)	0.0401(4)	355.6840(6.17)
^{103}Rh	333.44(3)	3.27(8)	0.0963(24)	180.87(22.6), 97.14(19.5), 51.50(16.0)
^{191}Ir	333.864(6)	1.53(10)	0.0241(16)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{149}Sm	333.97(4)	4790(60)	96.5(12)	439.40(2860), 737.44(597), 505.51(528)
^{238}Np	334.3100(20)d	0.0550(8)	0.000700[0.6%]	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{115}In	335.450(10)	9.1(7)	0.240(18)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{232}Th	335.92(10)	0.089(4)	0.00116(5)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{93}Nb	337.527(7)	0.054(6)	0.00176(20)	99.4070(0.196), 255.9290(0.176), 253.115(0.1320)
^{58}Ni	339.420(11)	0.1670(21)	0.00862(11)	8998.414(1.49), 464.978(0.843), 8533.509(0.721)
^{159}Tb	339.487(5)	0.35(4)	0.0067(8)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{48}Ti	341.706(5)	1.840(21)	0.1165(13)	1381.745(5.18), 6760.084(2.97), 6418.426(1.96)
^{79}Br	343.405(3)	0.118(4)	0.00448(15)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{63}Cu	343.898(14)	0.215(4)	0.01025(19)	278.250(0.893), 7915.62(0.869), 159.281(0.648)
^{81}Br	345.0060(10)	0.154(4)	0.00584(15)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{203}Tl	347.96(8)	0.361(10)	0.00535(15)	139.94(0.400), 318.88(0.325), 5641.57(0.316)
^{164}Dy	349.248(10)	14.7(6)	0.274(11)	184.257(146), 538.609(69.2), 496.931(44.9)
^{20}Ne	350.72(6)	0.0198(4)	0.00297(6)	2035.67(0.0245), 4374.13(0.01910), 2793.94(0.00900)
^{197}Au	350.8280(10)	1.0(5)	0.015(8)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{191}Ir	351.689(4)	10.9(4)	0.172(6)	328.448(9.1), 84.2740(7.7), 136.1250(6.5)
^{56}Fe	352.347(12)	0.273(3)	0.01481(16)	7631.136(0.653), 7645.5450(0.549), 6018.532(0.227)
^{232}Th	354.27(10)	0.0408(20)	0.00053(3)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{195}Pt	355.6840(20)	6.17(6)	0.0958(9)	332.985(2.580)
^{133}Cs	356.157(4)	0.445(12)	0.0101(3)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{159}Tb	357.748(5)	0.26(3)	0.0050(6)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{109}Ag	360.41(3)	1.55(3)	0.0435(8)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{189}Os	361.137(6)	0.466(15)	0.00742(24)	186.7180(2.08), 155.10(1.19), 557.978(0.84)
^{174}Yb	363.938(6)	0.80(12)	0.0140(21)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{191}Ir	365.440(7)	1.15(10)	0.0181(16)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{79}Br	366.604(4)	0.233(6)	0.00884(23)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{176}Lu	367.433(11)	2.23(8)	0.0386(14)	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{199}Hg	367.947(9)	251(5)	3.79(8)	5967.02(62.5), 1693.296(56.2), 4739.43(30.1)
^{189}Os	371.261(5)	0.574(14)	0.00914(22)	186.7180(2.08), 155.10(1.19), 557.978(0.84)
^{193}Ir	371.5020(20)	2.11(12)	0.0333(19)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{165}Ho	371.772(5)	1.56(8)	0.0287(15)	136.6650(14.5), 116.8360(8.1), 80.574(3.87)
^{133}Cs	377.311(5)	0.310(9)	0.00707(21)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{107}Ag	380.90(3)	1.59(3)	0.0447(8)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{197}Au	381.1990(10)	3.0(4)	0.046(6)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{169}Tm	384.0790(20)	1.95(5)	0.0350(9)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{115}In	385.111(8)	12.1(9)	0.319(24)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{65}Cu	385.77(3)	0.1310(18)	0.00625(9)	278.250(0.893), 7915.62(0.869), 159.281(0.648)
^{164}Dy	385.9840(20)	34.8(10)	0.649(19)	184.257(146), 538.609(69.2), 496.931(44.9)
^{24}Mg	389.670(21)	0.00586(24)	0.00073(3)	3916.84(0.0320), 585.00(0.0314), 2828.172(0.0240)
^{71}Ga	390.66(4)	0.0476(12)	0.00207(5)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{185}Re	390.854(23)	1.15(5)	0.0187(8)	63.5820(8.0), 155.041(7.16), 59.0100(5.5)
^{59}Co	391.218(15)	1.080(14)	0.0555(7)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{71}Ga	393.28(3)	0.1340(23)	0.00582(10)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{203}Tl	395.62(8)	0.0862(20)	0.00128(3)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{174}Yb	396.329(20)d	1.42(5)	0.0249[0.3%]	514.868(9.0), 639.261(1.43), 5266.3(1.4)
^{181}Ta	402.623(3)	1.180(23)	0.0198(4)	270.4030(2.60), 173.2050(1.210), 133.8770(0.63)

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{169}Tm	411.5060(20)	2.37(5)	0.0425(9)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{164}Dy	411.651(5)	35.1(10)	0.655(19)	184.257(146), 538.609(69.2), 496.931(44.9)
^{197}Au	411.802d	94.29(15)	1.453[0.5%]	214.9710(9.0), 247.5730(5.56), 261.4040(5.3)
^{164}Dy	414.985(7)	31(5)	0.58(9)	184.257(146), 538.609(69.2), 496.931(44.9)
^{115}In	416.86(3)d	43.0(18)	1.13[30%]	1293.54(131), 1097.30(87.3), 272.9660(33.1)
^{191}Ir	418.138(6)	3.45(15)	0.0544(24)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{51}V	419.475(13)	0.249(6)	0.0148(4)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{85}Rb	421.50(3)	0.0259(5)	0.000918(18)	556.82(0.0913), 487.89(0.0494), 555.61(0.0407)
^{139}La	422.66(4)	0.370(14)	0.0081(3)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{203}Tl	424.81(8)	0.1200(25)	0.00178(4)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{83}Kr	425.30(11)	2.960(19)	0.1070(7)	881.74(20.8), 1213.42(8.28), 1463.86(7.10)
^{165}Ho	426.012(5)	2.88(15)	0.053(3)	136.6650(14.5), 116.8360(8.1), 80.574(3.87)
^{75}As	426.5750(10)	0.100(3)	0.00404(12)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{174}Yb	428.613(12)	0.61(7)	0.0107(12)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{139}La	432.493(12)d	0.1780(18)	0.00388[0.9%]	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{191}Ir	432.716(6)	1.85(7)	0.0292(11)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{115}In	433.723(8)	6.0(4)	0.158(11)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{59}Co	435.677(17)	0.789(10)	0.0406(5)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{174}Yb	436.173(5)	0.52(6)	0.0091(11)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{51}V	436.627(13)	0.397(9)	0.0236(5)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{149}Sm	439.40(4)	2860(150)	58(3)	333.97(4790), 737.44(597), 505.51(528)
^{76}Se	439.4510(20)	0.319(8)	0.0122(3)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{133}Cs	442.8430(20)	0.316(12)	0.0072(3)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{127}I	442.901(10)d	0.595(4)	0.0142[51%]	133.6110(1.42), 27.3620(0.43), 58.1100(0.28)
^{169}Tm	446.328(3)	1.62(4)	0.0291(7)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{59}Co	447.711(19)	3.41(4)	0.1754(21)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{164}Dy	447.893(7)	17.4(5)	0.324(9)	184.257(146), 538.609(69.2), 496.931(44.9)
^{133}Cs	450.345(3)	0.99(5)	0.0226(11)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{159}Tb	451.617(10)	0.21(3)	0.0040(6)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{55}Mn	454.378(21)	0.388(7)	0.0214(4)	846.754(13.10), 1810.72(3.62), 26.560(3.42)
^{138}Ba	454.73(5)	0.0853(22)	0.00188(5)	1435.77(0.308), 627.29(0.294), 818.514(0.212)
^{169}Tm	456.0460(10)	1.16(4)	0.0208(7)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{176}Lu	457.944(15)	8.3(3)	0.144(5)	150.392(13.8), 138.607(6.79), 208.3660(6.0)
^{93}Nb	458.467(10)	0.0240(5)	0.000783(16)	99.4070(0.196), 255.9290(0.176), 253.115(0.1320)
^{137}Ba	462.78(4)	0.0660(16)	0.00146(4)	1435.77(0.308), 627.29(0.294), 818.514(0.212)
^{159}Tb	464.264(17)	0.192(21)	0.0037(4)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{58}Ni	464.978(12)	0.843(10)	0.0435(5)	8998.414(1.49), 8533.509(0.721), 6837.50(0.458)
^{65}Cu	465.14(3)	0.1350(21)	0.00644(10)	278.250(0.893), 7915.62(0.869), 159.281(0.648)
^{164}Dy	465.416(6)	38.0(10)	0.709(19)	184.257(146), 538.609(69.2), 496.931(44.9)
^{79}Br	468.980(3)	0.29(3)	0.0110(11)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{103}Rh	470.40(3)	2.61(7)	0.0769(21)	180.87(22.6), 97.14(19.5), 51.50(16.0)
^{75}As	471.0000(10)	0.203(5)	0.00821(20)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{115}In	471.349(11)	4.3(3)	0.113(8)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{203}Tl	471.90(8)	0.116(3)	0.00172(4)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{23}Na	472.202(9)d	0.478(4)	0.0630[100%]	1368.66(0.530), 2754.13(0.530), 90.9920(0.235)
^{232}Th	472.30(10)	0.165(8)	0.00215(10)	583.27(0.279), 566.63(0.19), 968.78(0.132)
^{75}As	473.1540(10)	0.176(5)	0.00712(20)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{140}Ce	475.04(4)	0.082(7)	0.00177(15)	661.99(0.241), 4766.10(0.113), 4291.08(0.053)
^{101}Ru	475.0950(20)	0.98(9)	0.029(3)	539.538(1.53), 686.907(0.52), 631.22(0.30)
^{164}Dy	477.061(6)	22(7)	0.41(13)	184.257(146), 538.609(69.2), 496.931(44.9)
^{164}Dy	477.08(4)	15.8(5)	0.295(9)	184.257(146), 538.609(69.2), 496.931(44.9)
^{174}Yb	477.391(5)	0.75(8)	0.0131(14)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{10}B	477.595(3)	716(25)	201(7)	
^{187}Os	478.04(4)	0.523(14)	0.00833(22)	186.7180(2.08), 155.10(1.19), 557.978(0.84)
^{186}W	479.550(22)d	2.59(5)	0.0427[1.4%]	685.73(3.24), 72.002(1.32), 134.247(1.050)
^{174}Yb	482.071(11)	0.23(3)	0.0040(5)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{59}Co	484.257(16)	0.804(11)	0.0413(6)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{139}La	487.021(12)d	2.79(4)	0.0609[0.9%]	1596.21(5.84), 815.772(1.430), 328.762(1.250)
^{85}Rb	487.89(4)	0.0494(12)	0.00175(4)	556.82(0.0913), 555.61(0.0407), 872.94(0.0321)
^{203}Tl	488.11(8)	0.096(4)	0.00142(6)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{115}In	492.532(11)	3.31(24)	0.087(6)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{73}Ge	492.933(5)	0.133(3)	0.00555(13)	595.851(1.100), 867.899(0.553), 608.353(0.250)
^{139}La	495.620(13)	0.081(3)	0.00177(7)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{109}Ag	495.71(3)	1.080(18)	0.0303(5)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{164}Dy	496.931(5)	44.9(11)	0.837(21)	184.257(146), 538.609(69.2), 185.19(39.1)
^{59}Co	497.269(16)	2.16(4)	0.1111(21)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{93}Nb	499.426(8)	0.0648(18)	0.00211(6)	99.4070(0.196), 255.9290(0.176), 253.115(0.1320)
^{169}Tm	499.5560(20)	0.88(3)	0.0158(5)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{70}Ge	499.87(3)	0.162(6)	0.00676(25)	595.851(1.100), 867.899(0.553), 608.353(0.250)

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{133}Cs	502.840(3)	0.256(13)	0.0058(3)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{169}Tm	505.018(7)	0.90(3)	0.0161(5)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{149}Sm	505.51(3)	528(80)	10.6(16)	333.97(4790), 439.40(2860), 737.44(597)
^{69}Ga	508.19(3)	0.349(6)	0.0152(3)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{133}Cs	510.795(3)	1.54(3)	0.0351(7)	176.4040(2.47), 205.615(1.560), 307.015(1.45)
^{174}Yb	511.784(11)	0.34(5)	0.0060(9)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{105}Pd	511.843(20)	4.00(4)	0.1139(11)	717.356(0.777), 616.192(0.629)
^{169}Tm	512.1370(20)	1.96(5)	0.0352(9)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{81}Br	512.488(20)	0.21(3)	0.0080(11)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{31}P	512.646(19)	0.079(4)	0.0077(4)	78.083(0.059), 636.663(0.0311), 3899.89(0.0294)
^{174}Yb	514.868(7)d	9.0(9)	0.158[100%]	639.261(1.43), 396.329(1.42), 5266.3(1.4)
^{40}Ar	516.0(3)	0.167(17)	0.0127(13)	167.30(0.53), 4745.3(0.36), 1186.8(0.34)
^{35}Cl	517.0730(10)	7.58(5)	0.648(4)	1164.8650(8.91), 6110.842(6.59), 1951.1400(6.33)
^{93}Nb	518.113(12)	0.0579(13)	0.00189(4)	99.4070(0.196), 255.9290(0.176), 253.115(0.1320)
^{76}Se	518.1810(20)	0.273(7)	0.0105(3)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{133}Cs	519.101(4)	0.349(18)	0.0080(4)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{40}Ca	519.66(5)	0.0503(13)	0.00380(10)	1942.67(0.352), 6419.59(0.176), 4418.52(0.0708)
^{76}Se	520.6370(20)	1.260(18)	0.0484(7)	613.724(2.14), 238.9980(2.06), 161.9220(0.855)
^{238}U	521.849(7)	0.073(3)	0.00093(4)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{232}Th	522.73(10)	0.102(5)	0.00133(7)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{109}Ag	524.47(3)	0.804(11)	0.0226(3)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{133}Cs	525.356(4)	0.39(3)	0.0089(7)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{159}Tb	525.933(17)	0.22(3)	0.0042(6)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{190}Os	527.60(3)	0.300(10)	0.00478(16)	186.7180(2.08), 155.10(1.19), 557.978(0.84)
^{197}Au	529.1650(20)	1.9(10)	0.029(15)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{133}Cs	529.504(6)	0.519(23)	0.0118(5)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{232}Th	531.58(10)	0.0404(23)	0.00053(3)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{174}Yb	534.735(9)	0.50(6)	0.0088(11)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{169}Tm	535.8280(10)	1.18(4)	0.0212(7)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{109}Ag	536.13(3)	1.090(16)	0.0306(5)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{129}Xe	536.17(9)	1.71(24)	0.039(6)	667.79(6.7), 772.72(1.78), 630.29(1.41)
^{85}Rb	536.48(4)	0.0167(5)	0.000592(18)	556.82(0.0913), 487.89(0.0494), 555.61(0.0407)
^{139}Ba	537.261(9)d	0.066(3)	0.00084[0.1%]	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{169}Tm	537.9910(20)	1.00(4)	0.0179(7)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{103}Rh	538.04(3)	2.43(7)	0.0716(21)	180.87(22.6), 97.14(19.5), 51.50(16.0)
^{164}Dy	538.609(8)	69.2(19)	1.29(4)	184.257(146), 496.931(44.9), 185.19(39.1)
^{85}Rb	538.66(4)	0.0169(5)	0.000599(18)	556.82(0.0913), 487.89(0.0494), 555.61(0.0407)
^{133}Cs	539.180(4)	0.360(11)	0.00821(25)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{238}U	539.278(12)	0.099(20)	0.00126(25)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{45}Sc	539.437(20)	0.738(19)	0.0497(13)	227.773(7.13), 147.011(6.08), 142.528(4.88)
^{99}Ru	539.538(15)	1.53(13)	0.046(4)	475.0950(0.98), 686.907(0.52), 631.22(0.30)
^{232}Th	539.66(10)	0.061(3)	0.00080(4)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{79}Br	542.515(6)	0.114(5)	0.00432(19)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{165}Ho	542.780(4)	1.94(13)	0.0356(24)	136.6650(14.5), 116.8360(8.1), 80.574(3.87)
^{141}Pr	546.448(15)	0.148(4)	0.00318(9)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{232}Th	548.23(11)	0.042(10)	0.00055(13)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{139}La	549.01(3)	0.098(4)	0.00214(9)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{109}Ag	549.56(3)	1.540(24)	0.0433(7)	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{169}Tm	551.5140(20)	1.29(25)	0.023(5)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{186}W	551.52(4)d	0.603(14)	0.00994[1.4%]	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{238}U	552.069(5)	0.207(5)	0.00264(6)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{238}U	554.054(8)	0.085(20)	0.00108(25)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{81}Br	554.3480(20)d	0.838(8)	0.0318[1.0%]	776.517(0.990), 245.203(0.80), 619.106(0.515)
^{45}Sc	554.44(4)	1.82(4)	0.123(3)	227.773(7.13), 147.011(6.08), 142.528(4.88)
^{85}Rb	555.61(3)d	0.0407(10)	0.00144[98%]	556.82(0.0913), 487.89(0.0494), 872.94(0.0321)
^{103}Rh	555.81(4)d	3.14(9)	0.092[98%]	180.87(22.6), 97.14(19.5), 51.50(16.0)
^{59}Co	555.972(13)	5.76(6)	0.296(3)	229.879(7.18), 277.161(6.77), 447.711(3.41)
^{85}Rb	556.82(3)	0.0913(24)	0.00324(9)	487.89(0.0494), 555.61(0.0407), 872.94(0.0321)
^{115}In	556.845(21)	4.7(3)	0.124(8)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{232}Th	556.93(11)	0.040(10)	0.00052(13)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{186}W	557.16(5)	0.125(5)	0.00206(8)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{141}Pr	557.75(3)	0.15(4)	0.0032(9)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{189}Os	557.978(5)	0.84(3)	0.0134(5)	186.7180(2.08), 155.10(1.19), 569.344(0.694)
^{113}Cd	558.32(3)	1860(30)	50.1(8)	651.19(358), 245.3(274)
^{75}As	559.10(5)d	2.00(10)	0.081[1.3%]	165.0490(0.996), 86.7880(0.579), 44.4250(0.560)
^{141}Pr	560.495(23)	0.150(7)	0.00323(15)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{91}Zr	560.958(3)	0.0285(5)	0.000947(17)	934.4640(0.125), 1465.7(0.063), 1205.6(0.042)
^{232}Th	561.25(11)	0.033(8)	0.00043(10)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{93}Nb	562.328(9)	0.0293(11)	0.00096(4)	99.4070(0.196), 255.9290(0.176), 253.115(0.1320)

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{121}Sb	564.24(4)d	2.700(4)	0.06720[0.5%]	61.4130(0.75), 78.0910(0.48), 121.4970(0.40)
^{169}Tm	565.2770(20)	1.58(4)	0.0283(7)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{232}Th	566.63(10)	0.19(5)	0.0025(7)	583.27(0.279), 472.30(0.165), 968.78(0.132)
^{139}La	567.386(12)	0.335(13)	0.0073(3)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{169}Tm	569.1730(20)	1.02(3)	0.0183(5)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{189}Os	569.344(20)	0.694(25)	0.0111(4)	186.7180(2.08), 155.10(1.19), 557.978(0.84)
^{141}Pr	570.111(14)	0.112(5)	0.00241(11)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{141}Pr	573.28(4)	0.12(3)	0.0026(7)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{89}Y	574.106(20)	0.174(7)	0.00593(24)	6080.171(0.76), 776.613(0.659), 202.53(0.289)
^{186}W	577.30(5)	0.191(5)	0.00315(8)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{232}Th	578.02(9)	0.105(5)	0.00137(7)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{76}Se	578.8550(20)	0.243(5)	0.00933(19)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{63}Cu	579.75(3)	0.0898(15)	0.00428(7)	278.250(0.893), 7915.62(0.869), 159.281(0.648)
^{238}U	580.340(13)	0.043(10)	0.00055(13)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{232}Th	583.27(9)	0.279(11)	0.00364(14)	566.63(0.19), 472.30(0.165), 968.78(0.132)
^{19}F	583.561(16)	0.00356(12)	0.000568(19)	1633.53(0.0096), 656.006(0.00197), 665.207(0.00149)
^{164}Dy	583.982(5)	24(7)	0.45(13)	184.257(146), 538.609(69.2), 496.931(44.9)
^{149}Sm	584.27(3)	480(70)	9.7(14)	333.97(4790), 439.40(2860), 737.44(597)
^{45}Sc	584.785(13)	1.77(3)	0.1193(20)	227.773(7.13), 147.011(6.08), 142.528(4.88)
^{24}Mg	585.00(3)	0.0314(11)	0.00392(14)	3916.84(0.0320), 2828.172(0.0240), 1808.668(0.0180)
^{232}Th	586.02(10)	0.045(3)	0.00059(4)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{169}Tm	590.2270(20)	1.27(10)	0.0228(18)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{238}U	592.309(13)	0.045(12)	0.00057(15)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{232}Th	593.23(10)	0.043(3)	0.00056(4)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{238}U	593.612(5)	0.108(24)	0.0014(3)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{139}La	595.099(12)	0.103(4)	0.00225(9)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{73}Ge	595.851(5)	1.100(24)	0.0459(10)	867.899(0.553), 608.353(0.250), 175.05(0.164)
^{71}Ga	601.21(6)d	0.471(22)	0.0205[2.4%]	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{123}Te	602.729(17)	2.46(16)	0.058(4)	722.772(0.52), 645.819(0.263)
^{169}Tm	603.9900(20)	1.40(5)	0.0251(9)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{232}Th	605.41(10)	0.054(4)	0.00071(5)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{238}U	605.581(9)	0.053(12)	0.00067(15)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{73}Ge	608.353(4)	0.250(6)	0.01043(25)	595.851(1.100), 867.899(0.553), 175.05(0.164)
^{115}In	608.422(11)	3.51(25)	0.093(7)	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{63}Cu	608.766(23)	0.270(6)	0.0129(3)	278.250(0.893), 7915.62(0.869), 159.281(0.648)
^{238}U	612.253(5)	0.23(5)	0.0029(6)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{77}Se	613.724(3)	2.14(5)	0.0821(19)	238.9980(2.06), 520.6370(1.260), 161.9220(0.855)
^{105}Pd	616.192(20)	0.629(9)	0.0179(3)	511.843(4.00), 717.356(0.777)
^{79}Br	616.3(5)d	0.39(4)	0.0148[62%]	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{143}Nd	618.062(19)	13.4(3)	0.282(6)	696.499(33.3), 814.12(4.98), 864.301(4.27)
^{186}W	618.26(4)d	0.746(17)	0.0123[1.4%]	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{81}Br	619.106(4)d	0.515(5)	0.01953[1.0%]	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{141}Pr	619.29(4)	0.152(4)	0.00327(9)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{203}Tl	624.46(8)	0.0413(10)	0.000612(15)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{186}W	625.519(10)d	0.129(3)	0.00213[1.4%]	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{138}Ba	627.29(5)	0.294(6)	0.00649(13)	1435.77(0.308), 818.514(0.212), 4095.84(0.155)
^{45}Sc	627.462(18)	2.23(5)	0.150(3)	227.773(7.13), 147.011(6.08), 142.528(4.88)
^{101}Ru	627.970(22)	0.176(16)	0.0053(5)	539.538(1.53), 475.0950(0.98), 686.907(0.52)
^{238}U	629.722(9)	0.073(20)	0.00093(25)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{71}Ga	629.96(5)d	0.490(22)	0.0213[2.4%]	834.08(1.65), 2201.91(0.52), 601.21(0.471)
^{141}Pr	630.04(3)	0.16(6)	0.0034(13)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{131}Xe	630.29(4)	1.41(11)	0.0325(25)	667.79(6.7), 772.72(1.78), 536.17(1.71)
^{101}Ru	631.22(4)	0.30(3)	0.0090(9)	539.538(1.53), 475.0950(0.98), 686.907(0.52)
^{167}Er	631.7050(20)	7.9(3)	0.143(5)	184.2850(56), 815.9890(42.5), 198.2440(29.9)
^{187}Os	633.14(4)	0.585(16)	0.00932(25)	186.7180(2.08), 155.10(1.19), 557.978(0.84)
^{141}Pr	633.34(4)	0.113(4)	0.00243(9)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{187}Os	635.02(5)	0.405(12)	0.00645(19)	186.7180(2.08), 155.10(1.19), 557.978(0.84)
^{31}P	636.663(21)	0.0311(14)	0.00304(14)	512.646(0.079), 78.083(0.059), 3899.89(0.0294)
^{169}Tm	637.900(3)	1.25(4)	0.0224(7)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{169}Tm	637.9020(20)	1.8(3)	0.032(5)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{238}U	638.505(12)	0.041(12)	0.00052(15)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{85}Rb	638.93(5)	0.0101(13)	0.00036(5)	556.82(0.0913), 487.89(0.0494), 555.61(0.0407)
^{174}Yb	639.261(9)	1.43(17)	0.025(3)	514.868(9.0), 396.329(1.42), 5266.3(1.4)
^{133}Cs	645.453(5)	0.248(13)	0.0057(3)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{51}V	645.703(13)	0.769(17)	0.0457(10)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{141}Pr	645.720(24)	0.311(7)	0.00669(15)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{123}Te	645.819(20)	0.263(22)	0.0062(5)	602.729(2.46), 722.772(0.52)
^{63}Cu	648.80(3)	0.102(3)	0.00486(14)	278.250(0.893), 7915.62(0.869), 159.281(0.648)
^{169}Tm	650.3720(10)	1.45(5)	0.0260(9)	200.(8.72), 149.7180(7.11), 140.(5.96)

