NEANDC(J)-59/L
INDC(JAP)-45/L

JAERI 1261

Japanese Evaluated Nuclear Data Library, Version-1 JENDL-1

March 1979

日 本 原 子 力 研 究 所

Japan Atomic Energy Research Institute

JAERI レポート

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編集兼発行　日本原子力研究所
印　　刷　三美印刷株式会社

Japanese Evaluated Nuclear Data Library, Version-1

—— JENDL-1 ——

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Received December 6, 1978

The first version of Japanese Evaluated Nuclear Data Library, JENDL-1, was compiled as one of the most important activities of Japanese Nuclear Data Committee (JNDC) and JAERI Nuclear Data Center. JENDL-1 includes 72 nuclides most of which are needed for the study of the fast breeder reactors. This report presents a record on compilation of these nuclides, except for the data of the fission product nuclides. Compilation work on JENDL-1 was performed by a JENDL-1 compilation group which was organized in JNDC. The compilation-group members worked to select the most reliable data from among available evaluation works. When there were no relevant data, they made reevaluation and recalculation. In particular, unresolved resonance parameters for ^{235}U, ^{238}U, ^{239}Pu, ^{240}Pu, and ^{241}Pu were carefully investigated and provided. Data compiled in JENDL-1 were taken mainly from evaluation works done by working groups of JNDC and by individuals in various organizations in Japan. When the data in ENDF/B-IV are judged to be the best, the JENDL-1 compilation group recommends the use of ENDF/B-IV for those data. Therefore, they are excluded from JENDL-1. JENDL-1 was released in autumn 1977, after its reliability had been examined through benchmark tests on the integral data.

Keywords: JENDL-1, Nuclear Data, Evaluation, Data Compilation, Fast Reactors, Unresolved Resonance Parameters, Nuclear Data Library, JNDC.

日本の評価ずみ核データライブラリー，第1版

—— JENDL-1 ——

日本原子力研究所　シグマ研究委員会
JENDL-1 編集グループ

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1978 年 12 月 6 日　受理

シグマ委員会および原研核データセンターの最重要成果の1つとして日本の評価ずみ核データライブラリーの第1版，JENDL-1 を編集した．JENDL-1 は高速炉の研究にとって必要な核種を主体とした 72 核種を含んでいる．この報告書は核分裂生成物核種のデータを除き，JENDL-1 に収納されている核種のデータ編集についての記録を記述している．JENDL-1 の編集作業はシグマ委員会内に JENDL-1 編集グループを置き，そこを中心にして進めた．JENDL-1 編集グループメンバーは利用可能な評価ずみ核データから最も適当と思われる核データを選択し，適当なデータが無い場合には再評価や再計算を行ってデータを整えた．特に ^{235}U，^{238}U，^{239}Pu，^{240}Pu，^{241}Pu の非分離共鳴パラメータについては慎重に検討してデータを求めた．JENDL-1 のデータは主としてシグマ委員会のワーキンググループや日本の研究機関で個々に行われた評価研究の成果から成っている．但し，ENDF/B-IV のデータが最良であると判断した場合には，ENDF/B-IV を推薦して，JENDL-1 には入れないことにした．JENDL-1 は積分データを対象にしたベンチマークテストを終え，信頼性を確かめたうえ，1977 年の秋に公開した．

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1. Introduction

It has been one of the most earnest wishes of the neutron nuclear data community in Japan to have a domestic evaluated nuclear data library, in spite of the circumstances that many evaluated data libraries or files such as ENDF[1], UKNDL[2], KEDAK[3] and ENDL[4] are available. Before starting the compilation work on Japanese Evaluated Nuclear Data Library (JENDL), there had been many examinations and discussions in Japanese Nuclear Data Committee (JNDC) concerning the purpose of this work, technical problems for realization, methodological problems for checking the results, and so on. The purpose of preparing JENDL is to meet demands of national projects, to make a contribution to the international cooperation, and to develop the potentiality to improve the evaluated data.

Since 1970, evaluation work on nuclear data has gradually increased not only in JNDC, but also in other organizations: in Kyushu University, for example, evaluations of ^{232}Th, ^{239}Np and ^{233}Pa nuclear data were performed. In JNDC, evaluation and survey works were carried out on the nuclear data for ^{235}U, ^{238}U, ^{239}Pu, ^{240}Pu, ^{241}Pu, Ta, Fe, Ni, Cr, Na, O and 28 important fission product nuclides. Some results of these evaluations have already been reported elsewhere[5,6].

Taking account of such a background on the evaluation work and of contribution to the national project on fast breeder reactors, JNDC decided to start compilation of the first version of JENDL (JENDL-1) which should include mainly the data of nuclides needed for the fast breeder reactors. A compilation group for JENDL-1 was organized in April 1974 in order to collect all available evaluations, to select the most reliable data among them or to modify some parts in the selected data, if necessary. The following nuclides were selected for JENDL-1 before starting the compilation work:

H, ^{6}Li, (^{7}Li), ^{10}B, (^{11}B), ^{12}C, (^{16}O), ^{23}Na, ^{27}Al, Si, Cr, ^{50}Cr, ^{52}Cr, ^{53}Cr, ^{54}Cr, ^{55}Mn, Fe, ^{54}Fe, ^{56}Fe, ^{57}Fe, ^{58}Fe, Ni, ^{58}Ni, ^{60}Ni, ^{61}Ni, ^{62}Ni, ^{64}Ni, Cu, ^{63}Cu, ^{65}Cu, ^{90}Sr, ^{93}Zr, Mo, ^{92}Mo, ^{94}Mo, ^{95}Mo, ^{96}Mo, ^{97}Mo, ^{98}Mo, ^{100}Mo, ^{99}Tc, ^{101}Ru, ^{102}Ru, ^{104}Ru, ^{106}Ru, ^{103}Rh, ^{105}Pd, ^{107}Pd, ^{109}Ag, ^{129}I, ^{131}Xe, ^{133}Cs, ^{135}Cs, ^{137}Cs, ^{144}Ce, ^{143}Nd, ^{144}Nd, ^{145}Nd, ^{147}Pm, ^{147}Sm, ^{149}Sm, ^{151}Sm, ^{153}Eu, ^{155}Eu, ^{181}Ta, ^{232}Th, ^{233}Pa, ^{234}U, ^{235}U, ^{238}U, ^{239}Np, ^{239}Pu, ^{240}Pu, ^{241}Pu, ^{241}Am

The nuclides in parentheses were finally excluded from JENDL-1, because the ENDF/B-IV data for these nuclides were judged to be the best at that time. Hence the data of ENDF/B-IV are recommended for the nuclides in parentheses when they are needed.

Concerning the data preparation, many persons helped the compilation group to provide the existing evaluated data, including their own evaluations. Some of them made survey work about the evaluated data and recommended the preferable data for JENDL-1. Using these data and many experimental data, the compilation-group members were engaged in the work on the examinations of the data. They made reevaluations and recalculations when there were no relevant data. In this report, these reevaluations are mainly described. In chapter 2, the general description about the data collection, reevaluation and recalculation is presented together with the formulas used to obtain the data in JENDL-1. In chapter 3, specific information for each nuclide is given. The numerical values are shown in Appendix as well as the graphs of cross sections.

The following persons cooperated in this work. The authors express their thanks for in-

valuable help from them :

H. Matsunobu (Sumitomo Atomic Energy Industries, Ltd.)

Y. Kanda (Kyushu University)

M. Kawai (NAIG Nuclear Research Laboratory, Nippon Atomic Industry Group Co., Ltd.)

M. Yamamoto (Atomic Energy Research Laboratory, Hitachi, Ltd.)

H. Nakamura (Fuji Electric Co., Ltd.)

M. Sasaki (Mitsubishi Atomic Power Industries, Ltd.)

T. Hojuyama (Mitsubishi Atomic Power Industries, Ltd.)

H. Yamakoshi (Ship Research Institute)

T. Ohsawa (Kyushu University)

M. Hatcha (Mitsui Shipbuilding and Engineering Co., Ltd.)

A. Asami (Japan Atomic Energy Research Institute)

T. Murata (NAIG Nuclear Research Laboratory, Nippon Atomic Industry Group Co., Ltd.)

T. Yoshida (NAIG Nuclear Research Laboratory, Nippon Atomic Industry Group Co., Ltd.)

A. Zukeran (Power Reactor and Nuclear Fuel Development Corporation)

and

members of fission product nuclear data evaluation group of JNDC.

Many experimental data were supplied for this work from NEUDADA Library of CCDN*). We are very much indebted to CCDN members for their cooperative support.

*) Centre de Compilation de Données Neutroniques (Saclay).

2. General Description for JENDL-1 Compilation

The data recommended to JENDL-1 are divided into five categories:
(i) the data recommended from working-group members of the JNDC through their own evaluation,
(ii) the data recommended from the compilation group for JENDL-1 through their own evaluation,
(iii) the data recommended through investigation of the existing evaluated data under a contract with JAERI,
(iv) the data recommended through evaluation made by the persons in charge, when there were no relevant data after investigation of the existing evaluated data under a contract with JAERI,
(v) the data of ENDF/B-IV recommended by persons in charge after investigations of the experimental and existing evaluated data, under a contract with JAERI.
The data for some nuclides are composed of two or three of these categories. TABLE 1 shows the contents of the recommendation for each nuclide. Though the data for the fission product nuclides —^{90}Sr, ^{93}Zr, and from ^{95}Mo to ^{155}Eu—are typical ones belonging to the category (i), no description for them will be given in this report because detailed explanation for these data has been already reported elsewhere[6].

Data of some quantities for almost all nuclides were estimated from the calculations with nuclear model codes. These quantities are background cross sections in the resonance region, inelastic scattering cross sections for each excited level of the residual nucleus, angular distributions of elastically scattered neutrons, and some of the threshold reaction cross sections. Methods and formulas used in the present work are given in the following parts of this chapter.

2.1 Resonance Formulas

The data format of JENDL-1 is the same as that of ENDF/B. Thus, most of the data-processing codes for ENDF/B are available to JENDL-1. In the resonance energy region, the single-level Breit-Wigner formula is commonly used as a matter of convenience for saving the computer time. It is well known, however, that the calculated values of the elastic scattering cross section become occasionally negative at some energy points when the single-level formula is used. This is due to a disregard of the interference term between the resonances which appears in the multi-level resonance formula. This term is expressed by the following formula[1], and is taken into account as a background cross section in JENDL-1:

$$\sigma_{el,b}(E_n)=\frac{2\pi}{k_n^2}\sum_J g_J \sum_{r=2}^{NR_J}\sum_{s=1}^{r-1}\left[\frac{\Gamma_{nr}\cdot\Gamma_{ns}\cdot\left[(E_n-E_r)\cdot(E_n-E_s)+\frac{1}{4}\Gamma_r\cdot\Gamma_s\right]}{\left[(E_n-E_r)^2+\frac{1}{4}\Gamma_r^2\right]\cdot\left[(E_n-E_s)^2+\frac{1}{4}\Gamma_s^2\right]}\right]_J, \qquad (2.1)$$

where notations are the same as those used in ENDF/B. In practical calculations in JENDL-1, the background cross section $\sigma_{el,b}(E_n)$ was obtained by subtracting the cross sections calculated with the single-level Breit-Wigner formula from those calculated with the multi-level Breit-Wigner formula given in ENDF/B.

Though there are some restrictions in ENDF/B for the use of the multi-level Breit-Wigner formula, it is an advantage that no additional parameters other than those for the single-level

TABLE 1 Nuclides, their MAT numbers and categories about data recommendation exclusive of secondary neutron spectrum.

Nuclide	MAT No.	Category	Nuclide	MAT No.	Category	Nuclide	MAT No	Category
H	1011	B , D	Cu	1290	C , D	^{133}Cs	1551	A
^{6}Li	1031	B , E	^{63}Cu	1291	C , D	^{135}Cs	1552	A
^{10}B	1051	B,D,E	^{65}Cu	1292	C , D	^{137}Cs	1553	A
^{12}C	1061	B,D,E	^{90}Sr	1381	A	^{144}Ce	1581	A
^{23}Na	1111	B , C	^{93}Zr	1401	A	^{143}Nd	1601	A
^{27}Al	1131	B	Mo	1420	A , B	^{144}Nd	1602	A
Si	1140	B	^{92}Mo	1421	C	^{145}Nd	1603	A
Cr	1240	B	^{94}Mo	1422	C	^{147}Pm	1611	A
^{50}Cr	1241	B	^{95}Mo	1423	A	^{147}Sm	1621	A
^{52}Cr	1242	B	^{96}Mo	1424	A	^{149}Sm	1622	A
^{53}Cr	1243	B	^{97}Mo	1425	A	^{151}Sm	1623	A
^{54}Cr	1244	B	^{98}Mo	1426	A	^{153}Eu	1631	A
^{55}Mn	1251	B,C,E	^{100}Mo	1427	A	^{155}Eu	1632	A
Fe	1260	B	^{99}Tc	1431	A	^{181}Ta	1731	A , B
^{54}Fe	1261	A , B	^{101}Ru	1441	A	^{232}Th	1901	C , D
^{56}Fe	1262	A , B	^{102}Ru	1442	A	^{233}Pa	1911	B,D,E
^{57}Fe	1263	B	^{104}Ru	1443	A	^{234}U	1921	B , E
^{58}Fe	1264	B	^{106}Ru	1444	A	^{235}U	1922	A,B,E
Ni	1280	B	^{103}Rh	1451	A	^{238}U	1923	A,B,E
^{58}Ni	1281	B , C	^{105}Pd	1461	A	^{239}Np	1931	B , C
^{60}Ni	1282	B , C	^{107}Pd	1462	A	^{239}Pu	1941	A,B,E
^{61}Ni	1283	B , C	^{109}Ag	1471	A	^{240}Pu	1942	A,B,E
^{62}Ni	1284	B , C	^{129}I	1531	A	^{241}Pu	1943	A , E
^{64}Ni	1285	B , C	^{131}Xe	1541	A	^{241}Am	1951	B , E

(A) the data recommended from the working-group members of the JNDC, through their own evaluation,
(B) the data recommended from the compilation group for the JENDL-1, through their own evaluation,
(C) the data recommended through evaluation made by the persons in charge, when there were no relevant data after investigation of the existing evaluated data under a contract with JAERI,
(D) the data recommended through investigation of the existing evaluated data under a contract with JAERI,
(E) the data of the ENDF/B-IV recommended by persons in charge after investigations of the experimental and existing evaluated data.

formula are required in the calculations. The only problem in applying this formula is that the total spin J must be known for all the levels considered. For most nuclides, the values of the spin J are not always assigned for all the resonances treated. In order to overcome this difficulty, a modified multi-level Breit-Wigner formula was developed[6] by estimating the values of J statistically for the levels with the unassigned J. The capture and elastic scattering cross sections are given in this modified formula as follows:

$$\sigma_{n,\gamma}(E_n)=\frac{\pi}{k_n^2}\sum_l\left[\sum_J g_J\sum_\lambda\frac{\Gamma_{n\lambda}\cdot\Gamma_{\gamma\lambda}}{(E_n-E_\lambda)^2+\frac{1}{4}\Gamma_\lambda^2}+\bar{g}\sum_\nu\frac{\Gamma_{n\nu}\cdot\Gamma_{\gamma\nu}}{(E_n-E_\nu)^2+\frac{1}{4}\Gamma_\nu^2}\right], \tag{2.2}$$

$$\begin{aligned}\sigma_{n,n}(E_n)=\frac{\pi}{k_n^2}\sum_l\Bigg[&4(2l+1)\cdot\sin^2\phi_l\\
&+\sum_J g_J\sum_\lambda\frac{\Gamma_{n\lambda}^2-\Gamma_{n\lambda}\cdot\Gamma_\lambda\cdot(1-\cos2\phi_l)+2\Gamma_{n\lambda}\cdot(E_n-E_\lambda)\cdot\sin2\phi_l}{(E_n-E_\lambda)^2+\frac{1}{4}\Gamma_\lambda^2}\\
&+\bar{g}\sum_\nu\frac{\Gamma_{n\nu}^2-\Gamma_{n\nu}\cdot\Gamma_\nu\cdot(1-\cos2\phi_l)+2\Gamma_{n\nu}\cdot(E_n-E_\nu)\cdot\sin2\phi_l}{(E_n-E_\nu)^2+\frac{1}{4}\Gamma_\nu^2}\\
&+\sum_J g_J\sum_{\lambda\neq\mu}\frac{\Gamma_{n\lambda}\cdot\Gamma_{n\mu}\cdot\left[(E_n-E_\lambda)\cdot(E_n-E_\mu)+\frac{1}{4}\Gamma_\lambda\cdot\Gamma_\mu\right]}{\left[(E_n-E_\lambda)^2+\frac{1}{4}\Gamma_\lambda^2\right]\cdot\left[(E_n-E_\mu)^2+\frac{1}{4}\Gamma_\mu^2\right]}\\
&+2\sum_J g_J\cdot P_J\sum_{\lambda\neq\nu}\frac{\Gamma_{n\lambda}\cdot\Gamma_{n\nu}\cdot\left[(E_n-E_\lambda)\cdot(E_n-E_\nu)+\frac{1}{4}\Gamma_\lambda\cdot\Gamma_\nu\right]}{\left[(E_n-E_\lambda)^2+\frac{1}{4}\Gamma_\lambda^2\right]\cdot\left[(E_n-E_\nu)^2+\frac{1}{4}\Gamma_\nu^2\right]}\\
&+\sum_J g_J\frac{P_J(P_JN-1)}{N-1}\sum_{\nu\neq\xi}\frac{\Gamma_{n\nu}\cdot\Gamma_{n\xi}\cdot\left[(E_n-E_\nu)\cdot(E_n-E_\xi)+\frac{1}{4}\Gamma_\nu\cdot\Gamma_\xi\right]}{\left[(E_n-E_\nu)^2+\frac{1}{4}\Gamma_\nu^2\right]\cdot\left[(E_n-E_\xi)^2+\frac{1}{4}\Gamma_\xi^2\right]}\Bigg].\end{aligned} \tag{2.3}$$

Here, suffices λ and μ indicate the resonances with known J-values, ν and ξ with unknown J-values, P_J is the probability that the spin of a resonance is J, N is the number of resonances whose J-values are unknown, and $\bar{g}$ is the average value of the statistical weight factor g_J. It is assumed in this formula[1,6] that the resonances are induced by the s- or p-wave neutrons, and probability[6] that a resonance belongs to the state J is inversely proportional to the average level spacing D_J.

2.2 Unresolved Resonance Parameters

For the heavy nuclides, the so-called unresolved resonance parameters must be given in the energy region where the resonance levels are considered to be still separated ($\Gamma<D$) but the resonance parameters are not given sufficiently yet. In this unresolved resonance region, the self-shielding and Doppler effects are still significant owing to the resonance structure of the cross sections. In JENDL-1, the unresolved resonance parameters are given to ^{235}U, ^{238}U, ^{239}Pu, ^{240}Pu and ^{241}Pu.

In the present work, the unresolved resonance parameters were obtained so as to reproduce the cross sections in this region. The following were assumed in this work:

(1) the states excited by the s- and p-wave neutrons were only considered,

(2) the γ-ray width Γ_γ was assumed to be constant for all the spin states of the compound nucleus,

(3) the mean level spacing was expressed as

$$D_J=\frac{2(2I+1)}{2J+1}D_0\cdot\exp[-E_n/T_c], \tag{2.4}$$

where J denotes the spin of the compound nucleus, I the spin of the target nucleus, D_0 the

observed mean level spacing in the low energy region, E_n the incident neutron energy and T_c the nuclear temperature of the compound nucleus which was assumed to be 500 keV in this work,

(4) the s- and p-wave neutron strength functions were searched for with their ratio fixed to a value recommended in BNL 325, 3rd edition[7],

(5) the spin dependence of the fission width was estimated by means of the channel theory of fission[8].

Using the above assumptions, the parameters of ^{235}U were determined so as to reproduce the fission and capture cross sections from 82 eV to 21.5 keV. The parameters of ^{238}U were given in the region of 4~46.5 keV. They were determined so that the total and capture cross sections might be reproduced. The parameters of ^{239}Pu were determined in the region of 598 eV~21.5 keV so as to reproduce the total, fission and capture cross sections, while the parameters of ^{240}Pu and ^{241}Pu were given from 3.91 to 46.5 keV and from 100 eV to 21.5 keV, respectively, to reproduce the fission and capture cross sections.

2.3 Cross Sections in the Fast Region

In the high energy region, the optical and statistical model calculations were mainly used to estimate the expectation values of the averaged cross sections. When there were many experimental data, they were naturally used to obtain the recommended data. In most cases, however, the experimental data for the neutron capture and inelastic scattering cross sections were too scarce to do the evaluation only with those data. Hence, the theoretical calculations had to be performed to obtain the capture and inelastic scattering cross sections. In the theoretical calculations, the sum of the partial cross sections concerned must be equal to the total cross section which is obtained by the optical model calculation. The cross section formulas[9] used here were derived so as to keep this consistency in the framework of the spherical optical model and the statistical model calculations.

The optical potential used in the present work is

$$V(r) = -V_O \cdot f(r, r_O, a_O) - iW_I \cdot f(r, r_I, a_I) - iW_S \cdot g(r, r_S, a_S) - V_{SO} \cdot \left(\frac{\hbar}{m_\pi c}\right)^2 \cdot \frac{1}{r}\left|\frac{d}{dr} f(r, r_{SO}, a_{SO})\right| \cdot (\vec{\sigma} \cdot \vec{l}), \tag{2.5}$$

where

$$f(r, x, a) = \{1 + \exp[(r - x \cdot A^{1/3})/a]\}^{-1}.$$

As to the surface absorption term, there are two kinds of the form factor, derivative Woods-Saxon type and Gaussian type. The form factor $g(r, r_S, a_S)$ is

$$g(r, r_S, a_S) = \begin{cases} 4a_S \left|\frac{d}{dr} f(r, r_S, a_S)\right|, & \text{for derivative Woods-Saxon,} \\ \exp\{[(r - r_S \cdot A^{1/3})/a_S]^2\}, & \text{for Gaussian.} \end{cases}$$

The potential parameters used in the calculations will be described for each nuclide in the next chapter.

Using the optical potential, the total, shape elastic scattering and the total reaction cross sections[9] are obtained. They are related with each other:

$$\sigma_{tot} = \sigma_{el,s} + \sigma_R \tag{2.6}$$

The total reaction cross section σ_R is written by using the neutron transmission coefficient $\langle \mathring{T}^{J\Pi}_{njl} \rangle$ which is obtained by the optical model calculation:

$$\sigma_R(E_n) = \frac{\pi}{k_n^2} \sum_{J\Pi jl} g_J \langle \mathring{T}^{J\Pi}_{njl} \rangle, \tag{2.7}$$

where k_n is the wave number of the incident neutron. The neutron transmission coefficient is

written in a rather general form as follows:

$$<\mathring{T}^{J\Pi}_{njl}> \equiv T^{j}_{l}(E_n, I, \pi_I), \tag{2.8}$$

where I and π_I are the spin and parity of the target nucleus.

For a level of the residual nucleus with excitation energy $\varepsilon_{n'}$, spin I' and parity $\pi_{I'}$, the transmission coefficient is

$$<\mathring{T}^{J\Pi}_{n'j'l'}> \equiv T^{j'}_{l'}(E_n-\varepsilon_{n'}, I', \pi_{I'}). \tag{2.9}$$

The energy difference $E_n-\varepsilon_{n'}$ is the emitted neutron energy $E_{n'}$. Hence, the quantity in Eq. (2.9) corresponds to the neutron transmission coefficient for the inverse process in which the neutron with energy $E_{n'}$ bombards the target nucleus in a state of the excitation energy $\varepsilon_{n'}$, spin I' and parity $\pi_{I'}$.

Two kinds of the γ-ray transmission coefficient are used in our cross section formula[9]:

$$<T^{J\Pi}_{\gamma 1}> = C^{J\Pi}_{O}\int_{E_n}^{E_n+B_n} d\varepsilon_\gamma \cdot \varepsilon_\gamma{}^3 \cdot f_\gamma(\varepsilon_\gamma)\cdot \rho_C(E_n+B_n-\varepsilon_\gamma) \tag{2.10}$$

and

$$<T^{J\Pi}_{\gamma 2}> = C^{J\Pi}_{O}\int_{0}^{E_n+B_n} d\varepsilon_\gamma \cdot \varepsilon_\gamma{}^3 \cdot f_\gamma(\varepsilon_\gamma)\cdot \rho_C(E_n+B_n-\varepsilon_\gamma). \tag{2.11}$$

Notations and assumptions used here are the same as those in Ref. 9. Using these quantities, the cross section formulas for the capture and inelastic scattering cross sections are

$$\sigma_{n,\gamma}(E_n) = \frac{\pi}{k_n{}^2}\sum_{J\Pi jl} g_J \cdot \frac{<\mathring{\Theta}^{J\Pi}_{njl}>}{<\Theta^{J\Pi}>}\cdot\left\{<\Theta^{J\Pi}_{\gamma 1}> + <\Theta^{J\Pi}_{\gamma 2}> \times\left[\frac{\Delta\Theta^{J\Pi}_{\gamma}}{<\mathring{\Theta}^{J\Pi}>}\cdot S^{J\Pi}_{njl;\,\gamma 2} - 1 + S^{J\Pi}_{njl;\,\gamma 2}\right]\right\}, \tag{2.12}$$

and

$$\sigma_{n,n'}(E_n\rightarrow E_{n'}) = \frac{\pi}{k_n{}^2}\sum_{J\Pi jlj'l'} g_J\left\{\frac{<\mathring{\Theta}^{J\Pi}_{njl}>\cdot<\mathring{\Theta}^{J\Pi}_{n'j'l'}>}{<\Theta^{J\Pi}>}\cdot S^{J\Pi}_{njl;\,n'j'l'} \times\left(1+\frac{\Delta\Theta^{J\Pi}_{\gamma}}{<\mathring{\Theta}^{J\Pi}>}\right) - \delta_{njl;\,n'j'l'}\cdot\frac{1}{4}(1-\alpha)\cdot Q^{J\Pi}(<\Theta^{J\Pi}>)\cdot<\mathring{\Theta}^{J\Pi}_{njl}>^2\right\}, \tag{2.13}$$

where $<\mathring{\Theta}^{J\Pi}_{njl}>$, $<\Theta^{J\Pi}_{\gamma i}>$, $\Delta\Theta^{J\Pi}_{\gamma}$, $<\mathring{\Theta}^{J\Pi}>$ and $<\Theta^{J\Pi}>$ are defined as follows:

$$<\mathring{\Theta}^{J\Pi}_{njl}> - \frac{1}{4}Q^{J\Pi}(<\Theta^{J\Pi}>)\cdot<\mathring{\Theta}^{J\Pi}_{njl}>^2 = <\mathring{T}^{J\Pi}_{njl}>, \tag{2.14}$$

$$<\Theta^{J\Pi}_{\gamma i}> - \frac{1}{4}Q^{J\Pi}(<\Theta^{J\Pi}>)\cdot<\Theta^{J\Pi}_{\gamma i}>^2 = <T^{J\Pi}_{\gamma i}>, \tag{2.15}$$

$$\Delta\Theta^{J\Pi}_{\gamma} = <\Theta^{J\Pi}_{\gamma 2}> - <\Theta^{J\Pi}_{\gamma 1}>, \tag{2.16}$$

$$<\mathring{\Theta}^{J\Pi}> = <\Theta^{J\Pi}_{\gamma 2}> + \sum_{n'j'l'}<\mathring{\Theta}^{J\Pi}_{n'j'l'}>, \tag{2.17}$$

and

$$<\Theta^{J\Pi}> = <\mathring{\Theta}^{J\Pi}>/(1-\alpha). \tag{2.18}$$

Quantity α is given by using the cross section $\Delta\sigma$ of the competing processes such as fission, $(n, 2n)$, $(n, 3n)$ and the charged particle emission,

$$\alpha = \Delta\sigma/\sigma_R. \tag{2.19}$$

The quantity $Q^{J\Pi}$ represents the effect of the resonance interference[10,11].

Correction factors of the resonance-width fluctuation are written in the integral forms

$$S^{J\Pi}_{njl;\,\gamma 2} = \int_0^\infty dt\cdot\exp\{-<\Theta^{J\Pi}_{\gamma 2}>\cdot t/<\mathring{\Theta}^{J\Pi}>\} \times\left\{\left(1+\frac{2}{\nu_n}\cdot\frac{<\mathring{\Theta}^{J\Pi}_{njl}>}{<\mathring{\Theta}^{J\Pi}>}\cdot t\right)\cdot\prod_{c\neq\gamma}\left(1+\frac{2}{\nu_c}\cdot\frac{<\mathring{\Theta}^{J\Pi}_{c}>}{<\mathring{\Theta}^{J\Pi}>}\cdot t\right)^{\nu_c/2}\right\}^{-1}, \tag{2.20}$$

for the γ-ray channel and

$$S^{J\Pi}_{njl;n'j'l'}=\int_0^\infty dt\left(1+\frac{2}{\nu_n}\cdot\delta_{njl;n'j'l'}\right)\cdot\exp\{-<\Theta^{J\Pi}_{\gamma 2}>\cdot t/<\mathring{\Theta}^{J\Pi}>\}$$
$$\times\left\{\left(1+\frac{2}{\nu_n}\cdot\frac{<\mathring{\Theta}^{J\Pi}_{njl}>}{<\mathring{\Theta}^{J\Pi}>}\cdot t\right)\cdot\left(1+\frac{2}{\nu_{n'}}\cdot\frac{<\mathring{\Theta}^{J\Pi}_{n'j'l'}>}{<\mathring{\Theta}^{J\Pi}>}\cdot t\right)\right.$$
$$\left.\times\prod_{c\neq\gamma}\left(1+\frac{2}{\nu_c}\cdot\frac{<\mathring{\Theta}^{J\Pi}_{c}>}{<\mathring{\Theta}^{J\Pi}>}\cdot t\right)^{\nu_c/2}\right\}^{-1}, \tag{2.21}$$

for the neutron channel.

When the levels of the residual nucleus are assumed to be overlapping above an energy ε_c, Eq. (2.9) is rewritten as

$$<\mathring{T}^{J\Pi}_{n'j'l'}>=\sum_{I'\pi_{I'}}\int_{\varepsilon_c}^{E_n}d\varepsilon_{n'}T^{j'}_{l'}(E_n-\varepsilon_{n'},I',\pi_{I'})\cdot\rho_T(U',I',\pi_{I'}). \tag{2.22}$$

The level density formula and parameters were taken from the Gilbert-Cameron's work[12]. In addition to this formula, parity distribution function was introduced[9] in our calculation. Using Eq. (2.13), the total inelastic scattering cross section is obtained by summing up the partial inelastic scattering cross section:

$$\sigma_{in}(E_n)=\sum_{n'\neq n}\sigma_{n,n'}(E_n\rightarrow E_{n'}). \tag{2.23}$$

For some nuclides, the $(n,2n)$ reaction cross section was calculated by using the simple formula proposed by Pearlstein[13]:

$$\sigma_{n,2n}(E_n)=\sigma_{ne}(E_n)\cdot P_M(E_n)\cdot P_{2n}(E_n), \tag{2.24}$$

where $\sigma_{ne}(E_n)$ is the non-elastic cross section, $P_M(E_n)$ the probability for neutron emission from the non-elastic process, and $P_{2n}(E_n)$ the ratio of the $(n,2n)$ to all neutron emission processes. The non-elastic cross section was given as follows[14]:

$$\sigma_{ne}(E_n)=\pi\cdot(0.12\cdot A^{1/3}+0.21)^2, \tag{2.25}$$

but, in the high energy region where the compound elastic scattering is negligibly small, it may be replaced by the total reaction cross section, σ_R. Pearlstein gave the following formula for the quantity $P_M(E_n)$:

$$P_M(E_n)=1-1.764\cdot\exp\{18.14\cdot(N-Z)/A\}. \tag{2.26}$$

When the cross section for emission of the charged particle is available, it may be given as

$$P_M(E_n)=1-\frac{\sigma_{CP}(E_n)}{\sigma_{ne}(E_n)}, \tag{2.27}$$

where $\sigma_{CP}(E_n)$ means the cross section for the charged particle emission. The quantity $P_{2n}(E_n)$ is defined simply as

$$P_{2n}(E_n)=\frac{\int_0^{E_n-S_n}\varepsilon\cdot\sigma_{inv}(\varepsilon)\cdot\exp[\sqrt{4a(E_n-\varepsilon)}]d\varepsilon-\int_0^{E_n-S_{2n}}\varepsilon\cdot\sigma_{inv}(\varepsilon)\cdot\exp[\sqrt{4a(E_n-\varepsilon)}]d\varepsilon}{\int_0^{E_n}\varepsilon\cdot\sigma_{inv}(\varepsilon)\cdot\exp[\sqrt{4a(E_n-\varepsilon)}]\cdot d\varepsilon}, \tag{2.28}$$

where $\sigma_{inv}(\varepsilon)$ is the cross section for inverse process, S_n a neutron separation energy[15] from the residual nucleus, S_{2n} the energy of two-neutron separation[15], and a the level density parameter of which formula was given by Newton[16]. In some cases, the calculated cross sections were renormalized to an appropriate experimental value. Details will be explained for each nuclide in the next chapter.

2.4 Level Density Formula

As mentioned in the previous subsection, the level density formula and parameters were taken from the Gilbert-Cameron's work[12]. Here, we give the formula, and explain some notations used

in the present work for the convenience of composition of the next chapter. The level density is used in Eqs. (2.10), (2.11) and (2.22). The first two equations include the level density for the compound nucleus, and the last includes one for the target or residual nucleus. The formula for the former does not have a spin cutoff factor for making the formula of the γ-ray transmission coefficient simple. However, we will present here the general formula including the spin cutoff factor and a parity distribution factor as well.

The level density formula is written as follows:

$$\rho(U, I, \pi)=\rho_{\mathrm{E}}(U)\cdot\rho_{\mathrm{S}}(I)\cdot\rho_{\mathrm{P}}(\pi), \tag{2.29}$$

where $\rho_{\mathrm{E}}(U)$ is the total level density[12] at the excitation energy U, $\rho_{\mathrm{S}}(I)$ the spin distribution function for the levels with spin I and $\rho_{\mathrm{P}}(\pi)$ the parity distribution for the parity π. They are

$$\rho_{\mathrm{E}}(U)=\frac{\sqrt{\pi}}{12}\frac{1}{a^{1/4}U^{5/4}}\exp(2\sqrt{aU}), \tag{2.30}$$

$$\rho_{\mathrm{S}}(I)=\frac{(2I+1)}{2\sqrt{2\pi}\sigma_M{}^3}\exp\{-I(I+1)/2\sigma_M{}^2\}, \tag{2.31}$$

and

$$\rho_{\mathrm{P}}(\pi)=\frac{N_\pi+0.5\cdot\exp[(U-U_{\mathrm{O}})/\delta]}{1+\exp[(U-U_{\mathrm{O}})/\delta]}. \tag{2.32}$$

The excitation energy U is related to the total excitation energy E by subtracting a pairing energy Δ:

$$U=E-\Delta. \tag{2.33}$$

The spin cutoff parameters σ_M is given by the following formula[12]:

$$\sigma_M{}^2=\alpha_M U^{1/2}, \tag{2.34}$$

where α_M is defined by using the level density parameter a and the mass number A of the nucleus:

$$\alpha_M=0.0888\sqrt{a}\,A^{2/3}. \tag{2.35}$$

The parity distribution function $\rho_{\mathrm{P}}(\pi)$ in Eq. (2.32) is tentatively given, where N_π stands for the fraction of the discrete levels with the parity π. Two parameters U_{O} and δ will be explained later. For the levels with high excitation energy, the function $\rho_{\mathrm{P}}(\pi)$ tends to 1/2.

Using Eqs. (2.30), (2.31), (2.32) and (2.34), we write the level density as follows:

$$\rho(U, I, \pi)=\frac{(2I+1)}{C_{\mathrm{O}}U^2}\exp\left\{2\sqrt{aU}-\frac{I(I+1)}{2\sigma_M{}^2}\right\}\cdot\rho_{\mathrm{P}}(\pi), \tag{2.36}$$

where

$$C_{\mathrm{O}}=24\sqrt{2}\,a^{1/4}\alpha_M{}^{3/2}. \tag{2.37}$$

This formula of the level density is favorable to such highly excited states as the Fermi gas model can be applied. So, we call this formula the gas model formula, and attach a subscript G as $\rho_{\mathrm{G}}(U, I, \pi)$. We assume that this formula may be used above an excitation energy E_x (or U_x);

$$U_x=E_x-\Delta. \tag{2.38}$$

Below this energy E_x, the so-called constant temperature model is assumed:

$$\rho_{\mathrm{T}}(U, I, \pi)=\rho_{\mathrm{G}}(U_x, I, \pi)\cdot\exp\{(U-U_x)/T\}, \tag{2.39}$$

where

$$\frac{1}{T}=\frac{1}{U_x}(\sqrt{aU_x}-2). \tag{2.40}$$

Since we assume that the levels above ε_c are overlapping as mentioned in the previous subsection, the constant temperature model is used between ε_c and E_x. In the low energy part of this region, the parity distribution may be very similar to that of the discrete levels, while the distribution for higher excitation tends to that of the gas model, that is, 1/2. This is the reason

why we assume the formula given in Eq. (2.32). The parameters U_0 and δ are artificially given as follows:

$$U_0 = \{(E_x + \varepsilon_c)/2\} - \Delta, \tag{2.41}$$

and

$$\delta = |E_x - \varepsilon_c|/8. \tag{2.42}$$

3. Description of the Recommended Data

As mentioned in chapter 1, many persons contributed the evaluated data to JENDL-1. Some of them offered their own evaluations, and the others recommended the already existing evaluations after their review-works on the evaluated data. The compilation-group members of JENDL-1 reexamined these data whether they satisfied necessary conditions to be filed. When the data were not adequate, the compilation-group members made reevaluation to provide data which satisfied the conditions completely. They had to do quick evaluation for Al, Si and Cr for some reason, so that many unsatisfactory points might exist on data collection and investigation for these nuclides.

In this chapter, specific information including these recommendation and reevaluation about the data of JENDL-1 is given for each nuclide except for the fission product nuclides. For ^{235}U, ^{238}U, ^{239}Pu, ^{240}Pu and ^{241}Pu, unresolved resonance parameters were carefully investigated. Description of the data for these five important nuclides is given in detail. In TABLE 2, contents of JENDL-1 data are summarized.

TABLE 2 Nuclides, material numbers (MAT) and quantities in JENDL-1. Symbols for quantities stand for as follows:

- σ : cross section.
- P : angular distributions for secondary neutrons.
- S : energy spectrum for secondary neutrons.
- $\bar{\mu}_L$: average cosine for scattering angle of elastically scattered neutrons.
- RP : resonance parameters.
- Y : fission product yields.
- $\bar{\nu}$: numbers of neutrons per fission. Subscripts p and d represent prompt and delayed neutrons.

Superscripts i and c on the quantities concerning the inelastic scattering mean the quantities for individual (or discrete) and for continuum levels. A symbol S_d. means delayed neutron spectrum.

Nuclide	MAT.	Quantities in JENDL-1.
H	1011	σ_{tot}, σ_{el}, P_{el} $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{6}Li	1031	σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n\alpha}$, $P_{n,2n\alpha}$, $S_{n,2n\alpha}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$. B-IV) $\sigma_{in}^{(c)}$, $\sigma_{n,2n\alpha}$, $\sigma_{n,p}$, $\bar{\mu}_L$, P_{el}, $P_{in}^{(c)}$, $S_{n,2n\alpha}$, $S_{in}^{(c)}$.
^{10}B	1051	σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $S_{n,2n}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,d}$, $\sigma_{n,\alpha}$, $\sigma_{n,t2\alpha}$, $\bar{\mu}_L$, σ_{n,α_0}, σ_{n,α_1}. B-IV) σ_{el} above 580 keV, $\sigma_{n,\alpha}$ above 235 keV, σ_{in}, $\sigma_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $\sigma_{n,p}$, $\sigma_{n,d}$, $\sigma_{n,t2\alpha}$, $\bar{\mu}_L$, σ_{n,α_0} above 235 keV, σ_{n,α_1} above 235 keV, P_{el}. Note: Excitation above 12th level is included in continuum.
^{12}C	1061	σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$. B-IV) σ_{tot} above 2 MeV, σ_{el} above 2 MeV, σ_{in}, $\sigma_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$, P_{el}, $P_{in}^{(i)}$, $S_{in}^{(c)}$.
^{23}Na	1111	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $S_{n,2n}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$. B-IV) $S_{n,2n}$.
^{27}Al	1131	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $S_{n,2n}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$. B-IV) $S_{n,2n}$.
Si	1140	σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $S_{n,2n}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$. B-IV) $S_{n,2n}$, $S_{in}^{(c)}$.
Cr	1240	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $S_{n,2n}$, $\sigma_{n,n'p}$, $P_{n,n'p}$, $S_{n,n'p}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$.

Table 2 continued

Nuclide	MAT.	Quantities in JENDL-1.
		B-IV) $S_{n,2n}$, $S_{n,n'p}$.
^{50}Cr	1241	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,n'p}$, $P_{n,n'p}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$.
^{52}Cr	1242	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$.
^{53}Cr	1243	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$.
^{54}Cr	1244	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{55}Mn	1251	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $S_{n,2n}$, $\sigma_{n,n'\alpha}$, $P_{n,n'\alpha}$, $S_{n,n'\alpha}$, $\sigma_{n,n'p}$, $P_{n,n'p}$, $S_{n,n'p}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,d}$, $\sigma_{n,^3He}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$. B-IV) RP, σ_{tot}, $\sigma_{n,\gamma}$ and σ_{el} below 80 keV $\sigma_{n,\gamma}$, σ_{in}, $\sigma_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $\sigma_{n,2n}$, $\sigma_{n,n'\alpha}$, $\sigma_{n,n'p}$, $\sigma_{n,p}$, $\sigma_{n,d}$, $\sigma_{n,^3He}$, $\bar{\mu}_L$, P_{el}, $S_{n,2n}$, $S_{n,n'\alpha}$, $S_{n,n'p}$, $S_{in}^{(c)}$.
Fe	1260	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $S_{n,2n}$, $\sigma_{n,n'p}$, $P_{n,n'p}$, $S_{n,n'p}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$. B-IV) $S_{n,2n}$, $S_{n,n'p}$.
^{54}Fe	1261	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,n'p}$, $P_{n,n'p}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$.
^{56}Fe	1262	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,n'p}$, $P_{n,n'p}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$.
^{57}Fe	1263	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$.

Table 2 continued

Nuclide	MAT.	Quantities in JENDL-1.
^{58}Fe	1264	σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$.
Ni	1280	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $S_{n,2n}$, $\sigma_{n,n'\alpha}$, $P_{n,n'\alpha}$, $\sigma_{n,n'p}$, $P_{n,n'p}$, $S_{n,n'p}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$. B-IV) $S_{n,2n}$, $S_{n,n'p}$.
^{58}Ni	1281	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,n'\alpha}$, $P_{n,n'\alpha}$, $\sigma_{n,n'p}$, $P_{n,n'p}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$.
^{60}Ni	1282	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,n'p}$, $P_{n,n'p}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$.
^{61}Ni	1283	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$.
^{62}Ni	1284	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$.
^{64}Ni	1285	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,\gamma}$, $\sigma_{n,\alpha}$, $\bar{\mu}_L$.
Cu	1290	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$. B-IV) $S_{n,2n}$.
^{63}Cu	1291	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{65}Cu	1292	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.

Table 2 continued

Nuclide	MAT.	Quantities in JENDL-1.
^{90}Sr	1381	σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{93}Zr	1401	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
Mo	1420	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{92}Mo	1421	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{94}Mo	1422	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{95}Mo	1423	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{96}Mo	1424	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{97}Mo	1425	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{98}Mo	1426	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{100}Mo	1427	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{99}Tc	1431	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{101}Ru	1441	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{102}Ru	1442	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{104}Ru	1443	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{106}Ru	1444	σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{103}Rh	1451	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{105}Pd	1461	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{107}Pd	1462	σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{109}Ag	1471	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.

Table 2 continued

Nuclide	MAT.	Quantities in JENDL-1.
^{129}I	1531	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{131}Xe	1541	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{133}Cs	1551	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{135}Cs	1552	σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{137}Cs	1553	σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{144}Ce	1581	σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{143}Nd	1601	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{144}Nd	1602	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{145}Nd	1603	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{147}Pm	1611	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{147}Sm	1621	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{149}Sm	1622	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{151}Sm	1623	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{153}Eu	1631	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{155}Eu	1632	σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{181}Ta	1731	RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $S_{n,2n}$, $\sigma_{n,\gamma}$, $\sigma_{n,p}$, $\bar{\mu}_L$. B-IV) $S_{n,2n}$.
^{232}Th	1901	$\bar{\nu}$, $\bar{\nu}_d$, S_{dn}, $\bar{\nu}_p$, Y, RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $S_{n,2n}$, $\sigma_{n,3n}$, $P_{n,3n}$, $S_{n,3n}$, $\sigma_{n,f}$, $P_{n,f}$, $S_{n,f}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.

Table 2 continued

Nuclide	MAT.	Quantities in JENDL-1.
		B-IV) Y, S_{dn}, $S_{n,2n}$, $S_{n,3n}$.
^{233}Pa	1911	$\bar{\nu}$, RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $S_{n,2n}$, $\sigma_{n,3n}$, $P_{n,3n}$, $S_{n,3n}$, $\sigma_{n,f}$, $P_{n,f}$, $S_{n,f}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
		B-IV) $S_{n,2n}$, $S_{n,3n}$, $S_{n,f}$.
^{234}U	1921	$\bar{\nu}$, RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $S_{n,2n}$, $\sigma_{n,3n}$, $P_{n,3n}$, $S_{n,3n}$, $\sigma_{n,f}$, $P_{n,f}$, $S_{n,f}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
		B-IV) $\bar{\nu}$, $S_{n,2n}$, $S_{n,3n}$, $S_{n,f}$.
^{235}U	1922	$\bar{\nu}$, Y, $\bar{\nu}_d$, S_{dn}, $\bar{\nu}_p$, RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $S_{n,2n}$, $\sigma_{n,3n}$, $P_{n,3n}$, $S_{n,3n}$, $\sigma_{n,f}$, $P_{n,f}$, $S_{n,f}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
		B-IV) Y, RP in resolved resonance region. σ_{tot}, σ_{el}, $\sigma_{n,f}$ and $\sigma_{n,\gamma}$ below 82 eV. $S_{in}^{(c)}$, $S_{n,2n}$, $S_{n,3n}$, $S_{n,f}$, S_{dn}.
^{238}U	1923	$\bar{\nu}$, Y, $\bar{\nu}_d$, S_{dn}, $\bar{\nu}_p$, RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $S_{n,2n}$, $\sigma_{n,3n}$, $P_{n,3n}$, $S_{n,3n}$, $\sigma_{n,f}$, $P_{n,f}$, $S_{n,f}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
		B-IV) $\bar{\nu}$, Y, $\bar{\nu}_d$, $\bar{\nu}_p$, RP in resolved resonance region. σ_{tot} and σ_{el} below 1 eV, and $\sigma_{n,\gamma}$ below 4 keV. $S_{n,2n}$, $S_{n,3n}$, $S_{n,f}$, $S_{in}^{(c)}$, S_{dn}.
^{239}Np	1931	$\bar{\nu}$, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,3n}$, $P_{n,3n}$, $\sigma_{n,f}$, $P_{n,f}$, $S_{n,f}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
^{239}Pu	1941	$\bar{\nu}$, Y, $\bar{\nu}_d$, S_{dn}, $\bar{\nu}_p$, RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $S_{n,2n}$, $\sigma_{n,3n}$, $P_{n,3n}$, $S_{n,3n}$, $\sigma_{n,f}$, $P_{n,f}$, $S_{n,f}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$.
		B-IV) Y. σ_{tot} and $\sigma_{n,\gamma}$ below 0.6 eV, and σ_{el} and $\sigma_{n,f}$ below 1.0 eV. $S_{n,2n}$, $S_{n,3n}$, $S_{n,f}$, S_{dn}.

Table 2 continued

Nuclide	MAT.	Quantities in JENDL-1.
^{240}Pu	1942	$\bar{\nu}$, $\bar{\nu}_d$, S_{dn}, $\bar{\nu}_p$, RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $S_{n,2n}$, $\sigma_{n,3n}$, $P_{n,3n}$, $S_{n,3n}$, $\sigma_{n,f}$, $P_{n,f}$, $S_{n,f}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$. B-IV) $\bar{\nu}$, $\bar{\nu}_d$, $\bar{\nu}_p$, RP in resolved resonance region. σ_{el} and σ_{tot} below 0.5 eV. $\sigma_{n,f}$ and $\sigma_{n,\gamma}$ below 3.91 keV. $S_{n,2n}$, $S_{n,3n}$, $S_{n,f}$, $S_{in}^{(c)}$, S_{dn}.
^{241}Pu	1943	$\bar{\nu}$, Y, $\bar{\nu}_d$, $\bar{\nu}_p$, S_{dn}, RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $S_{n,2n}$, $\sigma_{n,3n}$, $P_{n,3n}$, $S_{n,3n}$, $\sigma_{n,f}$, $P_{n,f}$, $S_{n,f}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$. B-IV) $\bar{\nu}$, Y, $\bar{\nu}_d$, $\bar{\nu}_p$, σ_{tot} and $\sigma_{n,f}$ below 1 eV, $S_{n,2n}$, $S_{n,3n}$, $S_{n,f}$, S_{dn}.
^{241}Am	1951	$\bar{\nu}$, Y, RP, σ_{tot}, σ_{el}, P_{el}, σ_{in}, $\sigma_{in}^{(i)}$, $P_{in}^{(i)}$, $\sigma_{in}^{(c)}$, $P_{in}^{(c)}$, $S_{in}^{(c)}$, $\sigma_{n,2n}$, $P_{n,2n}$, $\sigma_{n,3n}$, $P_{n,3n}$, $\sigma_{n,f}$, $P_{n,f}$, $S_{n,f}$, $\sigma_{n,\gamma}$, $\bar{\mu}_L$. B-IV) Y, $S_{n,f}$.

Hydrogen

M. Yamamoto recommended the elastic scattering cross section and its angular distributions above 100 keV by Hopkins and Breit[17], and the capture cross section by Horsley[18]. The JENDL-1 compilation group examined his recommendation through comparing with the experimental data. No serious problems were found in his recommended data, and hence the compilation group adopted them.

However, the data below 100 keV had to be added in order to complete the data file of the elastic scattering cross section. The experimental data in this energy region gather around a curve derived from the s-wave neutron scattering by single proton. The cross section formula is

$$\sigma_{el}(E_n)=\frac{1}{4}\sigma_{el}^{(1)}(E_n)+\frac{3}{4}\sigma_{el}^{(2)}(E_n)\ , \tag{3.1}$$

where

$$\sigma_{el}^{(1)}(E_n)=\frac{4\pi a_1^2B^2}{\left[B-\frac{1}{4}\frac{a_1r_1}{\rho^2}E_n\right]^2+\frac{a_1^2}{2\rho^2}B\cdot E_n}\ , \tag{3.2}$$

$$\sigma_{el}^{(2)}(E_n)=\frac{16\pi a_3^2B^2}{(2B+E_n)\left[2B+\frac{1}{4}\left(\frac{a_3r_3}{\rho^2}\right)^2E_n\right]}\ . \tag{3.3}$$

Investigation was made to decide the values of a size parameter of the deuteron $\rho=\hbar/\sqrt{2mB}$, the deuteron binding energy B, the singlet and triplet scattering length a_1 and a_3, and the effective range r_1 and r_3 for the singlet and triplet states. Using a reduced mass m of the neutron-proton system and the binding energy of the deuteron $B=2.225$ MeV, the parameter ρ was given as 4.31 fm. There had been many studies on the scattering length and the effective range. Lomon and Wilson[19] obtained the values shown in TABLE 3-1 (a), and Dilg[20] deduced the data in TABLE 3-1 (b).

Using these parameter sets, we calculated the cross sections and compared them with the experimental data at 24 keV measured by Fujita *et al.*[21] Though the differences among them were very small, the result with the parameters of Lomon and Wilson was closer to the data of Fujita *et al.* rather than those with the parameters of Dilg. Therefore, we adopted the parameter set of Lomon and Wilson and obtained the cross sections below 100 keV. As to the angular distributions in this energy region, isotropic scattering was assumed in the center of mass system because only the s-wave neutrons were effective.

TABLE 3-1 Effective range and scattering length for the neutron-proton system.

a) Lomon and Wilson	b) Dilg
$a_1=-23.719\pm0.013$ (fm)	$a_1=-23.749\pm0.009$ (fm)
$a_3=5.414\pm0.005$ (fm)	$a_3=5.423\pm0.004$ (fm)
$r_1=2.76\pm0.05$ (fm)	$r_1=2.81\pm0.05$ (fm)
$r_3=1.750\pm0.005$ (fm)	$r_3=1.760\pm0.005$ (fm)

Lithium-6

There have been many experimental and theoretical investigations on the (n, α) reaction cross section because of its importance as one of the standard cross section below 100 keV. T. Nakagawa[22] also studied this cross section below about 400 keV. He assumed the formula

$$\sigma_{n,\alpha}=\frac{C_1}{\sqrt{E_n}}+\frac{C_2\sqrt{E_n}}{(E_o-E_n)^2+\frac{1}{4}\Gamma^2}+\Delta\sigma\ , \tag{3.4}$$

and looked for the parameters C_1, C_2, E_o, Γ and $\Delta\sigma$ so that the formula might reproduce the experimental data by Pönitz[23] and Coates *et al.*[24] He obtained $C_1=0.1495$, $C_2=0.013329$, $E_o=0.2394$, $\Gamma=0.09900$ and $\Delta\sigma=-0.03232$. However, he did not get the elastic scattering cross section and/or total cross section.

Komoda and Igarasi[25] investigated the ^{6}Li cross sections below 20 MeV from the viewpoint of a self-consistent evaluation in the wide energy range. They used the Kapur-Peierls formula[26] with some approximation. The cross section formula is as follows:

$$\sigma_{n,x}=\frac{\pi}{k_n^2}\sum_{Jsls'l'}g_J|\delta_{xs'l';nsl}-U^J{}_{xs'l';nsl}|^2\ . \tag{3.5}$$

The collision matrix U is given in the following formula:

$$U_{c'c}=\exp\{i(\omega_c'+\omega_c)\}\cdot\delta_{c';c}+i\sum_{\lambda}\frac{g_{\lambda c'}g_{\lambda c}}{E_\lambda-\frac{i}{2}\Gamma_\lambda-E_n}\ , \tag{3.6}$$

where c stands for a channel index, ω_c a phase-shift of Coulomb minus hard sphere scattering, P_c a penetration factor and

$$g_{\lambda c}=\exp(i\omega_c)\cdot\sqrt{2P_c}\theta_{\lambda c}\ , \tag{3.7}$$

A reduced width amplitude $\theta_{\lambda c}$ is a complex number but is assumed to be independent of the energy. Two factors ω_c and P_c are energy dependent. Komoda and Igarasi assumed the relations

$$\Gamma_\lambda=\sum_c\Gamma_{\lambda c}=\sum_c|g_{\lambda c}|^2\ , \tag{3.8}$$

$$|\theta_{\lambda c}|^2=\Gamma_\lambda/(2\sum_{c'}P_{c'})\ , \tag{3.9}$$

for the initial values of the parameters.

Using these formulas, they looked for some positive parity states of ^{7}Li which had not been confirmed yet experimentally. Since the $1/v$-form of the (n, α) cross section is brought about from the s-wave neutron resonances, the positive parity states of the compound nucleus must exist somewhere. They assumed that the positive parity states must exist in the energy region above 2 MeV according to the theoretical prediction.[27] For this purpose, they adopted the experimental data by Fort and Marquette[28], Pönitz[23], Coates *et al.*[24], Bartle[29], and Kern and Kreger[30] for the (n, α) reaction cross section, and the data by Asami and Moxon[31], Lane *et al.*[32], Knitter and Coppola[33], Hopkins *et al.*[34], Batchelor and Towle[35], and Cookson *et al.*[36] for the elastic scattering cross section. After many trials for reproducing these data, they obtained the cross sections of the elastic scattering, (n, α) reaction and inelastic scattering for the second excited state of ^{6}Li.

TABLE 3-2 Parameters of ^{6}Li.

E (MeV)	J^Π	Γ_n (MeV)	Γ_α (MeV)	arg θ_n (radian)	arg θ_α (radian)
0.25	$5/2^-$	0.0577	0.0229	0	0
2.3	$1/2^+$	1.92	1.02	0	0
2.9	$3/2^-$	0.867	0	0	
4.1	$1/2^-$	0.943	0	0	
4.7	$3/2^-$	1.53	0	0	
4.7	$1/2^+$	6.06	0.44	0	0
7.6	$3/2^+$	5.23	0.98	−2.31	+0.78
9.3	$3/2^+$	6.35	1.68	−2.11	−0.96
12.8	$3/2^+$	6.86	2.28	−1.61	−1.59

Interaction radii; $a_n=2.73$ fm, $a_\alpha=3.10$ fm.

Results of this calculation were slightly higher than the experimental peak values at 250 keV. In order to correct this shortcoming, they made further calculation and obtained the parameters shown in TABLE 3-2. Using these parameters, they showed the cross-section values of the total, elastic scattering, inelastic scattering and (n, α) reaction which agreed with some recent experimental data. Therefore, the compilation group adopted the data of Komoda and Igarasi from the viewpoint of the self-consistency of the data.

Some partial and differential cross sections of ENDF/B-IV are recommended. They are indicated in the comment file of JENDL-1.

Boron-10

Since the (n, α) reaction cross section of ^{10}B is one of the important standard data for measurements, there have been many evaluation and experimental works. M. Yamamoto made a survey work in order to look for the appropriate data for JENDL-1.

(n, α) reaction cross section

Most measurements[37~44] of the (n, α) cross section at 0.0253 eV gave almost the same value. Hence, Yamamoto adopted the average value of 3836.6 barns as a recommended thermal cross section of the (n, α) reaction.

There were many evaluation works[45~50] above the thermal region. Rejecting the works in which only the $1/v$-form was assumed, Yamamoto adopted the works of Gubernator and Moret[49] and of Sowerby *et al.*[50]. He examined their data carefully and recommended the data of Sowerby *et al.* below 150 keV because they made a correction of the elastic scattering effects. Above 150 keV, Yamamoto recommended the data of ENDF/B-IV[51] which were derived from the R-matrix analysis.

The JENDL-1 compilation group agreed to his recommendation. In addition to his recommendation, we derived the cross sections for $^{10}B(n, \alpha_0)$ and $^{10}B(n, \alpha_1)$ from the data of Sowerby *et al.* which correspond to the processes leaving the residual nucleus ^{7}Li to its ground state and an excited state with the energy of 478 keV, respectively. The branching ratio was taken from ENDF/B-IV.

Elastic scattering cross section

Yamamoto recommended the calculated data from the resonance parameters compiled in BNL 325, 3rd edition[7] below 400 keV. This result agreed with the data of Asami and Moxon[52]. The thermal value of 2.173 barns was also in agreement with the data of 2.23±0.6 barns of BNL 325[7]. For the data above 400 keV, Yamamoto recommended ENDF/B-IV. After examination of the data status, we decided to receive his recommendation. Hence, no data of the elastic scattering cross section is given in the JENDL-1 file above 400 keV.

The other data

Since the capture cross section was very small and minor, we gave a simple formula of the $1/v$-form,

$$\sigma_{n,\gamma}(E_n)=8\times10^{-5}/\sqrt{E_n} \text{ (barns)}, \tag{3.10}$$

where E_n is given in MeV and the numerator is decided so that the thermal value of 0.5±0.2 barns[7] may be reproduced.

Available data of the $(n, 2n)$ cross section was only one point of 27±4 milli-barns at 14.1 MeV by Mather and Pain[53]. A straight line passing through this point was assumed tentatively.

For the data of the inelastic scattering, (n, p), (n, d) cross sections, etc., the ENDF/B-IV is recommended.

Carbon

There were many works[54~66] on review, evaluation and experiment. M. Yamamoto surveyed these works and made some evaluation work in order to recommend the appropriate evaluated data to JENDL-1. For the total cross section, he recommended the evaluated data by Nishimura *et al.*[64] or by Francis *et al.*[56] below 2 MeV. As to the other quantities including the total cross section above 2 MeV, he recommended the data of the ENDF/B-IV as the best. Taking account of his recommendation and making an examination of the data, the compilation group of JENDL-1 adopted the data mentioned below.

Below 2 MeV

Though Yamamoto recommended the total cross section obtained by Nishimura *et al.* or Francis *et al.*, the values of these two evaluations were only slightly different with each other. Hence, we took the data by Nishimura *et al.* However, their data were obtained in the energy region where the capture cross sections were very small and could be completely neglected. In this sense, we considered them as the elastic scattering cross sections rather than the total cross sections. In fact, their cross-section formula gives a constant value at the very low energy region.

$$\sigma_{el}(E_n)=4.699-3.061E_n+1.069E_n^2-0.095E_n^3-0.026E_n^4 \text{ (barns)}, \tag{3.11}$$

where E_n is given in MeV.

Adopted capture cross section at 0.0253 eV was 3.4 milli-barns[7] and was reproduced by the following formula which was used in the whole energy range below 20 MeV:

$$\sigma_{n,\gamma}(E_n)=(5.408\times10^{-4})/\sqrt{E_n} \text{ (barns)}, \tag{3.12}$$

where E_n is in eV. The total cross section was composed of these capture and elastic scattering cross sections.

Above 2 MeV

Except for the total and capture cross sections, the data of the ENDF/B-IV were adopted because there were no reasons to reject the recommendation of Yamamoto. The capture cross sections were obtained from the above mentioned formula and the total cross sections were composed of the partial cross sections. It was confirmed that the values of the total cross section above and below 2 MeV connected smoothly with each other.

Sodium

Since this element is one of the most important materials for the fast breeder reactor, there have been many works on measurement and evaluation of the nuclear data. Surveying the evaluation works made before 1974, M. Yamamoto adopted five evaluation works[67~71] as the important references, and investigated them in detail through comparing their data with each other and with the experimental data.

Thermal and resonance region

Yamamoto adopted the data at 0.0253 eV recommended in the BNL 325, 3rd edition[7]; the total cross section of 3.7 barns and the capture cross section of 530 milli-barns. He assumed that the capture cross section had the form of $1/v$ in the thermal energy region. These values and the form of the cross sections were used to determine the cross sections in the resonance region which he defined from 500 eV to 150 keV where the self-shielding effect is important for the reactor calculations.

Yamamoto estimated the resonance parameters for the first six levels of 2.8, 7.5, 35, 53, 115 and 130 keV. He used mainly the data recommended by Paik and Pitterle, those compiled in

BNL 325, 3rd edition and those measured by Hockenbury *et al.*[72]. For 2.8 keV level, he investigated the data by Seltzer and Firk[73], Rahn *et al.*[74], Good *et al.*[75], Lynn *et al.*[76] and Moxon and Pattenden[77]. He found good agreement between these data sets and adopted the data compiled in BNL 325, 3rd edition, with $J=1$ and $l=0$. Values of Γ_γ at 7.5 keV level were discrepant between Paik and Pitterle[71] and Mughabghab and Garber[7]. Assuming $l=1$ and using the value by Mughabghab and Garber for Γ_γ, Yamamoto obtained $J>1$ from the values of $g\Gamma_n\Gamma_\gamma/\Gamma$ and $\sigma_0\Gamma_\gamma$ by Hockenbury *et al.* Then he estimated Γ_n for $J=2$ and 3, and obtained $\Gamma_n=0.0017$ eV for $J=2$, $\Gamma_n=0.003$ eV for $J=3$ and $\sigma_0=170$ barns. He discarded these results for their unacceptable values. He examined the data by Hockenbury *et al.* and Paik and Pitterle, and decided $J=1$ and $l=1$. He accepted the data of these two groups. His recommended values are given in TABLE 3-3.

Yamamoto obtained $\Gamma_n=0.55$ eV for 35 keV level from the value of $2g\Gamma_n$ by Mughabghab and Garber. He calculated also the values of $g\Gamma_n\Gamma_\gamma/\Gamma$ from the data given by Paik and Pitterle, and by Mughabghab and Garber, and confirmed that they agreed with the experimental data by Hockenbury *et al.* within the experimental error. He adopted the data compiled by Mughabghab and Garber through these examinations. As to the 53 keV level, he adopted also the data set by Mughabghab and Garber after comparing the data by Paik and Pitterle, Rahn *et al.*, Hockenbury *et al.* and Mughabghab and Garber. He confirmed that the agreement was rather good among these data sets.

Assuming $J=2$ and $J=3$ for the 115 keV and 130 keV levels, respectively, Yamamoto estimated the values of Γ_n for these two levels by using Γ_γ compiled in the BNL 325, 3rd edition and $g\Gamma_n\Gamma_\gamma/\Gamma$ of Hockenbury *et al.* He confirmed that they agreed with those given by Paik and Pitterle.

The compilation group of JENDL-1 accepted his recommendation concerning the resonance parameters and resonance region, except for the background data in this region. According to the compilation[7] of the resonance parameters, there are many data available even above 150 keV. The compilation group added eight resonance levels between 150 and 540 keV to make the background data in the resonance region from their tails. Besides, the compilation group added small background data so that the cross-section curves for the total and capture cross sections in this region might connect smoothly with those for the regions below 500 eV and above 150 keV, respectively.

Fast region

Yamamoto investigated the total cross sections given by Stelson and Preston[78], Garg *et al.*[79], Langsford *et al.*[80] and Whalen *et al.*[81] in the region from 150 to 550 keV. He examined accuracy, availability, etc. of the data, and adopted the data by Stelson and Preston in this energy region. From 550 keV to 10 MeV, he adopted the data by Cierjacks *et al.*[82] after surveying the data by Stelson and Preston, Adair *et al.*[83], Calvi *et al.*[84], Leroy *et al.*[85], Vaughn *et al.*[86], Deconninck *et al.*[87], Meier *et al.*[88], Towle and Gilboy[89], Fabiani *et al.*[90], Glasgow and Foster[91], and Langsford

TABLE 3-3 Resonance parameters of Na.

E (keV)	J	l	Γ_n (eV)	Γ_γ (ev)
2.85	1	0	411	0.38
7.35	1	1	0.013	1.0
35.4	3	1	0.55	0.79
53.15	2	1	1200	1.58
114.7	2	0	120	3.0
129.5	3	1	0.772	0.58

et al. as well as the data by Cierjacks *et al.* Yamamoto confirmed that the data by these authors were consistent with each other. He adopted the data by Glasgow and Foster for the total cross sections above 10 MeV.

As to the capture cross sections above 150 keV, Yamamoto adopted the data by Le Rigoleur *et al.*[92] Using the data by Williamson[93], Bass and Saleh[94] and Picard and Williamson[95], Yamamoto obtained the (n, p) reaction cross sections above 3.75 MeV. He estimated also the cross sections of the (n, α) and $(n, 2n)$ reactions from the data by Williamson[93], and Wölfer and Bormann[96] for the former reaction and by Menlove *et al.*[97] for the latter.

Yamamoto took the first seven levels of ^{23}Na, i.e. 0.439, 2.078, 2.393, 2.641, 2.705, 2.983 and 3.680 MeV, and estimated the inelastic scattering cross sections for the first level on the basis of the experimental data by Towle and Gilboy, Chien and Smith[98], Lind and Day[99] and Shipley *et al.*[100] For the higher excited levels, he took the data by Freeman and Montague[101], Lind and Day, Towle and Owens[102] and the evaluated data by Schmidt[68]. He obtained the total inelastic scattering cross sections up to 4 MeV by summing up these partial cross sections for each level. Above 4 MeV, he used the evaluated data by Schmidt and the experimental data by Martin and Stewart[103,104] and Sukhanov and Rukavishnikov[105]. For the elastic scattering cross sections, he obtained the values by subtracting simply the non-elastic cross section from the total cross section. However, he recommended the data of the angular distributions from the compilation work by Garber *et al.*[106] and the evaluation work by Moorhead[69].

The compilation group of JENDL-1 accepted his recommendation and added some other data needed to the data library. For example, $\bar{\mu}$ was provided by using the above mentioned angular distributions of the recommended elastic scattering cross sections.

Aluminium

Since there were many experimental data, an eye-guide decision was applied for many quantities. The inelastic scattering and $(n, 2n)$ reaction cross sections were exceptionally estimated from the theoretical calculations for scarcity of the experimental data. The $(n, n'p)$, (n, d), (n, t) and $(n, {}^3\mathrm{He})$ reactions were ignored for their small cross-section values.

Low energy region below 3 keV

The thermal capture and elastic scattering cross sections recommended in the ref. 7) were adopted. They are 0.23 barn and 1.50 barns, respectively. The elastic scattering cross sections in this region were assumed to be equal to that at 0.0253 eV. The capture cross sections below 500 eV were assumed to have a shape of $1/v$. The capture cross sections between 500 eV and 3 keV were estimated by an eye guide and were connected smoothly with those above 3 keV and below 500 eV.

Resonance region

The cross sections between 3 and 140 keV were calculated from the resonance parameters using the multilevel Breit-Wigner formula in Eqs. (2.2) and (2.3). The resonance parameters were taken from the ref. 7), and some modifications were made so that the calculated total cross sections might satisfactorily reproduce the experimental data. Besides, a negative level was also taken into account so as to get better fit between experimental and calculated cross sections. The adopted resonance parameters are shown in TABLE 3-4.

Some small structure was observed around 10 keV in the total cross section. However, the resonance parameters about this structure had not been analysed yet. Thus, the background data for the elastic scattering and capture cross sections were needed to reproduce this structure.