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{69}Ga	651.09(3)	0.1030(22)	0.00448(10)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{113}Cd	651.19(3)	358(5)	9.65(13)	558.32(1860), 245.3(274)
^{19}F	656.006(18)	0.00197(7)	0.000314(11)	1633.53(0.0096), 583.561(0.00356), 665.207(0.00149)
^{75}As	657.05(5)d	0.279(14)	0.0113[1.3%]	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{109}Ag	657.50(10)d	1.86(5)	0.0523[99%]	198.72(7.75), 235.62(4.62), 78.91(3.90)
^{139}La	658.278(12)	0.103(4)	0.00225(9)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{169}Tm	658.913(5)	1.56(5)	0.0280(9)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{79}Br	660.561(4)	0.082(3)	0.00311(11)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{140}Ce	661.99(5)	0.241(15)	0.0052(3)	4766.10(0.113), 475.04(0.082), 4291.08(0.053)
^{232}Th	665.11(10)	0.084(4)	0.00110(5)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{19}F	665.207(18)	0.00149(6)	2.38E-04(10)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{131}Xe	667.79(6)	6.7(5)	0.155(12)	772.72(1.78), 536.17(1.71), 630.29(1.41)
^{209}Bi	673.97(5)	0.0026(4)	3.8E-05(6)	4171.05(0.0171), 4054.57(0.0137), 319.78(0.0115)
^{232}Th	681.81(9)	0.079(4)	0.00103(5)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{186}W	685.73(4)d	3.24(7)	0.0534[1.4%]	479.550(2.59), 72.002(1.32), 134.247(1.050)
^{99}Ru	686.907(17)	0.52(5)	0.0156(15)	539.538(1.53), 475.0950(0.98), 631.22(0.30)
^{238}U	689.907(11)	0.043(10)	0.00055(13)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{79}Br	689.994(16)	0.083(4)	0.00315(15)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{69}Ga	690.943(24)	0.305(4)	0.01326(17)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{56}Fe	691.960(19)	0.1370(18)	0.00743(10)	7631.136(0.653), 7645.5450(0.549), 352.347(0.273)
^{121}Sb	692.65(4)d	0.146(5)	0.00363[0.5%]	564.24(2.700), 61.4130(0.75), 78.0910(0.48)
^{77}Se	694.914(4)	0.443(10)	0.0170(4)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{143}Nd	696.499(10)	33.3(23)	0.70(5)	618.062(13.4), 814.12(4.98), 864.301(4.27)
^{81}Br	698.374(5)d	0.337(3)	0.01278[1.0%]	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{141}Pr	698.65(3)	0.22(6)	0.0047(13)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{169}Tm	703.6280(10)	1.32(4)	0.0237(7)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{232}Th	705.17(11)	0.050(4)	0.00065(5)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{139}La	708.244(14)	0.134(5)	0.00292(11)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{232}Th	714.23(10)	0.052(3)	0.00068(4)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{59}Co	717.310(18)	0.845(14)	0.0435(7)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{105}Pd	717.356(22)	0.777(9)	0.0221(3)	511.843(4.00), 616.192(0.629)
^{169}Tm	719.2610(20)	1.01(3)	0.0181(5)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{95}Mo	719.528(14)	0.310(10)	0.0098(3)	778.221(2.02), 849.85(0.43), 847.603(0.324)
^{139}La	722.538(14)	0.212(8)	0.00463(17)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{123}Te	722.772(25)	0.52(4)	0.0123(10)	602.729(2.46), 645.819(0.263)
^{167}Er	730.6580(10)	11.6(4)	0.210(7)	184.2850(56), 815.9890(42.5), 198.2440(29.9)
^{203}Tl	732.09(9)	0.064(3)	0.00095(4)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{203}Tl	737.12(8)	0.118(5)	0.00175(7)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{142}Ce	737.43(7)	0.026(3)	0.00056(7)	661.99(0.241), 4766.10(0.113), 475.04(0.082)
^{149}Sm	737.44(4)	597(8)	12.03(16)	333.97(4790), 439.40(2860), 505.51(528)
^{167}Er	741.3650(20)	6.72(24)	0.122(4)	184.2850(56), 815.9890(42.5), 198.2440(29.9)
^{142}Nd	742.106(22)	3.8(4)	0.080(8)	696.499(33.3), 618.062(13.4), 814.12(4.98)
^{141}Pr	746.973(14)	0.146(4)	0.00314(9)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{50}Cr	749.09(3)	0.569(9)	0.0332(5)	834.849(1.38), 8884.36(0.78), 7938.46(0.424)
^{139}La	751.637(18)d	0.2650(23)	0.00578[0.9%]	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{176}Lu	761.564(20)	2.60(9)	0.0450(16)	150.392(13.8), 457.944(8.3), 138.607(6.79)
^{174}Yb	767.169(9)	0.151(25)	0.0026(4)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{39}K	770.3050(20)	0.903(12)	0.0700(9)	29.8300(1.380), 1158.887(0.1600), 5380.018(0.146)
^{131}Xe	772.72(4)	1.78(14)	0.041(3)	667.79(6.7), 536.17(1.71), 630.29(1.41)
^{186}W	772.89(5)d	0.490(10)	0.00808[1.4%]	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{81}Br	776.517(3)d	0.990(10)	0.0375[1.0%]	554.3480(0.838), 245.203(0.80), 619.106(0.515)
^{89}Y	776.613(18)	0.659(9)	0.0225(3)	6080.171(0.76), 202.53(0.289), 574.106(0.174)
^{95}Mo	778.221(10)	2.02(6)	0.0638(19)	849.85(0.43), 847.603(0.324), 719.528(0.310)
^{157}Gd	780.174(10)	1010(22)	19.5(4)	181.931(7200), 79.5100(4010), 944.174(3090)
^{186}W	782.12(6)	0.22(3)	0.0036(5)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{59}Co	785.628(21)	2.41(7)	0.124(4)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{71}Ga	786.17(16)d	0.160(22)	0.0070[2.4%]	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{35}Cl	786.3020(10)	3.420(3)	0.2923(3)	1164.8650(8.91), 517.0730(7.58), 6110.842(6.59)
^{35}Cl	788.4280(10)	5.42(5)	0.463(4)	1164.8650(8.91), 517.0730(7.58), 6110.842(6.59)
^{183}W	792.059(16)	0.119(6)	0.00196(10)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{51}V	793.546(13)	0.199(5)	0.0118(3)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{232}Th	797.79(9)	0.0416(20)	0.00054(3)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{67}Zn	805.79(3)	0.045(3)	0.00209(14)	1077.335(0.356), 115.225(0.167), 7863.55(0.1410)
^{174}Yb	811.427(9)	0.92(16)	0.016(3)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{143}Nd	814.12(3)	4.98(12)	0.1046(25)	696.499(33.3), 618.062(13.4), 864.301(4.27)
^{139}La	815.772(19)d	1.430(12)	0.0312[0.9%]	1596.21(5.84), 487.021(2.79), 328.762(1.250)
^{167}Er	815.9890(20)	42.5(15)	0.77(3)	184.2850(56), 198.2440(29.9), 79.8040(18.2)
^{186}W	816.13(5)	0.104(4)	0.00171(7)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{135}Ba	818.514(12)	0.212(4)	0.00468(9)	1435.77(0.308), 627.29(0.294), 4095.84(0.155)

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{115}In	818.70(20)d	17.8(7)	0.470[30%]	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{167}Er	821.1680(20)	6.2(3)	0.112(5)	184.2850(56), 815.9890(42.5), 198.2440(29.9)
^{51}V	823.184(13)	0.320(8)	0.0190(5)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{174}Yb	825.22(7)	0.154(24)	0.0027(4)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{81}Br	827.828(6)d	0.285(3)	0.01081[1.0%]	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{238}U	831.837(19)	0.053(12)	0.00067(15)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{71}Ga	834.08(3)d	1.65(5)	0.0717[2.4%]	2201.91(0.52), 629.96(0.490), 601.21(0.471)
^{68}Zn	834.77(3)	0.037(5)	0.00171(23)	1077.335(0.356), 115.225(0.167), 7863.55(0.1410)
^{232}Th	834.83(14)	0.059(5)	0.00077(7)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{53}Cr	834.849(22)	1.38(3)	0.0804(17)	8884.36(0.78), 749.09(0.569), 7938.46(0.424)
^{93}Nb	835.72(3)	0.0376(8)	0.00123(3)	99.4070(0.196), 255.9290(0.176), 253.115(0.1320)
^{40}Ar	837.7(3)	0.063(7)	0.0048(5)	167.30(0.53), 4745.3(0.36), 1186.8(0.34)
^{186}W	840.18(5)	0.143(5)	0.00236(8)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{32}S	840.993(13)	0.347(6)	0.0328(6)	5420.574(0.308), 2379.661(0.208), 3220.588(0.117)
^{51}V	845.948(13)	0.252(7)	0.0150(4)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{55}Mn	846.754(20)d	13.10(4)	0.7226[12%]	1810.72(3.62), 26.560(3.42), 83.884(3.11)
^{95}Mo	847.603(11)	0.324(9)	0.0102(3)	778.221(2.02), 849.85(0.43), 719.528(0.310)
^{95}Mo	849.85(3)	0.43(3)	0.0136(10)	778.221(2.02), 847.603(0.324), 719.528(0.310)
^{87}Sr	850.657(12)	0.275(4)	0.00951(14)	1836.067(1.030), 898.055(0.702)
^{238}U	853.23(4)	0.055(12)	0.00070(15)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{167}Er	853.4810(10)	7.5(3)	0.136(5)	184.2850(56), 815.9890(42.5), 198.2440(29.9)
^{9}Be	853.630(12)	0.00208(24)	0.00070(8)	6809.61(0.0058), 3367.448(0.00285), 2590.014(0.00191)
^{169}Tm	854.337(4)	1.41(4)	0.0253(7)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{64}Zn	855.69(3)	0.066(6)	0.0031(3)	1077.335(0.356), 115.225(0.167), 7863.55(0.1410)
^{171}Yb	857.621(7)	0.208(25)	0.0036(4)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{232}Th	860.61(13)	0.047(5)	0.00061(7)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{143}Nd	864.301(10)	4.27(11)	0.0897(23)	696.499(33.3), 618.062(13.4), 814.12(4.98)
^{141}Pr	864.98(3)	0.14(3)	0.0030(7)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{139}La	867.846(20)d	0.337(4)	0.00735[0.9%]	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{73}Ge	867.899(5)	0.553(12)	0.0231(5)	595.851(1.100), 608.353(0.250), 175.05(0.164)
^{23}Na	869.210(9)	0.1080(13)	0.01424(17)	1368.66(0.530), 2754.13(0.530), 472.202(0.478)
^{16}O	870.68(6)	1.77E-04(11)	3.35E-05(21)	2184.42(1.64E-04), 1087.75(1.58E-04), 3272.02(3.53E-05)
^{174}Yb	871.695(9)	0.24(4)	0.0042(7)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{85}Rb	872.94(4)	0.0321(5)	0.001138(18)	556.82(0.0913), 487.89(0.0494), 555.61(0.0407)
^{203}Tl	873.16(8)	0.168(4)	0.00249(6)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{23}Na	874.389(6)	0.0760(11)	0.01002(15)	1368.66(0.530), 2754.13(0.530), 472.202(0.478)
^{58}Ni	877.977(11)	0.236(3)	0.01219(15)	8998.414(1.49), 464.978(0.843), 8533.509(0.721)
^{83}Kr	881.74(11)	20.8(3)	0.752(11)	1213.42(8.28), 1463.86(7.10), 425.30(2.960)
^{161}Dy	882.27(6)	18.3(6)	0.341(11)	184.257(146), 538.609(69.2), 496.931(44.9)
^{76}Se	885.8270(20)	0.262(7)	0.0101(3)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{186}W	891.59(6)	0.136(5)	0.00224(8)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{71}Ga	894.91(11)d	0.35(3)	0.0152[2.4%]	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{157}Gd	897.502(10)	1200(50)	23.1(10)	181.931(7200), 79.5100(4010), 944.174(3090)
^{157}Gd	897.611(10)	1090(50)	21.0(10)	181.931(7200), 79.5100(4010), 944.174(3090)
^{87}Sr	898.055(11)	0.702(10)	0.0243(4)	1836.067(1.030), 850.657(0.275)
^{183}W	903.274(17)	0.115(5)	0.00190(8)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{167}Er	914.9420(10)	6.99(24)	0.127(4)	184.2850(56), 815.9890(42.5), 198.2440(29.9)
^{139}La	919.550(23)d	0.1630(18)	0.00356[0.9%]	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{121}Sb	921.00(7)	0.075(4)	0.00187(10)	564.24(2.700), 61.4130(0.75), 78.0910(0.48)
^{139}La	925.189(21)d	0.422(4)	0.00921[0.9%]	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{91}Zr	934.4640(10)	0.125(5)	0.00415(17)	1465.7(0.063), 1205.6(0.042), 2042.2(0.032)
^{235}U	943.14(7)	0.082(10)	0.00104(13)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{157}Gd	944.174(10)	3090(70)	59.5(13)	181.931(7200), 79.5100(4010), 962.104(2050)
^{59}Co	945.314(17)	0.98(4)	0.0504(21)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{203}Tl	949.88(8)	0.0479(15)	0.000710(22)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{93}Nb	957.28(5)	0.0248(7)	0.000809(23)	99.4070(0.196), 255.9290(0.176), 253.115(0.1320)
^{73}Ge	961.055(7)	0.129(4)	0.00538(17)	595.851(1.100), 867.899(0.553), 608.353(0.250)
^{157}Gd	962.104(10)	2050(130)	39.5(25)	181.931(7200), 79.5100(4010), 944.174(3090)
^{171}Yb	964.197(10)	0.229(25)	0.0040(4)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{232}Th	968.78(9)	0.132(6)	0.00172(8)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{115}Sn	972.619(17)	0.0158(5)	0.000403(13)	1293.591(0.1340), 1171.28(0.0879), 1229.64(0.0673)
^{24}Mg	974.66(3)	0.00663(24)	0.00083(3)	3916.84(0.0320), 585.00(0.0314), 2828.172(0.0240)
^{157}Gd	977.121(10)	1440(21)	27.8(4)	181.931(7200), 79.5100(4010), 944.174(3090)
^{182}W	979.871(18)	0.102(10)	0.00168(16)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{7}Li	980.53(7)	0.00415(13)	0.00181(6)	2032.30(0.0381), 1051.90(0.00414)
^{27}Al	982.951(10)	0.00902(14)	0.001013(16)	1778.92(0.232), 30.6380(0.0798), 7724.027(0.0493)
^{19}F	983.538(20)	0.00116(4)	1.85E-04(6)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{141}Pr	992.00(4)	0.138(10)	0.00297(22)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{141}Pr	1006.361(22)	0.153(8)	0.00329(17)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{68}Zn	1007.809(25)	0.056(7)	0.0026(3)	1077.335(0.356), 115.225(0.167), 7863.55(0.1410)
^{232}Th	1013.84(11)	0.037(3)	0.00048(4)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{22}Ne	1017.00(20)	0.0030(5)	0.00045(8)	2035.67(0.0245), 350.72(0.0198), 4374.13(0.01910)
^{182}W	1026.373(17)	0.161(15)	0.00265(25)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{85}Rb	1026.55(6)	0.0218(4)	0.000773(14)	556.82(0.0913), 487.89(0.0494), 555.61(0.0407)
^{85}Rb	1032.32(5)	0.0227(4)	0.000805(14)	556.82(0.0913), 487.89(0.0494), 555.61(0.0407)
^{171}Yb	1039.150(7)	0.22(3)	0.0039(5)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{81}Br	1044.002(5)d	0.323(3)	0.01225[1.0%]	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{138}Ba	1047.73(6)	0.0319(10)	0.000704(22)	1435.77(0.308), 627.29(0.294), 818.514(0.212)
^{71}Ga	1050.69(5)d	0.119(13)	0.0052[2.4%]	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{7}Li	1051.90(7)	0.00414(12)	0.00181(5)	2032.30(0.0381), 980.53(0.00415)
^{19}F	1056.776(17)	0.00095(3)	1.52E-04(5)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{31}P	1071.217(23)	0.0249(12)	0.00244(12)	512.646(0.079), 78.083(0.059), 636.663(0.0311)
^{20}Ne	1071.34(7)	0.0054(4)	0.00081(6)	2035.67(0.0245), 350.72(0.0198), 4374.13(0.01910)
^{171}Yb	1076.246(6)	0.52(6)	0.0091(11)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{85}Rb	1076.64(20)d	0.0301(5)	0.001067[0.08%]	556.82(0.0913), 487.89(0.0494), 555.61(0.0407)
^{67}Zn	1077.335(16)	0.356(5)	0.01650(23)	115.225(0.167), 7863.55(0.1410), 1883.12(0.0718)
^{16}O	1087.75(6)	1.58E-04(7)	2.99E-05(13)	870.68(1.77E-04), 2184.42(1.64E-04), 3272.02(3.53E-05)
^{171}Yb	1093.674(9)	0.24(3)	0.0042(5)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{115}In	1097.30(20)d	87.3(17)	2.30[30%]	1293.54(131), 416.86(43.0), 272.9660(33.1)
^{73}Ge	1101.282(6)	0.134(3)	0.00559(13)	595.851(1.100), 867.899(0.553), 608.353(0.250)
^{96}Zr	1102.67(6)	0.0235(8)	0.00078(3)	934.4640(0.125), 1465.7(0.063), 1205.6(0.042)
^{177}Hf	1102.824(5)	2.96(8)	0.0503(14)	213.439(29.3), 214.3410(16.3), 93.182(13.3)
^{85}Rb	1105.52(10)	0.0151(3)	0.000535(11)	556.82(0.0913), 487.89(0.0494), 555.61(0.0407)
^{157}Gd	1107.612(9)	1830(40)	35.3(8)	181.931(7200), 79.5100(4010), 944.174(3090)
^{142}Ce	1107.66(5)	0.040(3)	0.00087(7)	661.99(0.241), 4766.10(0.113), 475.04(0.082)
^{203}Tl	1110.37(8)	0.0413(12)	0.000612(18)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{93}Nb	1118.54(3)	0.022(7)	0.00072(23)	99.4070(0.196), 255.9290(0.176), 253.115(0.1320)
^{157}Gd	1119.163(10)	1180(30)	22.7(6)	181.931(7200), 79.5100(4010), 944.174(3090)
^{171}Yb	1119.780(8)	0.46(6)	0.0081(11)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{203}Tl	1121.29(7)	0.0600(17)	0.000890(25)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{25}Mg	1129.575(23)	0.00891(25)	0.00111(3)	3916.84(0.0320), 585.00(0.0314), 2828.172(0.0240)
^{141}Pr	1150.946(21)	0.141(5)	0.00303(11)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{203}Tl	1155.43(7)	0.0605(17)	0.000897(25)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{39}K	1158.887(10)	0.1600(25)	0.01240(19)	29.8300(1.380), 770.3050(0.903), 5380.018(0.146)
^{35}Cl	1164.8650(10)	8.91(4)	0.762(3)	517.0730(7.58), 6110.842(6.59), 1951.1400(6.33)
^{177}Hf	1167.072(6)	3.95(10)	0.0671(17)	213.439(29.3), 214.3410(16.3), 93.182(13.3)
^{119}Sn	1171.28(6)	0.0879(13)	0.00224(3)	1293.591(0.1340), 1229.64(0.0673), 972.619(0.0158)
^{177}Hf	1174.635(5)	4.8(7)	0.081(12)	213.439(29.3), 214.3410(16.3), 93.182(13.3)
^{157}Gd	1183.968(10)	958(60)	18.5(12)	181.931(7200), 79.5100(4010), 944.174(3090)
^{157}Gd	1185.988(9)	1600(90)	30.8(17)	181.931(7200), 79.5100(4010), 944.174(3090)
^{40}Ar	1186.8(3)	0.34(3)	0.0258(23)	167.30(0.53), 4745.3(0.36), 516.0(0.167)
^{157}Gd	1187.122(9)	1420(90)	27.4(17)	181.931(7200), 79.5100(4010), 944.174(3090)
^{73}Ge	1204.199(6)	0.141(4)	0.00588(17)	595.851(1.100), 867.899(0.553), 608.353(0.250)
^{90}Zr	1205.6(7)	0.042(5)	0.00140(17)	934.4640(0.125), 1465.7(0.063), 2042.2(0.032)
^{93}Nb	1206.26(5)	0.0284(10)	0.00093(3)	99.4070(0.196), 255.9290(0.176), 253.115(0.1320)
^{177}Hf	1207.213(5)	3.9(3)	0.066(5)	213.439(29.3), 214.3410(16.3), 93.182(13.3)
^{83}Kr	1213.42(12)	8.28(17)	0.299(6)	881.74(20.8), 1463.86(7.10), 425.30(2.960)
^{75}As	1216.08(5)d	0.155(8)	0.0063[1.3%]	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{177}Hf	1229.287(8)	4.26(11)	0.0723(19)	213.439(29.3), 214.3410(16.3), 93.182(13.3)
^{117}Sn	1229.64(6)	0.0673(13)	0.00172(3)	1293.591(0.1340), 1171.28(0.0879), 972.619(0.0158)
^{203}Tl	1234.69(7)	0.0746(25)	0.00111(4)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{56}Fe	1260.448(19)	0.0684(11)	0.00371(6)	7631.136(0.653), 7645.5450(0.549), 352.347(0.273)
^{67}Zn	1261.15(3)	0.0431(10)	0.00200(5)	1077.335(0.356), 115.225(0.167), 7863.55(0.1410)
^{135}Ba	1261.52(7)	0.095(5)	0.00210(11)	1435.77(0.308), 627.29(0.294), 818.514(0.212)
^{12}C	1261.765(9)	0.00124(3)	0.000313(8)	4945.301(0.00261), 3683.920(0.00122)
^{28}Si	1273.349(17)	0.0289(6)	0.00312(7)	3538.966(0.1190), 4933.889(0.1120), 2092.902(0.0331)
^{235}U	1279.01(10)	0.200(10)	0.00255(13)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{115}In	1293.54(15)d	131(3)	3.46[30%]	1097.30(87.3), 416.86(43.0), 272.9660(33.1)
^{115}Sn	1293.591(15)	0.1340(21)	0.00342(5)	1171.28(0.0879), 1229.64(0.0673), 972.619(0.0158)
^{76}Se	1296.986(7)	0.240(7)	0.0092(3)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{85}Rb	1304.48(4)	0.0204(5)	0.000723(18)	556.82(0.0913), 487.89(0.0494), 555.61(0.0407)
^{173}Yb	1308.53(11)	0.168(19)	0.0029(3)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{77}Se	1308.632(5)	0.317(8)	0.0122(3)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{19}F	1309.126(17)	0.00076(3)	1.21E-04(5)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{81}Br	1317.473(10)d	0.314(3)	0.01191[1.0%]	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{131}Xe	1317.93(8)	0.89(7)	0.0205(16)	667.79(6.7), 772.72(1.78), 536.17(1.71)
^{67}Zn	1340.14(3)	0.0457(16)	0.00212(7)	1077.335(0.356), 115.225(0.167), 7863.55(0.1410)
^{23}Na	1368.66(3)d	0.530(8)	0.0699[2.3%]	2754.13(0.530), 472.202(0.478), 90.9920(0.235)

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{174}Yb	1378.22(7)	0.42(12)	0.0074(21)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{48}Ti	1381.745(5)	5.18(12)	0.328(8)	6760.084(2.97), 6418.426(1.96), 341.706(1.840)
^{19}F	1387.901(20)	0.00082(3)	1.31E-04(5)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{91}Zr	1405.159(3)	0.0301(10)	0.00100(3)	934.4640(0.125), 1465.7(0.063), 1205.6(0.042)
^{51}V	1434.10(3)d	4.81(10)	0.286[91%]	125.082(1.61), 6517.282(0.78), 645.703(0.769)
^{137}Ba	1435.77(4)	0.308(7)	0.00680(15)	627.29(0.294), 818.514(0.212), 4095.84(0.155)
^{137}Ba	1444.91(5)	0.0801(20)	0.00177(4)	1435.77(0.308), 627.29(0.294), 818.514(0.212)
^{83}Kr	1463.86(6)	7.10(8)	0.257(3)	881.74(20.8), 1213.42(8.28), 425.30(2.960)
^{71}Ga	1464.00(7)d	0.0609(19)	0.00265[2.4%]	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{90}Zr	1465.7(7)	0.063(15)	0.0021(5)	934.4640(0.125), 1205.6(0.042), 2042.2(0.032)
^{81}Br	1474.880(10)d	0.1930(20)	0.00732[1.0%]	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{203}Tl	1478.77(8)	0.0544(22)	0.00081(3)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{115}In	1507.40(20)d	15.5(5)	0.409[30%]	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{59}Co	1515.720(25)	1.740(25)	0.0895(13)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{171}Yb	1521.197(16)	0.193(24)	0.0034(4)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{51}V	1558.843(18)	0.323(8)	0.0192(5)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{199}Hg	1570.273(12)	29.6(7)	0.447(11)	367.947(251), 5967.02(62.5), 1693.296(56.2)
^{141}Pr	1575.6(5)d	0.426(12)	0.0092[1.8%]	176.8630(1.06), 140.9050(0.479), 5666.170(0.379)
^{48}Ti	1585.941(5)	0.624(8)	0.0395(5)	1381.745(5.18), 6760.084(2.97), 6418.426(1.96)
^{139}La	1596.21(4)d	5.84(9)	0.1274[0.9%]	487.021(2.79), 815.772(1.430), 328.762(1.250)
^{71}Ga	1596.68(8)d	0.0732(16)	0.00318[2.4%]	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{35}Cl	1601.072(4)	1.210(7)	0.1034(6)	1164.8650(8.91), 517.0730(7.58), 6110.842(6.59)
^{56}Fe	1612.786(18)	0.1530(22)	0.00830(12)	7631.136(0.653), 7645.5450(0.549), 352.347(0.273)
^{27}Al	1622.877(18)	0.00989(15)	0.001111(17)	1778.92(0.232), 30.6380(0.0798), 7724.027(0.0493)
^{19}F	1633.53(3)d	0.0096(4)	0.00153[100%]	583.561(0.00356), 656.006(0.00197), 665.207(0.00149)
^{23}Na	1636.293(21)	0.0250(7)	0.00330(9)	1368.66(0.530), 2754.13(0.530), 472.202(0.478)
^{173}Yb	1638.36(17)	0.22(3)	0.0039(5)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{14}N	1678.281(14)	0.0063(3)	0.00136(7)	5269.159(0.0236), 5297.821(0.01680), 5533.395(0.0155)
^{173}Yb	1679.70(14)	0.161(19)	0.0028(3)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{199}Hg	1693.296(11)	56.2(16)	0.849(24)	367.947(251), 5967.02(62.5), 4739.43(30.1)
^{56}Fe	1725.288(21)	0.181(3)	0.00982(16)	7631.136(0.653), 7645.5450(0.549), 352.347(0.273)
^{203}Tl	1741.01(8)	0.0548(25)	0.00081(4)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{115}In	1753.8(6)d	3.82(12)	0.101[30%]	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{51}V	1777.961(19)	0.169(13)	0.0101(8)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{27}Al	1778.92(3)d	0.232(4)	0.0261[95%]	30.6380(0.0798), 7724.027(0.0493), 3033.896(0.0179)
^{53}Cr	1784.70(4)	0.1760(20)	0.01026(12)	834.849(1.38), 8884.36(0.78), 749.09(0.569)
^{25}Mg	1808.668(22)	0.0180(5)	0.00224(6)	3916.84(0.0320), 585.00(0.0314), 2828.172(0.0240)
^{55}Mn	1810.72(4)d	3.62(11)	0.200[12%]	846.754(13.10), 26.560(3.42), 83.884(3.11)
^{59}Co	1830.800(25)	1.700(23)	0.0874(12)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{87}Sr	1836.067(21)	1.030(18)	0.0356(6)	898.055(0.702), 850.657(0.275)
^{19}F	1843.688(20)	0.000600(23)	9.6E-05(4)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{71}Ga	1861.09(6)d	0.0904(19)	0.00393[2.4%]	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{90}Zr	1880.4(4)	0.016(4)	0.00053(13)	934.4640(0.125), 1465.7(0.063), 1205.6(0.042)
^{67}Zn	1883.12(3)	0.0718(18)	0.00333(8)	1077.335(0.356), 115.225(0.167), 7863.55(0.1410)
^{14}N	1884.821(16)	0.01470(18)	0.00318(4)	5269.159(0.0236), 5297.821(0.01680), 5533.395(0.0155)
^{85}Rb	1890.7(4)	0.017(4)	0.00060(14)	556.82(0.0913), 487.89(0.0494), 555.61(0.0407)
^{83}Kr	1897.79(8)	2.24(3)	0.0810(11)	881.74(20.8), 1213.42(8.28), 1463.86(7.10)
^{20}Ne	1931.08(6)	0.00591(22)	0.00089(3)	2035.67(0.0245), 350.72(0.0198), 4374.13(0.01910)
^{40}Ca	1942.67(3)	0.352(7)	0.0266(5)	6419.59(0.176), 4418.52(0.0708), 2001.31(0.0659)
^{35}Cl	1951.1400(20)	6.33(4)	0.541(3)	1164.8650(8.91), 517.0730(7.58), 6110.842(6.59)
^{102}Ru	1959.30(7)	0.210(19)	0.0063(6)	539.538(1.53), 475.0950(0.98), 686.907(0.52)
^{35}Cl	1959.346(4)	4.10(3)	0.350(3)	1164.8650(8.91), 517.0730(7.58), 6110.842(6.59)
^{22}Ne	1979.89(6)	0.00306(17)	0.00046(3)	2035.67(0.0245), 350.72(0.0198), 4374.13(0.01910)
^{14}N	1999.690(16)	0.00323(4)	0.000699(9)	5269.159(0.0236), 5297.821(0.01680), 5533.395(0.0155)
^{40}Ca	2001.31(3)	0.0659(15)	0.00498(11)	1942.67(0.352), 6419.59(0.176), 4418.52(0.0708)
^{40}Ca	2009.84(3)	0.0409(10)	0.00309(8)	1942.67(0.352), 6419.59(0.176), 4418.52(0.0708)
^{23}Na	2025.139(22)	0.0341(8)	0.00450(11)	1368.66(0.530), 2754.13(0.530), 472.202(0.478)
^{7}Li	2032.30(4)	0.0381(8)	0.0166(4)	980.53(0.00415), 1051.90(0.00414)
^{20}Ne	2035.67(20)	0.0245(25)	0.0037(4)	350.72(0.0198), 4374.13(0.01910), 2793.94(0.00900)
^{90}Zr	2042.2(4)	0.032(8)	0.0011(3)	934.4640(0.125), 1465.7(0.063), 1205.6(0.042)
^{28}Si	2092.902(18)	0.0331(6)	0.00357(7)	3538.966(0.1190), 4933.889(0.1120), 1273.349(0.0289)
^{115}In	2112.1(4)d	24.1(7)	0.636[30%]	1293.54(131), 1097.30(87.3), 416.86(43.0)
^{115}Sn	2112.302(16)	0.0152(5)	0.000388(13)	1293.591(0.1340), 1171.28(0.0879), 1229.64(0.0673)
^{55}Mn	2113.05(4)d	1.91(5)	0.105[12%]	846.754(13.10), 1810.72(3.62), 26.560(3.42)
^{31}P	2114.47(3)	0.0115(5)	0.00113(5)	512.646(0.079), 78.083(0.059), 636.663(0.0311)
^{31}P	2151.52(4)	0.0100(5)	0.00098(5)	512.646(0.079), 78.083(0.059), 636.663(0.0311)
^{31}P	2156.90(4)	0.0128(6)	0.00125(6)	512.646(0.079), 78.083(0.059), 636.663(0.0311)
^{16}O	2184.42(7)	1.64E-04(7)	3.11E-05(13)	870.68(1.77E-04), 1087.75(1.58E-04), 3272.02(3.53E-05)
^{71}Ga	2201.91(13)d	0.52(4)	0.0226[2.4%]	834.08(1.65), 629.96(0.490), 601.21(0.471)

^{A}Z	Eγ-keV	$\sigma_\gamma^Z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^Z(E_\gamma)$ for associated intense gamma rays
^{23}Na	2208.40(3)	0.0259(9)	0.00341(12)	1368.66(0.530), 2754.13(0.530), 472.202(0.478)
^{137}Ba	2217.84(8)	0.044(5)	0.00097(11)	1435.77(0.308), 627.29(0.294), 818.514(0.212)
^{1}H	2223.24835(9)	0.3326(7)	1.0000(21)	
^{53}Cr	2239.04(8)	0.186(3)	0.01084(17)	834.849(1.38), 8884.36(0.78), 749.09(0.569)
^{27}Al	2282.794(9)	0.00890(17)	0.001000(19)	1778.92(0.232), 30.6380(0.0798), 7724.027(0.0493)
^{32}S	2379.661(14)	0.208(5)	0.0197(5)	840.993(0.347), 5420.574(0.308), 3220.588(0.117)
^{171}Yb	2401.37(3)	0.20(3)	0.0035(5)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{23}Na	2414.457(21)	0.0237(5)	0.00312(7)	1368.66(0.530), 2754.13(0.530), 472.202(0.478)
^{19}F	2431.084(10)	0.000392(24)	6.3E-05(4)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{24}Mg	2438.54(3)	0.00473(19)	0.000590(24)	3916.84(0.0320), 585.00(0.0314), 2828.172(0.0240)
^{71}Ga	2491.6(3)d	0.17(4)	0.0074[2.4%]	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{209}Bi	2505.35(7)	0.0021(3)	3.0E-05(4)	4171.05(0.0171), 4054.57(0.0137), 319.78(0.0115)
^{71}Ga	2507.40(12)d	0.28(4)	0.0122[2.4%]	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{23}Na	2517.81(3)	0.0699(15)	0.00921(20)	1368.66(0.530), 2754.13(0.530), 472.202(0.478)
^{14}N	2520.457(17)	0.00441(24)	0.00095(5)	5269.159(0.0236), 5297.821(0.01680), 5533.395(0.0155)
^{139}La	2521.40(5)d	0.2120(23)	0.00463[0.9%]	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{19}F	2529.212(18)	0.00061(3)	9.7E-05(5)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{90}Zr	2557.8(8)	0.016(4)	0.00053(13)	934.4640(0.125), 1465.7(0.063), 1205.6(0.042)
^{90}Zr	2577.3(14)	0.016(4)	0.00053(13)	934.4640(0.125), 1465.7(0.063), 1205.6(0.042)
^{31}P	2586.00(4)	0.0089(4)	0.00087(4)	512.646(0.079), 78.083(0.059), 636.663(0.0311)
^{9}Be	2590.014(19)	0.00191(15)	0.00064(5)	6809.61(0.0058), 3367.448(0.00285), 853.630(0.00208)
^{27}Al	2590.193(9)	0.00807(16)	0.000906(18)	1778.92(0.232), 30.6380(0.0798), 7724.027(0.0493)
^{23}Na	2752.271(23)	0.0654(12)	0.00862(16)	1368.66(0.530), 2754.13(0.530), 472.202(0.478)
^{23}Na	2754.13(6)d	0.530(8)	0.0699[2.3%]	1368.66(0.530), 472.202(0.478), 90.9920(0.235)
^{40}Ar	2771.9(8)	0.057(9)	0.0043(7)	167.30(0.53), 4745.3(0.36), 1186.8(0.34)
^{20}Ne	2793.94(5)	0.00900(11)	0.001352(17)	2035.67(0.0245), 350.72(0.0198), 4374.13(0.01910)
^{24}Mg	2828.172(25)	0.0240(8)	0.00299(10)	3916.84(0.0320), 585.00(0.0314), 1808.668(0.0180)
^{209}Bi	2828.29(7)	0.00179(24)	2.6E-05(4)	4171.05(0.0171), 4054.57(0.0137), 319.78(0.0115)
^{35}Cl	2863.819(12)	1.820(10)	0.1556(9)	1164.8650(8.91), 517.0730(7.58), 6110.842(6.59)
^{20}Ne	2895.32(10)	0.00252(7)	0.000378(11)	2035.67(0.0245), 350.72(0.0198), 4374.13(0.01910)
^{32}S	2930.67(3)	0.0832(13)	0.00786(12)	840.993(0.347), 5420.574(0.308), 2379.661(0.208)
^{19}F	3014.568(10)	0.000405(15)	6.46E-05(24)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{27}Al	3033.896(6)	0.0179(3)	0.00201(3)	1778.92(0.232), 30.6380(0.0798), 7724.027(0.0493)
^{71}Ga	3034.6(4)d	0.15(3)	0.0065[2.4%]	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{24}Mg	3054.00(3)	0.0083(3)	0.00103(4)	3916.84(0.0320), 585.00(0.0314), 2828.172(0.0240)
^{31}P	3058.17(4)	0.0110(4)	0.00108(4)	512.646(0.079), 78.083(0.059), 636.663(0.0311)
^{35}Cl	3061.82(4)	1.130(7)	0.0966(6)	1164.8650(8.91), 517.0730(7.58), 6110.842(6.59)
^{139}La	3082.979(24)	0.140(5)	0.00305(11)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{32}S	3220.588(17)	0.117(5)	0.0111(5)	840.993(0.347), 5420.574(0.308), 2379.661(0.208)
^{16}O	3272.02(8)	3.53E-05(23)	6.7E-06(4)	870.68(1.77E-04), 2184.42(1.64E-04), 1087.75(1.58E-04)
^{31}P	3273.98(4)	0.0083(3)	0.00081(3)	512.646(0.079), 78.083(0.059), 636.663(0.0311)
^{24}Mg	3301.41(3)	0.00620(24)	0.00077(3)	3916.84(0.0320), 585.00(0.0314), 2828.172(0.0240)
^{9}Be	3367.448(25)	0.00285(22)	0.00096(7)	6809.61(0.0058), 853.630(0.00208), 2590.014(0.00191)
^{24}Mg	3413.10(3)	0.00401(16)	0.000500(20)	3916.84(0.0320), 585.00(0.0314), 2828.172(0.0240)
^{9}Be	3443.406(20)	0.00098(7)	0.000330(24)	6809.61(0.0058), 3367.448(0.00285), 853.630(0.00208)
^{27}Al	3465.058(7)	0.0146(3)	0.00164(3)	1778.92(0.232), 30.6380(0.0798), 7724.027(0.0493)
^{186}W	3469.40(14)	0.103(6)	0.00170(10)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{232}Th	3473.00(8)	0.057(3)	0.00074(4)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{90}Zr	3475.8(15)	0.019(5)	0.00063(17)	934.4640(0.125), 1465.7(0.063), 1205.6(0.042)
^{19}F	3488.064(18)	0.00073(3)	1.16E-04(5)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{31}P	3522.59(3)	0.0219(8)	0.00214(8)	512.646(0.079), 78.083(0.059), 636.663(0.0311)
^{232}Th	3530.96(13)	0.0397(24)	0.00052(3)	583.27(0.279), 566.63(0.19), 472.30(0.165)
^{14}N	3531.981(15)	0.0071(4)	0.00154(9)	5269.159(0.0236), 5297.821(0.01680), 5533.395(0.0155)
^{28}Si	3538.966(22)	0.1190(20)	0.01284(22)	4933.889(0.1120), 2092.902(0.0331), 1273.349(0.0289)
^{238}U	3583.10(7)	0.042(3)	0.00053(4)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{23}Na	3587.460(25)	0.0596(11)	0.00786(15)	1368.66(0.530), 2754.13(0.530), 472.202(0.478)
^{27}Al	3591.189(8)	0.01000(21)	0.001123(24)	1778.92(0.232), 30.6380(0.0798), 7724.027(0.0493)
^{174}Yb	3632.3(10)	0.40(10)	0.0070(18)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{138}Ba	3641.12(9)	0.0562(16)	0.00124(4)	1435.77(0.308), 627.29(0.294), 818.514(0.212)
^{139}La	3665.631(24)	0.135(5)	0.00295(11)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{14}N	3677.732(13)	0.0115(6)	0.00249(13)	5269.159(0.0236), 5297.821(0.01680), 5533.395(0.0155)
^{139}La	3679.641(24)	0.139(5)	0.00303(11)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{12}C	3683.920(9)	0.00122(3)	0.000308(8)	4945.301(0.00261), 1261.765(0.00124)
^{40}Ar	3700.6(8)	0.065(7)	0.0049(5)	167.30(0.53), 4745.3(0.36), 1186.8(0.34)
^{174}Yb	3714.7(5)	0.23(6)	0.0040(11)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{141}Pr	3790.37(3)	0.140(6)	0.00301(13)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{25}Mg	3831.480(24)	0.00418(14)	0.000521(17)	3916.84(0.0320), 585.00(0.0314), 2828.172(0.0240)
^{174}Yb	3885.0(4)	0.72(17)	0.013(3)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{31}P	3899.89(3)	0.0294(10)	0.00288(10)	512.646(0.079), 78.083(0.059), 636.663(0.0311)

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{24}Mg	3916.84(3)	0.0320(11)	0.00399(14)	585.00(0.0314), 2828.172(0.0240), 1808.668(0.0180)
^{174}Yb	3929.3(4)	0.38(9)	0.0067(16)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{19}F	3964.872(20)	0.000435(18)	6.9E-05(3)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{23}Na	3981.450(25)	0.0677(11)	0.00892(15)	1368.66(0.530), 2754.13(0.530), 472.202(0.478)
^{90}Zr	3982.3(15)	0.015(4)	0.00050(13)	934.4640(0.125), 1465.7(0.063), 1205.6(0.042)
^{209}Bi	4054.57(6)	0.0137(18)	2.0E-04(3)	4171.05(0.0171), 319.78(0.0115), 4101.76(0.0089)
^{238}U	4060.35(5)	0.186(3)	0.00237(4)	74.6640(1.30000), 106.1230(0.723), 277.5990(0.382)
^{138}Ba	4095.84(9)	0.155(4)	0.00342(9)	1435.77(0.308), 627.29(0.294), 818.514(0.212)
^{209}Bi	4101.76(6)	0.0089(12)	1.29E-04(17)	4171.05(0.0171), 4054.57(0.0137), 319.78(0.0115)
^{27}Al	4133.407(7)	0.0149(3)	0.00167(3)	1778.92(0.232), 30.6380(0.0798), 7724.027(0.0493)
^{209}Bi	4165.36(5)	0.00173(24)	2.5E-05(4)	4171.05(0.0171), 4054.57(0.0137), 319.78(0.0115)
^{209}Bi	4171.05(9)	0.0171(22)	2.5E-04(3)	4054.57(0.0137), 319.78(0.0115), 4101.76(0.0089)
^{56}Fe	4218.27(5)	0.099(3)	0.00537(16)	7631.136(0.653), 7645.5450(0.549), 352.347(0.273)
^{203}Tl	4225.47(17)	0.045(3)	0.00067(4)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{186}W	4249.66(7)	0.115(6)	0.00190(10)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{209}Bi	4256.65(5)	0.0024(3)	3.5E-05(4)	4171.05(0.0171), 4054.57(0.0137), 319.78(0.0115)
^{27}Al	4259.534(7)	0.0153(3)	0.00172(3)	1778.92(0.232), 30.6380(0.0798), 7724.027(0.0493)
^{140}Ce	4291.08(4)	0.053(4)	0.00115(9)	661.99(0.241), 4766.10(0.113), 475.04(0.082)
^{142}Ce	4336.46(8)	0.0251(20)	0.00054(4)	661.99(0.241), 4766.10(0.113), 475.04(0.082)
^{20}Ne	4374.13(6)	0.01910(22)	0.00287(3)	2035.67(0.0245), 350.72(0.0198), 2793.94(0.00900)
^{139}La	4389.505(14)	0.255(10)	0.00556(22)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{139}La	4416.22(3)	0.247(9)	0.00539(20)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{40}Ca	4418.52(5)	0.0708(18)	0.00535(14)	1942.67(0.352), 6419.59(0.176), 2001.31(0.0659)
^{203}Tl	4495.74(13)	0.043(4)	0.00064(6)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{139}La	4502.647(13)	0.164(6)	0.00358(13)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{14}N	4508.731(12)	0.0132(7)	0.00286(15)	5269.159(0.0236), 5297.821(0.01680), 5533.395(0.0155)
^{203}Tl	4540.62(15)	0.0413(25)	0.00061(4)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{19}F	4556.817(20)	0.000517(23)	8.2E-05(4)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{184}W	4573.7(3)	0.104(9)	0.00171(15)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{186}W	4574.94(8)	0.152(10)	0.00251(16)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{186}W	4626.35(7)	0.124(7)	0.00204(12)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{31}P	4671.37(3)	0.0194(7)	0.00190(7)	512.646(0.079), 78.083(0.059), 636.663(0.0311)
^{186}W	4684.40(8)	0.150(7)	0.00247(12)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{203}Tl	4687.58(12)	0.098(4)	0.00145(6)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{27}Al	4690.676(5)	0.01090(24)	0.00122(3)	1778.92(0.232), 30.6380(0.0798), 7724.027(0.0493)
^{141}Pr	4692.120(22)	0.291(10)	0.00626(22)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{203}Tl	4705.83(14)	0.058(3)	0.00086(4)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{27}Al	4733.844(11)	0.0126(3)	0.00142(3)	1778.92(0.232), 30.6380(0.0798), 7724.027(0.0493)
^{199}Hg	4739.43(5)	30.1(8)	0.455(12)	367.947(251), 5967.02(62.5), 1693.296(56.2)
^{40}Ar	4745.3(8)	0.36(4)	0.027(3)	167.30(0.53), 1186.8(0.34), 516.0(0.167)
^{203}Tl	4752.24(11)	0.148(5)	0.00219(7)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{140}Ce	4766.10(5)	0.113(8)	0.00244(17)	661.99(0.241), 475.04(0.082), 4291.08(0.053)
^{141}Pr	4801.22(3)	0.140(8)	0.00301(17)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{174}Yb	4830.2(4)	0.25(6)	0.0044(11)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{203}Tl	4841.40(15)	0.090(4)	0.00133(6)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{139}La	4842.695(7)	0.661(25)	0.0144(6)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{32}S	4869.61(3)	0.0650(13)	0.00614(12)	840.993(0.347), 5420.574(0.308), 2379.661(0.208)
^{139}La	4888.606(7)	0.150(6)	0.00327(13)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{203}Tl	4913.57(11)	0.164(5)	0.00243(7)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{28}Si	4933.889(24)	0.1120(23)	0.01209(25)	3538.966(0.1190), 2092.902(0.0331), 1273.349(0.0289)
^{12}C	4945.301(3)	0.00261(5)	0.000659(13)	1261.765(0.00124), 3683.920(0.00122)
^{35}Cl	4979.759(20)	1.230(10)	0.1051(9)	1164.8650(8.91), 517.0730(7.58), 6110.842(6.59)
^{174}Yb	5011.0(4)	0.18(4)	0.0032(7)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{55}Mn	5014.37(7)	0.737(20)	0.0407(11)	846.754(13.10), 1810.72(3.62), 26.560(3.42)
^{203}Tl	5014.61(15)	0.058(3)	0.00086(4)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{19}F	5033.530(23)	0.00063(3)	1.00E-04(5)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{141}Pr	5096.081(15)	0.208(8)	0.00447(17)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{139}La	5097.726(6)	0.68(3)	0.0148(7)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{93}Nb	5103.34(7)	0.0232(12)	0.00076(4)	99.4070(0.196), 255.9290(0.176), 253.115(0.1320)
^{139}La	5126.257(6)	0.114(4)	0.00249(9)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{203}Tl	5130.50(23)	0.058(4)	0.00086(6)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{141}Pr	5140.72(3)	0.269(11)	0.00579(24)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{164}Dy	5142.29(3)	15.7(10)	0.293(19)	184.257(146), 538.609(69.2), 496.931(44.9)
^{51}V	5142.363(23)	0.200(6)	0.0119(4)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{190}Os	5146.63(14)	0.409(20)	0.0065(3)	186.7180(2.08), 155.10(1.19), 557.978(0.84)
^{191}Ir	5147.51(12)	1.29(6)	0.0203(10)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{139}La	5160.902(6)	0.089(5)	0.00194(11)	1596.21(5.84), 487.021(2.79), 815.772(1.430)
^{182}W	5164.43(3)	0.19(3)	0.0031(5)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{203}Tl	5180.38(12)	0.141(5)	0.00209(7)	139.94(0.400), 347.96(0.361), 318.88(0.325)

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{55}Mn	5180.89(8)	0.412(13)	0.0227(7)	846.754(13.10), 1810.72(3.62), 26.560(3.42)
^{59}Co	5181.77(7)	0.912(23)	0.0469(12)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{51}V	5210.143(19)	0.244(20)	0.0145(12)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{203}Tl	5261.48(13)	0.084(4)	0.00125(6)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{186}W	5261.68(6)	0.86(4)	0.0142(7)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{174}Yb	5266.3(4)	1.4(6)	0.025(11)	514.868(9.0), 639.261(1.43), 396.329(1.42)
^{14}N	5269.159(13)	0.0236(3)	0.00511(7)	5297.821(0.01680), 5533.395(0.0155), 1884.821(0.01470)
^{19}F	5279.360(20)	0.000421(20)	6.7E-05(3)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{203}Tl	5279.86(12)	0.207(6)	0.00307(9)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{14}N	5297.821(15)	0.01680(23)	0.00363(5)	5269.159(0.0236), 5533.395(0.0155), 1884.821(0.01470)
^{186}W	5320.72(6)	0.605(21)	0.0100(4)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{39}K	5380.018(16)	0.146(4)	0.0113(3)	29.8300(1.380), 770.3050(0.903), 1158.887(0.1600)
^{203}Tl	5404.41(12)	0.147(5)	0.00218(7)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{32}S	5420.574(24)	0.308(7)	0.0291(7)	840.993(0.347), 2379.661(0.208), 3220.588(0.117)
^{203}Tl	5451.07(14)	0.079(3)	0.00117(4)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{68}Zn	5474.02(10)	0.042(5)	0.00195(23)	1077.335(0.356), 115.225(0.167), 7863.55(0.1410)
^{93}Nb	5496.24(10)	0.0205(14)	0.00067(5)	99.4070(0.196), 255.9290(0.176), 253.115(0.1320)
^{133}Cs	5505.46(20)	0.333(22)	0.0076(5)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{51}V	5515.813(23)	0.39(4)	0.0232(24)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{55}Mn	5527.08(8)	0.788(22)	0.0435(12)	846.754(13.10), 1810.72(3.62), 26.560(3.42)
^{203}Tl	5533.35(13)	0.131(5)	0.00194(7)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{14}N	5533.395(14)	0.0155(8)	0.00335(17)	5269.159(0.0236), 5297.821(0.01680), 1884.821(0.01470)
^{75}As	5533.94(3)	0.151(7)	0.0061(3)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{191}Ir	5534.73(12)	1.39(6)	0.0219(10)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{19}F	5543.713(10)	0.000407(17)	6.5E-05(3)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{164}Dy	5557.26(3)	28.7(14)	0.54(3)	184.257(146), 538.609(69.2), 496.931(44.9)
^{14}N	5562.057(13)	0.0084(5)	0.00182(11)	5269.159(0.0236), 5297.821(0.01680), 5533.395(0.0155)
^{191}Ir	5564.54(14)	1.71(8)	0.0270(13)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{133}Cs	5572.00(25)	0.249(20)	0.0057(5)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{40}Ar	5582.4(8)	0.077(8)	0.0058(6)	167.30(0.53), 4745.3(0.36), 1186.8(0.34)
^{76}Se	5600.995(21)	0.301(14)	0.0116(5)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{71}Ga	5601.75(25)	0.063(4)	0.00274(17)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{203}Tl	5603.28(13)	0.282(10)	0.00418(15)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{164}Dy	5607.69(3)	35.9(16)	0.67(3)	184.257(146), 538.609(69.2), 496.931(44.9)
^{133}Cs	5637.056(17)	0.277(21)	0.0063(5)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{203}Tl	5641.57(12)	0.316(7)	0.00469(10)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{199}Hg	5658.24(4)	27.5(7)	0.415(11)	367.947(251), 5967.02(62.5), 1693.296(56.2)
^{59}Co	5660.93(4)	1.89(6)	0.097(3)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{141}Pr	5666.170(6)	0.379(15)	0.0082(3)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{191}Ir	5667.81(3)	2.68(10)	0.0423(16)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{191}Ir	5689.06(3)	1.73(7)	0.0273(11)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{197}Au	5710.52(10)	1.27(17)	0.020(3)	410.(94.), 214.9710(9.0), 247.5730(5.56)
^{35}Cl	5715.244(21)	1.820(16)	0.1556(14)	1164.8650(8.91), 517.0730(7.58), 6110.842(6.59)
^{193}Ir	5728.97(7)	1.15(5)	0.0181(8)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{137}Ba	5730.81(6)	0.0617(20)	0.00136(4)	1435.77(0.308), 627.29(0.294), 818.514(0.212)
^{169}Tm	5731.36(11)	1.17(22)	0.021(4)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{169}Tm	5737.51(11)	1.42(7)	0.0255(13)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{59}Co	5742.53(4)	0.766(23)	0.0394(12)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{51}V	5752.064(22)	0.366(24)	0.0218(14)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{191}Ir	5783.01(3)	1.34(6)	0.0211(10)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{141}Pr	5843.026(5)	0.147(6)	0.00316(13)	176.8630(1.06), 140.9050(0.479), 1575.6(0.426)
^{203}Tl	5917.48(16)	0.084(4)	0.00125(6)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{55}Mn	5920.39(8)	1.06(3)	0.0585(17)	846.754(13.10), 1810.72(3.62), 26.560(3.42)
^{56}Fe	5920.449(21)	0.225(5)	0.0122(3)	7631.136(0.653), 7645.5450(0.549), 352.347(0.273)
^{169}Tm	5941.47(11)	1.51(7)	0.0271(13)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{169}Tm	5943.09(11)	1.03(20)	0.018(4)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{191}Ir	5958.28(3)	1.79(8)	0.0282(13)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{199}Hg	5967.02(4)	62.5(15)	0.944(23)	367.947(251), 1693.296(56.2), 4739.43(30.1)
^{59}Co	5975.98(4)	2.9(4)	0.149(21)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{169}Tm	6001.61(11)	0.99(10)	0.0178(18)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{76}Se	6006.973(21)	0.289(20)	0.0111(8)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{71}Ga	6007.25(14)	0.069(5)	0.00300(22)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{19}F	6016.802(16)	0.00094(4)	1.50E-04(6)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{56}Fe	6018.532(20)	0.227(5)	0.0123(3)	7631.136(0.653), 7645.5450(0.549), 352.347(0.273)
^{89}Y	6080.171(22)	0.76(4)	0.0259(14)	776.613(0.659), 202.53(0.289), 574.106(0.174)
^{191}Ir	6082.48(3)	2.62(11)	0.0413(17)	351.689(10.9), 328.448(9.1), 84.2740(7.7)
^{35}Cl	6110.842(18)	6.59(6)	0.563(5)	1164.8650(8.91), 517.0730(7.58), 1951.1400(6.33)
^{71}Ga	6111.72(24)	0.055(4)	0.00239(17)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{182}W	6144.28(3)	0.174(11)	0.00287(18)	685.73(3.24), 479.550(2.59), 72.002(1.32)