TABLE 3-4 Adopted resonance parameters of ^{27}Al.

E (keV)	J	l	Γ_n (keV)	Γ_γ (ev)
−15	3	0	1.0	1.5
5.903	1	1	0.001	0.95
34.7	2	0	3.42	2.8
88.5	3	0	11.31	1.6
119.8	2	1	3.49	1.6
145.0	3	0	15.14	1.6
159.0	4	1	2.84	1.6
204.8	2	1	4.26	1.6
208.1	2	1	4.34	1.6

Fast region

The total cross section had been measured by many authors over a wide energy range, and the data seemed to be in good agreement with each other. Thus, an eye-guide method was available to get a curve of the total cross section. Drawing a curve below 3.0 MeV was made by taking a fine structure of the data into account, and above 3.0 MeV was done by taking a gross structure. The capture cross sections above 140 keV were also obtained by an eye guide. The curve reproduced a gross structure of the data.

The (n, α) reaction cross section was taken from the evaluation of Kanda and Nakasima[107]. The (n, p) reaction cross sections were obtained entirely on the basis of the experimental data. The details of this evaluation will be presented elsewhere[108]. Very few measurements on the ^{27}Al$(n, 2n)^{26m}$Al reaction had been made and no experimental data were available for the ^{27}Al$(n, 2n)^{26m+26g}$Al reaction. Thus the $(n, 2n)$ cross sections were calculated by Pearlstein's method[13].

The inelastic scattering cross sections were calculated with a computer code CASTHY[9] by taking the (n, γ), (n, p), (n, α) and $(n, 2n)$ reactions into account as the competing processes. The optical potential parameters used in the calculations were searched for so that the average values of the experimental total cross sections were well reporduced. The potential parameters and level parameters are shown in TABLE 3-5 (a) and (b), respectively. The calculated values of the inelastic scattering cross section were in good agreement with the measured data[102,109,110]. The elastic scattering cross sections were obtained from the total and partial cross sections thus estimated.

TABLE 3-5 (a) Optical potential parameters.

$V_0=42.39-0.18\cdot E_n$ (MeV)
$W_s=4.5$ (MeV)
$V_{so}=5.8$ (MeV)
$r_0=r_{so}=1.235$ (fm)
$r_s=1.137$ (fm)
$a_0=a_{so}=0.65$ (fm)
$a_s=0.6$ (fm)

TABLE 3-5 (b) Level scheme of ^{27}Al.

No.	E (MeV)	spin-parity
gr.	0.0	5/2+
1.	0.842	1/2+
2.	1.013	3/2+
3.	1.65	5/2+
4.	1.83	5/2+
5.	2.21	7/2+
6.	2.73	5/2+
7.	2.98	3/2+
8.	3.00	9/2+

Levels above 3.7 MeV are assumed to be overlapping.

Silicon

The evaluated neutron cross sections for natural silicon were obtained from 10^{-5}eV to 15 MeV mainly on the basis of the available experimental data. However, the cross sections for the inelastic scattering and $(n, 2n)$ reaction were estimated from the theoretical calculations, since the

experimental data for the inelastic scattering were not enough to give the excitation curve in a whole range and the data for the $(n, 2n)$ reaction were very scarce. The (n, p), (n, α), (n, n') and $(n, 2n)$ reaction cross sections for the natural Si were composed of the corresponding quantities for each isotope whose data were obtained in this work. Since the cross sections of the reactions for (n, t), $(n, {}^3He)$ and $(n, n'\alpha)$ are very small and also the reactions for $(n, n'p)$ and (n, d) make small contributions below 15 MeV, these reactions are ignored in JENDL-1.

Energy region below 1 keV

The radiative capture cross sections for ^{28}Si and ^{29}Si at 0.0253 eV were taken from the experimental data of Spitz and de Boer[111]. They were 160 mb for ^{28}Si and 101 mb for ^{29}Si, respectively. The capture cross section of ^{30}Si at 0.0253 eV was obtained to be 106 mb by averaging the data of Köhler and Knopf[112], and Ryves[113]. From these values, the capture cross section for the natural Si was given to be 156 mb at 0.0253 eV. The scattering cross section for the natural Si was taken to be 2.2 barns at 0.0253 eV from a recommended value of BNL 325[7].

In this energy range, the elastic scattering cross section for the natural Si was taken to be a constant value equal to that at 0.0253 eV. The capture cross section for the natural Si was assumed to have a form of $1/v$ passing through the above mentioned value at 0.0253 eV.

Energy region above 1 keV

There have been many experiments on the total cross section for the natural Si. In this quick evaluation, high-resolution measurements on the total cross section for the natural Si made by Cierjacks *et al.*[82], Schwartz *et al.*[114], Perey *et al.*[115] and Cabe and Cance[116] were examined above 200 keV, and the data of Fields and Walt[117] were investigated below 200 keV. Except for the data by Cierjacks *et al.* which were slightly higher systematically than others, the data were in good agreement with each other. The data of Fields and Walt measured below 800 keV were in agreement with the data of the high-resolution measurements in the overlapping region. Therefore, the total cross sections above 1 keV were obtained by averaging the experimental data so that the gross structure of the data might be reproduced. Connection with the data below 1 keV was tested and confirmed.

The experimental capture cross sections were very scarce for the natural Si. In this evaluation, the capture cross sections for the natural Si were calculated from 1 keV to 1.6 MeV by using the recent data of the resonance parameters by Boldeman *et al.*[118] and Kenney *et al.*[119], which are shown in TABLE 3-6. The resonance structure obtained in this way was not reliable, because the resonance parameters for each isotope were insufficient for construction of detailed data of the natural Si. Hence, the calculated values were averaged over every proper energy-interval and were renormalized so as to connect the cross-section curve in this region with the $1/v$ part below 1 keV. The cross-section value of 0.56 mb at 14.1 MeV was obtained by averaging the experimental data of Cvelber *et al.*[120] and of Rigaud *et al.*[121] The cross section from 1.6 to 15 MeV was estimated so that it might increase monotonously and pass through the values at 1.6 and 14.1 MeV obtained above.

The (n, p) cross sections from 5.0 to 7.8 MeV for ^{28}Si were obtained from an eye-guided curve which roughly followed the experimental data of Marion *et al.*[122] and Jeronymo *et al.*[123] These two data sets agreed with each other, even the structures of the excitation functions. The experimental data of Bass *et al.*[124] were lower than the two data sets by 20 to 50% in the same energy region, but the shape of their excitation functions was in agreement with each other in the same region. Since only the data of Bass *et al.* were available in the range of 7.8~9.0 MeV, their data were multiplied by a factor of 1.4 to connect with the former two data sets around 7 MeV. In the range of 9~15 MeV, the excitation curve was drawn by an eye guide to pass through the data around 14 MeV including those of Cohen and White[125].

TABLE 3-6 Adopted resonance parameters for Si isotopes.

(a) s-wave resonance parameters for ^{28}Si.

E (keV)	J	Γ_n (keV)	Γ_γ (eV)
55.9	1/2	1.5	0.113
182.7	1/2	56	1
1159.0	1/2	3.3	3.8

(b) p-wave resonance parameters for ^{28}Si.

E (keV)	J	Γ_n (keV)	Γ_γ (eV)
67.71	3/2	0.01	1.185
354.1	1.17	0.2	0.84
399	3/2	0.2	0.66
562	3/2	2.0	2.92
585.8	1/2	0.8	2.77
770	1.17	0.3	1.76
782	1.17	0.3	0.43
802	1.17	0.4	3.29
806	3/2	27	9.7
907	3/2	3	1.13
950	1.17	0.5	1.46
955	1/2	90	16
973	3/2	0.5	1.83
1040	1/2	1.4	2.06
1197	3/2	12	3.82
1261	1/2	6	4.3
1400	3/2	8	2.7

(c) d-wave resonance parameters for ^{28}Si.

E (keV)	J	Γ_n (keV)	Γ_γ (eV)
31.74	5/2	1.9×10^{-5}	1.0
70.8	2.1	1.5×10^{-5}	1.0
531	5/2	0.53	0.65
601	3/2	0.20	3.5
843	3/2	2.5	2.0
870	5/2	0.20	1.3

(d) Resonance parameters for ^{29}Si.

E (keV)	J	l	Γ_n (eV)	Γ_γ (eV)
38.82	2	1	80	2.31

(e) Resonance parameters for ^{30}Si.

E (keV)	J	l	Γ_n (eV)	Γ_γ (eV)
4.98	1/2	0	5	0.7

For the ^{29}Si(n, p) reaction cross section, there existed only a few experimental data around 14 MeV. A value of 120 mb at 14.5 MeV was taken from the data of Paul and Clark[126], Ranakumar *et al.*[127] and Singh[128]. A general shape of the excitation curve for this reaction was assumed to be the same as that for the ^{28}Si(n, p) reaction, and the cross-section values were obtained by normalizing the curve to the above mentioned value at 14.5 MeV. The shape near the threshold energy was modified a little so that the curve might start from this energy. The ^{30}Si(n, p) reaction cross section was ignored here because of its very small values.

The cross section for the ^{28}Si(n, α) reaction from 5.3 to 8.5 MeV was obtained from an eye-guide curve which followed the experimental data of Birk *et al.*[129] and Mainsbridge *et al.*[130] Above 8.5 MeV, there were only a few experimental data around 14 MeV. A value of 150 mb at 14.5 MeV was taken from the data of Singh,[128] and a cross-section curve in this range was drawn so as to pass through the above value at 14.5 MeV and to connect smoothly with the values in the lower range.

The ^{29}Si(n, α) reaction cross section from 2.5 to 3.8 MeV was taken from the experimental data of Konijn and Lauber.[131] The cross-section values in the range of 3.8~6.5 MeV were obtained from a smooth line drawn roughly by an eye guide so as to follow the experimental data of Birk *et al.*[129] Only the experimental data around 14 MeV were available in the range of 6.5~15 MeV. A value of 18 mb at 14.5 MeV was adopted from the data of Singh.[128] The excitation curve in this region was drawn by an eye guide so as to decrease monotonously and pass through the above mentioned 18 mb at 14.5 MeV.

For the ^{30}Si(n, α) reaction cross section, there existed a few experimental data only around 14 MeV. A cross-section value of 70 mb at 14.5 MeV was adopted from the data of Ranakumar *et al.*[127] and Singh.[128] A general shape of the excitation curve for this reaction was assumed to be the same as that for the ^{28}Si(n, α). The absolute values were obtained by normalizing the

TABLE 3-7 Level parameters for Si isotopes.

	^{28}Si		^{29}Si		^{30}Si	
	E (MeV)		E (MeV)		E (MeV)	
gr.	0.0	0	0.0	1/2$^+$	0.0	0$^+$
1	1.799	2$^+$	1.273	3/2$^+$	2.235	2$^+$
2	4.617	4$^+$	2.028	5/2$^+$	3.498	2$^+$
3	4.975	0$^+$	2.425	3/2$^+$	3.770	1$^+$
4	6.276	3$^+$	3.067	5/2$^+$	3.788	0$^+$
5	6.691	0$^+$	3.623	7/2$^-$	4.809	2$^+$
6	6.878	3$^-$	4.080	7/2$^+$	4.830	3$^+$
7	6.889	4$^+$	4.741	9/2$^+$	5.230	3$^+$
8	7.381	1$^+$	4.839	1/2$^+$	5.280	4$^+$
9	7.416	2$^+$	4.895	5/2$^+$	5.372	0$^+$
10	7.798	3$^+$	4.933	3/2$^-$	5.487	3$^-$
11	7.935	2$^+$			5.612	2$^+$
12					5.951	4$^+$

Overlapping levels are assumed above 8.25 MeV for ^{28}Si, 5.2 MeV for ^{29}Si, and 6.5 MeV for ^{30}Si, respectively.

curve to the above mentioned value at 14.5 MeV with some modifications.

Since the experimental data of the $(n, 2n)$ reaction cross section were available only for ^{28}Si, the data for the other isotopes were calculated by the method of Pearlstein.[13] The inelastic scattering cross sections for ^{28}Si, ^{29}Si and ^{30}Si were calculated with a computer code CASTHY.[9] The optical potential parameters by Bhat *et al.*[132] were used here, and the (n, γ), (n, p), (n, α) and $(n, 2n)$ reactions were taken into account as the competing processes in this calculation. The level parameters used in the calculation are shown in TABLE 3-7. The elastic scattering cross section for the natural Si was obtained by subtracting the partial cross sections mentioned above from the total cross section.

Chromium

The data compiled in JENDL-1 are those for natural chromium and ^{50,52,53,54}Cr below 15 MeV. The data for the natural element are composed of the data for the four isotopes multiplied by the abundance ratio of each isotope. The abundance ratios adopted here are 4.35% for ^{50}Cr, 83.79% for ^{52}Cr, 9.5% for ^{53}Cr and 2.36% for ^{54}Cr, respectively.

Thermal and resonance region

Resonance parameters on each isotope were adopted from those given in KFK-2063[133] and BNL 325, 3rd edition[7]. The data given in KFK-2063 were preferentially adopted, except for ^{54}Cr. The energy regions where the resonance parameters are assigned in JENDL-1 are 5.4 to 472.0 keV for ^{50}Cr, 1.62 to 530.0 keV for ^{52}Cr, 4.18 to 246.0 keV for ^{53}Cr, and 10.3 to 394.0 keV for ^{54}Cr, respectively. When the radiative width Γ_γ, neutron width Γ_n and the spin J were not given separately, they were determined so as to keep the values of $2g\Gamma_n\Gamma_\gamma/\Gamma$ or $g\Gamma_n\Gamma_\gamma/\Gamma$ given in the literatures[7,133]. When the values of Γ_γ were not given in both KFK-2063 and BNL 325, tentative values were adopted from the γ-ray transmission coefficient ($T=2\pi\Gamma_\gamma/D$) which was obtained in the statistical model calculations mentioned below. The experimental data of the thermal cross sections[7] for each isotope were reproduced by using these parameters and suitable background data. For example, in addition to a component from the resonance parameters, the thermal capture cross section in the present evaluation possesses the background whose tail of $1/v$ form contributes in the resonance region. The experimental data for the natural chromium were used in the resonance region in order to check the reliability of the present evaluated data which were

composed of those for each isotope.

Fast region

The optical and statistical model calculations were performed above about 600 keV in order to obtain the inelastic scattering and capture cross sections. The derivative Woods-Saxon form was used for the imaginary part of the optical potential. The potential parameters were looked for automatically so that the averaged values of the experimental total cross section[134~140] might be reproduced well in the MeV region. The initial values of the parameters were taken from a parameter-set given by Beery *et al.*[141] The potential parameters thus obtained are shown in TABLE 3-8. Using these potential parameters, angular distributions of the elastically scattered neutrons were calculated in the energy region of 10 keV~15 MeV. Below 10 keV, isotropic angular distributions were assumed in the present work.

The capture cross sections of the natural isotope were calculated so as to reproduce the value of 20 mb at 10 keV within an accuracy of 5%. This calculation gave the values of the γ-ray transmission coefficient for each isotope at the neutron separation energy from the compound nucleus. These values are given in TABLE 3-9. The inelastic scattering cross sections were calculated with the capture and compound elastic scattering cross sections. The level schemes used in the calculations were adopted tentatively from the Table of isotopes[142] and Nuclear Data Sheets[143]. The adopted level schemes are shown in TABLE 3-10. The levels above 3.82, 4.0, 2.77 and 4.0 MeV were assumed to be overlapping for ^{50}Cr, ^{52}Cr, ^{53}Cr and ^{54}Cr, respectively.

The $(n, 2n)$ reaction cross sections for each isotope were calculated by Pearlstein's method[13], and were normalized to the following recommended values at 14.0 MeV. The values used here

TABLE 3-8 Optical potential parameters.

$V_0=47.37-0.223E_n$ (MeV)	$r_0=r_{so}=1.25$ (fm)
$W_s=9.47$ (MeV)	$r_s=1.421$ (fm)
$V_{so}=5.05$ (MeV)	$a_0=0.724$ (fm)
	$a_s=0.347$ (fm)
	$a_{so}=0.65$ (fm)

TABLE 3-9 Transmission coefficients for γ-rays and $\bar{D}$ (keV) for s-wave resonance.

$T_\gamma=2.36\times10^{-4}$,	$\bar{D}=18.67$ for ^{50}Cr
$T_\gamma=7.69\times10^{-5}$,	$\bar{D}=36.28$ for ^{52}Cr
$T_\gamma=1.69\times10^{-4}$,	$\bar{D}=7.93$ for ^{53}Cr
$T_\gamma=2.12\times10^{-5}$,	$\bar{D}=26.5$ for ^{54}Cr

TABLE 3-10 The level schemes for chromium isotopes.

	^{50}Cr		^{52}Cr		^{53}Cr		^{54}Cr	
	E (MeV)		E (MeV)		E (MeV)		E (MeV)	
gr.	0	0^+	0	0^+	0	$3/2^-$	0	0^+
1	0.783	2^+	1.434	2^+	0.564	$1/2^-$	0.835	2^+
2	1.879	4^+	2.370	4^+	1.006	$5/2^-$	1.826	4^+
3	2.922	2^-	2.647	0^+	1.287	$7/2^-$	2.620	2^+
4	3.158	2^-	2.768	4^+	1.539	$7/2^-$	2.829	0^+
5	3.320	4^-	2.965	2^+	1.973	$5/2^-$	3.074	2^+
6	3.588	2^+	3.114	6^+	2.171	$1/2^-$	3.160	6^+
7	3.603	4^+	3.162	2^+	2.233	$9/2^-$	3.222	4^+
8	3.621	1^-	3.414	3^+	2.321	$3/2^-$	3.393	0^+
9	3.693	2^-	3.472	4^+	2.455	$7/2^-$	3.437	2^+
10	3.787	5^+	3.617	5^+	2.661	$5/2^-$	3.460	8^+
11			3.771	2^+	2.670	$3/2^-$	3.487	4^+
12			3.832	6^+	2.711	$1/2^-$	3.657	4^+
13			3.947	1^-			3.720	1^+
14							3.799	4^+
15							3.863	2^+
16							3.932	3^+
17							3.980	5^+

Levels above 3.82, 4.0, 2.77 and 4.0 MeV are assumed to be overlapping for ^{50}Cr, ^{52}Cr, ^{53}Cr and ^{54}Cr, respectively.

were 29.4 mb[144] at 14.0 MeV for ^{50}Cr, 352 mb[144] at 14.5 MeV for ^{52}Cr, 1050 mb[145] at 14.0 MeV for ^{53}Cr and 1120 mb[144] at 14.0 MeV for ^{54}Cr, respectively. The (n, p) reaction cross sections for ^{50}Cr, ^{52}Cr and ^{53}Cr were obtained by using the recommended values of KFK-120[68] renormalized to the calculated values of 14.5 MeV data presented by Levkovskii[146]. The (n, α) reaction cross section was assumed to have the same trend as that of the (n, p) reaction cross section. This assumption follows that of KFK-120. The adopted values were renormalized to the data by Gardner and Yu-Wen Yu[147] in the present evaluation. The $(n, n'p)$ reaction cross sections for ^{50}Cr were adopted from the data by Alley and Lessler[148].

Manganese

H. Nakamura surveyed the existing experimental and evaluated data for this element. From among many works, he adopted the evaluation work by Takahashi[149] and investigated the other data by comparing with this evaluation. Nakamura confirmed that most data adopted by Takahashi were appropriate for JENDL-1. In particular, he recommended the data below 80 keV as the best at present. After this survey work, he made a new evaluation on the total and capture cross sections above 80 keV.

From 80 keV to 2 MeV, he represented the total cross section in a form of a step function with some energy intervals of 10 to 100 keV. Above 2 MeV, he averaged the experimental data and made a smooth curve.

As to the capture cross sections, Nakamura made an evaluation in the following way by using the experimental and calculated data. From 80 to 600 keV, he drew a curve on the basis of the experimental data of Stupegia *et al.*[150] and also made a curve standing on the data by Menlove *et al.*[151] from 10 to 15 MeV. Between these two regions, he used the calculated values which were normalized to a value of 3.8 mb[152] at 600 keV.

Except for these two quantities, Nakamura recommended the data given by Takahashi. As to the total and capture cross sections above 80 keV, he recommended naturally his evaluation mentioned above. However, his data of the total cross section were presented in a step-wise function which did not seem appropriate for presentation of the evaluated data. Hence, the compilation group performed recalculation to make a smooth curve for the total cross section above 80 keV. The capture cross section given by Nakamura was adopted in JENDL-1. For the other quantities, his recommendation was accepted by the JENDL-1 compilation group.

Iron

Since iron is one of the most important structural materials for reactors, many experimental and evaluation works have been carried out. H. Yamakoshi made survey-work on the data status of ^{54}Fe and ^{56}Fe, and some calculations on the total, elastic, and inelastic scattering cross sections. He looked for a set of the optical potential parameters in these calculations.

The JENDL-1 compilation group took four isotopes, ^{54}Fe, ^{56}Fe, ^{57}Fe and ^{58}Fe, to make the data files. Therefore, JENDL-1 has the data files for these four isotopes and the natural element. Abundance ratios of the four isotopes are 5.8%, 91.7%, 2.19% and 0.31% for ^{54}Fe, ^{56}Fe, ^{57}Fe and ^{58}Fe, respectively.

Resonance region

Recent experimental data[133,153,154] and the data compiled in BNL 325, 3rd edition[7] were adopted in order to determine the resonance-parameter sets of the four isotopes. For ^{54}Fe, the total cross sections measured by Pandey *et al.*[153], and the capture cross sections by Spencer and

Beer[133,154] were examined. The former experiment gave the values of $g\Gamma_n$ below about 650 keV, and assigned the s-wave to 21 resonances and the p-wave to 62 resonances. The latter experiment obtained the capture widths for some levels, of which average value was about 2.5 eV. Substituting this average value for unassigned capture widths and using the effective scattering radius, 5.6 fm, given in ref. 7), the total, capture and elastic scattering cross sections were calculated. Appropriateness of the parameters and the maximum energy of the resonance region were examined through comparing these calculated values with the tails of the cross sections in high energy region. There seemed to be some missed levels above 250 keV. Hence only in the region below 250 keV were given the resonance parameters for ^{54}Fe. The background data for the elastic scattering cross section were calculated by the method mentioned in the previous chapter.

Pandey *et al.*[153] gave the resonance parameters for ^{56}Fe below about 500 keV. They assigned the s-wave for 19 resonances and the p-wave for 80 resonances. According to ref. 7), however, there seemed to be a few resonance levels attributed to the p-wave below 50 keV, which were not given by Pandey *et al.* Therefore, five resonances at 1.15, 22.7, 34.1, 36.6 and 38.3 keV were assumed here to be the p-wave resonances. As to the capture width of ^{56}Fe, the data were adopted from ref. 7) and the work of Fröhner[155]. Average capture width calculated from these data was 1.4 eV, which we substituted for unassigned capture widths. The effective scattering radius of 6.9 fm was obtained so that the total cross section of 13.5 ± 0.4 barns[4] at 0.0253 eV for natural iron might be reproduced. Using these parameters, the total, capture and elastic scattering cross sections were calculated, and were compared with the low energy tails of the cross sections in high energy region. This comparison showed that there seemed to be some missed levels above 400 keV. Hence, the resonance parameters for ^{56}Fe were only given below 400 keV. The background data for the elastic scattering cross section were also given.

The resonance parameters for ^{57}Fe were adopted from ref. 7), and Beer and Spencer[133]. The average capture widths were assumed to be 1.3 eV for the s-wave and 0.4 eV for the p-wave resonances. They were also substituted for unassigned capture widths. Though some widths for inelastic scattering channel were given by Beer and Spencer, they were ignored in JENDL-1 because the format of ENDF/B-type did not have any room for the inelastic scattering neutron width. The resonance parameters for this nuclide were given below 150 keV region.

Because of less importance of ^{58}Fe for fast reactor, a simple form was assumed for the capture and elastic scattering cross sections. Here we assumed the capture cross section below 200 keV to be $1/v$ form which passed through 1.15 ± 0.02 barns[7] at 0.0253 eV, and the elastic scattering cross section to be a constant of 5.81 barns which was obtained with the effective scattering radius of 6.8 fm[7].

Resonance parameters for the natural iron were composed of those for the above four isotopes. The total cross sections of Fe were calculated by using these parameters, and compared with the experimental data. Agreement between them was roughly well, but a little difference was still found around the so-called 24 keV window. In order to remove this drawback, we took an additional background for the total cross section of Fe artificially.

Fast region

There are many experimental data of the total cross section for the natural iron which show some structure even in the MeV region. In JENDL-1, however, this structure was smoothed away because it was not necessarily clear whether the data revealed a real structure of the cross section or not, and besides whether the structure could be built from the evaluated data of the four isotopes or from the partial cross sections. This may be a common problem for the medium weight nuclides, and should be further investigated in detail.

Yamakoshi looked for a set of the optical potential parameters with which the smoothed total

cross section was reproduced. TABLE 3-11 indicates the parameters. Using this parameter set, the statistical model calculations[9] were made to obtain the capture, elastic scattering, inelastic scattering cross sections and the angular distributions of the elastic scattering cross section. Some reaction cross sections were needed in the calculation as the competition with the above mentioned cross sections. In JENDL-1, the $(n, 2n)$, $(n, n'p)$, (n, p) and (n, α) reactions were taken into account, and the following data were adopted.

As to the $(n, 2n)$ reaction cross section, the calculation was made by using the method of Pearlstein[13], and the results of this calculation were renormalized to the recommended experimental values[144,148,156,157] around 14.5 MeV, that is, 0.0155 barn[156] for ^{54}Fe, 0.40 barn[148] for ^{56}Fe, 0.87 barn[144] for ^{57}Fe and 1.06 barns[157] for ^{58}Fe, respectively. A shape of the $(n, n'p)$ reaction cross section for ^{54}Fe and ^{56}Fe was assumed to be the same as that of the data for the natural iron of ENDF/B-IV[1]. Making some modification near threshold, and renormalization to 0.22 barn[158] for ^{54}Fe and 0.035 barn[158] for ^{56}Fe, respectively, the data for these two isotopes were obtained. This method was also adopted for the (n, α) reaction cross section. The shape of the cross section was assumed to be the same for the four isotopes, and was adopted from the data of ref. 68). The data of Gardner and Yu-Wen[147] were used for the normalization. For the (n, p) reaction cross section, adopted were the evaluated data of Simons and McElroy[159] for ^{54}Fe, Kanda and Nakasima[107] for ^{56}Fe, and Alley and Lessler[148] for ^{57}Fe and ^{58}Fe, respectively.

Taking these reactions into account, the statistical model calculations were performed, as mentioned above. The level schemes for each isotope were tentatively made on the basis of the data from Table of Isotopes, sixth edition[142] and Nuclear Data Sheets[160,163]. Adopted data are shown in TABLE 3-12. The capture cross section for the natural iron was so calculated that the

TABLE 3-11 Optical potential parameters for Fe.

$V_O=46.0-0.25E_n$ (MeV)	$W_I=0.125E_n-0.0004E_n^2$ (MeV)
$V_S=14.0-0.2E_n$ (MeV)	$V_{SO}=6.0$ (MeV)
(Gaussian form)	
$R_O=1.16A^{1/3}+0.4821$ (fm)	$a_O=0.62$ (fm)
$R_I=1.16A^{1/3}+0.8799$ (fm)	$a_I=0.62$ (fm)
$R_S=1.16A^{1/3}+0.8799$ (fm)	$a_S=0.7$ (fm)
$R_{SO}=1.16A^{1/3}-0.3443$ (fm)	$a_{SO}=0.62$ (fm)

TABLE 3-12 Level schemes for Fe isotopes.

	^{54}Fe		^{56}Fe		^{57}Fe		^{58}Fe	
	E (MeV)		E (MeV)		E (MeV)		E (MeV)	
gr.	0.0	0^+	0.0	0^+	0.0	$1/2^-$	0.0	0^+
1	1.4077	2^+	0.84675	2^+	0.014408	$3/2^-$	0.8106	2^+
2	2.5389	4^+	2.08505	4^+	0.13646	$5/2^-$	1.6745	2^+
3	2.564	0^+	2.6577	2^+	0.3668	$3/2^-$	2.133	3_+
4	2.948	6^+	2.940	0^+	0.7066	$5/2^-$	2.257	0^+
5	2.9607	2^+	2.9597	2^+	1.004	$7/2^-$	2.596	4^+
6	3.1632	2^+	3.12	5^+	1.196	$1/2^-$	2.782	1^+
7	3.2972	4^+	3.3699	2^+	1.265	$3/2^-$	2.876	2^+
8	3.3448	3^-	3.383	6^+	1.356	$1/2^-$	3.084	2^+
9	3.8359	4^+	3.4453	3^-	1.627	$3/2^-$		
10			3.45	3^-	1.725	$3/2^-$		
11			3.60	2^+				
12			3.748	4^+				
13			3.826	1^-				
14			3.8565	3^+				

Levels above 4.0, 4.0, 1.9 and 3.15 MeV are assumed to be overlapping for ^{54}Fe, ^{56}Fe, ^{57}Fe and ^{58}Fe, respectively.

experimental data of 6.5 mb at 100 keV was reproduced. Through this calculation, normalization factor of the capture cross section was obtained for each isotope. Therefore, the cross sections for individual isotopes could be obtained independently. In JENDL-1, the experimental capture cross sections for the natural iron were adopted from 400 keV to 2 MeV. Hence, there may be a little difference between the data of the natural iron and the sum of the data for the isotopes.

Nickel

Natural nickel is composed of ^{58}Ni, ^{60}Ni, ^{61}Ni, ^{62}Ni, and ^{64}Ni with the abundance of 67.88%, 26.23%, 1.19%, 3.66% and 1.08%, respectively. Evaluation was made first on each isotope. The cross sections of the natural nickel were calculated from those of the component nuclides and were modified by the use of the experimental data. The $(n, 2n)$ and (n, α) reaction cross sections were evaluated by H. Matsunobu. The other quantities such as the total, capture, inelastic scattering, $(n, n'p)$ and (n, p) cross sections were prepared by the JENDL-1 compilation group members.

Resonance parameters

The resonance parameters were determined after investigating the data adopted in ENDF/B-IV, those recommended in BNL 325, 3rd edition,[7] those evaluated by Moxon[164], and the recent experimental data. The capture widths of 2 eV for s-wave and of 1 eV for p-wave were assumed for all the resonances with unknown capture widths.

As to the s-wave resonances, the resonance parameters in ref. 7) were taken for ^{58}Ni and ^{60}Ni, up to 207 and 500 keV, respectively. The parameters evaluated by Moxon were taken for the levels between 207 and 601 keV for ^{58}Ni, and for the levels at 347.24 and 437.24 keV as well as for those between 500 and 600 keV for ^{60}Ni. His evaluated parameters were also taken for the levels below 69 keV for ^{61}Ni, those up to 591 keV for ^{62}Ni, and those below 600 keV for ^{64}Ni, respectively. Modifications were made for the capture widths of the levels at 42.87, 94.7 and 105.6 keV for ^{62}Ni, and at 14.3 and 33.82 keV for ^{64}Ni, on the basis of the experimental data by Beer and Spencer[133].

For the p-wave resonances, the data of $g\Gamma_n\Gamma_\gamma/\Gamma$ are usually given in the experiments. Thus, we calculated the values of this quantity from the evaluated resonance parameters and compared them with the experimental data. For the levels with unknown spin for the even nuclides, the two-third of them with large values of $g\Gamma_n\Gamma_\gamma/\Gamma$ were assumed to have the spin of 3/2, whereas the spin of 1/2 was assigned to the remaining one-third of the levels. For ^{61}Ni, the g-factor was assumed to be 1/2.

The values of $g\Gamma_n\Gamma_\gamma/\Gamma$ for ^{58}Ni below 54.7 keV were determined from the averages of the experimental data by Hockenbury *et al.*[72] and by Fröhner.[155] The values of ref. 7) were also taken between 54.7 and 117.5 keV. The parameters by Moxon were adopted above 117.5 keV as well as his spin assignment, except for a level at 427.24 keV to which we assigned $J=3/2$. For ^{60}Ni, the values of $g\Gamma_n\Gamma_\gamma/\Gamma$ up to 173.7 keV were obtained by averaging the experimental data by Stieglitz *et al.*[165] and by Fröhner. The data evaluated by Moxon were adopted between 173.7 and 570 keV. For ^{61}Ni, the evaluated data by Moxon were adopted below 6.57 keV, and the data in ref. 7) were taken above 6.47 keV. A level at 21.35 keV was assumed to be a p-wave resonance while an s-wave was specified in ref. 7). The values of $g\Gamma_n\Gamma_\gamma/\Gamma$ for ^{62}Ni were taken from the data by Beer and Spencer up to 170 keV. The evaluated data by Moxon were adopted between 170 and 600 keV. For ^{64}Ni, the values of $g\Gamma_n\Gamma_\gamma/\Gamma$ by Beer and Spencer were adopted for the levels at 14.8, 31.85 and 62.8 keV. Above 100 keV, the data evaluated by Moxon were adopted.

The background data were obtained for the natural nickel, and were given so that the calculated cross sections might agree with the experimental data when they were averaged over some

energy intervals. As to the total cross section, the calculated values were lower than the experimental data below 5 keV, but were considerably higher above 45 keV. Therefore, the positive background cross sections were added below 5 keV and the negative ones above 45 keV. The thermal value of the calculated capture cross section is 4.58 barns which agrees with the value of 4.43±0.16 barns recommended in ref. 7). In the energy range between 10 and 35 keV, and above 45 keV the calculated capture cross sections were lower than the experimental data and positive background cross sections were applied for these energy ranges.

Cross sections in the fast region

The parameters of the optical potential were looked for so that the calculated total cross sections of the natural nickel might agree well with the experimental data which were averaged over some energy intervals above 20 keV. The parameters thus obtained are shown in TABLE 3-13. Using this optical potential and the statistical model, we calculated the capture, elastic scattering and inelastic scattering cross sections. The capture cross sections of the natural nickel were normalized to the value of 17 mb at 100 keV within 5%. This calculation gave the values of the γ-ray transmission coefficients T_γ for each isotope at the neutron separation energy from the compound nucleus. These values are shown in TABLE 3-14. Angular distributions of the elastically scattered neutrons were represented in the Legendre expansion above 10 keV, while the isotropic distributions were assumed in the low energy region. Level schemes for the five isotopes were adopted from the Nuclear Data Sheets[163,166~169]. The adopted level schemes are shown in

TABLE 3-13 Optical potential parameters.

$V_0=45.59-0.223E_n$ (MeV)	$r_0=1.34$ (fm)
	$r_s=1.3$ (fm)
	$r_{so}=1.3$ (fm)
$W_s=7.29$ (MeV)	$a_0=0.429$ (fm)
	$a_s=0.475$ (fm)
$V_{so}=8.5$ (MeV)	$a_{so}=0.45$ (fm)

TABLE 3-14 Transmission coefficients for γ-rays.

$T_\gamma=2.6\times10^{-4}$ for ^{58}Ni
$T_\gamma=1.4\times10^{-4}$ for ^{60}Ni
$T_\gamma=7.1\times10^{-4}$ for ^{61}Ni
$T_\gamma=8.0\times10^{-5}$ for ^{62}Ni
$T_\gamma=4.6\times10^{-5}$ for ^{64}Ni

TABLE 3-15 Level schemes for nickel isotopes.

	^{58}Ni		^{60}Ni		^{61}Ni		^{62}Ni		^{64}Ni	
	E (MeV)		E (MeV)		E (MeV)		E (MeV)		E (MeV)	
gr.	0.0	0^+	0.0	0^+	0.0	$3/2^-$	0.0	0^+	0.0	0^+
1	1.4540	2^+	1.33252	2^+	0.06742	$5/2^-$	1.17305	2^+	1.3459	2^+
2	2.4591	4^+	2.1589	2^+	0.283	$1/2^-$	2.04876	0^+	2.2750	2^+
3	2.7753	2	2.2848	0^+	0.656	$3/2^-$	2.30202	2^+	2.6080	4^+
4	2.9017	1^+	2.50575	4^+	0.9088	$5/2^-$	2.3365	4^+	2.8650	0^+
5	2.9424	0^+	2.6262	3^+	1.015	$7/2^-$	2.8907	0^+	2.8850	6^+
6	3.0378	2^+	3.1190	2^+	1.10	$3/2^-$	3.0593	6^+	2.9710	2^+
7	3.2635	2^+	3.1241	2^+	1.1323	$5/2^-$	3.1582	2^+	3.0280	0^+
8	3.4203	3^+	3.130	4^+	1.1857	$3/2^-$	3.1768	2^+	3.1650	4^+
9	3.5260	4^+	3.1864	3^+	1.458	$7/2^-$	3.2576	1^+	3.2730	2^+
10	3.5309	6^+	3.1941	1^+	1.610	$5/2^-$	3.27098	2^+	3.3930	1^-
11	3.5934	1^+	3.2694	2^+	1.7298	$1/2^-$	3.2776	1^-	3.4590	6^+
12	3.6204	4^+	3.3936	2^+			3.3699	1^+	3.4830	4^+
13	3.7746	3^+	3.6710	4^+			3.464	4^+	3.560	3^-
14	3.8985	2^+	4.0076	2^+			3.51898	2^+		
15	4.1079	2^+	4.0204	1^+			3.52265	2^+		
16			4.0450	3^-			3.7566	3^-		
17							3.84923	0^+		
18							3.8617	2^+		

Levels above 4.25, 4.07, 1.80, 3.97 and 3.64 MeV are assumed to be overlapping for ^{58}Ni, ^{60}Ni, ^{61}Ni, ^{62}Ni and ^{64}Ni, respectively.

TABLE 3-15. The levels above 4.25, 4.07, 1.80, 3.97 and 3.64 MeV were assumed to be overlapping for ^{58}Ni, ^{60}Ni, ^{61}Ni, ^{62}Ni and ^{64}Ni, respectively.

As to the cross sections for the threshold reactions, evaluations were performed by T. Asami and by H. Matsunobu. Asami examined the experimental data for the (n, p) and $(n, n'p)$ reactions, while Matsunobu surveyed the data for the $(n, 2n)$, (n, α) and $(n, n'\alpha)$ reactions. Since there were some experimental data on the (n, p), $(n, n'p)$, (n, α), $(n, n'\alpha)$ and $(n, 2n)$ reaction cross sections for ^{58}Ni, they used these data to obtain the cross-section curves from threshold to 15 MeV. For the (n, p) reaction cross sections, Asami adopted his own evaluation[108]. He estimated the $(n, n'p)$ reaction cross section at 14.8 MeV to be 600 mb, and adopted the shape of the curve which Alley and Lessler[148] had given below 16 MeV. Matsunobu carried out the least squares fit to obtain the cross-section curve of the $(n, 2n)$ reaction. He gave the formulas as follows:

$$\sigma_{n,2n}(E_n)=8.76E_n^2-216.9E_n+1341.9 \text{ (mb)}, \quad \text{for } 12.4<E_n<13.2 \text{ MeV} \tag{3.13}$$

and

$$\sigma_{n,2n}(E_n)=19.37E_n-249.7 \text{ (mb)}, \quad \text{for } 13.2\leq E_n<15 \text{ MeV} \tag{3.14}$$

He also estimated the $(n, n\alpha)$ reaction cross section.

For ^{60}Ni, Asami estimated the (n, p) and $(n, n'p)$ reaction cross sections from the experimental data. He gave the value of 60 mb to the $(n, n'p)$ reaction cross section at 14.0 MeV. The shape of the cross-section curve was assumed to be the same as that for ^{58}Ni mentioned above. Taking the shape of the (n, p) reaction cross sections for ^{58}Ni and ^{60}Ni into account, he estimated the curves of the (n, p) reaction cross sections for ^{61}Ni and ^{62}Ni, but he neglected the $(n, n'p)$ reaction cross sections for ^{61}Ni and ^{62}Ni, and the (n, p) and $(n, n'p)$ reaction cross sections for ^{64}Ni. Matsunobu obtained the $(n, 2n)$ cross-section curves for ^{60}Ni, ^{61}Ni, ^{62}Ni and ^{64}Ni from the values given by Pearlstein[13]. He also estimated the (n, α) reaction cross sections for ^{60}Ni, ^{61}Ni, ^{62}Ni and ^{64}Ni, but neglected the $(n, n'\alpha)$ reaction cross sections for these isotopes.

Copper

M. Sasaki performed survey work on experiments, evaluations and compilations of the nuclear data for natural copper, ^{63}Cu and ^{65}Cu. Since the existing data on resonance parameters had been almost reviewed and selected in BNL 325, 3rd edition[7], he also adopted the data given in ref. 7). He made some additional work on determination of s- and p-wave resonances, where undecided angular momentum had been assigned to the resonances. Using these parameters and substituting average values for some unknown capture widths, he calculated the elastic scattering and capture cross sections at 0.0253 eV, and found the calculation being 1/2~1/10 as large as the experiment. In order to mend this discrepancy, he added a bound level for each of the two isotopes.

JENDL-1 compilation group made recalculation on the thermal cross sections by the use of the resonance parameters mentioned above and of the effective scattering radius: 7.06 fm for ^{63}Cu and 6.56 fm for ^{65}Cu, respectively. Agreement between the calculated values and experimental data was good. However, the elastic scattering cross section of 7.9±0.2 barns at 0.0253 eV for natural copper was not reproduced from these parameters of the isotopes. Hence, a constant value of −0.3 barn was added below 50 eV as the background data of the elastic scattering cross section.

Above the resonance region, Sasaki used the optical and statistical model calculations to obtain the total, capture, elastic scattering and inelastic scattering cross sections. TABLE 3-16 shows the optical potential parameters used in the calculation. Level schemes[170,171] are exhibited in TABLE 3-17. In this calculation, he took only the $(n, 2n)$ reaction into account as a competing process.

TABLE 3-16 Optical potential parameters of Cu.

$V_0=46.0-0.250E_n$ (MeV)
$W_I=0.125E_n-0.0004E_n^2$ (MeV)
$W_S=7.0$ (MeV)
$V_{SO}=7.0$ (MeV)
$R_0=1.16A^{1/3}+0.6$ (fm)
$R_I=1.16A^{1/3}+0.6$ (fm)
$R_S=1.16A^{1/3}+1.1$ (fm)
$R_{SO}=1.16A^{1/3}+0.6$ (fm)
$a_0=0.62$ (fm)
$a_I=0.62$ (fm)
$a_S=0.35$ (fm)
$a_{SO}=0.6$ (fm)

TABLE 3-17 Level schemes for ^{63}Cu and ^{65}Cu.

	^{63}Cu		^{65}Cu	
	E (MeV)		E (MeV)	
gr.	0.0	3/2$^-$	0.0	3/2$^-$
1	0.66962	1/2$^-$	0.7706	1/2$^-$
2	0.96206	5/2$^-$	1.11554	5/2$^-$
3	1.32703	7/2$^-$	1.48183	7/2$^-$
4	1.41203	5/2$^-$	1.62344	5/2$^-$
5	1.54702	3/2$^-$	1.72494	3/2$^-$
6	1.8613	5/2$^-$	2.093	5/2$^-$
7	2.0111	3/2$^-$	2.2123	3/2$^-$
8			2.280	5/2$^-$
9			2.3282	3/2$^-$
10			2.531	9/2$^+$

Levels above 2.05 MeV for ^{63}Cu and 2.54 MeV for ^{65}Cu are assumed to be overlapping.

The cross sections of this reaction were adopted from the evaluation work of Kanda and Nakasima[107].

The capture and elastic scattering cross sections of the natural copper were made of those for the two isotopes. However, they were slightly larger than the experimental data, and he multiplied them by a factor of 0.06 for the capture and of 0.90 for the elastic scattering cross sections.

Molybdenum

Among seven stable isotopes of molybdenum, ^{95}Mo and ^{97}Mo had already been taken as two of the most important 28 fission product nuclides in an evaluation work[5,6] of the fission product nuclear data working group of JNDC. After this evaluation work, the working group took 72 nuclides, including ^{96}Mo, ^{98}Mo and ^{100}Mo, whose capture cross sections together with those of the above 28 nuclides amount to about 95% of the effective capture cross section of all fission products. Nuclear data evaluation on these three molybdenum isotopes was carried out in an early stage of this second round on the evaluation work of the fission products. As to the other two isotopes, ^{92}Mo and ^{94}Mo, T. Hojuyama performed the evaluation[172] of the nuclear data. He followed the same method on nuclear data evaluation as that used by the working group of fission product nuclear data in JNDC[5,6].

The JENDL-1 compilation group adopted these evaluated data and prepared the data for the natural molybdenum. Since the evaluation on ^{95}Mo and ^{97}Mo nuclear data had been already reported, short description will be given here for the data of the other five isotopes.

The resonance parameters for these five isotopes were taken from BNL 325, 3rd edition[7]. Seeing the magnitude of the reduced neutron width, Hojuyama and the other persons in charge assigned the s- and p-waves to the levels which had not been assigned the angular momentum yet. They substituted the average gamma widths where the levels had not been given the gamma widths. These are assumed in meV as 176 (for $J=1/2$) and 242 (for $J=3/2$) for ^{92}Mo, 193 for ^{94}Mo, 119 for ^{96}Mo, 93 for ^{98}Mo and 75 for ^{100}Mo, respectively. By using these resonance parameters, the thermal capture cross sections were calculated for each isotope, and were compared with the experimental data. Since they did not agree with the experiments in general, the background data of $1/v$ form were assumed in order to fit the calculations to the experiments. In the upper part of the resonance region, the statistical examination was tried to check whether there were some missed levels or not, through comparing the average resonance cross sections with those obtained by the statistical model calculations. According to this examination, the upper

TABLE 3-18 Potential parameters of the optical model for Mo isotopes.

$V_O=46-0.25E_n$ (MeV)
$W_I=0.125E_n-0.0004E_n^2$ (MeV)
$W_S=7.0$ (MeV)
$V_{SO}=7.0$ (MeV)
$R_O=1.16A^{1/3}+0.6$ (fm)
$R_I=1.16A^{1/3}+0.6$ (fm)
$R_{SO}=1.16A^{1/3}+0.6$ (fm)
$R_S=1.16A^{1/3}+1.1$ (fm)
$a_O=0.62$ (fm)
$a_I=0.62$ (fm)
$a_{SO}=0.62$ (fm)
$a_S=0.35$ (fm)

TABLE 3-19 Level schemes of molybdenum isotopes; energy in MeV.

No.	^{92}Mo		^{94}Mo		^{95}Mo		^{96}Mo		^{97}Mo		^{98}Mo		^{100}Mo	
	E		*E*		*E*		*E*		*E*		*E*		*E*	
gr.	0.0	0^+	0.0	0^+	0.0	5/2	0.0	0^+	0.0	$5/2^+$	0.0	0^+	0.0	0^+
1	1.509	2^+	0.871	2^+	0.20394	$3/2^+$	0.7783	2^+	0.4809	$3/2^+$	0.7349	0^+	0.5356	2^+
2	2.283	4^+	1.574	4^+	0.76583	$7/2^+$	1.1479	0^+	0.6582	$7/2^+$	0.78742	2^+	0.6944	0^+
3	2.520	0^+	1.740	0^+	0.7862	$1/2^+$	1.4978	2^+	0.6796	$1/2^+$	1.43232	2^+	1.0637	2^+
4	2.526	5^-	1.864	2^+	0.82065	$3/2^+$	1.626	2^+	0.7190	$5/2^+$	1.51013	4^+	1.1361	4^+
5	2.612	6^+	2.067	2^+	0.9478	$9/2^+$	1.628	4^+	0.7211	$3/2^+$	1.7585	2^+	1.4633	2^+
6	2.759	8^+	2.300	4^+	1.0391	$1/2^+$	1.8694	4^+	0.8880	$1/2^+$	1.965	0^+	1.7657	1^+
7	2.849	3^-	2.393	2^+	1.059	$5/2^+$	1.9783	3^+	1.0246	$7/2^+$	2.0176	3^-	1.7704	3^+
8	3.092	2^+	2.423	6^+	1.0741	$7/2^+$	2.0956	2^+	1.0926	$3/2^+$	2.1049	2^+	1.9081	3^-
9	3.535	2^+	2.534	3^-	1.2225	$5/2^+$	2.219	4^+	1.1167	$9/2^+$	2.2069	2^+	2.033	0^+
10	3.621	3^-	2.568	4^+	1.310	$1/2^+$	2.2345	3^-	1.2688	$7/2^+$	2.2240	4^+	2.040	2^+
11	3.623	7^-	2.608	6^+	1.376	$3/2^+$	2.4262	3^+	1.2845	$3/2^+$	2.3334	2^+	2.1014	4^+
12	3.688	3^-	2.740	2^+	1.433	$5/2^+$	2.438	5^+	1.4095	$11/2^+$	2.3437	6^+	2.340	2^+
13			2.856	8^+	1.541	$11/2^+$	2.441	6^+	1.4373	$11/2^-$	2.4198	3^-	2.4156	3^-
14			2.873	6^+	1.5528	$9/2^+$	2.481	4^+	1.5156	$9/2^+$	2.4854	4^+	2.470	4^+
15			2.956	8^+									2.5632	3^+
16													5.59	4^+

Overlapping levels are assumed above 3.726 for ^{92}Mo, 2.991 for ^{94}Mo, 1.62 for ^{95}Mo, 2.541 for ^{96}Mo, 1.54 for ^{97}Mo, 2.506 for ^{98}Mo and 2.67 for ^{100}Mo, in MeV, respectively.

energies of the resonance region for each isotope were 23.8 for ^{92}Mo, 4.91 for ^{94}Mo, 4.65 for ^{96}Mo, 5.98 for ^{98}Mo and 3.60 for ^{100}Mo, in keV, respectively. The background data for the elastic scattering cross section were determined by the method mentioned in chapter 2.

Above the resonance region, the optical and statistical model calculations were carried out in order to obtain the total, capture, elastic scattering and inelastic scattering cross sections. TABLE 3-18 shows the optical potential parameters, and TABLE 3-19 exhibits the level schemes used in the calculation.

Tantalum

H. Yamakoshi had carried out an evaluation work on Ta neutron nuclear data above 10 keV, before the JENDL-1 compilation work was started. Averaging the experimental total cross sections from 10 keV to 15 MeV, he looked for a set of the optical potential parameters with which he could reproduce this average cross section. He calculated the capture, $(n, 2n)$, (n, p), inelastic scattering and elastic scattering cross sections. In order to pick up his work and include it into

JENDL-1, the JENDL-1 compilation group made some work on investigation and correction of his results. Below 10 keV, in particular, the compilation group made the data preparation.

The compilation group adopted the resonance parameters from BNL 325, 3rd edition[7], excluding the levels which were not given the value of $2g\Gamma_n$. Since only 26 levels were assigned Γ_γ in ref. 7), their average value of 55.9 meV was given for the levels with vacant value of Γ_γ. The calculation with these parameters could not reproduce the thermal values of the capture and elastic scattering cross sections. Since average level spacing of 4.4 eV from the resonances is almost equal to the resonance energy of the first level, there may be a bound level near the zero neutron energy and its contribution may be significant to reproduce the thermal cross sections. The parameters of this negative resonance were tentatively adopted from ENDF/B-IV. Background data for the resonance cross sections were made by the method mentioned in Chapter 2.

Accepting the optical potential parameters, the data for $(n, 2n)$ and (n, p) reaction cross sections, and $\langle\Gamma_\gamma\rangle$ from the work by Yamakoshi, the compilation group made recalculations for the capture, inelastic scattering and elastic scattering cross sections above resonance region. This calculation was extended below 1 keV in order to examine a connection of the cross sections with those in the resonance region. Though there were some resonance levels above 1 keV, the resonance region was defined here below 1 keV through this examination. The potential parameters used in this calculation are shown in **TABLE 3-20**. The parameters D_{obs} of 4.4 eV and $\langle\Gamma_\gamma\rangle$ of 59.8 meV were used for the calculation of the capture cross sections. The level scheme of ^{181}Ta was adopted from a compilation by Ellis[173]. **TABLE 3-21** shows this scheme.

TABLE 3-20 Optical potential parameters.

$V_0=46.0-0.25E_n$ (MeV)	
$W_I=0.125E_n-0.0004E_n^2$ (MeV)	
$W_S=14.0-0.2E_n$ (Gaussian form) (MeV)	
$V_{SO}=6.0$ (MeV)	
$r_0=1.268$ (fm)	$a_0=0.62$ (fm)
$r_I=1.268$ (fm)	$a_I=0.62$ (fm)
$r_S=1.316$ (fm)	$a_S=0.7$ (fm)
$r_{SO}=1.099$ (fm)	$a_{SO}=0.62$ (fm)

TABLE 3-21 Level scheme of ^{181}Ta.

	E (MeV)	
gr.	0.0	7/2+
1	0.00621	9/2−
2	0.13625	9/2+
3	0.1587	11/2−
4	0.3014	11/2+
5	0.3390	13/2−
6	0.4821	5/2+
7	0.4951	13/2+
8	0.5480	15/2−
9	0.6151	1/2+
10	0.6190	3/2+
11	0.7166	15/2+

Levels above 780 keV are assumed to be overlapping.

Thorium-232

T. Ohsawa surveyed many experimental and evaluation works on the nuclear data of this nuclide in order to contribute reliable nuclear data to the JENDL-1 compilation work. He reported the results of this survey work to the JENDL-1 compilation group, and recommended his own evaluation work. The data compiled in JENDL-1 are mainly those recommended by Ohsawa.

Thermal and resonance region

Ohsawa obtained the thermal capture cross section of 7.4 barns from a weighted mean of about ten experimental data. He adopted the total cross section of 13.28 barns at 1.44 eV measured by Rayburn and Wollan[174]. Rahn *et al.*[175] had obtained the resonance parameters in the wide energy range. Ohsawa prefered their data rather than those by Ribon *et al.*[176] and by Garg *et al.*[177] However, he adopted the parameters only below 3.5 keV, because there might be

considerable missed levels above this energy. Thus, the resonance region in JENDL-1 is below 3.5 keV for this nuclide. Although the background data were given by the method mentioned in Chapter 2, the thermal cross sections could not be reproduced from the adopted resonance parameters. In order to make the background for the thermal cross sections, Ohsawa adopted the negative resonances from the evaluation by Steen[178]. The contribution from the negative resonances was assumed to be $0.0144/\sqrt{E_n}$.

Fast region

There were many experimental data for the total, fission and capture cross sections. Ohsawa evaluated the total cross sections from 3.5 keV to 1.5 MeV by using the experimental data of Uttley *et al.*[179,180] From 1.5 to 15 MeV, he used the data by Foster and Glassgow[140] and by Fasoli *et al.*[181] He obtained the optical potential parameters so as to reproduce these data and applied them in order to estimate the total cross sections from 15 to 20 MeV.

As to the fission cross section, he adopted the data by Henkel[182] below 9 MeV, because the data of this old experiment were given in the region from threshold to 9 MeV and their preciseness was not necessarily worse than that of the recent experimental data. Above 9 MeV, he made evaluation by using the experimental data of Rago and Goldstein[183], and Pankratov[184].

Ohsawa selected the capture cross sections measured by Macklin *et al.*[185], Belanova *et al.*[186], Koroleva and Stavissky[187] and Chaubey and Sehgal[188] of which uncertainties were given clearly, and obtained a weighted mean value of 0.615 barns at 24 keV. He used this value as the standard in his evaluation. He renormalized the experimental data to this value and obtained the evaluated capture cross sections. Above 500 keV, he adopted mainly the data by Barry *et al.*[189], Stupegia *et al.*[190] and Batchelor *et al.*[191]

He recommended the evaluation of the $(n, 2n)$ reaction cross sections by Kawamura *et al.*[192] He also recommended the $(n, 3n)$ reaction cross sections evaluated by Howerton[193] after having renormalized them to the experimental data by McTaggart and Goodfellow[194] at 14 MeV. He obtained the elastic and inelastic scattering cross sections by the optical and statistical model calculations. The optical potential parameters and the level scheme used in the calculations are shown in TABLES 3-22 and 3-23. He recommended the evaluated data of $\bar{\nu}$ by Davey[195] and the fission neutron spectrum given by Zamyatnin *et al.*[196]

TABLE 3-22 Optical potential parameters for ^{232}Th.

V_0=41.37	(MeV)	
W_s=6.49	(MeV)	(Gaussian)
V_{so}=7.0	(MeV)	
r_0=1.32	(fm)	
r_s=1.405	(fm)	
r_{so}=1.32	(fm)	
a_0=0.47	(fm)	
a_s=1.0	(fm)	(Gaussian)
a_{so}=0.47	(fm)	

TABLE 3-23 Level scheme of ^{232}Th.

	E (MeV)	
gr.	0.0	0^+
1	0.4975	2^+
2	0.1624	4^+
3	0.334	6^+
4	0.5578	8^+
5	0.7301	0^+
6	0.7741	2^+
7	0.7852	2^+
8	0.8281	10^+
9	0.8730	4^+
10	1.023	6^+
11	1.045	1^-
12	1.095	3^-
13	1.139	12^+

Levels above 1.2 MeV are assumed to be overlapping.

Protactinium-233

According to the CINDA 75, there were some evaluation works and experiments. Kanda ascertained that the data measured by Simpson and Codding[197] were the most important, at least at the time of 1975. After investigating the evaluated and experimental data, Kanda recommended the evaluation of Drake and Nichols[198]. The reason of his recommendation was that the experimental data by Simpson and Codding had been used in their evaluation. In addition to the evaluation of Drake and Nichols, he requested the JENDL-1 compilation group to calculate the partial inelastic scattering cross sections with recent information about the level scheme and the optical potential used by Drake and Nichols.

The JENDL-1 compilation group tried to calculate the partial inelastic scattering cross sections after his requirement. However, we found that the formation cross sections of the compound nucleus above about 9 MeV were smaller than the sum of the fission, $(n, 2n)$ and $(n, 3n)$ reaction cross sections given by Drake and Nichols. In order to remove this drawback, we adopted a set of the optical potential parameters which we had used in the evaluation of ^{241}Am cross sections[199]. At 6 MeV, for example, the formation cross section of the compound nucleus obtained with this set of the potential parameters is 2.74 barns, which is equal to the sum of the fission, capture and inelastic scattering cross sections given by Drake and Nichols. This implies that our potential is rather suitable to reproduce the results given by Drake and Nichols.

By using this optical potential and the fission and capture cross sections given by Drake and Nichols, we calculated the total, elastic scattering, inelastic scattering, $(n, 2n)$ and $(n, 3n)$ reaction cross sections above 1 keV. Level scheme used here is shown in TABLE 3-24.

TABLE 3-24 Level scheme of ^{233}Pa.

	E (MeV)	
gr.	0.0	$3/2^-$
1	0.0067	$1/2^-$
2	0.0571	$7/2^-$
3	0.0710	$5/2^-$
4	0.0865	$5/2^+$
5	0.0947	$3/2^+$
6	0.1037	$7/2^+$
7	0.1090	$9/2^+$
8	0.1633	$11/2^-$
9	0.1692	$1/2^+$
10	0.1800	$9/2^-$
11	0.2017	$3/2^+$
12	0.2123	$5/2^+$
13	0.2379	$5/2^+$
14	0.2796	$7/2^+$
15	0.3004	$7/2^+$
16	0.3662	$9/2^+$

Levels above 400 keV are assumed to be overlapping.

Uranium-234

Measurements on the neutron nuclear data for ^{234}U have been performed mainly on the resonance parameters and fission cross sections. The data on resonance parameters were available for the levels below 1.4 keV, and the data on the fission cross section were up to 4 MeV.

Except for these, no data were available for this nuclide. On the other hand, evaluation work on the neutron cross sections has been made by several authors[200~203]. But, some discrepancies exist among their evaluated data. Therefore, the JENDL-1 compilation group made a new evaluation work.

The resonance parameters given by James and Slaughter[204] were adopted in this work after comparing them with the data by Harvey and Hughes[205], and James and Rae[206]. James and Rae had obtained the fission widths by using the neutron widths of Harvey and Hughes. James and Slaughter made measurement to improve the neutron widths and the energy scale which James and Rae had given.

The total, fission, capture and elastic scattering cross sections in the thermal region were calculated from the adopted resonance parameters, but they were slightly different from the experimental data[7]. In order to remove this difference, a bound level was added. The parameters of Drake and Nichols[201] were appropriate to this bound level.

Although the resonance parameters thus adopted were stored in the JENDL-1 file, the resonance region was limited below 215 eV. The decision was made through a statistical examination about connection between the capture cross sections calculated from the resonance parameters and those obtained by the statistical model calculations mentioned below. The resonance parameters above 215 eV were used in order to make the background cross sections in the resonance region.

The evaluated fission cross sections of Drake and Nichols[201] were adopted from 215 eV to 2 MeV, because they were in good agreement with the experimental data[207~210]. Above 2 MeV, the fission cross sections calculated by Jary[211] were adopted, since they were close to the experimental data[207,210]. Except for the fission cross section there were no experimental data, and we obtained the data by using the optical and statistical model calculations. The optical potential parameters were taken from the work of Agee and Rosen[212]. The $(n, 2n)$ and $(n, 3n)$ reaction cross sections were calculated by the simple evaporation model[13]. The results were close to the data calculated by Parker [200] but were somewhat different from Jary's calculation[211]. By using the fission, $(n, 2n)$ and $(n, 3n)$ reaction cross sections as the cross sections of the competing processes, we calculated the capture, inelastic scattering and compound elastic scattering cross sections by the method mentioned in Chapter 2. The parameters D_{obs} of 12.3 eV and $\langle \Gamma_\gamma \rangle$ of 25 meV were used in this calculation to normalize the γ-ray transmission coefficients. The optical potential parameters and level scheme used in this calculation are shown in TABLES 3-25 and 3-26, respectively.

TABLE 3-25 Optical potential parameters for ^{234}U.

$V_O=40.5+0.5E_n$ (MeV)
$W_S=8.2$ (MeV)
$V_{SO}=7.0$ (MeV)
$r_O=1.32$ (fm)
$r_S=1.32$ (fm)
$r_{SO}=1.32$ (fm)
$a_O=0.47$ (fm)
$a_S=0.47$ (fm)
$a_{SO}=0.47$ (fm)

TABLE 3-26 Level scheme of ^{234}U.

	E (MeV)	
gr.	0.0	0^+
1	0.044	2^+
2	0.144	4^+
3	0.297	6^+
4	0.499	8^+
5	0.790	1^-
6	0.811	0^+
7	0.8496	3^-
8	0.8516	2^+
9	0.9269	2^+
10	0.948	4^+
11	0.965	3^+
12	1.023	3^-
13	1.046	0^+

Levels above 1.06 MeV are assumed to be overlapping.

Uranium-235

Some evaluation works had been performed on ^{235}U, ^{238}U, ^{239}Pu, ^{240}Pu and ^{241}Pu in a working group of JNDC, before starting the compilation work of JENDL-1. The evaluation of ^{235}U above 1 keV had been made by H. Matsunobu[213], but the works on the resolved resonance parameters and on the cross sections below 1 eV had been too late for the JENDL-1 compilation. The working group recommended in the end the data of ENDF/B-IV. The JENDL-1 compilation group adopted this recommendation, but supplied the unresolved resonance parameters between 82 eV and 21.5 keV in their way. The evaluation by Matsunobu was adopted above 21.5 keV.

Unresolved resonance parameters

The parameters were determined so as to reproduce the evaluated fission and capture cross sections by Matsunobu. Since Matsunobu had given the data only above 1 keV, some appropriate experimental data were required to determine the parameters between 82 eV and 1 keV, below which the resolved resonance parameters were given. The data by Perez[214] were adopted for this purpose, after many experiments had been examined.

Three parameters Γ_γ, D_{obs} and R being fixed on 45 meV, 0.63 eV and 9.5663 fm, respectively, the fission widths and the neutron strength functions were searched for. The spin-dependence of the fission widths was estimated[8] by means of the channel theory of the fission. The ratio of the s-wave to p-wave strength functions was determined from the values recommended in BNL 325, 3rd edition[7]. The parameters thus obtained are given in TABLE 3-27 with the calculated cross sections. The total cross sections calculated from these parameters agree very well with the experimental data measured by Uttley[215]. The calculated partial cross sections join smoothly with the evaluated cross sections by Matsunobu at 21.5 keV.

Fast region

The JENDL-1 compilation group mainly adopted the data evaluated by Matsunobu, with slight

TABLE 3-27 Unresolved resonance parameters and the calculated cross sections of ^{235}U. Fixed parameters; D_{obs}=0.63 eV, Γ_γ=45 meV, R=9.5663 fm.

E_n (keV)	S_0 ($\times 10^{-4}$)	S_1 ($\times 10^{-4}$)	$\Gamma_f^{(3-)}$ (meV)	$\Gamma_f^{(4-)}$ (meV)	$\Gamma_f^{(2+)}$ (meV)	$\Gamma_f^{(3+)}$ (meV)	$\Gamma_f^{(4+)}$ (meV)	$\Gamma_f^{(5+)}$ (meV)	σ_t (b)	σ_f (b)	σ_c (b)
0.082	0.94	1.85	161	89	174	72	161	89	54.49	25.40	16.50
0.15	0.99	1.95	201	111	217	90	201	111	45.04	21.03	11.45
0.25	1.19	2.33	269	149	290	120	269	149	42.69	20.92	9.02
0.35	0.93	1.81	237	131	256	106	237	131	31.99	13.34	6.36
0.45	0.99	1.94	362	200	391	162	361	200	30.91	13.95	4.77
0.55	1.18	2.31	447	247	483	200	447	247	32.40	15.57	4.49
0.65	1.04	2.04	315	174	339	141	315	174	28.44	11.71	4.44
0.75	1.12	2.19	273	151	295	122	273	151	28.51	11.28	4.75
0.85	0.91	1.78	233	129	251	104	233	129	24.48	8.31	3.98
0.95	0.99	1.94	166	92	179	74	166	92	24.87	7.66	4.75
1.5	1.03	2.01	305	168	329	136	305	168	22.60	7.53	2.90
2.5	0.93	1.82	339	188	366	152	339	188	19.34	5.47	1.94
3.5	0.92	1.80	423	234	456	189	423	234	18.12	4.87	1.46
4.5	0.97	1.89	363	201	392	162	363	201	17.66	4.37	1.47
5.5	0.94	1.84	320	177	345	143	320	177	16.95	3.77	1.40
6.5	0.97	1.90	340	188	366	152	340	188	16.70	3.66	1.30
7.5	0.96	1.87	281	155	303	126	281	155	16.30	3.23	1.33
8.5	1.02	2.00	262	145	282	117	262	145	16.33	3.18	1.38
9.5	1.00	1.96	300	166	324	134	300	166	16.00	3.11	1.22
15.0	0.94	1.83	327	181	353	146	327	181	14.89	2.54	0.95
21.5	0.93	1.82	339	187	366	152	339	187	14.32	2.28	0.84

modification on the fission cross sections above 6 MeV. Here we give a brief review of his evaluation and our modification. Matsunobu examined the experimental total cross sections and adopted the data measured by Uttley[215] between 1 keV and 1 MeV, by Schwartz *et al.*[216] between 500 keV and 15 MeV, and by Foster and Glasgow[140] between 2.5 MeV and 15 MeV. Dividing the energy region into some appropriate intervals, he obtained the cross-section curve in each interval by applying the least squares method with the third or fourth order polynomials in the neutron energy.

Matsunobu selected the fission cross sections measured after 1965. He used the data by relative measurements to shape the cross-section curve and determined the cross-section values from the absolute measurements. He noticed that some remarkable discrepancies existed among the data in the energy range below 100 keV as seen in **Fig. 3-1**. However, most of the data published after 1965 agree fairly well with each other and show lower values than Davey's evaluation[217]. In particular, the agreement is good in the energy range from 55 to 80 keV. Hence these new data were adopted below 100 keV.

Scatter among the experimental data from 100 keV to 1 MeV is fairly large as shown in **Fig. 3-2**. Extremely low data by Poenitz[218] were not taken into account in Matsunobu's evaluation. He also abandoned the data by Kaeppeler[219] between 500 and 700 keV, because they deviated from global tendency of the fission cross sections. Near 1 MeV, agreement is satisfactory among the experimental data. Matsunobu obtained the cross-section curve by using the least squares method with polynomials. He divided the energy range into 10 intervals and decided the order of the polynomials in each interval so that the cross-section shape might be reproduced. The results of Matsunobu's evaluation are also shown in **Figs. 3-1** and **3-2**.

Above 6 MeV, there are large discrepancies among existing evaluated data. Recently, a new measurement was reported by Czirr and Sidhu[220] who paid much attention to obtain the correct shape of the fission cross sections. The JENDL-1 compilation group adopted their data and normalized them to Matsunobu's data between 3 and 5.4 MeV. Consequently, the data by Czirr and Sidhu were reduced by about 2 % from the values reported in their paper. The adopted data in JENDL-1 are shown in **Fig. 3-3** with those in ENDF/B-IV and Sowerby's evaluation[221]. They agree well with each other.

In most cases, the capture cross sections have been included in the measurements of the α-value, i.e., the capture to fission ratio. Therefore, Matsunobu made evaluation on the α-values and then obtained the capture cross sections by multiplying them by his evaluated fission cross sections. He performed this procedure below 1 MeV where some experimental α-values were available. Above 1 MeV, however, there were no available data for both the α-values and the capture cross sections. Although Matsunobu carried out the statistical model calculation to get the capture cross sections, he did not take the results of the calculation, but took tentatively the data of ENDF/B-III since the calculation failed to reproduce the shape of the α-values below 1 MeV.

Before doing evaluation on the elastic and inelastic scattering cross sections, Matsunobu obtained the $(n, 2n)$ and $(n, 3n)$ reaction cross sections by using the experimental data measured by Mather *et al*[222]. He drew smooth curves passing through the experimental data in an eye-guide method.