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{203}Tl	6166.61(14)	0.166(6)	0.00246(9)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{133}Cs	6175.412(17)	0.252(16)	0.0057(4)	176.4040(2.47), 205.615(1.560), 510.795(1.54)
^{203}Tl	6183.05(15)	0.081(4)	0.00120(6)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{182}W	6190.78(3)	0.45(4)	0.0074(7)	685.73(3.24), 479.550(2.59), 72.002(1.32)
^{159}Tb	6218.56(7)	0.190(22)	0.0036(4)	75.0500(1.78), 63.6860(1.46), 64.1100(1.2)
^{203}Tl	6222.57(16)	0.065(4)	0.00096(6)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{91}Zr	6295.13(16)	0.0279(20)	0.00093(7)	934.4640(0.125), 1465.7(0.063), 1205.6(0.042)
^{14}N	6322.428(12)	0.01450(22)	0.00314(5)	5269.159(0.0236), 5297.821(0.01680), 5533.395(0.0155)
^{71}Ga	6358.61(14)	0.138(5)	0.00600(22)	834.08(1.65), 2201.91(0.52), 629.96(0.490)
^{28}Si	6379.801(21)	0.0207(6)	0.00223(7)	3538.966(0.1190), 4933.889(0.1120), 2092.902(0.0331)
^{169}Tm	6387.37(11)	1.48(7)	0.0265(13)	200.(8.72), 149.7180(7.11), 140.(5.96)
^{23}Na	6395.478(15)	0.1000(20)	0.0132(3)	1368.66(0.530), 2754.13(0.530), 472.202(0.478)
^{48}Ti	6418.426(14)	1.96(6)	0.124(4)	1381.745(5.18), 6760.084(2.97), 341.706(1.840)
^{40}Ca	6419.59(5)	0.176(5)	0.0133(4)	1942.67(0.352), 4418.52(0.0708), 2001.31(0.0659)
^{51}V	6464.887(18)	0.43(4)	0.0256(24)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{131}Xe	6467.09(12)	1.33(19)	0.031(4)	667.79(6.7), 772.72(1.78), 536.17(1.71)
^{59}Co	6485.99(3)	2.32(5)	0.119(3)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{203}Tl	6514.57(15)	0.129(5)	0.00191(7)	139.94(0.400), 347.96(0.361), 318.88(0.325)
^{51}V	6517.282(19)	0.78(4)	0.0464(24)	1434.10(4.81), 125.082(1.61), 645.703(0.769)
^{121}Sb	6523.52(7)	0.075(3)	0.00187(8)	564.24(2.700), 61.4130(0.75), 78.0910(0.48)
^{19}F	6600.175(16)	0.00096(3)	1.53E-04(5)	1633.53(0.0096), 583.561(0.00356), 656.006(0.00197)
^{76}Se	6600.690(21)	0.623(20)	0.0239(8)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{35}Cl	6619.615(19)	2.530(23)	0.2163(20)	1164.8650(8.91), 517.0730(7.58), 6110.842(6.59)
^{35}Cl	6627.821(18)	1.470(16)	0.1257(14)	1164.8650(8.91), 517.0730(7.58), 6110.842(6.59)
^{53}Cr	6645.61(8)	0.183(13)	0.0107(8)	834.849(1.38), 8884.36(0.78), 749.09(0.569)
^{59}Co	6706.01(3)	3.02(6)	0.155(3)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{157}Gd	6750.11(5)	965(30)	18.6(6)	181.931(7200), 79.5100(4010), 944.174(3090)
^{48}Ti	6760.084(14)	2.97(9)	0.188(6)	1381.745(5.18), 6418.426(1.96), 341.706(1.840)
^{55}Mn	6783.74(12)	0.378(17)	0.0209(9)	846.754(13.10), 1810.72(3.62), 26.560(3.42)
^{31}P	6785.504(24)	0.0267(15)	0.00261(15)	512.646(0.079), 78.083(0.059), 636.663(0.0311)
^{75}As	6808.872(8)	0.160(8)	0.0065(3)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{9}Be	6809.61(3)	0.0058(5)	0.00195(17)	3367.448(0.00285), 853.630(0.00208), 2590.014(0.00191)
^{75}As	6810.898(8)	0.56(3)	0.0227(12)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{62}Ni	6837.50(3)	0.458(8)	0.0236(4)	8998.414(1.49), 464.978(0.843), 8533.509(0.721)
^{45}Sc	6839.09(4)	0.95(4)	0.064(3)	227.773(7.13), 147.011(6.08), 142.528(4.88)
^{45}Sc	6840.34(4)	0.76(11)	0.051(7)	227.773(7.13), 147.011(6.08), 142.528(4.88)
^{51}V	6874.157(19)	0.49(6)	0.029(4)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{59}Co	6877.16(3)	3.02(6)	0.155(3)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{66}Zn	6958.8(3)	0.043(3)	0.00199(14)	1077.335(0.356), 115.225(0.167), 7863.55(0.1410)
^{59}Co	6985.41(3)	1.05(13)	0.054(7)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{63}Cu	6988.68(5)	0.126(6)	0.0060(3)	278.250(0.893), 7915.62(0.869), 159.281(0.648)
^{75}As	7020.139(8)	0.104(7)	0.0042(3)	559.10(2.00), 165.0490(0.996), 86.7880(0.579)
^{55}Mn	7057.89(9)	1.22(3)	0.0673(17)	846.754(13.10), 1810.72(3.62), 26.560(3.42)
^{53}Cr	7099.91(6)	0.146(9)	0.0085(5)	834.849(1.38), 8884.36(0.78), 749.09(0.569)
^{55}Mn	7159.63(10)	0.643(24)	0.0355(13)	846.754(13.10), 1810.72(3.62), 26.560(3.42)
^{51}V	7162.898(15)	0.59(4)	0.0351(24)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{63}Cu	7176.68(5)	0.0925(17)	0.00441(8)	278.250(0.893), 7915.62(0.869), 159.281(0.648)
^{76}Se	7179.492(21)	0.261(25)	0.0100(10)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{28}Si	7199.199(23)	0.0125(4)	0.00135(4)	3538.966(0.1190), 4933.889(0.1120), 2092.902(0.0331)
^{59}Co	7214.42(3)	1.38(3)	0.0710(15)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{55}Mn	7243.52(9)	1.36(3)	0.0750(17)	846.754(13.10), 1810.72(3.62), 26.560(3.42)
^{63}Cu	7253.01(5)	0.1500(23)	0.00715(11)	278.250(0.893), 7915.62(0.869), 159.281(0.648)
^{55}Mn	7270.14(12)	0.362(15)	0.0200(8)	846.754(13.10), 1810.72(3.62), 26.560(3.42)
^{56}Fe	7278.838(10)	0.137(4)	0.00743(22)	7631.136(0.653), 7645.5450(0.549), 352.347(0.273)
^{14}N	7298.983(17)	0.00746(12)	0.00161(3)	5269.159(0.0236), 5297.821(0.01680), 5533.395(0.0155)
^{63}Cu	7306.93(4)	0.321(17)	0.0153(8)	278.250(0.893), 7915.62(0.869), 159.281(0.648)
^{51}V	7310.721(15)	0.227(9)	0.0135(5)	1434.10(4.81), 125.082(1.61), 6517.282(0.78)
^{207}Pb	7367.78(7)	0.137(3)	0.00200(4)	
^{35}Cl	7413.968(18)	3.29(5)	0.281(4)	1164.8650(8.91), 517.0730(7.58), 6110.842(6.59)
^{76}Se	7418.467(21)	0.350(13)	0.0134(5)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{31}P	7422.022(25)	0.0082(3)	0.00080(3)	512.646(0.079), 78.083(0.059), 636.663(0.0311)
^{59}Co	7491.54(3)	1.16(3)	0.0596(15)	229.879(7.18), 277.161(6.77), 555.972(5.76)
^{60}Ni	7536.637(25)	0.190(4)	0.00981(21)	8998.414(1.49), 464.978(0.843), 8533.509(0.721)
^{79}Br	7577.04(8)	0.108(3)	0.00410(11)	776.517(0.990), 554.3480(0.838), 245.203(0.80)
^{85}Rb	7624.07(11)	0.0114(5)	0.000404(18)	556.82(0.0913), 487.89(0.0494), 555.61(0.0407)
^{56}Fe	7631.136(14)	0.653(13)	0.0354(7)	7645.5450(0.549), 352.347(0.273), 6018.532(0.227)
^{63}Cu	7637.40(4)	0.54(7)	0.026(3)	278.250(0.893), 7915.62(0.869), 159.281(0.648)
^{56}Fe	7645.5450(10)	0.549(11)	0.0298(6)	7631.136(0.653), 352.347(0.273), 6018.532(0.227)
^{27}Al	7693.397(4)	0.0081(3)	0.00091(3)	1778.92(0.232), 30.6380(0.0798), 7724.027(0.0493)

^{A}Z	Eγ-keV	$\sigma_\gamma^z(E_\gamma)$-barns	k_0	Eγ, $\sigma_\gamma^z(E_\gamma)$ for associated intense gamma rays
^{27}Al	7724.027(4)	0.0493(15)	0.00554(17)	1778.92(0.232), 30.6380(0.0798), 3033.896(0.0179)
^{35}Cl	7790.330(18)	2.66(3)	0.227(3)	1164.8650(8.91), 517.0730(7.58), 6110.842(6.59)
^{60}Ni	7819.517(21)	0.336(6)	0.0173(3)	8998.414(1.49), 464.978(0.843), 8533.509(0.721)
^{64}Zn	7863.55(7)	0.1410(19)	0.00653(9)	1077.335(0.356), 115.225(0.167), 1883.12(0.0718)
^{63}Cu	7915.62(4)	0.869(20)	0.0414(10)	278.250(0.893), 159.281(0.648), 7637.40(0.54)
^{52}Cr	7938.46(23)	0.424(11)	0.0247(6)	834.849(1.38), 8884.36(0.78), 749.09(0.569)
^{45}Sc	8175.176(21)	1.80(6)	0.121(4)	227.773(7.13), 147.011(6.08), 142.528(4.88)
^{14}N	8310.161(19)	0.00330(6)	0.000714(13)	5269.159(0.0236), 5297.821(0.01680), 5533.395(0.0155)
^{50}Cr	8482.80(9)	0.169(7)	0.0098(4)	834.849(1.38), 8884.36(0.78), 749.09(0.569)
^{50}Cr	8510.77(8)	0.233(8)	0.0136(5)	834.849(1.38), 8884.36(0.78), 749.09(0.569)
^{45}Sc	8532.122(20)	0.89(4)	0.060(3)	227.773(7.13), 147.011(6.08), 142.528(4.88)
^{58}Ni	8533.509(17)	0.721(13)	0.0372(7)	8998.414(1.49), 464.978(0.843), 6837.50(0.458)
^{53}Cr	8884.36(5)	0.78(5)	0.045(3)	834.849(1.38), 749.09(0.569), 7938.46(0.424)
^{58}Ni	8998.414(15)	1.49(3)	0.0769(15)	464.978(0.843), 8533.509(0.721), 6837.50(0.458)
^{54}Fe	9297.68(19)	0.0747(25)	0.00405(14)	7631.136(0.653), 7645.5450(0.549), 352.347(0.273)
^{53}Cr	9719.06(5)	0.260(18)	0.0152(10)	834.849(1.38), 8884.36(0.78), 749.09(0.569)
^{77}Se	9883.35(3)	0.220(22)	0.0084(8)	613.724(2.14), 238.9980(2.06), 520.6370(1.260)
^{14}N	10829.120(12)	0.0113(8)	0.00244(17)	5269.159(0.0236), 5297.821(0.01680), 5533.395(0.0155)
^{3}He	20520.46	4.2E-11(12)	3.2E-11(9)	

8. PGAA-IAEA Database: CD-ROM

R.B. Firestone, V. Zerkin

Both the database of prompt gamma-rays from slow neutron capture for elemental analysis and the results of this Co-ordinated Research Project are available on the accompanying CD-ROM. The file *index.html* is the Home Page for the CD-ROM, and provides links to the following information.

a. **CRP** – general information, papers and reports relevant to this Coordinated Research Project.

b. **PGAA-IAEA Database Viewer** – interactive program to display and search the PGAA database by isotope, energy, or capture cross section.

c. **Database of Prompt Gamma Rays from Slow Neutron Capture for Elemental Analysis** – this report.

d. **PGAA Database Files -** Adopted PGAA database and associated files in EXCEL, PDF and TEXT formats. The archival databases by Lone *et al.* [8.1] and by Reedy and Frankle (LANL) [8.2, 8.3] are also available.

e. **Evaluated Gamma-ray Activation File (EGAF)** - Adopted PGAA database in ENSDF format. Data can be viewed with Isotope Explorer 2.2 ENSDF Viewer (see below).

f. **PGAA Database Evaluation** – ENSDF-format versions of the adopted PGAA database, and the Budapest and ENSDF isotopic input files. Decay scheme balance and statistical analysis summaries are provided.

g. **Isotope Explorer 2.2 ENSDF Viewer -** Windows software for viewing the level scheme drawings and tables provided in ENSDF format. The complete ENSDF database is included, as of December 2002.

The databases and viewers are discussed in greater detail in the following sections.

8.1. PGAA-IAEA Database Viewer

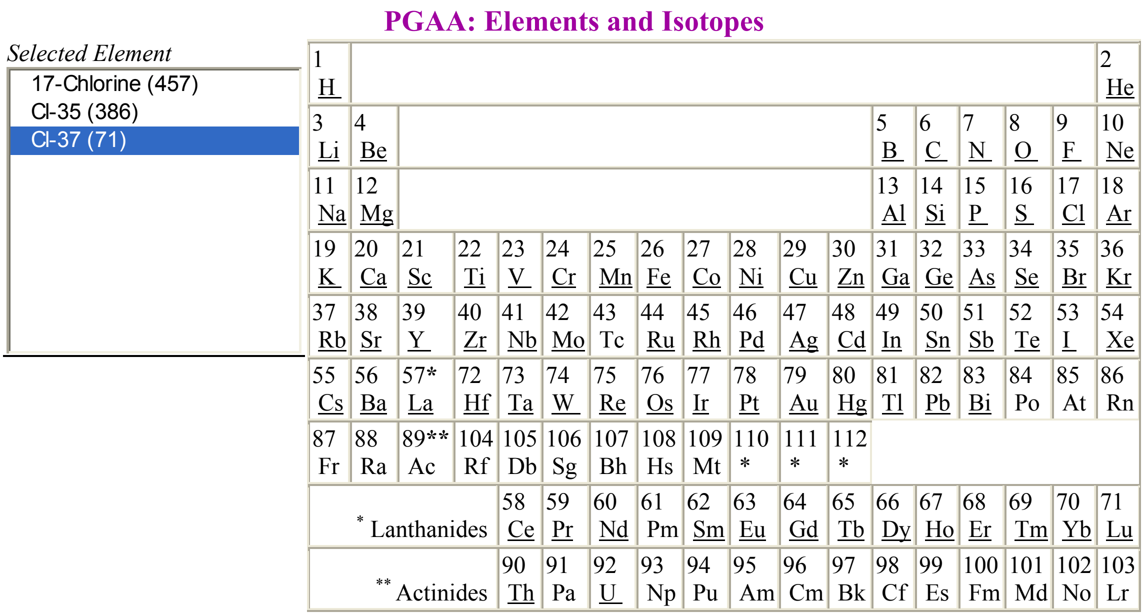


FIG. 8.1 Periodic table of elements and isotopes displayed by the PGAA-IAEA Viewer.

The PGAA-IAEA Database Viewer is provided on this CD-ROM, and was developed by Zerkin (IAEA, NDS). This Viewer is also available on the Internet from the Nuclear Data Service of the International Atomic Energy Agency: http://www-nds.iaea.org, and contains html-pages with large portions of JavaScript and GIF-plots for the gamma emissions of each isotope. Such a design enables the Viewer to be used on many platforms with standard Web-browsers. The Viewer also includes interactive plotting provided with the ZVView program, which can be used as a helper-application. ZVView for Windows and Linux are included in the CD-ROM.

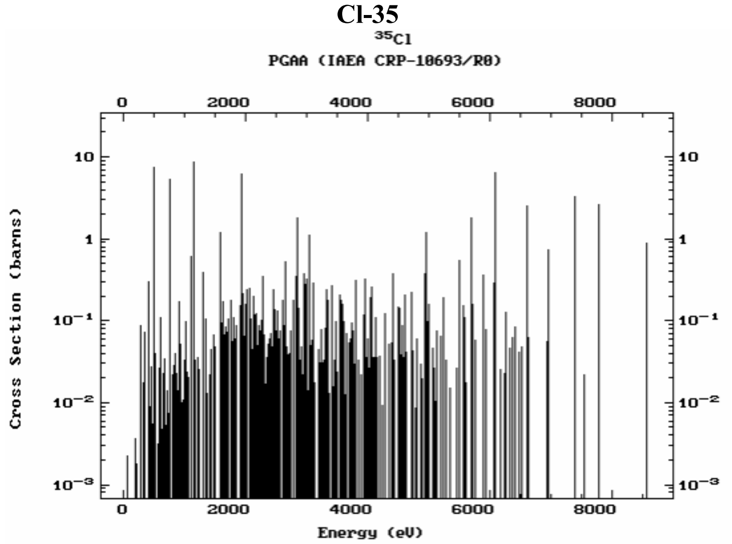
Target: 17-Chlorine

Atomic weight (amu) = 35.4527(9)

Elemental Cross Section (barns) = 33.1(3)

Isotope	Abundance (%)	Isotopic Cross Section (barns)	g-factor	N gammas
Cl-35	75.78(4)	43.6(4)	1	386
Cl-37	24.22(4)	0.433(6)	1	71

Cl-35



Cl-37

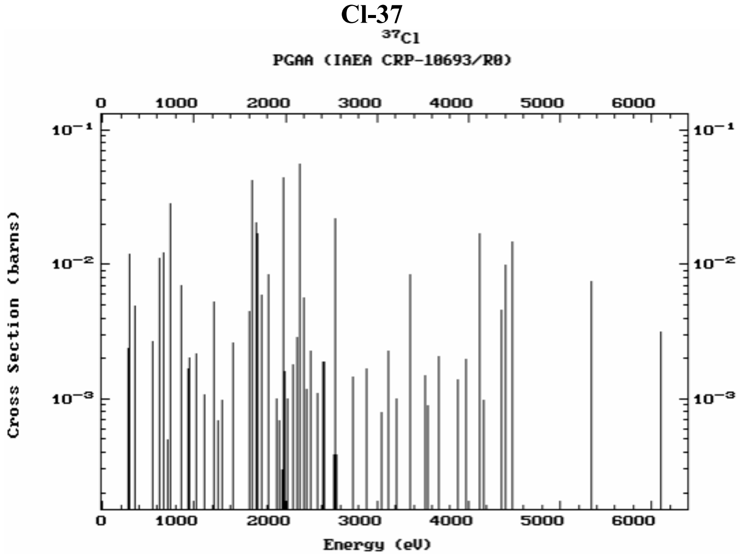


FIG. 8.2 Isotopic and elemental data, and histograms of gamma-ray energies and intensities displayed with the PGAA-IAEA Viewer.

The Viewer can be opened in standard mode to view the database, or in advanced mode to search the database. Fig. 8.1 shows a periodic table of the PGAA elements, as obtained when the Viewer is opened.

Clicking with the mouse on an element in the periodic table displays the isotopes of that element and the number of prompt gamma rays in the database for each isotope. A new window is also opened, as shown in Fig. 8.2, that displays the isotopic and elemental data and histograms of the gamma-ray energies and intensities.

Clicking on an isotope in the selected element box (square on the left) opens a table of gamma-ray energies, cross sections, prompt or decay type, and k_0 values as shown in Fig. 8.3.

Target: 17-Chlorine-35
Isotopic Abundance(%): 75.78(4)
Isotopic Capture Cross Section (barns): 43.6(4)
Number of Gammas: 386
Westcott g-factor:1
Sigma(b): Partial gamma ray production cross section (barns)
p - Prompt, d - Delayed, S – Stable

#	E(keV)	Sigma(b)	Type	Half-life	k0
1	85.747(9)	2.3e-3(5)	p	Stable	6.9e-3(15)
2	204.380(8)	3.7e-3(8)	p	Stable	0.0111(24)
3	225.49(7)	1.58e-3(6)	p	Stable	4.74e-3(18)
4	225.89(5)	1.1e-3(5)	p	Stable	3.3e-3(15)
5	236.775(13)	1.8e-3(6)	p	Stable	5.4e-3(18)
6	292.177(8)	0.0893(10)	p	Stable	0.268(3)
7	302.64(4)	2.1e-3(11)	p	Stable	6e-3(3)
8	337.620(11)	0.018(6)	p	Stable	0.054(18)
9	342.314(7)	5.4e-3(9)	p	Stable	0.016(3)
10	358.291(6)	0.0736(20)	p	Stable	0.221(6)
11	369(4)	0.019(5)	p	Stable	0.057(15)
12	371.3(25)	1.4e-3(3)	p	Stable	4.2e-3(9)
13	376.4460(20)	1.3e-3(3)	p	Stable	3.9e-3(9)
14	427.89(10)	9.9e-3(16)	p	Stable	3e-2(5)
15	428.060(8)	3.9e-3(7)	p	Stable	0.0117(21)
16	435.964(13)	0.051(8)	p	Stable	0.153(24)
17	436.222(4)	0.309(20)	p	Stable	0.928(6)
18	455.58(11)	4.3e-3(21)	p	Stable	0.013(6)
19	459.46(8)	9e-3(3)	p	Stable	0.027(9)
20	463.72(4)	2e-3(16)	p	Stable	6e-3(5)
21	464.8(5)	4e-3(3)	p	Stable	0.012(9)
22	465.9(11)	5e-3(15)	p	Stable	0.015(5)
23	466.63(15)	1e-2(5)	p	Stable	3e-2(15)
24	468.359(7)	0.0274(20)	p	Stable	0.082(6)
25	478.4(25)	0.027(15)	p	Stable	8e-2(5)

FIG. 8.3 Display of partial table of gamma-ray energies, cross sections, prompt or decay type, and k_0 value (complete table contains 386 gamma rays).

As advanced retrieval mode is available in which the Viewer displays a gamma-ray search window as shown in Fig. 8.4. There are two options in this mode: retrieve the whole database (about 35 000 lines) or a reduced version (about 1300 gamma lines). The reduced version contains lines that are up to 10% of the most intense gamma-ray emission for each element, but at least one gamma-ray emission for each isotope independent of the intensity.

The result of the search shown in Fig. 8.4 for gamma rays between 3000 and 3002 keV is displayed in a new window as shown in Fig. 8.5. PGAA databases can also be downloaded in text format from the PGAA-IAEA Viewer.

Gamma-Ray Search

	Energy (keV)	Z	A	CS
From	☑ 3000	☐ 20	☐ 43	☐ 1e-4
To	☑ 3002	☐ 30	☐ 44	☐ 1e-3

Type: ◉ All ○ Prompt ○ Delayed

Sort by: ◉ Energy ○ Cross Section

Fig. 8.4 Gamma-ray search window: data can be selected from the entire database by energy, atomic number, mass number, delayed or prompt type, and/or cross section, and the results can be sorted by energy or cross section.

P G A A -

n	Energy,keV	Isotope	Sigma,b	Type	Half-life	k_0
1	3001.07(5)	Cl-35	0.216(7)	p	S	0.649(21)
2	3001.17(13)	La-139	2.2e-3(23)	p	S	6.6e-3(7)
3	3001.55(5)	K-40 1	1.3e-5(3)	p	S	3.9e-5(9)
4	3001.89(15)	Ca-40	7.3e-4(19)	p	S	2.2e-3(6)
5	3001.97(13)	Sc-45	0.043(12)	p	S	0.13(4)

p - prompt, d - delayed, S – stable

FIG.8.5 Display of results of a search for gamma rays with E = 3000 – 3002 keV.

8.2. PGAA data files

The PGAA database and associated files are provided in various formats. Microsoft EXCEL format files include elemental data (atomic weights and elemental cross sections), isotopic data (abundances, cross sections and g-factors), and gamma-ray data (energies, cross sections and k_0 values). Tables of isotopic data, decay parent data, gamma-ray lists, g-factors and references from this document are provided in Adobe Portable Document Format and PostScript. Energies and cross sections for adopted prompt and decay gamma rays, and input ENSDF and Budapest gamma rays are available in text format.

8.3. Evaluated Gamma-ray Activation File (EGAF)

The Evaluated Gamma-ray Activation File (EGAF) contains the recommended PGAA database in ENSDF format. The nuclear structure information associated with these data is also preserved, along with three neutron-capture gamma-ray datasets: adopted PGAA, Budapest PGAA and LANL data [8.2, 8.3]. EGAF can be viewed by means of the Isotope Explorer 2.2 ENSDF Viewer (see below).

8.4. PGAA database evaluation

Selecting an element in the HTML periodic table provides a detailed summary of the evaluation. The atomic abundances and Mughabghab *et al.* cross sections are given for each isotope [8.4-8.6]. All Budapest and ENSDF input databases and the final adopted data are provided in ENSDF format. A summary of the initial matching of the Budapest data to the ENSDF data is given as a text file for determining isotopic assignments. This file contains all of the gamma rays measured at Budapest, and was subsequently edited to select only those gamma rays that could be reliably placed in a know level scheme. Additional text files show the least-squares energy and intensity fits, and decay-scheme intensity balance for all relevant datasets. Summary HTML tables are provided that compare the adopted, ENSDF, Budapest, Reedy and Frankle [8.2, 8.3], and Lone *et al.* [8.1].

The total cross section is presented, as deduced from the total measured gamma-ray intensity feeding the ground state and/or de-exciting the capture state. This parameter can also be deduced in some cases from the gamma-ray intensity of short-lived radioisotopes. If the decay scheme is dominated by continuum or unobserved gamma rays that populate the ground state, this cross section should be considered to be a lower limit. The agreement between Mughabghab [8.4] and the current measurements was excellent in a good many cases. Data that exceed the Mughabghab values may indicate that the adopted values are too low, particularly when the overall intensity balances are correct. The new cross section results should be taken as a guide to the overall quality of the data; we do not recommend that these values be quoted until further analysis can be performed.

8.5. Isotope Explorer 2.2, ENSDF Viewer

Isotope Explorer 2.2 by Firestone and Chu (Lawrence Berkeley National Laboratory, USA) and Ekström (Lund University, Sweden) can be installed on Windows PC computers to display level scheme drawings and tables from the data provided in ENSDF format. A "tour" of Isotope Explorer's capabilities is provided, as shown in Fig. 8.6. Links are available to download and install the program, and a detailed user manual is included. The program is installed by going to the download link, clicking on the self-extracting program archive IE223.EXE (50 MB), choosing "OPEN", and extracting the program and files to the selected directory. The application can be run from this directory or a short cut can be created on the extension .ENS is used for the PGAA ENSDF data. Associating this extension with Isotope Explorer in the PC will allow direct runs when opening the file. The ENSDF format files can also be read with a text editor, and the ENSDF format manual is provided.