There were some experimental data on the elastic scattering cross sections between 200 keV and 2.3 MeV, and on the inelastic scattering cross sections between 130 keV and 7.5 MeV. Using these experimental data, the data for the total cross sections and for the other partial cross sections already evaluated by him, Matsunobu obtained the evaluated elastic and inelastic scattering cross sections from 1 keV to 15 MeV. He divided the energy range into several intervals and used some appropriate methods to estimate the cross sections for each interval. Details are given in

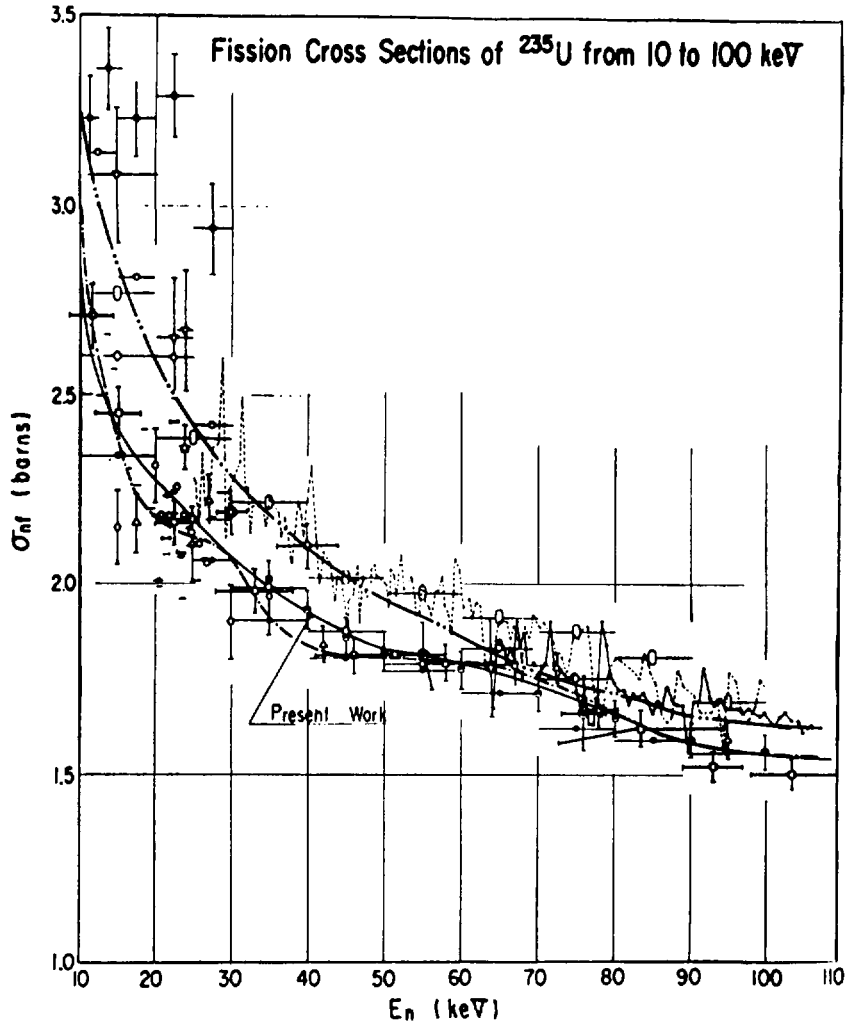

Fig. 3-1 Fission cross sections of ^{235}U from 10 to 100 keV. Four evaluations are plotted with the experimental data. Solid curve shows JENDL-1 data, dashed curve is ENDF/B-III, one dot curve is a Russian evaluation, and two dots curve shows Davey's evaluation[217].

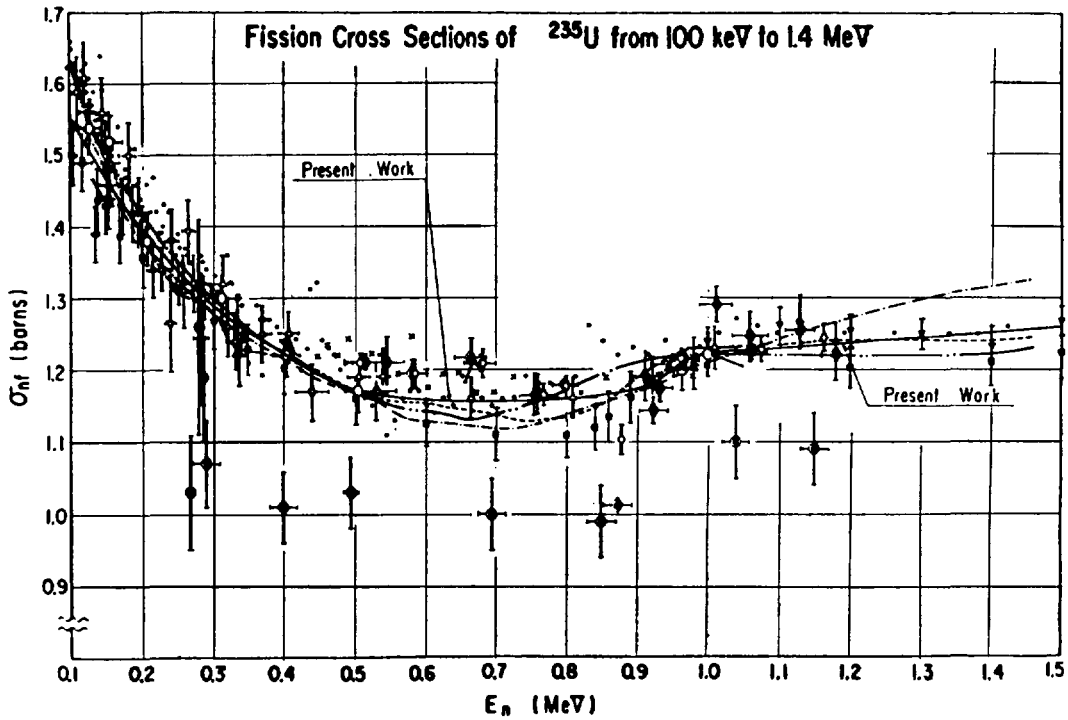

Fig. 3-2 Fission cross sections of ^{235}U from 100 keV to 1.4 MeV. Four evaluations are plotted with the experimental data. Four different curves correspond to the same works as those mentioned in Fig. 3-1.

TABLE 3-28 Optical potential parameters for ^{235}U.

$V_O=40.0512-0.2301E_n+0.0109E_n^2$ (MeV)
$W_S=8.7702$ (MeV)
$V_{SO}=13.6953$ (MeV)
$r_O=1.3526$ (fm)
$r_S=1.3466$ (fm)
$r_{SO}=1.0885$ (fm)
$a_O=0.4972$ (fm)
$a_S=0.4169$ (fm)
$a_{SO}=0.5003$ (fm)

TABLE 3-29 Level scheme[142] of ^{235}U.

	E (MeV)	
gr.	0.0	7/2⁻
1	0.00008	1/2⁺
2	0.0131	3/2⁺
3	0.0462	9/2⁻
4	0.0517	5/2⁺
5	0.0817	7/2⁺
6	0.1030	11/2⁻
7	0.1293	5/2⁺
8	0.1504	9/2⁺
9	0.170	13/2⁻
10	0.1714	7/2⁺
11	0.1970	11/2⁺
12	0.2253	9/2⁺
13	0.248	15/2⁻
14	0.2946	13/2⁺
15	0.3329	5/2⁺
16	0.3673	7/2⁺
17	0.3935	3/2⁺
18	0.4145	9/2⁺
19	0.4268	5/2⁺
20	0.4743	7/2⁺
21	0.5333	9/2⁺
22	0.652	3/2⁻
23	0.658	1/2⁺
24	0.771	1/2⁺

Levels above 900 keV are assumed to be overlapping.

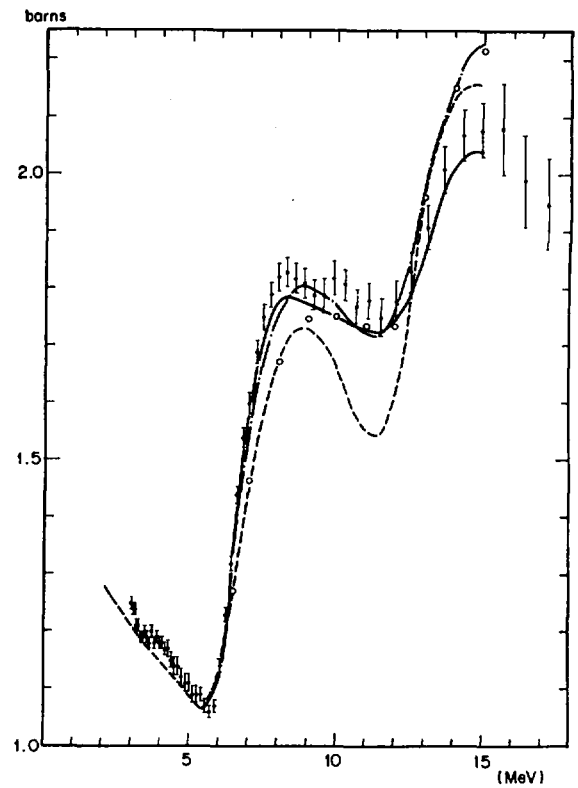

Fig. 3-3 Fission cross sections of ^{235}U from 1 to 15 MeV. Open circles show an evaluation work by Sowerby and Patrick[221], and closed circles are experimental results by Czirr and Sidhu[220]. JENDL-1 data are shown with a solid curve, and Matsunobu's evaluation is a dashed curve. A dotted curve shows ENDF/B-IV.

ref. 213). He estimated also the angular distributions of the elastic and inelastic scattering cross sections. He made optical model calculations with the potential parameters shown in TABLE 3-28. This set of the parameters was obtained so as to reproduce the evaluated total cross sections.

Numbers of prompt neutrons per fission were estimated with four linear functions of the energy which were respectively defined in each of four divided energy intervals[213]. Numbers of delayed neutrons per fissions by Schatz[223] were adopted.

Uranium-238

Evaluation of the neutron nuclear data for this nuclide had been made by Y. Kanda[213] as one of the most important works in JNDC. He prepared the evaluated data between 1 keV and 20 MeV, and the JENDL-1 compilation group adopted most of his evaluated data except for the

data below 46.5 keV where unresolved resonance parameters were needed. The resolved resonance parameters and the cross sections in the thermal region were taken from ENDF/B-IV, according to a recommendation of a person in charge who had watched and examined the status of the resonance parameters of ^{238}U as one of the activities in the working group of JNDC.

Unresolved resonance parameters

The unresolved resonance parameters were given in the energy range between 4 keV and 46.5 keV. Although the resolved resonance parameters have been measured up to about 6 keV, the parameters in ENDF/B-IV were given only below 4 keV. Therefore, the unresolved resonance region in JENDL-1 was set above 4 keV. The upper energy of 46.5 keV was decided owing to a requirement from the reactor calculation. The subthreshold fission was neglected in this evaluation, and the ratio of the *s*-wave to *p*-wave neutron strength functions was assumed to be a constant which was given from the values recommended in BNL 325, 3rd edition.[7] Besides, we fixed three parameters of $D_{obs}=20.8$ eV, $\Gamma_\gamma=2.3$ meV and $R=9.184$ fm.

Under these conditions, the *s*-wave strength functions were searched for so as to reproduce appropriate experimental total and capture cross sections. The total cross sections were taken from the experimental data by Uttley *et al.*[180], and the capture cross sections were from Moxon[224], while Kanda had made the evaluation for the capture cross sections on the basis of the data by Fricke *et al.*[225] The energy dependence of the former data seemed to be favorable to the results of the calculations. The strength functions thus obtained are given in **TABLE 3-30** with the cross sections calculated from these strength functions. The calculated total and capture cross sections are shown in **Figs. 3-4** and **3-5** with the experimental data.

Fast region

As a lot of experiments were made for the total, capture and fission cross sections, Kanda made his evaluation work on the basis of the available experimental data for these cross sections. On the other hand, since only a few experimental data were available for the elastic and inelastic scattering, $(n, 2n)$ and $(n, 3n)$ reaction cross sections, he used the theoretical calculations for these quantities.

The total cross sections below 500 keV were evaluated on the basis of the experimental data by Uttley *et al.*[180] and Whalen *et al.*[226] Below 100 keV, however, the JENDL-1 compilation group modified his results slightly so as to connect smoothly to the cross sections calculated from

TABLE 3-30 Unresolved resonance parameters and the calculated cross sections of ^{238}U. Fixed parameters: $D_{obs}=20.8$ eV, $\Gamma_\gamma=2.3$ meV, $R=9.1840$ fm.

E_n (keV)	S_0 ($\times10^{-4}$)	S_1 ($\times10^{-4}$)	σ_t (b)	σ_c (b)	σ_{el} (b)	σ_{in} (b)
4	0.93	1.57	16.80	1.03	15.77	
5	0.95	1.61	16.30	0.94	15.36	
6	0.94	1.60	15.80	0.86	14.94	
7	0.94	1.59	15.40	0.80	14.60	
8	0.93	1.59	15.10	0.76	14.34	
9	0.93	1.59	14.85	0.72	14.13	
10	0.93	1.59	14.65	0.69	13.96	
12	0.95	1.62	14.38	0.65	13.73	
15	0.98	1.66	14.00	0.60	13.50	
17	1.00	1.69	13.96	0.57	13.39	
20	1.01	1.71	13.75	0.53	13.22	
25	1.05	1.79	13.55	0.48	13.07	
30	1.08	1.83	13.35	0.44	12.91	
35	1.10	1.87	13.20	0.41	12.79	
40	1.14	1.94	13.10	0.38	12.72	
46.5	1.17	1.99	12.95	0.35	12.59	0.011

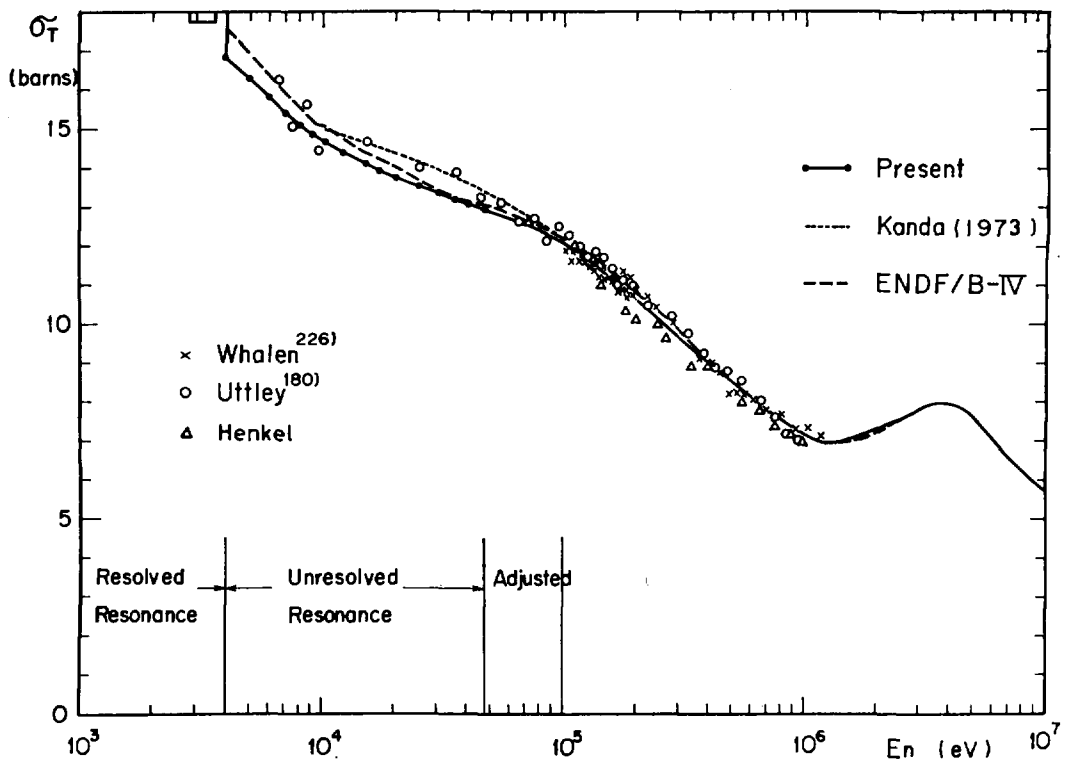

Fig. 3-4 Total cross sections of ^{238}U. Triangls show very old data by Henkel *et al.* (*Phys. Rev.* **94** (1954) 141). Cross-section curve extrapolated from fast region is adjusted in the adjusted region so as to connect smoothly to the cross sections from unresolved resonance region.

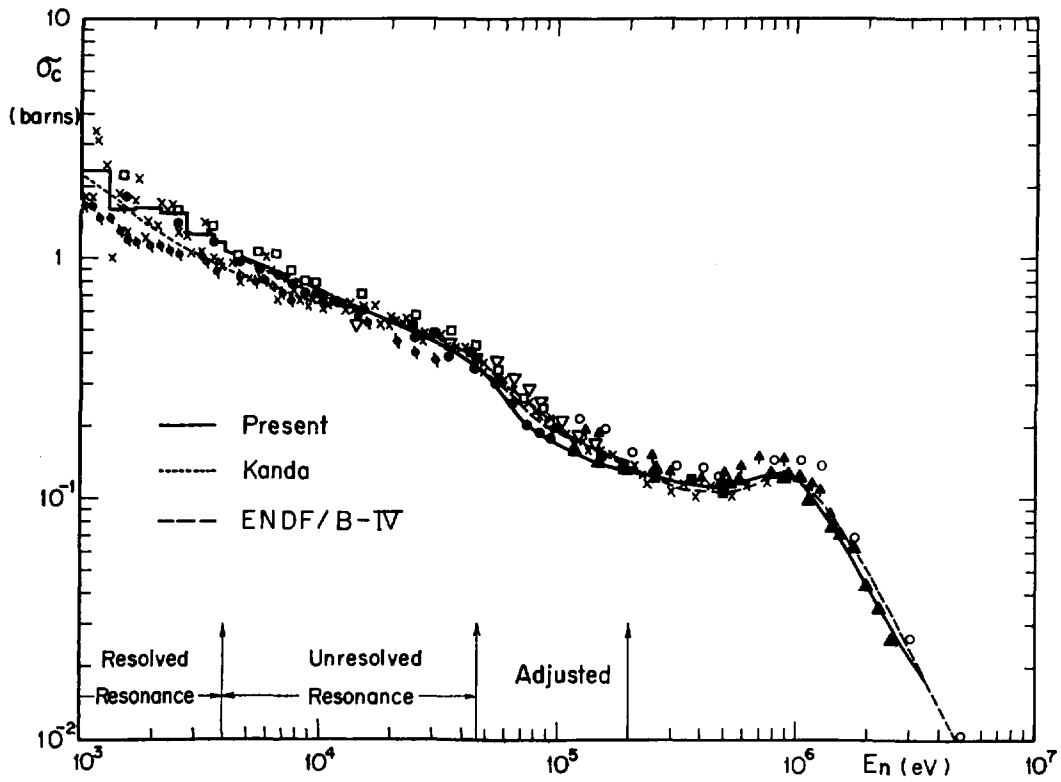

Fig. 3-5 Capture cross sections of ^{238}U. Three evaluations are plotted with the experimental data. Symbols of the data discussed in the text are ● for Moxon[224], × for Fricke *et al.*[225], ■ for Menlove and Poenitz[233], and ▽ for Panitkin *et al.*[234]

the unresolved resonance parameters. Between 500 keV and 4.5 MeV, Kanda adopted the data measured by Kopsch *et al.*[227] because their experimental condition seemed to be the best concerning the inscattering. The data measured by Whalen *et al.* and by Foster and Glasgow[140] agree with those by Kopsch *et al.* The data by Foster and Glasgow were taken between 4.5 MeV and 15 MeV, and the data by Bratenahl *et al.*[138] and by Peterson *et al.*[228] were mainly adopted above 15 MeV.

Kanda had worked out the evaluation of the fission cross sections in 1972 on the basis of the experimental data. Ratio measurements of ^{238}U fission to ^{235}U fission were multiplied by the fission cross sections of ^{235}U evaluated by Davey[217], in order to induce the fission cross sections of ^{238}U. Two ratio measurements were released after his evaluation over a wide energy range. One was carried out by Coates *et al.*[229] in the energy range from 600 keV to 20 MeV. Meadows[230] measured the ratio in the energy range from 1 to 10 MeV. He obtained, in particular, the absolute values of the ratio in the energy region 2 to 3 MeV. His results agree well with the ratio data by Poenitz and Armani[231], Jarvis[232], and White and Warner[210]. The JENDL-1 compilation group adopted the shape of the data by Coates *et al.*, and increased them by 3% so as to fit in with Meadows' data between 2 and 3 MeV. The adopted curve of the ratio data is shown in **Fig. 3-6**. The cross sections of ^{238}U were obtained from this curve by using the fission cross sections of ^{235}U adopted in JENDL-1. The fission cross sections of JENDL-1 are compared with the other evaluations in **Fig. 3-7**. The data of JENDL-1 are larger than the other evaluated data from 7 to 12 MeV and are smaller from 14 to 18 MeV. The small values near 15 MeV are due to the small fission cross sections of ^{235}U in JENDL-1.

As mentioned above concerning the capture cross sections, Kanda adopted the data by Fricke *et al.* below 1 MeV, because the S/N ratios of their γ-ray detector were better than those in the experiment by Moxon. Besides, their data agreed with the data measured by Menlove *et al.*[233] and Panitkin *et al.*[234] in spite of the different methods. However, the data by Moxon were adopted in JENDL-1 below 46.5 keV by taking account of the energy dependence of the calculated cross sections in the unresolved resonance region. The capture cross sections in JENDL-1 were mainly taken from Kanda's evaluation[213] above 46.5 keV, but his data were slightly modified between 46.5 and 200 keV so that the cross-section curve might connect smoothly to the curves below and above this region.

The inelastic scattering cross sections up to 3 MeV were adopted from the optical and statistical model calculations by Igarasi *et al.*[235] The optical potential parameters and level scheme used in their calculation are given in **TABLES 3-31** and **3-32**, respectively. Since all necessary data were prepared below 3 MeV except for the elastic scattering cross sections, the JENDL-1 compilation group obtained them by subtracting the capture, fission and inelastic scattering cross sections from the total cross sections.

Above 3 MeV, the JENDL-1 compilation group adopted the data by Kanda for the elastic scattering, $(n, 2n)$ and $(n, 3n)$ reaction cross sections. He took account of the experimental data of the elastic scattering cross sections measured indirectly by Batchelor *et al.*[191] and Voigner[236]. Kanda adopted the data measured by Knight *et al.*[237] for the $(n, 2n)$ reaction cross sections, and the data measured by Mather and Pain[53] and the data measured indirectly by White[238] for the $(n, 3n)$ reaction cross sections. He obtained the shapes of cross sections by means of Pearlstein's method[13] and normalized them to the experimental data adopted above. Using these data, Kanda calculated the inelastic scattering cross sections by subtracting the already obtained partial cross sections from the total cross sections. The inelastic scattering cross sections thus obtained agree well with the experimental data at 14 MeV.

The angular distributions of elastically scattered neutrons were calculated with the CASTHY code.[9] The angular distributions of inelastically scattered neutrons were evaluated for the first

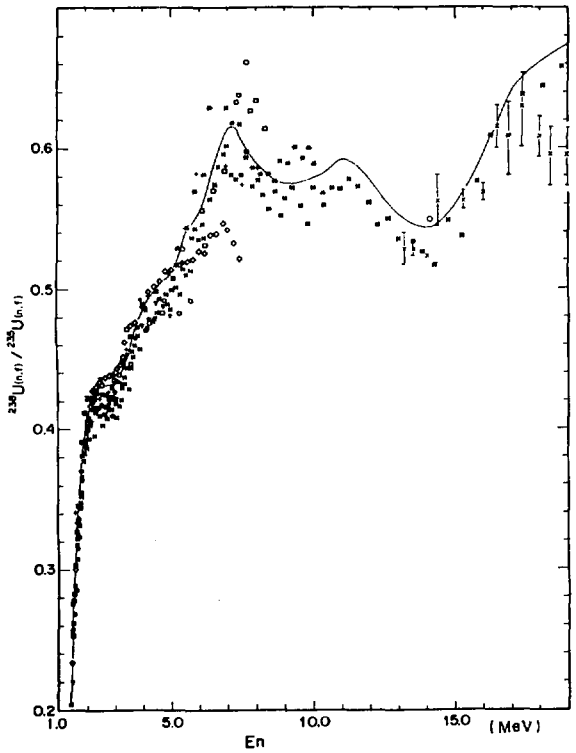

Fig. 3-6 Ratio data of the fission cross sections of ^{233}U to ^{235}U. Present evaluation gives a solid curve. Symbols of the experimental data discussed in the text are ○ for White and Warner[210], ⋈ for Coates *et al.*[229], ■ for Meadows[230], and ⧖ for Poenitz and Armani[231].

TABLE 3-31 Optical potential parameters for ^{238}U.

V_0=40.5 (MeV)
W_s=9.0 (MeV)
V_{so}=15.0 (MeV)
r_0=1.32 (fm)
r_s=1.32 (fm)
r_{so}=1.32 (fm)
a_0=0.47 (fm)
a_s=0.47 (fm)
a_{so}=0.47 (fm)

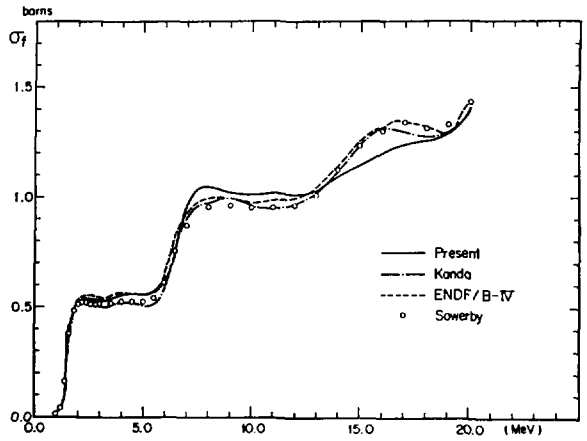

Fig. 3-7 Evaluated fission cross sections of ^{238}U. Open circles show an evaluation by Sowerby and Patrick[221].

TABLE 3-32 Level scheme of ^{238}U.

	E (MeV)	
gr.	0.0	0^+
1	0.0447	2^+
2	0.148	4^+
3	0.301	6^+
4	0.520	8^+
5	0.680	1^-
6	0.732	3^-
7	0.790	10^+
8	0.838	5^-
9	0.939	2^+
10	0.968	2^+
11	1.006	0^+
12	1.047	2^+
13	1.076	2^+
14	1.100	12^+
15	1.123	1^-
16	1.150	2^-
17	1.190	3^-
18	1.210	2^+
19	1.246	4^-
20	1.272	5^-
21	1.313	2^+
22	1.361	2^+
23	1.401	2^+
24	1.437	14^+
25	1.470	1^-

Levels above 1.5 MeV are assumed to be overlapping.

and second excited states on the basis of the experimental data by Guenther and Smith[239]. The isotropic scattering in the center of mass system was assumed for the inelastic scattering for the other discrete levels.

Neptunium-239

Y. Kanda performed the primary evaluation on this nuclide. Since the experimental data were very scarce, he obtained the data mainly by the theoretical calculations. His evaluated data below 4 eV and his recommendation about the fission and capture cross sections were adopted

in JENDL-1 without any modification, but the total, elastic scattering, inelastic scattering, $(n, 2n)$ and $(n, 3n)$ reaction cross sections were recalculated above 4 eV before they were stored in the JENDL-1 files.

Thermal and resonance region

In the thermal energy region, Kanda adopted the experimental results by Stoughton and Halperin[240] concerning the capture cross sections. He recommended that the cross sections were proportional to $1/v$ and had a value of 37 barns at 0.0253 eV. This is due to his adoption of an effective cross section of 66 barns for Maxwellian distribution. Since the fission cross sections were negligibly small, he made the total cross section to be the sum of the capture and potential scattering cross sections. The latter was

$$\sigma_{\mathrm{p.s.}} = 4\pi(r_0 A^{1/3})^2 \ . \tag{3.15}$$

He used $r_0 = 1.47$ fm and gave the value of 10.5 barns to the potential scattering cross section.

Since no experimental data had been found in the resonance region, he calculated the average cross sections by using the following formula,

$$\bar{\sigma}_{\mathrm{ab}} = 2\pi^2 \lambda\!\!\!^{-2} g_J \frac{1}{\bar{D}} \left(\frac{\bar{\Gamma}_{\mathrm{a}} \bar{\Gamma}_{\mathrm{b}}}{\bar{\Gamma}} \right) S \ , \tag{3.16}$$

where S stands for a factor representing the effect of the resonance width fluctuation. He used the values of 1.28×10^{-4}, 26 meV and 15 eV for $\bar{\Gamma}_n^{\circ}/\bar{D}$, $\bar{\Gamma}_\gamma$ and $\bar{D}$, respectively. These were estimated from the values given by Lynn[241] for ^{237}Np, ^{238}U and ^{240}Pu. Since the calculated value of the elastic scattering cross section was 9 barns and was not different from the value of the potential scattering cross section in the thermal energy region, Kanda gave 10.5 barns to the elastic scattering cross sections in the resonance energy region. The capture cross section was assumed as follows

$$\bar{\sigma}_{n\gamma} = 435/\sqrt{E_n} \quad \text{(barns)} \ , \tag{3.17}$$

where E_n is measured in eV. He gave 4 eV to the lower boundary of the resonance region.

Fast region

In the fast energy region, Kanda recommended the total cross sections obtained from the optical model calculations performed by Ohta and Miyamoto[242]. He used this potential in order to calculate the inelastic scattering cross sections. The potential parameters and level scheme used are shown in **TABLES 3-33** and **3-34**. Kanda extrapolated the curve of the capture cross sections in the resonance region up to 100 keV. He renormalized the measured cross sections by Nagle *et al.*[243] at this energy point so as to connect them with those in the resonance region.

He estimated the fission cross sections by investigating the energy dependence of the fission cross sections for U and Pu isotopes. He drew the curves of the fission cross sections for the several isotopes with a unified energy-scale in which the neutron separation energy $B_n[x]$ of the

TABLE 3-33 Optical potential parameters for ^{239}Np.

$V_0 = 45.87 - 0.2E_n$ (MeV)
$W_I = 0.06$ (MeV)
$W_S = 14.1$ (MeV) (Gaussian)
$W_{SO} = 7.3$ (MeV)
$r_0 = 1.27$ (fm)
$r_I = 1.27$ (fm)
$r_S = 1.302$ (fm)
$r_{SO} = 1.27$ (fm)
$a_0 = 0.652$ (fm)
$a_I = 0.315$ (fm)
$a_S = 0.98$ (fm)
$a_{SO} = 0.652$ (fm)

TABLE 3-34 Level scheme of ^{239}Np.

	E (MeV)	
gr.	0.0	$5/2^+$
1	0.03114	$7/2^+$
2	0.07112	$9/2^+$
3	0.07467	$5/2^-$
4	0.1177	$11/2^+$
5	0.1230	$7/2^-$
6	0.1731	$9/2^-$
7	0.2414	$11/2^-$
8	0.320	$13/2^-$

Levels above 430 keV are assumed to be overlapping.

isotope x was placed at that of ^{239}Np, and the interval of the energy-coordinate for x was modified by multiplying a factor $(B_{2n}-B_n)[^{239}\mathrm{Np}]/(B_{2n}-B_n)[x]$. He decided the shape of the cross sections after he found out the similarity of the cross-section curves in this energy-scale. He decided the absolute values by using the well-known systematics of the cross sections versus $Z^{4/3}/A$ at 3 MeV. As to the cross sections of the $(n, 2n)$, $(n, 3n)$ and elastic scattering, he adopted those obtained by Ohta and Miyamoto[242].

The evaluated data given by Kanda were examined about their consistency before they were adopted in JENDL-1. In particular, the partial inelastic scattering cross sections were calculated by taking account of the competing processes, i.e., the capture, fission, $(n, 2n)$ and $(n, 3n)$ cross sections. In this calculation, however, it was found that the sum of the cross sections for the above mentioned competing processes exceeded the formation cross section of the compound nucleus which was obtained by using the optical potential parameters shown in TABLE 3-33. This drawback was due to slightly large values of the $(n, 2n)$ and $(n, 3n)$ cross sections from Ohta and Miyamoto. The compilation group removed it by recalculating the $(n, 2n)$ and $(n, 3n)$ reaction cross sections so that the self-consistency might be satisfied among the reaction processes via the compound nucleus.

Plutonium-239

Cross sections were evaluated by M. Kawai[213] above 1 keV and his evaluation was adopted in JENDL-1 above 21.5 keV. Many measurements have so far been made for the total and fission cross sections and for the α-value (the capture to fission ratio). Kawai evaluated the total, fission and capture cross sections on the basis of these experimental data. The theoretical calculation was made for the evaluation of the other cross sections because of scarce experimental data. The unresolved resonance parameters were determined by the JENDL-1 compilation group between 598 eV and 21.5 keV. The evaluated data by Ribon and Le Coq[244] were adopted for the resolved resonance parameters below 598 eV. The thermal cross sections contained in ENDF/B-IV were recommended below 1 eV, except for the capture cross sections which were decreased in JENDL-1 in the energy range above 0.5 eV so as to attain the smooth connection with the cross sections calculated from the resonance parameters.

Resonance parameters

The resolved resonance parameters evaluated by Ribon and Le Coq[244] were adopted in the energy range up to 598 eV according to the recommendation by T. Yoshida[245], who had examined the present status of the resonance parameters. The background cross sections were applied to the elastic scattering and total cross sections so that the cross sections calculated with the single-level Breit-Wigner formula might agree with the results of the calculation with the multi-level Breit-Wigner formula. Near 1 eV, the background cross sections were applied to the total, capture, fission and elastic scattering so that the calculated cross sections might connect smoothly with the cross sections below 1 eV which were given as pointwise data.

The unresolved resonance parameters were given between 598 eV and 21.5 keV. The parameters were determined so as to reproduce the total, fission and capture cross sections evaluated by Kawai on the basis of the experimental data. Since the uncertainties of the experimental α-values were large, the weight of the capture cross sections was considered lower than the weights of the total and fission cross sections in the process of determining the parameters. In practice, the fission width and the neutron strength functions were only searched for. The ratio of the s-wave to p-wave neutron strength functions was assumed to keep a constant value which was determined from the values recommended in BNL 325, 3rd

edition. According to the analysis[8] based on the channel theory of fission, the 0^+ state has at least one open fission channel but the 1^+ state has one subthreshold channel. Therefore the intermediate structure is expected[246] for the fission width of the 1^+ state due to the coupling between the excited states in the first and second minima of the fission potential. In the present analysis, only the fission width of the 1^+ state was searched for to reproduce the cross section, while the fission widths of the other states were assumed to be constants[8] expected from the channel theory. The resonance parameters thus obtained are given in **TABLE 3-35** with the cross sections calculated from these parameters. The α-values calculated from these parameters are given in **Fig. 3-8** with the experimental data.

Fast region

Kawai made the evaluation of the total cross sections by using the least squares method with some polynomials. He used the experimental data of Uttley[247], Schwartz *et al.*[216], Henkel *et al.*[248], Foster and Glasgow[140], Smith *et al.*[249] and Cabe *et al.*[250]

Before starting the compilation work of JENDL-1, Kawai had compiled the experimental data of the fission cross sections above 1 keV published up to 1973. The data obtained by the relative measurement, which will be called relative data hereafter, were combined with the following standards in order to deduce the cross sections: the (n, α) cross section of ^{10}B evaluated by Sowerby *et al.*[251], the fission cross sections of ^{235}U and ^{238}U by Matsunobu[213] and Kanda[213], respectively. Using these experimental data, he tried to obtain the evaluated fission cross sections. He divided the whole energy range into some small energy intervals and applied the least squares method with a polynomial in the energy E_n in each interval, giving larger weights to the recent experimental data. Below 10 keV, larger weights were assigned to the data by the absolute measurements than the relative data, since the uncertainties in the standard fission cross sections of ^{235}U were fairly large.

From 1 to 30 keV, the evaluation was performed by averaging the data measured by TOF technique over some small energy intervals, in which the evaluated data were given in the form of histogram. From 30 keV to 1 MeV, both of the absolute and relative data were simultaneously

TABLE 3-35 Unresolved resonance parameters and the calculated cross sections of ^{239}Pu. Fixed parameters are $D_{obs}=2.3$ eV, $\Gamma_\gamma=40$ meV, $R=9.0094$ fm, $\Gamma_f^{(0+)}=2800$ meV, $\Gamma_f^{(0-)}=0$ meV, $\Gamma_f^{(1-)}=1000$ meV, and $\Gamma_f^{(2-)}=600$ meV.

E_n (keV)	S_0 ($\times 10^{-4}$)	S_1 ($\times 10^{-4}$)	$\Gamma_f^{(1+)}$ (meV)	σ_t (b)	σ_c (b)	σ_f (b)	σ_{el} (b)	σ_{in} (b)	α
0.598	1.41	2.49	33.2	34.06	8.50	9.71	14.85		0.88
0.65	0.90	1.59	8.15	24.86	6.99	4.54	13.33		1.54
0.75	0.93	1.64	28.4	24.24	5.56	5.71	12.97		0.97
0.85	0.80	1.41	44.9	21.60	4.21	5.24	12.14		0.80
0.95	1.32	2.34	50.5	28.04	5.60	7.94	14.50		0.70
1.5	1.03	1.82	30.4	21.30	3.86	4.45	12.99		0.87
2.5	1.18	2.08	13.4	20.11	3.38	3.24	13.49		1.04
3.5	1.06	1.87	22.8	17.77	2.39	2.82	12.56		0.84
4.5	1.05	1.86	20.1	16.90	2.06	2.46	12.38		0.84
5.5	1.08	1.92	14.4	16.48	1.91	2.20	12.37		0.87
6.5	1.03	1.82	18.6	15.72	1.62	2.07	12.03		0.78
7.5	1.02	1.80	28.3	15.30	1.40	2.11	11.79		0.66
8.5	1.16	2.05	29.8	15.71	1.31	2.25	11.94	0.221	0.58
9.5	1.08	1.92	19.8	15.09	1.20	1.91	11.70	0.285	0.63
10.0	1.08	1.91	21.2	14.97	1.14	1.90	11.63	0.302	0.60
12.0	1.08	1.92	19.3	14.60	1.01	1.79	11.46	0.346	0.57
15.0	1.09	1.93	20.7	14.21	0.866	1.73	11.25	0.366	0.50
18.0	1.08	1.92	22.9	13.86	0.763	1.69	11.05	0.362	0.45
21.5	1.11	1.97	21.1	13.67	0.697	1.67	10.93	0.375	0.42

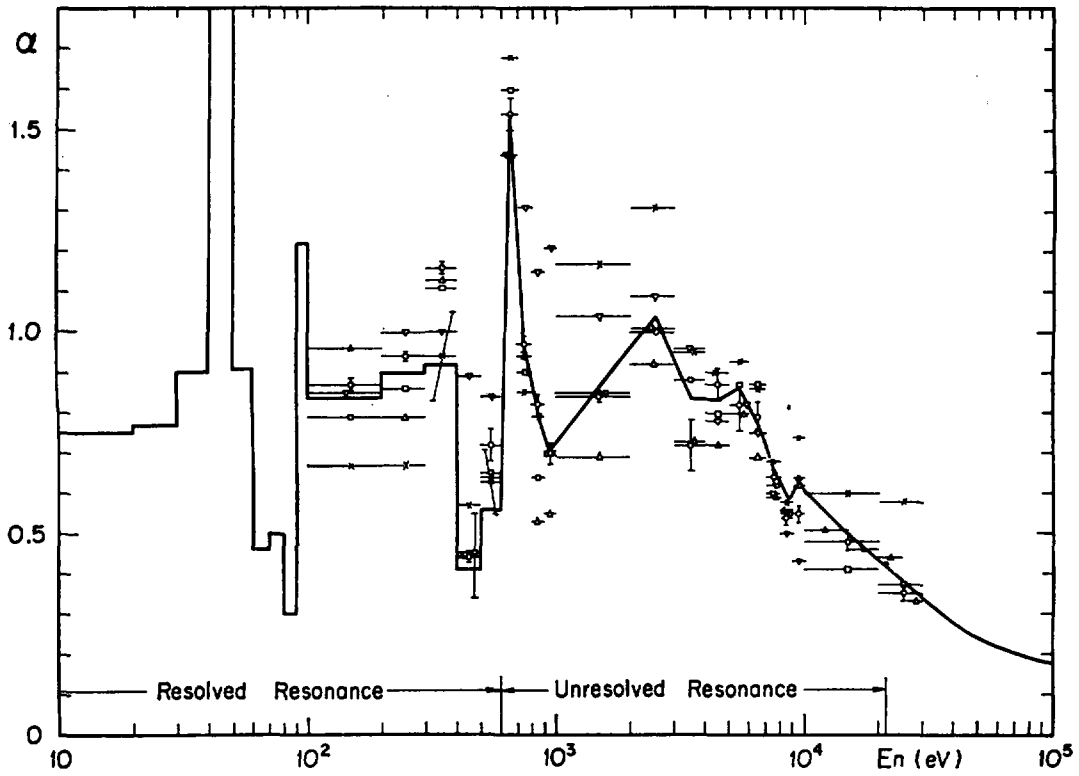

Fig. 3-8 Alpha values of ^{239}Pu in the resonance region. Solid curve shows the present result calculated with the unresolved and resolved resonance parameters.

used. Above 1 MeV, only the relative data were used. The fitted cross-section curve was modified so as to reproduce the experimental data at 5.5 and 14.1 MeV where good agreements were observed among many experimental data.

After his first evaluation, a considerable number of experimental data were reported at the conference held at Washington, 1975, and the specialist meeting held at ANL, 1976. Most of these new data gave higher values than the evaluated data of Kawai. Taking account of these new data, Kawai made reevaluation for the fission cross sections. The adopted data in JENDL-1 were these reevaluated ones. **Fig. 3-9** shows the adopted fission cross section with other evaluations as well as the experiments.

In order to obtain the capture cross sections below 1 MeV, Kawai made evaluation on the α-value first, and then combined it with the fission cross section mentioned above. He made the least squares fit with some polynomials to obtain the evaluated curve of the α-value. He gave the large weight to the data of Gwin *et al.*[252] His evaluated data were modified below 21.5 keV in determining the unresolved resonance parameters. **Fig. 3-10** shows this result with the experimental data.

Between 1 and 5.5 MeV, the capture cross sections were calculated on the basis of the spherical optical and statistical models. The optical model parameters were determined so as to reproduce the evaluated total cross sections. The parameters are given in **Table 3-36**. The level density parameters were taken from the values recommended by Gilbert and Cameron[12] and the densities were normalized so that the mean level spacings for ^{239}Pu and ^{240}Pu might be reproduced. The radiation width of 30 meV was obtained so as to reproduce the evaluated capture cross section at 100 keV. The level density parameters and the level scheme used in the calculation are given in **Tables 3-37** and **3-38**, respectively. The competing processes taken into account were the fission, $(n, 2n)$ and $(n, 3n)$ reactions. Above 5.5 MeV, the data of ENDF/B-IV were recommended.

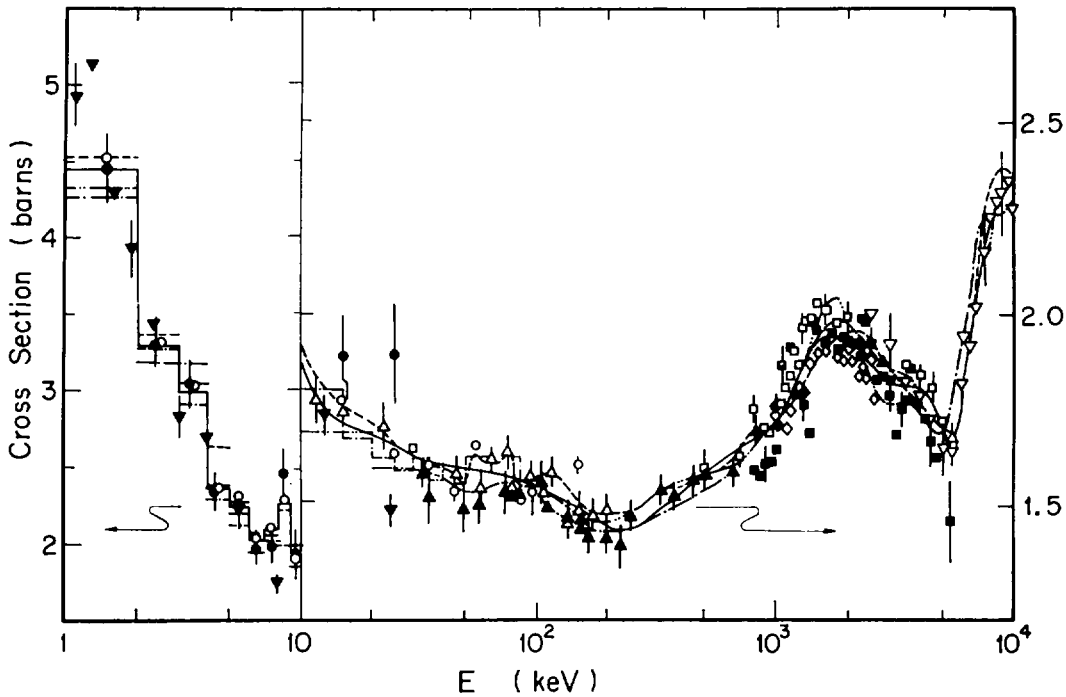

Fig. 3-9 Fission cross sections of ^{239}Pu. Solid curve shows the present result and dashed curve in ENDF/B-IV. One dot and two dots curves are the evaluations by Sowerby *et al.* (*Ann. Nucl. Sci. Eng.* 1 (1974) 409) and by Byer (*Atomic Energy Rev.* **10**, No. 4 (1972) 529), respectively.

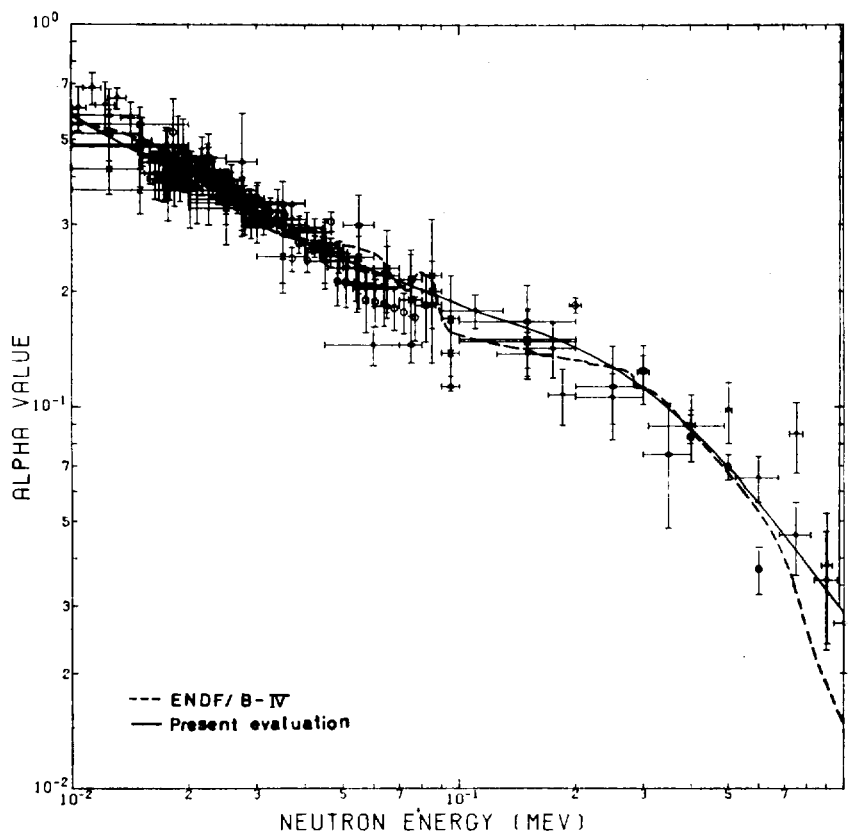

Fig. 3-10 Alpha values of ^{239}Pu between 10 keV to 1 MeV.

TABLE 3-36 Optical potential parameters for ^{239}Pu.

$V_0=41.15+0.45E_n-0.1825E_n^2$ (MeV)	$E_n \leq 2$ MeV
$=41.91875-0.31875E_n-0.009687E_n^2$ (MeV)	$E_n \geq 2$ MeV
$W_S=7.82-2.71E_n+0.82E_n^2$ (MeV)	$E_n \leq 2$ MeV
$=4.48125-0.64875E_n-0.019687E_n^2$ (MeV)	$E_n \geq 2$ MeV
$V_{SO}=7.0$ (MeV)	
$r_0=1.32$ (fm)	
$r_S=1.38$ (fm)	
$r_{SO}=1.32$ (fm)	
$a_0=0.47$ (fm)	
$a_S=0.47$ (fm)	
$a_{SO}=0.47$ (fm)	

TABLE 3-37 Level density parameters for ^{239}Pu and ^{240}Pu.

	^{239}Pu	^{240}Pu
a (MeV^{-1})	26.53	26.93
Δ (MeV)	0.61	1.04
α (MeV$^{-1/2}$)	17.62	17.80
E_x (MeV)	3.74	4.17
C_0	8292.6	11277.4
B_n (MeV)	5.66	6.53

TABLE 3-38 Level scheme of ^{239}Pu.

	E (MeV)	
gr.	0.0	1/2$^+$
1	0.008	3/2$^+$
2	0.057	5/2$^+$
3	0.076	7/2$^+$
4	0.164	9/2$^+$
5	0.193	11/2$^+$
6	0.286	5/2$^+$
7	0.330	7/2$^+$
8	0.388	9/2$^+$
9	0.392	7/2$^-$
10	0.432	5/2$^+$
11	0.434	9/2$^-$
12	0.463	11/2$^+$
13	0.470	1/2$^-$
14	0.480	7/2$^+$
15	0.486	11/2$^-$
16	0.492	3/2$^-$
17	0.505	5/2$^-$
18	0.512	7/2$^+$
19	0.556	7/2$^-$
20	0.735	3/2$^+$
21	0.759	5/2$^+$
22	0.800	7/2$^+$
23	0.849	9/2$^+$

Levels above 875 keV are assumed to be overlapping.

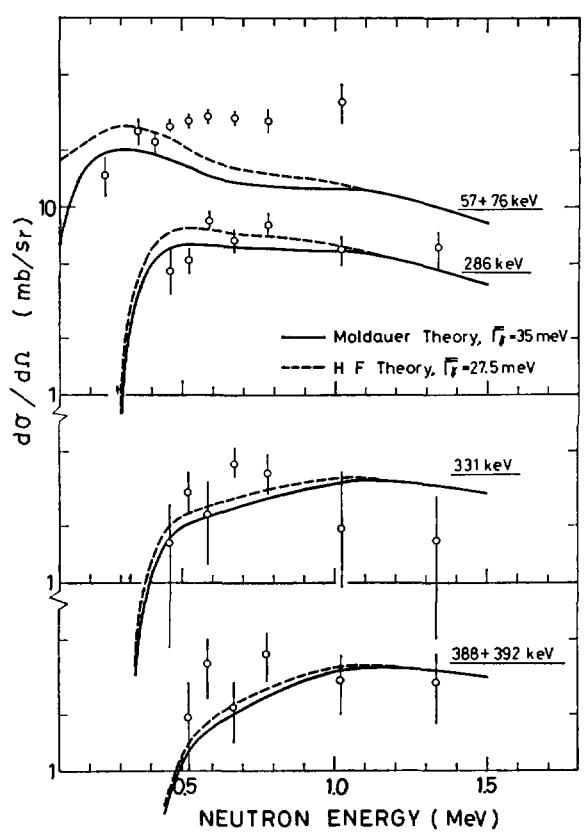

Fig. 3-11 Inelastic scattering cross sections of ^{239}Pu. Solid curves are the present results.

Kawai calculated the inelastic scattering cross sections together with the capture cross sections. The results agree fairly well with the experimental data as seen in **Fig. 3-11**. The JENDL-1 compilation group adopted his calculation without any modification. The $(n, 2n)$ and $(n, 3n)$ reaction cross sections were calculated with Pearlstein's method[13]. The obtained cross sections agree well with the experimental data by Mather *et al.*[222] The elastic scattering cross sections were obtained by subtracting the nonelastic scattering cross sections from the total cross sections.

The angular distributions of elastically scattered neutrons were calculated with the computer code CASTHY[9] and μ_L was calculated from the distributions. The isotropic scattering was assumed for the inelastically scattered neutrons.

The ν_p-value was evaluated by Kawai using the least squares fitting method. He renormalized the experimental data with the following standards;

$\nu_p = 3.756$ for spontaneous fission of ^{252}Cf,

$\nu_p = 2.8738$ for thermal fission of ^{239}Pu.

He fitted a polynomial of the third order in E_n to the renormalized data for two energy regions. The results are

$$\nu_p = 2.87380 + 0.83192 E_n + 0.071643 E_n^2 - 0.016536 E_n^3 \ , \quad E_n(\mathrm{MeV}) \leq 1.5\ \mathrm{MeV} \ , \tag{3.18}$$

$$= 2.8621 + 0.162757 E_n - 9.984 \times 10^{-4} E_n^2 - 3.178 \times 10^{-6} E_n^3 \quad E_n(\mathrm{MeV}) > 1.5\ \mathrm{MeV} \ . \tag{3.19}$$

He adopted the evaluation of ν_d by Manero and Konshin[253].

Plutonium-240

Evaluation was made by T. Murata between 1 keV and 15 MeV, and his evaluated data were mainly adopted in JENDL-1 above 46.5 keV. Between 3.19 and 46.5 keV, the unresolved resonance parameters were provided by the JENDL-1 compilation group. Below 3.91 keV, the data contained in ENDF/B-IV were recommended both for the resolved resonance parameters and for the point-wise data in the thermal energy region. Although a number of experiments have been made very recently, the experimental data are not sufficiently numerous except for the fission cross section. Hence, Murata evaluated the fission cross sections on the basis of the experimental data, and used the theoretical calculations for the other cross sections.

Resonance parameters

The resolved resonance parameters were given in the energy range up to 3.91 keV. The parameters of ENDF/B-IV were recommended with the background cross sections by a person in charge who had examined the status of the resonance parameters of ^{240}Pu.

The unresolved resonance parameters were given from 3.91 to 46.5 keV. The parameters were determined so as to reproduce the evaluated fission and capture cross sections. The evaluation by Murata shown in **Fig. 3-12** was adopted as the fission cross sections to be reproduced. On the other hand, the capture cross sections evaluated by Murata seemed to be lower than the experimental data below 10 keV and considerably higher from 30 to 120 keV as seen in **Fig. 3-13**. It was found in the preliminary calculation that the unresolved resonance parameters reproducing the Murata's evaluated fission and capture cross sections gave a very anomalous shape to the total cross section. Then, a new evaluation was made for the capture cross section below 120 keV on the basis of the experimental data by Hockenbury *et al.*[254] and by Weston and Todd[255]. The present evaluation took the values by Weston and Todd below 10 keV and above 30 keV, and took the mean values of the two sets of data between 10 and 30 keV. The total

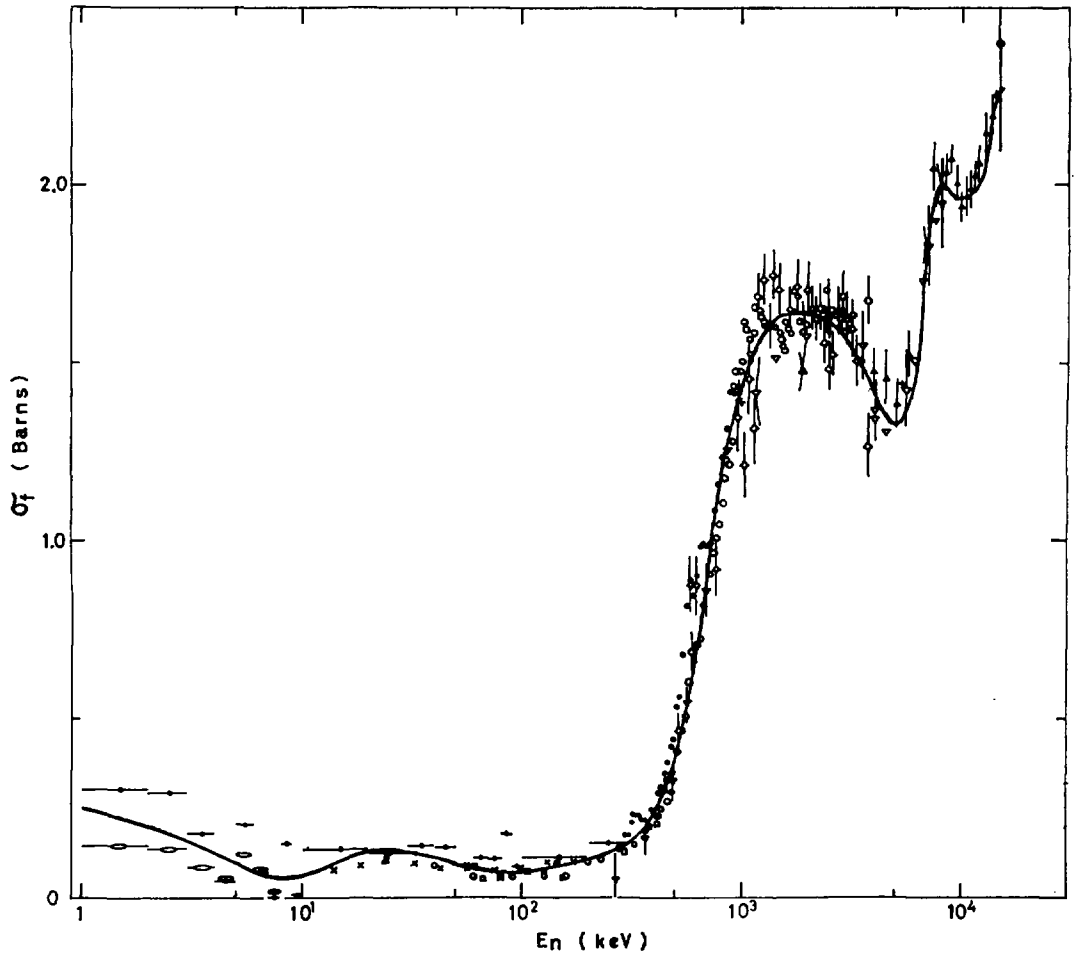

Fig. 3-12 Fission cross sections of ^{240}Pu. Solid curve shows the present evaluation. Symbols of the experimental data discussed in the text are ● for Byers *et al* [257] and ⬭ for Migneco and Theobald[258].

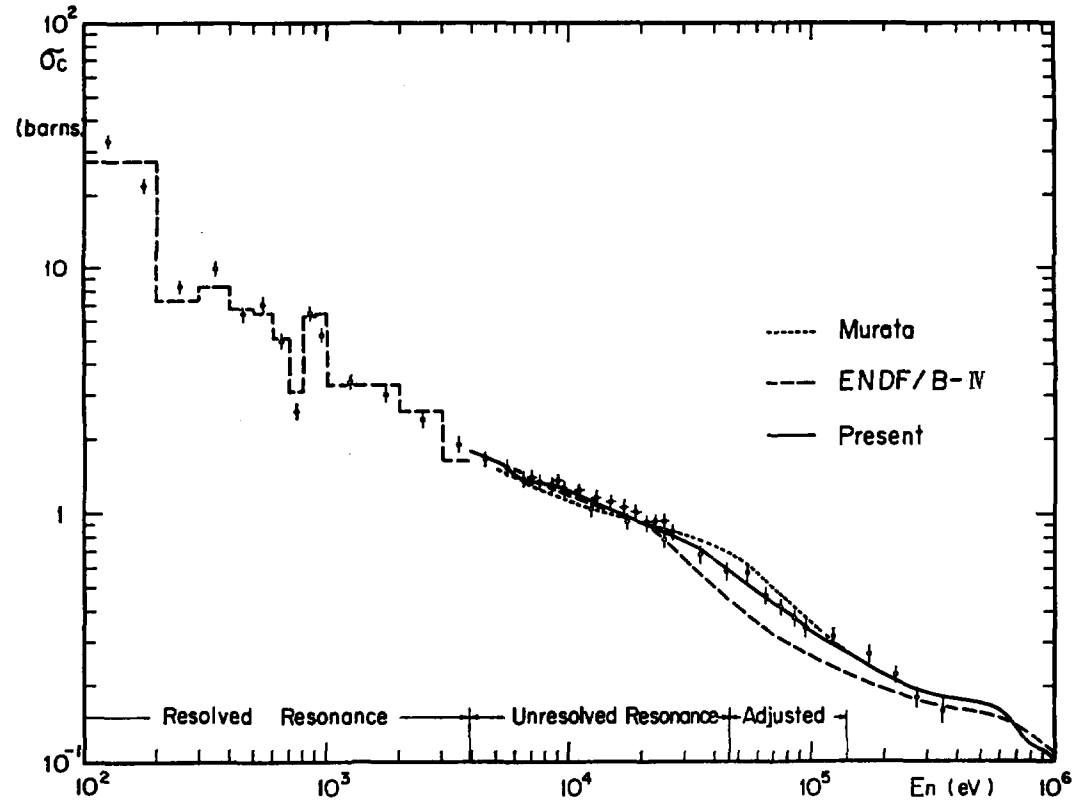

Fig. 3-13 Capture cross sections of ^{240}Pu. Three evaluated cross sections are shown with the two sets of the experimental data. Open circles are the data of Weston and Todd[255], and closed circles are Hockenbury *et al*.[254]

cross section evaluated by Murata was ignored, because his cross sections seemed too lwo to be connected smoothly to those calculated from the resolved resonance parameters, as seen in **Fig. 3-14**.

The fission widths and the strength functions were searched for. The fission widths were assumed to be the same for all the spin states. The ratio of the *s*-wave to *p*-wave strength functions was assumed to be a constant value calculated from the recommended data in BNL 325, 3rd edition[7]. The resonance parameters thus obtained are given in **TABLE 3-39** with the cross sections. As seen in **Fig. 3-14**, the total cross sections calculated from these parameters show a reasonable energy dependence, but are larger than those evaluated by Murata.

Fast region

The total cross sections measured by Smith *et al.*[256] between 100 keV and 1.5 MeV are the only available experimental data for the total cross section above 10 keV. Hence, Murata

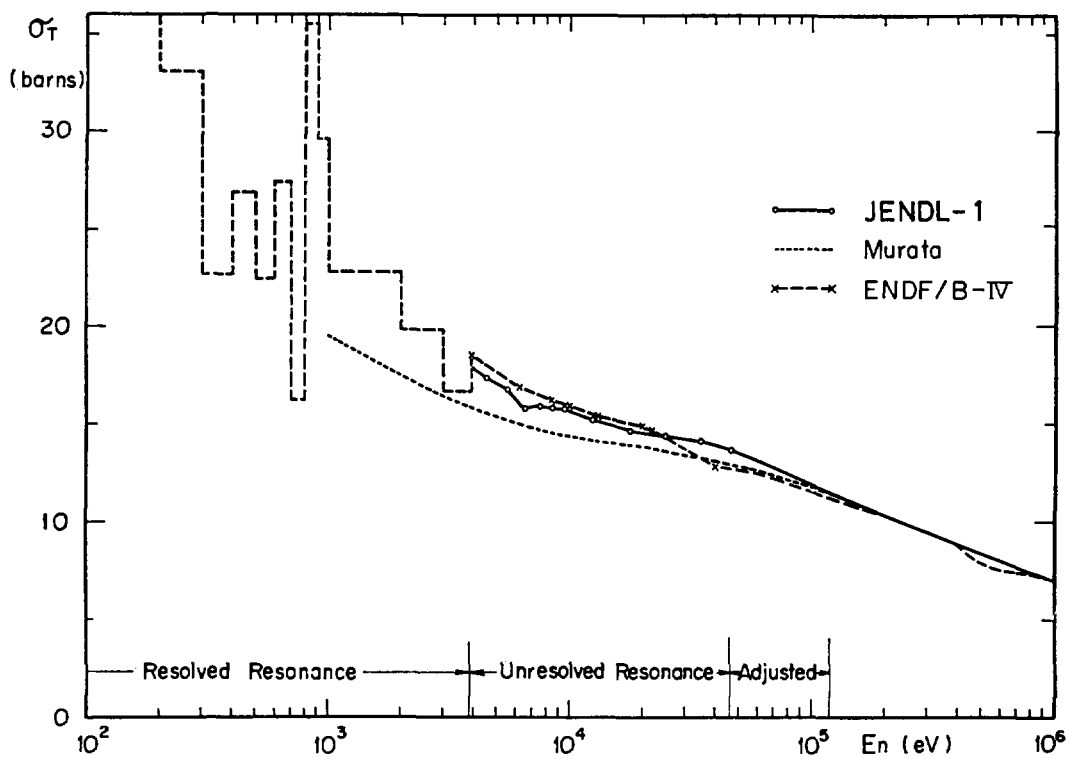

Fig. 3-14 Total cross sections of ^{240}Pu. Three evaluated cross sections are shown.

TABLE 3-39 Unresolved resonance parameters and the calculated cross sections of ^{240}Pu. Fixed parameters are D_{obs}=13.6 eV, Γ_γ=29.5 meV and R=9.18 fm.

E_n (keV)	S_0 ($\times 10^{-4}$)	S_1 ($\times 10^{-4}$)	Γ_f (meV)	σ_t (b)	σ_c (b)	σ_f (b)	σ_{el} (b)	σ_{in} (b)
3.91	1.04	2.66	2.44	17.9	1.72	0.133	16.05	
4.5	1.04	2.64	2.22	17.4	1.61	0.114	15.68	
5.5	1.03	2.62	1.83	16.8	1.48	0.087	15.23	
6.5	0.93	2.37	1.65	15.8	1.32	0.070	14.41	
7.5	1.01	2.56	1.35	15.9	1.30	0.057	14.54	
8.5	1.04	2.64	1.29	15.8	1.26	0.053	14.48	
9.5	1.06	2.71	1.38	15.7	1.23	0.055	14.42	
12.0	1.07	2.72	2.29	15.2	1.09	0.080	14.03	
17.5	1.06	2.69	3.97	14.6	0.936	0.115	13.55	
25.0	1.14	2.89	5.23	14.4	0.819	0.131	13.45	
35.0	1.17	2.99	5.63	14.1	0.703	0.122	13.27	
46.5	1.15	2.91	5.79	13.7	0.589	0.106	12.92	0.039

TABLE 3-40 Optical potential parameters of ^{240}Pu.

$V_O=40.85-0.053E_n$ (MeV)
$W_S=4.86+0.390E_n+0.230\sqrt{E_n}$ (MeV)
$V_{SO}=7.0$ (MeV)
$r_O=1.32$ (fm)
$r_S=1.41$ (fm)
$r_{SO}=1.32$ (fm)
$a_O=0.47$ (fm)
$a_S=0.47$ (fm)
$a_{SO}=0.47$ (fm)

calculated the total cross sections of ^{240}Pu from those of ^{238}U evaluated by Kanda[213] with the aid of the optical model. First, the ratios of the total cross sections of ^{240}Pu to those of ^{238}U were calculated with the optical potential whose parameters were determined so as to reproduce the evaluated total cross sections of ^{238}U. The potential parameters are given in TABLE 3-40. Using the cross sections of U^{238}, Murata obtained the total cross sections of ^{240}Pu as follows:

$$\sigma_T(^{240}\mathrm{Pu})=\sigma_T(^{238}\mathrm{U})\times\left[\frac{\sigma_T(^{240}\mathrm{Pu})}{\sigma_T(^{238}\mathrm{U})}\right]_{\mathrm{cal.}} \tag{3.20}$$

The cross sections thus obtained were decreased by 3% so as to fit them to the experimental data by Smith *et al.* Murata ignored the structure observed in the experimental data between 500 and 800 keV by considering the uncertainties due to the resonances of Aluminium that was contained in the target used by Smith *et al.*[256] His evaluated cross sections were considerably lower than those calculated from the unresolved resonance parameters below 46.5 keV. Therefore, his evaluation was adopted above 120 keV, and a smooth curve was drawn with the eye-guide method between 46.5 and 120 keV.

Murata made the evaluation of the fission cross sections on the basis of the many experimental data. Although most of the experiments gave the resonance parameters for the subthreshold fission below 10 keV, Murata gave the smoothed cross section by averaging the experimental data of Byers *et al.*[257] and of Migneco and Theobald[258]. Between 10 keV and 4 MeV, many experiments had been made, some of which were measured as the ratio to the fission cross section of ^{235}U. The ratio data were multiplied by the evaluated data of ^{235}U given by Matsunobu[213] in order to obtain the fission cross sections. The scattering of the experimental data was 10~25% in the energy range between 10 and 300 keV, 10~15% between 300 keV and 1 MeV, and 5% between 1 and 4 MeV. Murata obtained a cross-section curve by the eye-guide method with these data. Above 4 MeV, the experimental data were scarce. Murata estimated the cross-section shape, by considering the contribution of $(n, n'f)$ and $(n, 2nf)$ reactions by means of the statistical theory of fission. The evaluated curve is shown in Fig. 3-12 with the experimental data.