When running Isotope Explorer directly from the executable, the user is prompted to select an isotope. The program can be configured to select data from a local or Internet database. A copy of the complete ENSDF file is included on the CD-ROM, which can be downloaded from the installation menu and used as the local database.

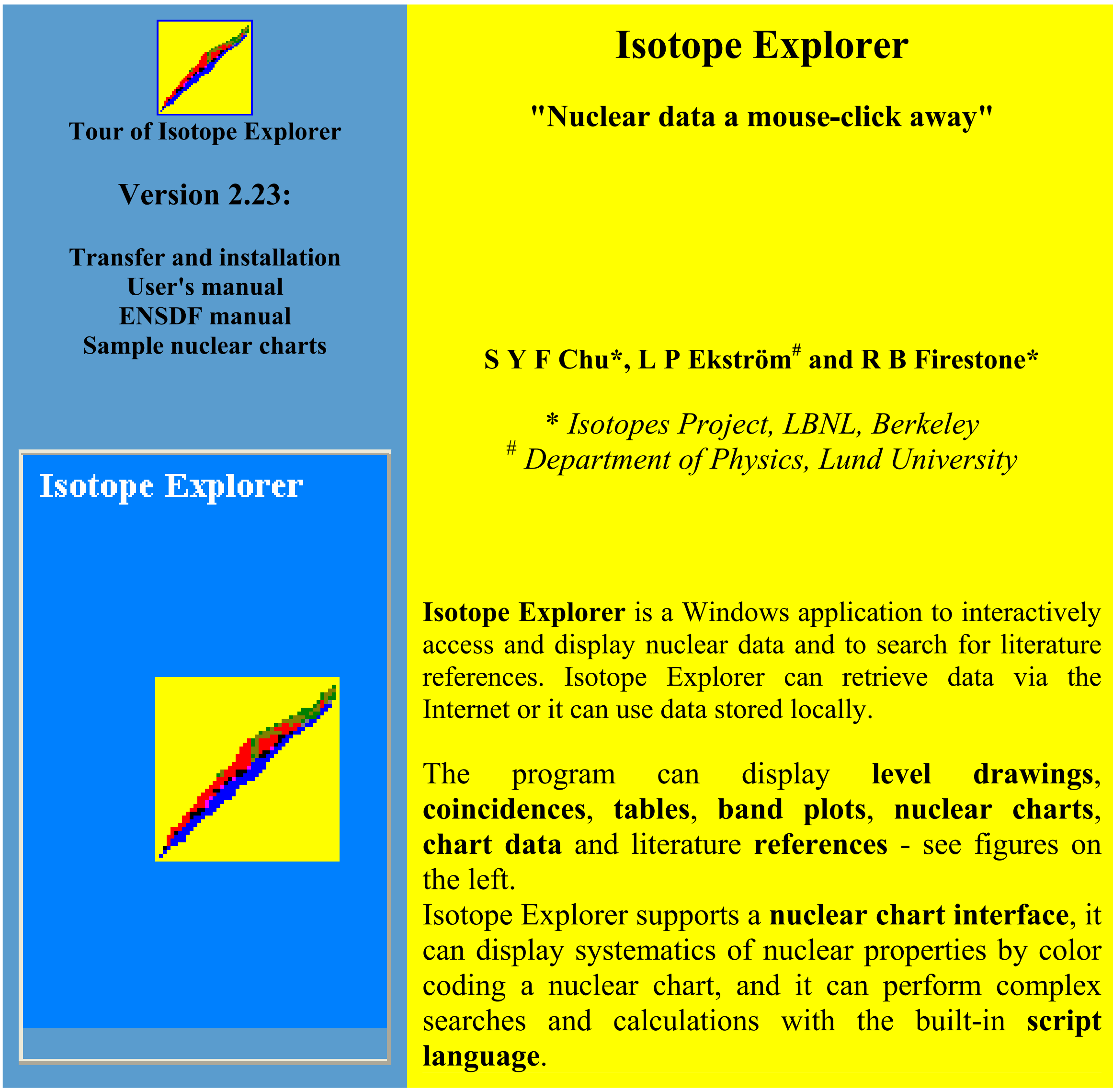


FIG. 8.6 Tour of Isotope Explorer 2.2.

The user can open an ENSDF file directly from the Isotope Explorer file menu. Fig. 8.7 shows an example of a level scheme display for the ^{24}Mg(n, γ) reaction. Only the lowest tier of gamma rays is shown, and the user must scroll through the display to see gamma rays from the capture state. Different displays can be chosen with the Addview menu. A tabular display is shown in Fig. 8.8. Other features including plots and chart generation are described in the Isotope Explorer manual.

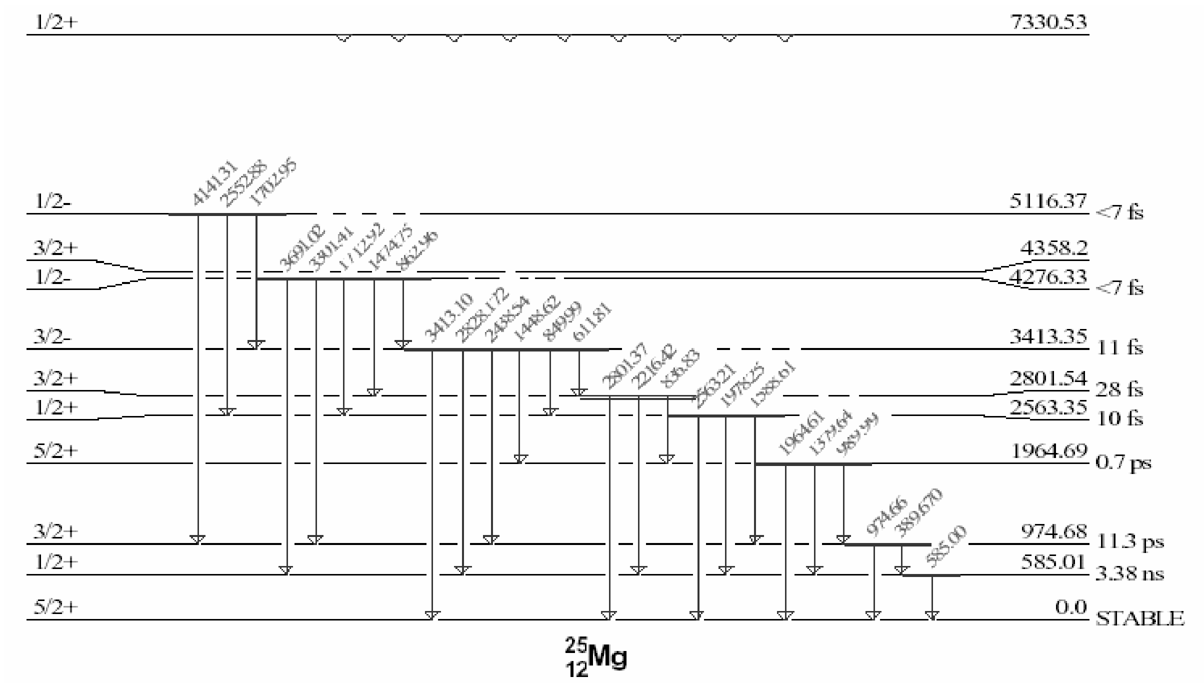


FIG. 8.7 Level scheme displayed with Isotope Explorer: gamma rays are displayed in tiers that can be scrolled through.

Gammas for ^{25}Mg: ^{24}Mg(n,γ) E=thermal

General Comments

SIGMAN=0.051 5 (1981MUZQ)

I_γ Normalization: NORMALIZATION FROM 1992WA06.

E_γ	E_{level}	$J\pi_i$	$J\pi_f$	Mult‡	δ‡	I_γ†	$T_{1/2}$
389.670 *21*	974.68 *3*	3/2+	1/2+	M1+E2	+0.13 *3*	0.00586 *24*	11.3 ps *3*
585.00 *3*	585.01 *3*	1/2+	5/2+	E2(+M3)	≈0	0.0314 *11*	3.38 ns *5*
611.81 *9*	3413.35 3	3/2−	3/2+			1.2×10^{-5} *12*	11 fs *4*
836.83 *6*	2801.54 *9*	3/2+	5/2+	M1(+E2)	−0.03 *3*	1.58×10^{-4} *15*	28 fs *7*
849.99 *4*	3413.35 3	3/2−	1/2+			6.6×10^{-5} *11*	11 fs *4*
862.96 *3*	4276.33 *4*	1/2−	3/2−	[M1]		0.000410 *21*	<7 fs
974.66 *3*	974.68 *3*	3/2+	5/2+	M1+E2	+0.36 *2*	0.00663 *24*	11.3 ps *3*
989.99 *10*	1964.69 *10*	5/2+	3/2+	M1+E2	−0.25 *2*	3.9×10^{-5} *8*	0.7 ps *3*
1379.64 *9*	1964.69 *10*	5/2+	1/2+	E2(+M3)	≈0	8.4×10^{-5} *11*	0.7 ps *3*
1448.62 *10*	3413.35 3	3/2−	5/2+			1.2×10^{-5} *12*	11 fs *4*
1474.75 *10*	4276.33 *4*	1/2−	3/2+			1.2×10^{-5} *12*	<7 fs
1588.61 *4*	2563.35 *4*	1/2+	3/2+			0.000250 *23*	10 fs *3*
1702.95 *15*	5116.37 *15*	1/2−	3/2−	M1+E2	+0.09 *7*	3.2×10^{-5} *10*	<7 fs
1712.92 *4*	4276.33 *4*	1/2−	1/2+	E1		0.00118 *7*	<7 fs
1964.61 *10*	1964.69 *10*	5/2+	5/2+	M1+E2	−0.60 *10*	8.1×10^{-5} *18*	0.7 ps *3*
1978.25 3	2563.35 *4*	1/2+	1/2+	M1		0.00111 *5*	10 fs *3*
2214.06 *15*	7330.53 *4*	1/2+	1/2−	[E1]		0.00030 *3*	
2216.42 *9*	2801.54 *9*	3/2+	1/2+			1.9×10^{-4} 3	28 fs *7*
2438.54 3	3413.35 3	3/2−	3/2+	E1(+M2)	≈0	0.00473 *19*	11 fs *4*
2552.88 *15*	5116.37 *15*	1/2−	1/2+	M1(+E2)	−0.19 *9*	2.4×10^{-5} *9*	<7 fs
2563.21 *4*	2563.35 *4*	1/2+	5/2+	[E2]		5.5×10^{-5} *16*	10 fs *3*
2801.37 *9*	2801.54 *9*	3/2+	5/2+	M1+E2	−0.64 8	1.31×10^{-4} *16*	28 fs *7*
2828.172 *25*	3413.35 3	3/2−	1/2+	E1(+M2)	≈0	0.0240 *8*	11 fs *4*

FIG. 8.8 Display of gamma-ray data as listed by Isotope Explorer.

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APPENDIX I

BUDAPEST REACTOR GAMMA-RAY CROSS-SECTION DATA

Zs. Révay, G.L. Molnár

The following table contains isotopic gamma-ray energy and thermal neutron radiative cross sections measured with the thermal neutron beam at the Budapest Reactor. Only transitions with $\sigma_\gamma^z(E_\gamma)$ larger than 5% of the highest cross section for gamma rays ≥ 100 keV are listed for each element. The complete set of data is available on the CD-ROM accompanying this document. These data are discussed in greater detail in Chapter 6.

Eγ-keV	σ_γ^z(Eγ)-barns
Hydrogen	
2223.2590(10)	0.3326(7)
Deuterium	
6250.2(1)	0.000492(25)
Lithium	
980.48(4)	0.00410(14)
1051.81(5)	0.00410(12)
2032.300(20)	0.0387(12)
7246.7(3)	0.0024(3)
Beryllium	
853.631(11)	0.00165(15)
2590.014(25)	0.00188(17)
3367.48(4)	0.0029(3)
3443.42(4)	0.00099(9)
6809.58(10)	0.0062(6)
Boron	
480(3)	713.0(23)
Carbon	
1261.71(6)	0.00123(3)
3684.02(7)	0.00117(4)
4945.30(7)	0.00270(8)
Nitrogen	
1678.24(3)	0.00625(9)
1681.17(4)	0.00130(4)
1884.85(3)	0.01450(18)
1999.69(3)	0.00321(5)
2520.45(4)	0.00425(8)
2830.80(5)	0.00133(4)
3531.98(5)	0.00686(12)
3677.80(5)	0.01140(15)
4508.69(6)	0.01290(21)
5268.98(7)	0.0237(4)
5297.66(15)	0.0167(3)
5533.25(8)	0.01570(25)
5561.95(8)	0.00863(15)
6322.30(9)	0.0149(3)
7298.90(10)	0.00772(16)
8310.17(13)	0.00336(9)
9149.24(17)	0.00133(6)
10829.10(21)	0.0107(4)
Oxygen	
870.68(3)	1.75(11)E-4
1087.71(3)	1.51(9)E-4
2184.38(4)	1.75(11)E-4
3272.11(7)	3.53(25)E-5
Fluorine	
166.61(3)	0.000405(20)
556.29(3)	2.01(10)E-4
583.493(22)	0.00352(15)
655.942(22)	0.00196(9)
661.71(4)	2.25(14)E-4
665.137(23)	0.00150(7)
822.64(3)	2.21(12)E-4
983.467(25)	0.00117(5)
1045.96(4)	1.84(12)E-4
1056.70(3)	0.00096(4)
1148.02(5)	0.000252(16)
1309.12(3)	0.00076(4)
1387.82(3)	0.00079(4)
1542.47(5)	0.000265(17)
1843.68(4)	0.00059(3)
2143.20(7)	1.94(14)E-4
2427.83(11)	1.87(18)E-4
2431.04(7)	0.00041(3)
2529.21(6)	0.00065(4)
3014.61(7)	0.000407(25)
3051.56(10)	0.000301(23)
3112.88(9)	2.17(16)E-4
3488.15(8)	0.00077(5)
3586.23(14)	0.00026(3)
3589.42(15)	2.0(3)E-4
3964.85(10)	0.00039(3)
4556.90(11)	0.00044(3)
5033.53(11)	0.00070(4)
5279.42(13)	0.00042(4)
5291.46(15)	2.3(3)E-4
5543.70(13)	0.00039(4)
5616.88(16)	1.76(15)E-4
6017.04(11)	0.00094(6)
6600.39(11)	0.00099(5)
Sodium	
90.979(16)	0.235(3)
472.222(13)	0.478(4)
869.221(17)	0.1080(13)
874.399(18)	0.0759(11)
1636.23(4)	0.0250(7)
2025.15(5)	0.0338(9)
2208.27(5)	0.0254(7)
2517.59(5)	0.0695(11)
2752.27(7)	0.0654(12)
3587.31(7)	0.0596(12)
3981.15(8)	0.0678(12)
6395.05(13)	0.1010(20)
Magnesium	
389.64(3)	0.0058(3)
584.936(24)	0.0316(15)
974.61(3)	0.0067(3)
1003.05(3)	0.00165(8)
1129.42(3)	0.0090(4)
1808.62(6)	0.0181(8)
2438.42(9)	0.00459(22)
2828.12(10)	0.0239(11)
2881.52(11)	0.00279(15)
3053.85(12)	0.0083(4)
3301.29(13)	0.0063(3)
3413.04(14)	0.00400(20)
3561.14(14)	0.00252(13)
3831.25(16)	0.00408(20)
3916.65(16)	0.0314(15)
5451.79(23)	0.00205(12)
8153.4(4)	0.00271(19)
Aluminum	
831.41(5)	0.00269(7)
982.94(4)	0.00902(14)
1013.57(4)	0.00555(10)
1408.27(4)	0.00640(13)
1526.12(4)	0.00339(9)
1589.59(4)	0.00247(7)
1622.90(3)	0.00989(15)
1927.44(4)	0.00262(7)
2108.19(4)	0.00549(11)
2138.82(4)	0.00424(9)
2271.77(4)	0.00396(10)

Eγ-keV	σ_γ^z(Eγ)-barns
2282.71(4)	0.00890(17)
2577.53(5)	0.00412(10)
2590.10(5)	0.00807(16)
2625.67(5)	0.00264(6)
2821.31(6)	0.00752(15)
3033.75(6)	0.0179(3)
3464.87(8)	0.0146(3)
3590.93(9)	0.01000(21)
3848.95(10)	0.00699(17)
3875.35(10)	0.00618(14)
4133.20(10)	0.0149(3)
4259.35(11)	0.0153(3)
4659.81(13)	0.00605(16)
4690.48(13)	0.01090(24)
4733.63(14)	0.0126(3)
4902.89(14)	0.00716(18)
5133.99(15)	0.00722(23)
5410.79(16)	0.00481(19)
5585.38(19)	0.00279(12)
6101.54(19)	0.00570(21)
6315.91(20)	0.00500(20)
7693.1(3)	0.0081(3)
7723.78(25)	0.0493(15)
Silicon	
1273.38(3)	0.0289(6)
2092.91(3)	0.0330(6)
3538.98(5)	0.1180(20)
3660.73(6)	0.00705(21)
4933.83(7)	0.1120(23)
5106.60(10)	0.0065(3)
6379.75(11)	0.0210(6)
7199.02(13)	0.0127(4)
Phosphorus	
77.992(23)	0.059(3)
512.650(18)	0.079(4)
636.570(17)	0.0310(14)
1071.154(20)	0.0248(12)
1322.639(25)	0.00526(25)
1676.81(3)	0.00402(20)
1941.01(4)	0.00411(20)
2114.32(4)	0.0114(5)
2151.42(4)	0.0099(5)
2156.74(4)	0.0127(6)
2585.82(5)	0.0088(4)
2885.89(5)	0.0064(3)
3057.94(6)	0.0109(5)
3273.87(7)	0.0084(4)
3522.49(7)	0.0224(11)
3899.65(8)	0.0301(14)
4199.70(9)	0.0057(3)
4364.24(9)	0.0074(4)
4660.97(10)	0.0057(3)
4671.21(9)	0.0199(10)

Eγ-keV	σ_γ^z(Eγ)-barns
5265.46(11)	0.0060(3)
5705.41(13)	0.00447(25)
6785.30(14)	0.0276(14)
7422.08(17)	0.0086(5)
Sulfur	
841.013(14)	0.348(6)
2379.50(4)	0.208(3)
2753.09(5)	0.0277(5)
2930.59(5)	0.0832(13)
3220.36(6)	0.1240(20)
3369.48(6)	0.0272(5)
4430.28(9)	0.0263(6)
4869.19(9)	0.0652(13)
5420.24(10)	0.309(7)
Chlorine	
517.077(8)	7.43(7)
786.18(15)	3.6(17)
788.37(21)	4.9(23)
1131.180(15)	0.634(10)
1162.56(5)	0.71(3)
1164.831(12)	8.92(7)
1601.055(14)	1.230(15)
1951.150(15)	6.49(5)
1959.359(16)	4.18(4)
2676.11(3)	0.524(10)
2863.76(3)	1.830(25)
3061.76(3)	1.110(19)
4979.75(5)	1.260(24)
5517.13(8)	0.578(17)
5715.16(7)	1.86(4)
6110.71(7)	7.37(11)
6619.58(8)	2.75(4)
6627.87(8)	1.56(3)
6977.75(10)	0.794(21)
7413.92(10)	3.57(6)
7790.28(11)	2.89(6)
8578.58(15)	0.93(3)
Potassium	
770.325(23)	0.903(12)
1158.880(24)	0.1600(25)
1247.20(3)	0.0784(13)
1303.42(3)	0.0550(12)
1613.76(3)	0.1190(20)
1618.98(3)	0.1300(21)
2007.71(4)	0.0513(12)
2017.49(4)	0.0540(12)
2039.94(4)	0.0519(13)
2047.33(4)	0.0537(13)
2073.67(4)	0.1370(24)
2290.64(5)	0.0582(13)
2545.92(6)	0.0536(12)
3055.30(7)	0.0464(12)
3545.64(9)	0.0746(18)

Eγ-keV	σ_γ^z(Eγ)-barns
4135.58(9)	0.0563(17)
4360.22(9)	0.0776(21)
5379.96(12)	0.146(4)
5695.45(13)	0.114(3)
5751.76(13)	0.108(3)
Calcium	
519.56(8)	0.0503(13)
1942.68(3)	0.352(7)
2001.31(3)	0.0659(15)
2009.84(3)	0.0409(10)
3609.84(9)	0.0284(9)
4418.50(12)	0.0708(18)
5899.99(20)	0.0258(12)
6419.69(21)	0.176(5)
Scandium	
52.049(21)	0.87(3)
142.627(16)	4.88(7)
147.114(16)	6.08(9)
216.475(17)	2.49(4)
227.860(16)	7.13(11)
228.806(16)	3.31(5)
295.343(19)	3.97(11)
486.054(21)	0.593(14)
539.466(25)	0.738(19)
547.14(3)	0.373(12)
554.555(23)	1.82(4)
584.80(3)	1.77(3)
627.477(22)	2.23(5)
721.78(3)	0.487(15)
773.834(22)	0.572(13)
807.74(3)	0.523(13)
860.66(3)	0.396(13)
1123.41(5)	0.380(14)
1166.60(4)	0.386(14)
1285.31(9)	0.373(19)
1335.04(3)	0.640(22)
1618.16(7)	0.362(19)
1693.35(5)	0.465(19)
1857.62(6)	0.393(17)
4974.54(10)	0.498(24)
5267.04(10)	0.38(3)
5896.90(17)	0.42(3)
6170.24(16)	0.47(5)
6317.64(25)	0.58(4)
6349.4(3)	0.53(4)
6556.82(14)	0.384(24)
6839.73(11)	0.95(4)
7117.01(18)	0.39(3)
7635.42(20)	0.40(3)
8132.37(18)	0.48(3)
8175.07(10)	1.80(6)
8315.75(16)	0.41(3)
8532.07(12)	0.89(4)

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
Titanium	
341.69(3)	1.840(21)
1381.74(3)	5.18(12)
1498.65(3)	0.297(5)
1585.95(3)	0.624(8)
1762.02(3)	0.311(4)
4881.24(6)	0.308(7)
6418.35(8)	1.96(6)
6555.87(9)	0.334(8)
6760.01(9)	2.97(9)
Vanadium	
125.23(3)	1.61(4)
148.09(3)	0.253(6)
295.196(25)	0.164(4)
419.624(24)	0.249(6)
436.765(23)	0.397(9)
645.789(22)	0.769(17)
793.614(23)	0.199(5)
823.26(3)	0.320(8)
846.046(24)	0.252(7)
1358.52(3)	0.151(5)
1558.89(3)	0.323(8)
1778.02(13)	0.169(13)
2145.88(7)	0.140(4)
4117.10(21)	0.094(4)
5142.40(14)	0.200(6)
5210.18(16)	0.244(20)
5515.90(17)	0.39(4)
5752.27(14)	0.366(24)
5892.46(15)	0.126(7)
6465.09(18)	0.43(4)
6517.62(15)	0.78(4)
6874.48(20)	0.49(6)
7163.17(18)	0.59(4)
7294.13(23)	0.089(5)
7310.98(21)	0.227(9)
Chromium	
564.14(3)	0.1130(20)
749.10(3)	0.569(9)
834.80(3)	1.38(3)
1784.41(4)	0.177(3)
1898.90(4)	0.0851(21)
2238.78(4)	0.185(3)
2320.80(4)	0.136(3)
5617.37(10)	0.132(5)
6134.19(12)	0.078(4)
7361.09(14)	0.091(4)
7373.85(15)	0.080(4)
7937.86(12)	0.424(11)
8482.84(14)	0.168(7)
8510.68(14)	0.231(8)
Manganese	
83.884(23)	3.11(5)
104.611(23)	1.74(3)
188.521(22)	0.330(6)
212.039(21)	2.13(3)
215.150(22)	0.168(3)
230.096(24)	0.193(4)
271.198(22)	0.94(6)
314.398(20)	1.460(20)
335.502(24)	0.147(3)
375.192(22)	0.124(3)
454.378(21)	0.388(7)
459.754(23)	0.210(5)
2043.99(5)	0.243(5)
2062.81(4)	0.179(5)
2175.91(5)	0.111(4)
2294.42(7)	0.112(6)
2330.55(7)	0.191(8)
3267.17(7)	0.188(6)
3408.61(5)	0.303(10)
4566.56(10)	0.197(9)
4689.14(11)	0.120(9)
4724.84(8)	0.281(10)
4949.21(8)	0.274(10)
5014.37(7)	0.737(20)
5034.60(15)	0.108(8)
5067.87(9)	0.265(12)
5180.89(8)	0.412(13)
5253.98(12)	0.132(13)
5527.08(8)	0.788(22)
5761.23(11)	0.200(12)
5920.39(8)	1.06(3)
6104.29(12)	0.213(10)
6783.74(12)	0.378(17)
6929.22(13)	0.248(12)
7057.89(9)	1.22(3)
7159.63(10)	0.643(24)
7243.52(9)	1.36(3)
7270.14(12)	0.362(15)
Iron	
122.078(22)	0.096(3)
352.332(16)	0.273(3)
366.737(16)	0.0497(7)
691.914(16)	0.1370(18)
898.14(3)	0.0540(10)
1018.860(21)	0.0507(11)
1260.353(21)	0.0684(11)
1612.77(3)	0.1530(22)
1725.255(24)	0.181(3)
2721.18(5)	0.0384(13)
3267.30(6)	0.0367(13)
3413.14(6)	0.0449(14)
3436.57(13)	0.045(4)
3854.17(7)	0.0333(12)
4217.93(6)	0.099(3)
4405.90(7)	0.0453(13)
4809.70(8)	0.0416(13)
5920.25(8)	0.225(5)
6018.29(8)	0.227(5)
7278.83(10)	0.137(4)
7631.05(9)	0.653(13)
7645.48(9)	0.549(11)
9297.90(21)	0.0747(25)
Cobalt	
58.90(22)	0.392(4)
158.519(12)	1.200(15)
229.811(12)	7.18(8)
254.371(12)	1.290(16)
277.199(11)	6.77(8)
391.221(12)	1.080(14)
435.671(12)	0.789(10)
447.717(11)	3.41(4)
461.064(15)	0.519(9)
484.284(11)	0.804(11)
497.264(13)	2.16(4)
555.941(10)	5.76(6)
710.493(16)	0.660(12)
717.302(14)	0.845(14)
726.616(21)	0.448(10)
785.614(17)	2.41(7)
901.148(18)	0.418(9)
930.47(5)	0.408(22)
1215.965(20)	0.520(9)
1507.28(3)	0.463(9)
1515.695(25)	1.740(25)
1830.77(3)	1.700(23)
1852.70(3)	0.456(10)
2032.74(4)	0.393(11)
3748.76(7)	0.415(13)
4906.06(17)	0.43(3)
5181.14(12)	0.912(23)
5269.92(12)	0.404(11)
5602.39(10)	0.434(16)
5614.04(10)	0.399(15)
5638.55(10)	0.379(15)
5660.68(16)	1.89(6)
5742.16(9)	0.766(23)
5925.39(10)	0.643(18)
5975.60(22)	2.9(4)
6486.17(13)	2.32(5)
6705.52(10)	3.02(6)
6876.76(11)	3.02(6)
6984.9(4)	1.05(13)
7055.43(12)	0.666(19)
7203.02(13)	0.369(16)
7214.09(12)	1.38(3)
7491.29(12)	1.16(3)

Eγ-keV	σ_γ^z(Eγ)-barns
Nickel	
282.940(18)	0.211(3)
339.370(18)	0.1660(21)
464.972(18)	0.843(10)
877.984(19)	0.236(3)
5817.17(6)	0.1090(24)
6583.78(7)	0.0837(21)
6837.44(6)	0.458(8)
7536.56(8)	0.191(4)
7819.55(8)	0.337(6)
8120.60(9)	0.133(3)
8533.45(8)	0.721(13)
8998.31(9)	1.49(3)
Copper	
88.86(3)	0.0970(17)
159.02(3)	0.649(8)
185.66(3)	0.244(3)
202.69(3)	0.1940(25)
277.993(25)	0.893(12)
343.651(25)	0.215(3)
384.27(3)	0.0701(11)
385.37(3)	0.1310(18)
464.857(25)	0.1350(21)
467.74(3)	0.0673(13)
503.45(3)	0.0596(10)
579.48(3)	0.0899(14)
608.52(3)	0.266(5)
648.53(3)	0.101(3)
662.67(5)	0.067(5)
5417.60(9)	0.0564(23)
6009.96(18)	0.0453(25)
6600.08(13)	0.078(5)
6674.12(13)	0.0534(24)
6679.64(11)	0.067(3)
6987.99(9)	0.092(3)
7175.93(12)	0.070(4)
7252.10(11)	0.114(5)
7306.25(9)	0.245(6)
7571.23(14)	0.047(3)
7636.75(9)	0.428(9)
7915.00(9)	0.869(16)
Zinc	
53.97(3)	0.0225(20)
61.2530(20)	0.055(5)
93.386(22)	0.0343(8)
115.256(23)	0.167(3)
153.124(22)	0.0322(6)
184.665(20)	0.0321(4)
300.317(25)	0.0202(6)
751.68(3)	0.0307(10)
834.78(3)	0.0372(12)
855.66(8)	0.066(6)
909.65(4)	0.0186(8)

Eγ-keV	σ_γ^z(Eγ)-barns
1007.806(25)	0.0557(15)
1077.336(17)	0.356(5)
1126.10(3)	0.0224(7)
1261.17(3)	0.0433(11)
1340.15(3)	0.0431(13)
1673.46(5)	0.0255(11)
1883.11(4)	0.0726(22)
2210.12(9)	0.0270(13)
4137.28(12)	0.0196(23)
5473.74(12)	0.040(4)
6867.51(17)	0.0243(17)
6910.92(16)	0.0192(14)
6958.45(12)	0.042(3)
7069.17(17)	0.0217(14)
7863.54(11)	0.141(5)
Gallium	
88.97(3)	0.0306(9)
103.25(3)	0.0525(11)
112.46(3)	0.155(3)
145.24(3)	0.465(7)
153.90(3)	0.0319(8)
181.60(7)	0.037(4)
184.13(3)	0.1040(21)
187.84(3)	0.1080(21)
192.09(3)	0.194(3)
194.67(3)	0.1060(21)
198.00(3)	0.1330(24)
211.08(3)	0.0343(8)
212.58(3)	0.0582(12)
229.06(3)	0.0377(10)
248.95(4)	0.140(10)
264.02(4)	0.0238(9)
266.09(4)	0.0361(11)
315.95(4)	0.0275(9)
318.87(3)	0.0592(14)
374.37(4)	0.0303(10)
390.64(3)	0.0477(12)
393.26(3)	0.1340(23)
411.11(3)	0.0384(11)
508.19(3)	0.349(6)
651.09(3)	0.1030(22)
690.943(24)	0.305(4)
1140.37(4)	0.0422(16)
1203.40(6)	0.0286(14)
1311.89(6)	0.0259(12)
4839.99(13)	0.040(3)
5194.5(3)	0.033(3)
5233.47(14)	0.0341(20)
5334.13(18)	0.0271(18)
5340.59(14)	0.0409(22)
5488.31(17)	0.0296(19)
5601.79(15)	0.063(4)
6008.11(14)	0.070(5)

Eγ-keV	σ_γ^z(Eγ)-barns
6111.19(16)	0.056(4)
6128.73(23)	0.024(3)
6360.02(13)	0.138(5)
6513.06(18)	0.0325(20)
Germanium	
175.05(3)	0.164(4)
253.22(3)	0.0609(16)
325.74(3)	0.0649(18)
492.989(22)	0.133(3)
499.966(22)	0.158(4)
595.879(20)	1.100(24)
608.375(21)	0.250(6)
701.490(24)	0.0642(19)
708.14(3)	0.0821(23)
867.940(23)	0.553(12)
961.04(4)	0.129(4)
999.78(3)	0.0581(19)
1101.22(3)	0.134(3)
1105.56(3)	0.0708(20)
1204.14(4)	0.141(4)
1471.75(5)	0.083(3)
Arsenic	
74.88(8)	0.12(3)
86.83(3)	0.579(11)
116.91(7)	0.107(18)
117.58(10)	0.071(18)
120.28(3)	0.402(8)
122.26(3)	0.227(5)
127.55(3)	0.096(3)
135.48(3)	0.156(4)
141.24(4)	0.0625(21)
144.60(3)	0.1000(22)
157.79(8)	0.117(24)
165.09(3)	0.996(16)
178.16(3)	0.0979(23)
187.94(4)	0.090(3)
198.70(3)	0.089(3)
211.18(3)	0.113(3)
221.60(4)	0.0534(25)
225.76(3)	0.0803(24)
235.84(3)	0.181(4)
263.88(5)	0.18(4)
281.56(6)	0.085(20)
297.55(4)	0.055(3)
300.44(5)	0.051(3)
352.41(4)	0.071(3)
357.36(4)	0.074(3)
363.94(4)	0.059(3)
402.64(4)	0.061(3)
426.62(3)	0.100(3)
471.05(3)	0.203(5)
473.21(3)	0.176(5)
550.48(4)	0.071(3)

Eγ-keV	$\sigma_{\gamma}^{z}(E\gamma)$-barns
6295.2(4)	0.064(6)
6810.11(21)	0.160(8)
6926.22(22)	0.061(4)
7020.0(3)	0.104(7)
Selenium	
87.87(3)	0.210(4)
139.28(3)	0.542(9)
161.99(3)	0.855(22)
200.50(4)	0.240(10)
239.06(3)	2.06(3)
249.85(3)	0.539(9)
281.68(3)	0.125(4)
286.62(3)	0.280(6)
297.26(3)	0.338(7)
439.52(3)	0.320(8)
467.77(4)	0.128(4)
484.45(4)	0.125(4)
518.21(4)	0.274(7)
520.68(3)	1.270(19)
578.85(3)	0.244(5)
613.72(3)	2.14(5)
694.88(3)	0.444(10)
755.34(3)	0.186(4)
817.86(4)	0.175(5)
885.40(4)	0.262(7)
888.84(4)	0.180(5)
1005.01(4)	0.118(5)
1240.06(5)	0.109(5)
1296.92(4)	0.241(7)
1308.60(4)	0.317(9)
1411.51(9)	0.117(6)
1713.48(6)	0.159(7)
1995.83(6)	0.123(6)
4526.6(3)	0.118(8)
4565.5(3)	0.163(12)
5025.57(12)	0.141(12)
5600.89(13)	0.287(14)
5795.65(17)	0.112(15)
6006.85(13)	0.269(16)
6232.01(17)	0.177(17)
6413.36(15)	0.184(15)
6600.67(12)	0.613(20)
7179.51(15)	0.237(19)
7418.52(14)	0.342(13)
9188.42(21)	0.128(8)
9883.30(22)	0.180(10)
Bromine	
59.57(3)	0.202(5)
195.64(3)	0.434(14)
211.62(4)	0.0454(21)
219.37(3)	0.399(14)
223.64(3)	0.153(5)
234.32(3)	0.205(10)

Eγ-keV	$\sigma_{\gamma}^{z}(E\gamma)$-barns
244.31(4)	0.45(3)
245.23(3)	0.80(3)
271.39(3)	0.462(7)
274.54(3)	0.158(3)
287.76(3)	0.253(4)
294.32(3)	0.1160(22)
299.95(16)	0.08(8)
315.05(3)	0.460(9)
343.42(4)	0.118(4)
345.09(4)	0.154(4)
366.58(4)	0.233(6)
389.10(4)	0.0486(13)
432.20(3)	0.0783(14)
452.69(6)	0.0679(24)
459.76(6)	0.0455(19)
468.91(4)	0.29(3)
512.22(5)	0.21(3)
542.39(4)	0.114(5)
549.45(3)	0.0593(14)
565.98(4)	0.0551(12)
608.70(4)	0.0438(13)
660.38(6)	0.082(3)
684.84(5)	0.050(3)
689.87(4)	0.083(4)
701.97(4)	0.0648(14)
715.93(4)	0.0420(23)
765.75(5)	0.0537(16)
830.72(4)	0.0413(12)
860.41(7)	0.0450(19)
914.25(4)	0.0508(14)
976.41(4)	0.0459(13)
1248.78(12)	0.0527(22)
7030.72(15)	0.0447(22)
7077.34(14)	0.0566(24)
7422.40(14)	0.0495(18)
7576.27(14)	0.108(3)
Rubidium	
113.75(3)	0.00535(14)
196.34(3)	0.00964(19)
421.494(23)	0.0259(5)
487.89(3)	0.0494(12)
514.55(3)	0.00653(20)
536.50(3)	0.0167(5)
538.66(3)	0.0169(5)
555.61(3)	0.0407(10)
556.81(3)	0.0913(24)
638.82(6)	0.0101(13)
691.57(3)	0.00725(18)
872.93(3)	0.0321(5)
881.53(4)	0.00480(17)
913.12(4)	0.00497(15)
1026.35(3)	0.0218(4)
1032.32(3)	0.0227(4)

Eγ-keV	$\sigma_{\gamma}^{z}(E\gamma)$-barns
1105.51(4)	0.0151(3)
1304.45(4)	0.0204(5)
1389.31(5)	0.00809(21)
1666.78(6)	0.00774(23)
6065.00(25)	0.0047(3)
6471.30(25)	0.0049(3)
6520.7(3)	0.0064(4)
6832.2(3)	0.0064(4)
7346.0(3)	0.0059(3)
7624.1(3)	0.0114(5)
Strontium	
388.526(22)	0.0517(9)
585.610(20)	0.0704(14)
850.671(17)	0.275(4)
898.063(16)	0.703(10)
1218.548(24)	0.0597(13)
1717.81(3)	0.0672(15)
1836.05(3)	1.030(18)
3009.34(7)	0.0579(16)
6266.82(17)	0.075(3)
6660.38(18)	0.064(3)
7527.58(20)	0.067(3)
Yttrium	
202.58(4)	0.291(4)
574.13(4)	0.172(4)
776.64(3)	0.659(9)
1211.56(4)	0.0447(12)
1371.09(6)	0.0400(12)
4107.52(6)	0.0518(17)
6080.12(7)	0.754(13)
Zirconium	
160.94(10)	0.0111(7)
266.78(7)	0.0091(5)
448.13(7)	0.0067(3)
560.91(6)	0.0285(5)
844.08(7)	0.0095(4)
912.71(7)	0.0117(5)
934.47(6)	0.125(5)
1102.67(6)	0.0235(8)
1132.10(7)	0.0100(7)
1206.89(8)	0.0417(25)
1405.02(6)	0.0301(10)
1847.78(15)	0.0084(8)
5262.7(4)	0.0064(8)
6294.86(18)	0.0279(20)
Niobium	
78.63(3)	0.0169(3)
99.41(3)	0.196(9)
113.39(3)	0.117(3)
161.24(3)	0.0190(5)
253.135(23)	0.1320(19)
255.957(23)	0.176(3)
293.223(25)	0.0651(16)

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
309.926(25)	0.0690(17)
329.19(3)	0.0108(4)
337.48(4)	0.054(6)
458.47(3)	0.0240(5)
499.48(3)	0.0648(18)
518.16(3)	0.0579(13)
527.64(5)	0.0127(7)
562.29(5)	0.0293(11)
689.78(4)	0.0164(6)
751.69(5)	0.0143(6)
755.30(5)	0.0123(6)
775.75(4)	0.0158(6)
835.75(4)	0.0376(8)
878.99(8)	0.0191(17)
883.74(5)	0.0192(7)
894.27(5)	0.0185(7)
896.96(6)	0.0144(7)
911.61(5)	0.0176(7)
957.27(4)	0.0248(7)
1121.9(3)	0.0106(13)
1129.01(10)	0.0175(15)
1192.10(7)	0.0137(7)
1206.48(8)	0.0284(10)
1223.01(10)	0.0121(7)
1228.40(11)	0.0114(7)
1239.54(10)	0.0096(7)
1291.47(8)	0.0097(7)
1392.82(9)	0.0105(8)
1459.99(10)	0.0095(6)
4739.39(23)	0.0153(9)
5070.5(3)	0.0102(8)
5103.62(24)	0.0232(12)
5193.8(3)	0.0114(8)
5496.46(25)	0.0205(14)
5895.3(3)	0.0183(8)
6831.7(3)	0.0175(8)
7186.6(3)	0.0089(6)
Molybdenum	
608.753(18)	0.121(4)
719.523(17)	0.310(10)
736.814(16)	0.119(4)
778.221(10)	2.02(6)
787.398(15)	0.168(5)
847.605(12)	0.324(9)
1091.298(25)	0.201(6)
1200.13(4)	0.124(4)
1497.65(5)	0.122(4)
6918.7(4)	0.106(6)
Ruthenium	
475.0950(10)	0.98(9)
539.522(11)	1.53(13)
627.974(16)	0.176(16)
631.24(3)	0.30(3)

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
686.890(13)	0.52(5)
822.610(19)	0.137(12)
1046.4980(20)	0.103(9)
1103.03(3)	0.100(9)
1341.52(3)	0.137(12)
1362.02(7)	0.111(13)
1627.24(3)	0.129(12)
1959.33(3)	0.210(19)
6627.84(14)	0.093(9)
7790.53(16)	0.132(13)
Rhodium	
51.34(4)	14.6(16)
85.19(3)	3.2(3)
96.99(3)	20.1(4)
100.68(3)	4.96(10)
127.21(3)	5.27(21)
134.54(3)	6.8(4)
169.26(7)	2.88(19)
177.64(4)	1.85(12)
180.73(3)	22.6(12)
185.93(3)	1.50(5)
202.69(5)	1.6(3)
212.92(3)	1.27(3)
215.35(3)	6.74(12)
217.75(3)	7.38(13)
266.60(3)	2.66(14)
269.17(3)	1.42(11)
323.79(10)	1.54(19)
333.44(3)	3.27(8)
374.79(3)	1.300(25)
420.61(3)	2.06(4)
440.52(3)	2.23(10)
470.41(3)	2.61(7)
482.24(3)	1.78(6)
786.94(4)	1.16(3)
5917.04(14)	1.31(4)
Palladium	
113.47(3)	0.335(5)
245.128(24)	0.250(4)
325.310(23)	0.208(3)
511.847(13)	4.00(4)
616.219(15)	0.628(9)
717.349(14)	0.777(9)
1045.77(3)	0.321(7)
1050.30(3)	0.360(8)
1127.99(3)	0.323(6)
1572.57(9)	0.22(3)
Silver	
78.91(4)	3.90(12)
105.61(5)	0.76(4)
113.51(6)	0.52(3)
117.45(3)	3.84(7)
191.39(3)	1.81(5)

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
192.90(3)	2.20(6)
195.34(4)	0.50(3)
198.52(3)	7.75(13)
201.31(6)	0.45(3)
206.46(3)	3.58(7)
215.15(4)	1.55(3)
235.62(3)	4.62(7)
236.85(4)	1.95(3)
259.17(3)	1.560(25)
267.08(3)	2.73(6)
270.00(4)	0.565(25)
286.91(4)	0.400(25)
294.39(3)	2.05(12)
299.95(3)	1.15(5)
328.99(3)	0.795(12)
338.742(25)	0.595(10)
349.95(3)	0.70(4)
357.77(5)	0.561(22)
360.39(3)	1.55(3)
378.12(5)	0.744(20)
380.90(3)	1.59(3)
408.61(3)	0.459(9)
465.37(6)	0.46(3)
495.714(25)	1.080(18)
524.473(25)	0.804(11)
536.125(24)	1.090(16)
549.560(23)	1.540(24)
586.81(3)	0.459(8)
593.88(3)	0.484(11)
620.08(4)	0.40(5)
626.41(4)	0.39(6)
632.95(3)	0.42(12)
657.741(22)	2.36(3)
724.75(4)	0.393(14)
750.77(3)	0.529(11)
1013.11(3)	0.698(13)
5701.49(20)	0.716(18)
5795.02(24)	0.513(14)
6058.03(22)	0.663(19)
Cadmium	
558.32(3)	1860(30)
576.04(3)	107.0(17)
651.19(3)	358(5)
725.19(3)	107.0(13)
805.85(3)	134.0(18)
1209.65(4)	122.0(19)
1364.30(4)	123.0(21)
1399.54(4)	97.7(15)
Indium	
60.97(4)	8.6(5)
85.66(4)	11.1(6)
96.11(4)	13.8(7)
126.49(4)	2.05(11)

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
141.17(7)	1.61(24)
155.40(5)	1.38(9)
162.50(4)	15.8(8)
171.16(4)	1.92(10)
173.87(4)	2.30(14)
186.32(4)	14.9(8)
202.58(5)	1.50(9)
235.21(4)	2.75(15)
273.05(4)	18.3(9)
285.00(4)	2.54(14)
291.00(4)	1.42(8)
295.58(4)	1.55(9)
298.72(4)	4.78(25)
321.24(5)	1.28(8)
335.47(4)	4.59(24)
337.84(5)	1.39(8)
375.89(4)	1.47(9)
385.06(4)	6.8(4)
422.23(5)	0.97(6)
433.80(4)	3.62(20)
471.92(4)	2.43(14)
476.13(8)	1.05(7)
492.52(5)	1.87(11)
518.06(5)	1.74(11)
521.62(7)	1.11(8)
548.70(5)	1.14(8)
556.67(4)	2.61(15)
577.45(8)	1.10(10)
602.36(4)	1.60(9)
608.34(4)	1.97(11)
634.03(9)	0.94(7)
693.24(5)	1.02(7)
819.00(6)	1.43(10)
847.50(6)	1.21(8)
5892.38(15)	1.17(9)
Tin	
158.65(6)	0.0145(3)
463.31(6)	0.0128(3)
703.87(7)	0.0078(3)
733.91(6)	0.00925(21)
813.26(7)	0.0071(3)
818.71(6)	0.0127(4)
925.90(6)	0.0097(3)
925.90(6)	0.0097(3)
931.81(6)	0.0111(3)
972.59(6)	0.0158(5)
1171.28(6)	0.0879(13)
1229.64(6)	0.0673(13)
1293.53(6)	0.1340(21)
1356.70(7)	0.0075(3)
2112.17(7)	0.0152(5)
2225.15(18)	0.0082(5)
Antimony	

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
87.83(4)	0.212(6)
88.96(9)	0.0220(25)
101.69(5)	0.0215(11)
103.79(5)	0.0578(18)
105.95(4)	0.161(4)
115.04(4)	0.271(9)
121.64(4)	0.360(8)
124.17(5)	0.0310(14)
133.95(4)	0.0608(19)
138.12(5)	0.0286(12)
141.54(5)	0.0577(18)
143.35(5)	0.0331(14)
148.39(4)	0.257(6)
155.27(5)	0.091(3)
166.56(5)	0.0699(23)
167.73(6)	0.0512(20)
173.91(6)	0.0192(11)
194.20(4)	0.0534(18)
201.70(4)	0.091(3)
204.68(5)	0.0355(15)
232.23(4)	0.0356(12)
233.28(4)	0.0996(24)
246.42(4)	0.0589(16)
252.89(4)	0.0474(14)
255.54(7)	0.027(3)
256.37(8)	0.021(3)
265.51(6)	0.0299(16)
272.36(7)	0.0225(14)
274.22(8)	0.0388(18)
275.72(8)	0.0306(16)
282.73(4)	0.274(7)
286.60(5)	0.0375(17)
288.21(7)	0.0267(18)
313.97(5)	0.0318(18)
322.19(5)	0.0390(20)
330.91(6)	0.058(3)
332.15(5)	0.101(3)
335.09(5)	0.0284(14)
351.57(5)	0.0345(15)
378.14(5)	0.0500(18)
384.55(4)	0.0702(22)
419.95(7)	0.071(8)
485.34(6)	0.0218(15)
491.21(5)	0.0354(16)
513.88(8)	0.0359(21)
542.35(8)	0.0270(20)
546.01(6)	0.0315(20)
555.18(12)	0.024(4)
564.26(5)	0.0532(25)
598.66(5)	0.058(3)
603.49(12)	0.020(3)
631.81(4)	0.0581(16)
746.85(9)	0.034(3)

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
775.58(9)	0.020(3)
824.31(9)	0.040(3)
921.04(4)	0.076(4)
5563.4(3)	0.0200(24)
5868.89(22)	0.035(3)
5885.08(20)	0.055(4)
6009.1(3)	0.020(3)
6048.81(25)	0.0184(25)
6082.94(22)	0.0182(23)
6363.5(3)	0.024(3)
6379.82(22)	0.043(4)
6467.8(4)	0.022(3)
6523.87(18)	0.075(3)
6728.38(23)	0.045(4)
Tellurium	
602.723(12)	2.37(24)
645.823(14)	0.26(3)
722.729(15)	0.52(5)
1488.89(3)	0.120(12)
2746.94(5)	0.138(14)
Iodine	
124.27(4)	0.183(8)
133.59(4)	1.42(6)
142.12(4)	0.156(7)
147.10(4)	0.109(5)
152.99(4)	0.214(9)
156.49(4)	0.118(5)
160.71(4)	0.192(8)
193.54(4)	0.127(5)
224.15(4)	0.095(4)
248.73(4)	0.149(6)
268.32(4)	0.082(4)
301.89(4)	0.229(9)
344.76(4)	0.102(5)
374.27(5)	0.091(5)
385.46(4)	0.087(4)
420.85(5)	0.144(11)
Xenon	
483.77(9)	0.51(7)
536.29(9)	1.71(24)
586.23(10)	0.48(7)
600.22(9)	0.54(8)
630.40(9)	1.38(19)
667.87(9)	6.9(10)
772.76(9)	1.9(3)
1028.88(8)	0.40(6)
1318.00(8)	1.03(14)
6467.02(13)	1.33(19)
Cesium	
59.85(7)	0.443(14)
113.60(7)	0.777(15)
116.21(7)	2.83(4)
118.04(8)	0.230(7)

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
120.42(7)	0.414(10)
130.05(7)	1.410(21)
174.06(7)	0.420(11)
176.21(7)	2.47(4)
186.67(7)	0.282(9)
198.11(7)	1.100(19)
205.43(7)	1.560(25)
211.15(7)	0.223(10)
218.18(7)	0.309(9)
219.57(7)	0.344(9)
234.15(7)	1.070(23)
245.66(7)	0.740(15)
256.44(7)	0.235(8)
260.99(7)	0.401(11)
268.82(7)	0.199(6)
293.15(8)	0.185(9)
295.24(8)	0.231(10)
307.07(7)	1.45(3)
309.52(7)	0.237(9)
316.87(8)	0.149(10)
356.06(7)	0.445(12)
367.54(8)	0.173(8)
377.05(7)	0.310(9)
386.73(7)	0.163(9)
442.66(8)	0.316(12)
450.27(8)	0.99(5)
502.86(8)	0.256(13)
510.81(9)	1.54(3)
518.91(7)	0.349(18)
523.47(17)	0.151(23)
525.08(9)	0.39(3)
529.15(7)	0.519(23)
539.16(7)	0.360(11)
554.51(7)	0.206(9)
557.57(11)	0.142(12)
570.42(7)	0.221(12)
645.53(9)	0.248(13)
648.33(9)	0.233(13)
662.98(9)	0.155(9)
708.20(7)	0.220(11)
911.24(12)	0.177(14)
966.47(10)	0.168(13)
1077.67(9)	0.209(12)
5493.52(23)	0.230(19)
5505.46(20)	0.333(22)
5572.00(25)	0.249(20)
5637.41(23)	0.277(21)
5748.9(3)	0.146(15)
6052.3(3)	0.240(20)
6175.64(22)	0.252(16)
6189.11(24)	0.191(14)
6697.91(24)	0.224(17)

Barium

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
283.67(5)	0.0403(10)
454.78(5)	0.0858(22)
462.80(5)	0.0656(17)
627.30(5)	0.293(6)
732.32(5)	0.0239(7)
818.47(5)	0.212(4)
1009.61(5)	0.0167(5)
1047.74(5)	0.0319(10)
1435.65(6)	0.308(8)
1444.71(6)	0.0799(21)
1550.86(7)	0.0228(8)
1898.47(8)	0.0285(11)
2594.00(10)	0.0185(8)
2639.09(11)	0.0170(8)
3641.22(13)	0.0560(16)
4095.77(15)	0.154(4)
4723.12(18)	0.0262(11)
5730.58(22)	0.0612(20)

Lanthanum

63.26(3)	0.176(6)
155.65(3)	0.192(5)
162.74(3)	0.490(13)
209.29(4)	0.0434(19)
218.30(3)	0.781(21)
235.82(3)	0.111(3)
237.747(24)	0.320(6)
255.49(3)	0.0409(15)
272.420(22)	0.502(8)
280.01(3)	0.0644(25)
283.69(4)	0.0411(25)
288.333(23)	0.729(12)
422.742(23)	0.371(7)
426.51(5)	0.044(3)
478.11(5)	0.0408(22)
495.66(3)	0.081(3)
538.93(5)	0.0455(25)
549.02(3)	0.098(3)
553.19(6)	0.061(4)
567.413(23)	0.335(7)
595.07(3)	0.103(3)
602.02(4)	0.0524(25)
623.60(4)	0.0518(23)
640.62(6)	0.054(3)
658.30(3)	0.103(3)
667.67(4)	0.058(3)
708.22(4)	0.134(4)
710.07(8)	0.067(3)
722.52(3)	0.212(5)
782.86(8)	0.040(3)
868.11(6)	0.056(3)
991.83(7)	0.049(3)
1020.36(7)	0.054(3)
2757.44(9)	0.050(5)