The experimental data[254,255] of the capture cross sections were available only in the energy range below 350 keV. Murata evaluated the capture cross sections by the use of the optical and statistical models. The level density parameters and the level scheme are given in TABLES 3-41 and 3-42. The former parameters are different from those given by Gilbert and Cameron. The calculated results were normalized to the experimental data at 10 keV. As shown in Fig. 3-13 and mentioned previously, his evaluated cross sections were higher than the experimental data by Weston and Todd[255] from 30 to 120 keV. Hence, his evaluation was adopted in JENDL-1 in the energy range above 120 keV, and a curve was drawn between 46.5 and 120 keV with the eye-guide method so as to pass the experimental data. Above 2 MeV, the calculated cross sections were very small, because the collective capture was not taken into account. Murata estimated the cross sections in this energy range from those of ^{238}U evaluated by Kanda[213].

Smith *et al.*[256] measured the angular distributions of the elastically scattered neutrons at 0.4, 0.6, 0.8 and 1.2 MeV. They obtained the Legendre coefficients of these distributions. Although these data could be made use of, Murata made calculations for the cross-section evaluation because he expected large errors of the experimental data above 1 MeV. He estimated the elastic scattering cross sections by the following way. Using the evaluated elastic scattering cross sections of ^{238}U, he obtained the shape elastic scattering cross sections of ^{240}Pu.

$$\sigma_{se}(^{240}\mathrm{Pu})=\sigma_{el}(^{238}\mathrm{U})\times\left[\frac{\sigma_{se}(^{240}\mathrm{Pu})}{\sigma_{el}(^{238}\mathrm{U})}\right]_{\mathrm{cal.}} \tag{3.21}$$

The calculations were performed with the optical and statistical models. The compound elastic scattering cross section was estimated from the evaluated data of total, shape elastic, fission and capture cross sections.

$$\sigma_{ce}=\{\sigma_T-\sigma_{se}-\sigma_{n,f}-\sigma_c\}\times\left[\frac{\sigma_{ce}}{\sigma_{ce}+\sigma_{in}}\right]_{\mathrm{cal.}} \tag{3.22}$$

At the final stage of Murata's evaluation, the elastic scattering cross sections were modified so that the sum of the partial cross sections might be equal to the total cross sections.

The inelastic scattering cross sections leaving the residual nucleus in its each excited state were estimated with the statistical model calculations and the following relation:

$$\sigma_{in}^{i}=\sigma_{in}^{(0)}\times\left[\frac{\sigma_{in}^{i}}{\sigma_{in}}\right]_{\mathrm{cal.}}, \tag{3.23}$$

where $\sigma_{in}^{(0)}$ were obtained from a relation

$$\sigma_{in}^{(0)}=\sigma_T-\sigma_{el}-\sigma_c-\sigma_{n,f}-\sigma_{n,2n}-\sigma_{n,3n}\ . \tag{3.24}$$

The $(n, 2n)$ and $(n, 3n)$ reaction cross sections were obtained by Pearlstein's method.[13] Then the σ_{in}^{i}'s were normalized to the experimental data by Smith *et al.*[256], who measured the inelastic

TABLE 3-41 Level density parameters of ^{240}Pu and ^{241}Pu.

	^{240}Pu	^{241}Pu
a (MeV^{-1})	26.93	27.40
Δ (MeV)	1.04	0.61
C_0 (MeV^{-1})	1.007×10^4	1.246×10^4
U_x (MeV)	5.5	5.5

TABLE 3-42 Level scheme of ^{240}Pu.

	E (MeV)	
gr.	0.0	0^+
1	0.0428	2^+
2	0.1417	4^+
3	0.2939	6^+
4	0.500	8^+
5	0.5974	1^-
6	0.6489	3^-
7	0.7422	5^-
8	0.8607	0^+
9	0.9003	2^+
10	0.9381	2^+
11	0.9589	2^-

Levels above 1.0 MeV are assumed to be overlapping.

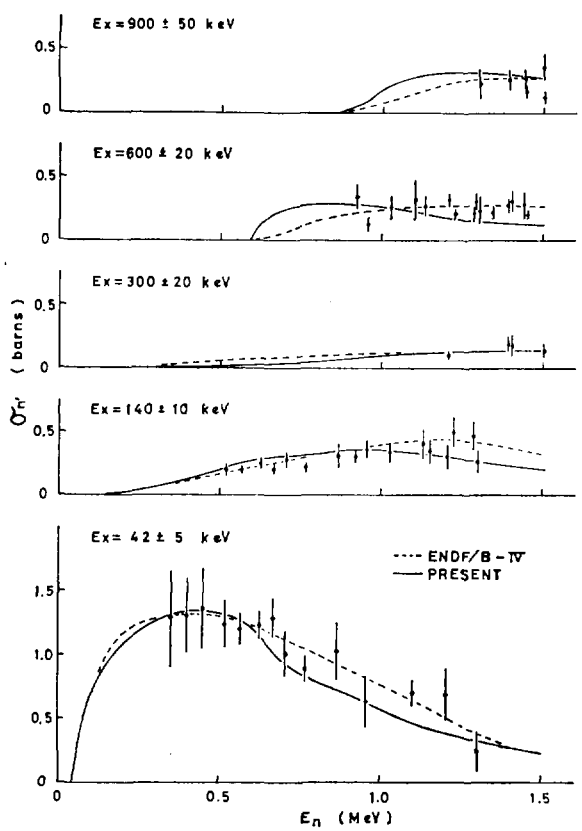

Fig. 3-15 Inelastic scattering cross sections of ^{240}Pu. Experimental data are taken from Smith *et al.*[256]

scattering cross sections from 0.3 to 1.5 MeV and the cross sections leaving the residual nucleus in its excited states of energies 42, 140, 300, 600 and 900 keV. Murata obtained finally the total inelastic scattering cross sections by summing up the σ_{in}^{i}'s. In this calculation, he assumed the levels above 1 MeV to be continuum. **Fig. 3-15** shows the inelastic scattering cross sections with the experiments.

Plutonium-241

The evaluation was made by Y. Kikuchi[259] for the full energy range. The experimental data published after 1960 had been collected through CINDA 75.

Thermal region

A considerable number of experimental data exist for the fission and total cross sections below 1 eV. Kikuchi examined whether or not the experimental data agreed fairly well with each other and whether the evaluated cross sections in ENDF/B-IV represented well these experimental data. He found that the data agreed well with each other including the data in ENDF/B-IV and, besides, they joined smoothly at 1 eV to those calculated from the resonance parameters described below. He confirmed also that the data in ENDF/B-IV agreed with the values of the recent IAEA evaluation for 2200 m/s neutrons by Lemmel[260]. Hence he recommended the fission and total cross sections given in ENDF/B-IV.

Since no experimental data were available for the elastic scattering cross sections in this energy region, he calculated the cross sections from the resonance parameters. In his calculation, the scattering radius of 1.0×10^{-12} cm was used so as to reproduce the IAEA evaluated value[260] for 2200 m/s neutrons. For the capture cross sections, no experimental data had been reported except for the 2200 m/s neutrons, and he obtained the capture cross sections by subtracting the fission and elastic scattering cross sections from the total cross sections.

Resonance region

The resonance parameters recommended in BNL 325, 3rd edition[7] were adopted up to 100 eV in Kikuchi's evaluation. For the levels whose fission and capture widths were not given in ref. 7), the fission widths deduced by Blons *et al.*[261] were adopted with the assumption of $\Gamma_\gamma=40$ meV. The scattering radius was assumed to be 1.0×10^{-12} cm so as to give the correct elastic scattering cross sections in the thermal energy region. The cross sections calculated from these resonance parameters satisfactorily reproduced the experimental fission and total cross sections, but underestimated the capture cross sections a little.

The unresolved resonance parameters were given in the range between 100 eV and 21.5 keV. The parameters were determined so as to reproduce the evaluated fission and capture cross sections. As to the fission cross section, the evaluation below 2 keV was made by averaging the data published in 1970's with equal weights. Above 2 keV, the data by Blons[262] were adopted. The capture cross sections were obtained from the α-values measured by Weston and Todd[255]. The fission and capture cross sections thus evaluated are shown in **Figs. 3-16** and **3-17**.

The s-wave and p-wave neutron strength functions were searched for with fixing their ratio to that obtained from the data recommended in BNL 325, 3rd edition[7]. According to the analysis[8] based on the channel theory of fission, the 3^+ state has one open fission channel and one subthreshold fission channel, while the 2^+ state has two open fission channels. Hence it has been expected[263] that the intermediate structure might be observed in the fission widths of the 3^+ state. It was found, however, in the preliminary calculation that the structure of α above 1 keV was too large to be explained by the intermediate structure in the fission widths of the 3^+ state only. Hence the fission widths of the 2^+ and 3^+ states were searched for with keeping

their ratio as expected from the channel theory[8], while the fission widths of the p-wave states were kept constant. The scattering radius was set as 9.3×10^{-13}cm in this energy region. This was obtained from the shape elastic scattering cross sections calculated with the optical model.

The strength functions and fission widths are given in TABLE 3-43 with the cross sections. The total cross sections calculated from these parameters are compared with the experimental data in Fig. 3-18. The calculated values are slightly lower than the experimental data above 500 eV.

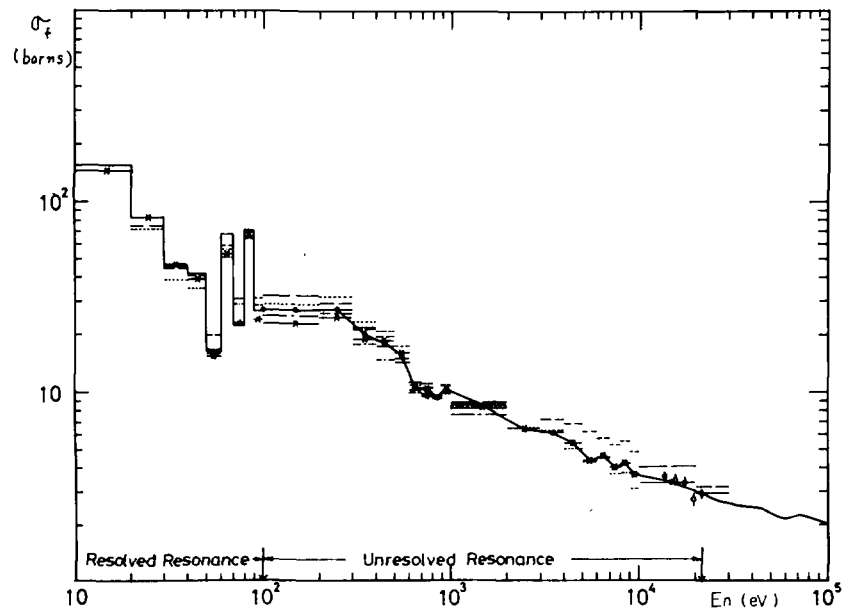

Fig. 3-16 Fission cross sections of ^{241}Pu between 10 eV to 100 keV. Solid curve shows the present result. Some sets of experimental data are presented in an averaged form.

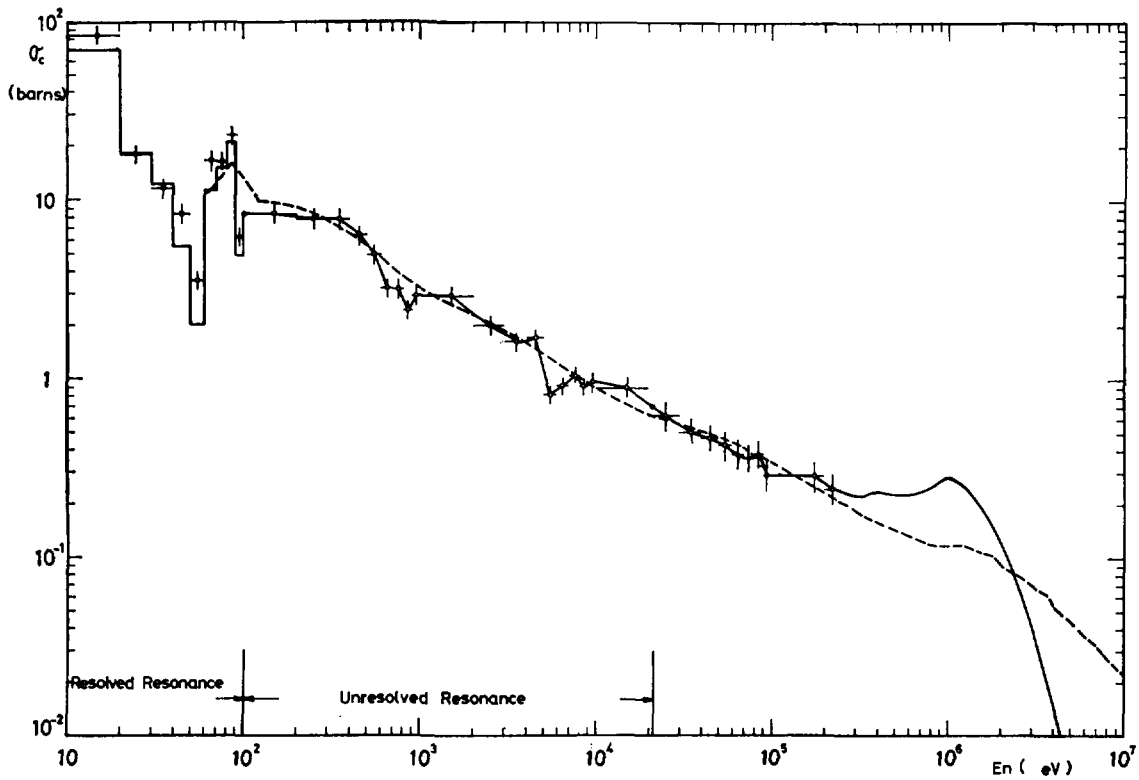

Fig. 3-17 Capture cross sections of ^{241}Pu. Present and ENDF/B-IV data are shown with the experimental data by Weston and Todd[255] (open circles). Solid curve shows the present result, and dashed curve ENDF/B-IV.

TABLE 3-43 Unresolved resonance parameters and the calculated cross sections of ^{241}Pu. Fixed parameters are D_{obs}=1 eV, Γ_γ=40 meV, R=9.33 fm, $\Gamma_f^{(1-)}$=420 meV, $\Gamma_f^{(2-)}$=275 meV, $\Gamma_f^{(3-)}$=760 meV and $\Gamma_f^{(4-)}$=640 meV.

E_n (keV)	S_0 ($\times 10^{-4}$)	S_1 ($\times 10^{-4}$)	$\Gamma_f^{(2+)}$ (meV)	$\Gamma_f^{(3+)}$ (meV)	σ_c (b)*	σ_f (b)*	σ_{el} (b)	σ_t (b)
0.1	0.87	1.52	604	417	8.30	26.70	11.90	46.90
0.15	1.08	1.88	586	405	8.30	26.70	12.37	47.37
0.25	1.41	2.45	621	429	7.79	26.80	13.13	47.72
0.35	1.38	2.40	385	266	7.81	20.20	13.47	41.48
0.45	1.35	2.35	424	293	6.39	17.70	13.20	37.29
0.55	1.24	2.16	513	354	4.90	15.30	12.66	32.86
0.65	0.89	1.55	580	400	3.18	10.50	11.70	25.47
0.75	0.94	1.64	552	381	3.15	10.19	11.89	25.23
0.85	0.87	1.51	755	522	2.38	9.29	11.61	23.28
0.95	1.06	1.85	633	438	2.89	10.37	12.01	25.27
1.5	1.18	2.05	422	292	2.90	8.38	12.38	23.66
2.5	1.10	1.92	471	325	1.98	6.25	12.00	20.23
3.5	1.22	2.13	606	419	1.62	6.13	11.95	19.70
4.5	1.31	2.28	429	296	1.70	5.37	12.18	10.25
5.5	0.94	1.64	1150	795	0.816	4.34	11.21	16.37
6.5	1.11	1.93	980	677	0.916	4.58	11.36	16.85
7.5	1.12	1.95	606	419	1.031	4.01	11.50	16.54
8.5	1.17	2.03	828	572	0.90	4.17	11.37	16.44
9.5	1.16	2.02	577	398	0.965	3.71	11.45	16.12
15	1.28	2.23	495	342	0.899	3.33	11.38	15.61
21.5	1.17	2.03	613	424	0.690	2.85	10.96	14.50

* Cross sections to be fitted.

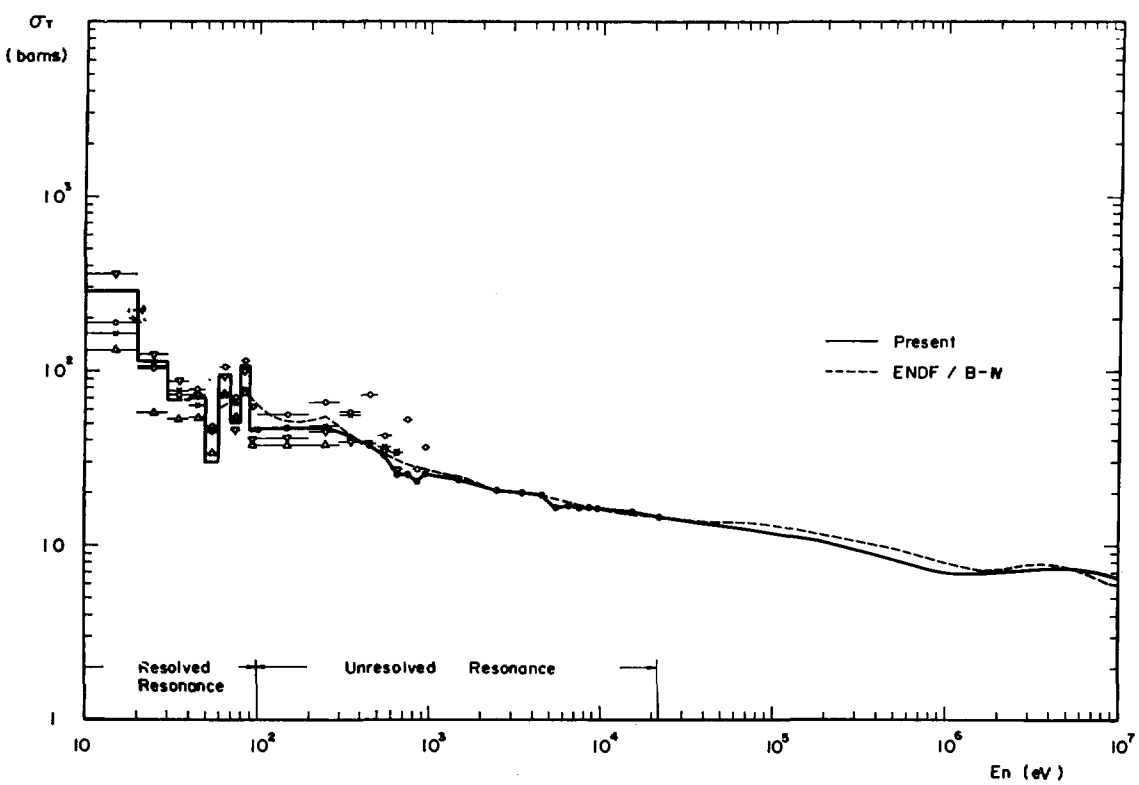

Fig. 3-18 Total cross sections of ^{241}Pu. Some sets of the experimental data are shown in an averaged form.

TABLE 3-44 Optical potential parameters for ^{241}Pu.

$V_O=40.5+0.5E_n$ (MeV)
$W_S=8.2+0.5\sqrt{E_n}$ (MeV)
$V_{SO}=7.0$ (MeV)
$r_O=1.32$ (fm)
$r_S=1.32$ (fm)
$r_{SO}=1.32$ (fm)
$a_O=0.47$ (fm)
$a_S=0.47$ (fm)
$a_{SO}=0.47$ (fm)

Considering the large discrepancies among the experimental data, one would permit this underestimation.

Fast region

Although there have been made some experiments on the total cross section below 1 keV, no measurement has been performed above several keV. Kikuchi made calculation with the optical model. He adopted tentatively the same potential parameters as those used in the evaluation of ^{241}Am by Igarasi[199]. It was found that this potential gave satisfactory results for the compound nucleus formation cross sections and for the strength functions, and therefore this potential was finally adopted. The potential parameters are given in TABLE 3-44. The evaluated curve is shown in Fig. 3-18.

Evaluation of the fission cross section was performed on the basis of the experimental data which covered almost the full energy range. Most of these experimental data are given as the ratio to the fission cross sections of ^{235}U. To obtain the cross sections of ^{241}Pu, the results of these relative measurements were multiplied by the fission cross sections of ^{235}U adopted in JENDL-1. Below 100 keV the data by Käppeler and Pfletschinger[264] were adopted, and the deduced cross sections agreed with the values of the absolute measurement by Perkin *et al.*[208] at 24 keV. The cross-section curve was obtained by the eye-guide method. Between 100 keV and 1 MeV, the data by Käppeler and Pfletschinger and by Behrens and Carlson[265] were adopted. The cross sections obtained from these relative measurements were higher than the data obtained by the absolute measurement by Szabo *et al.*[266] between 200 and 400 keV. This discrepancy might be caused partially by the present deduction based on the JENDL-1 data of ^{235}U which seem to be a little higher than those of ENDF/B-IV between 150 and 500 keV.

Above 1 MeV, the data by Behrens and Carlson[265] were adopted. Between 1 and 3 MeV, the data of Behrens and Carlson multiplied by the JENDL-1 data agree very well with the data from the absolute measurement by Szabo *et al.*[267] The evaluated curve thus obtained is shown in Fig. 3-19 with the experimental data as well as the data in ENDF/B-IV which seem to be obtained on the basis of the data by Smith *et al.*[268] above 1 MeV and are higher than the JENDL-1 data.

The capture cross sections up to 250 keV were evaluated by the use of the α-values measured by Weston and Todd[255]. Above 250 keV, the capture cross sections were calculated[259] simultaneously with the elastic and inelastic scattering cross sections by using the statistical model. The level density parameters were taken from the recommendation by Gilbert and Cameron[12]. The level scheme evaluated by Prince[269] was adopted, which is given in TABLE 3-45. The sum of the fission, $(n, 2n)$ and $(n, 3n)$ cross sections was given as the cross section of the competing processes. The $(n, 2n)$ and $(n, 3n)$ reaction cross sections were calculated with Pearlstein's method.[13] The γ-ray transmission coefficient was so renormalized that the calculated capture cross section at 250 keV coincided with the value obtained from the experimental data. The results are shown

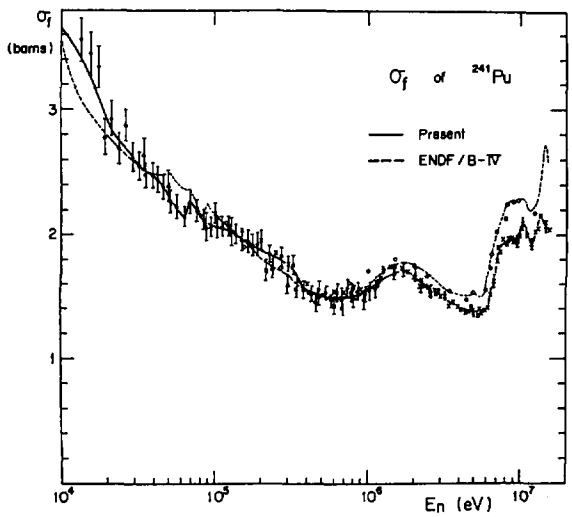

Fig. 3-19 Fission cross sections of ^{241}Pu above 10 keV. Symbols of the experimental data discussed in the text are ● for Käppeler and Pfletschinger[264], × for Behrens and Carlson[265] (selected points), △ for Szabo *et al.*[266], and ○ for Smith *et al.*[268]

TABLE 3-45 Level scheme of ^{241}Pu evaluated by Prince[269].

	E (MeV)	
gr.	0.0	5/2+
1	0.040	7/2+
2	0.095	9/2+
3	0.163	1/2+
4	0.169	3/2+
5	0.174	7/2+
6	0.231	9/2+
7	0.245	7/2+
8	0.300	11/2+
9	0.335	9/2+
10	0.448	5/2+
11	0.753	1/2+
12	0.828	1/2−
13	0.894	3/2+
14	0.918	5/2+
15	0.941	7/2+

Levels above 950 keV are assumed to be overlapping.

in **Fig. 3-17** with the experimental data whose errors are ones quoted in the α measurements and do not include the errors in the fission cross sections used for the deduction. The calculation gives satisfactory agreement with the experimental values below 250 keV. This suggests reliability of the present calculation. However, the capture cross section decreases abruptly in the energy range above 1 MeV. The present evaluation may underestimate the capture cross section in this energy range because of the disregard of the direct capture process.

The elastic and inelastic scattering cross sections were also obtained by the optical and statistical model calculations together with their angular distributions of scattered neutrons. Detailed discussion on these data was given in refs. 259) and 213).

Americium-241

There had been a few works[203,270,271] on evaluation for neutron data before 1975. Available experimental data were only for the fission cross section above 100 eV, and resonance parameters were merely analysed up to 46 eV[7]. In 1975, the resonance parameters were released up to about 150 eV[272] and the absorption cross sections were also reported in an energy-averaged form[255].

Using the data released before 1975, Igarasi performed evaluation[199,273] on the neutron cross sections and $\bar{\nu}$-values above 1 keV. Though his result of the fission cross sections was too large below 100 keV, the average absorption cross sections were in good agreement with those of Weston and Todd[255]. In 1976, he and his coworkers made reevaluation[274] to obtain more reliable results in the energy region from 0.0253 eV to 15 MeV. The JENDL-1 compilation group adopted the results of this reevaluation work.

Thermal and resonance region

There have been some experiments on the thermal capture and fission cross sections. In the evaluation work[274] mentioned above, they adopted the data by Harbour *et al.*[275] for the thermal capture cross section, and the data by Bak *et al.*[276] for the thermal fission cross section.

Most data on the resonance parameters released before 1973 had been taken into account in BNL 325, 3rd edition[7]. After this compilation work, Belanova *et al.*[277], and Derrien and Lucas[272] reported their results. Careful intercomparison among the data of these three literatures showed

no serious discrepancy but the values of $2g\Gamma_n$ at 6.745, 7.659, 8.173, 18.167 and 43.294 eV levels between the data by Derrien and Lucas and those in ref. 7). For these levels, the former data may be more reliable than the latter. The s-wave neutron strength functions were in good agreement between these two.

After these examinations, Nakagawa *et al.*[274] adopted the data by Derrien and Lucas. For the levels not given the γ-ray widths and/or fission widths, average values were taken tentatively; $\langle\Gamma_\gamma\rangle=43.77\pm0.12$ meV and $\langle\Gamma_f\rangle=0.23$ meV, respectively. Thus, the resonance parameters were prepared below 150 eV for JENDL-1.

Fast region

Igarasi[199,273] estimated the cross sections of the total, fission, capture, elastic scattering, inelastic scattering, $(n, 2n)$ and $(n, 3n)$ reactions above 1 keV, mainly from the optical and statistical model calculations. He looked for the spherical optical potential so as to reproduce the total cross sections which were assumed to be about the same as those of ^{235}U and of ^{239}Pu below 2.0 MeV, and were estimated from the coupled channel calculations[278] above 2.0 MeV. The neutron strength function mentioned above was well reproduced from his potential. The potential parameters are shown in **TABLE 3-46**.

He reproduced a gross structure of the experimental fission cross sections with the least squares method. He used a cross-section formula[199] composed of the resonance and barrier penetration terms. Though his result reproduced the experimental data well, serious disconnection appeared in the fission cross sections between the resonance and the fast regions. This was due to the strong dependence of his result on the experimental data by Seeger *et al.*[279] which might be ten times as large as normal data. Then he reduced artificially these data by multiplying an energy dependent factor below 100 keV:

$$f(E_n)=0.15+\frac{0.85}{1.0+\exp\{-200(E_n-0.05)\}}\ , \tag{3.25}$$

where energy E_n is measured in MeV. Using this modification, he obtained fairly reasonable connection between the resonance and epi-resonance parts. **Fig. 3-20** shows this result.

In order to perform the statistical model calculations to obtain the capture, compound elastic

TABLE 3-46 Optical potential parameters for ^{241}Am.

$V_0=40.5+0.5E_n$ (MeV)	$r_0=1.32$ (fm)
$W_S=8.2+0.5\sqrt{E_n}$ (MeV)	$r_S=1.32$ (fm)
$W_{SO}=7.0$ (MeV)	$r_{SO}=1.32$ (fm)
	$a_0=0.47$ (fm)
	$a_S=0.47$ (fm)
	$a_{SO}=0.47$ (fm)

TABLE 3-47 Level scheme of ^{241}Am.

	E (MeV)	
gr.	0.0	5/2⁻
1	0.042	7/2⁻
2	0.095	9/2⁻
3	0.158	11/2⁻
4	0.206	5/2⁺
5	0.235	7/2⁺
6	0.272	9/2⁺
7	0.323	11/2⁺
8	0.380	13/2⁺
9	0.475	3/2⁻
10	0.504	5/2⁻
11	0.549	7/2⁻
12	0.625	1/2⁺
13	0.636	3/2⁻
14	0.652	1/2⁻
15	0.653	3/2⁺
16	0.682	11/2⁻
17	0.732	11/2⁺
18	0.822	13/2⁺

Levels above 850 keV are assumed to be overlapping.

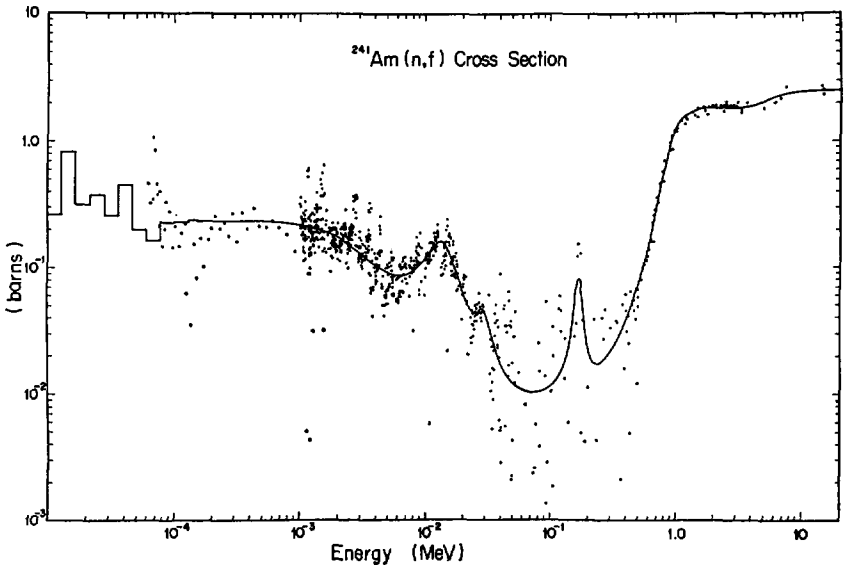

Fig. 3-20 Fission cross sections of ^{241}Am. Experimental data by Seeger *et al.*[277] are modified below 100 keV (see text).

and inelastic scattering cross sections, he estimated the $(n, 2n)$ and $(n, 3n)$ reaction cross sections which were used as the competing processes in the calculations. He used tentatively Pearlstein's method[13] to calculate these reaction cross sections. Using these and the fission cross sections as the competition, he calculated the capture, compound elastic and inelastic scattering cross sections. Level scheme[280,281] used here is shown in TABLE 3-47. The level density parameters were taken from the Gilbert-Cameron's work[12]. The γ-ray transmission coefficient T_γ was taken to be 0.35 at zero neutron energy. The absorption cross sections made from the present results were compared with those measured by Weston and Todd. The agreement between the two was very good.

The average cosine of the elastically scattered neutrons was also obtained in his calculation. The average number of neutrons emitted per fission was estimated by the following formula:

$$\bar{\nu}=3.219+0.15E_n \ . \tag{3.26}$$

He derived this formula from the data of ref. 7) and the neutron separation energy 6.66 MeV from ^{241}Am.

4. Conclusion

Outline of JENDL-1 was presented in the previous chapters. Data compiled in JENDL-1 were mainly from the evaluation works by the working groups of Japanese Nuclear Data Committee (JNDC) and by individuals in various organizations in Japan. Some data, however, were recommended from ENDF/B-IV. These ENDF/B-IV data are not included in JENDL-1 file. Hence these data of ENDF/B-IV should be merged in JENDL-1 when they are needed. Contents of JENDL-1 data are summarized in Table 2, where one would see what data should be taken from ENDF/B-IV.

Before releasing JENDL-1, a working group of JNDC had examined the reliability of JENDL-1 through benchmark tests on the integral data. Results of this examination were fairly satisfactory[282], and showed that JENDL-1 could serve practical use.

From the viewpoint of nuclear data evaluation, there may be some problems in the data of JENDL-1. These may come from the fact that the compilation group had too huge problems of JENDL-1 compilation and could not make a fully careful examination on individual data. The JENDL-1 compilation group welcomes any comments and suggestions on the basis of experience in the practical use of JENDL-1.

This work has been done under constant support, interest and encouragement of the members of Japanese Nuclear Data Committee (Chairman, Dr. K. Tsukada) and related staffs of Japan Atomic Energy Research Institute. The authors would like to thank them for their many suggestions to promote this work. They are very much indebted to JNDC members for valuable discussions and comments. The authors would like to express their appreciation to CCDN members for supply of the experimental data. They are also grateful to Drs. K. Harada, S. Tanaka, A. Asami and T. Fuketa for their careful reading of the manuscript.

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Appendix

Appendix A. Averaged Cross Sections

Energy averaged cross sections are tabulated with unit in barns. Energy intervals are taken between the following energy bounds;

$$(1.0,\ 1.5,\ 2.0,\ 3.0,\ 4.0,\ 5.0,\ 6.0,\ 8.0)\times 10^{n}\ (\mathrm{eV}),$$

where n runs from -5 to 7.

The cross sections are given in **Tables A1-1** to **A1-46**. The **Tables A2-1** to **A2-42** show the inelastic scattering cross sections for discrete levels up to the 11-th level. The data in last two columns are the cross sections for overlapping levels and the total inelastic scattering cross sections. Q-values for each level are given in MeV.

Data of ENDF/B-IV are recommended in the energy range between asterisks.

Appendix B. Cross-section Curves

Figs. B1-1 to **B1-150** illustrate the curves for the total, elastic, capture and fission cross sections from 10^{-5}eV to 20MeV. The (n, α) reaction cross sections for ^{6}Li and ^{10}B are included in **Figs. B1-7** and **B1-11**, respectively. Reaction cross sections for the other nuclides are given in **Figs. B2-1** to **B2-45**.

Appendix A. Averaged Croos Sections

TABLE A1.1

H-1

MATERIAL =1011 CROSS SECTION M -1

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	2.1473+ 1	2.0437+ 1							1.0238+ 0				6.6722- 1
1.0000- 2 ~ 1.5000- 2	2.0919+ 1	2.0437+ 1							4.7473- 1				6.6722- 1
1.5000- 2 ~ 2.0000- 2	2.0847+ 1	2.0437+ 1							4.0022- 1				6.6722- 1
2.0000- 2 ~ 3.0000- 2	2.0776+ 1	2.0437+ 1							3.3568- 1				6.6722- 1
3.0000- 2 ~ 4.0000- 2	2.0730+ 1	2.0437+ 1							2.8299- 1				6.6722- 1
4.0000- 2 ~ 5.0000- 2	2.0700+ 1	2.0437+ 1							2.4931- 1				6.6722- 1
5.0000- 2 ~ 6.0000- 2	2.0676+ 1	2.0437+ 1							2.2538- 1				6.6722- 1
6.0000- 2 ~ 8.0000- 2	2.0647+ 1	2.0437+ 1							2.0009- 1				6.6722- 1
8.0000- 2 ~ 1.0000- 1	2.0617+ 1	2.0437+ 1							1.7628- 1				6.6722- 1
1.0000- 1 ~ 1.5000- 1	2.0593+ 1	2.0437+ 1							1.5010- 1				6.6722- 1
1.5000- 1 ~ 2.0000- 1	2.0576+ 1	2.0437+ 1							1.2654- 1				6.6722- 1
2.0000- 1 ~ 3.0000- 1	2.0559+ 1	2.0437+ 1							1.0613- 1				6.6722- 1
3.0000- 1 ~ 4.0000- 1	2.0542+ 1	2.0437+ 1							8.9471- 2				6.6722- 1
4.0000- 1 ~ 5.0000- 1	2.0529+ 1	2.0437+ 1							7.8824- 2				6.6722- 1
5.0000- 1 ~ 6.0000- 1	2.0519+ 1	2.0437+ 1							7.1259- 2				6.6722- 1
6.0000- 1 ~ 8.0000- 1	2.0507+ 1	2.0437+ 1							6.3262- 2				6.6722- 1
8.0000- 1 ~ 1.0000+ 0	2.0495+ 1	2.0437+ 1							5.5733- 2				6.6722- 1
1.0000+ 0 ~ 1.5000+ 0	2.0486+ 1	2.0437+ 1							4.7457- 2				6.6722- 1
1.5000+ 0 ~ 2.0000+ 0	2.0481+ 1	2.0436+ 1							4.0007- 2				6.6722- 1
2.0000+ 0 ~ 3.0000+ 0	2.0475+ 1	2.0436+ 1							3.3555- 2				6.6722- 1
3.0000+ 0 ~ 4.0000+ 0	2.0469+ 1	2.0436+ 1							2.8288- 2				6.6722- 1
4.0000+ 0 ~ 5.0000+ 0	2.0465+ 1	2.0436+ 1							2.4921- 2				6.6722- 1
5.0000+ 0 ~ 6.0000+ 0	2.0462+ 1	2.0436+ 1							2.2530- 2				6.6722- 1
6.0000+ 0 ~ 8.0000+ 0	2.0458+ 1	2.0436+ 1							2.0001- 2				6.6722- 1
8.0000+ 0 ~ 1.0000+ 1	2.0454+ 1	2.0436+ 1							1.7621- 2				6.6722- 1
1.0000+ 1 ~ 1.5000+ 1	2.0450+ 1	2.0435+ 1							1.5004- 2				6.6722- 1
1.5000+ 1 ~ 2.0000+ 1	2.0447+ 1	2.0434+ 1							1.2649- 2				6.6722- 1
2.0000+ 1 ~ 3.0000+ 1	2.0444+ 1	2.0432+ 1							1.0609- 2				6.6722- 1
3.0000+ 1 ~ 4.0000+ 1	2.0441+ 1	2.0431+ 1							8.9435- 3				6.6722- 1
4.0000+ 1 ~ 5.0000+ 1	2.0439+ 1	2.0430+ 1							7.8792- 3				6.6722- 1
5.0000+ 1 ~ 6.0000+ 1	2.0436+ 1	2.0429+ 1							7.1230- 3				6.6722- 1
6.0000+ 1 ~ 8.0000+ 1	2.0433+ 1	2.0427+ 1							6.3237- 3				6.6722- 1
8.0000+ 1 ~ 1.0000+ 2	2.0430+ 1	2.0424+ 1							5.5711- 3				6.6722- 1
1.0000+ 2 ~ 1.5000+ 2	2.0421+ 1	2.0416+ 1							4.7414- 3				6.6722- 1
1.5000+ 2 ~ 2.0000+ 2	2.0409+ 1	2.0406+ 1							3.9937- 3				6.6722- 1
2.0000+ 2 ~ 3.0000+ 2	2.0397+ 1	2.0393+ 1							3.3468- 3				6.6722- 1
3.0000+ 2 ~ 4.0000+ 2	2.0385+ 1	2.0382+ 1							2.8190- 3				6.6722- 1
4.0000+ 2 ~ 5.0000+ 2	2.0376+ 1	2.0373+ 1							2.4820- 3				6.6722- 1
5.0000+ 2 ~ 6.0000+ 2	2.0363+ 1	2.0360+ 1							2.2427- 3				6.6722- 1
6.0000+ 2 ~ 8.0000+ 2	2.0340+ 1	2.0338+ 1							1.9898- 3				6.6722- 1
8.0000+ 2 ~ 1.0000+ 3	2.0315+ 1	2.0313+ 1							1.7519- 3				6.6722- 1
1.0000+ 3 ~ 1.5000+ 3	2.0234+ 1	2.0233+ 1							1.4989- 3				6.6722- 1
1.5000+ 3 ~ 2.0000+ 3	2.0124+ 1	2.0123+ 1							1.2740- 3				6.6722- 1
2.0000+ 3 ~ 3.0000+ 3	2.0011+ 1	2.0009+ 1							1.0700- 3				6.6722- 1
3.0000+ 3 ~ 4.0000+ 3	1.9902+ 1	1.9901+ 1							8.9647- 4				6.6722- 1
4.0000+ 3 ~ 5.0000+ 3	1.9821+ 1	1.9821+ 1							7.8245- 4				6.6722- 1
5.0000+ 3 ~ 6.0000+ 3	1.9704+ 1	1.9704+ 1							7.0013- 4				6.6722- 1
6.0000+ 3 ~ 8.0000+ 3	1.9495+ 1	1.9494+ 1							6.1189- 4				6.6722- 1
8.0000+ 3 ~ 1.0000+ 4	1.9275+ 1	1.9275+ 1							5.2843- 4				6.6722- 1
1.0000+ 4 ~ 1.5000+ 4	1.8762+ 1	1.8762+ 1							4.3597- 4				6.6722- 1
1.5000+ 4 ~ 2.0000+ 4	1.8118+ 1	1.8117+ 1							3.5335- 4				6.6722- 1
2.0000+ 4 ~ 3.0000+ 4	1.7472+ 1	1.7472+ 1							2.8250- 4				6.6722- 1
3.0000+ 4 ~ 4.0000+ 4	1.6649+ 1	1.6648+ 1							2.2445- 4				6.6722- 1
4.0000+ 4 ~ 5.0000+ 4	1.5859+ 1	1.5859+ 1							1.9012- 4				6.6722- 1
5.0000+ 4 ~ 6.0000+ 4	1.5166+ 1	1.5166+ 1							1.6543- 4				6.6722- 1
6.0000+ 4 ~ 8.0000+ 4	1.4246+ 1	1.4246+ 1							1.3997- 4				6.6722- 1
8.0000+ 4 ~ 1.0000+ 5	1.3211+ 1	1.3211+ 1							1.1669- 4				6.6722- 1
1.0000+ 5 ~ 1.5000+ 5	1.1721+ 1	1.1721+ 1							9.1664- 5				6.6703- 1
1.5000+ 5 ~ 2.0000+ 5	1.0223+ 1	1.0223+ 1							7.0473- 5				6.6697- 1
2.0000+ 5 ~ 3.0000+ 5	8.7165+ 0	8.7165+ 0							5.4665- 5				6.6687- 1
3.0000+ 5 ~ 4.0000+ 5	7.3795+ 0	7.3794+ 0							4.4522- 5				6.6676- 1
4.0000+ 5 ~ 5.0000+ 5	6.4973+ 0	6.4972+ 0							3.9563- 5				6.6664- 1
5.0000+ 5 ~ 6.0000+ 5	5.8493+ 0	5.8491+ 0							3.7405- 5				6.6653- 1
6.0000+ 5 ~ 8.0000+ 5	5.1617+ 0	5.1617+ 0							3.5672- 5				6.6636- 1
8.0000+ 5 ~ 1.0000+ 6	4.5138+ 0	4.5138+ 0							3.4648- 5				6.6615- 1
1.0000+ 6 ~ 1.5000+ 6	3.7925+ 0	3.7925+ 0							3.4419- 5				6.6576- 1
1.5000+ 6 ~ 2.0000+ 6	3.1453+ 0	3.1453+ 0							3.4281- 5				6.6531- 1
2.0000+ 6 ~ 3.0000+ 6	2.5707+ 0	2.5707+ 0							3.4956- 5				6.6471- 1
3.0000+ 6 ~ 4.0000+ 6	2.0849+ 0	2.0849+ 0							3.5970- 5				6.6394- 1
4.0000+ 6 ~ 5.0000+ 6	1.7625+ 0	1.7624+ 0							3.6348- 5				6.4248- 1
5.0000+ 6 ~ 6.0000+ 6	1.5271+ 0	1.5271+ 0							3.6100- 5				6.4311- 1
6.0000+ 6 ~ 8.0000+ 6	1.2736+ 0	1.2736+ 0							3.5044- 5				6.6152- 1
8.0000+ 6 ~ 1.0000+ 7	1.0348+ 0	1.0348+ 0							3.3297- 5				6.6030- 1
1.0000+ 7 ~ 1.5000+ 7	7.7807- 1	7.7804- 1							3.0737- 5				6.5800- 1
1.5000+ 7 ~ 2.0000+ 7	5.5776- 1	5.5774- 1							2.7342- 5				6.5553- 1

TABLE A1.2

Li-6

MATERIAL :1031 CROSS SECTION LI 6

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	2.8881+ 3	7.3600- 1							8.6344- 2			2.8873+ 3	****
1.0000- 2 ~ 1.5000- 2	1.3396+ 3	7.3599- 1							4.0038- 2			1.3388+ 3	
1.5000- 2 ~ 2.0000- 2	1.1295+ 3	7.3598- 1							3.3753- 2			1.1287+ 3	
2.0000- 2 ~ 3.0000- 2	9.4745+ 2	7.3598- 1							2.8311- 2			9.4668+ 2	
3.0000- 2 ~ 4.0000- 2	7.9887+ 2	7.3597- 1							2.3867- 2			7.9807+ 2	
4.0000- 2 ~ 5.0000- 2	7.0390+ 2	7.3596- 1							2.1027- 2			7.0310+ 2	
5.0000- 2 ~ 6.0000- 2	6.3642+ 2	7.3596- 1							1.9010- 2			6.3562+ 2	
6.0000- 2 ~ 8.0000- 2	5.6507+ 2	7.3595- 1							1.6877- 2			5.6429+ 2	
8.0000- 2 ~ 1.0000- 1	4.9790+ 2	7.3595- 1							1.4869- 2			4.9714+ 2	
1.0000- 1 ~ 1.5000- 1	4.2413+ 2	7.3797- 1							1.2661- 2			4.2332+ 2	
1.5000- 1 ~ 2.0000- 1	3.5774+ 2	7.4117- 1							1.0674- 2			3.5687+ 2	
2.0000- 1 ~ 3.0000- 1	3.0022+ 2	7.4451- 1							8.9527- 3			2.9933+ 2	
3.0000- 1 ~ 4.0000- 1	2.5322+ 2	7.4774- 1							7.5475- 3			2.5234+ 2	
4.0000- 1 ~ 5.0000- 1	2.2318+ 2	7.5015- 1							6.6495- 3			2.2232+ 2	
5.0000- 1 ~ 6.0000- 1	2.0182+ 2	7.5207- 1							6.0114- 3			2.0098+ 2	
6.0000- 1 ~ 8.0000- 1	1.7924+ 2	7.5437- 1							5.3369- 3			1.7843+ 2	
8.0000- 1 ~ 1.0000+ 0	1.5798+ 2	7.5680- 1							4.7019- 3			1.5720+ 2	
1.0000+ 0 ~ 1.5000+ 0	1.3467+ 2	7.5799- 1							4.0038- 3			1.3386+ 2	
1.5000+ 0 ~ 2.0000+ 0	1.1372+ 2	7.5825- 1							3.3754- 3			1.1284+ 2	
2.0000+ 0 ~ 3.0000+ 0	9.5538+ 1	7.5851- 1							2.8311- 3			9.4645+ 1	
3.0000+ 0 ~ 4.0000+ 0	8.0672+ 1	7.5877- 1							2.3867- 3			7.9788+ 1	
4.0000+ 0 ~ 5.0000+ 0	7.1158+ 1	7.5896- 1							2.1028- 3			7.0293+ 1	
5.0000+ 0 ~ 6.0000+ 0	6.4390+ 1	7.5911- 1							1.9010- 3			6.3547+ 1	
6.0000+ 0 ~ 8.0000+ 0	5.7229+ 1	7.5929- 1							1.6877- 3			5.6415+ 1	
8.0000+ 0 ~ 1.0000+ 1	5.0479+ 1	7.5947- 1							1.4869- 3			4.9702+ 1	
1.0000+ 1 ~ 1.5000+ 1	4.3137+ 1	7.5946- 1							1.2661- 3			4.2321+ 1	
1.5000+ 1 ~ 2.0000+ 1	3.6547+ 1	7.5931- 1							1.0674- 3			3.5676+ 1	
2.0000+ 1 ~ 3.0000+ 1	3.0810+ 1	7.5915- 1							8.9527- 4			2.9921+ 1	
3.0000+ 1 ~ 4.0000+ 1	2.6103+ 1	7.5900- 1							7.5475- 4			2.5223+ 1	
4.0000+ 1 ~ 5.0000+ 1	2.3082+ 1	7.5889- 1							6.6495- 4			2.2221+ 1	
5.0000+ 1 ~ 6.0000+ 1	2.0928+ 1	7.5880- 1							6.0114- 4			2.0088+ 1	
6.0000+ 1 ~ 8.0000+ 1	1.8643+ 1	7.5869- 1							5.3369- 4			1.7833+ 1	
8.0000+ 1 ~ 1.0000+ 2	1.6485+ 1	7.5858- 1							4.7019- 4			1.5711+ 1	
1.0000+ 2 ~ 1.5000+ 2	1.4160+ 1	7.5834- 1							4.0038- 4			1.3377+ 1	
1.5000+ 2 ~ 2.0000+ 2	1.2077+ 1	7.5804- 1							3.3754- 4			1.1277+ 1	
2.0000+ 2 ~ 3.0000+ 2	1.0250+ 1	7.5772- 1							2.8311- 4			9.4575+ 0	
3.0000+ 2 ~ 4.0000+ 2	8.7425+ 0	7.5742- 1							2.3867- 4			7.9724+ 0	
4.0000+ 2 ~ 5.0000+ 2	7.7892+ 0	7.5712- 1							2.1028- 4			7.0237+ 0	
5.0000+ 2 ~ 6.0000+ 2	7.1235+ 0	7.5681- 1							1.9010- 4			6.3500+ 0	
6.0000+ 2 ~ 8.0000+ 2	6.4100+ 0	7.5644- 1							1.6877- 4			5.6377+ 0	
8.0000+ 2 ~ 1.0000+ 3	5.7298+ 0	7.5605- 1							1.4869- 4			4.9671+ 0	
1.0000+ 3 ~ 1.5000+ 3	4.9935+ 0	7.5539- 1							1.2661- 4			4.2308+ 0	
1.5000+ 3 ~ 2.0000+ 3	4.3281+ 0	7.5461- 1							1.0674- 4			3.5682+ 0	
2.0000+ 3 ~ 3.0000+ 3	3.7559+ 0	7.5361- 1							8.9527- 5			2.9956+ 0	
3.0000+ 3 ~ 4.0000+ 3	3.2858+ 0	7.5253- 1							7.5475- 5			2.5285+ 0	
4.0000+ 3 ~ 5.0000+ 3	2.9849+ 0	7.5161- 1							6.6495- 5			2.2306+ 0	
5.0000+ 3 ~ 6.0000+ 3	2.7739+ 0	7.5077- 1							6.0114- 5			2.0197+ 0	
6.0000+ 3 ~ 8.0000+ 3	2.5486+ 0	7.4971- 1							5.3369- 5			1.7971+ 0	
8.0000+ 3 ~ 1.0000+ 4	2.3389+ 0	7.4847- 1							4.7019- 5			1.5886+ 0	
1.0000+ 4 ~ 1.5000+ 4	2.1096+ 0	7.4678- 1							4.0038- 5			1.3613+ 0	
1.5000+ 4 ~ 2.0000+ 4	1.9045+ 0	7.4502- 1							3.3754- 5			1.1588+ 0	
2.0000+ 4 ~ 3.0000+ 4	1.7316+ 0	7.4364- 1							2.8311- 5			9.8760- 1	
3.0000+ 4 ~ 4.0000+ 4	1.5972+ 0	7.4377- 1							2.3867- 5			8.5324- 1	
4.0000+ 4 ~ 5.0000+ 4	1.5195+ 0	7.4636- 1							2.1028- 5			7.7311- 1	
5.0000+ 4 ~ 6.0000+ 4	1.4745+ 0	7.5213- 1							1.9010- 5			7.2218- 1	
6.0000+ 4 ~ 8.0000+ 4	1.4467+ 0	7.6792- 1							1.6877- 5			6.7875- 1	
8.0000+ 4 ~ 1.0000+ 5	1.4659+ 0	8.0705- 1							1.4869- 5			6.5881- 1	
1.0000+ 5 ~ 1.5000+ 5	1.7279+ 0	9.9634- 1							1.2661- 5			7.3151- 1	
1.5000+ 5 ~ 2.0000+ 5	3.2743+ 0	2.0435+ 0							1.0674- 5			1.2306+ 0	
2.0000+ 5 ~ 3.0000+ 5	8.7944+ 0	6.2337+ 0							8.9527- 6			2.5607+ 0	
3.0000+ 5 ~ 4.0000+ 5	3.8841+ 0	2.9801+ 0							7.5475- 6			9.0392- 1	
4.0000+ 5 ~ 5.0000+ 5	2.2536+ 0	1.7673+ 0							6.6495- 6			4.8615- 1	
5.0000+ 5 ~ 6.0000+ 5	1.7723+ 0	1.3978+ 0							6.0114- 6			3.7445- 1	
6.0000+ 5 ~ 8.0000+ 5	1.5066+ 0	1.1886+ 0							5.3369- 6			3.1806- 1	
8.0000+ 5 ~ 1.0000+ 6	1.3581+ 0	1.0674+ 0							4.7019- 6			2.9064- 1	
1.0000+ 6 ~ 1.5000+ 6	1.2696+ 0	9.9281- 1							4.0038- 6			2.7674- 1	
1.5000+ 6 ~ 2.0000+ 6	1.2662+ 0	9.9810- 1	6.1920- 3						3.3753- 6			2.6190- 1	
2.0000+ 6 ~ 3.0000+ 6	1.6710+ 0	1.3169+ 0	1.4165- 1						2.8311- 6			2.1243- 1	
3.0000+ 6 ~ 4.0000+ 6	1.9788+ 0	1.3091+ 0	5.0376- 1						2.3867- 6	****		1.5267- 1	
4.0000+ 6 ~ 5.0000+ 6	2.1780+ 0	1.4022+ 0	6.3622- 1						2.1027- 6			1.0817- 1	
5.0000+ 6 ~ 6.0000+ 6	2.0335+ 0	1.2715+ 0	6.5463- 1						1.9010- 6			8.1976- 2	
6.0000+ 6 ~ 8.0000+ 6	1.8855+ 0	1.1621+ 0	6.5169- 1						1.6877- 6			5.2062- 2	
8.0000+ 6 ~ 1.0000+ 7	1.7080+ 0	1.0286+ 0	6.0997- 1						1.4869- 6			3.6005- 2	
1.0000+ 7 ~ 1.5000+ 7	1.3792+ 0	7.9967- 1	4.8396- 1						1.2661- 6			2.9248- 2	
1.5000+ 7 ~ 2.0000+ 7	1.0599+ 0	5.8317- 1	3.7172- 1						1.0674- 6	****		1.6290- 2	****

TABLE A1.3

B-10

MATERIAL :1051 CROSS SECTION 9 -10

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU BAR
1.0000- 5 ~ 1.0000- 2	1.1835+ 4	2.1729+ 0							1.5509+ 0	****		1.1831+ 4	****
1.0000- 2 ~ 1.5000- 2	5.4891+ 3	2.1729+ 0							7.1918- 1			5.4959+ 3	
1.5000- 2 ~ 2.0000- 2	4.6278+ 3	2.1729+ 0							6.0630- 1			4.6248+ 3	
2.0000- 2 ~ 3.0000- 2	3.8817+ 3	2.1729+ 0							5.0853- 1			3.8790+ 3	
3.0000- 2 ~ 4.0000- 2	3.2728+ 3	2.1729+ 0							4.2872- 1			3.2701+ 3	
4.0000- 2 ~ 5.0000- 2	2.8836+ 3	2.1728+ 0							3.7771- 1			2.8809+ 3	
5.0000- 2 ~ 6.0000- 2	2.6070+ 3	2.1728+ 0							3.4146- 1			2.6044+ 3	
6.0000- 2 ~ 8.0000- 2	2.3147+ 3	2.1728+ 0							3.0315- 1			2.3121+ 3	
8.0000- 2 ~ 1.0000- 1	2.0394+ 3	2.1728+ 0							2.6708- 1			2.0369+ 3	
1.0000- 1 ~ 1.5000- 1	1.7370+ 3	2.1727+ 0							2.2743- 1			1.7344+ 3	
1.5000- 1 ~ 2.0000- 1	1.4648+ 3	2.1727+ 0							1.9173- 1			1.4621+ 3	
2.0000- 1 ~ 3.0000- 1	1.2290+ 3	2.1726+ 0							1.6081- 1			1.2263+ 3	
3.0000- 1 ~ 4.0000- 1	1.0365+ 3	2.1725+ 0							1.3557- 1			1.0338+ 3	
4.0000- 1 ~ 5.0000- 1	9.1337+ 2	2.1725+ 0							1.1944- 1			9.1078+ 2	
5.0000- 1 ~ 6.0000- 1	8.2588+ 2	2.1725+ 0							1.0798- 1			8.2336+ 2	
6.0000- 1 ~ 8.0000- 1	7.3337+ 2	2.1724+ 0							9.5864- 2			7.3095+ 2	
8.0000- 1 ~ 1.0000+ 0	6.4627+ 2	2.1724+ 0							8.4458- 2			6.4396+ 2	
1.0000+ 0 ~ 1.5000+ 0	5.5058+ 2	2.1722+ 0							7.1918- 2			5.4831+ 2	
1.5000+ 0 ~ 2.0000+ 0	4.6445+ 2	2.1720+ 0							6.0630- 2			4.6220+ 2	
2.0000+ 0 ~ 3.0000+ 0	3.8986+ 2	2.1719+ 0							5.0854- 2			3.8762+ 2	
3.0000+ 0 ~ 4.0000+ 0	3.2895+ 2	2.1717+ 0							4.2872- 2			3.2673+ 2	
4.0000+ 0 ~ 5.0000+ 0	2.9003+ 2	2.1715+ 0							3.7771- 2			2.8782+ 2	
5.0000+ 0 ~ 6.0000+ 0	2.6238+ 2	2.1714+ 0							3.4146- 2			2.6017+ 2	
6.0000+ 0 ~ 8.0000+ 0	2.3314+ 2	2.1713+ 0							3.0315- 2			2.3094+ 2	
8.0000+ 0 ~ 1.0000+ 1	2.0563+ 2	2.1712+ 0							2.6708- 2			2.0343+ 2	
1.0000+ 1 ~ 1.5000+ 1	1.7540+ 2	2.1708+ 0							2.2743- 2			1.7318+ 2	
1.5000+ 1 ~ 2.0000+ 1	1.4815+ 2	2.1704+ 0							1.9173- 2			1.4595+ 2	
2.0000+ 1 ~ 3.0000+ 1	1.2456+ 2	2.1700+ 0							1.6081- 2			1.2237+ 2	
3.0000+ 1 ~ 4.0000+ 1	1.0530+ 2	2.1695+ 0							1.3557- 2			1.0311+ 2	
4.0000+ 1 ~ 5.0000+ 1	9.2992+ 1	2.1692+ 0							1.1944- 2			9.0809+ 1	
5.0000+ 1 ~ 6.0000+ 1	8.4247+ 1	2.1689+ 0							1.0798- 2			8.2066+ 1	
6.0000+ 1 ~ 8.0000+ 1	7.5002+ 1	2.1685+ 0							9.5864- 3			7.2823+ 1	
8.0000+ 1 ~ 1.0000+ 2	6.6301+ 1	2.1680+ 0							8.4458- 3			6.4124+ 1	
1.0000+ 2 ~ 1.5000+ 2	5.6755+ 1	2.1673+ 0							7.1918- 3			5.4557+ 1	
1.5000+ 2 ~ 2.0000+ 2	4.8138+ 1	2.1668+ 0							6.0630- 3			4.5948+ 1	
2.0000+ 2 ~ 3.0000+ 2	4.0671+ 1	2.1666+ 0							5.0854- 3			3.8494+ 1	
3.0000+ 2 ~ 4.0000+ 2	3.4580+ 1	2.1647+ 0							4.2872- 3			3.2408+ 1	
4.0000+ 2 ~ 5.0000+ 2	3.0688+ 1	2.1641+ 0							3.7771- 3			2.8518+ 1	
5.0000+ 2 ~ 6.0000+ 2	2.7924+ 1	2.1636+ 0							3.4146- 3			2.5756+ 1	
6.0000+ 2 ~ 8.0000+ 2	2.5000+ 1	2.1632+ 0							3.0315- 3			2.2833+ 1	
8.0000+ 2 ~ 1.0000+ 3	2.2250+ 1	2.1628+ 0							2.6708- 3			2.0084+ 1	
1.0000+ 3 ~ 1.5000+ 3	1.9236+ 1	2.1627+ 0							2.2743- 3			1.7064+ 1	
1.5000+ 3 ~ 2.0000+ 3	1.6516+ 1	2.1632+ 0							1.9173- 3			1.4347+ 1	
2.0000+ 3 ~ 3.0000+ 3	1.4170+ 1	2.1650+ 0							1.6081- 3			1.1997+ 1	
3.0000+ 3 ~ 4.0000+ 3	1.2252+ 1	2.1681+ 0							1.3557- 3			1.0079+ 1	
4.0000+ 3 ~ 5.0000+ 3	1.1091+ 1	2.1719+ 0							1.1944- 3			8.8559+ 0	
5.0000+ 3 ~ 6.0000+ 3	1.0167+ 1	2.1763+ 0							1.0798- 3			7.9880+ 0	
6.0000+ 3 ~ 8.0000+ 3	9.2572+ 0	2.1834+ 0							9.5864- 4			7.0721+ 0	
8.0000+ 3 ~ 1.0000+ 4	8.4076+ 0	2.1938+ 0							8.4458- 4			6.2125+ 0	
1.0000+ 4 ~ 1.5000+ 4	7.4942+ 0	2.2146+ 0							7.1918- 4			5.2726+ 0	
1.5000+ 4 ~ 2.0000+ 4	6.6805+ 0	2.2444+ 0							6.0630- 4			4.4324+ 0	
2.0000+ 4 ~ 3.0000+ 4	6.0093+ 0	2.2923+ 0							5.0854- 4			3.7148+ 0	
3.0000+ 4 ~ 4.0000+ 4	5.5018+ 0	2.3594+ 0							4.2872- 4			3.1411+ 0	
4.0000+ 4 ~ 5.0000+ 4	5.2153+ 0	2.4291+ 0							3.7771- 4			2.7855+ 0	
5.0000+ 4 ~ 6.0000+ 4	5.0448+ 0	2.5012+ 0							3.4146- 4			2.5423+ 0	
6.0000+ 4 ~ 8.0000+ 4	4.9079+ 0	2.6101+ 0							3.0315- 4			2.2966+ 0	
8.0000+ 4 ~ 1.0000+ 5	4.8364+ 0	2.7570+ 0							2.6708- 4			2.0786+ 0	
1.0000+ 5 ~ 1.5000+ 5	4.8419+ 0	3.0105+ 0							2.2743- 4			1.8309+ 0	
1.5000+ 5 ~ 2.0000+ 5	4.8758+ 0	3.3406+ 0							1.9173- 4			1.5347+ 0	
2.0000+ 5 ~ 3.0000+ 5	4.8837+ 0	3.6812+ 0							1.6081- 4			****	
3.0000+ 5 ~ 4.0000+ 5	4.7729+ 0	3.8328+ 0							1.3557- 4				
4.0000+ 5 ~ 5.0000+ 5	4.5444+ 0	3.7142+ 0							1.1944- 4				
5.0000+ 5 ~ 6.0000+ 5	4.1022+ 0	****							1.0798- 4				
6.0000+ 5 ~ 8.0000+ 5	3.4445+ 0		****						9.5864- 5				
8.0000+ 5 ~ 1.0000+ 6	2.8912+ 0								8.4458- 5				
1.0000+ 6 ~ 1.5000+ 6	2.3091+ 0								7.1918- 5				
1.5000+ 6 ~ 2.0000+ 6	2.0814+ 0								6.0630- 5				
2.0000+ 6 ~ 3.0000+ 6	2.1252+ 0								5.0854- 5				
3.0000+ 6 ~ 4.0000+ 6	1.7536+ 0								4.2872- 5		****		
4.0000+ 6 ~ 5.0000+ 6	1.7485+ 0								3.7771- 5				
5.0000+ 6 ~ 6.0000+ 6	1.4941+ 0								3.4146- 5				
6.0000+ 6 ~ 8.0000+ 6	1.5400+ 0								3.0315- 5				
8.0000+ 6 ~ 1.0000+ 7	1.4636+ 0			7.1680- 7					2.6708- 5				
1.0000+ 7 ~ 1.5000+ 7	1.4606+ 0			1.8028- 5					2.2743- 5				
1.5000+ 7 ~ 2.0000+ 7	1.4350+ 0	****	****	3.0016- 2					1.9172- 5	****	****	****	****

TABLE A1.4

C-12

MATERIAL :1061 CROSS SECTION C -12

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU BAR
1.0000- 5 ~ 1.0000- 2	4.7132+ 0	4.6990+ 0							1.0485- 2				****
1.0000- 2 ~ 1.5000- 2	4.7053+ 0	4.6990+ 0							4.8617- 3				
1.5000- 2 ~ 2.0000- 2	4.7038+ 0	4.6990+ 0							4.0986- 3				
2.0000- 2 ~ 3.0000- 2	4.7025+ 0	4.6990+ 0							3.4377- 3				
3.0000- 2 ~ 4.0000- 2	4.7020+ 0	4.6990+ 0							2.8982- 3				
4.0000- 2 ~ 5.0000- 2	4.7017+ 0	4.6990+ 0							2.5533- 3				
5.0000- 2 ~ 6.0000- 2	4.7014+ 0	4.6990+ 0							2.3083- 3				
6.0000- 2 ~ 8.0000- 2	4.7011+ 0	4.6990+ 0							2.0493- 3				
8.0000- 2 ~ 1.0000- 1	4.7008+ 0	4.6990+ 0							1.8055- 3				
1.0000- 1 ~ 1.5000- 1	4.7006+ 0	4.6990+ 0							1.5374- 3				
1.5000- 1 ~ 2.0000- 1	4.7004+ 0	4.6990+ 0							1.2961- 3				
2.0000- 1 ~ 3.0000- 1	4.7002+ 0	4.6990+ 0							1.0871- 3				
3.0000- 1 ~ 4.0000- 1	4.7001+ 0	4.6990+ 0							9.1648- 4				
4.0000- 1 ~ 5.0000- 1	4.6999+ 0	4.6990+ 0							8.0743- 4				
5.0000- 1 ~ 6.0000- 1	4.6998+ 0	4.6990+ 0							7.2995- 4				
6.0000- 1 ~ 8.0000- 1	4.6997+ 0	4.6990+ 0							6.4805- 4				
8.0000- 1 ~ 1.0000+ 0	4.6996+ 0	4.6990+ 0							5.7094- 4				
1.0000+ 0 ~ 1.5000+ 0	4.6995+ 0	4.6990+ 0							4.8617- 4				
1.5000+ 0 ~ 2.0000+ 0	4.6994+ 0	4.6990+ 0							4.0986- 4				
2.0000+ 0 ~ 3.0000+ 0	4.6994+ 0	4.6990+ 0							3.4377- 4				
3.0000+ 0 ~ 4.0000+ 0	4.6993+ 0	4.6990+ 0							2.8982- 4				
4.0000+ 0 ~ 5.0000+ 0	4.6993+ 0	4.6990+ 0							2.5533- 4				
5.0000+ 0 ~ 6.0000+ 0	4.6992+ 0	4.6990+ 0							2.3083- 4				
6.0000+ 0 ~ 8.0000+ 0	4.6992+ 0	4.6990+ 0							2.0493- 4				
8.0000+ 0 ~ 1.0000+ 1	4.6992+ 0	4.6990+ 0							1.8055- 4				
1.0000+ 1 ~ 1.5000+ 1	4.6991+ 0	4.6990+ 0							1.5374- 4				
1.5000+ 1 ~ 2.0000+ 1	4.6991+ 0	4.6989+ 0							1.2961- 4				
2.0000+ 1 ~ 3.0000+ 1	4.6990+ 0	4.6989+ 0							1.0871- 4				
3.0000+ 1 ~ 4.0000+ 1	4.6990+ 0	4.6989+ 0							9.1648- 5				
4.0000+ 1 ~ 5.0000+ 1	4.6989+ 0	4.6989+ 0							8.0743- 5				
5.0000+ 1 ~ 6.0000+ 1	4.6989+ 0	4.6988+ 0							7.2995- 5				
6.0000+ 1 ~ 8.0000+ 1	4.6988+ 0	4.6988+ 0							6.4805- 5				
8.0000+ 1 ~ 1.0000+ 2	4.6988+ 0	4.6987+ 0							5.7094- 5				
1.0000+ 2 ~ 1.5000+ 2	4.6986+ 0	4.6986+ 0							4.8617- 5				
1.5000+ 2 ~ 2.0000+ 2	4.6985+ 0	4.6984+ 0							4.0986- 5				
2.0000+ 2 ~ 3.0000+ 2	4.6982+ 0	4.6982+ 0							3.4377- 5				
3.0000+ 2 ~ 4.0000+ 2	4.6979+ 0	4.6979+ 0							2.8982- 5				
4.0000+ 2 ~ 5.0000+ 2	4.6976+ 0	4.6976+ 0							2.5533- 5				
5.0000+ 2 ~ 6.0000+ 2	4.6973+ 0	4.6973+ 0							2.3083- 5				
6.0000+ 2 ~ 8.0000+ 2	4.6969+ 0	4.6968+ 0							2.0493- 5				
8.0000+ 2 ~ 1.0000+ 3	4.6962+ 0	4.6962+ 0							1.8055- 5				
1.0000+ 3 ~ 1.5000+ 3	4.6951+ 0	4.6951+ 0							1.5374- 5				
1.5000+ 3 ~ 2.0000+ 3	4.6936+ 0	4.6936+ 0							1.2961- 5				
2.0000+ 3 ~ 3.0000+ 3	4.6913+ 0	4.6912+ 0							1.0871- 5				
3.0000+ 3 ~ 4.0000+ 3	4.6882+ 0	4.6882+ 0							9.1648- 6				
4.0000+ 3 ~ 5.0000+ 3	4.6852+ 0	4.6852+ 0							8.0743- 6				
5.0000+ 3 ~ 6.0000+ 3	4.6822+ 0	4.6821+ 0							7.2995- 6				
6.0000+ 3 ~ 8.0000+ 3	4.6776+ 0	4.6776+ 0							6.4805- 6				
8.0000+ 3 ~ 1.0000+ 4	4.6715+ 0	4.6715+ 0							5.7094- 6				
1.0000+ 4 ~ 1.5000+ 4	4.6604+ 0	4.6604+ 0							4.8617- 6				
1.5000+ 4 ~ 2.0000+ 4	4.6454+ 0	4.6454+ 0							4.0986- 6				
2.0000+ 4 ~ 3.0000+ 4	4.6221+ 0	4.6221+ 0							3.4378- 6				
3.0000+ 4 ~ 4.0000+ 4	4.5925+ 0	4.5925+ 0							2.8982- 6				
4.0000+ 4 ~ 5.0000+ 4	4.5629+ 0	4.5629+ 0							2.5533- 6				
5.0000+ 4 ~ 6.0000+ 4	4.5334+ 0	4.5334+ 0							2.3083- 6				
6.0000+ 4 ~ 8.0000+ 4	4.4896+ 0	4.4896+ 0							2.0493- 6				
8.0000+ 4 ~ 1.0000+ 5	4.4318+ 0	4.4318+ 0							1.8055- 6				
1.0000+ 5 ~ 1.5000+ 5	4.3284+ 0	4.3284+ 0							1.5374- 6				
1.5000+ 5 ~ 2.0000+ 5	4.1926+ 0	4.1926+ 0							1.2961- 6				
2.0000+ 5 ~ 3.0000+ 5	3.9977+ 0	3.9977+ 0							1.0871- 6				
3.0000+ 5 ~ 4.0000+ 5	3.7497+ 0	3.7497+ 0							9.1648- 7				
4.0000+ 5 ~ 5.0000+ 5	3.5254+ 0	3.5254+ 0							8.0743- 7				
5.0000+ 5 ~ 6.0000+ 5	3.3188+ 0	3.3188+ 0							7.2995- 7				
6.0000+ 5 ~ 8.0000+ 5	3.0422+ 0	3.0422+ 0							6.4805- 7				
8.0000+ 5 ~ 1.0000+ 6	2.7251+ 0	2.7251+ 0							5.7094- 7				
1.0000+ 6 ~ 1.5000+ 6	2.3024+ 0	2.3024+ 0							4.8617- 7				
1.5000+ 6 ~ 2.0000+ 6	1.8631+ 0	1.8631+ 0							4.0986- 7				
2.0000+ 6 ~ 3.0000+ 6	****	****							3.4377- 7				
3.0000+ 6 ~ 4.0000+ 6									2.8982- 7				
4.0000+ 6 ~ 5.0000+ 6			****						2.5533- 7				
5.0000+ 6 ~ 6.0000+ 6									2.3083- 7				
6.0000+ 6 ~ 8.0000+ 6									2.0493- 7			****	
8.0000+ 6 ~ 1.0000+ 7									1.8055- 7				
1.0000+ 7 ~ 1.5000+ 7									1.5374- 7				
1.5000+ 7 ~ 2.0000+ 7	****	****	****						1.2960- 7			****	****