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
2862.97(9)	0.066(4)
2924.52(12)	0.040(3)
2988.29(19)	0.045(4)
3016.74(9)	0.065(3)
3035.23(11)	0.046(3)
3082.71(7)	0.135(5)
3188.94(15)	0.045(4)
3265.07(13)	0.049(5)
3281.12(14)	0.048(5)
3424.65(11)	0.070(4)
3442.03(16)	0.040(3)
3476.53(16)	0.048(4)
3606.05(14)	0.054(4)
3609.85(16)	0.047(3)
3665.23(8)	0.132(6)
3679.24(8)	0.137(6)
3727.27(11)	0.069(4)
3737.46(25)	0.042(4)
3900.56(14)	0.053(4)
4389.17(9)	0.256(9)
4415.77(10)	0.240(9)
4502.26(11)	0.159(7)
4558.45(14)	0.047(3)
4842.33(9)	0.656(17)
4888.37(12)	0.146(7)
5097.40(10)	0.680(18)
5125.96(15)	0.110(7)

Cerium

475.09(6)	0.082(7)
662.03(5)	0.233(18)
737.43(7)	0.026(3)
765.97(5)	0.0145(12)
1107.66(5)	0.040(3)
1153.97(5)	0.0146(12)
4290.99(8)	0.053(4)
4336.46(8)	0.0251(20)
4765.96(9)	0.109(9)

Praseodymium

60.18(5)	0.134(14)
64.56(5)	0.137(6)
68.67(5)	0.116(6)
85.16(5)	0.207(11)
126.92(4)	0.307(15)
140.98(3)	0.479(10)
176.95(3)	1.06(4)
182.87(3)	0.377(14)
460.24(5)	0.057(3)
508.89(6)	0.104(10)
528.23(3)	0.0579(19)
546.47(3)	0.148(4)
560.48(4)	0.150(7)
570.15(4)	0.112(5)
573.88(5)	0.084(5)

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
619.35(3)	0.152(4)
633.19(4)	0.113(4)
645.651(25)	0.311(7)
729.24(3)	0.0712(23)
746.94(3)	0.146(4)
893.36(5)	0.053(3)
956.89(7)	0.091(7)
991.87(6)	0.138(10)
1006.30(5)	0.153(8)
1102.83(7)	0.056(3)
1150.98(4)	0.141(5)
3602.56(16)	0.054(3)
3650.12(16)	0.061(3)
3653.98(14)	0.060(4)
3790.15(11)	0.140(6)
4496.29(16)	0.098(6)
4691.91(14)	0.291(10)
4722.39(22)	0.083(4)
4800.96(16)	0.140(8)
5095.9(4)	0.208(8)
5137.43(22)	0.098(4)
5140.60(17)	0.269(11)
5665.98(18)	0.379(15)
5842.92(18)	0.147(6)
Neodymium	
453.920(20)	3.00(9)
618.044(16)	13.4(3)
696.487(20)	33.2(17)
742.088(18)	3.07(8)
814.128(20)	5.05(13)
864.356(22)	5.08(13)
1413.16(3)	1.85(6)
6502.32(14)	3.18(11)
Samarium	
334.02(5)	4790(60)
712.25(5)	268(4)
737.48(5)	598(8)
Europium	
52.39(9)	55(3)
56.73(16)	16(6)
59.79(14)	10(3)
63.43(23)	12(5)
65.1(3)	16(8)
68.23(9)	69(20)
71.24(12)	45(14)
73.21(9)	106(22)
74.86(12)	43(12)
77.40(8)	187(13)
79.78(22)	12(6)
82.51(13)	7(5)
85.28(13)	9(5)
87.13(11)	29(3)
88.31(12)	42(5)

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
89.97(8)	1430(30)
91.20(10)	20(10)
95.25(11)	8(3)
100.86(23)	24(5)
103.34(13)	48(5)
106.57(14)	42(6)
109.63(13)	22(9)
111.0(3)	22(6)
113.1(3)	15(5)
117.54(10)	14.7(22)
119.71(13)	11.9(25)
121.71(11)	17.7(25)
124.01(16)	25(3)
125.19(16)	25(3)
129.06(12)	14.7(16)
130.93(15)	15.0(16)
132.71(10)	20.7(13)
135.42(9)	27.8(14)
137.89(20)	7(3)
140.19(9)	21(4)
143.54(8)	43(3)
148.80(22)	13(4)
150.59(19)	7(3)
154.14(9)	22(3)
157.22(7)	7.5(22)
158.31(21)	9.3(16)
160.29(16)	9.3(17)
163.89(14)	13.1(24)
167.01(13)	18.9(19)
169.28(9)	54.8(22)
171.95(9)	40(3)
176.6(3)	6(3)
179.83(13)	20(3)
182.38(11)	23(3)
187.37(8)	31.2(14)
190.96(11)	19.7(14)
193.11(13)	28.3(20)
194.73(25)	11.7(20)
197.10(16)	14.1(14)
199.12(10)	25.5(15)
203.63(10)	18.4(14)
206.53(8)	58.7(20)
208.51(18)	16.1(21)
209.93(25)	8.5(24)
214.57(17)	13(3)
221.30(8)	73(3)
225.11(21)	11.2(23)
228.7(4)	5.6(22)
233.22(14)	15.9(23)
239.25(23)	12.4(25)
243.1(3)	12.2(20)
244.88(24)	26.3(22)
246.5(3)	15(3)

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
253.52(10)	11(3)
256.20(9)	12.0(25)
260.66(9)	15.9(18)
265.0(5)	3.8(5)
266.96(14)	8.0(11)
270.84(10)	6.5(11)
273.65(8)	17.3(12)
276.14(9)	10.9(11)
279.91(14)	6.9(5)
281.78(9)	20.4(8)
283.53(24)	5.9(4)
285.10(9)	23.2(18)
287.29(10)	11.5(8)
288.82(11)	9.3(6)
293.68(14)	6.0(4)
295.41(10)	13.4(5)
297.40(12)	7.0(4)
299.83(8)	24.0(6)
304.22(9)	7.3(6)
309.71(8)	11.5(9)
313.97(24)	4.5(10)
316.18(12)	10.8(9)
318.95(11)	11.7(9)
321.61(12)	9.8(8)
326.15(21)	12(4)
330.82(11)	9.0(8)
334.45(10)	11.1(10)
337.58(23)	4.1(9)
340.01(17)	5.5(9)
344.53(10)	7.1(14)
348.73(12)	7.5(13)
353.10(18)	4.4(4)
354.81(12)	8.7(14)
358.27(11)	7.6(15)
360.06(17)	5.1(4)
364.82(10)	7.8(5)
366.57(9)	8.8(7)
369.39(15)	5.9(8)
370.82(12)	8.3(5)
376.75(9)	8.4(5)
378.98(10)	6.5(4)
381.56(10)	5.3(5)
388.00(16)	4.3(6)
390.61(12)	8.7(7)
392.96(12)	7.5(6)
396.92(11)	7.5(6)
400.52(19)	4.2(6)
404.34(14)	9.6(9)
411.61(17)	5.3(7)
414.24(11)	9.1(8)
423.32(10)	13.1(10)
427.02(13)	8.0(9)
433.04(10)	10.3(11)

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
438.1(3)	5.3(9)
440.83(24)	6.2(9)
444.6(3)	4.7(10)
449.85(20)	5.4(11)
472.38(12)	5.3(9)
526.49(11)	4.3(4)
5379.7(4)	9.2(19)
5500.68(18)	7.0(4)
5595.20(20)	5.3(4)
5816.5(8)	3.7(12)
6069.29(18)	8.2(7)
6229.7(7)	4.1(8)
Gadolinium	
79.71(6)	4040(110)
89.17(6)	1380(40)
182.12(6)	7300(400)
199.42(6)	2000(600)
255.80(6)	373(30)
277.73(6)	495(12)
780.15(6)	1020(23)
870.85(6)	434(11)
897.66(5)	1080(50)
897.66(5)	1200(50)
915.11(6)	392(11)
944.70(10)	3080(70)
962.18(5)	1980(50)
977.22(5)	1420(30)
1003.97(7)	391(30)
1097.03(5)	660(16)
1107.51(6)	1840(40)
1116.52(5)	418(10)
1119.23(5)	1180(30)
1141.36(7)	474(30)
1184.32(7)	1160(120)
1186.75(5)	1550(190)
1186.75(5)	1600(190)
1259.91(5)	420(11)
1263.73(5)	644(16)
1323.48(5)	641(17)
5903.39(13)	453(14)
6750.05(14)	963(30)
Terbium	
59.48(8)	0.48(6)
61.59(25)	0.052(15)
63.74(8)	1.46(16)
65.94(15)	0.090(17)
68.25(24)	0.035(14)
74.89(8)	1.78(18)
76.77(12)	0.089(12)
79.28(8)	0.43(6)
84.21(14)	0.050(10)
87.46(9)	0.160(19)
89.04(9)	0.21(3)

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
93.06(8)	0.218(25)
94.55(12)	0.071(11)
97.36(8)	0.50(6)
101.16(15)	0.023(5)
103.80(9)	0.089(10)
108.69(14)	0.026(5)
112.26(9)	0.089(10)
117.76(12)	0.028(5)
131.00(9)	0.064(8)
135.44(8)	0.39(4)
139.03(15)	0.052(6)
141.06(11)	0.107(12)
150.45(7)	0.144(15)
153.52(7)	0.44(5)
158.85(7)	0.111(12)
163.02(7)	0.105(11)
176.79(10)	0.070(9)
184.37(13)	0.11(3)
193.32(7)	0.37(4)
209.61(8)	0.055(6)
212.38(12)	0.032(4)
214.61(11)	0.036(5)
220.96(12)	0.022(4)
228.09(9)	0.032(4)
234.38(18)	0.026(5)
235.88(14)	0.032(6)
238.81(18)	0.023(5)
241.64(20)	0.035(8)
243.03(8)	0.219(24)
247.98(7)	0.30(3)
255.39(12)	0.112(16)
257.81(14)	0.045(7)
262.32(22)	0.022(6)
264.75(14)	0.031(7)
270.57(8)	0.102(12)
275.49(8)	0.124(14)
277.64(9)	0.093(11)
278.75(7)	0.083(11)
282.86(12)	0.049(8)
284.10(9)	0.087(11)
288.07(7)	0.126(14)
290.41(9)	0.052(7)
295.87(9)	0.062(8)
302.75(8)	0.086(10)
308.04(9)	0.056(8)
310.46(8)	0.177(21)
315.81(8)	0.118(14)
317.42(8)	0.121(15)
319.75(8)	0.132(15)
339.35(7)	0.35(4)
341.01(9)	0.069(9)
345.29(8)	0.128(16)
348.61(13)	0.053(10)

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
350.99(10)	0.176(22)
352.37(10)	0.160(21)
356.22(11)	0.117(17)
357.64(8)	0.26(3)
359.90(16)	0.048(9)
361.61(10)	0.095(12)
363.69(9)	0.120(15)
369.90(8)	0.057(7)
372.86(9)	0.070(8)
374.51(8)	0.099(11)
376.11(7)	0.154(16)
378.60(8)	0.161(19)
379.8(3)	0.024(8)
399.42(11)	0.074(11)
404.69(10)	0.127(17)
414.66(16)	0.092(22)
420.55(8)	0.092(12)
426.89(7)	0.147(17)
437.21(11)	0.077(16)
441.73(13)	0.077(12)
447.20(17)	0.10(3)
451.44(15)	0.21(3)
453.14(22)	0.033(12)
455.4(3)	0.029(12)
459.70(9)	0.085(12)
464.28(7)	0.192(21)
491.51(23)	0.024(6)
497.07(15)	0.041(9)
519.73(19)	0.059(13)
521.32(23)	0.046(12)
525.65(8)	0.22(3)
529.24(6)	0.022(8)
532.71(8)	0.129(16)
541.57(8)	0.121(15)
545.14(11)	0.064(10)
585.69(13)	0.054(8)
600.02(7)	0.155(18)
611.47(18)	0.034(9)
625.64(16)	0.027(7)
634.67(11)	0.037(7)
5184.6(6)	0.023(9)
5228.0(5)	0.052(12)
5238.6(7)	0.026(10)
5245.4(6)	0.061(13)
5288.8(5)	0.027(7)
5460.9(5)	0.029(7)
5524.3(4)	0.051(13)
5608.1(6)	0.042(9)
5661.3(5)	0.037(7)
5684.4(6)	0.027(7)
5754.6(4)	0.031(8)
5776.2(3)	0.120(17)
5784.1(4)	0.041(9)

Eγ-keV	σ_γ^z(Eγ)-barns
5842.1(11)	0.054(10)
5860.8(10)	0.036(8)
5891.2(3)	0.137(19)
5896.0(6)	0.023(7)
5953.5(3)	0.103(13)
5993.8(3)	0.114(15)
6138.4(3)	0.110(15)
6218.5(3)	0.190(22)
6240.8(3)	0.072(10)
6268.7(4)	0.029(6)
6311.9(7)	0.028(6)
Dysprosium	
50.44(7)	33.9(15)
80.64(7)	12.0(4)
108.23(7)	15.6(5)
184.34(7)	146(15)
185.19(9)	33.8(9)
260.11(7)	8.3(3)
282.89(7)	7.8(3)
349.14(8)	14.7(6)
351.20(8)	10.9(5)
386.08(7)	34.8(10)
389.83(8)	7.3(4)
392.66(7)	11.3(5)
411.71(7)	35.1(10)
415.03(7)	30.8(9)
421.10(10)	11.8(11)
447.96(7)	17.4(5)
465.46(7)	38.0(10)
470.25(8)	9.3(6)
477.10(7)	15.8(5)
496.96(7)	44.9(11)
499.43(9)	13.0(10)
500.62(9)	10.3(5)
509.06(9)	9.5(6)
510.81(14)	8.5(7)
515.33(7)	9.7(5)
538.65(7)	69.2(19)
570.05(9)	9.7(5)
584.00(7)	25.7(7)
807.46(7)	12.1(5)
882.27(6)	18.3(6)
888.13(7)	10.4(5)
911.99(7)	16.0(7)
979.98(9)	8.5(4)
994.64(7)	9.2(4)
2947.66(19)	10.8(7)
3012.35(13)	7.8(5)
3035.56(12)	10.9(6)
3114.14(15)	7.4(6)
3443.43(14)	10.6(16)
4123.88(15)	13.1(9)
5144.00(22)	15.7(10)

Eγ-keV	σ_γ^z(Eγ)-barns
5557.15(17)	28.7(14)
5607.73(18)	35.9(16)
Holmium	
69.79(4)	1.09(6)
116.84(4)	8.1(4)
136.67(4)	14.5(7)
149.32(4)	2.25(12)
180.96(5)	0.94(5)
221.18(4)	2.05(11)
239.13(4)	2.25(12)
289.04(4)	1.16(6)
290.61(4)	0.96(5)
304.63(4)	1.34(7)
333.61(4)	1.04(6)
371.74(4)	1.56(8)
401.57(4)	1.07(9)
410.45(4)	1.23(7)
425.90(4)	2.88(15)
455.53(4)	0.78(4)
489.45(4)	1.15(6)
542.74(4)	1.94(13)
543.69(4)	1.00(5)
Erbium	
99.07(3)	3.73(14)
184.301(25)	56(5)
198.267(24)	29.9(16)
284.71(3)	13.7(12)
447.556(24)	3.07(11)
631.709(19)	7.9(3)
730.649(19)	11.6(4)
741.372(20)	6.72(24)
816.003(23)	42.5(15)
821.20(3)	6.2(3)
830.01(4)	4.12(19)
853.505(20)	7.5(3)
914.952(20)	6.99(24)
1277.57(8)	2.82(16)
Thulium	
66.06(10)	0.51(10)
68.54(6)	1.75(23)
75.23(9)	0.94(8)
87.44(5)	1.29(3)
105.11(6)	0.780(23)
114.50(5)	3.19(6)
129.99(5)	0.940(25)
144.43(5)	5.96(11)
149.66(5)	7.11(12)
165.69(5)	3.29(6)
180.92(5)	3.85(14)
198.46(5)	0.96(3)
204.41(5)	8.72(19)
219.65(5)	3.64(6)
231.71(6)	0.60(3)

Eγ-keV	σ_γ^z(Eγ)-barns
235.12(5)	1.18(4)
237.19(5)	5.52(10)
242.58(5)	1.28(4)
310.97(5)	2.50(5)
352.91(6)	0.547(23)
384.04(5)	1.95(5)
400.21(5)	0.717(19)
411.46(5)	2.37(5)
424.61(5)	0.556(25)
442.06(8)	0.51(4)
446.31(5)	1.62(4)
455.96(6)	1.16(4)
457.23(11)	0.557(25)
468.62(7)	0.45(4)
472.94(8)	0.60(5)
496.52(5)	0.80(3)
499.32(5)	0.88(3)
505.00(6)	0.90(3)
506.61(6)	0.84(3)
510.43(11)	0.61(3)
512.01(5)	1.96(5)
523.32(7)	0.48(3)
532.39(6)	0.59(3)
535.78(5)	1.18(4)
537.97(6)	1.00(4)
562.39(5)	0.85(3)
565.22(5)	1.58(4)
569.25(5)	1.02(3)
585.09(6)	0.60(4)
589.13(10)	0.58(10)
590.18(7)	1.27(10)
603.91(5)	1.40(5)
611.80(8)	0.83(4)
632.37(6)	0.74(3)
637.75(4)	1.25(4)
640.56(8)	0.70(3)
650.21(6)	1.45(5)
658.85(5)	1.56(5)
703.71(5)	1.32(4)
710.70(7)	0.60(3)
719.12(8)	1.01(3)
720.61(8)	0.57(3)
724.48(5)	0.68(3)
815.56(5)	0.76(3)
854.23(5)	1.41(4)
1178.65(9)	0.56(4)
4732.63(22)	0.58(5)
5158.2(4)	0.47(5)
5737.50(20)	1.42(7)
5908.3(3)	0.49(4)
5943.14(20)	1.51(7)
6001.51(22)	0.99(10)
6387.49(22)	1.48(7)

Eγ-keV	σ_γ^z(Eγ)-barns
6442.19(23)	0.47(3)
Ytterbium	
180.23(5)	0.52(5)
363.33(3)	0.89(9)
428.28(3)	0.59(6)
435.88(3)	0.53(5)
477.23(3)	0.71(7)
514.87(3)	9.0(9)
534.83(3)	0.49(5)
639.73(3)	1.45(15)
5284.9(5)	1.49(15)
Lutetium	
71.46(7)	3.96(16)
93.97(8)	0.71(4)
111.65(7)	1.02(5)
112.83(7)	1.16(5)
119.70(7)	1.12(5)
121.54(7)	5.20(17)
138.57(6)	6.76(25)
144.65(7)	1.34(8)
145.84(9)	1.51(9)
147.15(6)	4.96(19)
150.34(6)	13.7(4)
162.44(6)	5.29(17)
168.61(7)	0.95(5)
171.80(6)	1.73(6)
185.49(6)	3.40(12)
188.01(6)	1.40(6)
192.00(6)	2.09(8)
201.58(7)	0.79(6)
207.77(7)	1.02(5)
225.34(6)	1.73(6)
235.83(6)	0.82(4)
259.35(6)	1.89(8)
263.29(9)	0.72(9)
264.28(9)	0.77(9)
268.75(5)	3.64(13)
284.54(6)	0.75(4)
301.10(6)	0.74(4)
310.13(5)	1.49(6)
318.98(5)	3.83(13)
335.81(5)	1.32(6)
347.96(6)	0.85(4)
367.38(5)	2.22(8)
413.66(5)	0.94(4)
457.94(4)	8.3(3)
761.64(4)	2.63(10)
838.99(7)	0.90(5)
1080.25(6)	0.69(4)
1088.06(5)	0.84(4)
Hafnium	
63.16(6)	5.26(14)
213.43(6)	29.4(6)

Eγ-keV	σ_γ^z(Eγ)-barns
214.38(7)	20.6(4)
215.37(8)	2.82(16)
303.98(6)	4.29(9)
325.55(6)	6.89(15)
1066.04(6)	1.96(5)
1077.71(6)	2.40(6)
1081.35(6)	2.82(7)
1102.72(6)	2.96(8)
1143.66(6)	1.84(6)
1167.02(6)	3.95(10)
1174.77(8)	4.8(7)
1175.65(11)	2.6(5)
1205.93(13)	1.47(23)
1207.11(7)	3.9(3)
1229.19(6)	4.26(11)
1269.27(6)	2.26(7)
1329.72(6)	2.09(7)
1333.66(6)	1.73(7)
1340.41(6)	2.40(8)
1420.57(7)	1.83(7)
5723.90(15)	2.52(11)
Tantalum	
97.77(7)	12.6(6)
133.89(6)	57(6)
146.80(6)	12.7(4)
156.12(6)	21.1(5)
173.22(6)	109.0(23)
190.34(6)	16.5(6)
270.48(6)	235(5)
297.19(6)	56.4(15)
360.60(6)	16.0(6)
402.70(5)	106.0(21)
511.85(9)	14.9(8)
5964.90(14)	12.5(7)
Tungsten	
111.11(9)	0.162(4)
127.46(9)	0.129(5)
145.74(9)	0.970(21)
162.21(9)	0.187(5)
201.42(9)	0.319(8)
204.80(9)	0.148(4)
226.13(10)	0.113(17)
252.93(9)	0.101(3)
273.02(9)	0.272(7)
289.93(9)	0.0603(22)
313.14(9)	0.054(4)
423.92(9)	0.0497(22)
473.85(10)	0.055(5)
499.96(9)	0.0491(23)
531.19(9)	0.052(3)
557.11(9)	0.125(5)
577.25(8)	0.191(5)
611.23(9)	0.066(3)

Eγ-keV	σ_γ^z(Eγ)-barns
616.14(9)	0.059(3)
657.42(13)	0.083(5)
694.27(9)	0.073(3)
745.76(10)	0.053(3)
782.13(9)	0.143(6)
788.69(11)	0.070(5)
791.86(9)	0.113(6)
816.24(9)	0.104(4)
840.03(8)	0.143(5)
866.24(9)	0.068(3)
888.17(9)	0.079(4)
891.42(9)	0.136(5)
894.52(9)	0.078(4)
903.16(9)	0.113(4)
908.82(9)	0.092(4)
979.58(9)	0.104(4)
1026.17(8)	0.164(6)
1070.98(10)	0.053(3)
1082.03(10)	0.061(4)
1274.51(9)	0.130(5)
3469.42(13)	0.103(6)
3492.76(17)	0.051(4)
3534.66(16)	0.063(5)
3561.02(14)	0.060(4)
3739.00(16)	0.069(4)
3847.35(17)	0.051(4)
4014.64(16)	0.055(4)
4118.85(16)	0.059(4)
4249.36(18)	0.115(6)
4384.34(21)	0.057(5)
4574.19(18)	0.104(9)
4626.40(15)	0.124(7)
4650.6(3)	0.052(5)
4684.37(14)	0.150(7)
5164.24(14)	0.226(9)
6144.21(18)	0.186(12)
6190.60(17)	0.513(18)
7412.02(24)	0.072(4)
Rhenium	
74.76(5)	1.29(8)
87.20(4)	0.84(4)
92.33(5)	1.14(6)
99.36(7)	0.230(24)
103.16(5)	0.43(3)
105.82(4)	1.91(8)
107.40(7)	0.352(25)
111.50(4)	1.80(7)
114.85(6)	0.43(5)
122.53(5)	0.74(4)
127.67(7)	0.43(4)
130.83(7)	0.43(3)
139.32(12)	0.43(5)
141.52(5)	1.46(8)

Eγ-keV	$\sigma_{\gamma}^{z}(E\gamma)$-barns
144.03(6)	1.85(9)
145.45(16)	0.44(5)
147.36(11)	0.47(5)
149.28(11)	0.44(5)
151.38(6)	1.15(7)
156.59(10)	0.73(8)
167.30(4)	1.46(6)
174.21(5)	0.382(24)
176.34(8)	0.31(3)
177.70(13)	0.26(3)
181.92(5)	0.388(25)
188.82(5)	1.11(5)
190.05(12)	0.284(24)
193.29(5)	0.43(3)
199.44(5)	0.91(4)
205.18(13)	0.37(8)
207.92(4)	4.44(21)
210.59(7)	1.50(10)
214.62(5)	2.53(14)
216.76(22)	0.30(7)
219.34(8)	0.67(9)
223.09(17)	0.24(6)
227.04(5)	1.78(12)
232.07(13)	0.36(7)
236.59(5)	1.45(10)
251.45(6)	1.80(23)
252.12(11)	0.58(16)
254.94(4)	1.15(5)
257.15(6)	1.52(22)
261.13(4)	0.67(3)
262.71(6)	0.267(17)
274.30(8)	0.80(6)
275.51(11)	0.51(4)
284.88(8)	0.41(4)
290.66(6)	3.5(4)
300.03(6)	0.70(5)
307.60(9)	0.34(3)
316.43(4)	2.21(10)
318.82(16)	0.25(3)
358.19(8)	0.236(19)
360.24(5)	0.449(25)
362.82(5)	0.46(3)
378.35(4)	0.54(3)
390.80(4)	1.15(5)
518.34(19)	0.24(6)
607.24(18)	0.25(3)
608.72(17)	0.25(3)
680.49(10)	0.34(3)
795.02(12)	0.31(3)
4663.71(23)	0.24(3)
4860.7(3)	0.37(4)
5007.0(3)	0.27(4)
5027.89(23)	0.29(5)

Eγ-keV	$\sigma_{\gamma}^{z}(E\gamma)$-barns
5073.41(24)	0.43(5)
5137.4(4)	0.39(4)
5871.62(21)	0.299(23)
5910.21(21)	0.60(4)
Osmium	
73.43(4)	0.174(8)
155.18(3)	1.19(3)
175.80(4)	0.189(8)
186.85(3)	2.08(5)
235.24(3)	0.184(6)
272.87(3)	0.242(6)
275.34(3)	0.173(5)
323.02(4)	0.242(9)
361.19(3)	0.466(15)
371.35(3)	0.574(14)
397.50(5)	0.115(5)
407.45(3)	0.134(5)
478.11(3)	0.523(14)
527.60(3)	0.300(10)
537.75(4)	0.121(6)
558.02(3)	0.84(3)
569.38(3)	0.694(25)
605.34(3)	0.113(4)
633.12(3)	0.585(16)
634.99(4)	0.405(12)
829.34(4)	0.167(6)
5146.63(14)	0.409(20)
5277.11(22)	0.116(15)
5683.87(21)	0.167(13)
Iridium	
58.83(6)	5.3(3)
63.19(5)	70(3)
64.81(5)	121(4)
66.62(9)	3.22(23)
71.54(20)	0.6(3)
73.35(5)	42.7(15)
77.79(5)	4.8(4)
84.21(5)	7.7(4)
86.75(7)	0.65(13)
88.64(5)	3.67(24)
90.65(5)	1.25(15)
95.37(6)	0.9(3)
107.94(5)	2.62(12)
110.65(7)	1.18(8)
112.12(6)	1.69(10)
118.38(8)	0.89(13)
124.41(8)	1.12(13)
126.88(5)	1.86(10)
136.20(5)	11.5(4)
138.43(10)	1.29(10)
140.01(10)	0.95(9)
144.79(6)	3.95(19)
148.85(6)	2.33(14)

Eγ-keV	$\sigma_{\gamma}^{z}(E\gamma)$-barns
151.51(6)	2.89(20)
156.38(6)	2.76(12)
162.52(13)	0.63(13)
165.41(18)	1.7(7)
169.25(5)	3.05(13)
177.00(18)	0.6(4)
178.91(8)	2.1(5)
183.35(14)	1.0(4)
184.67(16)	0.92(22)
193.59(8)	1.31(24)
197.12(21)	0.73(19)
199.02(10)	1.07(18)
201.48(9)	1.36(17)
203.83(8)	1.67(12)
206.19(6)	3.70(18)
208.07(16)	0.70(9)
210.74(10)	2.1(4)
211.49(5)	0.6(3)
215.37(15)	0.74(9)
216.75(5)	5.57(24)
222.36(10)	0.83(16)
226.23(14)	4.0(4)
231.64(8)	0.95(13)
241.70(15)	0.65(13)
245.60(8)	1.05(10)
248.07(18)	0.9(3)
250.63(8)	0.87(10)
254.29(9)	1.08(11)
259.11(8)	1.29(18)
262.01(6)	3.05(18)
263.90(11)	1.39(13)
267.35(9)	0.93(21)
270.79(12)	0.86(20)
273.23(17)	0.72(17)
274.88(16)	0.74(16)
278.33(7)	1.95(16)
284.29(7)	1.95(15)
294.16(13)	1.12(17)
297.51(23)	0.65(17)
300.05(7)	1.07(12)
302.91(7)	1.20(11)
308.23(9)	1.45(11)
310.04(19)	0.61(10)
315.94(9)	2.4(4)
333.79(6)	1.53(10)
337.48(7)	0.96(9)
340.48(12)	0.72(9)
351.59(5)	10.9(4)
365.02(13)	1.15(10)
371.34(6)	2.11(12)
417.99(5)	3.45(15)
432.55(5)	1.85(7)
459.46(7)	1.44(9)

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
461.97(10)	0.78(7)
486.87(10)	0.93(13)
4531.38(22)	0.61(5)
4867.01(17)	0.68(4)
4980.43(17)	0.82(4)
4985.92(18)	0.58(3)
5020.66(19)	0.66(6)
5028.44(18)	0.67(6)
5129.20(16)	0.90(5)
5147.51(15)	1.29(6)
5166.97(16)	0.96(6)
5219.77(21)	0.72(5)
5283.60(17)	0.85(6)
5304.48(18)	0.73(5)
5327.56(21)	0.71(5)
5357.49(17)	1.03(6)
5431.36(17)	0.78(4)
5458.96(22)	0.60(5)
5467.0(3)	0.59(7)
5487.39(22)	0.58(4)
5517.18(19)	0.76(4)
5534.73(17)	1.39(6)
5564.68(17)	1.71(8)
5570.03(22)	0.67(4)
5595.77(17)	0.72(4)
5612.60(17)	1.06(5)
5667.81(16)	2.68(10)
5689.23(16)	1.73(7)
5728.93(17)	1.15(5)
5782.85(18)	1.34(6)
5866.76(19)	0.79(5)
5954.4(3)	0.74(4)
5958.09(23)	1.79(8)
5962.25(23)	0.75(4)
6082.02(18)	2.62(11)
Platinum	
326.20(4)	0.511(10)
332.84(4)	2.580(25)
355.54(4)	6.17(6)
521.02(4)	0.336(10)
5254.41(19)	0.397(11)
Gold	
55.11(3)	2.90(12)
74.94(4)	0.390(18)
97.24(3)	4.51(6)
101.93(3)	0.953(17)
146.44(4)	0.43(3)
158.44(3)	1.250(14)
168.36(3)	3.53(4)
170.17(3)	1.510(17)
180.83(5)	0.53(4)
188.17(5)	0.51(4)
192.55(4)	4.6(3)

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
204.15(4)	0.513(8)
215.01(3)	7.77(8)
219.42(5)	0.42(3)
247.63(3)	5.56(6)
261.36(3)	6.3(3)
271.35(9)	0.42(6)
291.77(4)	1.48(3)
307.73(4)	0.607(21)
311.95(4)	0.627(25)
328.49(3)	2.09(4)
343.62(3)	1.080(20)
346.86(5)	0.58(5)
350.79(4)	1.30(7)
355.53(4)	0.460(21)
371.05(4)	0.572(18)
381.22(3)	4.22(6)
418.90(3)	1.060(21)
439.77(8)	1.49(23)
440.66(13)	0.69(15)
444.35(4)	0.83(3)
449.54(4)	0.646(24)
456.23(5)	0.57(3)
458.15(5)	0.59(3)
498.53(5)	0.457(25)
511.50(8)	1.26(9)
515.92(5)	0.57(3)
529.30(4)	2.80(17)
540.27(4)	0.60(4)
543.97(4)	0.54(3)
548.91(4)	0.85(5)
565.72(6)	0.43(5)
571.62(5)	0.61(7)
625.35(5)	0.45(3)
640.55(5)	0.59(4)
672.72(3)	0.635(17)
702.22(3)	0.565(7)
835.81(5)	0.758(23)
4799.83(5)	0.996(23)
4852.60(9)	0.406(18)
4898.11(9)	0.411(17)
4905.79(9)	0.423(17)
4957.67(6)	0.95(3)
4998.64(8)	0.530(20)
5086.25(7)	0.607(16)
5102.64(5)	1.110(23)
5140.69(8)	0.395(14)
5148.64(9)	0.500(15)
5226.41(8)	0.450(18)
5279.40(7)	0.524(16)
5354.86(7)	0.401(13)
Mercury	
367.96(3)	251(5)
661.39(3)	29.5(6)

Eγ-keV	$\sigma_\gamma^z(E\gamma)$-barns
1202.25(7)	15.9(4)
1205.67(7)	17.8(6)
1225.51(4)	16.3(4)
1262.96(4)	28.5(6)
1273.52(4)	14.0(4)
1407.94(4)	12.6(3)
1570.32(4)	39.1(9)
1693.31(4)	74.4(21)
2002.03(5)	32.2(12)
2639.67(5)	15.3(4)
3185.77(6)	15.0(5)
3288.75(6)	17.6(5)
4675.64(9)	17.2(5)
4739.44(8)	39.8(10)
4759.06(9)	16.4(5)
4842.44(9)	26.5(8)
5050.06(9)	26.5(8)
5388.48(10)	23.1(6)
5658.17(10)	36.4(9)
5967.00(10)	82.7(20)
6457.78(12)	30.5(10)
Thallium	
139.94(9)	0.400(7)
154.01(9)	0.0926(17)
198.33(8)	0.0408(10)
265.86(9)	0.0210(7)
292.26(8)	0.0983(20)
304.86(9)	0.0225(12)
310.31(9)	0.0245(12)
318.88(8)	0.325(6)
325.85(8)	0.0301(10)
330.09(9)	0.0267(10)
330.09(9)	0.0267(10)
331.76(9)	0.0371(10)
347.96(8)	0.361(10)
383.99(8)	0.0341(12)
395.62(8)	0.0862(20)
424.81(8)	0.1200(25)
471.90(8)	0.116(3)
488.11(8)	0.096(4)
563.21(8)	0.0356(15)
591.13(9)	0.0225(10)
624.46(8)	0.0413(10)
626.54(8)	0.0388(10)
629.12(8)	0.0388(10)
678.01(8)	0.0361(15)
732.09(9)	0.064(3)
737.12(8)	0.118(5)
764.13(9)	0.0316(12)
818.14(8)	0.0279(10)
873.16(8)	0.168(4)
931.39(8)	0.0257(12)
949.88(8)	0.0479(15)

Eγ-keV	σ_γ^z(Eγ)-barns
1013.27(9)	0.0217(12)
1093.02(8)	0.0353(12)
1110.37(8)	0.0413(12)
1121.29(7)	0.0600(17)
1155.43(7)	0.0605(17)
1234.69(7)	0.0746(25)
1478.77(8)	0.0544(22)
1741.01(8)	0.0548(25)
1756.27(12)	0.027(3)
4115.08(17)	0.0222(17)
4195.98(14)	0.0373(22)
4225.47(17)	0.045(3)
4309.00(24)	0.0210(22)
4343.56(12)	0.034(3)
4402.60(15)	0.0208(15)
4495.74(13)	0.043(4)
4540.62(15)	0.0413(25)
4600.95(16)	0.0292(22)
4687.58(12)	0.098(4)
4705.83(14)	0.058(3)
4752.24(11)	0.148(5)
4841.40(15)	0.090(4)
4913.57(11)	0.164(5)
4980.97(20)	0.036(3)
5014.61(15)	0.058(3)
5130.50(23)	0.058(4)
5180.38(12)	0.141(5)
5261.48(13)	0.084(4)
5279.86(12)	0.207(6)
5404.41(12)	0.147(5)
5451.07(14)	0.079(3)
5533.35(13)	0.131(5)
5603.28(13)	0.282(10)
5641.57(12)	0.316(7)
5917.48(16)	0.084(4)
6025.21(24)	0.0222(25)
6118.79(23)	0.0232(20)
6166.61(14)	0.166(6)
6183.05(15)	0.081(4)
6222.57(16)	0.065(4)
6336.11(22)	0.0245(22)
6514.57(15)	0.129(5)
Lead	
6737.53(14)	0.00691(19)
7367.83(12)	0.137(3)
Bismuth	
162.34(4)	0.00162(21)
319.83(4)	0.0115(14)
673.99(4)	0.0026(4)
774.95(5)	0.00141(20)
808.79(4)	0.00119(16)
900.21(6)	0.00102(14)
1337.07(5)	0.00156(21)

Eγ-keV	σ_γ^z(Eγ)-barns
2505.31(8)	0.0021(3)
2598.28(9)	0.00166(24)
2624.22(8)	0.00154(21)
2828.27(8)	0.00179(24)
3080.67(10)	0.00145(20)
3356.53(11)	0.00167(24)
3396.18(11)	0.00170(24)
3632.83(12)	0.00136(20)
4054.32(10)	0.0137(18)
4101.62(11)	0.0089(12)
4165.44(14)	0.00173(24)
4170.96(11)	0.0171(22)
4256.42(13)	0.0024(3)
Thorium	
77.09(15)	0.09(3)
211.86(11)	0.0191(17)
229.08(11)	0.0163(13)
256.25(11)	0.093(17)
277.48(11)	0.0312(25)
281.40(11)	0.0170(14)
311.91(10)	0.0187(10)
316.64(10)	0.0397(18)
319.08(10)	0.082(3)
327.80(10)	0.0269(16)
329.88(11)	0.0221(17)
331.37(11)	0.0291(19)
335.92(10)	0.089(4)
354.27(10)	0.0408(20)
472.30(10)	0.165(8)
522.73(10)	0.102(5)
531.58(10)	0.0404(23)
539.66(10)	0.061(3)
548.23(11)	0.042(10)
556.93(11)	0.040(10)
561.25(11)	0.033(8)
566.63(10)	0.19(5)
578.02(9)	0.105(5)
583.27(9)	0.279(11)
586.02(10)	0.045(3)
593.23(10)	0.043(3)
605.41(10)	0.054(4)
612.45(9)	0.018(3)
659.56(16)	0.0173(20)
665.11(10)	0.084(4)
681.81(9)	0.079(4)
705.17(11)	0.050(4)
714.23(10)	0.052(3)
752.05(16)	0.0142(19)
797.79(9)	0.0416(20)
808.53(11)	0.0212(14)
814.75(10)	0.0196(13)
834.83(14)	0.059(5)
860.61(13)	0.047(5)

Eγ-keV	σ_γ^z(Eγ)-barns
872.13(11)	0.0268(15)
968.78(9)	0.132(6)
1013.84(11)	0.037(3)
1034.27(11)	0.0165(14)
1100.98(11)	0.0211(16)
2703.55(24)	0.014(5)
2719.67(18)	0.016(3)
2824.9(3)	0.0144(22)
3148.23(10)	0.0208(14)
3196.66(12)	0.0171(13)
3287.94(14)	0.0165(14)
3341.90(13)	0.0168(13)
3398.09(13)	0.0191(14)
3436.17(12)	0.0211(15)
3448.42(10)	0.0233(16)
3473.00(8)	0.057(3)
3509.43(14)	0.0170(14)
3530.96(13)	0.0397(24)
3946.42(10)	0.0268(15)
Uranium	
521.89(5)	0.072(3)
551.808(22)	0.207(5)
909.06(6)	0.026(4)
943.14(7)	0.082(10)

ENSDF THERMAL NEUTRON CAPTURE GAMMA-RAY REFERENCES

The ENSDF database contains one to three primary references for each thermal neutron capture dataset that indicate the main literature sources. Additional references are included in the dataset and can be found in the original ENSDF-formatted files on the accompanying CD-ROM. Each reference is assigned an 8-digit keynumber specifying the publication year, first two initials of the first author's last name, and an arbitrary sequence code. Reference keynumbers for all of the primary ENSDF references used in this report are summarized in the following table. The complete citations for each reference follow the keynumber table

Isotope	NSR Reference Keynumber(s)
^{1}H	1994Ki27,1982Va13,1980Is02
^{2}H	1982Ju01,1980Al31
^{6}Li	1985Ko47
^{7}Li	1991Ly01
^{9}Be	1983Ke11,1974JuZW
^{10}B	1986Ko19
^{12}C	1982Mu14
^{13}C	1982Mu14
^{14}N	1997Ju02,1994Ra17,1990Is05
^{16}O	1977Mc05
^{17}O	1978LoZW,1978LoZT
^{19}F	1996Ra04
^{20}Ne	1986Pr05
^{21}Ne	1986Pr05
^{22}Ne	1986Pr05
^{23}Na	1983Hu11,1983Ti02
^{24}Mg	1992Wa06,1991MiZQ
^{25}Mg	1992Wa06,1991Ki04
^{26}Mg	1992Wa06
^{27}Al	1982Sc14
^{28}Si	1992Ra19,1990Is02
^{29}Si	1992Ra19,1990Is02
^{30}Si	1992Ra19,1990Is02
^{31}P	1989Mi16,1985Ke11
^{32}S	1985Ra15
^{33}S	1985Ra15
^{34}S	1985Ra15
^{36}S	1984Ra09,1997Be42
^{35}Cl	1982Kr12,1985Ke04,1996Co16
^{37}Cl	1973Sp06
^{36}Ar	1970Ha56
^{40}Ar	1970Ha56
^{39}K	1984Vo01
^{40}K	1984Kr05
^{41}K	1985Kr06
^{40}Ca	1967Gr16,1970Cr04
^{42}Ca	1969Gr08
^{43}Ca	1972Wh02
^{44}Ca	1968Gr11

Isotope	NSR Reference Keynumber(s)
^{46}Ca	1970Cr04
^{48}Ca	1970Cr04,1969ArZT
^{45}Sc	1982Ti02
^{46}Ti	1972Kn07
^{47}Ti	1989Co01,1984Ru06
^{48}Ti	1992Ku17,1983Ru08
^{49}Ti	1984Ru06,1971Te01
^{50}Ti	1971Ar39
^{50}V	1991Mi08,1978Ro03,1973HaWJ
^{51}V	1991Mi08
^{50}Cr	1974KoYY,1972Ko15,1972Lo26
^{52}Cr	1980Ko01,1972Ko15
^{53}Cr	1989Ho15,1988Li30,1994Co09
^{54}Cr	1972Wh05
^{55}Mn	1980De20,1975Co05,1974Bo19
^{54}Fe	1972Ko15,1967Ar14,1990Ku26
^{56}Fe	1980Ve05,1978Ve06,1969Ko05
^{57}Fe	1969Fa05,1973Ko27
^{58}Fe	1983VeZZ,1980Ve05,1978Ve06
^{59}Co	1984Ko29
^{58}Ni	1993Ha05,1977Is01,1972St06
^{60}Ni	1993Ha05
^{61}Ni	1970Fa06,1975Wi06
^{62}Ni	1977Is01,1970GaZQ,1972Ko15
^{64}Ni	1977Is01
^{63}Cu	1983De28
^{65}Cu	1983De29
^{64}Zn	1972Bo75
^{66}Zn	1971Kn06,1975DeYM,1970Ba21
^{67}Zn	1971Ot01
^{68}Zn	1972Bo75
^{69}Ga	1967Ba79,1970Li04,1971Ve03
^{71}Ga	1970Li04,1971Ve03
^{70}Ge	1991Is01,1972Gr34,1972We10
^{72}Ge	1972Gr34,1972Ha74,1972We10
^{73}Ge	1985HoZQ,1991Is01
^{74}Ge	1972Gr34,1972Ha74,1991Is01
^{76}Ge	1972Gr34,1972Ha74
^{75}As	1990Ho10

Isotope	NSR Reference Keynumber(s)
^{74}Se	1984To11,1982ToZS,1981En07
^{76}Se	1982ToZS,1985To10
^{77}Se	1987Su05,1981En07,1979BrZE
^{78}Se	1979BrZE,1970Ba54,1981En07
^{80}Se	1971Ra07
^{79}Br	1978Do06,1977DoZP
^{81}Br	1978Do06
^{83}Kr	1987Ha21,1972Ma42
^{86}Kr	1977Je03
^{85}Rb	1969Da15,1969Ra10,1968Ir02
^{86}Sr	1986Wi16
^{87}Sr	1987Wi15
^{88}Sr	1989Wi05
^{89}Y	1993Mi04
^{90}Zr	1978LoZX
^{91}Zr	1979HeZT,1972FaZW
^{92}Zr	1977Ba33
^{94}Zr	1977Ba33,1976BaYM
^{93}Nb	1985Bo48,1968Ju01
^{100}Mo	1990Se17
^{92}Mo	1991Is05
^{94}Mo	1973Ba57
^{95}Mo	1970He27
^{96}Mo	1973De39
^{97}Mo	1971He10
^{98}Mo	1973De39
^{99}Tc	1979Pi08
^{99}Ru	1988Co18,1988CoZU,1991Is05
^{100}Ru	1982Ba69
^{101}Ru	1991Is05
^{102}Ru	1979SeZT
^{104}Ru	1978Gu14,1974Hr01
^{103}Rh	1981Ke03
^{102}Pd	1970Bo29
^{104}Pd	1970Bo29
^{105}Pd	1987Co03,1970Or05
^{108}Pd	1980Ca02
^{107}Ag	1985Ma54
^{109}Ag	1979Bo41
^{110}Cd	1987BaYW,1991NeZX
^{111}Cd	1993De01
^{113}Cd	1984Mh01,1979Br25,1968Gr32
^{113}In	1975Ra07
^{115}In	1976Al06,1972Ra39,1973Sc23
^{115}Sn	1991Ra01
^{121}Sb	1972Sh02,1978Al09,1977Va11
^{123}Sb	1973ShZZ,1980Al22
^{122}Te	192000Bo24
^{123}Te	1995Ge06,1983Ro13,1969Bu05
^{124}Te	1999Ho01,1998Ho16,1997BoZW
^{128}Te	1981Ho12,1999Bo31

Isotope	NSR Reference Keynumber(s)
^{130}Te	1980Ho29,1977RuZR
^{127}I	1991Sa07
^{129}Xe	1988Ha28,1971Gr28
^{131}Xe	1988Ha28,1971Gr28
^{136}Xe	1977Pr07
^{133}Cs	1987Bo24
^{134}Ba	1993Bo01
^{135}Ba	1990Is07,1983BrZK,1969Ge07
^{136}Ba	1995Bo03
^{137}Ba	1995Bo05
^{138}Ba	1969Mo13
^{139}La	1970Ju04,1988BoZH,1990Is09
^{136}Ce	1981KoZW
^{138}Ce	1969Gr31
^{140}Ce	1970Ge03
^{142}Ce	1976Ge02
^{141}Pr	1985AlZN,1981Ke11,1968Ke08
^{142}Nd	1976Mi19,1993Bo29
^{143}Nd	1983Sn04
^{144}Nd	1975Hi03
^{145}Nd	1983Sn01,1976Bu14
^{146}Nd	1975Ro16,1976Ro03
^{148}Nd	1976Pi04
^{150}Nd	1975SmZT,1976Pi13,1985BuZU
^{144}Sm	1978WaZM
^{147}Sm	1971Gr37,1993Ju01
^{148}Sm	1982Ba15
^{149}Sm	1966Sm03,1963Gr18,1969Re11
^{150}Sm	1986Va08
^{152}Sm	1963Gr18,1969Sm04,1971Be41
^{154}Sm	1982Sc03
^{151}Eu	1978Vo05
^{153}Eu	1987Ba52,1978PrZY,1984Ro06
^{152}Gd	1996SpZZ
^{154}Gd	1986Sc25
^{155}Gd	1982Ba28
^{156}Gd	1993Ko01,1986GrZR,1971Gr42
^{157}Gd	1978Gr14,1970Bo29,1994GrZZ
^{158}Gd	1971Gr42
^{160}Gd	1971Gr42
^{159}Tb	1974Ke01,1989Du03
^{160}Dy	1977Be03
^{161}Dy	1995Be02,1967Ba34
^{162}Dy	1989Sc31,1967Sc05,1986Bo43
^{163}Dy	1964Sc25
^{164}Dy	1965Sc09,1983Is04
^{165}Ho	1967Mo05,1984Ke15
^{166}Er	1965Ko13,1970Mi01
^{167}Er	1991Da12,1991DaZT,1996Gi09
^{168}Er	1970Mu15
^{170}Er	1971Al01,1984MuZY

Isotope	NSR Reference Keynumber(s)
^{169}**Tm**	1994HoZZ,1989Du03,1968Lo09
^{168}**Yb**	1969Bo16,1972Wi12,1973GrZV
^{170}**Yb**	1972Wa10
^{171}**Yb**	1985Ge02,1975Gr32,1988Su01
^{172}**Yb**	1971Al01
^{173}**Yb**	1987Ge01,1981Gr01
^{174}**Yb**	1971Al27,1971Br17
^{176}**Yb**	1972Al19,1973PrZI,1990Bo49
^{175}**Lu**	1991Kl02
^{176}**Lu**	1965Ma18,1975Ge11,1971Ma45
^{174}**Hf**	1971Al01
^{176}**Hf**	1967Pr08,1967Na07
^{177}**Hf**	1986Ha22,1987Bo52
^{178}**Hf**	1989Ri03,1976Be23
^{179}**Hf**	1974Bu22,1990Bo52,1986RoZM
^{180}**Hf**	1971Al22,1967Pr08
^{180}**Ta**	1973LaZY
^{181}**Ta**	1979Va10,1971He13,1974An12
^{182}**W**	1997Pr02
^{183}**W**	1974Gr11,1975Bu01
^{184}**W**	1973PrYV
^{186}**W**	1973PrZI,1969BoZN,1989BoYT
^{185}**Re**	1969La11,1973Gl06
^{187}**Re**	1972Sh13,1968Su01,1978Sc10
^{184}**Os**	1974PrZY,1974Pr15
^{186}**Os**	1974Pr15,1974NeZY
^{187}**Os**	1983Fe06
^{188}**Os**	1992Br17,1976Be50
^{189}**Os**	1979Ca02
^{190}**Os**	1991Bo35
^{192}**Os**	1978Be22,1979Wa04
^{191}**Ir**	1991Ke10
^{193}**Ir**	1998Ba85,1998Ba42,1987CoZW
^{194}**Pt**	1987Ca03,1982Wa20
^{195}**Pt**	1979Ci04
^{196}**Pt**	1978Ya07
^{197}**Au**	1996Ma70,1996Ma75,1993Pe04
^{199}**Hg**	1970Or05,1971Ma10,1974Br02
^{201}**Hg**	1975Br02
^{203}**Tl**	1974Co21,1975RaYX
^{204}**Pb**	1967Ju02,1983Hu13
^{206}**Pb**	1983Hu13
^{207}**Pb**	1998Be19,1983Ma55
^{209}**Bi**	1989Sh20,1983Ts01
^{232}**Th**	1974Ke13,1979Je01
^{234}**U**	1972Ri08,1979Al03
^{235}**U**	1975OtZX,1973Gr20,1970Ka22
^{238}**U**	1978Bo12,1972Bo46,1984Ch05

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DEFINITIONS

E_γ: energy of gamma ray emitted in the decay process from neutron capture.

θ: natural abundance of the capturing isotope involved in the subsequent emission of the prompt gamma ray of interest.

v: speed of neutron.

v_0: neutron speed of 2200 m s^{-1}.

$\sigma_\gamma(v)$: nuclear capture cross section for neutron of speed v.

σ_0 or $\sigma_\gamma \equiv \sigma_\gamma(v_0)$: thermal neutron capture cross section or the nuclear capture cross section for neutron of speed v_0.

σ_γ^Z or σ_0^Z: thermal neutron capture cross section for the element (Z) = $\sum_i^{\text{all isotopes}} (\theta\sigma_\gamma)_i$

$P(E_\gamma)$: absolute emission probability of a gamma ray of energy E_γ (gammas per capture).

$\sigma_\gamma(E_\gamma)$: nuclear partial capture cross section = $P(E_\gamma)\sigma_0$.

$\sigma_\gamma^Z(E_\gamma)$: elemental partial capture cross section = $\theta P(E_\gamma)\sigma_0 = \theta\sigma_\gamma(E_\gamma)$; Equation (2) of Chapter 2.

$\hat{\sigma}$: effective capture cross section; definition is given by Equation (3) of Chapter 2.

$\langle\sigma\rangle$: effective capture cross section; definition is given by Equation (5) of Chapter 2.

g_W: Westcott g-factor; definition is given by Equation (12) of Chapter 2.

$\hat{g}$: effective g-factor; definition is given by Equation (20) of Chapter 2.

k_0: prompt k_0 factor; definition is given by Equation (1) of Chapter 2.

$k_0(x)$ or $k_0(E_\gamma)$: prompt k_0 factor of the specific gamma ray (of energy E_γ) from element x relative to the hydrogen 2223-keV gamma ray.

At. Wt.: Atomic Weight.

N_γ: Number of gamma rays.

ACRONYMS FOR PROMPT-GAMMA ACTIVATION ANALYSIS

No single abbreviation has been universally agreed in the analytical use of gamma rays from the capture of slow neutrons. The technique has most often been called PGAA or PGNAA during the course of this CRP. The following list has been collected from the literature:

CGA	Capture Gamma-ray Analysis
NCGA	Neutron Capture Gamma-ray Analysis
PCGRA	Prompt Capture Gamma-ray Analysis
PGA	Prompt Gamma Analysis
PGAA	Prompt Gamma Activation Analysis
PGNA	Prompt Gamma Neutron Analysis
PGNAA	Prompt Gamma-ray Neutron Activation Analysis
PNAA	Prompt Neutron Activation Analysis
PNCAA	Prompt Neutron Capture Activation Analysis
RNC	Radiative Neutron Capture
TCGS	Thermal-neutron Capture Gamma-ray Spectroscopy

Additional terms have been used when cold neutrons are employed:

CPGAA	Cold Prompt Gamma Activation Analysis
CNPGAA	Cold Neutron Prompt Gamma Activation Analysis
PGCNAA	Prompt Gamma Cold Neutron Activation Analysis
TNPGAA	Thermal Neutron Prompt Gamma Activation Analysis

Other acronym of note:

INAA	Delayed Instrumental Neutron Activation Analysis

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