TABLE A1.5

Na-23

MATERIAL =1111 CROSS SECTION NA-23

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	4.8426+ 0	3.1998+ 0							1.6303+ 0				2.9238- 2
1.0000- 2 ~ 1.5000- 2	3.9583+ 0	3.1943+ 0							7.5645- 1				2.9238- 2
1.5000- 2 ~ 2.0000- 2	3.8328+ 0	3.1848+ 0							6.3828- 1				2.9238- 2
2.0000- 2 ~ 3.0000- 2	3.7143+ 0	3.1733+ 0							5.3576- 1				2.9238- 2
3.0000- 2 ~ 4.0000- 2	3.6474+ 0	3.1757+ 0							4.5154- 1				2.9238- 2
4.0000- 2 ~ 5.0000- 2	3.6065+ 0	3.1816+ 0							3.9766- 1				2.9238- 2
5.0000- 2 ~ 6.0000- 2	3.5743+ 0	3.1875+ 0							3.5938- 1				2.9238- 2
6.0000- 2 ~ 8.0000- 2	3.5364+ 0	3.1963+ 0							3.1894- 1				2.9238- 2
8.0000- 2 ~ 1.0000- 1	3.4967+ 0	3.2081+ 0							2.8087- 1				2.9238- 2
1.0000- 1 ~ 1.5000- 1	3.4527+ 0	3.2113+ 0							2.3912- 1				2.9238- 2
1.5000- 1 ~ 2.0000- 1	3.4102+ 0	3.2058+ 0							2.0159- 1				2.9238- 2
2.0000- 1 ~ 3.0000- 1	3.3666+ 0	3.1977+ 0							1.6908- 1				2.9238- 2
3.0000- 1 ~ 4.0000- 1	3.3252+ 0	3.1868+ 0							1.4253- 1				2.9238- 2
4.0000- 1 ~ 5.0000- 1	3.2947+ 0	3.1758+ 0							1.2557- 1				2.9238- 2
5.0000- 1 ~ 6.0000- 1	3.2706+ 0	3.1650+ 0							1.1352- 1				2.9238- 2
6.0000- 1 ~ 8.0000- 1	3.2423+ 0	3.1486+ 0							1.0078- 1				2.9238- 2
8.0000- 1 ~ 1.0000+ 0	3.2126+ 0	3.1268+ 0							8.8788- 2				2.9238- 2
1.0000+ 0 ~ 1.5000+ 0	3.1906+ 0	3.1148+ 0							7.5617- 2				2.9238- 2
1.5000+ 0 ~ 2.0000+ 0	3.1759+ 0	3.1119+ 0							6.3765- 2				2.9238- 2
2.0000+ 0 ~ 3.0000+ 0	3.1673+ 0	3.1112+ 0							5.4044- 2				2.9238- 2
3.0000+ 0 ~ 4.0000+ 0	3.1631+ 0	3.1125+ 0							4.8338- 2				2.9238- 2
4.0000+ 0 ~ 5.0000+ 0	3.1599+ 0	3.1138+ 0							4.1338- 2				2.9238- 2
5.0000+ 0 ~ 6.0000+ 0	3.1574+ 0	3.1152+ 0							3.7743- 2				2.9238- 2
6.0000+ 0 ~ 8.0000+ 0	3.1545+ 0	3.1172+ 0							3.3900- 2				2.9238- 2
8.0000+ 0 ~ 1.0000+ 1	3.1513+ 0	3.1199+ 0							3.0242- 2				2.9238- 2
1.0000+ 1 ~ 1.5000+ 1	3.1472+ 0	3.1209+ 0							2.6159- 2				2.9238- 2
1.5000+ 1 ~ 2.0000+ 1	3.1427+ 0	3.1202+ 0							2.2429- 2				2.9238- 2
2.0000+ 1 ~ 3.0000+ 1	3.1381+ 0	3.1193+ 0							1.9139- 2				2.9238- 2
3.0000+ 1 ~ 4.0000+ 1	3.1337+ 0	3.1180+ 0							1.6410- 2				2.9238- 2
4.0000+ 1 ~ 5.0000+ 1	3.1304+ 0	3.1168+ 0							1.4639- 2				2.9238- 2
5.0000+ 1 ~ 6.0000+ 1	3.1278+ 0	3.1155+ 0							1.3367- 2				2.9238- 2
6.0000+ 1 ~ 8.0000+ 1	3.1247+ 0	3.1136+ 0							1.2006- 2				2.9238- 2
8.0000+ 1 ~ 1.0000+ 2	3.1214+ 0	3.1111+ 0							1.0711- 2				2.9238- 2
1.0000+ 2 ~ 1.5000+ 2	3.1169+ 0	3.1079+ 0							9.3828- 3				2.9238- 2
1.5000+ 2 ~ 2.0000+ 2	3.1120+ 0	3.1041+ 0							8.2120- 3				2.9238- 2
2.0000+ 2 ~ 3.0000+ 2	3.1076+ 0	3.1008+ 0							7.4072- 3				2.9238- 2
3.0000+ 2 ~ 4.0000+ 2	3.1039+ 0	3.0979+ 0							6.8525- 3				2.9238- 2
4.0000+ 2 ~ 5.0000+ 2	3.1012+ 0	3.0950+ 0							6.4675- 3				2.9238- 2
5.0000+ 2 ~ 6.0000+ 2	3.1188+ 0	3.1125+ 0							6.3003- 3				2.9238- 2
6.0000+ 2 ~ 8.0000+ 2	3.1730+ 0	3.1666+ 0							6.3875- 3				2.9238- 2
8.0000+ 2 ~ 1.0000+ 3	3.3588+ 0	3.3519+ 0							6.8361- 3				2.9238- 2
1.0000+ 3 ~ 1.5000+ 3	4.3183+ 0	4.3095+ 0							8.7334- 3				2.9238- 2
1.5000+ 3 ~ 2.0000+ 3	8.7954+ 0	8.7796+ 0							1.5722- 2				2.9238- 2
2.0000+ 3 ~ 3.0000+ 3	1.4292+ 2	1.4277+ 2							1.4436- 1				2.9238- 2
3.0000+ 3 ~ 4.0000+ 3	7.4450+ 1	7.4400+ 1							4.9390- 2				2.9238- 2
4.0000+ 3 ~ 5.0000+ 3	1.5798+ 1	1.5793+ 1							4.6395- 3				2.9238- 2
5.0000+ 3 ~ 6.0000+ 3	9.7455+ 0	9.7439+ 0							1.5517- 3				2.9238- 2
6.0000+ 3 ~ 8.0000+ 3	7.1641+ 0	7.1621+ 0							2.0443- 3				2.9238- 2
8.0000+ 3 ~ 1.0000+ 4	5.8649+ 0	5.8646+ 0							2.2977- 4				2.9238- 2
1.0000+ 4 ~ 1.5000+ 4	5.0717+ 0	5.0716+ 0							8.8129- 5				2.9238- 2
1.5000+ 4 ~ 2.0000+ 4	4.6083+ 0	4.6082+ 0							3.6823- 5				2.9238- 2
2.0000+ 4 ~ 3.0000+ 4	4.3346+ 0	4.3345+ 0							2.5503- 5				2.9238- 2
3.0000+ 4 ~ 4.0000+ 4	4.1703+ 0	4.1667+ 0							3.6039- 3				2.9238- 2
4.0000+ 4 ~ 5.0000+ 4	4.2326+ 0	4.2323+ 0							3.2753- 4				2.9238- 2
5.0000+ 4 ~ 6.0000+ 4	9.5243+ 0	9.5171+ 0							7.2250- 3				2.9238- 2
6.0000+ 4 ~ 8.0000+ 4	4.0176+ 0	4.0176+ 0							8.7813- 5				2.9238- 2
8.0000+ 4 ~ 1.0000+ 5	3.8525+ 0	3.8525+ 0							1.6888- 5				2.9238- 2
1.0000+ 5 ~ 1.5000+ 5	3.6976+ 0	3.6958+ 0							1.7899- 3				3.0368- 2
1.5000+ 5 ~ 2.0000+ 5	3.5149+ 0	3.5167+ 0							7.9088- 4				4.9328- 2
2.0000+ 5 ~ 3.0000+ 5	4.1141+ 0	4.1214+ 0							7.4162- 4				8.3219- 2
3.0000+ 5 ~ 4.0000+ 5	3.5118+ 0	3.5131+ 0							4.2304- 4				1.9666- 2
4.0000+ 5 ~ 5.0000+ 5	3.3862+ 0	3.3821+ 0	6.2610- 3						2.6035- 4				8.9423- 2
5.0000+ 5 ~ 6.0000+ 5	3.4650+ 0	3.3293+ 0	1.3750- 1						3.2068- 4				-2.7107 2
6.0000+ 5 ~ 8.0000+ 5	6.0121+ 0	5.6448+ 0	3.6825- 1						3.2243- 4				1.5415- 1
8.0000+ 5 ~ 1.0000+ 6	4.1742+ 0	3.7891+ 0	3.8612- 1						2.2164- 4				2.8898- 1
1.0000+ 6 ~ 1.5000+ 6	3.2010+ 0	2.6202+ 0	5.8170- 1						1.9620- 4				2.4707- 1
1.5000+ 6 ~ 2.0000+ 6	2.5920+ 0	1.9934+ 0	6.0050- 1						2.0446- 4				3.2904- 1
2.0000+ 6 ~ 3.0000+ 6	2.7354+ 0	2.0338+ 0	7.0241- 1						1.9743- 4				4.6783- 1
3.0000+ 6 ~ 4.0000+ 6	2.1398+ 0	1.3192+ 0	8.2150- 1						1.7186- 4	2.2920- 5			4.7969- 1
4.0000+ 6 ~ 5.0000+ 6	1.9605+ 0	1.0848+ 0	8.7500- 1						1.5397- 4	8.6359- 4		5.6195- 4	4.8751- 1
5.0000+ 6 ~ 6.0000+ 6	1.8582+ 0	9.5206- 1	8.9499- 1						1.6123- 4	9.5540- 3		1.7805- 3	5.2100- 1
6.0000+ 6 ~ 8.0000+ 6	1.6686+ 0	7.0894- 1	9.1975- 1						1.6761- 4	2.9661- 2		1.0299- 2	5.6321- 1
8.0000+ 6 ~ 1.0000+ 7	1.5292+ 0	5.6398- 1	8.6425- 1						1.7833- 4	5.4694- 2		4.6250- 2	5.7394- 1
1.0000+ 7 ~ 1.5000+ 7	1.6662+ 0	8.1927- 1	6.5200- 1	8.6046- 3					2.0382- 4	6.1046- 2		1.2530- 1	6.4615- 1

TABLE A1.6

Al-27

MATERIAL :1131 CROSS SECTION AL-27

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	2.2183+ 0	1.5000+ 0							7.0925- 1				2.4512- 2
1.0000- 2 ~ 1.5000- 2	1.8355+ 0	1.5000+ 0							3.2888- 1				2.4431- 2
1.5000- 2 ~ 2.0000- 2	1.7872+ 0	1.5000+ 0							2.7726- 1				2.4408- 2
2.0000- 2 ~ 3.0000- 2	1.7378+ 0	1.5000+ 0							2.3255- 1				2.4385- 2
3.0000- 2 ~ 4.0000- 2	1.7082+ 0	1.5000+ 0							1.9605- 1				2.4362- 2
4.0000- 2 ~ 5.0000- 2	1.6858+ 0	1.5000+ 0							1.7273- 1				2.4345- 2
5.0000- 2 ~ 6.0000- 2	1.6633+ 0	1.5000+ 0							1.5615- 1				2.4332- 2
6.0000- 2 ~ 8.0000- 2	1.6404+ 0	1.5000+ 0							1.3863- 1				2.4316- 2
8.0000- 2 ~ 1.0000- 1	1.6238+ 0	1.5000+ 0							1.2214- 1				2.4299- 2
1.0000- 1 ~ 1.5000- 1	1.6100+ 0	1.5000+ 0							1.0400- 1				2.4278- 2
1.5000- 1 ~ 2.0000- 1	1.5985+ 0	1.5000+ 0							8.7677- 2				2.4255- 2
2.0000- 1 ~ 3.0000- 1	1.5813+ 0	1.5000+ 0							7.3540- 2				2.4232- 2
3.0000- 1 ~ 4.0000- 1	1.5630+ 0	1.5000+ 0							6.1997- 2				2.4209- 2
4.0000- 1 ~ 5.0000- 1	1.5559+ 0	1.5000+ 0							5.4620- 2				2.4192- 2
5.0000- 1 ~ 6.0000- 1	1.5498+ 0	1.5000+ 0							4.9379- 2				2.4179- 2
6.0000- 1 ~ 8.0000- 1	1.5451+ 0	1.5000+ 0							4.3838- 2				2.4163- 2
8.0000- 1 ~ 1.0000+ 0	1.5394+ 0	1.5000+ 0							3.8622- 2				2.4146- 2
1.0000+ 0 ~ 1.5000+ 0	1.5359+ 0	1.5000+ 0							3.2888- 2				2.4124- 2
1.5000+ 0 ~ 2.0000+ 0	1.5345+ 0	1.5000+ 0							2.7726- 2				2.4102- 2
2.0000+ 0 ~ 3.0000+ 0	1.5324+ 0	1.5000+ 0							2.3255- 2				2.4078- 2
3.0000+ 0 ~ 4.0000+ 0	1.5296+ 0	1.5000+ 0							1.9605- 2				2.4056- 2
4.0000+ 0 ~ 5.0000+ 0	1.5268+ 0	1.5000+ 0							1.7272- 2				2.4039- 2
5.0000+ 0 ~ 6.0000+ 0	1.5241+ 0	1.5000+ 0							1.5615- 2				2.4025- 2
6.0000+ 0 ~ 8.0000+ 0	1.5199+ 0	1.5000+ 0							1.3863- 2				2.4010- 2
8.0000+ 0 ~ 1.0000+ 1	1.5144+ 0	1.5000+ 0							1.2213- 2				2.3993- 2
1.0000+ 1 ~ 1.5000+ 1	1.5114+ 0	1.5000+ 0							1.0400- 2				2.3971- 2
1.5000+ 1 ~ 2.0000+ 1	1.5109+ 0	1.5000+ 0							8.7677- 3				2.3949- 2
2.0000+ 1 ~ 3.0000+ 1	1.5103+ 0	1.5000+ 0							7.3540- 3				2.3925- 2
3.0000+ 1 ~ 4.0000+ 1	1.5094+ 0	1.5000+ 0							6.1997- 3				2.3902- 2
4.0000+ 1 ~ 5.0000+ 1	1.5085+ 0	1.5000+ 0							5.4620- 3				2.3886- 2
5.0000+ 1 ~ 6.0000+ 1	1.5076+ 0	1.5000+ 0							4.9379- 3				2.3872- 2
6.0000+ 1 ~ 8.0000+ 1	1.5063+ 0	1.5000+ 0							4.3838- 3				2.3856- 2
8.0000+ 1 ~ 1.0000+ 2	1.5045+ 0	1.5000+ 0							3.8622- 3				2.3839- 2
1.0000+ 2 ~ 1.5000+ 2	1.5035+ 0	1.5000+ 0							3.3300- 3				2.3818- 2
1.5000+ 2 ~ 2.0000+ 2	1.5033+ 0	1.5000+ 0							2.8651- 3				2.3795- 2
2.0000+ 2 ~ 3.0000+ 2	1.5030+ 0	1.5000+ 0							2.4535- 3				2.3772- 2
3.0000+ 2 ~ 4.0000+ 2	1.5025+ 0	1.5000+ 0							2.1110- 3				2.3749- 2
4.0000+ 2 ~ 5.0000+ 2	1.5020+ 0	1.5000+ 0							1.8880- 3				2.3732- 2
5.0000+ 2 ~ 6.0000+ 2	1.5018+ 0	1.5000+ 0							1.7626- 3				2.3719- 2
6.0000+ 2 ~ 8.0000+ 2	1.5017+ 0	1.5000+ 0							1.6708- 3				2.3703- 2
8.0000+ 2 ~ 1.0000+ 3	1.5016+ 0	1.5000+ 0							1.6096- 3				2.3686- 2
1.0000+ 3 ~ 1.5000+ 3	1.5016+ 0	1.5000+ 0							1.6266- 3				2.3665- 2
1.5000+ 3 ~ 2.0000+ 3	1.5017+ 0	1.5000+ 0							1.7275- 3				2.3642- 2
2.0000+ 3 ~ 3.0000+ 3	1.5020+ 0	1.5000+ 0							2.0142- 3				2.3618- 2
3.0000+ 3 ~ 4.0000+ 3	1.4916+ 0	1.4890+ 0							2.6034- 3				2.3596- 2
4.0000+ 3 ~ 5.0000+ 3	1.4402+ 0	1.4368+ 0							3.4051- 3				2.3579- 2
5.0000+ 3 ~ 6.0000+ 3	3.1962+ 0	3.0351+ 0							1.6108- 1				2.3566- 2
6.0000+ 3 ~ 8.0000+ 3	1.3486+ 0	1.3426+ 0							6.0097- 3				2.3550- 2
8.0000+ 3 ~ 1.0000+ 4	1.2763+ 0	1.2730+ 0							3.3213- 3				2.3533- 2
1.0000+ 4 ~ 1.5000+ 4	1.2299+ 0	1.2272+ 0							2.7266- 3				2.3045- 2
1.5000+ 4 ~ 2.0000+ 4	8.8157- 1	8.7881- 1							2.7576- 3				2.2291- 2
2.0000+ 4 ~ 3.0000+ 4	6.8309- 1	6.7913- 1							3.9618- 3				2.1225- 2
3.0000+ 4 ~ 4.0000+ 4	1.4918+ 1	1.4903+ 1							1.4983- 2				1.9849- 2
4.0000+ 4 ~ 5.0000+ 4	4.2532+ 0	4.2504+ 0							2.7273- 3				1.8658- 2
5.0000+ 4 ~ 6.0000+ 4	2.2720+ 0	2.2709+ 0							1.1519- 3				1.7657- 2
6.0000+ 4 ~ 8.0000+ 4	2.0882+ 0	2.0870+ 0							1.2117- 3				1.6398- 2
8.0000+ 4 ~ 1.0000+ 5	1.1674+ 1	1.1671+ 1							2.9088- 3				1.5193- 2
1.0000+ 5 ~ 1.5000+ 5	5.2212+ 0	5.2189+ 0							2.2629- 3				1.4697- 2
1.5000+ 5 ~ 2.0000+ 5	6.3412+ 0	6.3400+ 0							1.1828- 3				1.6066- 2
2.0000+ 5 ~ 3.0000+ 5	4.1459+ 0	4.1451+ 0							7.6753- 4				2.2918- 2
3.0000+ 5 ~ 4.0000+ 5	3.7577+ 0	3.7569+ 0							8.2463- 4				3.8647- 2
4.0000+ 5 ~ 5.0000+ 5	4.4142+ 0	4.4136+ 0							6.2578- 4				5.8358- 2
5.0000+ 5 ~ 6.0000+ 5	3.9937+ 0	3.9933+ 0							3.7014- 4				8.0662- 2
6.0000+ 5 ~ 8.0000+ 5	3.8512+ 0	3.8509+ 0							3.0349- 4				1.1551- 1
8.0000+ 5 ~ 1.0000+ 6	3.4169+ 0	3.4078+ 0	8.8822- 3						1.8898- 4				1.6014- 1
1.0000+ 6 ~ 1.5000+ 6	3.1517+ 0	3.0417+ 0	1.0992- 1						1.2425- 4				2.2848- 1
1.5000+ 6 ~ 2.0000+ 6	2.8808+ 0	2.6150+ 0	2.4568- 1						1.3787- 4	0.0000+ 0			3.0187- 1
2.0000+ 6 ~ 3.0000+ 6	2.9672+ 0	2.5004+ 0	4.6656- 1						1.0902- 4	2.4250- 4			3.6406- 1
3.0000+ 6 ~ 4.0000+ 6	2.5409+ 0	1.8404+ 0	6.9598- 1						6.5044- 5	4.5175- 3		0.0000+ 0	3.9696- 1
4.0000+ 6 ~ 5.0000+ 6	2.1767+ 0	1.3485+ 0	8.1380- 1						4.9519- 5	1.4525- 2		2.5000- 5	3.9113- 1
5.0000+ 6 ~ 6.0000+ 6	2.0250+ 0	1.1158+ 0	8.7485- 1						6.7176- 5	3.3500- 2		8.5000- 4	3.9640- 1
6.0000+ 6 ~ 8.0000+ 6	1.8750+ 0	9.4734- 1	8.5455- 1						1.0880- 4	5.5625- 2		1.7263- 2	4.1297- 1
8.0000+ 6 ~ 1.0000+ 7	1.7000+ 0	8.0231- 1	7.4796- 1						1.7863- 4	8.0625- 2		6.8800- 2	4.5866- 1
1.0000+ 7 ~ 1.5000+ 7	1.7350+ 0	8.9029- 1	6.3707- 1	8.7447- 3					3.4576- 4	8.3550- 2		1.1495- 1	5.8190- 1
1.5000+ 7 ~ 2.0000+ 7	1.7710+ 0	1.0291+ 0	3.6315- 1	2.5879- 1					6.3980- 4	4.8700- 2		7.0535- 2	7.2992- 1

TABLE A1.7

Si

MATERIAL :1140 CROSS SECTION SI-0

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	2.6917+ 0	2.2000+ 0							4.8112- 1				2.3974- 2
1.0000- 2 ~ 1.5000- 2	2.4280+ 0	2.2000+ 0							2.2307- 1				2.3981- 2
1.5000- 2 ~ 2.0000- 2	2.3958+ 0	2.2000+ 0							1.8806- 1				2.3983- 2
2.0000- 2 ~ 3.0000- 2	2.3619+ 0	2.2000+ 0							1.5773- 1				2.3985- 2
3.0000- 2 ~ 4.0000- 2	2.3446+ 0	2.2000+ 0							1.3297- 1				2.3987- 2
4.0000- 2 ~ 5.0000- 2	2.3329+ 0	2.2000+ 0							1.1714- 1				2.3989- 2
5.0000- 2 ~ 6.0000- 2	2.3211+ 0	2.2000+ 0							1.0590- 1				2.3990- 2
6.0000- 2 ~ 8.0000- 2	2.3035+ 0	2.2000+ 0							9.4013- 2				2.3992- 2
8.0000- 2 ~ 1.0000- 1	2.2841+ 0	2.2000+ 0							8.2824- 2				2.3993- 2
1.0000- 1 ~ 1.5000- 1	2.2719+ 0	2.2000+ 0							7.0524- 2				2.3995- 2
1.5000- 1 ~ 2.0000- 1	2.2608+ 0	2.2000+ 0							5.9451- 2				2.3997- 2
2.0000- 1 ~ 3.0000- 1	2.2509+ 0	2.2000+ 0							4.9863- 2				2.3999- 2
3.0000- 1 ~ 4.0000- 1	2.2434+ 0	2.2000+ 0							4.2034- 2				2.4001- 2
4.0000- 1 ~ 5.0000- 1	2.2380+ 0	2.2000+ 0							3.7031- 2				2.4002- 2
5.0000- 1 ~ 6.0000- 1	2.2339+ 0	2.2000+ 0							3.3477- 2				2.4004- 2
6.0000- 1 ~ 8.0000- 1	2.2309+ 0	2.2000+ 0							2.9720- 2				2.4005- 2
8.0000- 1 ~ 1.0000+ 0	2.2268+ 0	2.2000+ 0							2.6183- 2				2.4006- 2
1.0000+ 0 ~ 1.5000+ 0	2.2248+ 0	2.2000+ 0							2.2295- 2				2.4008- 2
1.5000+ 0 ~ 2.0000+ 0	2.2248+ 0	2.2000+ 0							1.8797- 2				2.4010- 2
2.0000+ 0 ~ 3.0000+ 0	2.2248+ 0	2.2000+ 0							1.5767- 2				2.4012- 2
3.0000+ 0 ~ 4.0000+ 0	2.2247+ 0	2.2000+ 0							1.3293- 7				2.4014- 2
4.0000+ 0 ~ 5.0000+ 0	2.2247+ 0	2.2000+ 0							1.1711- 2				2.4016- 2
5.0000+ 0 ~ 6.0000+ 0	2.2247+ 0	2.2000+ 0							1.0588- 2				2.4017- 2
6.0000+ 0 ~ 8.0000+ 0	2.2247+ 0	2.2000+ 0							9.4002- 3				2.4018- 2
8.0000+ 0 ~ 1.0000+ 1	2.2246+ 0	2.2000+ 0							8.2820- 3				2.4020- 2
1.0000+ 1 ~ 1.5000+ 1	2.2245+ 0	2.2000+ 0							7.0527- 3				2.4022- 2
1.5000+ 1 ~ 2.0000+ 1	2.2244+ 0	2.2000+ 0							5.9460- 3				2.4024- 2
2.0000+ 1 ~ 3.0000+ 1	2.2242+ 0	2.2000+ 0							4.9875- 3				2.4026- 2
3.0000+ 1 ~ 4.0000+ 1	2.2240+ 0	2.2000+ 0							4.2048- 3				2.4028- 2
4.0000+ 1 ~ 5.0000+ 1	2.2237+ 0	2.2000+ 0							3.7047- 3				2.4029- 2
5.0000+ 1 ~ 6.0000+ 1	2.2235+ 0	2.2000+ 0							3.3493- 3				2.4031- 2
6.0000+ 1 ~ 8.0000+ 1	2.2231+ 0	2.2000+ 0							2.9736- 3				2.4032- 2
8.0000+ 1 ~ 1.0000+ 2	2.2227+ 0	2.2000+ 0							2.6198- 3				2.4034- 2
1.0000+ 2 ~ 1.5000+ 2	2.2218+ 0	2.2000+ 0							2.2310- 3				2.4041- 2
1.5000+ 2 ~ 2.0000+ 2	2.2208+ 0	2.2000+ 0							1.8809- 3				2.4051- 2
2.0000+ 2 ~ 3.0000+ 2	2.2188+ 0	2.2000+ 0							1.5777- 3				2.4061- 2
3.0000+ 2 ~ 4.0000+ 2	2.2164+ 0	2.2000+ 0							1.3301- 3				2.4071- 2
4.0000+ 2 ~ 5.0000+ 2	2.2140+ 0	2.2000+ 0							1.1719- 3				2.4079- 2
5.0000+ 2 ~ 6.0000+ 2	2.2116+ 0	2.2000+ 0							1.0595- 3				2.4085- 2
6.0000+ 2 ~ 8.0000+ 2	2.2080+ 0	2.2000+ 0							9.4062- 4				2.4092- 2
8.0000+ 2 ~ 1.0000+ 3	2.2032+ 0	2.2000+ 0							8.2873- 4				2.4099- 2
1.0000+ 3 ~ 1.5000+ 3	2.1820+ 0	2.1812+ 0							7.3530- 4				2.4202- 2
1.5000+ 3 ~ 2.0000+ 3	2.1444+ 0	2.1437+ 0							6.6266- 4				2.4357- 2
2.0000+ 3 ~ 3.0000+ 3	2.0080+ 0	2.0074+ 0							5.9511- 4				2.4519- 2
3.0000+ 3 ~ 4.0000+ 3	2.0120+ 0	2.0114+ 0							7.1398- 4				2.4674- 2
4.0000+ 3 ~ 5.0000+ 3	1.9376+ 0	1.9277+ 0							6.3140- 3				2.4790- 2
5.0000+ 3 ~ 6.0000+ 3	1.8800+ 0	1.8708+ 0							4.6931- 3				2.5028- 2
6.0000+ 3 ~ 8.0000+ 3	1.8200+ 0	1.8192+ 0							4.0217- 4				2.5507- 2
8.0000+ 3 ~ 1.0000+ 4	1.7400+ 0	1.7397+ 0							3.1418- 4				2.6013- 2
1.0000+ 4 ~ 1.5000+ 4	1.6625+ 0	1.6622+ 0							2.6958- 4				2.8350- 2
1.5000+ 4 ~ 2.0000+ 4	1.5875+ 0	1.5873+ 0							2.4600- 4				3.1884- 2
2.0000+ 4 ~ 3.0000+ 4	1.6000+ 0	1.5986+ 0							9.7486- 4				3.5737- 2
3.0000+ 4 ~ 4.0000+ 4	1.5250+ 0	1.5202+ 0							4.5581- 3			0.0000+ 0	3.9302- 2
4.0000+ 4 ~ 5.0000+ 4	1.4250+ 0	1.4236+ 0							1.4032- 3			0.0000+ 0	4.1946- 2
5.0000+ 4 ~ 6.0000+ 4	1.6500+ 0	1.6484+ 0							1.4757- 3			0.0000+ 0	4.6361- 2
6.0000+ 4 ~ 8.0000+ 4	1.9375+ 0	1.9307+ 0							5.7554- 3			0.0000+ 0	5.4741- 2
8.0000+ 4 ~ 1.0000+ 5	1.3250+ 0	1.3246+ 0							3.6620- 4			0.0000+ 0	6.3596- 2
1.0000+ 5 ~ 1.5000+ 5	6.8700- 1	6.8663- 1							3.7078- 4			0.0000+ 0	8.6574- 2
1.5000+ 5 ~ 2.0000+ 5	5.6765+ 0	5.6760+ 0							4.6511- 4			0.0000+ 0	1.1674- 1
2.0000+ 5 ~ 3.0000+ 5	6.6800+ 0	6.6797+ 0							3.0523- 4			0.0000+ 0	1.4808- 1
3.0000+ 5 ~ 4.0000+ 5	3.6470+ 0	3.6465+ 0							4.7430- 4			0.0000+ 0	1.7818- 1
4.0000+ 5 ~ 5.0000+ 5	3.0810+ 0	3.0807+ 0							2.4535- 4			0.0000+ 0	2.0068- 1
5.0000+ 5 ~ 6.0000+ 5	4.1468+ 0	4.1457+ 0							1.0488- 3			0.0000+ 0	2.2054- 1
6.0000+ 5 ~ 8.0000+ 5	2.7104+ 0	2.7098+ 0							8.6020- 4			0.0000+ 0	2.4672- 1
8.0000+ 5 ~ 1.0000+ 6	4.6561+ 0	4.6550+ 0							1.1000- 3			0.0000+ 0	2.7438- 1
1.0000+ 6 ~ 1.5000+ 6	2.8353+ 0	2.8336+ 0	1.1665- 3						5.0747- 4			0.0000+ 0	3.0238- 1
1.5000+ 6 ~ 2.0000+ 6	3.4090+ 0	3.3624+ 0	4.6282- 2						3.5269- 4			0.0000+ 0	3.3305- 1
2.0000+ 6 ~ 3.0000+ 6	2.6449+ 0	2.2017+ 0	4.4274- 1						3.7971- 4	0.0000+ 0		3.8198- 5	4.0589- 1
3.0000+ 6 ~ 4.0000+ 6	2.1301+ 0	1.5127+ 0	6.1662- 1						4.0966- 4	1.1494- 9		3.2389- 4	4.6022- 1
4.0000+ 6 ~ 5.0000+ 6	2.3834+ 0	1.6890+ 0	6.8680- 1						4.3348- 4	4.5664- 3		2.5498- 3	4.9365- 1
5.0000+ 6 ~ 6.0000+ 6	2.1090+ 0	1.2947+ 0	7.5431- 1						4.5345- 4	5.1154- 2		8.3782- 3	5.3682- 1
6.0000+ 6 ~ 8.0000+ 6	1.9084+ 0	8.2431- 1	6.2817- 1						4.7844- 4	3.1581- 1		1.3964- 1	6.3871- 1
8.0000+ 6 ~ 1.0000+ 7	1.8262+ 0	6.0792- 1	5.1513- 1	9.5632- 5					5.0626- 4	3.9421- 1		3.0838- 1	7.4739- 1
1.0000+ 7 ~ 1.5000+ 7	1.7823+ 0	5.6307- 1	6.9749- 1	1.0848- 2					5.4466- 4	2.9666- 1		2.1376- 1	7.7569- 1

TABLE A1.8

Cr

MATERIAL :1240 CROSS SECTION CR-0

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	1.3324+ 1	3.8338+ 0							9.4835+ 0			0.0000+ 0	1.2934- 2
1.0000- 2 ~ 1.5000- 2	8.2326+ 0	3.8338+ 0							4.4027+ 0			0.0000+ 0	1.2934- 2
1.5000- 2 ~ 2.0000- 2	7.5375+ 0	3.8338+ 0							3.7028+ 0			0.0000+ 0	1.2934- 2
2.0000- 2 ~ 3.0000- 2	6.9419+ 0	3.8338+ 0							3.1126+ 0			0.0000+ 0	1.2934- 2
3.0000- 2 ~ 4.0000- 2	6.4525+ 0	3.8338+ 0							2.6182+ 0			0.0000+ 0	1.2934- 2
4.0000- 2 ~ 5.0000- 2	6.1426+ 0	3.8338+ 0							2.3145+ 0			0.0000+ 0	1.2934- 2
5.0000- 2 ~ 6.0000- 2	5.9194+ 0	3.8338+ 0							2.0882+ 0			0.0000+ 0	1.2934- 2
6.0000- 2 ~ 8.0000- 2	5.6848+ 0	3.8339+ 0							1.8514+ 0			0.0000+ 0	1.2934- 2
8.0000- 2 ~ 1.0000- 1	5.4663+ 0	3.8339+ 0							1.6366+ 0			0.0000+ 0	1.2934- 2
1.0000- 1 ~ 1.5000- 1	5.2225+ 0	3.8339+ 0							1.3894+ 0			0.0000+ 0	1.2934- 2
1.5000- 1 ~ 2.0000- 1	5.0054+ 0	3.8339+ 0							1.1744+ 0			0.0000+ 0	1.2934- 2
2.0000- 1 ~ 3.0000- 1	4.8155+ 0	3.8339+ 0							9.8251- 1			0.0000+ 0	1.2934- 2
3.0000- 1 ~ 4.0000- 1	4.6624+ 0	3.8340+ 0							8.3041- 1			0.0000+ 0	1.2935- 2
4.0000- 1 ~ 5.0000- 1	4.5635+ 0	3.8341+ 0							7.3013- 1			0.0000+ 0	1.2935- 2
5.0000- 1 ~ 6.0000- 1	4.4934+ 0	3.8341+ 0							6.5942- 1			0.0000+ 0	1.2935- 2
6.0000- 1 ~ 8.0000- 1	4.4202+ 0	3.8342+ 0							5.8723- 1			0.0000+ 0	1.2935- 2
8.0000- 1 ~ 1.0000+ 0	4.3501+ 0	3.8343+ 0							5.1632- 1			0.0000+ 0	1.2935- 2
1.0000+ 0 ~ 1.5000+ 0	4.2740+ 0	3.8345+ 0							4.4020- 1			0.0000+ 0	1.2935- 2
1.5000+ 0 ~ 2.0000+ 0	4.2050+ 0	3.8348+ 0							3.7067- 1			0.0000+ 0	1.2935- 2
2.0000+ 0 ~ 3.0000+ 0	4.1461+ 0	3.8352+ 0							3.1135- 1			0.0000+ 0	1.2935- 2
3.0000+ 0 ~ 4.0000+ 0	4.0976+ 0	3.8358+ 0							2.6218- 1			0.0000+ 0	1.2935- 2
4.0000+ 0 ~ 5.0000+ 0	4.0672+ 0	3.8363+ 0							2.3084- 1			0.0000+ 0	1.2935- 2
5.0000+ 0 ~ 6.0000+ 0	4.0459+ 0	3.8368+ 0							2.0968- 1			0.0000+ 0	1.2935- 2
6.0000+ 0 ~ 8.0000+ 0	4.0230+ 0	3.8377+ 0							1.8551- 1			0.0000+ 0	1.2935- 2
8.0000+ 0 ~ 1.0000+ 1	4.0021+ 0	3.8388+ 0							1.6333- 1			0.0000+ 0	1.2935- 2
1.0000+ 1 ~ 1.5000+ 1	3.9801+ 0	3.8408+ 0							1.3948- 1			0.0000+ 0	1.2935- 2
1.5000+ 1 ~ 2.0000+ 1	3.9610+ 0	3.8436+ 0							1.1745- 1			0.0000+ 0	1.2935- 2
2.0000+ 1 ~ 3.0000+ 1	3.9466+ 0	3.8479+ 0							9.8913- 2			0.0000+ 0	1.2935- 2
3.0000+ 1 ~ 4.0000+ 1	3.9369+ 0	3.8536+ 0							8.3324- 2			0.0000+ 0	1.2935- 2
4.0000+ 1 ~ 5.0000+ 1	3.9330+ 0	3.8594+ 0							7.3841- 2			0.0000+ 0	1.2935- 2
5.0000+ 1 ~ 6.0000+ 1	3.9318+ 0	3.8652+ 0							6.6697- 2			0.0000+ 0	1.2935- 2
6.0000+ 1 ~ 8.0000+ 1	3.9333+ 0	3.8740+ 0							5.9309- 2			0.0000+ 0	1.2935- 2
8.0000+ 1 ~ 1.0000+ 2	3.9384+ 0	3.8858+ 0							5.2635- 2			0.0000+ 0	1.2935- 2
1.0000+ 2 ~ 1.5000+ 2	3.9520+ 0	3.9071+ 0							4.4989- 2			0.0000+ 0	1.2937- 2
1.5000+ 2 ~ 2.0000+ 2	3.9766+ 0	3.9383+ 0							3.8399- 2			0.0000+ 0	1.2941- 2
2.0000+ 2 ~ 3.0000+ 2	4.0201+ 0	3.9876+ 0							3.2615- 2			0.0000+ 0	1.2945- 2
3.0000+ 2 ~ 4.0000+ 2	4.0857+ 0	4.0576+ 0							2.8150- 2			0.0000+ 0	1.2948- 2
4.0000+ 2 ~ 5.0000+ 2	4.1586+ 0	4.1333+ 0							2.5306- 2			0.0000+ 0	1.2951- 2
5.0000+ 2 ~ 6.0000+ 2	4.2318+ 0	4.2084+ 0							2.3390- 2			0.0000+ 0	1.2956- 2
6.0000+ 2 ~ 8.0000+ 2	4.3452+ 0	4.3236+ 0							2.1593- 2			0.0000+ 0	1.2967- 2
8.0000+ 2 ~ 1.0000+ 3	4.5069+ 0	4.4869+ 0							2.0024- 2			0.0000+ 0	1.2978- 2
1.0000+ 3 ~ 1.5000+ 3	4.9105+ 0	4.8915+ 0							1.9069- 2			0.0000+ 0	1.3043- 2
1.5000+ 3 ~ 2.0000+ 3	6.1470+ 0	5.8057+ 0							3.4134- 1			0.0000+ 0	1.3137- 2
2.0000+ 3 ~ 3.0000+ 3	8.8279+ 0	8.8034+ 0							2.4516- 2			0.0000+ 0	1.3234- 2
3.0000+ 3 ~ 4.0000+ 3	2.1094+ 1	2.1045+ 1							4.9116- 2			0.0000+ 0	1.3328- 2
4.0000+ 3 ~ 5.0000+ 3	2.7170+ 1	2.7103+ 1							6.6708- 2			0.0000+ 0	1.3398- 2
5.0000+ 3 ~ 6.0000+ 3	3.3228+ 1	3.3110+ 1							1.1816- 1			0.0000+ 0	1.3573- 2
6.0000+ 3 ~ 8.0000+ 3	2.5428+ 1	2.5353+ 1							7.4248- 2			0.0000+ 0	1.3921- 2
8.0000+ 3 ~ 1.0000+ 4	1.6905+ 1	1.6869+ 1							3.5756- 2			0.0000+ 0	1.4162- 2
1.0000+ 4 ~ 1.5000+ 4	4.5024+ 0	4.4951+ 0							7.3470- 3			0.0000+ 0	1.4782- 2
1.5000+ 4 ~ 2.0000+ 4	2.7740+ 0	2.7679+ 0							6.6982- 3			0.0000+ 0	1.5828- 2
2.0000+ 4 ~ 3.0000+ 4	3.1761+ 0	3.1582+ 0							1.7891- 2			0.0000+ 0	1.7590- 2
3.0000+ 4 ~ 4.0000+ 4	2.6483+ 0	2.6383+ 0							9.9970- 3			0.0000+ 0	2.0212- 2
4.0000+ 4 ~ 5.0000+ 4	3.4478+ 0	3.4369+ 0							1.0921- 2			0.0000+ 0	2.2930- 2
5.0000+ 4 ~ 6.0000+ 4	1.0754+ 1	1.0745+ 1							9.5130- 3			0.0000+ 0	2.5755- 2
6.0000+ 4 ~ 8.0000+ 4	2.6890+ 0	2.6843+ 0							4.6649- 3			0.0000+ 0	3.0100- 2
8.0000+ 4 ~ 1.0000+ 5	7.0782+ 0	7.0706+ 0							7.6659- 3			0.0000+ 0	3.5944- 2
1.0000+ 5 ~ 1.5000+ 5	8.4181+ 0	8.4115+ 0							6.5871- 3			0.0000+ 0	4.6311- 2
1.5000+ 5 ~ 2.0000+ 5	6.3012+ 0	6.2957+ 0							5.4694- 3			0.0000+ 0	5.9459- 2
2.0000+ 5 ~ 3.0000+ 5	5.3290+ 0	5.3243+ 0							4.6977- 3	0.0000+ 0		0.0000+ 0	7.6255- 2
3.0000+ 5 ~ 4.0000+ 5	4.5819+ 0	4.5777+ 0							4.2139- 3	0.0000+ 0		0.0000+ 0	9.3520- 2
4.0000+ 5 ~ 5.0000+ 5	4.1551+ 0	4.1510+ 0							4.1012- 3	0.0000+ 0		0.0000+ 0	1.0577- 1
5.0000+ 5 ~ 6.0000+ 5	3.9026+ 0	3.8973+ 0	1.1152- 3						4.1916- 3	0.0000+ 0		0.0000+ 0	1.1470- 1
6.0000+ 5 ~ 8.0000+ 5	3.7221+ 0	3.7052+ 0	1.2398- 2						4.4172- 3	0.0000+ 0		0.0000+ 0	1.2569- 1
8.0000+ 5 ~ 1.0000+ 6	3.6494+ 0	3.6054+ 0	3.9370- 2						4.6248- 3	0.0000+ 0		0.0000+ 0	1.4167- 1
1.0000+ 6 ~ 1.5000+ 6	3.7058+ 0	3.6049+ 0	9.5571- 2						5.2805- 3	0.0000+ 0		0.0000+ 0	1.8513- 1
1.5000+ 6 ~ 2.0000+ 6	3.7983+ 0	3.2857+ 0	5.0889- 1						3.6511- 3	0.0000+ 0		0.0000+ 0	2.8151- 1
2.0000+ 6 ~ 3.0000+ 6	3.8610+ 0	3.1164+ 0	7.4208- 1						2.5757- 3	0.0000+ 0		0.0000+ 0	4.0892- 1
3.0000+ 6 ~ 4.0000+ 6	3.8643+ 0	2.8242+ 0	1.0383+ 0						1.6444- 3	5.4375- 5		3.0450- 5	5.5406- 1
4.0000+ 6 ~ 5.0000+ 6	3.8238+ 0	2.5914+ 0	1.2298+ 0						1.2587- 3	4.4587- 4		2.5339- 4	6.5289- 1
5.0000+ 6 ~ 6.0000+ 6	3.7449+ 0	2.4114+ 0	1.3282+ 0						1.0703- 3	2.1339- 3		1.3145- 3	7.1560- 1
6.0000+ 6 ~ 8.0000+ 6	3.5442+ 0	2.1564+ 0	1.3693+ 0						8.4844- 4	1.0634- 2		6.5501- 3	7.6683- 1
8.0000+ 6 ~ 1.0000+ 7	3.2139+ 0	1.8269+ 0	1.3031+ 0	1.8825- 2				6.4321- 6	5.9805- 4	4.0240- 2		2.4208- 2	7.8758- 1
1.0000+ 7 ~ 1.5000+ 7	2.7236+ 0	1.3969+ 0	9.7664- 1	1.9031- 1				3.1579- 3	2.8169- 4	9.7732- 2		5.9448- 2	7.5369- 1

TABLE A1.9

Cr-50

MATERIAL :1241 CROSS SECTION CR-50

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	5.3584+ 1	4.3934+ 0							4.9187+ 1			0.0000+ 0	1.3463- 2
1.0000- 2 ~ 1.5000- 2	2.7185+ 1	4.3934+ 0							2.2786+ 1			0.0000+ 0	1.3463- 2
1.5000- 2 ~ 2.0000- 2	2.3638+ 1	4.3934+ 0							1.9254+ 1			0.0000+ 0	1.3463- 2
2.0000- 2 ~ 3.0000- 2	2.0499+ 1	4.3935+ 0							1.6108+ 1			0.0000+ 0	1.3463- 2
3.0000- 2 ~ 4.0000- 2	1.8007+ 1	4.3935+ 0							1.3615+ 1			0.0000+ 0	1.3463- 2
4.0000- 2 ~ 5.0000- 2	1.6368+ 1	4.3935+ 0							1.1973+ 1			0.0000+ 0	1.3463- 2
5.0000- 2 ~ 6.0000- 2	1.5207+ 1	4.3935+ 0							1.0813+ 1			0.0000+ 0	1.3463- 2
6.0000- 2 ~ 8.0000- 2	1.4020+ 1	4.3936+ 0							9.6273+ 0			0.0000+ 0	1.3463- 2
8.0000- 2 ~ 1.0000- 1	1.2856+ 1	4.3936+ 0							8.4622+ 0			0.0000+ 0	1.3463- 2
1.0000- 1 ~ 1.5000- 1	1.1598+ 1	4.3937+ 0							7.1978+ 0			0.0000+ 0	1.3463- 2
1.5000- 1 ~ 2.0000- 1	1.0472+ 1	4.3938+ 0							6.0743+ 0			0.0000+ 0	1.3463- 2
2.0000- 1 ~ 3.0000- 1	9.4876+ 0	4.3940+ 0							5.0901+ 0			0.0000+ 0	1.3463- 2
3.0000- 1 ~ 4.0000- 1	8.6924+ 0	4.3942+ 0							4.2953+ 0			0.0000+ 0	1.3463- 2
4.0000- 1 ~ 5.0000- 1	8.1770+ 0	4.3945+ 0							3.7821+ 0			0.0000+ 0	1.3463- 2
5.0000- 1 ~ 6.0000- 1	7.8159+ 0	4.3947+ 0							3.4168+ 0			0.0000+ 0	1.3463- 2
6.0000- 1 ~ 8.0000- 1	7.4316+ 0	4.3951+ 0							3.0323+ 0			0.0000+ 0	1.3463- 2
8.0000- 1 ~ 1.0000+ 0	7.0674+ 0	4.3956+ 0							2.6705+ 0			0.0000+ 0	1.3463- 2
1.0000+ 0 ~ 1.5000+ 0	6.6737+ 0	4.3964+ 0							2.2736+ 0			0.0000+ 0	1.3463- 2
1.5000+ 0 ~ 2.0000+ 0	6.3184+ 0	4.3976+ 0							1.9166+ 0			0.0000+ 0	1.3463- 2
2.0000+ 0 ~ 3.0000+ 0	6.0106+ 0	4.3994+ 0							1.6089+ 0			0.0000+ 0	1.3463- 2
3.0000+ 0 ~ 4.0000+ 0	5.7603+ 0	4.4019+ 0							1.3577+ 0			0.0000+ 0	1.3463- 2
4.0000+ 0 ~ 5.0000+ 0	5.5623+ 0	4.4043+ 0							1.1961+ 0			0.0000+ 0	1.3463- 2
5.0000+ 0 ~ 6.0000+ 0	5.4899+ 0	4.4067+ 0							1.0827+ 0			0.0000+ 0	1.3463- 2
6.0000+ 0 ~ 8.0000+ 0	5.3721+ 0	4.4104+ 0							9.6161- 1			0.0000+ 0	1.3463- 2
8.0000+ 0 ~ 1.0000+ 1	5.2642+ 0	4.4153+ 0							8.4924- 1			0.0000+ 0	1.3463- 2
1.0000+ 1 ~ 1.5000+ 1	5.1461+ 0	4.4238+ 0							7.2233- 1			0.0000+ 0	1.3463- 2
1.5000+ 1 ~ 2.0000+ 1	5.0469+ 0	4.4381+ 0							6.1091- 1			0.0000+ 0	1.3463- 2
2.0000+ 1 ~ 3.0000+ 1	4.9667+ 0	4.4545+ 0							5.1216- 1			0.0000+ 0	1.3463- 2
3.0000+ 1 ~ 4.0000+ 1	4.9126+ 0	4.4792+ 0							4.3352- 1			0.0000+ 0	1.3463- 2
4.0000+ 1 ~ 5.0000+ 1	4.8862+ 0	4.5040+ 0							3.8217- 1			0.0000+ 0	1.3463- 2
5.0000+ 1 ~ 6.0000+ 1	4.8749+ 0	4.5291+ 0							3.4584- 1			0.0000+ 0	1.3463- 2
6.0000+ 1 ~ 8.0000+ 1	4.8756+ 0	4.5669+ 0							3.0875- 1			0.0000+ 0	1.3463- 2
8.0000+ 1 ~ 1.0000+ 2	4.8905+ 0	4.6179+ 0							2.7260- 1			0.0000+ 0	1.3463- 2
1.0000+ 2 ~ 1.5000+ 2	4.9427+ 0	4.7088+ 0							2.3390- 1			0.0000+ 0	1.3466- 2
1.5000+ 2 ~ 2.0000+ 2	5.0417+ 0	4.8421+ 0							1.9949- 1			0.0000+ 0	1.3469- 2
2.0000+ 2 ~ 3.0000+ 2	5.2207+ 0	5.0508+ 0							1.6990- 1			0.0000+ 0	1.3473- 2
3.0000+ 2 ~ 4.0000+ 2	5.4911+ 0	5.3445+ 0							1.4659- 1			0.0000+ 0	1.3476- 2
4.0000+ 2 ~ 5.0000+ 2	5.7891+ 0	5.6572+ 0							1.3195- 1			0.0000+ 0	1.3479- 2
5.0000+ 2 ~ 6.0000+ 2	6.1127+ 0	5.9906+ 0							1.2196- 1			0.0000+ 0	1.3484- 2
6.0000+ 2 ~ 8.0000+ 2	6.6519+ 0	6.5993+ 0							1.1239- 1			0.0000+ 0	1.3494- 2
8.0000+ 2 ~ 1.0000+ 3	7.4635+ 0	7.3590+ 0							1.0442- 1			0.0000+ 0	1.3504- 2
1.0000+ 3 ~ 1.5000+ 3	9.2498+ 0	9.1513+ 0							9.8469- 2			0.0000+ 0	1.3566- 2
1.5000+ 3 ~ 2.0000+ 3	1.2728+ 1	1.2627+ 1							9.8375- 2			0.0000+ 0	1.3657- 2
2.0000+ 3 ~ 3.0000+ 3	2.2138+ 1	2.2022+ 1							1.1473- 1			0.0000+ 0	1.3751- 2
3.0000+ 3 ~ 4.0000+ 3	5.3025+ 1	5.2844+ 1							1.8087- 1			0.0000+ 0	1.3842- 2
4.0000+ 3 ~ 5.0000+ 3	1.6783+ 2	1.6742+ 2							4.1259- 1			0.0000+ 0	1.3909- 2
5.0000+ 3 ~ 6.0000+ 3	4.1967+ 2	4.1883+ 2							8.3672- 1			0.0000+ 0	1.4047- 2
6.0000+ 3 ~ 8.0000+ 3	1.7126+ 2	1.7098+ 2							2.7847- 1			0.0000+ 0	1.4323- 2
8.0000+ 3 ~ 1.0000+ 4	3.9502+ 1	3.9435+ 1							6.6867- 2			0.0000+ 0	1.4616- 2
1.0000+ 4 ~ 1.5000+ 4	1.3406+ 1	1.3386+ 1							1.9852- 2			0.0000+ 0	1.5262- 2
1.5000+ 4 ~ 2.0000+ 4	5.2910+ 0	5.2333+ 0							5.7681- 2			0.0000+ 0	1.6295- 2
2.0000+ 4 ~ 3.0000+ 4	6.8583+ 0	6.8358+ 0							2.2461- 2			0.0000+ 0	1.8051- 2
3.0000+ 4 ~ 4.0000+ 4	2.0039+ 1	1.9985+ 1							5.4047- 2			0.0000+ 0	2.0684- 2
4.0000+ 4 ~ 5.0000+ 4	1.0711+ 1	1.0686+ 1							2.4855- 2			0.0000+ 0	2.3434- 2
5.0000+ 4 ~ 6.0000+ 4	6.9801+ 0	6.9545+ 0							2.5507- 2			0.0000+ 0	2.6310- 2
6.0000+ 4 ~ 8.0000+ 4	4.7915+ 0	4.7709+ 0							2.0562- 2			0.0000+ 0	3.0764 2
8.0000+ 4 ~ 1.0000+ 5	8.3740+ 0	8.3547+ 0							1.9321- 2			0.0000+ 0	3.6800- 2
1.0000+ 5 ~ 1.5000+ 5	7.0886+ 0	7.0719+ 0							1.6757- 2			0.0000+ 0	4.7642- 2
1.5000+ 5 ~ 2.0000+ 5	5.9461+ 0	5.9320+ 0							1.4138- 2			0.0000+ 0	6.1542- 2
2.0000+ 5 ~ 3.0000+ 5	4.9954+ 0	4.9833+ 0							1.2034- 2	0.0000+ 0		0.0000+ 0	7.9642- 2
3.0000+ 5 ~ 4.0000+ 5	4.2886+ 0	4.2781+ 0							1.0516- 2	0.0000+ 0		0.0000+ 0	9.8699- 2
4.0000+ 5 ~ 5.0000+ 5	3.9019+ 0	3.8921+ 0							9.7660- 3	0.0000+ 0		0.0000+ 0	1.1251- 1
5.0000+ 5 ~ 6.0000+ 5	3.6074+ 0	3.6778+ 0							9.6329- 3	0.0000+ 0		0.0000+ 0	1.2264- 1
6.0000+ 5 ~ 8.0000+ 5	3.5514+ 0	3.5410+ 0	4.1810- 4						9.9544- 3	0.0000+ 0		0.0000+ 0	1.3426- 1
8.0000+ 5 ~ 1.0000+ 6	3.5289+ 0	3.1597+ 0	3.6255- 1						5.8303- 3	0.0000+ 0		0.0000+ 0	1.6545- 1
1.0000+ 6 ~ 1.5000+ 6	3.6586+ 0	3.0579+ 0	5.9730- 1						4.3693- 3	0.0000+ 0		0.0000+ 0	2.2430- 1
1.5000+ 6 ~ 2.0000+ 6	3.8230+ 0	3.0638+ 0	7.5490- 1						4.4391- 3	0.0000+ 0		0.0000+ 0	3.0947- 1
2.0000+ 6 ~ 3.0000+ 6	3.9110+ 0	3.0584+ 0	8.4860- 1						4.0290- 3	0.0000+ 0		0.0000+ 0	4.2865- 1
3.0000+ 6 ~ 4.0000+ 6	3.8821+ 0	2.8949+ 0	9.8111- 1						4.1086- 3	1.2500- 3		7.0000- 4	5.5226- 1
4.0000+ 6 ~ 5.0000+ 6	3.7845+ 0	2.5999+ 0	1.1637+ 0						2.8422- 3	1.0250- 2		5.8250- 3	6.5102- 1
5.0000+ 6 ~ 6.0000+ 6	3.6599+ 0	2.3639+ 0	1.2641+ 0						2.2100- 3	1.6250- 2		1.0275- 2	7.1452- 1
6.0000+ 6 ~ 8.0000+ 6	3.4241+ 0	2.0732+ 0	1.2779+ 0						1.6926- 3	4.5250- 2		2.5625- 2	7.6090- 1
8.0000+ 6 ~ 1.0000+ 7	3.0863+ 0	1.7315+ 0	1.0633+ 0					1.4787- 4	1.0552- 3	1.8538- 1		1.0588- 1	7.7696- 1
1.0000+ 7 ~ 1.5000+ 7	2.6348+ 0	1.3235+ 0	7.6764- 1	6.6133- 3				7.2595- 2	4.2910- 4	2.9570- 1		1.6815- 1	7.4277- 1

TABLE A1.10

Cr-52

MATERIAL :1242 CROSS SECTION CR-52

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	4.4169+ 0	2.0727+ 0							2.3414+ 0				1.2946- 2
1.0000- 2 ~ 1.5000- 2	3.1588+ 0	2.0727+ 0							1.0870+ 0				1.2946- 2
1.5000- 2 ~ 2.0000- 2	2.9867+ 0	2.0727+ 0							9.1420- 1				1.2946- 2
2.0000- 2 ~ 3.0000- 2	2.8421+ 0	2.0727+ 0							7.6835- 1				1.2946- 2
3.0000- 2 ~ 4.0000- 2	2.7208+ 0	2.0727+ 0							6.4643- 1				1.2946- 2
4.0000- 2 ~ 5.0000- 2	2.6438+ 0	2.0727+ 0							5.7145- 1				1.2946- 2
5.0000- 2 ~ 6.0000- 2	2.5915+ 0	2.0727+ 0							5.1556- 1				1.2946- 2
6.0000- 2 ~ 8.0000- 2	2.5307+ 0	2.0727+ 0							4.5710- 1				1.2946- 2
8.0000- 2 ~ 1.0000- 1	2.4757+ 0	2.0727+ 0							4.0407- 1				1.2946- 2
1.0000- 1 ~ 1.5000- 1	2.4183+ 0	2.0727+ 0							3.4299- 1				1.2946- 2
1.5000- 1 ~ 2.0000- 1	2.3620+ 0	2.0727+ 0							2.8993- 1				1.2946- 2
2.0000- 1 ~ 3.0000- 1	2.3157+ 0	2.0727+ 0							2.4257- 1				1.2946- 2
3.0000- 1 ~ 4.0000- 1	2.2794+ 0	2.0727+ 0							2.0501- 1				1.2946- 2
4.0000- 1 ~ 5.0000- 1	2.2541+ 0	2.0727+ 0							1.8025- 1				1.2946- 2
5.0000- 1 ~ 6.0000- 1	2.2364+ 0	2.0727+ 0							1.6279- 1				1.2946- 2
6.0000- 1 ~ 8.0000- 1	2.2182+ 0	2.0727+ 0							1.4497- 1				1.2946- 2
8.0000- 1 ~ 1.0000+ 0	2.2013+ 0	2.0727+ 0							1.2745- 1				1.2946- 2
1.0000+ 0 ~ 1.5000+ 0	2.1817+ 0	2.0727+ 0							1.0865- 1				1.2946- 2
1.5000+ 0 ~ 2.0000+ 0	2.1644+ 0	2.0727+ 0							9.1486- 2				1.2946- 2
2.0000+ 0 ~ 3.0000+ 0	2.1499+ 0	2.0727+ 0							7.6837- 2				1.2946- 2
3.0000+ 0 ~ 4.0000+ 0	2.1375+ 0	2.0727+ 0							6.4691- 2				1.2946- 2
4.0000+ 0 ~ 5.0000+ 0	2.1302+ 0	2.0727+ 0							5.6947- 2				1.2946- 2
5.0000+ 0 ~ 6.0000+ 0	2.1244+ 0	2.0727+ 0							5.1718- 2				1.2946- 2
6.0000+ 0 ~ 8.0000+ 0	2.1184+ 0	2.0726+ 0							4.5744- 2				1.2946- 2
8.0000+ 0 ~ 1.0000+ 1	2.1129+ 0	2.0726+ 0							4.0251- 2				1.2946- 2
1.0000+ 1 ~ 1.5000+ 1	2.1069+ 0	2.0725+ 0							3.4340- 2				1.2946- 2
1.5000+ 1 ~ 2.0000+ 1	2.1014+ 0	2.0725+ 0							2.8906- 2				1.2946- 2
2.0000+ 1 ~ 3.0000+ 1	2.0966+ 0	2.0723+ 0							2.4311- 2				1.2946- 2
3.0000+ 1 ~ 4.0000+ 1	2.0926+ 0	2.0722+ 0							2.0441- 2				1.2946- 2
4.0000+ 1 ~ 5.0000+ 1	2.0900+ 0	2.0720+ 0							1.8082- 2				1.2946- 2
5.0000+ 1 ~ 6.0000+ 1	2.0882+ 0	2.0719+ 0							1.6301- 2				1.2946- 2
6.0000+ 1 ~ 8.0000+ 1	2.0861+ 0	2.0716+ 0							1.4455- 2				1.2946- 2
8.0000+ 1 ~ 1.0000+ 2	2.0840+ 0	2.0713+ 0							1.2776- 2				1.2946- 2
1.0000+ 2 ~ 1.5000+ 2	2.0816+ 0	2.0707+ 0							1.0852- 2				1.2949- 2
1.5000+ 2 ~ 2.0000+ 2	2.0791+ 0	2.0699+ 0							9.1740- 3				1.2952- 2
2.0000+ 2 ~ 3.0000+ 2	2.0764+ 0	2.0687+ 0							7.6775- 3				1.2956- 2
3.0000+ 2 ~ 4.0000+ 2	2.0735+ 0	2.0671+ 0							6.4917- 3				1.2960- 2
4.0000+ 2 ~ 5.0000+ 2	2.0712+ 0	2.0654+ 0							5.7107- 3				1.2962- 2
5.0000+ 2 ~ 6.0000+ 2	2.0690+ 0	2.0638+ 0							5.1608- 3				1.2968- 2
6.0000+ 2 ~ 8.0000+ 2	2.0659+ 0	2.0613+ 0							4.6022- 3				1.2978- 2
8.0000+ 2 ~ 1.0000+ 3	2.0621+ 0	2.0580+ 0							4.0578- 3				1.2989- 2
1.0000+ 3 ~ 1.5000+ 3	2.0559+ 0	2.0523+ 0							3.6038- 3				1.3054- 2
1.5000+ 3 ~ 2.0000+ 3	2.4650+ 0	2.0785+ 0							3.8651- 1				1.3148- 2
2.0000+ 3 ~ 3.0000+ 3	2.0337+ 0	2.0312+ 0							2.4667- 3				1.3246- 2
3.0000+ 3 ~ 4.0000+ 3	2.0160+ 0	2.0139+ 0							2.0657- 3				1.3339- 2
4.0000+ 3 ~ 5.0000+ 3	1.9980+ 0	1.9962+ 0							1.8234- 3				1.3409- 2
5.0000+ 3 ~ 6.0000+ 3	1.9797+ 0	1.9781+ 0							1.6508- 3				1.3550- 2
6.0000+ 3 ~ 8.0000+ 3	1.9513+ 0	1.9499+ 0							1.4717- 3				1.3834- 2
8.0000+ 3 ~ 1.0000+ 4	1.9119+ 0	1.9106+ 0							1.3048- 3				1.4133- 2
1.0000+ 4 ~ 1.5000+ 4	1.8374+ 0	1.8362+ 0							1.1193- 3				1.4791- 2
1.5000+ 4 ~ 2.0000+ 4	1.7164+ 0	1.7155+ 0							9.6299- 4				1.5835- 2
2.0000+ 4 ~ 3.0000+ 4	1.5799+ 0	1.5647+ 0							1.5149- 2				1.7596- 2
3.0000+ 4 ~ 4.0000+ 4	1.2311+ 0	1.2234+ 0							7.6546- 3				2.0215- 2
4.0000+ 4 ~ 5.0000+ 4	3.1029+ 0	3.0925+ 0							1.0348- 2				2.2931- 2
5.0000+ 4 ~ 6.0000+ 4	1.2256+ 1	1.2247+ 1							8.7840- 3				2.5754- 2
6.0000+ 4 ~ 8.0000+ 4	1.6423+ 0	1.6401+ 0							2.2238- 3				3.0097- 2
8.0000+ 4 ~ 1.0000+ 5	6.9044+ 0	6.8976+ 0							6.8027- 3				3.5939- 2
1.0000+ 5 ~ 1.5000+ 5	8.7702+ 0	8.7639+ 0							6.3453- 3				4.6305- 2
1.5000+ 5 ~ 2.0000+ 5	6.3889+ 0	6.3834+ 0							5.4397- 3				5.9452- 2
2.0000+ 5 ~ 3.0000+ 5	5.3628+ 0	5.3581+ 0							4.6789- 3				7.6251- 2
3.0000+ 5 ~ 4.0000+ 5	4.5856+ 0	4.5814+ 0							4.2184- 3				9.3519- 2
4.0000+ 5 ~ 5.0000+ 5	4.1499+ 0	4.1457+ 0							4.1307- 3				1.0577- 1
5.0000+ 5 ~ 6.0000+ 5	3.8982+ 0	3.8940+ 0							4.2421- 3				1.1468- 1
6.0000+ 5 ~ 8.0000+ 5	3.7185+ 0	3.7140+ 0							4.4916- 3				1.2529- 1
8.0000+ 5 ~ 1.0000+ 6	3.6474+ 0	3.6424+ 0							4.9568- 3				1.4023- 1
1.0000+ 6 ~ 1.5000+ 6	3.7064+ 0	3.6880+ 0	1.2254- 2						5.8801- 3			0.0000+ 0	1.8109- 1
1.5000+ 6 ~ 2.0000+ 6	3.8007+ 0	3.3468+ 0	4.4927- 1						4.0193- 3			0.0000+ 0	2.7751- 1
2.0000+ 6 ~ 3.0000+ 6	3.8636+ 0	3.1702+ 0	6.9059- 1						2.7836- 3			0.0000+ 0	4.0281- 1
3.0000+ 6 ~ 4.0000+ 6	3.8657+ 0	2.8511+ 0	1.0128+ 0						1.6831- 3	0.0000+ 0		0.0000+ 0	5.4988- 1
4.0000+ 6 ~ 5.0000+ 6	3.8233+ 0	2.6032+ 0	1.2178+ 0						1.3021- 3	0.0000+ 0		0.0000+ 0	6.5028- 1
5.0000+ 6 ~ 6.0000+ 6	3.7429+ 0	2.4168+ 0	1.3219+ 0						1.1201- 3	1.5000- 3		8.2000- 4	7.1381- 1
6.0000+ 6 ~ 8.0000+ 6	3.5417+ 0	2.1573+ 0	1.3680+ 0						8.9348- 4	9.7750- 3		5.2625- 3	7.6579- 1
8.0000+ 6 ~ 1.0000+ 7	3.2124+ 0	1.8254+ 0	1.3294+ 0						6.4034- 4	3.6750- 2		1.9838- 2	7.8703- 1
1.0000+ 7 ~ 1.5000+ 7	2.7210+ 0	1.3951+ 0	1.0710+ 0	1.0649- 1					3.1025- 4	9.6600- 2		5.2100- 2	7.5346- 1

TABLE A1.11

Cr-53

MATERIAL =1243 CROSS SECTION CR-53

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	6.5595+ 1	9.1674+ 0							5.6387+ 1			0.0000+ 0	1.2702- 2
1.0000- 2 ~ 1.5000- 2	3.5314+ 1	9.1674+ 0							2.6096+ 1			0.0000+ 0	1.2702- 2
1.5000- 2 ~ 2.0000- 2	3.1192+ 1	9.1675+ 0							2.2022+ 1			0.0000+ 0	1.2702- 2
2.0000- 2 ~ 3.0000- 2	2.7653+ 1	9.1675+ 0							1.8450+ 1			0.0000+ 0	1.2702- 2
3.0000- 2 ~ 4.0000- 2	2.4808+ 1	9.1675+ 0							1.5572+ 1			0.0000+ 0	1.2702- 2
4.0000- 2 ~ 5.0000- 2	2.2877+ 1	9.1676+ 0							1.3708+ 1			0.0000+ 0	1.2702- 2
5.0000- 2 ~ 6.0000- 2	2.1580+ 1	9.1677+ 0							1.2388+ 1			0.0000+ 0	1.2702- 2
6.0000- 2 ~ 8.0000- 2	2.0168+ 1	9.1677+ 0							1.0991+ 1			0.0000+ 0	1.2702- 2
8.0000- 2 ~ 1.0000- 1	1.8860+ 1	9.1678+ 0							9.6926+ 0			0.0000+ 0	1.2702- 2
1.0000- 1 ~ 1.5000- 1	1.7424+ 1	9.1679+ 0							8.2472+ 0			0.0000+ 0	1.2702- 2
1.5000- 1 ~ 2.0000- 1	1.6122+ 1	9.1683+ 0							6.9491+ 0			0.0000+ 0	1.2702- 2
2.0000- 1 ~ 3.0000- 1	1.5006+ 1	9.1686+ 0							5.8270+ 0			0.0000+ 0	1.2702- 2
3.0000- 1 ~ 4.0000- 1	1.4086+ 1	9.1691+ 0							4.9146+ 0			0.0000+ 0	1.2702- 2
4.0000- 1 ~ 5.0000- 1	1.3511+ 1	9.1696+ 0							4.3395+ 0			0.0000+ 0	1.2702- 2
5.0000- 1 ~ 6.0000- 1	1.3095+ 1	9.1701+ 0							3.9245+ 0			0.0000+ 0	1.2702- 2
6.0000- 1 ~ 8.0000- 1	1.2651+ 1	9.1708+ 0							3.4805+ 0			0.0000+ 0	1.2702- 2
8.0000- 1 ~ 1.0000+ 0	1.2249+ 1	9.1718+ 0							3.0776+ 0			0.0000+ 0	1.2702- 2
1.0000+ 0 ~ 1.5000+ 0	1.1787+ 1	9.1735+ 0							2.6129+ 0			0.0000+ 0	1.2702- 2
1.5000+ 0 ~ 2.0000+ 0	1.1385+ 1	9.1760+ 0							2.2087+ 0			0.0000+ 0	1.2702- 2
2.0000+ 0 ~ 3.0000+ 0	1.1028+ 1	9.1797+ 0							1.8402+ 0			0.0000+ 0	1.2702- 2
3.0000+ 0 ~ 4.0000+ 0	1.0747+ 1	9.1848+ 0							1.5624+ 0			0.0000+ 0	1.2702- 2
4.0000+ 0 ~ 5.0000+ 0	1.0564+ 1	9.1895+ 0							1.3741+ 0			0.0000+ 0	1.2702- 2
5.0000+ 0 ~ 6.0000+ 0	1.0436+ 1	9.1945+ 0							1.2413+ 0			0.0000+ 0	1.2702- 2
6.0000+ 0 ~ 8.0000+ 0	1.0308+ 1	9.2019+ 0							1.1057+ 0			0.0000+ 0	1.2702- 2
8.0000+ 0 ~ 1.0000+ 1	1.0184+ 1	9.2118+ 0							9.7243- 1			0.0000+ 0	1.2702- 2
1.0000+ 1 ~ 1.5000+ 1	1.0059+ 1	9.2292+ 0							8.2961- 1			0.0000+ 0	1.2702- 2
1.5000+ 1 ~ 2.0000+ 1	9.9540+ 0	9.2541+ 0							6.9998- 1			0.0000+ 0	1.2702- 2
2.0000+ 1 ~ 3.0000+ 1	9.8801+ 0	9.2916+ 0							5.8844- 1			0.0000+ 0	1.2702- 2
3.0000+ 1 ~ 4.0000+ 1	9.8992+ 0	9.3420+ 0							4.9711- 1			0.0000+ 0	1.2702- 2
4.0000+ 1 ~ 5.0000+ 1	9.8310+ 0	9.3927+ 0							4.3834- 1			0.0000+ 0	1.2702- 2
5.0000+ 1 ~ 6.0000+ 1	9.8428+ 0	9.4438+ 0							3.9900- 1			0.0000+ 0	1.2702- 2
6.0000+ 1 ~ 8.0000+ 1	9.8758+ 0	9.5211+ 0							3.5460- 1			0.0000+ 0	1.2702- 2
8.0000+ 1 ~ 1.0000+ 2	9.9390+ 0	9.6256+ 0							3.1348- 1			0.0000+ 0	1.2702- 2
1.0000+ 2 ~ 1.5000+ 2	1.0083+ 1	9.8127+ 0							2.6999- 1			0.0000+ 0	1.2704- 2
1.5000+ 2 ~ 2.0000+ 2	1.0318+ 1	1.0080+ 1							2.3011- 1			0.0000+ 0	1.2708- 2
2.0000+ 2 ~ 3.0000+ 2	1.0720+ 1	1.0522+ 1							1.9732- 1			0.0000+ 0	1.2712- 2
3.0000+ 2 ~ 4.0000+ 2	1.1308+ 1	1.1138+ 1							1.7064- 1			0.0000+ 0	1.2716- 2
4.0000+ 2 ~ 5.0000+ 2	1.1965+ 1	1.1810+ 1							1.5527- 1			0.0000+ 0	1.2718- 2
5.0000+ 2 ~ 6.0000+ 2	1.2672+ 1	1.2527+ 1							1.4427- 1			0.0000+ 0	1.2724- 2
6.0000+ 2 ~ 8.0000+ 2	1.3864+ 1	1.3729+ 1							1.3414- 1			0.0000+ 0	1.2735- 2
8.0000+ 2 ~ 1.0000+ 3	1.5721+ 1	1.5595+ 1							1.2642- 1			0.0000+ 0	1.2746- 2
1.0000+ 3 ~ 1.5000+ 3	1.9939+ 1	1.9816+ 1							1.2302- 1			0.0000+ 0	1.2813- 2
1.5000+ 3 ~ 2.0000+ 3	2.0940+ 1	2.0809+ 1							1.3125- 1			0.0000+ 0	1.2909- 2
2.0000+ 3 ~ 3.0000+ 3	5.9079+ 1	5.8895+ 1							1.8336- 1			0.0000+ 0	1.3010- 2
3.0000+ 3 ~ 4.0000+ 3	1.7906+ 2	1.7885+ 2							4.1546- 1			0.0000+ 0	1.3107- 2
4.0000+ 3 ~ 5.0000+ 3	1.9147+ 2	1.9087+ 2							4.9764- 1			0.0000+ 0	1.3179- 2
5.0000+ 3 ~ 6.0000+ 3	1.9823+ 2	1.9839+ 2							8.4379- 1			0.0000+ 0	1.3323- 2
6.0000+ 3 ~ 8.0000+ 3	1.7168+ 2	1.7104+ 2							6.4085- 1			0.0000+ 0	1.3613- 2
8.0000+ 3 ~ 1.0000+ 4	1.4269+ 2	1.4236+ 2							3.3409- 1			0.0000+ 0	1.3919- 2
1.0000+ 4 ~ 1.5000+ 4	2.4783+ 1	2.4731+ 1							5.1319- 2			0.0000+ 0	1.4587- 2
1.5000+ 4 ~ 2.0000+ 4	1.1485+ 1	1.1452+ 1							3.2984- 2			0.0000+ 0	1.5646- 2
2.0000+ 4 ~ 3.0000+ 4	1.3511+ 1	1.3466+ 1							4.5275- 2			0.0000+ 0	1.7424- 2
3.0000+ 4 ~ 4.0000+ 4	7.2525+ 0	7.2385+ 0							1.4060- 2			0.0000+ 0	2.0059- 2
4.0000+ 4 ~ 5.0000+ 4	3.5779+ 0	3.5660+ 0							1.1929- 2			0.0000+ 0	2.2781- 2
5.0000+ 4 ~ 6.0000+ 4	1.5207+ 0	1.5119+ 0							8.8340- 3			0.0000+ 0	2.5602- 2
6.0000+ 4 ~ 8.0000+ 4	1.1288+ 1	1.1272+ 1							1.6906- 2			0.0000+ 0	2.9930- 2
8.0000+ 4 ~ 1.0000+ 5	9.6038+ 0	9.5929+ 0							1.0925- 2			0.0000+ 0	3.5734- 2
1.0000+ 5 ~ 1.5000+ 5	6.8400+ 0	6.8351+ 0							4.8871- 3			0.0000+ 0	4.5979- 2
1.5000+ 5 ~ 2.0000+ 5	6.5611+ 0	6.5584+ 0							2.6685- 3			0.0000+ 0	5.8920- 2
2.0000+ 5 ~ 3.0000+ 5	5.5167+ 0	5.5144+ 0							2.2365- 3			0.0000+ 0	7.5339- 2
3.0000+ 5 ~ 4.0000+ 5	4.7176+ 0	4.7156+ 0							1.9586- 3			0.0000+ 0	9.2079- 2
4.0000+ 5 ~ 5.0000+ 5	4.2638+ 0	4.2619+ 0							1.8699- 3			0.0000+ 0	1.0388- 1
5.0000+ 5 ~ 6.0000+ 5	3.9936+ 0	3.9799+ 0	1.1739- 2						1.8713- 3			0.0000+ 0	1.1280- 1
6.0000+ 5 ~ 8.0000+ 5	3.7958+ 0	3.6695+ 0	1.3032- 1						1.8635- 3			0.0000+ 0	1.2686- 1
8.0000+ 5 ~ 1.0000+ 6	3.6992+ 0	3.5126+ 0	1.8458- 1						1.9165- 3			0.0000+ 0	1.4446- 1
1.0000+ 6 ~ 1.5000+ 6	3.7166+ 0	3.2358+ 0	4.7774- 1						1.5205- 3			0.0000+ 0	2.0232- 1
1.5000+ 6 ~ 2.0000+ 6	3.7814+ 0	2.9190+ 0	8.6126- 1						7.5138- 4			0.0000+ 0	3.1096- 1
2.0000+ 6 ~ 3.0000+ 6	3.8318+ 0	2.7152+ 0	1.1161+ 0						5.6019- 4	0.0000+ 0		0.0000+ 0	4.6034- 1
3.0000+ 6 ~ 4.0000+ 6	3.8509+ 0	2.5731+ 0	1.2771+ 0						4.2232- 4	0.0000+ 0		0.0000+ 0	5.9727- 1
4.0000+ 6 ~ 5.0000+ 6	3.8398+ 0	2.4852+ 0	1.3540+ 0						3.3171- 4	0.0000+ 0		0.0000+ 0	6.7830- 1
5.0000+ 6 ~ 6.0000+ 6	3.7825+ 0	2.3795+ 0	1.3997+ 0						2.6809- 4	8.7500- 4		1.9000- 3	7.3107- 1
6.0000+ 6 ~ 8.0000+ 6	3.5953+ 0	2.1719+ 0	1.4072+ 0						1.9999- 4	5.0000- 3		1.0800- 2	7.7636- 1
8.0000+ 6 ~ 1.0000+ 7	3.2568+ 0	1.8631+ 0	1.1521+ 0	1.9814- 1					1.1758- 4	1.4562- 2		3.1375- 2	7.9431- 1
1.0000+ 7 ~ 1.5000+ 7	2.7686+ 0	1.4299+ 0	3.2388- 1	8.8605- 1					2.0356- 5	4.1350- 2		8.9250- 2	7.5814- 1

TABLE A1.12

Cr-54

MATERIAL :1244 CROSS SECTION MR 54

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	2.6114+ 0	1.4848+ 0							1.1253+ 0				1.2467- 2
1.0000- 2 ~ 1.5000- 2	2.0074+ 0	1.4848+ 0							5.2133- 1				1.2467- 2
1.5000- 2 ~ 2.0000- 2	1.9270+ 0	1.4848+ 0							4.4060- 1				1.2467- 2
2.0000- 2 ~ 3.0000- 2	1.8543+ 0	1.4848+ 0							3.6849- 1				1.2467- 2
3.0000- 2 ~ 4.0000- 2	1.7957+ 0	1.4848+ 0							3.1155- 1				1.2467- 2
4.0000- 2 ~ 5.0000- 2	1.7597+ 0	1.4848+ 0							2.7393- 1				1.2467- 2
5.0000- 2 ~ 6.0000- 2	1.7325+ 0	1.4848+ 0							2.4740- 1				1.2467- 2
6.0000- 2 ~ 8.0000- 2	1.7056+ 0	1.4848+ 0							2.2030- 1				1.2467- 2
8.0000- 2 ~ 1.0000- 1	1.6801+ 0	1.4848+ 0							1.9369- 1				1.2467- 2
1.0000- 1 ~ 1.5000- 1	1.6503+ 0	1.4848+ 0							1.6512- 1				1.2467- 2
1.5000- 1 ~ 2.0000- 1	1.6241+ 0	1.4848+ 0							1.3902- 1				1.2467- 2
2.0000- 1 ~ 3.0000- 1	1.6020+ 0	1.4848+ 0							1.1678- 1				1.2467- 2
3.0000- 1 ~ 4.0000- 1	1.5833+ 0	1.4848+ 0							9.8297- 2				1.2467- 2
4.0000- 1 ~ 5.0000- 1	1.5714+ 0	1.4848+ 0							8.6558- 2				1.2467- 2
5.0000- 1 ~ 6.0000- 1	1.5635+ 0	1.4848+ 0							7.8598- 2				1.2467- 2
6.0000- 1 ~ 8.0000- 1	1.5564+ 0	1.4848+ 0							6.9507- 2				1.2467- 2
8.0000- 1 ~ 1.0000+ 0	1.5472+ 0	1.4848+ 0							6.1167- 2				1.2467- 2
1.0000+ 0 ~ 1.5000+ 0	1.5370+ 0	1.4848+ 0							5.2175- 2				1.2467- 2
1.5000+ 0 ~ 2.0000+ 0	1.5288+ 0	1.4848+ 0							4.3929- 2				1.2467- 2
2.0000+ 0 ~ 3.0000+ 0	1.5217+ 0	1.4848+ 0							3.6942- 2				1.2467- 2
3.0000+ 0 ~ 4.0000+ 0	1.5159+ 0	1.4848+ 0							3.1063- 2				1.2467- 2
4.0000+ 0 ~ 5.0000+ 0	1.5126+ 0	1.4847+ 0							2.7471- 2				1.2467- 2
5.0000+ 0 ~ 6.0000+ 0	1.5096+ 0	1.4847+ 0							2.4773- 2				1.2467- 2
6.0000+ 0 ~ 8.0000+ 0	1.5067+ 0	1.4847+ 0							2.1965- 2				1.2467- 2
8.0000+ 0 ~ 1.0000+ 1	1.5040+ 0	1.4847+ 0							1.9418- 2				1.2467- 2
1.0000+ 1 ~ 1.5000+ 1	1.5011+ 0	1.4846+ 0							1.6487- 2				1.2467- 2
1.5000+ 1 ~ 2.0000+ 1	1.4984+ 0	1.4845+ 0							1.3935- 2				1.2467- 2
2.0000+ 1 ~ 3.0000+ 1	1.4960+ 0	1.4844+ 0							1.1658- 2				1.2467- 2
3.0000+ 1 ~ 4.0000+ 1	1.4940+ 0	1.4842+ 0							9.8534- 3				1.2467- 2
4.0000+ 1 ~ 5.0000+ 1	1.4927+ 0	1.4840+ 0							8.6633- 3				1.2467- 2
5.0000+ 1 ~ 6.0000+ 1	1.4917+ 0	1.4838+ 0							7.8242- 3				1.2467- 2
6.0000+ 1 ~ 8.0000+ 1	1.4905+ 0	1.4836+ 0							6.9678- 3				1.2467- 2
8.0000+ 1 ~ 1.0000+ 2	1.4893+ 0	1.4832+ 0							6.1249- 3				1.2467- 2
1.0000+ 2 ~ 1.5000+ 2	1.4878+ 0	1.4826+ 0							5.2223- 3				1.2469- 2
1.5000+ 2 ~ 2.0000+ 2	1.4861+ 0	1.4817+ 0							4.3990- 3				1.2473- 2
2.0000+ 2 ~ 3.0000+ 2	1.4840+ 0	1.4803+ 0							3.6935- 3				1.2477- 2
3.0000+ 2 ~ 4.0000+ 2	1.4816+ 0	1.4785+ 0							3.1115- 3				1.2481- 2
4.0000+ 2 ~ 5.0000+ 2	1.4794+ 0	1.4767+ 0							2.7383- 3				1.2484- 2
5.0000+ 2 ~ 6.0000+ 2	1.4773+ 0	1.4748+ 0							2.4874- 3				1.2490- 2
6.0000+ 2 ~ 8.0000+ 2	1.4743+ 0	1.4721+ 0							2.2015- 3				1.2501- 2
8.0000+ 2 ~ 1.0000+ 3	1.4703+ 0	1.4683+ 0							1.9373- 3				1.2513- 2
1.0000+ 3 ~ 1.5000+ 3	1.4633+ 0	1.4616+ 0							1.6542- 3				1.2581- 2
1.5000+ 3 ~ 2.0000+ 3	1.4532+ 0	1.4518+ 0							1.3935- 3				1.2680- 2
2.0000+ 3 ~ 3.0000+ 3	1.4375+ 0	1.4363+ 0							1.1737- 3				1.2783- 2
3.0000+ 3 ~ 4.0000+ 3	1.4155+ 0	1.4145+ 0							9.8923- 4				1.2882- 2
4.0000+ 3 ~ 5.0000+ 3	1.3918+ 0	1.3907+ 0							8.7751- 4				1.2955- 2
5.0000+ 3 ~ 6.0000+ 3	1.3680+ 0	1.3652+ 0							7.9353- 4				1.3102- 2
6.0000+ 3 ~ 8.0000+ 3	1.3290+ 0	1.3223+ 0							7.0816- 4				1.3397- 2
8.0000+ 3 ~ 1.0000+ 4	1.2557+ 0	1.2551+ 0							6.4123- 4				1.3709- 2
1.0000+ 4 ~ 1.5000+ 4	1.1207+ 0	1.0917+ 0							2.8983- 2				1.4387- 2
1.5000+ 4 ~ 2.0000+ 4	6.0196- 1	5.9027- 1							1.1692- 2				1.5458- 2
2.0000+ 4 ~ 3.0000+ 4	1.1465+ 1	1.1461+ 1							3.7125- 3				1.7251- 2
3.0000+ 4 ~ 4.0000+ 4	2.3316+ 0	2.3313+ 0							3.3245- 4				1.9897- 2
4.0000+ 4 ~ 5.0000+ 4	1.8712+ 0	1.8709+ 0							2.8143- 4				2.2624- 2
5.0000+ 4 ~ 6.0000+ 4	1.6674+ 0	1.6587+ 0							8.7477- 3				2.5443- 2
6.0000+ 4 ~ 8.0000+ 4	1.3939+ 0	1.3891+ 0							4.7813- 3				2.9756- 2
8.0000+ 4 ~ 1.0000+ 5	9.2214- 1	9.1864- 1							3.4969- 3				3.5525- 2
1.0000+ 5 ~ 1.5000+ 5	4.6992+ 0	4.6979+ 0							1.3390- 3				4.5658- 2
1.5000+ 5 ~ 2.0000+ 5	2.7863+ 0	2.7845+ 0							1.8100- 3				5.8412- 2
2.0000+ 5 ~ 3.0000+ 5	3.9822+ 0	3.9805+ 0							1.7477- 3				7.4493- 2
3.0000+ 5 ~ 4.0000+ 5	4.4432+ 0	4.4417+ 0							1.5130- 3				9.0766- 2
4.0000+ 5 ~ 5.0000+ 5	4.3693+ 0	4.3677+ 0							1.5852- 3				1.0217- 1
5.0000+ 5 ~ 6.0000+ 5	4.0881+ 0	4.0864+ 0							1.7089- 3				1.1046- 1
6.0000+ 5 ~ 8.0000+ 5	3.8673+ 0	3.8655+ 0							1.8465- 3				1.2058- 1
8.0000+ 5 ~ 1.0000+ 6	3.7443+ 0	3.4849+ 0	2.5697- 1						1.3547- 3				1.4532- 1
1.0000+ 6 ~ 1.5000+ 6	3.7297+ 0	3.1373+ 0	5.9048- 1						6.9619- 4				2.0889- 1
1.5000+ 6 ~ 2.0000+ 6	3.7556+ 0	3.0012+ 0	7.5365- 1						6.9110- 4				2.9605- 1
2.0000+ 6 ~ 3.0000+ 6	3.7959+ 0	2.9270+ 0	8.6825- 1						6.1745- 4				4.1819- 1
3.0000+ 6 ~ 4.0000+ 6	3.8387+ 0	2.7520+ 0	1.0860+ 0						6.4769- 4				5.5323- 1
4.0000+ 6 ~ 5.0000+ 6	3.8573+ 0	2.5815+ 0	1.2747+ 0						5.2683- 4				6.5220- 1
5.0000+ 6 ~ 6.0000+ 6	3.8222+ 0	2.4375+ 0	1.3837+ 0						4.3287- 4				7.1967- 1
6.0000+ 6 ~ 8.0000+ 6	3.6474+ 0	2.2166+ 0	1.4302+ 0						3.0332- 4				7.7565- 1
8.0000+ 6 ~ 1.0000+ 7	3.3270+ 0	1.9080+ 0	1.4185+ 0	8.0549- 5					1.8355- 4				7.9734- 1
1.0000+ 7 ~ 1.5000+ 7	2.8056+ 0	1.4646+ 0	6.4044- 1	7.0408- 1					4.5733- 5				7.8220- 1

TABLE A1.13

Mn-55

MATERIAL :1251 CROSS SECTION MN-55

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	****	****							****				****
1.0000- 2 ~ 1.5000- 2													
1.5000- 2 ~ 2.0000- 2													
2.0000- 2 ~ 3.0000- 2													
3.0000- 2 ~ 4.0000- 2													
4.0000- 2 ~ 5.0000- 2													
5.0000- 2 ~ 6.0000- 2													
6.0000- 2 ~ 8.0000- 2													
8.0000- 2 ~ 1.0000- 1													
1.0000- 1 ~ 1.5000- 1													
1.5000- 1 ~ 2.0000- 1													
2.0000- 1 ~ 3.0000- 1													
3.0000- 1 ~ 4.0000- 1													
4.0000- 1 ~ 5.0000- 1													
5.0000- 1 ~ 6.0000- 1													
6.0000- 1 ~ 8.0000- 1													
8.0000- 1 ~ 1.0000+ 0													
1.0000+ 0 ~ 1.5000+ 0													
1.5000+ 0 ~ 2.0000+ 0													
2.0000+ 0 ~ 3.0000+ 0													
3.0000+ 0 ~ 4.0000+ 0													
4.0000+ 0 ~ 5.0000+ 0													
5.0000+ 0 ~ 6.0000+ 0													
6.0000+ 0 ~ 8.0000+ 0													
8.0000+ 0 ~ 1.0000+ 1													
1.0000+ 1 ~ 1.5000+ 1													
1.5000+ 1 ~ 2.0000+ 1													
2.0000+ 1 ~ 3.0000+ 1													
3.0000+ 1 ~ 4.0000+ 1													
4.0000+ 1 ~ 5.0000+ 1													
5.0000+ 1 ~ 6.0000+ 1													
6.0000+ 1 ~ 8.0000+ 1													
8.0000+ 1 ~ 1.0000+ 2													
1.0000+ 2 ~ 1.5000+ 2													
1.5000+ 2 ~ 2.0000+ 2													
2.0000+ 2 ~ 3.0000+ 2													
3.0000+ 2 ~ 4.0000+ 2													
4.0000+ 2 ~ 5.0000+ 2													
5.0000+ 2 ~ 6.0000+ 2													
6.0000+ 2 ~ 8.0000+ 2													
8.0000+ 2 ~ 1.0000+ 3													
1.0000+ 3 ~ 1.5000+ 3													
1.5000+ 3 ~ 2.0000+ 3													
2.0000+ 3 ~ 3.0000+ 3													
3.0000+ 3 ~ 4.0000+ 3													
4.0000+ 3 ~ 5.0000+ 3													
5.0000+ 3 ~ 6.0000+ 3													
6.0000+ 3 ~ 8.0000+ 3													
8.0000+ 3 ~ 1.0000+ 4													
1.0000+ 4 ~ 1.5000+ 4													
1.5000+ 4 ~ 2.0000+ 4													
2.0000+ 4 ~ 3.0000+ 4													
3.0000+ 4 ~ 4.0000+ 4													
4.0000+ 4 ~ 5.0000+ 4													
5.0000+ 4 ~ 6.0000+ 4													
6.0000+ 4 ~ 8.0000+ 4													
8.0000+ 4 ~ 1.0000+ 5	****	****							****				
1.0000+ 5 ~ 1.5000+ 5	7.5647+ 0	7.4495+ 0	****						1.4714- 2				
1.5000+ 5 ~ 2.0000+ 5	5.5629+ 0	5.1930+ 0							1.0298- 2				
2.0000+ 5 ~ 3.0000+ 5	4.2857+ 0	3.8363+ 0							7.5690- 3				
3.0000+ 5 ~ 4.0000+ 5	3.5441+ 0	3.0395+ 0							6.0792- 3				
4.0000+ 5 ~ 5.0000+ 5	3.8779+ 0	3.3326+ 0							4.9314- 3				
5.0000+ 5 ~ 6.0000+ 5	3.1573+ 0	2.5778+ 0							4.0890- 3				
6.0000+ 5 ~ 8.0000+ 5	3.2393+ 0	2.6168+ 0							3.7240- 3			****	
8.0000+ 5 ~ 1.0000+ 6	3.2133+ 0	2.5471+ 0							3.7027- 3				
1.0000+ 6 ~ 1.5000+ 6	3.3969+ 0	2.5997+ 0							3.0401- 3				
1.5000+ 6 ~ 2.0000+ 6	3.4924+ 0	2.5339+ 0							2.4620- 3	****			
2.0000+ 6 ~ 3.0000+ 6	3.6265+ 0	2.4061+ 0							2.0463- 3				
3.0000+ 6 ~ 4.0000+ 6	3.7203+ 0	2.1938+ 0							1.4395- 3				
4.0000+ 6 ~ 5.0000+ 6	3.7109+ 0	2.0669+ 0							1.0833- 3				
5.0000+ 6 ~ 6.0000+ 6	3.6672+ 0	1.9777+ 0							9.0708- 4		****		
6.0000+ 6 ~ 8.0000+ 6	3.5080+ 0	1.8069+ 0							7.9277- 4				
8.0000+ 6 ~ 1.0000+ 7	3.2523+ 0	1.6013+ 0					****	****	5.8827- 4				
1.0000+ 7 ~ 1.5000+ 7	2.8561+ 0	1.3421+ 0	****	****			****	****	7.6366- 4	****	****	****	****

TABLE A1.14

Fe

MATERIAL 1260 CROSS SECTION FE-0

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	1.9167+ 1	1.1193+ 1							7.9712+ 0	0.0000+ 0		0.0000+ 0	1.2396- 2
1.0000- 2 ~ 1.5000- 2	1.4889+ 1	1.1193+ 1							3.6945+ 0	0.0000+ 0		0.0000+ 0	1.2468- 2
1.5000- 2 ~ 2.0000- 2	1.4313+ 1	1.1193+ 1							3.1186+ 0	0.0000+ 0		0.0000+ 0	1.2489- 2
2.0000- 2 ~ 3.0000- 2	1.3806+ 1	1.1193+ 1							2.6124+ 0	0.0000+ 0		0.0000+ 0	1.2510- 2
3.0000- 2 ~ 4.0000- 2	1.3402+ 1	1.1193+ 1							2.2052+ 0	0.0000+ 0		0.0000+ 0	1.2530- 2
4.0000- 2 ~ 5.0000- 2	1.3138+ 1	1.1193+ 1							1.9391+ 0	0.0000+ 0		0.0000+ 0	1.2545- 2
5.0000- 2 ~ 6.0000- 2	1.2955+ 1	1.1193+ 1							1.7553+ 0	0.0000+ 0		0.0000+ 0	1.2558- 2
6.0000- 2 ~ 8.0000- 2	1.2760+ 1	1.1193+ 1							1.5592+ 0	0.0000+ 0		0.0000+ 0	1.2572- 2
8.0000- 2 ~ 1.0000- 1	1.2571+ 1	1.1193+ 1							1.3711+ 0	0.0000+ 0		0.0000+ 0	1.2587- 2
1.0000- 1 ~ 1.5000- 1	1.2367+ 1	1.1193+ 1							1.1694+ 0	0.0000+ 0		0.0000+ 0	1.2607- 2
1.5000- 1 ~ 2.0000- 1	1.2178+ 1	1.1192+ 1							9.8458- 1	0.0000+ 0		0.0000+ 0	1.2627- 2
2.0000- 1 ~ 3.0000- 1	1.2019+ 1	1.1192+ 1							8.2681- 1	0.0000+ 0		0.0000+ 0	1.2648- 2
3.0000- 1 ~ 4.0000- 1	1.1888+ 1	1.1191+ 1							6.9609- 1	0.0000+ 0		0.0000+ 0	1.2668- 2
4.0000- 1 ~ 5.0000- 1	1.1805+ 1	1.1191+ 1							6.1423- 1	0.0000+ 0		0.0000+ 0	1.2684- 2
5.0000- 1 ~ 6.0000- 1	1.1745+ 1	1.1190+ 1							5.5480- 1	0.0000+ 0		0.0000+ 0	1.2696- 2
6.0000- 1 ~ 8.0000- 1	1.1682+ 1	1.1190+ 1							4.9206- 1	0.0000+ 0		0.0000+ 0	1.2710- 2
8.0000- 1 ~ 1.0000+ 0	1.1623+ 1	1.1189+ 1							4.3416- 1	0.0000+ 0		0.0000+ 0	1.2725- 2
1.0000+ 0 ~ 1.5000+ 0	1.1556+ 1	1.1187+ 1							3.6910- 1	0.0000+ 0		0.0000+ 0	1.2745- 2
1.5000+ 0 ~ 2.0000+ 0	1.1496+ 1	1.1184+ 1							3.1133- 1	0.0000+ 0		0.0000+ 0	1.2765- 2
2.0000+ 0 ~ 3.0000+ 0	1.1441+ 1	1.1180+ 1							2.6071- 1	0.0000+ 0		0.0000+ 0	1.2786- 2
3.0000+ 0 ~ 4.0000+ 0	1.1395+ 1	1.1175+ 1							2.1981- 1	0.0000+ 0		0.0000+ 0	1.2807- 2
4.0000+ 0 ~ 5.0000+ 0	1.1363+ 1	1.1170+ 1							1.9341- 1	0.0000+ 0		0.0000+ 0	1.2822- 2
5.0000+ 0 ~ 6.0000+ 0	1.1339+ 1	1.1165+ 1							1.7449- 1	0.0000+ 0		0.0000+ 0	1.2834- 2
6.0000+ 0 ~ 8.0000+ 0	1.1312+ 1	1.1157+ 1							1.5496- 1	0.0000+ 0		0.0000+ 0	1.2848- 2
8.0000+ 0 ~ 1.0000+ 1	1.1283+ 1	1.1147+ 1							1.3623- 1	0.0000+ 0		0.0000+ 0	1.2863- 2
1.0000+ 1 ~ 1.5000+ 1	1.1245+ 1	1.1129+ 1							1.1555- 1	0.0000+ 0		0.0000+ 0	1.2883- 2
1.5000+ 1 ~ 2.0000+ 1	1.1201+ 1	1.1103+ 1							9.7158- 2	0.0000+ 0		0.0000+ 0	1.2903- 2
2.0000+ 1 ~ 3.0000+ 1	1.1147+ 1	1.1066+ 1							8.0835- 2	0.0000+ 0		0.0000+ 0	1.2924- 2
3.0000+ 1 ~ 4.0000+ 1	1.1084+ 1	1.1016+ 1							6.7680- 2	0.0000+ 0		0.0000+ 0	1.2945- 2
4.0000+ 1 ~ 5.0000+ 1	1.1026+ 1	1.0966+ 1							5.9000- 2	0.0000+ 0		0.0000+ 0	1.2960- 2
5.0000+ 1 ~ 6.0000+ 1	1.0971+ 1	1.0918+ 1							5.2920- 2	0.0000+ 0		0.0000+ 0	1.2972- 2
6.0000+ 1 ~ 8.0000+ 1	1.0893+ 1	1.0846+ 1							4.6470- 2	0.0000+ 0		0.0000+ 0	1.2986- 2
8.0000+ 1 ~ 1.0000+ 2	1.0794+ 1	1.0753+ 1							4.0180- 2	0.0000+ 0		0.0000+ 0	1.3002- 2
1.0000+ 2 ~ 1.5000+ 2	1.0630+ 1	1.0596+ 1							3.3329- 2	0.0000+ 0		0.0000+ 0	1.3021- 2
1.5000+ 2 ~ 2.0000+ 2	1.0410+ 1	1.0383+ 1							2.6963- 2	0.0000+ 0		0.0000+ 0	1.3041- 2
2.0000+ 2 ~ 3.0000+ 2	1.0118+ 1	1.0094+ 1							2.3625- 2	0.0000+ 0		0.0000+ 0	1.3063- 2
3.0000+ 2 ~ 4.0000+ 2	9.7622+ 0	9.7439+ 0							1.8313- 2	0.0000+ 0		0.0000+ 0	1.3083- 2
4.0000+ 2 ~ 5.0000+ 2	9.4466+ 0	9.4316+ 0							1.4922- 2	0.0000+ 0		0.0000+ 0	1.3098- 2
5.0000+ 2 ~ 6.0000+ 2	9.1668+ 0	9.1542+ 0							1.2590- 2	0.0000+ 0		0.0000+ 0	1.3110- 2
6.0000+ 2 ~ 8.0000+ 2	8.8097+ 0	8.7993+ 0							1.0304- 2	0.0000+ 0		0.0000+ 0	1.3125- 2
8.0000+ 2 ~ 1.0000+ 3	8.4071+ 0	8.3987+ 0							8.4097- 3	0.0000+ 0		0.0000+ 0	1.3140- 2
1.0000+ 3 ~ 1.5000+ 3	8.3186+ 0	7.9018+ 0							4.1671- 1	0.0000+ 0		0.0000+ 0	1.3159- 2
1.5000+ 3 ~ 2.0000+ 3	7.2654+ 0	7.2554+ 0							9.9730- 3	0.0000+ 0		0.0000+ 0	1.3179- 2
2.0000+ 3 ~ 3.0000+ 3	6.6299+ 0	6.6267+ 0							3.2193- 3	0.0000+ 0		0.0000+ 0	1.3201- 2
3.0000+ 3 ~ 4.0000+ 3	6.8172+ 0	6.8099+ 0							7.2259- 3	0.0000+ 0		0.0000+ 0	1.3221- 2
4.0000+ 3 ~ 5.0000+ 3	5.6760+ 0	5.6703+ 0							5.6271- 3	0.0000+ 0		0.0000+ 0	1.3236- 2
5.0000+ 3 ~ 6.0000+ 3	5.6399+ 0	5.6330+ 0							6.8412- 3	0.0000+ 0		0.0000+ 0	1.3248- 2
6.0000+ 3 ~ 8.0000+ 3	1.4327+ 1	1.4296+ 1							3.1174- 2	0.0000+ 0		0.0000+ 0	1.3263- 2
8.0000+ 3 ~ 1.0000+ 4	1.0345+ 1	1.0323+ 1							2.2561- 2	0.0000+ 0		0.0000+ 0	1.3278- 2
1.0000+ 4 ~ 1.5000+ 4	4.6800+ 0	4.6659+ 0	6.0765- 4						1.3485- 2	0.0000+ 0		0.0000+ 0	1.3934- 2
1.5000+ 4 ~ 2.0000+ 4	3.0085+ 0	2.9811+ 0	2.6054- 2						1.4192- 3	0.0000+ 0		0.0000+ 0	1.5218- 2
2.0000+ 4 ~ 3.0000+ 4	1.8481+ 1	1.8426+ 1	3.2675- 2						2.1845- 2	0.0000+ 0		0.0000+ 0	1.7343- 2
3.0000+ 4 ~ 4.0000+ 4	8.8643+ 0	8.8143+ 0	2.9771- 2						1.9689- 2	0.0000+ 0		0.0000+ 0	2.0460- 2
4.0000+ 4 ~ 5.0000+ 4	4.5445+ 0	4.5170+ 0	2.6886- 2						6.0677- 4	0.0000+ 0		0.0000+ 0	2.3657- 2
5.0000+ 4 ~ 6.0000+ 4	4.3969+ 0	4.3397+ 0	2.4573- 2						3.2667- 2	0.0000+ 0		0.0000+ 0	2.6955- 2
6.0000+ 4 ~ 8.0000+ 4	3.8362+ 0	3.8047+ 0	2.2016- 2						9.5147- 3	0.0000+ 0		0.0000+ 0	3.1993- 2
8.0000+ 4 ~ 1.0000+ 5	6.4844+ 0	6.4494+ 0	1.9604- 2						1.5455- 2	0.0000+ 0		0.0000+ 0	3.8738- 2
1.0000+ 5 ~ 1.5000+ 5	4.1599+ 0	4.1342+ 0	1.7191- 2						8.5129- 3	1.3050- 6		0.0000+ 0	5.0373- 2
1.5000+ 5 ~ 2.0000+ 5	4.5471+ 0	4.5239+ 0	1.5903- 2						7.3514- 3	3.9150- 6		0.0000+ 0	7.2060- 2
2.0000+ 5 ~ 3.0000+ 5	3.5563+ 0	3.5350+ 0	1.5391- 2						5.8572- 3	7.8300- 6		0.0000+ 0	9.3874- 2
3.0000+ 5 ~ 4.0000+ 5	3.7160+ 0	3.6967+ 0	1.6137- 2						3.1134- 3	1.3050- 5		0.0000+ 0	1.1679- 1
4.0000+ 5 ~ 5.0000+ 5	4.0502+ 0	4.0259+ 0	1.9323- 2						4.9756- 3	1.8270- 5		0.0000+ 0	1.2771- 1
5.0000+ 5 ~ 6.0000+ 5	3.8120+ 0	3.7859+ 0	2.0821- 2						5.1998- 3	2.3490- 5		0.0000+ 0	1.4114- 1
6.0000+ 5 ~ 8.0000+ 5	3.6067+ 0	3.5790+ 0	2.2655- 2						5.0619- 3	3.1320- 5		0.0000+ 0	1.5697- 1
8.0000+ 5 ~ 1.0000+ 6	3.4697+ 0	3.2574+ 0	2.0803- 1						4.2040- 3	4.1760- 5		0.0000+ 0	1.8450- 1
1.0000+ 6 ~ 1.5000+ 6	3.4183+ 0	2.9148+ 0	5.0094- 1						2.3167- 3	2.3809- 4		0.0000+ 0	2.4250- 1
1.5000+ 6 ~ 2.0000+ 6	3.4217+ 0	2.7409+ 0	6.7798- 1						1.9905- 3	7.9460- 4		0.0000+ 0	3.2023- 1
2.0000+ 6 ~ 3.0000+ 6	3.4738+ 0	2.6666+ 0	8.0250- 1						1.8726- 3	2.8855- 3		0.0000+ 0	4.2279- 1
3.0000+ 6 ~ 4.0000+ 6	3.5409+ 0	2.4459+ 0	1.0825+ 0						1.5402- 3	1.0844- 2		8.7000- 6	5.5259- 1
4.0000+ 6 ~ 5.0000+ 6	3.5722+ 0	2.2538+ 0	1.2948+ 0						1.2282- 3	2.2058- 2		1.4210- 4	6.5060- 1
5.0000+ 6 ~ 6.0000+ 6	3.5469+ 0	2.1141+ 0	1.3959+ 0						1.1830- 3	3.4668- 2		8.9335- 4	7.1595- 1
6.0000+ 6 ~ 8.0000+ 6	3.4099+ 0	1.9054+ 0	1.4372+ 0	1.4334- 5					1.1332- 3	6.1039- 2		5.0054- 3	7.7723- 1
8.0000+ 6 ~ 1.0000+ 7	3.1515+ 0	1.6266+ 0	1.4087+ 0	4.9034- 3				0.0000+ 0	1.0141- 3	8.9407- 2		2.0670- 2	8.1630- 1
1.0000+ 7 ~ 1.5000+ 7	2.7287+ 0	1.2598+ 0	1.0993+ 0	1.5744- 1				2.4929- 2	6.1082- 4	1.2007- 1		6.6389- 2	8.1540- 1

TABLE A1.15

Fe-54

MATERIAL =1261 CROSS SECTION FE-54

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	7.1499+ 0	4.9293- 1							6.6570+ 0	0.0000+ 0		0.0000+ 0	1.2928- 2
1.0000- 2 ~ 1.5000- 2	3.5805+ 0	4.9293- 1							3.0875+ 0	0.0000+ 0		0.0000+ 0	1.3022- 2
1.5000- 2 ~ 2.0000- 2	3.0992+ 0	4.9293- 1							2.6063+ 0	0.0000+ 0		0.0000+ 0	1.3048- 2
2.0000- 2 ~ 3.0000- 2	2.6823+ 0	4.9293- 1							2.1894+ 0	0.0000+ 0		0.0000+ 0	1.3076- 2
3.0000- 2 ~ 4.0000- 2	2.3359+ 0	4.9293- 1							1.8429+ 0	0.0000+ 0		0.0000+ 0	1.3102- 2
4.0000- 2 ~ 5.0000- 2	2.1174+ 0	4.9294- 1							1.6245+ 0	0.0000+ 0		0.0000+ 0	1.3122- 2
5.0000- 2 ~ 6.0000- 2	1.9647+ 0	4.9294- 1							1.4717+ 0	0.0000+ 0		0.0000+ 0	1.3138- 2
6.0000- 2 ~ 8.0000- 2	1.7961+ 0	4.9294- 1							1.3032+ 0	0.0000+ 0		0.0000+ 0	1.3156- 2
8.0000- 2 ~ 1.0000- 1	1.6417+ 0	4.9295- 1							1.1487+ 0	0.0000+ 0		0.0000+ 0	1.3176- 2
1.0000- 1 ~ 1.5000- 1	1.4719+ 0	4.9296- 1							9.7890- 1	0.0000+ 0		0.0000+ 0	1.3201- 2
1.5000- 1 ~ 2.0000- 1	1.3174+ 0	4.9297- 1							8.2440- 1	0.0000+ 0		0.0000+ 0	1.3228- 2
2.0000- 1 ~ 3.0000- 1	1.1852+ 0	4.9299- 1							6.9220- 1	0.0000+ 0		0.0000+ 0	1.3255- 2
3.0000- 1 ~ 4.0000- 1	1.0760+ 0	4.9302- 1							5.8297- 1	0.0000+ 0		0.0000+ 0	1.3282- 2
4.0000- 1 ~ 5.0000- 1	1.0075+ 0	4.9305- 1							5.1449- 1	0.0000+ 0		0.0000+ 0	1.3301- 2
5.0000- 1 ~ 6.0000- 1	9.5756- 1	4.9307- 1							4.6449- 1	0.0000+ 0		0.0000+ 0	1.3317- 2
6.0000- 1 ~ 8.0000- 1	9.0537- 1	4.9311- 1							4.1225- 1	0.0000+ 0		0.0000+ 0	1.3336- 2
8.0000- 1 ~ 1.0000+ 0	8.5701- 1	4.9317- 1							3.6384- 1	0.0000+ 0		0.0000+ 0	1.3355- 2
1.0000+ 0 ~ 1.5000+ 0	8.0246- 1	4.9326- 1							3.0920- 1	0.0000+ 0		0.0000+ 0	1.3381- 2
1.5000+ 0 ~ 2.0000+ 0	7.5470- 1	4.9340- 1							2.6131- 1	0.0000+ 0		0.0000+ 0	1.3407- 2
2.0000+ 0 ~ 3.0000+ 0	7.1230- 1	4.9360- 1							2.1870- 1	0.0000+ 0		0.0000+ 0	1.3435- 2
3.0000+ 0 ~ 4.0000+ 0	6.7872- 1	4.9387- 1							1.8485- 1	0.0000+ 0		0.0000+ 0	1.3461- 2
4.0000+ 0 ~ 5.0000+ 0	6.5671- 1	4.9415- 1							1.6257- 1	0.0000+ 0		0.0000+ 0	1.3481- 2
5.0000+ 0 ~ 6.0000+ 0	6.4132- 1	4.9442- 1							1.4691- 1	0.0000+ 0		0.0000+ 0	1.3496- 2
6.0000+ 0 ~ 8.0000+ 0	6.2564- 1	4.9482- 1							1.3082- 1	0.0000+ 0		0.0000+ 0	1.3515- 2
8.0000+ 0 ~ 1.0000+ 1	6.1044- 1	4.9537- 1							1.1508- 1	0.0000+ 0		0.0000+ 0	1.3535- 2
1.0000+ 1 ~ 1.5000+ 1	5.9453- 1	4.9631- 1							9.8222- 2	0.0000+ 0		0.0000+ 0	1.3560- 2
1.5000+ 1 ~ 2.0000+ 1	5.8042- 1	4.9767- 1							8.2758- 2	0.0000+ 0		0.0000+ 0	1.3587- 2
2.0000+ 1 ~ 3.0000+ 1	5.6936- 1	4.9970- 1							6.9665- 2	0.0000+ 0		0.0000+ 0	1.3614- 2
3.0000+ 1 ~ 4.0000+ 1	5.6118- 1	5.0241- 1							5.8769- 2	0.0000+ 0		0.0000+ 0	1.3641- 2
4.0000+ 1 ~ 5.0000+ 1	5.5703- 1	5.0512- 1							5.1915- 2	0.0000+ 0		0.0000+ 0	1.3660- 2
5.0000+ 1 ~ 6.0000+ 1	5.5503- 1	5.0789- 1							4.7206- 2	0.0000+ 0		0.0000+ 0	1.3676- 2
6.0000+ 1 ~ 8.0000+ 1	5.5380- 1	5.1189- 1							4.1914- 2	0.0000+ 0		0.0000+ 0	1.3695- 2
8.0000+ 1 ~ 1.0000+ 2	5.5441- 1	5.1730- 1							3.7118- 2	0.0000+ 0		0.0000+ 0	1.3714- 2
1.0000+ 2 ~ 1.5000+ 2	5.5868- 1	5.2676- 1							3.1926- 2	0.0000+ 0		0.0000+ 0	1.3739- 2
1.5000+ 2 ~ 2.0000+ 2	5.6745- 1	5.4025- 1							2.7203- 2	0.0000+ 0		0.0000+ 0	1.3766- 2
2.0000+ 2 ~ 3.0000+ 2	5.8374- 1	5.6046- 1							2.3288- 2	0.0000+ 0		0.0000+ 0	1.3793- 2
3.0000+ 2 ~ 4.0000+ 2	6.0745- 1	5.8735- 1							2.0106- 2	0.0000+ 0		0.0000+ 0	1.3820- 2
4.0000+ 2 ~ 5.0000+ 2	6.3248- 1	6.1426- 1							1.8222- 2	0.0000+ 0		0.0000+ 0	1.3840- 2
5.0000+ 2 ~ 6.0000+ 2	6.6250- 1	6.4561- 1							1.6888- 2	0.0000+ 0		0.0000+ 0	1.3855- 2
6.0000+ 2 ~ 8.0000+ 2	7.1246- 1	6.9688- 1							1.5587- 2	0.0000+ 0		0.0000+ 0	1.3874- 2
8.0000+ 2 ~ 1.0000+ 3	7.8013- 1	7.6559- 1							1.4541- 2	0.0000+ 0		0.0000+ 0	1.3894- 2
1.0000+ 3 ~ 1.5000+ 3	9.2286- 1	9.0921- 1							1.3650- 2	0.0000+ 0		0.0000+ 0	1.3919- 2
1.5000+ 3 ~ 2.0000+ 3	1.1852+ 0	1.1718+ 0							1.3460- 2	0.0000+ 0		0.0000+ 0	1.3945- 2
2.0000+ 3 ~ 3.0000+ 3	1.7603+ 0	1.7456+ 0							1.4624- 2	0.0000+ 0		0.0000+ 0	1.3973- 2
3.0000+ 3 ~ 4.0000+ 3	3.1008+ 0	3.0821+ 0							1.8639- 2	0.0000+ 0		0.0000+ 0	1.3999- 2
4.0000+ 3 ~ 5.0000+ 3	6.0283+ 0	6.0006+ 0							2.7666- 2	0.0000+ 0		0.0000+ 0	1.4019- 2
5.0000+ 3 ~ 6.0000+ 3	1.3984+ 1	1.3933+ 1							5.1120- 2	0.0000+ 0		0.0000+ 0	1.4035- 2
6.0000+ 3 ~ 8.0000+ 3	1.4291+ 2	1.4254+ 2							3.7316- 1	0.0000+ 0		0.0000+ 0	1.4053- 2
8.0000+ 3 ~ 1.0000+ 4	8.9589- 1	8.9211+ 1							3.7808- 1	0.0000+ 0		0.0000+ 0	1.4073- 2
1.0000+ 4 ~ 1.5000+ 4	8.1651+ 0	7.9581+ 0							2.0706- 1	0.0000+ 0		0.0000+ 0	1.4726- 2
1.5000+ 4 ~ 2.0000+ 4	1.8399+ 0	1.8379+ 0							2.0198- 3	0.0000+ 0		0.0000+ 0	1.5994- 2
2.0000+ 4 ~ 3.0000+ 4	6.8986- 1	6.8911- 1							7.5193- 4	0.0000+ 0		0.0000+ 0	1.8124- 2
3.0000+ 4 ~ 4.0000+ 4	5.1915- 1	4.6906- 1							5.0092- 2	0.0000+ 0		0.0000+ 0	2.1284- 2
4.0000+ 4 ~ 5.0000+ 4	8.0477- 1	8.0310- 1							1.6728- 3	0.0000+ 0		0.0000+ 0	2.4556- 2
5.0000+ 4 ~ 6.0000+ 4	1.1939+ 1	1.1894+ 1							4.5384- 2	0.0000+ 0		0.0000+ 0	2.7957- 2
6.0000+ 4 ~ 8.0000+ 4	3.9672+ 0	3.9528+ 0							1.4422- 2	0.0000+ 0		0.0000+ 0	3.3197- 2
8.0000+ 4 ~ 1.0000+ 5	1.2826+ 0	1.2757+ 0							6.8560- 3	0.0000+ 0		0.0000+ 0	4.0264- 2
1.0000+ 5 ~ 1.5000+ 5	4.3418+ 0	4.3264+ 0							1.5403- 2	2.2500- 5		0.0000+ 0	5.2932- 2
1.5000+ 5 ~ 2.0000+ 5	7.1629+ 0	7.1527+ 0							1.0162- 2	6.7500- 5		0.0000+ 0	6.9226- 2
2.0000+ 5 ~ 3.0000+ 5	4.8966+ 0	4.8895+ 0							6.9052- 3	1.3500- 4		0.0000+ 0	9.0781- 2
3.0000+ 5 ~ 4.0000+ 5	4.2618+ 0	4.2539+ 0							7.6508- 3	2.2500- 4		0.0000+ 0	1.1436- 1
4.0000+ 5 ~ 5.0000+ 5	3.9106+ 0	3.9031+ 0							7.1859- 3	3.1500- 4		0.0000+ 0	1.3241- 1
5.0000+ 5 ~ 6.0000+ 5	3.6945+ 0	3.6869+ 0							7.1513- 3	4.0500- 4		0.0000+ 0	1.4646- 1
6.0000+ 5 ~ 8.0000+ 5	3.5184+ 0	3.5104+ 0							7.4287- 3	5.4000- 4		0.0000+ 0	1.6276- 1
8.0000+ 5 ~ 1.0000+ 6	3.4155+ 0	3.4068+ 0							7.9733- 3	7.2000- 4		0.0000+ 0	1.8139- 1
1.0000+ 6 ~ 1.5000+ 6	3.4058+ 0	3.3735+ 0	1.8582- 2						9.1794- 3	4.1050- 3		0.0000+ 0	2.1874- 1
1.5000+ 6 ~ 2.0000+ 6	3.4504+ 0	3.0453+ 0	3.8432- 1						6.1672- 3	1.3700- 2		0.0000+ 0	3.0565- 1
2.0000+ 6 ~ 3.0000+ 6	3.5135+ 0	2.8868+ 0	5.7126- 1						5.1663- 3	4.9750- 2		0.0000+ 0	4.1466- 1
3.0000+ 6 ~ 4.0000+ 6	3.5488+ 0	2.5884+ 0	7.6955- 1						3.1873- 3	1.8675- 1		1.5000- 4	5.5484- 1
4.0000+ 6 ~ 5.0000+ 6	3.5482+ 0	2.3678+ 0	8.0673- 1						2.2200- 3	3.6825- 1		2.4500- 3	6.5375- 1
5.0000+ 6 ~ 6.0000+ 6	3.4870+ 0	2.2077+ 0	7.9262- 1						2.0033- 3	4.7275- 1		1.1450- 2	7.1724- 1
6.0000+ 6 ~ 8.0000+ 6	3.3321+ 0	1.9817+ 0	7.4978- 1						1.8392- 3	5.7050- 1		2.8000- 2	7.7429- 1
8.0000+ 6 ~ 1.0000+ 7	3.0645+ 0	1.6897+ 0	7.3105- 1					0.0000+ 0	1.7727- 3	5.9137- 1		5.0250- 2	8.0972- 1
1.0000+ 7 ~ 1.5000+ 7	2.6536+ 0	1.2990+ 0	6.8273- 1	3.4210- 3				1.2420- 1	1.3285- 3	4.5515- 1		8.8450- 2	8.0864- 1

TABLE A1.16

Fe-56

MATERIAL :1262 CROSS SECTION FE-56

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	1.7962+ 1	9.8865+ 0							8.0759+ 0			0.0000+ 0	1.2489- 2
1.0000- 2 ~ 1.5000- 2	1.3630+ 1	9.8865+ 0							3.7430+ 0			0.0000+ 0	1.2585- 2
1.5000- 2 ~ 2.0000- 2	1.3046+ 1	9.8865+ 0							3.1596+ 0			0.0000+ 0	1.2612- 2
2.0000- 2 ~ 3.0000- 2	1.2533+ 1	9.8864+ 0							2.6467+ 0			0.0000+ 0	1.2640- 2
3.0000- 2 ~ 4.0000- 2	1.2121+ 1	9.8864+ 0							2.2341+ 0			0.0000+ 0	1.2667- 2
4.0000- 2 ~ 5.0000- 2	1.1851+ 1	9.8863+ 0							1.9645+ 0			0.0000+ 0	1.2687- 2
5.0000- 2 ~ 6.0000- 2	1.1665+ 1	9.8863+ 0							1.7784+ 0			0.0000+ 0	1.2703- 2
6.0000- 2 ~ 8.0000- 2	1.1466+ 1	9.8862+ 0							1.5797+ 0			0.0000+ 0	1.2721- 2
8.0000- 2 ~ 1.0000- 1	1.1275+ 1	9.8861+ 0							1.3891+ 0			0.0000+ 0	1.2742- 2
1.0000- 1 ~ 1.5000- 1	1.1071+ 1	9.8859+ 0							1.1848+ 0			0.0000+ 0	1.2767- 2
1.5000- 1 ~ 2.0000- 1	1.0883+ 1	9.8856+ 0							9.9749- 1			0.0000+ 0	1.2794- 2
2.0000- 1 ~ 3.0000- 1	1.0723+ 1	9.8851+ 0							8.3765- 1			0.0000+ 0	1.2822- 2
3.0000- 1 ~ 4.0000- 1	1.0590+ 1	9.8846+ 0							7.0522- 1			0.0000+ 0	1.2849- 2
4.0000- 1 ~ 5.0000- 1	1.0506+ 1	9.8840+ 0							6.2227- 1			0.0000+ 0	1.2869- 2
5.0000- 1 ~ 6.0000- 1	1.0446+ 1	9.8834+ 0							5.6206- 1			0.0000+ 0	1.2885- 2
6.0000- 1 ~ 8.0000- 1	1.0381+ 1	9.8826+ 0							4.9849- 1			0.0000+ 0	1.2904- 2
8.0000- 1 ~ 1.0000+ 0	1.0321+ 1	9.8815+ 0							4.3982- 1			0.0000+ 0	1.2924- 2
1.0000+ 0 ~ 1.5000+ 0	1.0253+ 1	9.8795+ 0							3.7391- 1			0.0000+ 0	1.2949- 2
1.5000+ 0 ~ 2.0000+ 0	1.0192+ 1	9.8766+ 0							3.1537- 1			0.0000+ 0	1.2976- 2
2.0000+ 0 ~ 3.0000+ 0	1.0137+ 1	9.8724+ 0							2.6408- 1			0.0000+ 0	1.3004- 2
3.0000+ 0 ~ 4.0000+ 0	1.0089+ 1	9.8667+ 0							2.2263- 1			0.0000+ 0	1.3031- 2
4.0000+ 0 ~ 5.0000+ 0	1.0057+ 1	9.8611+ 0							1.9588- 1			0.0000+ 0	1.3051- 2
5.0000+ 0 ~ 6.0000+ 0	1.0032+ 1	9.8555+ 0							1.7670- 1			0.0000+ 0	1.3067- 2
6.0000+ 0 ~ 8.0000+ 0	1.0004+ 1	9.8470+ 0							1.5690- 1			0.0000+ 0	1.3086- 2
8.0000+ 0 ~ 1.0000+ 1	9.9737+ 0	9.8358+ 0							1.3792- 1			0.0000+ 0	1.3106- 2
1.0000+ 1 ~ 1.5000+ 1	9.9332+ 0	9.8163+ 0							1.1695- 1			0.0000+ 0	1.3131- 2
1.5000+ 1 ~ 2.0000+ 1	9.8868+ 0	9.7885+ 0							9.8292- 2			0.0000+ 0	1.3158- 2
2.0000+ 1 ~ 3.0000+ 1	9.8289+ 0	9.7471+ 0							8.1727- 2			0.0000+ 0	1.3186- 2
3.0000+ 1 ~ 4.0000+ 1	9.7611+ 0	9.6927+ 0							6.8370- 2			0.0000+ 0	1.3213- 2
4.0000+ 1 ~ 5.0000+ 1	9.6985+ 0	9.6390+ 0							5.9550- 2			0.0000+ 0	1.3233- 2
5.0000+ 1 ~ 6.0000+ 1	9.6393+ 0	9.5860+ 0							5.3367- 2			0.0000+ 0	1.3249- 2
6.0000+ 1 ~ 8.0000+ 1	9.5547+ 0	9.5079+ 0							4.6804- 2			0.0000+ 0	1.3268- 2
8.0000+ 1 ~ 1.0000+ 2	9.4464+ 0	9.4060+ 0							4.0397- 2			0.0000+ 0	1.3288- 2
1.0000+ 2 ~ 1.5000+ 2	9.2682+ 0	9.2348+ 0							3.3409- 2			0.0000+ 0	1.3313- 2
1.5000+ 2 ~ 2.0000+ 2	9.0292+ 0	9.0023+ 0							2.6903- 2			0.0000+ 0	1.3340- 2
2.0000+ 2 ~ 3.0000+ 2	8.7025+ 0	8.6813+ 0							2.1146- 2			0.0000+ 0	1.3368- 2
3.0000+ 2 ~ 4.0000+ 2	8.3133+ 0	8.2968+ 0							1.6457- 2			0.0000+ 0	1.3395- 2
4.0000+ 2 ~ 5.0000+ 2	7.9677+ 0	7.9543+ 0							1.3387- 2			0.0000+ 0	1.3415- 2
5.0000+ 2 ~ 6.0000+ 2	7.6611+ 0	7.6499+ 0							1.1233- 2			0.0000+ 0	1.3431- 2
6.0000+ 2 ~ 8.0000+ 2	7.2679+ 0	7.2589+ 0							9.0566- 3			0.0000+ 0	1.3450- 2
8.0000+ 2 ~ 1.0000+ 3	6.8300+ 0	6.8226+ 0							7.3249- 3			0.0000+ 0	1.3470- 2
1.0000+ 3 ~ 1.5000+ 3	6.6961+ 0	6.2416+ 0							4.5453- 1			0.0000+ 0	1.3495- 2
1.5000+ 3 ~ 2.0000+ 3	5.4804+ 0	5.4772+ 0							3.2497- 3			0.0000+ 0	1.3522- 2
2.0000+ 3 ~ 3.0000+ 3	4.7970+ 0	4.7950+ 0							1.9967- 3			0.0000+ 0	1.3550- 2
3.0000+ 3 ~ 4.0000+ 3	4.1486+ 0	4.1473+ 0							1.2325- 3			0.0000+ 0	1.3577- 2
4.0000+ 3 ~ 5.0000+ 3	3.7292+ 0	3.7283+ 0							8.7587- 4			0.0000+ 0	1.3597- 2
5.0000+ 3 ~ 6.0000+ 3	3.3940+ 0	3.3933+ 0							6.8343- 4			0.0000+ 0	1.3613- 2
6.0000+ 3 ~ 8.0000+ 3	3.0328+ 0	3.0323+ 0							5.3823- 4			0.0000+ 0	1.3632- 2
8.0000+ 3 ~ 1.0000+ 4	2.6616+ 0	2.6611+ 0							4.5769- 4			0.0000+ 0	1.3652- 2
1.0000+ 4 ~ 1.5000+ 4	2.1180+ 0	2.1176+ 0							4.7229- 4			0.0000+ 0	1.4307- 2
1.5000+ 4 ~ 2.0000+ 4	1.2704+ 0	1.2696+ 0							7.8284- 4			0.0000+ 0	1.5574- 2
2.0000+ 4 ~ 3.0000+ 4	1.9180+ 1	1.9157+ 1							2.2884- 2			0.0000+ 0	1.7690- 2
3.0000+ 4 ~ 4.0000+ 4	9.1555+ 0	9.1379+ 0							1.7609- 2			0.0000+ 0	2.0812- 2
4.0000+ 4 ~ 5.0000+ 4	4.4820+ 0	4.4817+ 0							2.1781- 4			0.0000+ 0	2.4029- 2
5.0000+ 4 ~ 6.0000+ 4	3.7305+ 0	3.6981+ 0							3.2396- 2			0.0000+ 0	2.7357- 2
6.0000+ 4 ~ 8.0000+ 4	3.4143+ 0	3.4050+ 0							9.2571- 3			0.0000+ 0	3.2462- 2
8.0000+ 4 ~ 1.0000+ 5	6.6893+ 0	6.6731+ 0							1.6222- 2			0.0000+ 0	3.9319- 2
1.0000+ 5 ~ 1.5000+ 5	4.0371+ 0	4.0289+ 0							8.2100- 3			0.0000+ 0	5.1523- 2
1.5000+ 5 ~ 2.0000+ 5	4.4279+ 0	4.4206+ 0							7.3364- 3			0.0000+ 0	6.7141- 2
2.0000+ 5 ~ 3.0000+ 5	3.4474+ 0	3.4414+ 0							5.9203- 3			0.0000+ 0	8.7646- 2
3.0000+ 5 ~ 4.0000+ 5	3.6582+ 0	3.6554+ 0							2.8821- 3			0.0000+ 0	1.0993- 1
4.0000+ 5 ~ 5.0000+ 5	4.0538+ 0	4.0538+ 0							3.3917- 3			0.0000+ 0	1.2693- 1
5.0000+ 5 ~ 6.0000+ 5	3.8143+ 0	3.8143+ 0							3.4742- 3			0.0000+ 0	1.4019- 1
6.0000+ 5 ~ 8.0000+ 5	3.6074+ 0	3.6074+ 0							3.7267- 3			0.0000+ 0	1.5579- 1
8.0000+ 5 ~ 1.0000+ 6	3.4694+ 0	3.2884+ 0	1.8052- 1						2.9132- 3			0.0000+ 0	1.8373- 1
1.0000+ 6 ~ 1.5000+ 6	3.4176+ 0	2.9502+ 0	4.6580- 1						1.6131- 3			0.0000+ 0	2.4385- 1
1.5000+ 6 ~ 2.0000+ 6	3.4188+ 0	2.8040+ 0	6.1472- 1						1.6293- 3			0.0000+ 0	3.1985- 1
2.0000+ 6 ~ 3.0000+ 6	3.4702+ 0	2.7453+ 0	7.2497- 1						1.6978- 3	0.0000+ 0		0.0000+ 0	4.2135- 1
3.0000+ 6 ~ 4.0000+ 6	3.5389+ 0	2.5499+ 0	9.8898- 1						1.4597- 3	1.3250- 5		0.0000+ 0	5.5090- 1
4.0000+ 6 ~ 5.0000+ 6	3.5711+ 0	2.3741+ 0	1.1957+ 0						1.1800- 3	7.6325- 4		0.0000+ 0	6.4946- 1
5.0000+ 6 ~ 6.0000+ 6	3.5475+ 0	2.2432+ 0	1.2957+ 0						1.1452- 3	7.8750- 3		2.5000- 4	7.1524- 1
6.0000+ 6 ~ 8.0000+ 6	3.4125+ 0	[illegible]	1.3390+ 0						1.1035- 3	3.0250- 2		3.6250- 3	7.7703- 1
8.0000+ 6 ~ 1.0000+ 7	3.1535+ 0	[illegible]	1.3179+ 0						9.8277- 4	5.9650- 2		1.9000- 2	8.1650- 1
1.0000+ 7 ~ 1.5000+ 7	2.7256+ 0	1.3572+ 0	1.0316+ 0	1.5206- 1				1.9373- 2	5.7856- 4	1.0072- 1		6.5550- 2	8.1572- 1

TABLE A1.17

Fe-57

MATERIAL =1263 CROSS SECTION FE-57

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	7.9907+ 0	3.2075- 1							7.6506+ 0			0.0000+ 0	1.2285- 2
1.0000- 2 ~ 1.5000- 2	3.8788+ 0	3.2075- 1							3.5452+ 0			0.0000+ 0	1.2382- 2
1.5000- 2 ~ 2.0000- 2	3.3256+ 0	3.2075- 1							2.9914+ 0			0.0000+ 0	1.2410- 2
2.0000- 2 ~ 3.0000- 2	2.8382+ 0	3.2075- 1							2.5101+ 0			0.0000+ 0	1.2438- 2
3.0000- 2 ~ 4.0000- 2	2.4455+ 0	3.2075- 1							2.1163+ 0			0.0000+ 0	1.2465- 2
4.0000- 2 ~ 5.0000- 2	2.1918+ 0	3.2075- 1							1.8710+ 0			0.0000+ 0	1.2486- 2
5.0000- 2 ~ 6.0000- 2	2.0138+ 0	3.2075- 1							1.6879+ 0			0.0000+ 0	1.2502- 2
6.0000- 2 ~ 8.0000- 2	1.8235+ 0	3.2074- 1							1.4965+ 0			0.0000+ 0	1.2521- 2
8.0000- 2 ~ 1.0000- 1	1.6543+ 0	3.2074- 1							1.3290+ 0			0.0000+ 0	1.2541- 2
1.0000- 1 ~ 1.5000- 1	1.4520+ 0	3.2074- 1							1.1231+ 0			0.0000+ 0	1.2567- 2
1.5000- 1 ~ 2.0000- 1	1.2834+ 0	3.2073- 1							9.4925- 1			0.0000+ 0	1.2595- 2
2.0000- 1 ~ 3.0000- 1	1.1228+ 0	3.2072- 1							7.9418- 1			0.0000+ 0	1.2623- 2
3.0000- 1 ~ 4.0000- 1	1.0022+ 0	3.2071- 1							6.7124- 1			0.0000+ 0	1.2650- 2
4.0000- 1 ~ 5.0000- 1	9.1430- 1	3.2069- 1							5.9017- 1			0.0000+ 0	1.2671- 2
5.0000- 1 ~ 6.0000- 1	8.6424- 1	3.2068- 1							5.3301- 1			0.0000+ 0	1.2687- 2
6.0000- 1 ~ 8.0000- 1	8.0238- 1	3.2066- 1							4.7466- 1			0.0000+ 0	1.2706- 2
8.0000- 1 ~ 1.0000+ 0	7.4112- 1	3.2063- 1							4.1734- 1			0.0000+ 0	1.2726- 2
1.0000+ 0 ~ 1.5000+ 0	6.8317- 1	3.2058- 1							3.5581- 1			0.0000+ 0	1.2752- 2
1.5000+ 0 ~ 2.0000+ 0	6.2254- 1	3.2051- 1							2.9960- 1			0.0000+ 0	1.2779- 2
2.0000+ 0 ~ 3.0000+ 0	5.7692- 1	3.2041- 1							2.5163- 1			0.0000+ 0	1.2808- 2
3.0000+ 0 ~ 4.0000+ 0	5.3395- 1	3.2027- 1							2.1190- 1			0.0000+ 0	1.2835- 2
4.0000+ 0 ~ 5.0000+ 0	5.1102- 1	3.2013- 1							1.8654- 1			0.0000+ 0	1.2855- 2
5.0000+ 0 ~ 6.0000+ 0	4.9203- 1	3.1999- 1							1.6944- 1			0.0000+ 0	1.2871- 2
6.0000+ 0 ~ 8.0000+ 0	4.7098- 1	3.1978- 1							1.4990- 1			0.0000+ 0	1.2891- 2
8.0000+ 0 ~ 1.0000+ 1	4.5458- 1	3.1960- 1							1.3198- 1			0.0000+ 0	1.2911- 2
1.0000+ 1 ~ 1.5000+ 1	4.3286- 1	3.1901- 1							1.1274- 1			0.0000+ 0	1.2937- 2
1.5000+ 1 ~ 2.0000+ 1	4.1527- 1	3.1830- 1							9.4849- 2			0.0000+ 0	1.2964- 2
2.0000+ 1 ~ 3.0000+ 1	3.9788- 1	3.1724- 1							7.9846- 2			0.0000+ 0	1.2993- 2
3.0000+ 1 ~ 4.0000+ 1	3.8454- 1	3.1581- 1							6.7223- 2			0.0000+ 0	1.3020- 2
4.0000+ 1 ~ 5.0000+ 1	3.7469- 1	3.1437- 1							5.9542- 2			0.0000+ 0	1.3040- 2
5.0000+ 1 ~ 6.0000+ 1	3.6700- 1	3.1292- 1							5.3749- 2			0.0000+ 0	1.3056- 2
6.0000+ 1 ~ 8.0000+ 1	3.5953- 1	3.1071- 1							4.7757- 2			0.0000+ 0	1.3076- 2
8.0000+ 1 ~ 1.0000+ 2	3.5083- 1	3.0772- 1							4.2357- 2			0.0000+ 0	1.3096- 2
1.0000+ 2 ~ 1.5000+ 2	3.3901- 1	3.0236- 1							3.6115- 2			0.0000+ 0	1.3122- 2
1.5000+ 2 ~ 2.0000+ 2	3.2560- 1	2.9440- 1							3.0737- 2			0.0000+ 0	1.3149- 2
2.0000+ 2 ~ 3.0000+ 2	3.0817- 1	2.8179- 1							2.5994- 2			0.0000+ 0	1.3177- 2
3.0000+ 2 ~ 4.0000+ 2	2.8633- 1	2.6389- 1							2.2300- 2			0.0000+ 0	1.3205- 2
4.0000+ 2 ~ 5.0000+ 2	2.6600- 1	2.4600- 1							1.9923- 2			0.0000+ 0	1.3225- 2
5.0000+ 2 ~ 6.0000+ 2	2.4756- 1	2.2917- 1							1.8296- 2			0.0000+ 0	1.3241- 2
6.0000+ 2 ~ 8.0000+ 2	2.1986- 1	2.0313- 1							1.6726- 2			0.0000+ 0	1.3260- 2
8.0000+ 2 ~ 1.0000+ 3	1.8438- 1	1.6907- 1							1.5299- 2			0.0000+ 0	1.3281- 2
1.0000+ 3 ~ 1.5000+ 3	1.2587- 1	1.1147- 1							1.4193- 2			0.0000+ 0	1.3307- 2
1.5000+ 3 ~ 2.0000+ 3	3.5375- 1	8.0886- 2							2.7286- 1			0.0000+ 0	1.3334- 2
2.0000+ 3 ~ 3.0000+ 3	1.3698- 1	1.1957- 1							1.7406- 2			0.0000+ 0	1.3362- 2
3.0000+ 3 ~ 4.0000+ 3	3.3332+ 1	3.3107+ 1							2.2417- 1			0.0000+ 0	1.3390- 2
4.0000+ 3 ~ 5.0000+ 3	2.0256+ 1	2.0112+ 1							1.4336- 1			0.0000+ 0	1.3410- 2
5.0000+ 3 ~ 6.0000+ 3	3.4993+ 1	3.4848+ 1							1.4503- 1			0.0000+ 0	1.3426- 2
6.0000+ 3 ~ 8.0000+ 3	8.0863+ 1	8.0454+ 1							4.0840- 1			0.0000+ 0	1.3445- 2
8.0000+ 3 ~ 1.0000+ 4	5.1236+ 0	5.1146+ 0							8.9788- 3			0.0000+ 0	1.3465- 2
1.0000+ 4 ~ 1.5000+ 4	2.1258+ 0	2.0545+ 0	2.5224- 2						4.6180- 2			0.0000+ 0	1.4121- 2
1.5000+ 4 ~ 2.0000+ 4	1.9718+ 0	8.6839- 1	1.0815+ 0						2.5581- 2			0.0000+ 0	1.5702- 2
2.0000+ 4 ~ 3.0000+ 4	1.7760+ 1	1.6367+ 1	1.3564+ 0						3.6502- 2			0.0000+ 0	1.8186- 2
3.0000+ 4 ~ 4.0000+ 4	1.4992+ 1	1.3733+ 1	1.2358+ 0						2.3245- 2			0.0000+ 0	2.1719- 2
4.0000+ 4 ~ 5.0000+ 4	1.4656+ 1	1.3526+ 1	1.1161+ 0						1.3399- 2			0.0000+ 0	2.5323- 2
5.0000+ 4 ~ 6.0000+ 4	1.1578+ 1	1.0547+ 1	1.0201+ 0						1.0296- 2			0.0000+ 0	2.9030- 2
6.0000+ 4 ~ 8.0000+ 4	1.9370+ 1	1.8512+ 1	9.1391- 1						7.2973- 3			0.0000+ 0	3.4689- 2
8.0000+ 4 ~ 1.0000+ 5	9.7745+ 0	8.9538+ 0	8.1379- 1						6.9131- 3			0.0000+ 0	4.2268- 2
1.0000+ 5 ~ 1.5000+ 5	9.7897+ 0	9.0717+ 0	7.1362- 1						4.2702- 3			0.0000+ 0	5.5539- 2
1.5000+ 5 ~ 2.0000+ 5	5.9260+ 0	5.2642+ 0	6.6013- 1						1.5374- 3			0.0000+ 0	7.3546- 2
2.0000+ 5 ~ 3.0000+ 5	5.1351+ 0	4.4946+ 0	6.3890- 1						1.1493- 3			0.0000+ 0	9.7657- 2
3.0000+ 5 ~ 4.0000+ 5	4.4975+ 0	3.8260+ 0	6.6987- 1						9.3088- 4			0.0000+ 0	1.2603- 1
4.0000+ 5 ~ 5.0000+ 5	4.1150+ 0	3.3104+ 0	8.0213- 1						7.7219- 4			0.0000+ 0	1.5349- 1
5.0000+ 5 ~ 6.0000+ 5	3.8676+ 0	3.0016+ 0	8.6430- 1						7.1066- 4			0.0000+ 0	1.7545- 1
6.0000+ 5 ~ 8.0000+ 5	3.6485+ 0	2.7070+ 0	9.4041- 1						6.6110- 4			0.0000+ 0	2.0400- 1
8.0000+ 5 ~ 1.0000+ 6	3.4957+ 0	2.4502+ 0	1.0448+ 0						5.5926- 4			0.0000+ 0	2.4127- 1
1.0000+ 6 ~ 1.5000+ 6	3.4119+ 0	2.2381+ 0	1.1731+ 0						4.9450- 4			0.0000+ 0	3.1030- 1
1.5000+ 6 ~ 2.0000+ 6	3.4021+ 0	2.1091+ 0	1.2925+ 0						5.0341- 4	0.0000+ 0		0.0000+ 0	4.1404- 1
2.0000+ 6 ~ 3.0000+ 6	3.4531+ 0	2.1377+ 0	1.3148+ 0						5.7803- 4	0.0000+ 0		0.0000+ 0	5.2944- 1
3.0000+ 6 ~ 4.0000+ 6	3.5346+ 0	2.2046+ 0	1.3294+ 0						6.5616- 4	0.0000+ 0		0.0000+ 0	6.2631- 1
4.0000+ 6 ~ 5.0000+ 6	3.5851+ 0	2.2184+ 0	1.3661+ 0						6.9051- 4	0.0000+ 0		0.0000+ 0	6.9182- 1
5.0000+ 6 ~ 6.0000+ 6	3.5742+ 0	2.1720+ 0	1.4003+ 0						6.6836- 4	1.2500- 3		0.0000+ 0	7.4202- 1
6.0000+ 6 ~ 8.0000+ 6	3.4471+ 0	2.0268+ 0	1.4067+ 0	6.5413- 4					5.9640- 4	9.6250- 3		2.5625- 3	7.9188- 1
8.0000+ 6 ~ 1.0000+ 7	3.1889+ 0	1.7765+ 0	1.1566+ 0	2.2390- 1					4.0354- 4	1.8625- 2		1.4688- 2	8.2345- 1
1.0000+ 7 ~ 1.5000+ 7	2.7653+ 0	1.3840+ 0	5.2131- 1	7.5140- 1					1.2186- 4	5.8650- 2		5.0800- 2	8.1853- 1

TABLE A1.18

Fe-58

MATERIAL =1264 CROSS SECTION FE-58

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	9.3842+ 0	5.8100+ 0							3.5462+ 0				1.2076- 2
1.0000- 2 ~ 1.5000- 2	7.4713+ 0	5.8100+ 0							1.6444+ 0				1.2175- 2
1.5000- 2 ~ 2.0000- 2	7.2536+ 0	5.8100+ 0							1.3863+ 0				1.2203- 2
2.0000- 2 ~ 3.0000- 2	6.9967+ 0	5.8100+ 0							1.1628+ 0				1.2231- 2
3.0000- 2 ~ 4.0000- 2	6.8178+ 0	5.8100+ 0							9.8026- 1				1.2269- 2
4.0000- 2 ~ 5.0000- 2	6.6812+ 0	5.8100+ 0							8.6363- 1				1.2280- 2
5.0000- 2 ~ 6.0000- 2	6.5886+ 0	5.8100+ 0							7.8076- 1				1.2298- 2
6.0000- 2 ~ 8.0000- 2	6.5107+ 0	5.8100+ 0							6.9315- 1				1.2316- 2
8.0000- 2 ~ 1.0000- 1	6.4310+ 0	5.8100+ 0							6.1088- 1				1.2336- 2
1.0000- 1 ~ 1.5000- 1	6.3406+ 0	5.8100+ 0							5.2001- 1				1.2363- 2
1.5000- 1 ~ 2.0000- 1	6.2646+ 0	5.8100+ 0							4.3863- 1				1.2391- 2
2.0000- 1 ~ 3.0000- 1	6.1891+ 0	5.8100+ 0							3.6770- 1				1.2419- 2
3.0000- 1 ~ 4.0000- 1	6.1245+ 0	5.8100+ 0							3.0999- 1				1.2447- 2
4.0000- 1 ~ 5.0000- 1	6.0932+ 0	5.8100+ 0							2.7310- 1				1.2468- 2
5.0000- 1 ~ 6.0000- 1	6.0660+ 0	5.8100+ 0							2.4690- 1				1.2484- 2
6.0000- 1 ~ 8.0000- 1	6.0328+ 0	5.8100+ 0							2.1919- 1				1.2504- 2
8.0000- 1 ~ 1.0000+ 0	6.0109+ 0	5.8100+ 0							1.9311- 1				1.2524- 2
1.0000+ 0 ~ 1.5000+ 0	5.9779+ 0	5.8100+ 0							1.6444- 1				1.2551- 2
1.5000+ 0 ~ 2.0000+ 0	5.9642+ 0	5.8100+ 0							1.3863- 1				1.2578- 2
2.0000+ 0 ~ 3.0000+ 0	5.9288+ 0	5.8100+ 0							1.1628- 1				1.2607- 2
3.0000+ 0 ~ 4.0000+ 0	5.9120+ 0	5.8100+ 0							9.8026- 2				1.2635- 2
4.0000+ 0 ~ 5.0000+ 0	5.8986+ 0	5.8100+ 0							8.6363- 2				1.2658- 2
5.0000+ 0 ~ 6.0000+ 0	5.8894+ 0	5.8100+ 0							7.8075- 2				1.2672- 2
6.0000+ 0 ~ 8.0000+ 0	5.8822+ 0	5.8100+ 0							6.9315- 2				1.2691- 2
8.0000+ 0 ~ 1.0000+ 1	5.8726+ 0	5.8100+ 0							6.1087- 2				1.2712- 2
1.0000+ 1 ~ 1.5000+ 1	5.8672+ 0	5.8100+ 0							5.2001- 2				1.2739- 2
1.5000+ 1 ~ 2.0000+ 1	5.8651+ 0	5.8100+ 0							4.3863- 2				1.2766- 2
2.0000+ 1 ~ 3.0000+ 1	5.8649+ 0	5.8100+ 0							3.6770- 2				1.2795- 2
3.0000+ 1 ~ 4.0000+ 1	5.8619+ 0	5.8100+ 0							3.0999- 2				1.2823- 2
4.0000+ 1 ~ 5.0000+ 1	5.8596+ 0	5.8100+ 0							2.7310- 2				1.2843- 2
5.0000+ 1 ~ 6.0000+ 1	5.8572+ 0	5.8100+ 0							2.4690- 2				1.2860- 2
6.0000+ 1 ~ 8.0000+ 1	5.8537+ 0	5.8100+ 0							2.1919- 2				1.2879- 2
8.0000+ 1 ~ 1.0000+ 2	5.8489+ 0	5.8100+ 0							1.9311- 2				1.2900- 2
1.0000+ 2 ~ 1.5000+ 2	5.8407+ 0	5.8100+ 0							1.6444- 2				1.2926- 2
1.5000+ 2 ~ 2.0000+ 2	5.8268+ 0	5.8100+ 0							1.3863- 2				1.2954- 2
2.0000+ 2 ~ 3.0000+ 2	1.0545+ 2	1.0638+ 2							9.2305- 2				1.2983- 2
3.0000+ 2 ~ 4.0000+ 2	9.0303+ 1	9.0231+ 1							7.0997- 2				1.3011- 2
4.0000+ 2 ~ 5.0000+ 2	7.9827+ 1	7.9868+ 1							5.8448- 2				1.3031- 2
5.0000+ 2 ~ 6.0000+ 2	7.2575+ 1	7.2625+ 1							5.0822- 2				1.3048- 2
6.0000+ 2 ~ 8.0000+ 2	6.4831+ 1	6.4707+ 1							4.4021- 2				1.3067- 2
8.0000+ 2 ~ 1.0000+ 3	5.7496+ 1	5.7458+ 1							3.7771- 2				1.3088- 2
1.0000+ 3 ~ 1.5000+ 3	4.9482+ 1	4.9431+ 1							3.1530- 2				1.3114- 2
1.5000+ 3 ~ 2.0000+ 3	4.2205+ 1	4.2178+ 1							2.6213- 2				1.3142- 2
2.0000+ 3 ~ 3.0000+ 3	3.5938+ 1	3.5918+ 1							2.1418- 2				1.3171- 2
3.0000+ 3 ~ 4.0000+ 3	3.0803+ 1	3.0788+ 1							1.7459- 2				1.3198- 2
4.0000+ 3 ~ 5.0000+ 3	2.7473+ 1	2.7458+ 1							1.5003- 2				1.3219- 2
5.0000+ 3 ~ 6.0000+ 3	2.5119+ 1	2.5105+ 1							1.3407- 2				1.3235- 2
6.0000+ 3 ~ 8.0000+ 3	2.2642+ 1	2.2630+ 1							1.1878- 2				1.3266- 2
8.0000+ 3 ~ 1.0000+ 4	2.0276+ 1	2.0265+ 1							1.0441- 2				1.3276- 2
1.0000+ 4 ~ 1.5000+ 4	1.7665+ 1	1.7658+ 1							8.9726- 3				1.3939- 2
1.5000+ 4 ~ 2.0000+ 4	1.5290+ 1	1.5290+ 1							7.7804- 3				1.5218- 2
2.0000+ 4 ~ 3.0000+ 4	1.3221+ 1	1.3214+ 1							6.8504- 3				1.7343- 2
3.0000+ 4 ~ 4.0000+ 4	1.1498+ 1	1.1492+ 1							6.0154- 3				2.0460- 2
4.0000+ 4 ~ 5.0000+ 4	1.0375+ 1	1.0370+ 1							5.3033- 3				2.3857- 2
5.0000+ 4 ~ 6.0000+ 4	9.5693+ 0	9.5584+ 0							4.6660- 3				2.6955- 2
6.0000+ 4 ~ 8.0000+ 4	8.6870+ 0	8.6828+ 0							4.2559- 3				3.1993- 2
8.0000+ 4 ~ 1.0000+ 5	7.8498+ 0	7.8402+ 0							3.5407- 3				3.8738- 2
1.0000+ 5 ~ 1.5000+ 5	6.8858+ 0	6.8829+ 0							2.9393- 3				5.0677- 2
1.5000+ 5 ~ 2.0000+ 5	5.9969+ 0	5.9944+ 0							2.4804- 3				6.5900- 2
2.0000+ 5 ~ 3.0000+ 5	5.2093+ 0	5.2041+ 0							2.2394- 3				8.5788- 2
3.0000+ 5 ~ 4.0000+ 5	4.5656+ 0	4.5635+ 0							2.0836- 3				1.0732- 1
4.0000+ 5 ~ 5.0000+ 5	4.1732+ 0	4.1712+ 0							2.0192- 3				1.2375- 1
5.0000+ 5 ~ 6.0000+ 5	3.9176+ 0	3.9154+ 0							2.1042- 3				1.3661- 1
6.0000+ 5 ~ 8.0000+ 5	3.6864+ 0	3.6841+ 0							2.3064- 3				1.5188- 1
8.0000+ 5 ~ 1.0000+ 6	3.5169+ 0	3.2879+ 0	2.2628- 1						1.5216- 3				1.8170- 1
1.0000+ 6 ~ 1.5000+ 6	3.4212+ 0	2.9388+ 0	4.7950- 1						8.9768- 4			0.0000+ 0	2.3996- 1
1.5000+ 6 ~ 2.0000+ 6	3.3836+ 0	2.7203+ 0	6.6189- 1						9.2183- 4			0.0000+ 0	3.1918- 1
2.0000+ 6 ~ 3.0000+ 6	3.4296+ 0	2.5181+ 0	9.1070- 1						8.4[illegible]			0.0000+ 0	4.4438- 1
3.0000+ 6 ~ 4.0000+ 6	3.5279+ 0	2.3990+ 0	1.1289+ 0						7.6390- 4			0.0000+ 0	5.7098- 1
4.0000+ 6 ~ 5.0000+ 6	[illegible]	[illegible]	1.2684+ 0						7.2127- 4			0.0000+ 0	6.5795- 1
5.0000+ 6 ~ 6.0000+ 6	3.5999+ 0	2.2382+ 0	1.3608+ 0						6.5448- 4	0.0000+ 0		0.0000+ 0	7.2366- 1
6.0000+ 6 ~ 8.0000+ 6	3.4849+ 0	2.0657+ 0	1.4180+ 0						6.1179- 4	0.0000+ 0		3.8000- 4	7.8713- 1
8.0000+ 6 ~ 1.0000+ 7	3.2355+ 0	1.8096+ 0	1.4215+ 0						3.6292- 4	1.2500- 4		3.5625- 3	8.2415- 1
1.0000+ 7 ~ 1.5000+ 7	2.7921+ 0	1.4117+ 0	7.8539- 1	5.7682- 1					1.2765- 4	8.8000- 3		1.2020- 2	8.2100- 1

TABLE A1.19

Ni

MATERIAL =1280 CROSS SECTION NI-0

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	3.1008+ 1	1.7199+ 1							1.3810+ 1	0.0000+ 0		0.0000+ 0	1.1931- 2
1.0000- 2 ~ 1.5000- 2	2.3595+ 1	1.7199+ 1							6.3968+ 0	0.0000+ 0		0.0000+ 0	1.2028- 2
1.5000- 2 ~ 2.0000- 2	2.2605+ 1	1.7199+ 1							5.4064+ 0	0.0000+ 0		0.0000+ 0	1.2056- 2
2.0000- 2 ~ 3.0000- 2	2.1722+ 1	1.7199+ 1							4.5232+ 0	0.0000+ 0		0.0000+ 0	1.2084- 2
3.0000- 2 ~ 4.0000- 2	2.1021+ 1	1.7199+ 1							3.8229+ 0	0.0000+ 0		0.0000+ 0	1.2111- 2
4.0000- 2 ~ 5.0000- 2	2.0560+ 1	1.7199+ 1							3.3612+ 0	0.0000+ 0		0.0000+ 0	1.2132- 2
5.0000- 2 ~ 6.0000- 2	2.0234+ 1	1.7199+ 1							3.0357+ 0	0.0000+ 0		0.0000+ 0	1.2148- 2
6.0000- 2 ~ 8.0000- 2	1.9902+ 1	1.7199+ 1							2.7032+ 0	0.0000+ 0		0.0000+ 0	1.2167- 2
8.0000- 2 ~ 1.0000- 1	1.9575+ 1	1.7199+ 1							2.3767+ 0	0.0000+ 0		0.0000+ 0	1.2188- 2
1.0000- 1 ~ 1.5000- 1	1.9225+ 1	1.7199+ 1							2.0264+ 0	0.0000+ 0		0.0000+ 0	1.2214- 2
1.5000- 1 ~ 2.0000- 1	1.8904+ 1	1.7198+ 1							1.7058+ 0	0.0000+ 0		0.0000+ 0	1.2241- 2
2.0000- 1 ~ 3.0000- 1	1.8631+ 1	1.7198+ 1							1.4329+ 0	0.0000+ 0		0.0000+ 0	1.2270- 2
3.0000- 1 ~ 4.0000- 1	1.8404+ 1	1.7198+ 1							1.2062+ 0	0.0000+ 0		0.0000+ 0	1.2297- 2
4.0000- 1 ~ 5.0000- 1	1.8260+ 1	1.7198+ 1							1.0620+ 0	0.0000+ 0		0.0000+ 0	1.2318- 2
5.0000- 1 ~ 6.0000- 1	1.8163+ 1	1.7198+ 1							9.6443- 1	0.0000+ 0		0.0000+ 0	1.2334- 2
6.0000- 1 ~ 8.0000- 1	1.8051+ 1	1.7198+ 1							8.5292- 1	0.0000+ 0		0.0000+ 0	1.2353- 2
8.0000- 1 ~ 1.0000+ 0	1.7949+ 1	1.7198+ 1							7.5098- 1	0.0000+ 0		0.0000+ 0	1.2373- 2
1.0000+ 0 ~ 1.5000+ 0	1.7839+ 1	1.7198+ 1							6.4107- 1	0.0000+ 0		0.0000+ 0	1.2399- 2
1.5000+ 0 ~ 2.0000+ 0	1.7736+ 1	1.7197+ 1							5.3903- 1	0.0000+ 0		0.0000+ 0	1.2427- 2
2.0000+ 0 ~ 3.0000+ 0	1.7650+ 1	1.7197+ 1							4.5331- 1	0.0000+ 0		0.0000+ 0	1.2455- 2
3.0000+ 0 ~ 4.0000+ 0	1.7577+ 1	1.7196+ 1							3.8117- 1	0.0000+ 0		0.0000+ 0	1.2483- 2
4.0000+ 0 ~ 5.0000+ 0	1.7533+ 1	1.7196+ 1							3.3713- 1	0.0000+ 0		0.0000+ 0	1.2503- 2
5.0000+ 0 ~ 6.0000+ 0	1.7499+ 1	1.7195+ 1							3.0399- 1	0.0000+ 0		0.0000+ 0	1.2519- 2
6.0000+ 0 ~ 8.0000+ 0	1.7463+ 1	1.7194+ 1							2.6954- 1	0.0000+ 0		0.0000+ 0	1.2539- 2
8.0000+ 0 ~ 1.0000+ 1	1.7431+ 1	1.7193+ 1							2.3841- 1	0.0000+ 0		0.0000+ 0	1.2559- 2
1.0000+ 1 ~ 1.5000+ 1	1.7393+ 1	1.7190+ 1							2.0234- 1	0.0000+ 0		0.0000+ 0	1.2585- 2
1.5000+ 1 ~ 2.0000+ 1	1.7358+ 1	1.7187+ 1							1.7104- 1	0.0000+ 0		0.0000+ 0	1.2612- 2
2.0000+ 1 ~ 3.0000+ 1	1.7325+ 1	1.7182+ 1							1.4311- 1	0.0000+ 0		0.0000+ 0	1.2641- 2
3.0000+ 1 ~ 4.0000+ 1	1.7297+ 1	1.7176+ 1							1.2098- 1	0.0000+ 0		0.0000+ 0	1.2668- 2
4.0000+ 1 ~ 5.0000+ 1	1.7276+ 1	1.7169+ 1							1.0639- 1	0.0000+ 0		0.0000+ 0	1.2689- 2
5.0000+ 1 ~ 6.0000+ 1	1.7259+ 1	1.7163+ 1							9.6108- 2	0.0000+ 0		0.0000+ 0	1.2705- 2
6.0000+ 1 ~ 8.0000+ 1	1.7239+ 1	1.7153+ 1							8.5614- 2	0.0000+ 0		0.0000+ 0	1.2724- 2
8.0000+ 1 ~ 1.0000+ 2	1.7216+ 1	1.7141+ 1							7.5308- 2	0.0000+ 0		0.0000+ 0	1.2745- 2
1.0000+ 2 ~ 1.5000+ 2	1.7133+ 1	1.7069+ 1							6.4242- 2	0.0000+ 0		0.0000+ 0	1.2771- 2
1.5000+ 2 ~ 2.0000+ 2	1.6992+ 1	1.6938+ 1							5.4186- 2	0.0000+ 0		0.0000+ 0	1.2798- 2
2.0000+ 2 ~ 3.0000+ 2	1.6789+ 1	1.6743+ 1							4.5583- 2	0.0000+ 0		0.0000+ 0	1.2827- 2
3.0000+ 2 ~ 4.0000+ 2	1.6524+ 1	1.6485+ 1							3.8524- 2	0.0000+ 0		0.0000+ 0	1.2854- 2
4.0000+ 2 ~ 5.0000+ 2	1.6314+ 1	1.6280+ 1							3.4022- 2	0.0000+ 0		0.0000+ 0	1.2874- 2
5.0000+ 2 ~ 6.0000+ 2	1.6160+ 1	1.6129+ 1							3.1030- 2	0.0000+ 0		0.0000+ 0	1.2891- 2
6.0000+ 2 ~ 8.0000+ 2	1.5936+ 1	1.5909+ 1							2.7665- 2	0.0000+ 0		0.0000+ 0	1.2910- 2
8.0000+ 2 ~ 1.0000+ 3	1.5652+ 1	1.5627+ 1							2.4635- 2	0.0000+ 0		0.0000+ 0	1.2930- 2
1.0000+ 3 ~ 1.5000+ 3	1.5370+ 1	1.5339+ 1							3.0938- 2	0.0000+ 0		0.0000+ 0	1.2956- 2
1.5000+ 3 ~ 2.0000+ 3	1.5174+ 1	1.5155+ 1							1.9336- 2	0.0000+ 0		0.0000+ 0	1.2984- 2
2.0000+ 3 ~ 3.0000+ 3	1.5489+ 1	1.5436+ 1							5.2572- 2	0.0000+ 0		0.0000+ 0	1.3012- 2
3.0000+ 3 ~ 4.0000+ 3	1.9716+ 1	1.9686+ 1							2.9826- 2	0.0000+ 0		0.0000+ 0	1.3040- 2
4.0000+ 3 ~ 5.0000+ 3	2.8687+ 1	2.8652+ 1							3.5235- 2	0.0000+ 0		0.0000+ 0	1.3060- 2
5.0000+ 3 ~ 6.0000+ 3	1.9991+ 1	1.9958+ 1							3.3407- 2	0.0000+ 0		0.0000+ 0	1.3076- 2
6.0000+ 3 ~ 8.0000+ 3	1.2066+ 1	1.2039+ 1							2.6815- 2	0.0000+ 0		0.0000+ 0	1.3095- 2
8.0000+ 3 ~ 1.0000+ 4	1.0683+ 1	1.0659+ 1							2.4303- 2	0.0000+ 0		0.0000+ 0	1.3116- 2
1.0000+ 4 ~ 1.5000+ 4	3.7700+ 1	3.7566+ 1							1.3500- 1	0.0000+ 0		0.0000+ 0	1.3907- 2
1.5000+ 4 ~ 2.0000+ 4	5.8957+ 1	5.8863+ 1							9.4709- 2	0.0000+ 0		0.0000+ 0	1.5136- 2
2.0000+ 4 ~ 3.0000+ 4	1.6257+ 1	1.6215+ 1							4.1885- 2	0.0000+ 0		0.0000+ 0	1.7152- 2
3.0000+ 4 ~ 4.0000+ 4	1.1151+ 1	1.1111+ 1							3.9362- 2	0.0000+ 0		0.0000+ 0	2.0071- 2
4.0000+ 4 ~ 5.0000+ 4	7.1515+ 0	7.1[illegible]							1.5595- 2	0.0000+ 0		0.0000+ 0	2.3145- 2
5.0000+ 4 ~ 6.0000+ 4	3.0632+ 0	3.0434+ 0							1.9830- 2	0.0000+ 0		0.0000+ 0	2.6303- 2
6.0000+ 4 ~ 8.0000+ 4	1.3659+ 1	1.3637+ 1	2.0782- 3						1.9112- 2	0.0000+ 0		0.0000+ 0	3.1112- 2
8.0000+ 4 ~ 1.0000+ 5	5.4407+ 0	5.4216+ 0	5.2739- 3						1.3805- 2	0.0000+ 0		0.0000+ 0	3.7533- 2
1.0000+ 5 ~ 1.5000+ 5	5.3627+ 0	5.3376+ 0	5.3895- 3						1.9515- 2	0.0000+ 0		1.4165- 4	4.9714- 2
1.5000+ 5 ~ 2.0000+ 5	5.2493+ 0	5.2263+ 0	5.2475- 3						1.7325- 2	0.0000+ 0		4.2494- 4	6.3893- 2
2.0000+ 5 ~ 3.0000+ 5	6.4222+ 0	6.4029+ 0	5.2107- 3						1.3228- 2	0.0000+ 0		8.4988- 4	8.1642- 2
3.0000+ 5 ~ 4.0000+ 5	5.1352+ 0	5.1163+ 0	6.3896- 3						1.1084- 2	0.0000+ 0		1.4165- 3	1.0158- 1
4.0000+ 5 ~ 5.0000+ 5	4.3138+ 0	4.2952+ 0	6.8250- 3						9.8129- 3	0.0000+ 0		1.9830- 3	1.1696- 1
5.0000+ 5 ~ 6.0000+ 5	4.1672+ 0	4.1480+ 0	7.0970- 3						9.5122- 3	6.1245- 5		2.5397- 3	1.2923- 1
6.0000+ 5 ~ 8.0000+ 5	3.8430+ 0	3.8217+ 0	8.0133- 3						9.7413- 3	2.4557- 4		3.3599- 3	1.4430- 1
8.0000+ 5 ~ 1.0000+ 6	3.5796+ 0	3.5551+ 0	9.1708- 3						1.0291- 2	4.9140- 4		4.4535- 3	1.6298- 1
1.0000+ 6 ~ 1.5000+ 6	3.3750+ 0	3.3200+ 0	3.1798- 2						1.1606- 2	4.8776- 3		6.7007- 3	2.0128- 1
1.5000+ 6 ~ 2.0000+ 6	3.2769+ 0	2.8824+ 0	3.5810- 1						7.9336- 3	1.8214- 2		1.0202- 2	2.8857- 1
2.0000+ 6 ~ 3.0000+ 6	3.3103+ 0	2.6785+ 0	5.3817- 1						6.6865- 3	7.1067- 2		1.5837- 2	4.0491- 1
3.0000+ 6 ~ 4.0000+ 6	3.4487+ 0	2.4753+ 0	7.5871- 1						4.0088- 3	1.8619- 1		2.4505- 2	5.4597- 1
4.0000+ 6 ~ 5.0000+ 6	3.5830+ 0	2.4390+ 0	8.2945- 1						2.6851- 3	2.7744- 1		3.4266- 2	6.3562- 1
5.0000+ 6 ~ 6.0000+ 6	3.6351+ 0	2.4277+ 0	8.0669- 1						2.1700- 3	3.5343- 1		4.4970- 2	6.9735- 1
6.0000+ 6 ~ 8.0000+ 6	3.5569+ 0	2.3408+ 0	7.4777- 1	2.1283- 6			1.3911- 4		1.5658- 3	4.0569- 1		6.0976- 2	7.6172- 1
8.0000+ 6 ~ 1.0000+ 7	3.3020+ 0	2.1191+ 0	6.6896- 1	2.9032- 3			1.7644- 3	3.3930- 3	1.0889- 3	4.2405- 1		8.0952- 2	8.0729- 1
1.0000+ 7 ~ 1.5000+ 7	2.8242+ 0	1.6321+ 0	4.4555- 1	6.6824- 2			1.2798- 2	2.0301- 1	5.0984- 4	3.6207- 1		1.0213- 1	8.1960- 1

TABLE A1.20

Ni-58

MATERIAL :1281 CROSS SECTION NI-58

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	4.0822+ 1	2.5241+ 1							1.5582+ 1	0.0000+ 0		3.2967-11	1.2058- 2
1.0000- 2 ~ 1.5000- 2	3.2474+ 1	2.5241+ 1							7.2338+ 0	0.0000+ 0		8.2434-11	1.2150- 2
1.5000- 2 ~ 2.0000- 2	3.1324+ 1	2.5241+ 1							6.0837+ 0	0.0000+ 0		1.1543-10	1.2176- 2
2.0000- 2 ~ 3.0000- 2	3.0356+ 1	2.5241+ 1							5.1151+ 0	0.0000+ 0		1.6493-10	1.2203- 2
3.0000- 2 ~ 4.0000- 2	2.9542+ 1	2.5241+ 1							4.3018+ 0	0.0000+ 0		2.3093-10	1.2229- 2
4.0000- 2 ~ 5.0000- 2	2.9045+ 1	2.5241+ 1							3.8045+ 0	0.0000+ 0		2.9693-10	1.2248- 2
5.0000- 2 ~ 6.0000- 2	2.8670+ 1	2.5241+ 1							3.4294+ 0	0.0000+ 0		3.6293-10	1.2263- 2
6.0000- 2 ~ 8.0000- 2	2.8282+ 1	2.5241+ 1							3.0418+ 0	0.0000+ 0		4.6193-10	1.2281- 2
8.0000- 2 ~ 1.0000- 1	2.7931+ 1	2.5241+ 1							2.6902+ 0	0.0000+ 0		5.9393-10	1.2301- 2
1.0000- 1 ~ 1.5000- 1	2.7524+ 1	2.5241+ 1							2.2832+ 0	0.0000+ 0		8.2493-10	1.2325- 2
1.5000- 1 ~ 2.0000- 1	2.7170+ 1	2.5240+ 1							1.9292+ 0	0.0000+ 0		1.1549- 9	1.2351- 2
2.0000- 1 ~ 3.0000- 1	2.6855+ 1	2.5240+ 1							1.6145+ 0	0.0000+ 0		1.6499- 9	1.2378- 2
3.0000- 1 ~ 4.0000- 1	2.6604+ 1	2.5240+ 1							1.3642+ 0	0.0000+ 0		2.3099- 9	1.2404- 2
4.0000- 1 ~ 5.0000- 1	2.6440+ 1	2.5240+ 1							1.1997+ 0	0.0000+ 0		2.9699- 9	1.2423- 2
5.0000- 1 ~ 6.0000- 1	2.6323+ 1	2.5240+ 1							1.0835+ 0	0.0000+ 0		3.6299- 9	1.2439- 2
6.0000- 1 ~ 8.0000- 1	2.6204+ 1	2.5240+ 1							9.6459- 1	0.0000+ 0		4.6199- 9	1.2457- 2
8.0000- 1 ~ 1.0000+ 0	2.6088+ 1	2.5239+ 1							8.4832- 1	0.0000+ 0		5.9399- 9	1.2476- 2
1.0000+ 0 ~ 1.5000+ 0	2.5962+ 1	2.5239+ 1							7.2257- 1	0.0000+ 0		8.2499- 9	1.2501- 2
1.5000+ 0 ~ 2.0000+ 0	2.5848+ 1	2.5238+ 1							6.0936- 1	0.0000+ 0		1.1550- 8	1.2527- 2
2.0000+ 0 ~ 3.0000+ 0	2.5748+ 1	2.5237+ 1							5.1090- 1	0.0000+ 0		1.6500- 8	1.2554- 2
3.0000+ 0 ~ 4.0000+ 0	2.5667+ 1	2.5236+ 1							4.3084- 1	0.0000+ 0		2.3100- 8	1.2580- 2
4.0000+ 0 ~ 5.0000+ 0	2.5613+ 1	2.5235+ 1							3.7885- 1	0.0000+ 0		2.9700- 8	1.2599- 2
5.0000+ 0 ~ 6.0000+ 0	2.5577+ 1	2.5233+ 1							3.4357- 1	0.0000+ 0		3.6300- 8	1.2614- 2
6.0000+ 0 ~ 8.0000+ 0	2.5536+ 1	2.5231+ 1							3.0459- 1	0.0000+ 0		4.6200- 8	1.2632- 2
8.0000+ 0 ~ 1.0000+ 1	2.5496+ 1	2.5228+ 1							2.6782- 1	0.0000+ 0		5.9400- 8	1.2652- 2
1.0000+ 1 ~ 1.5000+ 1	2.5452+ 1	2.5224+ 1							2.2854- 1	0.0000+ 0		8.2500- 8	1.2676- 2
1.5000+ 1 ~ 2.0000+ 1	2.5409+ 1	2.5217+ 1							1.9226- 1	0.0000+ 0		1.1550- 7	1.2702- 2
2.0000+ 1 ~ 3.0000+ 1	2.5368+ 1	2.5207+ 1							1.6149- 1	0.0000+ 0		1.6500- 7	1.2729- 2
3.0000+ 1 ~ 4.0000+ 1	2.5329+ 1	2.5193+ 1							1.3581- 1	0.0000+ 0		2.3100- 7	1.2755- 2
4.0000+ 1 ~ 5.0000+ 1	2.5299+ 1	2.5179+ 1							1.1994- 1	0.0000+ 0		2.9700- 7	1.2774- 2
5.0000+ 1 ~ 6.0000+ 1	2.5274+ 1	2.5166+ 1							1.0812- 1	0.0000+ 0		3.6300- 7	1.2790- 2
6.0000+ 1 ~ 8.0000+ 1	2.5241+ 1	2.5145+ 1							9.5843- 2	0.0000+ 0		4.6200- 7	1.2808- 2
8.0000+ 1 ~ 1.0000+ 2	2.5203+ 1	2.5118+ 1							8.4599- 2	0.0000+ 0		5.9400- 7	1.2827- 2
1.0000+ 2 ~ 1.5000+ 2	2.5111+ 1	2.5039+ 1							7.1706- 2	0.0000+ 0		8.2500- 7	1.2852- 2
1.5000+ 2 ~ 2.0000+ 2	2.4970+ 1	2.4909+ 1							6.0399- 2	0.0000+ 0		1.1550- 6	1.2878- 2
2.0000+ 2 ~ 3.0000+ 2	2.4765+ 1	2.4715+ 1							5.0353- 2	0.0000+ 0		1.6500- 6	1.2905- 2
3.0000+ 2 ~ 4.0000+ 2	2.4499+ 1	2.4457+ 1							4.2298- 2	0.0000+ 0		2.3100- 6	1.2931- 2
4.0000+ 2 ~ 5.0000+ 2	2.4236+ 1	2.4199+ 1							3.7009- 2	0.0000+ 0		2.9700- 6	1.2950- 2
5.0000+ 2 ~ 6.0000+ 2	2.3913+ 1	2.3880+ 1							3.3240- 2	0.0000+ 0		3.6300- 6	1.2965- 2
6.0000+ 2 ~ 8.0000+ 2	2.3318+ 1	2.3289+ 1							2.9355- 2	0.0000+ 0		4.6200- 6	1.2983- 2
8.0000+ 2 ~ 1.0000+ 3	2.2411+ 1	2.2386+ 1							2.5557- 2	0.0000+ 0		5.9400- 6	1.3003- 2
1.0000+ 3 ~ 1.5000+ 3	2.1299+ 1	2.1278+ 1							2.1390- 2	0.0000+ 0		8.2500- 6	1.3027- 2
1.5000+ 3 ~ 2.0000+ 3	2.0014+ 1	1.9996+ 1							1.7627- 2	0.0000+ 0		1.1550- 5	1.3053- 2
2.0000+ 3 ~ 3.0000+ 3	1.8190+ 1	1.8176+ 1							1.4317- 2	0.0000+ 0		1.6500- 5	1.3080- 2
3.0000+ 3 ~ 4.0000+ 3	1.6188+ 1	1.6176+ 1							1.1666- 2	0.0000+ 0		2.3100- 5	1.3106- 2
4.0000+ 3 ~ 5.0000+ 3	1.4295+ 1	1.4285+ 1							1.0001- 2	0.0000+ 0		2.9700- 5	1.3125- 2
5.0000+ 3 ~ 6.0000+ 3	1.2732+ 1	1.2724+ 1							8.9246- 3	0.0000+ 0		3.6300- 5	1.3141- 2
6.0000+ 3 ~ 8.0000+ 3	1.0756+ 1	1.0741+ 1							1.4825- 2	0.0000+ 0		4.6200- 5	1.3159- 2
8.0000+ 3 ~ 1.0000+ 4	7.7831+ 0	7.7750+ 0							8.0473- 3	0.0000+ 0		5.9400- 5	1.3178- 2
1.0000+ 4 ~ 1.5000+ 4	6.8818+ 0	6.5857+ 0							9.5951- 2	0.0000+ 0		8.2500- 5	1.3942- 2
1.5000+ 4 ~ 2.0000+ 4	7.3655+ 1	7.3567+ 1							8.8160- 2	0.0000+ 0		1.1550- 4	1.5128- 2
2.0000+ 4 ~ 3.0000+ 4	1.6778+ 1	1.6747+ 1							3.1462- 2	0.0000+ 0		1.6500- 4	1.7080- 2
3.0000+ 4 ~ 4.0000+ 4	1.0148+ 1	1.0102+ 1							4.5698- 2	0.0000+ 0		2.3100- 4	1.9914- 2
4.0000+ 4 ~ 5.0000+ 4	6.5515+ 0	6.5386+ 0							1.2579- 2	0.0000+ 0		2.9700- 4	2.2905- 2
5.0000+ 4 ~ 6.0000+ 4	2.3326+ 0	2.3105+ 0							2.1764- 2	0.0000+ 0		3.6300- 4	2.5985- 2
6.0000+ 4 ~ 8.0000+ 4	1.8318+ 1	1.8301+ 1							1.6312- 2	0.0000+ 0		4.6200- 4	3.0682- 2
8.0000+ 4 ~ 1.0000+ 5	6.7795+ 0	6.7716+ 0							7.2540- 3	0.0000+ 0		5.9400- 4	3.6952- 2
1.0000+ 5 ~ 1.5000+ 5	6.9328+ 0	6.9209+ 0							1.1096- 2	0.0000+ 0		8.2500- 4	4.8906- 2
1.5000+ 5 ~ 2.0000+ 5	6.6355+ 0	6.6186+ 0							1.5775- 2	0.0000+ 0		1.1550- 3	6.2825- 2
2.0000+ 5 ~ 3.0000+ 5	5.6898+ 0	5.6746+ 0							1.3480- 2	0.0000+ 0		1.6500- 3	8.0415- 2
3.0000+ 5 ~ 4.0000+ 5	4.9093+ 0	4.8952+ 0							1.1817- 2	0.0000+ 0		2.3100- 3	9.9901- 2
4.0000+ 5 ~ 5.0000+ 5	4.4212+ 0	4.4071+ 0							1.1085- 2	0.0000+ 0		2.9700- 3	1.1510- 1
5.0000+ 5 ~ 6.0000+ 5	4.0931+ 0	4.0789+ 0							1.0909- 2	9.0000- 5		3.6900- 3	1.2729- 1
6.0000+ 5 ~ 8.0000+ 5	3.7822+ 0	3.7658+ 0							1.1113- 2	3.6000- 4		4.8600- 3	1.4242- 1
8.0000+ 5 ~ 1.0000+ 6	3.5362+ 0	3.5174+ 0							1.1689- 2	7.2000- 4		6.4200- 3	1.6135- 1
1.0000+ 6 ~ 1.5000+ 6	3.3592+ 0	3.3248+ 0	4.0855- 3						1.3361- 2	7.1500- 3		9.6000- 3	1.9966- 1
1.5000+ 6 ~ 2.0000+ 6	3.2868+ 0	2.9047+ 0	3.3072- 1						9.2924- 3	2.6700- 2		1.4500- 2	2.8890- 1
2.0000+ 6 ~ 3.0000+ 6	3.3323+ 0	2.7156+ 0	4.8184- 1						7.7045- 3	1.0400- 1		2.2250- 2	4.0651- 1
3.0000+ 6 ~ 4.0000+ 6	3.4635+ 0	2.4815+ 0	6.7144- 1						4.5092- 3	2.7200- 1		3.4000- 2	5.5368- 1
4.0000+ 6 ~ 5.0000+ 6	3.5857+ 0	2.4345+ 0	6.9772- 1						2.8541- 3	4.0350- 1		4.7000- 2	6.4214- 1
5.0000+ 6 ~ 6.0000+ 6	3.6240+ 0	2.4162+ 0	6.3442- 1						2.2842- 3	5.1000- 1		6.1000- 2	7.0037- 1
6.0000+ 6 ~ 8.0000+ 6	3.5302+ 0	2.3194+ 0	5.5774- 1				2.0478- 4		1.6544- 3	5.7000- 1		8.1250- 2	7.6161- 1
8.0000+ 6 ~ 1.0000+ 7	3.2640+ 0	2.0890+ 0	4.9115- 1				2.6000- 3	5.0000- 3	1.1949- 3	5.7000- 1		1.0513- 1	8.0597- 1
1.0000+ 7 ~ 1.5000+ 7	2.7806+ 0	1.5989+ 0	2.6972- 1	8.8400- 3			1.8860- 2	2.8700- 1	5.5122- 4	4.7425- 1		1.2325- 1	8.1709- 1

TABLE A1.21

Ni-60

MATERIAL =1282 CROSS SECTION NI-60

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	9.6658+ 0	1.0747+ 0							8.5811+ 0			9.9900-13	1.1729- 2
1.0000- 2 ~ 1.5000- 2	5.0571+ 0	1.0747+ 0							3.9747+ 0			2.4980-12	1.1834- 2
1.5000- 2 ~ 2.0000- 2	4.4542+ 0	1.0747+ 0							3.3505+ 0			3.4980-12	1.1863- 2
2.0000- 2 ~ 3.0000- 2	3.8966+ 0	1.0747+ 0							2.8084+ 0			4.9980-12	1.1893- 2
3.0000- 2 ~ 4.0000- 2	3.4673+ 0	1.0747+ 0							2.3664+ 0			6.9980-12	1.1923- 2
4.0000- 2 ~ 5.0000- 2	3.1828+ 0	1.0747+ 0							2.0855+ 0			8.9980-12	1.1944- 2
5.0000- 2 ~ 6.0000- 2	2.9653+ 0	1.0747+ 0							1.8856+ 0			1.0998-11	1.1962- 2
6.0000- 2 ~ 8.0000- 2	2.7551+ 0	1.0747+ 0							1.6753+ 0			1.3998-11	1.1982- 2
8.0000- 2 ~ 1.0000- 1	2.5553+ 0	1.0747+ 0							1.4786+ 0			1.7998-11	1.2004- 2
1.0000- 1 ~ 1.5000- 1	2.3395+ 0	1.0747+ 0							1.2607+ 0			2.4998-11	1.2032- 2
1.5000- 1 ~ 2.0000- 1	2.1406+ 0	1.0747+ 0							1.0612+ 0			3.4998-11	1.2061- 2
2.0000- 1 ~ 3.0000- 1	1.9692+ 0	1.0747+ 0							8.9146- 1			4.9998-11	1.2092- 2
3.0000- 1 ~ 4.0000- 1	1.8301+ 0	1.0747+ 0							7.5042- 1			6.9998-11	1.2121- 2
4.0000- 1 ~ 5.0000- 1	1.7390+ 0	1.0747+ 0							6.6073- 1			8.9998-11	1.2143- 2
5.0000- 1 ~ 6.0000- 1	1.6755+ 0	1.0747+ 0							6.0001- 1			1.1000-10	1.2160- 2
6.0000- 1 ~ 8.0000- 1	1.6094+ 0	1.0747+ 0							5.3065- 1			1.4000-10	1.2181- 2
8.0000- 1 ~ 1.0000+ 0	1.5441+ 0	1.0747+ 0							4.6718- 1			1.8000-10	1.2202- 2
1.0000+ 0 ~ 1.5000+ 0	1.4814+ 0	1.0747+ 0							3.9875- 1			2.5000-10	1.2230- 2
1.5000+ 0 ~ 2.0000+ 0	1.4288+ 0	1.0746+ 0							3.3540- 1			3.5000-10	1.2260- 2
2.0000+ 0 ~ 3.0000+ 0	1.3827+ 0	1.0746+ 0							2.8208- 1			5.0000-10	1.2290- 2
3.0000+ 0 ~ 4.0000+ 0	1.3419+ 0	1.0745+ 0							2.3721- 1			7.0000-10	1.2319- 2
4.0000+ 0 ~ 5.0000+ 0	1.3148+ 0	1.0744+ 0							2.0983- 1			9.0000-10	1.2341- 2
5.0000+ 0 ~ 6.0000+ 0	1.2930+ 0	1.0744+ 0							1.8922- 1			1.1000- 9	1.2358- 2
6.0000+ 0 ~ 8.0000+ 0	1.2677+ 0	1.0743+ 0							1.6781- 1			1.4000- 9	1.2379- 2
8.0000+ 0 ~ 1.0000+ 1	1.2412+ 0	1.0742+ 0							1.4845- 1			1.8000- 9	1.2401- 2
1.0000+ 1 ~ 1.5000+ 1	1.2051+ 0	1.0739+ 0							1.2604- 1			2.5000- 9	1.2429- 2
1.5000+ 1 ~ 2.0000+ 1	1.1809+ 0	1.0736+ 0							1.0659- 1			3.5000- 9	1.2458- 2
2.0000+ 1 ~ 3.0000+ 1	1.1627+ 0	1.0731+ 0							8.9259- 2			5.0000- 9	1.2488- 2
3.0000+ 1 ~ 4.0000+ 1	1.1486+ 0	1.0725+ 0							7.5533- 2			7.0000- 9	1.2518- 2
4.0000+ 1 ~ 5.0000+ 1	1.1387+ 0	1.0719+ 0							6.6492- 2			9.0000- 9	1.2539- 2
5.0000+ 1 ~ 6.0000+ 1	1.1315+ 0	1.0712+ 0							6.0126- 2			1.1000- 8	1.2557- 2
6.0000+ 1 ~ 8.0000+ 1	1.1243+ 0	1.0702+ 0							5.3639- 2			1.4000- 8	1.2577- 2
8.0000+ 1 ~ 1.0000+ 2	1.1165+ 0	1.0690+ 0							4.7275- 2			1.8000- 8	1.2599- 2
1.0000+ 2 ~ 1.5000+ 2	1.1077+ 0	1.0667+ 0							4.0469- 2			2.5000- 8	1.2627- 2
1.5000+ 2 ~ 2.0000+ 2	1.0989+ 0	1.0635+ 0							3.4304- 2			3.5000- 8	1.2656- 2
2.0000+ 2 ~ 3.0000+ 2	1.0888+ 0	1.0586+ 0							2.9064- 2			5.0000- 8	1.2687- 2
3.0000+ 2 ~ 4.0000+ 2	1.0774+ 0	1.0522+ 0							2.4797- 2			7.0000- 8	1.2716- 2
4.0000+ 2 ~ 5.0000+ 2	1.0683+ 0	1.0461+ 0							2.2102- 2			9.0000- 8	1.2738- 2
5.0000+ 2 ~ 6.0000+ 2	1.0610+ 0	1.0406+ 0							2.0329- 2			1.1000- 7	1.2755- 2
6.0000+ 2 ~ 8.0000+ 2	1.0512+ 0	1.0328+ 0							1.8352- 2			1.4000- 7	1.2776- 2
8.0000+ 2 ~ 1.0000+ 3	1.0403+ 0	1.0236+ 0							1.6591- 2			1.8000- 7	1.2797- 2
1.0000+ 3 ~ 1.5000+ 3	1.0284+ 0	1.0116+ 0							1.6792- 2			2.5000- 7	1.2825- 2
1.5000+ 3 ~ 2.0000+ 3	1.0177+ 0	1.0042+ 0							1.3562- 2			3.5000- 7	1.2854- 2
2.0000+ 3 ~ 3.0000+ 3	1.1754+ 0	1.0363+ 0							1.4018- 1			5.0000- 7	1.2885- 2
3.0000+ 3 ~ 4.0000+ 3	1.1511+ 0	1.1382+ 0							1.2839- 2			7.0000- 7	1.2914- 2
4.0000+ 3 ~ 5.0000+ 3	1.4279+ 0	1.4141+ 0							1.3860- 2			9.0000- 7	1.2936- 2
5.0000+ 3 ~ 6.0000+ 3	2.0454+ 0	1.9868+ 0							5.8637- 2			1.1000- 6	1.2953- 2
6.0000+ 3 ~ 8.0000+ 3	4.2475+ 0	4.2255+ 0							2.2023- 2			1.4000- 6	1.2974- 2
8.0000+ 3 ~ 1.0000+ 4	1.5423+ 1	1.5378+ 1							4.4677- 2			1.8000- 6	1.2996- 2
1.0000+ 4 ~ 1.5000+ 4	1.2061+ 2	1.2045+ 2							1.6739- 1			2.5000- 6	1.3036- 2
1.5000+ 4 ~ 2.0000+ 4	3.1056+ 1	3.1037+ 1							1.9773- 2			3.5000- 6	1.5142- 2
2.0000+ 4 ~ 3.0000+ 4	1.8104+ 1	1.8069+ 1							3.4630- 2			5.0000- 6	1.7269- 2
3.0000+ 4 ~ 4.0000+ 4	1.3538+ 1	1.3519+ 1							1.9067- 2			7.0000- 6	2.0331- 2
4.0000+ 4 ~ 5.0000+ 4	8.8295+ 0	8.8066+ 0							2.2836- 2			9.0000- 6	2.3538- 2
5.0000+ 4 ~ 6.0000+ 4	6.2933+ 0	6.2832+ 0							1.0094- 2			1.1000- 5	2.6820- 2
6.0000+ 4 ~ 8.0000+ 4	7.0763+ 0	7.0650+ 0							1.1299- 2			1.4000- 5	3.1799- 2
8.0000+ 4 ~ 1.0000+ 5	6.8150+ 0	6.8001+ 0							1.4855- 2			1.8000- 5	3.8407- 2
1.0000+ 5 ~ 1.5000+ 5	5.8162+ 0	5.8065+ 0							9.7057- 3			2.5000- 5	5.0882- 2
1.5000+ 5 ~ 2.0000+ 5	5.2446+ 0	5.2382+ 0							6.3530- 3			3.5000- 5	6.5377- 2
2.0000+ 5 ~ 3.0000+ 5	6.3539+ 0	6.3456+ 0							8.1985- 3			5.0000- 5	8.3580- 2
3.0000+ 5 ~ 4.0000+ 5	5.1465+ 0	5.1391+ 0							7.3666- 3			7.0000- 5	1.0362- 1
4.0000+ 5 ~ 5.0000+ 5	4.6432+ 0	4.6360+ 0							7.0728- 3			9.0000- 5	1.1905- 1
5.0000+ 5 ~ 6.0000+ 5	4.2935+ 0	4.2863+ 0							7.1192- 3			1.3200- 4	1.3123- 1
6.0000+ 5 ~ 8.0000+ 5	3.9456+ 0	3.9380+ 0							7.4138- 3			2.2800- 4	1.4596- 1
8.0000+ 5 ~ 1.0000+ 6	3.6523+ 0	3.6440+ 0							7.9488- 3			3.5600- 4	1.6383- 1
1.0000+ 6 ~ 1.5000+ 6	3.4029+ 0	3.3489+ 0	4.3706- 2						8.7050- 3			6.8000- 4	2.0166- 1
1.5000+ 6 ~ 2.0000+ 6	3.2630+ 0	2.8690+ 0	3.8678- 1						5.5452- 3			1.3200- 3	2.8600- 1
2.0000+ 6 ~ 3.0000+ 6	3.2756+ 0	2.6248+ 0	6.4266- 1						4.9120- 3	4.6225- 4		2.6750- 3	4.0186- 1
3.0000+ 6 ~ 4.0000+ 6	3.4228+ 0	2.4734+ 0	9.3871- 1						3.1351- 3	2.3750- 3		5.1750- 3	5.3174- 1
4.0000+ 6 ~ 5.0000+ 6	3.5747+ 0	2.4561+ 0	1.0994+ 0						2.5004- 3	8.3750- 3		8.5500- 3	6.2241- 1
5.0000+ 6 ~ 6.0000+ 6	3.6498+ 0	2.4538+ 0	1.1603+ 0						2.0937- 3	2.0750- 2		1.2875- 2	6.9021- 1
6.0000+ 6 ~ 8.0000+ 6	3.5997+ 0	2.3793+ 0	1.1369+ 0						1.5159- 3	6.1000- 2		2.1000- 2	7.6076- 1
8.0000+ 6 ~ 1.0000+ 7	3.3630+ 0	2.1689+ 0	1.0317+ 0					0.0000+ 0	9.6442- 4	1.2738- 1		3.4125- 2	8.0919- 1
1.0000+ 7 ~ 1.5000+ 7	2.8942+ 0	1.6653+ 0	8.4315- 1	1.2867- 1				3.1460- 2	4.8491- 4	1.3940- 1		6.6200- 2	8.2341- 1

TABLE A1.22

Ni-61

MATERIAL :1283 CROSS SECTION NI-61

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	1.0441+ 1	2.7739+ 0							7.6088+ 0			6.1938-13	1.1579- 2
1.0000- 2 ~ 1.5000- 2	6.3322+ 0	2.7739+ 0							3.5524+ 0			1.5488-12	1.1689- 2
1.5000- 2 ~ 2.0000- 2	5.7687+ 0	2.7739+ 0							3.0021+ 0			2.1688-12	1.1721- 2
2.0000- 2 ~ 3.0000- 2	5.2911+ 0	2.7739+ 0							2.5111+ 0			3.0988-12	1.1753- 2
3.0000- 2 ~ 4.0000- 2	4.8933+ 0	2.7739+ 0							2.1228+ 0			4.3388-12	1.1784- 2
4.0000- 2 ~ 5.0000- 2	4.6457+ 0	2.7739+ 0							1.8666+ 0			5.5788-12	1.1807- 2
5.0000- 2 ~ 6.0000- 2	4.4625+ 0	2.7739+ 0							1.6858+ 0			6.8188-12	1.1826- 2
6.0000- 2 ~ 8.0000- 2	4.2729+ 0	2.7739+ 0							1.5011+ 0			8.6788-12	1.1848- 2
8.0000- 2 ~ 1.0000- 1	4.0951+ 0	2.7739+ 0							1.3199+ 0			1.1159-11	1.1871- 2
1.0000- 1 ~ 1.5000- 1	3.8989+ 0	2.7739+ 0							1.1246+ 0			1.5499-11	1.1901- 2
1.5000- 1 ~ 2.0000- 1	3.7257+ 0	2.7739+ 0							9.4800- 1			2.1699-11	1.1932- 2
2.0000- 1 ~ 3.0000- 1	3.5695+ 0	2.7739+ 0							7.9523- 1			3.0999-11	1.1964- 2
3.0000- 1 ~ 4.0000- 1	3.4472+ 0	2.7739+ 0							6.7034- 1			4.3399-11	1.1995- 2
4.0000- 1 ~ 5.0000- 1	3.3651+ 0	2.7739+ 0							5.8953- 1			5.5799-11	1.2019- 2
5.0000- 1 ~ 6.0000- 1	3.3095+ 0	2.7739+ 0							5.3511- 1			6.8199-11	1.2037- 2
6.0000- 1 ~ 8.0000- 1	3.2498+ 0	2.7739+ 0							4.7401- 1			8.6799-11	1.2059- 2
8.0000- 1 ~ 1.0000+ 0	3.1919+ 0	2.7738+ 0							4.1686- 1			1.1160-10	1.2082- 2
1.0000+ 0 ~ 1.5000+ 0	3.1297+ 0	2.7738+ 0							3.5586- 1			1.5500-10	1.2112- 2
1.5000+ 0 ~ 2.0000+ 0	3.0740+ 0	2.7737+ 0							2.9939- 1			2.1700-10	1.2143- 2
2.0000+ 0 ~ 3.0000+ 0	3.0266+ 0	2.7736+ 0							2.6170- 1			3.1000-10	1.2175- 2
3.0000+ 0 ~ 4.0000+ 0	2.9867+ 0	2.7735+ 0							2.1172- 1			4.3400-10	1.2207- 2
4.0000+ 0 ~ 6.0000+ 0	2.9634+ 0	2.7734+ 0							1.8722- 1			5.5800-10	1.2230- 2
5.0000+ 0 ~ 6.0000+ 0	2.9445+ 0	2.7733+ 0							1.6878- 1			6.8200-10	1.2248- 2
6.0000+ 0 ~ 8.0000+ 0	2.9247+ 0	2.7732+ 0							1.4973- 1			8.6800-10	1.2270- 2
8.0000+ 0 ~ 1.0000+ 1	2.9082+ 0	2.7729+ 0							1.3241- 1			1.1160- 9	1.2293- 2
1.0000+ 1 ~ 1.5000+ 1	2.8865+ 0	2.7725+ 0							1.1241- 1			1.5500- 9	1.2323- 2
1.5000+ 1 ~ 2.0000+ 1	2.8693+ 0	2.7720+ 0							9.4994- 2			2.1700- 9	1.2354- 2
2.0000+ 1 ~ 3.0000+ 1	2.8519+ 0	2.7711+ 0							7.9527- 2			3.1000- 9	1.2387- 2
3.0000+ 1 ~ 4.0000+ 1	2.8388+ 0	2.7699+ 0							6.7221- 2			4.3400- 9	1.2418- 2
4.0000+ 1 ~ 5.0000+ 1	2.8284+ 0	2.7688+ 0							5.9150- 2			5.5800- 9	1.2441- 2
5.0000+ 1 ~ 6.0000+ 1	2.8226+ 0	2.7677+ 0							5.3440- 2			6.8200- 9	1.2460- 2
6.0000+ 1 ~ 8.0000+ 1	2.8147+ 0	2.7659+ 0							4.7605- 2			8.6800- 9	1.2481- 2
8.0000+ 1 ~ 1.0000+ 2	2.8059+ 0	2.7638+ 0							4.1908- 2			1.1160- 8	1.2605- 2
1.0000+ 2 ~ 1.5000+ 2	2.7963+ 0	2.7595+ 0							3.6748- 2			1.5500- 8	1.2534- 2
1.5000+ 2 ~ 2.0000+ 2	2.7841+ 0	2.7536+ 0							3.0223- 2			2.1700- 8	1.2565- 2
2.0000+ 2 ~ 3.0000+ 2	2.7707+ 0	2.7445+ 0							2.5427- 2			3.1000- 8	1.2598- 2
3.0000+ 2 ~ 4.0000+ 2	2.7539+ 0	2.7321+ 0							2.1558- 2			4.3400- 8	1.2629- 2
4.0000+ 2 ~ 5.0000+ 2	2.7390+ 0	2.7194+ 0							1.9085- 2			5.5800- 8	1.2652- 2
5.0000+ 2 ~ 6.0000+ 2	2.7241+ 0	2.7062+ 0							1.7395- 2			6.8200- 8	1.2671- 2
6.0000+ 2 ~ 8.0000+ 2	2.7014+ 0	2.6857+ 0							1.5612- 2			8.6800- 8	1.2693- 2
8.0000+ 2 ~ 1.0000+ 3	2.6715+ 0	2.6570+ 0							1.4068- 2			1.1160- 7	1.2716- 2
1.0000+ 3 ~ 1.5000+ 3	2.6422+ 0	2.8845+ 0							7.5746- 1			1.5500- 7	1.2746- 2
1.5000+ 3 ~ 2.0000+ 3	2.5119+ 0	2.5002+ 0							1.1939- 2			2.1700- 7	1.2777- 2
2.0000+ 3 ~ 3.0000+ 3	2.3582+ 0	2.3393+ 0							1.8595- 2			3.1000- 7	1.2809- 2
3.0000+ 3 ~ 4.0000+ 3	2.2751+ 0	2.4035+ 0							3.7186- 1			4.3400- 7	1.2840- 2
4.0000+ 3 ~ 5.0000+ 3	1.6844+ 0	1.6543+ 0							1.0181- 2			5.5800- 7	1.2863- 2
5.0000+ 3 ~ 6.0000+ 3	1.0444+ 0	1.0295+ 0							1.4969- 2			6.8200- 7	1.2882- 2
6.0000+ 3 ~ 8.0000+ 3	3.5863+ 1	3.4972+ 1							6.9047- 1			8.6800- 7	1.2904- 2
8.0000+ 3 ~ 1.0000+ 4	8.2209+ 0	7.9014+ 0							3.1953- 1			1.1160- 6	1.2927- 2
1.0000+ 4 ~ 1.5000+ 4	8.8221+ 0	8.5940+ 0							2.2810- 1			1.5500- 6	1.3810- 2
1.5000+ 4 ~ 2.0000+ 4	2.3417+ 1	2.3308+ 1							1.0915- 1			2.1700- 6	1.5181- 2
2.0000+ 4 ~ 3.0000+ 4	6.8548+ 0	6.7717+ 0							8.3081- 2			3.1000- 6	[illegible]402- 2
3.0000+ 4 ~ 4.0000+ 4	1.3202+ 1	1.3113+ 1							8.9534- 2			4.3400- 6	[illegible]586- 2
4.0000+ 4 ~ 5.0000+ 4	6.5836+ 0	6.5390+ 0							4.4536- 2			5.5800- 6	2.3910- 2
5.0000+ 4 ~ 6.0000+ 4	6.8412+ 0	6.8037+ 0							3.7471- 2			6.8200- 6	2.7304- 2
6.0000+ 4 ~ 8.0000+ 4	1.0543+ 1	1.0350+ 1	1.7464- 1						1.7758- 2			8.6800- 6	3.2879- 2
8.0000+ 4 ~ 1.0000+ 5	8.8340+ 0	8.3806+ 0	4.4318- 1						1.0021- 2			1.1160- 5	4.0728- [illegible]
1.0000+ 5 ~ 1.5000+ 5	7.8311+ 0	7.3689+ 0	4.5290- 1						7.3470- 3			1.5500- 5	5.4638- 2
1.5000+ 5 ~ 2.0000+ 5	6.8824+ 0	6.4346+ 0	4.4097- 1						5.3408- 3			2.1700- 5	7.0768- 2
2.0000+ 5 ~ 3.0000+ 5	6.0003+ 0	5.5577+ 0	4.3787- 1						4.0223- 3			3.1000- 5	9.1377- 2
3.0000+ 5 ~ 4.0000+ 5	5.2958+ 0	4.8938+ 0	3.9694- 1						3.1438- 3			4.3400- 5	1.1705- 1
4.0000+ 5 ~ 5.0000+ 5	4.7334+ 0	4.1562+ 0	5.7353- 1						2.7884- 3			5.5800- 5	1.3717- 1
5.0000+ 5 ~ 6.0000+ 5	4.3784+ 0	3.7787+ 0	5.9639- 1						2.6379- 3	1.4339- 5		8.0800- 5	1.5373- 1
6.0000+ 5 ~ 8.0000+ 5	4.0172+ 0	3.3407+ 0	6.7339- 1						2.5029- 3	1.0720- 4		1.3720- 4	1.7723- 1
8.0000+ 5 ~ 1.0000+ 6	3.7040+ 0	2.9302+ 0	7.7066- 1						2.3660- 3	2.3573- 4		2.1240- 4	2.0795- 1
1.0000+ 6 ~ 1.5000+ 6	3.4212+ 0	2.4583+ 0	9.5833- 1						1.6892- 3	2.1500- 3		4.0500- 4	2.7539- 1
1.5000+ 6 ~ 2.0000+ 6	3.2492+ 0	2.1626+ 0	1.0765+ 0						1.3059- 3	8.0000- 3		7.7500- 4	3.7267- 1
2.0000+ 6 ~ 3.0000+ 6	3.2522+ 0	2.1182+ 0	1.0997+ 0						1.1060- 3	3.1250- 2		1.5475- 3	4.8314- 1
3.0000+ 6 ~ 4.0000+ 6	3.4113+ 0	2.2191+ 0	1.1052+ 0						9.7233- 4	8.2750- 2		3.0250- 3	5.7853- 1
4.0000+ 6 ~ 5.0000+ 6	3.5776+ 0	2.3202+ 0	1.1234+ 0						8.7428- 4	1.2000- 1		5.0250- 3	6.4884- 1
5.0000+ 6 ~ 6.0000+ 6	3.6751+ 0	2.3935+ 0	1.1185+ 0						7.4059- 4	1.5475- 1		7.5250- 3	7.0781- 1
6.0000+ 6 ~ 8.0000+ 6	3.6315+ 0	2.3782+ 0	1.0688+ 0	1.7885- 4					5.5036- 4	1.7175- 1		1.2112- 2	7.6963- 1
8.0000+ 6 ~ 1.0000+ 7	3.4149+ 0	2.2009+ 0	7.8170- 1	2.4175- 1					2.8100- 4	1.7175- 1		2.0125- 2	8.1268- 1
1.0000+ 7 ~ 1.5000+ 7	2.9542+ 0	1.7279+ 0	9.5357- 1	6.9050- 1					7.2262- 5	1.4320- 1		3.9250- 2	8.2635- 1

TABLE A1.23

Ni-62

MATERIAL =1284 CROSS SECTION NI-62

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	5.7663+ 1	1.3908+ 1							4.3756+ 1				1.1430- 2
1.0000- 2 ~ 1.5000- 2	3.4188+ 1	1.3908+ 1							2.0280+ 1				1.1547- 2
1.5000- 2 ~ 2.0000- 2	3.1027+ 1	1.3908+ 1							1.7119+ 1				1.1580- 2
2.0000- 2 ~ 3.0000- 2	2.8248+ 1	1.3908+ 1							1.4340+ 1				1.1615- 2
3.0000- 2 ~ 4.0000- 2	2.6013+ 1	1.3908+ 1							1.2105+ 1				1.1647- 2
4.0000- 2 ~ 5.0000- 2	2.4553+ 1	1.3908+ 1							1.0645+ 1				1.1672- 2
5.0000- 2 ~ 6.0000- 2	2.3544+ 1	1.3908+ 1							9.6360+ 0				1.1691- 2
6.0000- 2 ~ 8.0000- 2	2.2468+ 1	1.3908+ 1							8.5597+ 0				1.1714- 2
8.0000- 2 ~ 1.0000- 1	2.1436+ 1	1.3909+ 1							7.5270+ 0				1.1739- 2
1.0000- 1 ~ 1.5000- 1	2.0329+ 1	1.3909+ 1							6.4201+ 0				1.1770- 2
1.5000- 1 ~ 2.0000- 1	1.9315+ 1	1.3909+ 1							5.4057+ 0				1.1803- 2
2.0000- 1 ~ 3.0000- 1	1.8450+ 1	1.3910+ 1							4.5399+ 0				1.1837- 2
3.0000- 1 ~ 4.0000- 1	1.7734+ 1	1.3911+ 1							3.8227+ 0				1.1870- 2
4.0000- 1 ~ 5.0000- 1	1.7285+ 1	1.3912+ 1							3.3736+ 0				1.1895- 2
5.0000- 1 ~ 6.0000- 1	1.6960+ 1	1.3913+ 1							3.0476+ 0				1.1914- 2
6.0000- 1 ~ 8.0000- 1	1.6617+ 1	1.3914+ 1							2.7035+ 0				1.1937- 2
8.0000- 1 ~ 1.0000+ 0	1.6302+ 1	1.3916+ 1							2.3859+ 0				1.1962- 2
1.0000+ 0 ~ 1.5000+ 0	1.5948+ 1	1.3919+ 1							2.0293+ 0				1.1993- 2
1.5000+ 0 ~ 2.0000+ 0	1.5636+ 1	1.3924+ 1							1.7128+ 0				1.2026- 2
2.0000+ 0 ~ 3.0000+ 0	1.5366+ 1	1.3930+ 1							1.4357+ 0				1.2060- 2
3.0000+ 0 ~ 4.0000+ 0	1.5152+ 1	1.3940+ 1							1.2120+ 0				1.2093- 2
4.0000+ 0 ~ 5.0000+ 0	1.5016+ 1	1.3949+ 1							1.0679+ 0				1.2118- 2
5.0000+ 0 ~ 6.0000+ 0	1.4922+ 1	1.3958+ 1							9.6465- 1				1.2137- 2
6.0000+ 0 ~ 8.0000+ 0	1.4830+ 1	1.3971+ 1							8.5829- 1				1.2160- 2
8.0000+ 0 ~ 1.0000+ 1	1.4746+ 1	1.3990+ 1							7.5652- 1				1.2185- 2
1.0000+ 1 ~ 1.5000+ 1	1.4666+ 1	1.4022+ 1							6.4456- 1				1.2216- 2
1.5000+ 1 ~ 2.0000+ 1	1.4613+ 1	1.4068+ 1							5.4545- 1				1.2249- 2
2.0000+ 1 ~ 3.0000+ 1	1.4595+ 1	1.4136+ 1							4.5817- 1				1.2283- 2
3.0000+ 1 ~ 4.0000+ 1	1.4618+ 1	1.4229+ 1							3.8855- 1				1.2316- 2
4.0000+ 1 ~ 5.0000+ 1	1.4666+ 1	1.4322+ 1							3.4313- 1				1.2340- 2
5.0000+ 1 ~ 6.0000+ 1	1.4728+ 1	1.4416+ 1							3.1170- 1				1.2360- 2
6.0000+ 1 ~ 8.0000+ 1	1.4837+ 1	1.4558+ 1							2.7885- 1				1.2383- 2
8.0000+ 1 ~ 1.0000+ 2	1.4997+ 1	1.4750+ 1							2.4733- 1				1.2407- 2
1.0000+ 2 ~ 1.5000+ 2	1.5306+ 1	1.5092+ 1							2.1405- 1				1.2439- 2
1.5000+ 2 ~ 2.0000+ 2	1.5777+ 1	1.5583+ 1							1.8423- 1				1.2472- 2
2.0000+ 2 ~ 3.0000+ 2	1.6541+ 1	1.6381+ 1							1.5982- 1				1.2506- 2
3.0000+ 2 ~ 4.0000+ 2	1.7635+ 1	1.7494+ 1							1.4080- 1				1.2539- 2
4.0000+ 2 ~ 5.0000+ 2	1.8825+ 1	1.8695+ 1							1.3001- 1				1.2563- 2
5.0000+ 2 ~ 6.0000+ 2	2.0105+ 1	1.9980+ 1							1.2321- 1				1.2583- 2
6.0000+ 2 ~ 8.0000+ 2	2.2231+ 1	2.2113+ 1							1.1744- 1				1.2606- 2
8.0000+ 2 ~ 1.0000+ 3	2.5514+ 1	2.5400+ 1							1.1458- 1				1.2630- 2
1.0000+ 3 ~ 1.5000+ 3	3.2865+ 1	3.2747+ 1							1.1780- 1				1.2662- 2
1.5000+ 3 ~ 2.0000+ 3	4.8329+ 1	4.8195+ 1							1.3410- 1				1.2694- 2
2.0000+ 3 ~ 3.0000+ 3	9.6481+ 1	9.6265+ 1							1.9583- 1				1.2729- 2
3.0000+ 3 ~ 4.0000+ 3	2.7534+ 2	2.7494+ 2							4.0545- 1				1.2761- 2
4.0000+ 3 ~ 5.0000+ 3	5.3602+ 2	5.3540+ 2							6.1897- 1				1.2786- 2
5.0000+ 3 ~ 6.0000+ 3	3.4225+ 2	3.4193+ 2							3.1931- 1				1.2805- 2
6.0000+ 3 ~ 8.0000+ 3	1.2362+ 2	1.2353+ 2							8.7909- 2				1.2829- 2
8.0000+ 3 ~ 1.0000+ 4	4.9843+ 1	4.9745+ 1							9.7805- 2				1.2853- 2
1.0000+ 4 ~ 1.5000+ 4	2.3179+ 1	2.3172+ 1							7.4364- 3				1.3774- 2
1.5000+ 4 ~ 2.0000+ 4	1.2434+ 1	1.2427+ 1							7.1175- 3				1.5203- 2
2.0000+ 4 ~ 3.0000+ 4	7.7898+ 0	7.7750+ 0							1.4784- 2				1.7508- 2
3.0000+ 4 ~ 4.0000+ 4	4.9431+ 0	4.9297+ 0							1.3379- 2				2.0802- 2
4.0000+ 4 ~ 5.0000+ 4	7.8936+ 0	7.8835+ 0							1.0103- 2				2.4230- 2
5.0000+ 4 ~ 6.0000+ 4	4.6333+ 0	4.6299+ 0							3.4324- 3				2.7722- 2
6.0000+ 4 ~ 8.0000+ 4	3.0161+ 0	3.0080+ 0							8.0777- 3				3.2992- 2
8.0000+ 4 ~ 1.0000+ 5	4.2922+ 0	4.2895+ 0							2.7432- 3				3.9963- 2
1.0000+ 5 ~ 1.5000+ 5	9.0816+ 0	9.0739+ 0							7.6902- 3				5.3044- 2
1.5000+ 5 ~ 2.0000+ 5	3.9164+ 0	3.9076+ 0							8.8242- 3				6.8225- 2
2.0000+ 5 ~ 3.0000+ 5	3.8118+ 0	3.8042+ 0							7.6304- 3				8.7276- 2
3.0000+ 5 ~ 4.0000+ 5	5.1661+ 0	5.1608+ 0							5.4291- 3				1.0825- 1
4.0000+ 5 ~ 5.0000+ 5	4.8092+ 0	4.8045+ 0							4.7596- 3			0.0000+ 0	1.2442- 1
5.0000+ 5 ~ 6.0000+ 5	4.4521+ 0	4.4479+ 0							4.8581- 3			3.5000- 6	1.3712- 1
6.0000+ 5 ~ 8.0000+ 5	4.0810+ 0	4.0759+ 0							5.1504- 3			1.4000- 5	1.5222- 1
8.0000+ 5 ~ 1.0000+ 6	3.7498+ 0	3.7442+ 0							5.5999- 3			2.8000- 5	1.6985- 1
1.0000+ 6 ~ 1.5000+ 6	3.4373+ 0	3.2723+ 0	1.5907- 1						4.9156- 3			8.2500- 5	2.1284- 1
1.5000+ 6 ~ 2.0000+ 6	3.2368+ 0	2.8018+ 0	4.3098- 1						3.4152- 3			2.0000- 4	2.8822- 1
2.0000+ 6 ~ 3.0000+ 6	3.2237+ 0	2.5754+ 0	6.4439- 1						3.3820- 3			4.9250- 4	3.9086- 1
3.0000+ 6 ~ 4.0000+ 6	3.3932+ 0	2.4554+ 0	9.3411- 1						2.5813- 3			1.0850- 3	5.1247- 1
4.0000+ 6 ~ 5.0000+ 6	3.5848+ 0	2.4349+ 0	1.1466+ 0						1.8750- 3	0.0000+ 0		1.9000- 3	6.1528- 1
5.0000+ 6 ~ 6.0000+ 6	3.6913+ 0	2.4558+ 0	1.2296+ 0						1.4361- 3	1.7500- 3		2.9250- 3	6.9120- 1
6.0000+ 6 ~ 8.0000+ 6	3.6700+ 0	2.4176+ 0	1.2233+ 0						9.1694- 4	2.3250- 2		4.9875- 3	7.6551- 1
8.0000+ 6 ~ 1.0000+ 7	3.4624+ 0	2.2400+ 0	1.1635+ 0						5.1651- 4	4.9625- 2		8.5750- 3	8.1284- 1
1.0000+ 7 ~ 1.5000+ 7	3.0052+ 0	1.7702+ 0	8.2997- 1	3.3428- 1					1.8361- 4	5.4350- 2		1.7400- 2	8.2900- 1

TABLE A1.24

Ni-64

MATERIAL =1285 CROSS SECTION NI-64

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	4.8521+ 0	2.8096- 1							4.5712+ 0				1.1152- 2
1.0000- 2 ~ 1.5000- 2	2.4064+ 0	2.8096- 1							2.1254+ 0				1.1281- 2
1.5000- 2 ~ 2.0000- 2	2.0699+ 0	2.8096- 1							1.7890+ 0				1.1317- 2
2.0000- 2 ~ 3.0000- 2	1.7839+ 0	2.8096- 1							1.5029+ 0				1.1355- 2
3.0000- 2 ~ 4.0000- 2	1.5460+ 0	2.8096- 1							1.2650+ 0				1.1392- 2
4.0000- 2 ~ 5.0000- 2	1.3983+ 0	2.8096- 1							1.1173+ 0				1.1419- 2
5.0000- 2 ~ 6.0000- 2	1.2891+ 0	2.8097- 1							1.0082+ 0				1.1440- 2
6.0000- 2 ~ 8.0000- 2	1.1755+ 0	2.8097- 1							8.9450- 1				1.1466- 2
8.0000- 2 ~ 1.0000- 1	1.0710+ 0	2.8097- 1							7.9006- 1				1.1493- 2
1.0000- 1 ~ 1.5000- 1	9.5223- 1	2.8098- 1							6.7125- 1				1.1528- 2
1.5000- 1 ~ 2.0000- 1	8.4783- 1	2.8098- 1							5.6684- 1				1.1564- 2
2.0000- 1 ~ 3.0000- 1	7.5565- 1	2.8100- 1							4.7466- 1				1.1602- 2
3.0000- 1 ~ 4.0000- 1	6.8184- 1	2.8101- 1							4.0082- 1				1.1638- 2
4.0000- 1 ~ 5.0000- 1	6.3377- 1	2.8103- 1							3.5274- 1				1.1665- 2
5.0000- 1 ~ 6.0000- 1	5.9958- 1	2.8104- 1							3.1854- 1				1.1687- 2
6.0000- 1 ~ 8.0000- 1	5.6451- 1	2.8107- 1							2.8344- 1				1.1712- 2
8.0000- 1 ~ 1.0000+ 0	5.3054- 1	2.8110- 1							2.4944- 1				1.1739- 2
1.0000+ 0 ~ 1.5000+ 0	4.9349- 1	2.8116- 1							2.1234- 1				1.1774- 2
1.5000+ 0 ~ 2.0000+ 0	4.6047- 1	2.8124- 1							1.7923- 1				1.1810- 2
2.0000+ 0 ~ 3.0000+ 0	4.3152- 1	2.8136- 1							1.5017- 1				1.1848- 2
3.0000+ 0 ~ 4.0000+ 0	4.0828- 1	2.8152- 1							1.2676- 1				1.1884- 2
4.0000+ 0 ~ 5.0000+ 0	3.9316- 1	2.8168- 1							1.1148- 1				1.1911- 2
5.0000+ 0 ~ 6.0000+ 0	3.8278- 1	2.8184- 1							1.0095- 1				1.1933- 2
6.0000+ 0 ~ 8.0000+ 0	3.7175- 1	2.8208- 1							8.9667- 2				1.1958- 2
8.0000+ 0 ~ 1.0000+ 1	3.6125- 1	2.8240- 1							7.8866- 2				1.1986- 2
1.0000+ 1 ~ 1.5000+ 1	3.5026- 1	2.8296- 1							6.7297- 2				1.2020- 2
1.5000+ 1 ~ 2.0000+ 1	3.4045- 1	2.8376- 1							5.6692- 2				1.2057- 2
2.0000+ 1 ~ 3.0000+ 1	3.3261- 1	2.8496- 1							4.7651- 2				1.2094- 2
3.0000+ 1 ~ 4.0000+ 1	3.2673- 1	2.8656- 1							4.0164- 2				1.2131- 2
4.0000+ 1 ~ 5.0000+ 1	3.2365- 1	2.8816- 1							3.5487- 2				1.2158- 2
5.0000+ 1 ~ 6.0000+ 1	3.2185- 1	2.8976- 1							3.2085- 2				1.2179- 2
6.0000+ 1 ~ 8.0000+ 1	3.2067- 1	2.9216- 1							2.8509- 2				1.2205- 2
8.0000+ 1 ~ 1.0000+ 2	3.2057- 1	2.9536- 1							2.5217- 2				1.2232- 2
1.0000+ 2 ~ 1.5000+ 2	3.2247- 1	3.0094- 1							2.1524- 2				1.2267- 2
1.5000+ 2 ~ 2.0000+ 2	3.2717- 1	3.0891- 1							1.8266- 2				1.2303- 2
2.0000+ 2 ~ 3.0000+ 2	3.3626- 1	3.2082- 1							1.5431- 2				1.2341- 2
3.0000+ 2 ~ 4.0000+ 2	3.4983- 1	3.3666- 1							1.3170- 2				1.2377- 2
4.0000+ 2 ~ 5.0000+ 2	3.6417- 1	3.5245- 1							1.1730- 2				1.2404- 2
5.0000+ 2 ~ 6.0000+ 2	3.7920- 1	3.6849- 1							1.0714- 2				1.2426- 2
6.0000+ 2 ~ 8.0000+ 2	4.0653- 1	3.9684- 1							9.6909- 3				1.2451- 2
8.0000+ 2 ~ 1.0000+ 3	4.4409- 1	4.3535- 1							8.7359- 3				1.2478- 2
1.0000+ 3 ~ 1.5000+ 3	5.1502- 1	5.0727- 1							7.7466- 3				1.2513- 2
1.5000+ 3 ~ 2.0000+ 3	6.3569- 1	6.2873- 1							6.9591- 3				1.2549- 2
2.0000+ 3 ~ 3.0000+ 3	8.6295- 1	8.5652- 1							6.4291- 3				1.2587- 2
3.0000+ 3 ~ 4.0000+ 3	1.2670+ 0	1.2607+ 0							6.2642- 3				1.2623- 2
4.0000+ 3 ~ 5.0000+ 3	1.8381+ 0	1.8316+ 0							6.4606- 3				1.2650- 2
5.0000+ 3 ~ 6.0000+ 3	2.6575+ 0	2.6505+ 0							6.9740- 3				1.2672- 2
6.0000+ 3 ~ 8.0000+ 3	4.7636+ 0	4.7551+ 0							8.5101- 3				1.2698- 2
8.0000+ 3 ~ 1.0000+ 4	1.0900+ 1	1.0887+ 1							1.3020- 2				1.2725- 2
1.0000+ 4 ~ 1.5000+ 4	9.1370+ 1	9.1290+ 1							7.9546- 2				1.3718- 2
1.5000+ 4 ~ 2.0000+ 4	4.2490+ 1	4.2459+ 1							3.0576- 2				1.5259- 2
2.0000+ 4 ~ 3.0000+ 4	6.4359+ 0	6.4261+ 0							9.8287- 3				1.7725- 2
3.0000+ 4 ~ 4.0000+ 4	6.4512+ 1	6.4483+ 1							2.9180- 2				2.1225- 2
4.0000+ 4 ~ 5.0000+ 4	3.1821+ 1	3.1818+ 1							3.6215- 3				2.4848- 2
5.0000+ 4 ~ 6.0000+ 4	1.6629+ 1	1.6628+ 1							9.8787- 4				2.8525- 2
6.0000+ 4 ~ 8.0000+ 4	1.0519+ 1	1.0516+ 1							3.2089- 3				3.4057- 2
8.0000+ 4 ~ 1.0000+ 5	7.2059+ 0	7.2057+ 0							1.5347- 4				4.1355- 2
1.0000+ 5 ~ 1.5000+ 5	5.1153+ 0	5.1114+ 0							3.9247- 3				5.5025- 2
1.5000+ 5 ~ 2.0000+ 5	7.4881+ 0	7.4847+ 0							3.3908- 3				7.0887- 2
2.0000+ 5 ~ 3.0000+ 5	5.0920+ 0	5.0888+ 0							3.1650- 3				9.0863- 2
3.0000+ 5 ~ 4.0000+ 5	5.2520+ 0	5.2488+ 0							3.1306- 3				1.1299- 1
4.0000+ 5 ~ 5.0000+ 5	4.9223+ 0	4.9191+ 0							3.1869- 3				1.3018- 1
5.0000+ 5 ~ 6.0000+ 5	4.5667+ 0	4.5634+ 0							3.2814- 3				1.4375- 1
6.0000+ 5 ~ 8.0000+ 5	4.1820+ 0	4.1784+ 0							3.5235- 3				1.5972- 1
8.0000+ 5 ~ 1.0000+ 6	3.8219+ 0	3.8180+ 0							3.8675- 3				1.7759- 1
1.0000+ 6 ~ 1.5000+ 6	3.4583+ 0	3.4202+ 0	3.2899- 2						4.5119- 3				2.0971- 1
1.5000+ 6 ~ 2.0000+ 6	3.2099+ 0	2.8616+ 0	3.4464- 1						3.0083- 3				2.7915- 1
2.0000+ 6 ~ 3.0000+ 6	3.1807+ 0	2.6144+ 0	5.6305- 1						3.0819- 3			6.4078- 6	3.6781- 1
3.0000+ 6 ~ 4.0000+ 6	3.3784+ 0	2.4787+ 0	8.9776- 1						1.9436- 3			4.7111- 5	4.8671- 1
4.0000+ 6 ~ 5.0000+ 6	3.6039+ 0	2.4458+ 0	1.1575+ 0						1.2871- 3			1.2500- 4	6.0307- 1
5.0000+ 6 ~ 6.0000+ 6	3.7344+ 0	2.4594+ 0	1.2739+ 0						8.8477- 4			2.8250- 4	6.9251- 1
6.0000+ 6 ~ 8.0000+ 6	3.7326+ 0	2.4502+ 0	1.2813+ 0						5.1566- 4			6.4375- 4	7.6954- 1
8.0000+ 6 ~ 1.0000+ 7	3.5471+ 0	2.3045+ 0	1.2386+ 0	2.4453- 3					2.6268- 4			1.3438- 3	8.1541- 1
1.0000+ 7 ~ 1.5000+ 7	3.1145+ 0	1.8524+ 0	6.4275- 1	6.1760- 1					5.9449- 5			3.4300- 3	8.3375- 1

TABLE A1.25

Cu

MATERIAL =1290 CROSS SECTION CU 0

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	1.9617+ 1	7.9345+ 0							1.1683+ 1				1.0582- 2
1.0000- 2 ~ 1.5000- 2	1.3355+ 1	7.9344+ 0							5.4206+ 0				1.0582- 2
1.5000- 2 ~ 2.0000- 2	1.2498+ 1	7.9344+ 0							4.5639+ 0				1.0582- 2
2.0000- 2 ~ 3.0000- 2	1.1767+ 1	7.9343+ 0							3.8328+ 0				1.0582- 2
3.0000- 2 ~ 4.0000- 2	1.1161+ 1	7.9342+ 0							3.2268+ 0				1.0582- 2
4.0000- 2 ~ 5.0000- 2	1.0782+ 1	7.9341+ 0							2.8478+ 0				1.0582- 2
5.0000- 2 ~ 6.0000- 2	1.0506+ 1	7.9339+ 0							2.5719+ 0				1.0582- 2
6.0000- 2 ~ 8.0000- 2	1.0215+ 1	7.9338+ 0							2.2813+ 0				1.0582- 2
8.0000- 2 ~ 1.0000- 1	9.9468+ 0	7.9335+ 0							2.0132+ 0				1.0582- 2
1.0000- 1 ~ 1.5000- 1	9.6447+ 0	7.9331+ 0							1.7116+ 0				1.0582- 2
1.5000- 1 ~ 2.0000- 1	9.3767+ 0	7.9325+ 0							1.4441+ 0				1.0582- 2
2.0000- 1 ~ 3.0000- 1	9.1412+ 0	7.9317+ 0							1.2095+ 0				1.0581- 2
3.0000- 1 ~ 4.0000- 1	8.9508+ 0	7.9305+ 0							1.0203+ 0				1.0581- 2
4.0000- 1 ~ 5.0000- 1	8.8274+ 0	7.9294+ 0							8.9797- 1				1.0581- 2
5.0000- 1 ~ 6.0000- 1	8.7387+ 0	7.9282+ 0							8.1044- 1				1.0581- 2
6.0000- 1 ~ 8.0000- 1	8.6467+ 0	7.9265+ 0							7.2019- 1				1.0581- 2
8.0000- 1 ~ 1.0000+ 0	8.5578+ 0	7.9242+ 0							6.3355- 1				1.0580- 2
1.0000+ 0 ~ 1.5000+ 0	8.4583+ 0	7.9202+ 0							5.3813- 1				1.0580- 2
1.5000+ 0 ~ 2.0000+ 0	8.3677+ 0	7.9145+ 0							4.5329- 1				1.0579- 2
2.0000+ 0 ~ 3.0000+ 0	8.2841+ 0	7.9059+ 0							3.7820- 1				1.0578- 2
3.0000+ 0 ~ 4.0000+ 0	8.2123+ 0	7.8945+ 0							3.1780- 1				1.0576- 2
4.0000+ 0 ~ 5.0000+ 0	8.1613+ 0	7.8832+ 0							2.7808- 1				1.0575- 2
5.0000+ 0 ~ 6.0000+ 0	8.1223+ 0	7.8719+ 0							2.5036- 1				1.0573- 2
6.0000+ 0 ~ 8.0000+ 0	8.0762+ 0	7.8552+ 0							2.2097- 1				1.0571- 2
8.0000+ 0 ~ 1.0000+ 1	8.0254+ 0	7.8330+ 0							1.9243- 1				1.0568- 2
1.0000+ 1 ~ 1.5000+ 1	7.9562+ 0	7.7947+ 0							1.6150- 1				1.0563- 2
1.5000+ 1 ~ 2.0000+ 1	7.8739+ 0	7.7411+ 0							1.3285- 1				1.0555- 2
2.0000+ 1 ~ 3.0000+ 1	7.7711+ 0	7.6632+ 0							1.0797- 1				1.0543- 2
3.0000+ 1 ~ 4.0000+ 1	7.6500+ 0	7.5630+ 0							8.7045- 2				1.0528- 2
4.0000+ 1 ~ 5.0000+ 1	7.5405+ 0	7.4670+ 0							7.3465- 2				1.0513- 2
5.0000+ 1 ~ 6.0000+ 1	7.4422+ 0	7.3703+ 0							6.3830- 2				1.0497- 2
6.0000+ 1 ~ 8.0000+ 1	7.3116+ 0	7.2578+ 0							5.3813- 2				1.0474- 2
8.0000+ 1 ~ 1.0000+ 2	7.1511+ 0	7.1069+ 0							4.4220- 2				1.0443- 2
1.0000+ 2 ~ 1.5000+ 2	6.9052+ 0	6.8710+ 0							3.4245- 2				1.0430- 2
1.5000+ 2 ~ 2.0000+ 2	6.5981+ 0	6.5696+ 0							2.6544- 2				1.0433- 2
2.0000+ 2 ~ 3.0000+ 2	6.2750+ 0	6.3820+ 0							5.9300- 1				1.0438- 2
3.0000+ 2 ~ 4.0000+ 2	5.9747+ 0	5.9576+ 0							1.7166- 2				1.0445- 2
4.0000+ 2 ~ 5.0000+ 2	5.4961+ 0	5.4689+ 0							2.7229- 2				1.0452- 2
5.0000+ 2 ~ 6.0000+ 2	3.1862+ 1	2.1707+ 1							1.0156+ 1				1.0460- 2
6.0000+ 2 ~ 8.0000+ 2	6.1537+ 0	5.9732+ 0							1.8051- 1				1.0473- 2
8.0000+ 2 ~ 1.0000+ 3	5.2376+ 0	5.0707+ 0							1.6690- 1				1.0493- 2
1.0000+ 3 ~ 1.5000+ 3	4.3143+ 0	4.2863+ 0							2.7947- 2				1.0533- 2
1.5000+ 3 ~ 2.0000+ 3	7.2583+ 0	7.1610+ 0							9.7269- 2				1.0595- 2
2.0000+ 3 ~ 3.0000+ 3	3.3430+ 1	3.2717+ 1							7.1283- 1				1.0703- 2
3.0000+ 3 ~ 4.0000+ 3	7.2268+ 0	7.1686+ 0							5.8245- 2				1.0860- 2
4.0000+ 3 ~ 5.0000+ 3	9.7896+ 0	9.4688+ 0							3.2088- 1				1.1035- 2
5.0000+ 3 ~ 6.0000+ 3	1.8546+ 1	1.8262+ 1							2.8325- 1				1.1214- 2
6.0000+ 3 ~ 8.0000+ 3	1.8453+ 1	1.8274+ 1							1.7931- 1				1.1517- 2
8.0000+ 3 ~ 1.0000+ 4	1.7969+ 1	1.7834+ 1							1.3536- 1				1.1930- 2
1.0000+ 4 ~ 1.5000+ 4	1.2754+ 1	1.2687+ 1							6.7394- 2				1.2708- 2
1.5000+ 4 ~ 2.0000+ 4	8.6073+ 0	8.5531+ 0							5.4192- 2				1.3910- 2
2.0000+ 4 ~ 3.0000+ 4	1.1847+ 1	1.1801+ 1							4.5874- 2				1.5836- 2
3.0000+ 4 ~ 4.0000+ 4	1.1511+ 1	1.1481+ 1							3.0544- 2				1.8528- 2
4.0000+ 4 ~ 5.0000+ 4	9.8868+ 0	9.8462+ 0							4.0607- 2				2.1308- 2
5.0000+ 4 ~ 6.0000+ 4	9.3329+ 0	9.2959+ 0							3.6990- 2				2.4128- 2
6.0000+ 4 ~ 8.0000+ 4	8.7132+ 0	8.6799+ 0							3.3310- 2				2.8385- 2
8.0000+ 4 ~ 1.0000+ 5	8.0910+ 0	8.0612+ 0							2.9868- 2				3.4019- 2
1.0000+ 5 ~ 1.5000+ 5	7.3378+ 0	7.3118+ 0							2.5965- 2				4.3549- 2
1.5000+ 5 ~ 2.0000+ 5	6.5820+ 0	6.5597+ 0							2.2309- 2				5.6221- 2
2.0000+ 5 ~ 3.0000+ 5	5.8364+ 0	5.8173+ 0							1.9073- 2				7.2761- 2
3.0000+ 5 ~ 4.0000+ 5	5.1551+ 0	5.1384+ 0							1.6717- 2				9.0899- 2
4.0000+ 5 ~ 5.0000+ 5	4.6786+ 0	4.6630+ 0							1.5655- 2				1.0516- 1
5.0000+ 5 ~ 6.0000+ 5	4.3220+ 0	4.3067+ 0							1.5264- 2				1.1675- 1
6.0000+ 5 ~ 8.0000+ 5	3.9209+ 0	3.8831+ 0	2.2411- 2						1.5166- 2				1.3222- 1
8.0000+ 5 ~ 1.0000+ 6	3.5365+ 0	3.4039+ 0	1.1649- 1						1.5018- 2				1.5404- 1
1.0000+ 6 ~ 1.5000+ 6	3.1980+ 0	2.7897+ 0	3.9461- 1						1.3135- 2				2.0153- 1
1.5000+ 6 ~ 2.0000+ 6	3.0050+ 0	2.2533+ 0	7.4166- 1						9.9600- 3				2.8364- 1
2.0000+ 6 ~ 3.0000+ 6	3.0989+ 0	2.0138+ 0	1.0778+ 0						7.8478- 3				4.0027- 1
3.0000+ 6 ~ 4.0000+ 6	3.4366+ 0	2.0365+ 0	1.3965+ 0						4.8674- 3				5.3925- 1
4.0000+ 6 ~ 5.0000+ 6	3.6912+ 0	2.1630+ 0	1.5251+ 0						3.2176- 3				6.5040- 1
5.0000+ 6 ~ 6.0000+ 6	3.7836+ 0	2.2533+ 0	1.5278+ 0						2.3595- 3				7.2450- 1
6.0000+ 6 ~ 8.0000+ 6	3.7110+ 0	2.2445+ 0	1.4651+ 0						1.5788- 3				7.8483- 1
8.0000+ 6 ~ 1.0000+ 7	3.4799+ 0	2.0539+ 0	1.4249+ 0						9.4366- 4				8.1876- 1
1.0000+ 7 ~ 1.5000+ 7	3.1161+ 0	1.6321+ 0	1.1693+ 0	3.1387- 1					4.2148- 4				8.2296- 1

TABLE A1.26

Cu-63

MATERIAL :1291 CROSS SECTION CU 63

ENERGY	TOTAL	ELASTIC	INELR	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	1.9458+ 1	5.5527+ 0							1.3905+ 1				1.0686- 2
1.0000- 2 ~ 1.5000- 2	1.1997+ 1	5.5526+ 0							6.4442+ 0				1.0686- 2
1.5000- 2 ~ 2.0000- 2	1.0993+ 1	5.5526+ 0							5.4399+ 0				1.0686- 2
2.0000- 2 ~ 3.0000- 2	1.0109+ 1	5.5525+ 0							4.5564+ 0				1.0686- 2
3.0000- 2 ~ 4.0000- 2	9.3986+ 0	5.5524+ 0							3.8462+ 0				1.0686- 2
4.0000- 2 ~ 5.0000- 2	8.9343+ 0	5.5523+ 0							3.3819+ 0				1.0686- 2
5.0000- 2 ~ 6.0000- 2	8.6132+ 0	5.5522+ 0							3.0609+ 0				1.0686- 2
6.0000- 2 ~ 8.0000- 2	8.2713+ 0	5.5521+ 0							2.7192+ 0				1.0686- 2
8.0000- 2 ~ 1.0000- 1	7.9427+ 0	5.5520+ 0							2.3908+ 0				1.0686- 2
1.0000- 1 ~ 1.5000- 1	7.5904+ 0	5.5517+ 0							2.0387+ 0				1.0686- 2
1.5000- 1 ~ 2.0000- 1	7.2674+ 0	5.5513+ 0							1.7161+ 0				1.0686- 2
2.0000- 1 ~ 3.0000- 1	6.9912+ 0	5.5506+ 0							1.4406+ 0				1.0686- 2
3.0000- 1 ~ 4.0000- 1	6.7621+ 0	5.5498+ 0							1.2123+ 0				1.0686- 2
4.0000- 1 ~ 5.0000- 1	6.6181+ 0	5.5490+ 0							1.0691+ 0				1.0686- 2
5.0000- 1 ~ 6.0000- 1	6.5135+ 0	5.5481+ 0							9.6536- 1				1.0686- 2
6.0000- 1 ~ 8.0000- 1	6.4024+ 0	5.5469+ 0							8.5554- 1				1.0686- 2
8.0000- 1 ~ 1.0000+ 0	6.2993+ 0	5.5453+ 0							7.5408- 1				1.0686- 2
1.0000+ 0 ~ 1.5000+ 0	6.1825+ 0	5.5424+ 0							6.4012- 1				1.0686- 2
1.5000+ 0 ~ 2.0000+ 0	6.0769+ 0	5.5382+ 0							5.3861- 1				1.0686- 2
2.0000+ 0 ~ 3.0000+ 0	5.9816+ 0	5.5321+ 0							4.4951- 1				1.0686- 2
3.0000+ 0 ~ 4.0000+ 0	5.9011+ 0	5.5239+ 0							3.7719- 1				1.0686- 2
4.0000+ 0 ~ 5.0000+ 0	5.8462+ 0	5.5158+ 0							3.3030- 1				1.0686- 2
5.0000+ 0 ~ 6.0000+ 0	5.8045+ 0	5.5078+ 0							2.9667- 1				1.0686- 2
6.0000+ 0 ~ 8.0000+ 0	5.7575+ 0	5.4958+ 0							2.6167- 1				1.0686- 2
8.0000+ 0 ~ 1.0000+ 1	5.7080+ 0	5.4800+ 0							2.2798- 1				1.0686- 2
1.0000+ 1 ~ 1.5000+ 1	5.6434+ 0	5.4530+ 0							1.9041- 1				1.0686- 2
1.5000+ 1 ~ 2.0000+ 1	5.5719+ 0	5.4152+ 0							1.5665- 1				1.0686- 2
2.0000+ 1 ~ 3.0000+ 1	5.4872+ 0	5.3609+ 0							1.2630- 1				1.0686- 2
3.0000+ 1 ~ 4.0000+ 1	5.3935+ 0	5.2920+ 0							1.0158- 1				1.0686- 2
4.0000+ 1 ~ 5.0000+ 1	5.3118+ 0	5.2267+ 0							8.5179- 2				1.0686- 2
5.0000+ 1 ~ 6.0000+ 1	5.2384+ 0	5.1648+ 0							7.3533- 2				1.0686- 2
6.0000+ 1 ~ 8.0000+ 1	5.1397+ 0	5.0783+ 0							6.1352- 2				1.0686- 2
8.0000+ 1 ~ 1.0000+ 2	5.0220+ 0	4.9719+ 0							5.0094- 2				1.0686- 2
1.0000+ 2 ~ 1.5000+ 2	4.8451+ 0	4.8071+ 0							3.8001- 2				1.0688- 2
1.5000+ 2 ~ 2.0000+ 2	4.6308+ 0	4.6027+ 0							2.8123- 2				1.0692- 2
2.0000+ 2 ~ 3.0000+ 2	4.3623+ 0	4.3408+ 0							2.1459- 2				1.0698- 2
3.0000+ 2 ~ 4.0000+ 2	4.0258+ 0	4.0059+ 0							1.9938- 2				1.0704- 2
4.0000+ 2 ~ 5.0000+ 2	3.5737+ 0	3.5380+ 0							3.5686- 2				1.0711- 2
5.0000+ 2 ~ 6.0000+ 2	4.2005+ 1	2.7318+ 1							1.4688+ 1				1.0719- 2
6.0000+ 2 ~ 8.0000+ 2	5.1326+ 0	4.8737+ 0							2.5891- 1				1.0733- 2
8.0000+ 2 ~ 1.0000+ 3	4.0858+ 0	3.8459+ 0							2.3982- 1				1.0752- 2
1.0000+ 3 ~ 1.5000+ 3	3.2240+ 0	3.2133+ 0							1.0767- 2				1.0797- 2
1.5000+ 3 ~ 2.0000+ 3	8.1549+ 0	8.0159+ 0							1.3902- 1				1.0857- 2
2.0000+ 3 ~ 3.0000+ 3	3.8402+ 1	3.7535+ 1							8.6726- 1				1.0973- 2
3.0000+ 3 ~ 4.0000+ 3	4.3017+ 0	4.2979+ 0							3.8049- 3				1.1134- 2
4.0000+ 3 ~ 5.0000+ 3	8.9141+ 0	8.5040+ 0							4.1013- 1				1.1329- 2
5.0000+ 3 ~ 6.0000+ 3	2.4900+ 1	2.4491+ 1							4.0884- 1				1.1485- 2
6.0000+ 3 ~ 8.0000+ 3	1.4736+ 1	1.4546+ 1							1.8987- 1				1.1832- 2
8.0000+ 3 ~ 1.0000+ 4	2.0427+ 1	2.0256+ 1							1.7095- 1				1.2230- 2
1.0000+ 4 ~ 1.5000+ 4	1.3943+ 1	1.3861+ 1							8.2122- 2				1.2984- 2
1.5000+ 4 ~ 2.0000+ 4	8.8575+ 0	8.7847+ 0							7.2720- 2				1.4207- 2
2.0000+ 4 ~ 3.0000+ 4	1.2916+ 1	1.2856+ 1							5.9677- 2				1.6147- 2
3.0000+ 4 ~ 4.0000+ 4	1.1860+ 1	1.1809+ 1							5.1553- 2				1.8857- 2
4.0000+ 4 ~ 5.0000+ 4	1.1177+ 1	1.1104+ 1							7.3323- 2				2.1665- 2
5.0000+ 4 ~ 6.0000+ 4	1.0531+ 1	1.0465+ 1							6.6888- 2				2.4516- 2
6.0000+ 4 ~ 8.0000+ 4	9.8102+ 0	9.7498+ 0							6.0374- 2				2.8780- 2
8.0000+ 4 ~ 1.0000+ 5	9.0875+ 0	9.0332+ 0							5.4321- 2				3.4449- 2
1.0000+ 5 ~ 1.5000+ 5	8.2155+ 0	8.1680+ 0							4.7423- 2				4.3958- 2
1.5000+ 5 ~ 2.0000+ 5	7.3446+ 0	7.3036+ 0							4.0918- 2				5.6666- 2
2.0000+ 5 ~ 3.0000+ 5	6.4914+ 0	6.4563+ 0							3.5029- 2				7.2941- 2
3.0000+ 5 ~ 4.0000+ 5	5.7184+ 0	5.6878+ 0							3.0632- 2				9.0619- 2
4.0000+ 5 ~ 5.0000+ 5	5.1835+ 0	5.1549+ 0							2.8576- 2				1.0442- 1
5.0000+ 5 ~ 6.0000+ 5	4.7869+ 0	4.7591+ 0							2.7771- 2				1.1557- 1
6.0000+ 5 ~ 8.0000+ 5	4.3434+ 0	4.2838+ 0	3.1489- 2						2.7464- 2				1.3081- 1
8.0000+ 5 ~ 1.0000+ 6	3.8951+ 0	3.7337+ 0	1.3359- 1						2.6902- 2				1.5366- 1
1.0000+ 6 ~ 1.5000+ 6	3.5215+ 0	3.0540+ 0	4.4229- 1						2.3029- 2				2.0372- 1
1.5000+ 6 ~ 2.0000+ 6	3.2782+ 0	2.4678+ 0	7.9221- 1						1.7186- 2				2.9179- 1
2.0000+ 6 ~ 3.0000+ 6	3.3473+ 0	2.2235+ 0	1.1110+ 0						1.3394- 2				4.1158- 1
3.0000+ 6 ~ 4.0000+ 6	3.6706+ 0	2.2657+ 0	1.3974+ 0						8.5881- 3				5.4759- 1
4.0000+ 6 ~ 5.0000+ 6	3.9340+ 0	2.4110+ 0	1.5172+ 0						5.8507- 3				6.5457- 1
5.0000+ 6 ~ 6.0000+ 6	4.0335+ 0	2.5073+ 0	1.5216+ 0						4.3934- 3				7.2673- 1
6.0000+ 6 ~ 8.0000+ 6	3.9520+ 0	2.4881+ 0	1.4611+ 0						2.9970- 3				7.8589- 1
8.0000+ 6 ~ 1.0000+ 7	3.6854+ 0	2.2666+ 0	1.4158+ 0						1.8329- 3				8.1862- 1
1.0000+ 7 ~ 1.5000+ 7	3.2669+ 0	1.7921+ 0	1.2603+ 0	2.1346- 1					8.5220- 4				8.2047- 1

TABLE A1.27

Cu-65

MATERIAL =1292

CROSS SECTION

CU-65

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	2.1014+ 1	1.4298+ 1							6.7161+ 0				1.0358- 2
1.0000- 2 ~ 1.5000- 2	1.7415+ 1	1.4298+ 1							3.1163+ 0				1.0358- 2
1.5000- 2 ~ 2.0000- 2	1.6922+ 1	1.4298+ 1							2.6238+ 0				1.0358- 2
2.0000- 2 ~ 3.0000- 2	1.6502+ 1	1.4298+ 1							2.2035+ 0				1.0358- 2
3.0000- 2 ~ 4.0000- 2	1.6153+ 1	1.4298+ 1							1.8552+ 0				1.0358- 2
4.0000- 2 ~ 5.0000- 2	1.5935+ 1	1.4298+ 1							1.6373+ 0				1.0358- 2
5.0000- 2 ~ 6.0000- 2	1.5776+ 1	1.4298+ 1							1.4788+ 0				1.0358- 2
6.0000- 2 ~ 8.0000- 2	1.5609+ 1	1.4297+ 1							1.3118+ 0				1.0358- 2
8.0000- 2 ~ 1.0000- 1	1.5455+ 1	1.4297+ 1							1.1577+ 0				1.0358- 2
1.0000- 1 ~ 1.5000- 1	1.5281+ 1	1.4296+ 1							9.8430- 1				1.0358- 2
1.5000- 1 ~ 2.0000- 1	1.5126+ 1	1.4296+ 1							8.3062- 1				1.0359- 2
2.0000- 1 ~ 3.0000- 1	1.4990+ 1	1.4294+ 1							6.9584- 1				1.0359- 2
3.0000- 1 ~ 4.0000- 1	1.4880+ 1	1.4293+ 1							5.8714- 1				1.0359- 2
4.0000- 1 ~ 5.0000- 1	1.4808+ 1	1.4291+ 1							5.1692- 1				1.0359- 2
5.0000- 1 ~ 6.0000- 1	1.4756+ 1	1.4290+ 1							4.6668- 1				1.0359- 2
6.0000- 1 ~ 8.0000- 1	1.4702+ 1	1.4287+ 1							4.1490- 1				1.0359- 2
8.0000- 1 ~ 1.0000+ 0	1.4649+ 1	1.4284+ 1							3.6521- 1				1.0359- 2
1.0000+ 0 ~ 1.5000+ 0	1.4589+ 1	1.4279+ 1							3.1053- 1				1.0359- 2
1.5000+ 0 ~ 2.0000+ 0	1.4532+ 1	1.4271+ 1							2.6196- 1				1.0359- 2
2.0000+ 0 ~ 3.0000+ 0	1.4478+ 1	1.4259+ 1							2.1906- 1				1.0359- 2
3.0000+ 0 ~ 4.0000+ 0	1.4427+ 1	1.4243+ 1							1.8463- 1				1.0359- 2
4.0000+ 0 ~ 5.0000+ 0	1.4389+ 1	1.4227+ 1							1.6204- 1				1.0359- 2
5.0000+ 0 ~ 6.0000+ 0	1.4357+ 1	1.4211+ 1							1.4631- 1				1.0359- 2
6.0000+ 0 ~ 8.0000+ 0	1.4317+ 1	1.4187+ 1							1.2970- 1				1.0359- 2
8.0000+ 0 ~ 1.0000+ 1	1.4270+ 1	1.4156+ 1							1.1361- 1				1.0359- 2
1.0000+ 1 ~ 1.5000+ 1	1.4198+ 1	1.4102+ 1							9.6277- 2				1.0359- 2
1.5000+ 1 ~ 2.0000+ 1	1.4105+ 1	1.4025+ 1							8.0315- 2				1.0359- 2
2.0000+ 1 ~ 3.0000+ 1	1.3978+ 1	1.3911+ 1							6.6549- 2				1.0359- 2
3.0000+ 1 ~ 4.0000+ 1	1.3818+ 1	1.3763+ 1							5.5033- 2				1.0359- 2
4.0000+ 1 ~ 5.0000+ 1	1.3666+ 1	1.3618+ 1							4.7707- 2				1.0360- 2
5.0000+ 1 ~ 6.0000+ 1	1.3519+ 1	1.3477+ 1							4.2405- 2				1.0360- 2
6.0000+ 1 ~ 8.0000+ 1	1.3308+ 1	1.3272+ 1							3.6698- 2				1.0360- 2
8.0000+ 1 ~ 1.0000+ 2	1.3039+ 1	1.3007+ 1							3.1311- 2				1.0360- 2
1.0000+ 2 ~ 1.5000+ 2	1.2597+ 1	1.2572+ 1							2.5678- 2				1.0361- 2
1.5000+ 2 ~ 2.0000+ 2	1.1993+ 1	1.1970+ 1							2.2938- 2				1.0364- 2
2.0000+ 2 ~ 3.0000+ 2	1.1388+ 1	1.1516+ 1							1.8720+ 0				1.0369- 2
3.0000+ 2 ~ 4.0000+ 2	1.0583+ 1	1.0572+ 1							1.1042- 2				1.0375- 2
4.0000+ 2 ~ 5.0000+ 2	9.8839+ 0	9.8756+ 0							8.3243- 3				1.0383- 2
5.0000+ 2 ~ 6.0000+ 2	9.2958+ 0	9.2892+ 0							6.6849- 3				1.0391- 2
6.0000+ 2 ~ 8.0000+ 2	8.5727+ 0	8.5675+ 0							5.1775- 3				1.0404- 2
8.0000+ 2 ~ 1.0000+ 3	7.7912+ 0	7.7873+ 0							3.9914- 3				1.0424- 2
1.0000+ 3 ~ 1.5000+ 3	6.7998+ 0	6.7332+ 0							6.6650- 2				1.0469- 2
1.5000+ 3 ~ 2.0000+ 3	5.3858+ 0	5.3821+ 0							3.7081- 3				1.0529- 2
2.0000+ 3 ~ 3.0000+ 3	2.2598+ 1	2.2233+ 1							3.6522- 1				1.0645- 2
3.0000+ 3 ~ 4.0000+ 3	1.3884+ 1	1.3704+ 1							1.8003- 1				1.0805- 2
4.0000+ 3 ~ 5.0000+ 3	1.1946+ 1	1.1825+ 1							1.2108- 1				1.0952- 2
5.0000+ 3 ~ 6.0000+ 3	4.5537+ 0	4.5515+ 0							2.2612- 3				1.1153- 2
6.0000+ 3 ~ 8.0000+ 3	2.4419+ 1	2.4264+ 1							1.5543- 1				1.1496- 2
8.0000+ 3 ~ 1.0000+ 4	1.2503+ 1	1.2447+ 1							5.5807- 2				1.1889- 2
1.0000+ 4 ~ 1.5000+ 4	1.0096+ 1	1.0062+ 1							3.4438- 2				1.2632- 2
1.5000+ 4 ~ 2.0000+ 4	8.2670+ 0	8.2543+ 0							1.2721- 2				1.3837- 2
2.0000+ 4 ~ 3.0000+ 4	9.3900+ 0	9.3750+ 0							1.5004- 2				1.5747- 2
3.0000+ 4 ~ 4.0000+ 4	8.8033+ 0	8.7828+ 0							2.0507- 2				1.8420- 2
4.0000+ 4 ~ 5.0000+ 4	1.0609+ 1	1.0574+ 1							3.5145- 2				2.1192- 2
5.0000+ 4 ~ 6.0000+ 4	1.0057+ 1	1.0025+ 1							3.1805- 2				2.4017- 2
6.0000+ 4 ~ 8.0000+ 4	9.4368+ 0	9.4084+ 0							2.8319- 2				2.8257- 2
8.0000+ 4 ~ 1.0000+ 5	8.8111+ 0	8.7861+ 0							2.4977- 2				3.3925- 2
1.0000+ 5 ~ 1.5000+ 5	8.0474+ 0	8.0262+ 0							2.1270- 2				4.3534- 2
1.5000+ 5 ~ 2.0000+ 5	7.2727+ 0	7.2548+ 0							1.7886- 2				5.6567- 2
2.0000+ 5 ~ 3.0000+ 5	6.4954+ 0	6.4802+ 0							1.5189- 2				7.3658- 2
3.0000+ 5 ~ 4.0000+ 5	5.7709+ 0	5.7575+ 0							1.3468- 2				9.2780- 2
4.0000+ 5 ~ 5.0000+ 5	5.2524+ 0	5.2396+ 0							1.2858- 2				1.0819- 1
5.0000+ 5 ~ 6.0000+ 5	4.8562+ 0	4.8435+ 0							1.2745- 2				1.2083- 1
6.0000+ 5 ~ 8.0000+ 5	4.3983+ 0	4.3832+ 0	2.1126- 3						1.2946- 2				1.3681- 1
8.0000+ 5 ~ 1.0000+ 6	3.9836+ 0	3.8904+ 0	7.8254- 2						1.3473- 2				1.5692- 1
1.0000+ 6 ~ 1.5000+ 6	3.5038+ 0	3.2016+ 0	2.8799- 1						1.2893- 2				1.9965- 1
1.5000+ 6 ~ 2.0000+ 6	3.2235+ 0	2.5837+ 0	6.2863- 1						1.0396- 2				2.7268- 1
2.0000+ 6 ~ 3.0000+ 6	3.2805+ 0	2.2692+ 0	1.0035+ 0						8.5048- 3				3.8235- 1
3.0000+ 6 ~ 4.0000+ 6	3.6539+ 0	2.2561+ 0	1.3947+ 0						4.6574- 3				5.2816- 1
4.0000+ 6 ~ 5.0000+ 6	3.9314+ 0	2.3860+ 0	1.5427+ 0						2.6866- 3				6.4868- 1
5.0000+ 6 ~ 6.0000+ 6	4.0393+ 0	2.4957+ 0	1.5415+ 0						1.7431- 3				7.2549- 1
6.0000+ 6 ~ 8.0000+ 6	3.9818+ 0	2.5069+ 0	1.4740+ 0						1.0381- 3				7.8539- 1
8.0000+ 6 ~ 1.0000+ 7	3.7607+ 0	2.3166+ 0	1.4424+ 0						5.2699- 4				8.1955- 1
1.0000+ 7 ~ 1.5000+ 7	3.3664+ 0	1.8613+ 0	9.6605- 1	5.3841- 1					1.6084- 4				8.2558- 1

TABLE A1.28

Mo

MATERIAL :1420 CROSS SECTION MO-0

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	1.3182+ 1	4.8831+ 0							8.2974+ 0				7.0127- 3
1.0000- 2 ~ 1.5000- 2	8.7322+ 0	4.8830+ 0							3.8490+ 0				7.0127- 3
1.5000- 2 ~ 2.0000- 2	8.1237+ 0	4.8830+ 0							3.2433+ 0				7.0127- 3
2.0000- 2 ~ 3.0000- 2	7.6086+ 0	4.8830+ 0							2.7208+ 0				7.0126- 3
3.0000- 2 ~ 4.0000- 2	7.1793+ 0	4.8830+ 0							2.2940+ 0				7.0126- 3
4.0000- 2 ~ 5.0000- 2	6.9048+ 0	4.8829+ 0							2.0242+ 0				7.0126- 3
5.0000- 2 ~ 6.0000- 2	6.7090+ 0	4.8829+ 0							1.8277+ 0				7.0126- 3
6.0000- 2 ~ 8.0000- 2	6.5066+ 0	4.8828+ 0							1.6229+ 0				7.0126- 3
8.0000- 2 ~ 1.0000- 1	6.3132+ 0	4.8828+ 0							1.4319+ 0				7.0126- 3
1.0000- 1 ~ 1.5000- 1	6.1011+ 0	4.8827+ 0							1.2174+ 0				7.0125- 3
1.5000- 1 ~ 2.0000- 1	5.9129+ 0	4.8825+ 0							1.0290+ 0				7.0124- 3
2.0000- 1 ~ 3.0000- 1	5.7453+ 0	4.8822+ 0							8.6279- 1				7.0123- 3
3.0000- 1 ~ 4.0000- 1	5.6121+ 0	4.8819+ 0							7.3013- 1				7.0122- 3
4.0000- 1 ~ 5.0000- 1	5.5249+ 0	4.8816+ 0							6.4290- 1				7.0120- 3
5.0000- 1 ~ 6.0000- 1	5.4632+ 0	4.8812+ 0							5.8185- 1				7.0119- 3
6.0000- 1 ~ 8.0000- 1	5.3988+ 0	4.8807+ 0							5.1906- 1				7.0117- 3
8.0000- 1 ~ 1.0000+ 0	5.3383+ 0	4.8800+ 0							4.5775- 1				7.0114- 3
1.0000+ 0 ~ 1.5000+ 0	5.2717+ 0	4.8788+ 0							3.9249- 1				7.0109- 3
1.5000+ 0 ~ 2.0000+ 0	5.2103+ 0	4.8770+ 0							3.3313- 1				7.0101- 3
2.0000+ 0 ~ 3.0000+ 0	5.1575+ 0	4.8743+ 0							2.8346- 1				7.0090- 3
3.0000+ 0 ~ 4.0000+ 0	5.1135+ 0	4.8704+ 0							2.4297- 1				7.0076- 3
4.0000+ 0 ~ 5.0000+ 0	5.0852+ 0	4.8663+ 0							2.1841- 1				7.0061- 3
5.0000+ 0 ~ 6.0000+ 0	5.0642+ 0	4.8620+ 0							2.0240- 1				7.0046- 3
6.0000+ 0 ~ 8.0000+ 0	5.0414+ 0	4.8550+ 0							1.8629- 1				7.0024- 3
8.0000+ 0 ~ 1.0000+ 1	5.0237+ 0	4.8449+ 0							1.7871- 1				6.9995- 3
1.0000+ 1 ~ 1.5000+ 1	5.9511+ 0	4.8239+ 0							1.1270+ 0				6.9944- 3
1.5000+ 1 ~ 2.0000+ 1	4.9543+ 0	4.7851+ 0							1.6907- 1				6.9870- 3
2.0000+ 1 ~ 3.0000+ 1	4.9026+ 0	4.6973+ 0							2.0512- 1				6.9760- 3
3.0000+ 1 ~ 4.0000+ 1	5.2611+ 0	4.6022+ 0							6.5888- 1				6.9614- 3
4.0000+ 1 ~ 5.0000+ 1	1.6403+ 2	9.2862+ 1							7.1170+ 1				6.9467- 3
5.0000+ 1 ~ 6.0000+ 1	7.2113+ 0	8.6741+ 0							5.3708- 1				6.9321- 3
6.0000+ 1 ~ 8.0000+ 1	7.5512+ 0	5.6532+ 0							1.8980+ 0				6.9101- 3
8.0000+ 1 ~ 1.0000+ 2	5.2158+ 0	5.0710+ 0							1.4448- 1				6.8808- 3
1.0000+ 2 ~ 1.5000+ 2	3.5560+ 1	2.7619+ 1							7.9409+ 0				6.8725- 3
1.5000+ 2 ~ 2.0000+ 2	6.2459+ 0	5.6552+ 0							5.9062- 1				6.8853- 3
2.0000+ 2 ~ 3.0000+ 2	5.7178+ 0	5.2514+ 0							4.6635- 1				6.9048- 3
3.0000+ 2 ~ 4.0000+ 2	1.7677+ 1	1.5352+ 1							2.3247+ 0				6.9323- 3
4.0000+ 2 ~ 5.0000+ 2	1.9930+ 1	1.6560+ 1							3.3700+ 0				6.9634- 3
5.0000+ 2 ~ 6.0000+ 2	8.7388+ 0	7.6277+ 0							1.1111+ 0				6.9954- 3
6.0000+ 2 ~ 8.0000+ 2	9.9268+ 0	8.4046+ 0							1.5223+ 0				7.0455- 3
8.0000+ 2 ~ 1.0000+ 3	7.0915+ 0	6.2509+ 0							8.3253- 1				7.1155- 3
1.0000+ 3 ~ 1.5000+ 3	7.4214+ 0	6.6811+ 0							7.4023- 1				7.2526- 3
1.5000+ 3 ~ 2.0000+ 3	9.3361+ 0	8.6156+ 0							7.2049- 1				7.4638- 3
2.0000+ 3 ~ 3.0000+ 3	7.9608+ 0	7.3431+ 0							6.1727- 1				7.7926- 3
3.0000+ 3 ~ 4.0000+ 3	1.3056+ 1	1.2469+ 1							5.8657- 1				8.2467- 3
4.0000+ 3 ~ 5.0000+ 3	7.6896+ 0	7.1374+ 0							5.5185- 1				8.7569- 3
5.0000+ 3 ~ 6.0000+ 3	7.4603+ 0	7.0268+ 0							4.3272- 1				9.2814- 3
6.0000+ 3 ~ 8.0000+ 3	7.9856+ 0	7.5528+ 0							4.3091- 1				1.0097- 2
8.0000+ 3 ~ 1.0000+ 4	8.0234+ 0	7.6496+ 0							3.7006- 1				1.1227- 2
1.0000+ 4 ~ 1.5000+ 4	8.1467+ 0	7.8497+ 0							2.9263- 1				1.3808- 2
1.5000+ 4 ~ 2.0000+ 4	8.4217+ 0	8.1872+ 0							2.3272- 1				1.7631- 2
2.0000+ 4 ~ 3.0000+ 4	8.3312+ 0	8.1490+ 0							1.8174- 1				2.3389- 2
3.0000+ 4 ~ 4.0000+ 4	8.5815+ 0	8.4363+ 0							1.4461- 1				3.1577- 2
4.0000+ 4 ~ 5.0000+ 4	8.7066+ 0	8.5862+ 0							1.2015- 1				4.0167- 2
5.0000+ 4 ~ 6.0000+ 4	8.8185+ 0	8.7143+ 0							1.0398- 1				4.8962- 2
6.0000+ 4 ~ 8.0000+ 4	8.9572+ 0	8.8688+ 0							8.8346- 2				6.2351- 2
8.0000+ 4 ~ 1.0000+ 5	9.0954+ 0	9.0202+ 0							7.5170- 2				7.9933- 2
1.0000+ 5 ~ 1.5000+ 5	9.2037+ 0	9.1392+ 0							6.4274- 2				1.0905- 1
1.5000+ 5 ~ 2.0000+ 5	9.2588+ 0	9.2025+ 0							5.6322- 2				1.4959- 1
2.0000+ 5 ~ 3.0000+ 5	9.1361+ 0	9.0520+ 0	3.1825- 2						5.2195- 2				2.0201- 1
3.0000+ 5 ~ 4.0000+ 5	8.8212+ 0	8.6907+ 0	7.8705- 2						5.1685- 2				2.5839- 1
4.0000+ 5 ~ 5.0000+ 5	8.4356+ 0	8.2854+ 0	9.6849- 2						5.3270- 2				3.0030- 1
5.0000+ 5 ~ 6.0000+ 5	8.0358+ 0	7.8530+ 0	1.2840- 1						5.4265- 2				3.3163- 1
6.0000+ 5 ~ 8.0000+ 5	7.4690+ 0	7.1962+ 0	2.1868- 1						5.3882- 2				3.6692- 1
8.0000+ 5 ~ 1.0000+ 6	6.8327+ 0	6.1898+ 0	5.9987- 1						4.2679- 2				4.1144- 1
1.0000+ 6 ~ 1.5000+ 6	5.9308+ 0	4.9270+ 0	9.6932- 1						3.4264- 2				4.5005- 1
1.5000+ 6 ~ 2.0000+ 6	5.0346+ 0	3.7233+ 0	1.2825+ 0						2.8442- 2				4.7215- 1
2.0000+ 6 ~ 3.0000+ 6	4.2374+ 0	2.6702+ 0	1.5452+ 0						2.1868- 2				4.8498- 1
3.0000+ 6 ~ 4.0000+ 6	3.8171+ 0	2.1104+ 0	1.6911+ 0						1.5501- 2				5.1063- 1
4.0000+ 6 ~ 5.0000+ 6	3.8107+ 0	2.0136+ 0	1.7869+ 0						1.0018- 2				5.7392- 1
5.0000+ 6 ~ 6.0000+ 6	3.9550+ 0	2.1280+ 0	1.8215+ 0						5.7278- 3				6.3868- 1
6.0000+ 6 ~ 8.0000+ 6	4.2121+ 0	2.4065+ 0	1.7999+ 0						2.5984- 3				7.2800- 1
8.0000+ 6 ~ 1.0000+ 7	4.3850+ 0	2.6513+ 0	1.7323+ 0						9.4706- 4				8.0898- 1
1.0000+ 7 ~ 1.5000+ 7	4.2987+ 0	2.5604+ 0	1.7370+ 0						2.8893- 4				8.5878- 1

TABLE A1.29

Mo-92

MATERIAL =1421 CROSS SECTION MO-92

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	4.6070+ 0	4.5462+ 0							6.0807- 2				7.9706- 3
1.0000- 2 ~ 1.5000- 2	4.5744+ 0	4.5462+ 0							2.8171- 2				8.1043- 3
1.5000- 2 ~ 2.0000- 2	4.5700+ 0	4.5462+ 0							2.3801- 2				8.1418- 3
2.0000- 2 ~ 3.0000- 2	4.5662+ 0	4.5462+ 0							1.9920- 2				8.1809- 3
3.0000- 2 ~ 4.0000- 2	4.5631+ 0	4.5462+ 0							1.6830- 2				8.2184- 3
4.0000- 2 ~ 5.0000- 2	4.5611+ 0	4.5462+ 0							1.4803- 2				8.2463- 3
5.0000- 2 ~ 6.0000- 2	4.5596+ 0	4.5462+ 0							1.3369- 2				8.2686- 3
6.0000- 2 ~ 8.0000- 2	4.5582+ 0	4.5462+ 0							1.1901- 2				8.2950- 3
8.0000- 2 ~ 1.0000- 1	4.5567+ 0	4.5462+ 0							1.0468- 2				8.3229- 3
1.0000- 1 ~ 1.5000- 1	4.5552+ 0	4.5462+ 0							8.9159- 3				8.3587- 3
1.5000- 1 ~ 2.0000- 1	4.5538+ 0	4.5463+ 0							7.5210- 3				8.3962- 3
2.0000- 1 ~ 3.0000- 1	4.5526+ 0	4.5463+ 0							6.3055- 3				8.4353- 3
3.0000- 1 ~ 4.0000- 1	4.5516+ 0	4.5463+ 0							5.3183- 3				8.4728- 3
4.0000- 1 ~ 5.0000- 1	4.5509+ 0	4.5463+ 0							4.6783- 3				8.5008- 3
5.0000- 1 ~ 6.0000- 1	4.5505+ 0	4.5463+ 0							4.2417- 3				8.5230- 3
6.0000- 1 ~ 8.0000- 1	4.5500+ 0	4.5463+ 0							3.7629- 3				8.5494- 3
8.0000- 1 ~ 1.0000+ 0	4.5496+ 0	4.5463+ 0							3.3098- 3				8.5774- 3
1.0000+ 0 ~ 1.5000+ 0	4.5491+ 0	4.5463+ 0							2.8258- 3				8.6131- 3
1.5000+ 0 ~ 2.0000+ 0	4.5487+ 0	4.5463+ 0							2.3796- 3				8.6507- 3
2.0000+ 0 ~ 3.0000+ 0	4.5484+ 0	4.5464+ 0							2.0012- 3				8.6897- 3
3.0000+ 0 ~ 4.0000+ 0	4.5481+ 0	4.5464+ 0							1.6863- 3				8.7273- 3
4.0000+ 0 ~ 5.0000+ 0	4.5480+ 0	4.5465+ 0							1.4915- 3				8.7552- 3
5.0000+ 0 ~ 6.0000+ 0	4.5479+ 0	4.5465+ 0							1.3473- 3				8.7775- 3
6.0000+ 0 ~ 8.0000+ 0	4.5478+ 0	4.5466+ 0							1.1976- 3				8.8039- 3
8.0000+ 0 ~ 1.0000+ 1	4.5478+ 0	4.5467+ 0							1.0606- 3				8.8318- 3
1.0000+ 1 ~ 1.5000+ 1	4.5478+ 0	4.5469+ 0							9.0499- 4				8.8676- 3
1.5000+ 1 ~ 2.0000+ 1	4.5479+ 0	4.5471+ 0							7.6931- 4				8.9051- 3
2.0000+ 1 ~ 3.0000+ 1	4.5482+ 0	4.5475+ 0							6.5063- 4				8.9442- 3
3.0000+ 1 ~ 4.0000+ 1	4.5486+ 0	4.5480+ 0							5.5731- 4				8.9817- 3
4.0000+ 1 ~ 5.0000+ 1	4.5490+ 0	4.5485+ 0							4.9782- 4				9.0097- 3
5.0000+ 1 ~ 6.0000+ 1	4.5494+ 0	4.5489+ 0							4.5677- 4				9.0319- 3
6.0000+ 1 ~ 8.0000+ 1	4.5500+ 0	4.5496+ 0							4.1696- 4				9.0583- 3
8.0000+ 1 ~ 1.0000+ 2	4.5508+ 0	4.5504+ 0							3.8140- 4				9.0863- 3
1.0000+ 2 ~ 1.5000+ 2	4.5519+ 0	4.5516+ 0							3.5295- 4				9.1220- 3
1.5000+ 2 ~ 2.0000+ 2	4.5528+ 0	4.5525+ 0							3.5649- 4				9.1596- 3
2.0000+ 2 ~ 3.0000+ 2	4.5487+ 0	4.5481+ 0							6.4132- 4				9.1986- 3
3.0000+ 2 ~ 4.0000+ 2	5.4037+ 0	4.5727+ 0							9.1107- 1				9.2362- 3
4.0000+ 2 ~ 5.0000+ 2	4.5141+ 0	4.5136+ 0							4.6322- 4				9.2641- 3
5.0000+ 2 ~ 6.0000+ 2	4.4904+ 0	4.4902+ 0							2.1690- 4				9.2864- 3
6.0000+ 2 ~ 8.0000+ 2	4.4863+ 0	4.4861+ 0							1.7644- 4				9.3128- 3
8.0000+ 2 ~ 1.0000+ 3	4.4691+ 0	4.4689+ 0							1.6982- 4				9.3407- 3
1.0000+ 3 ~ 1.5000+ 3	4.4305+ 0	4.4303+ 0							1.9948- 4				9.3765- 3
1.5000+ 3 ~ 2.0000+ 3	4.5529+ 0	4.3604+ 0							1.9243- 1				9.4140- 3
2.0000+ 3 ~ 3.0000+ 3	9.8773+ 0	3.7930+ 0							8.4282- 2				9.4531- 3
3.0000+ 3 ~ 4.0000+ 3	1.5513+ 1	1.5168+ 1							3.4565- 1				9.4906- 3
4.0000+ 3 ~ 5.0000+ 3	5.9730+ 0	5.6703+ 0							3.0275- 1				9.5185- 3
5.0000+ 3 ~ 6.0000+ 3	5.0831+ 0	4.8779+ 0							2.0525- 1				9.5408- 3
6.0000+ 3 ~ 8.0000+ 3	5.4179+ 0	5.2118+ 0							2.0612- 1				9.5672- 3
8.0000+ 3 ~ 1.0000+ 4	6.0745+ 0	5.9086+ 0							1.6592- 1				9.5951- 3
1.0000+ 4 ~ 1.5000+ 4	7.0803+ 0	6.9956+ 0							8.4708- 2				1.0897- 2
1.5000+ 4 ~ 2.0000+ 4	8.6885+ 0	8.6093+ 0							7.9191- 2				1.2923- 2
2.0000+ 4 ~ 3.0000+ 4	7.6328+ 0	7.5699+ 0							6.2892- 2				1.6473- 2
3.0000+ 4 ~ 4.0000+ 4	8.4730+ 0	8.4094+ 0							6.3271- 2				2.1899- 2
4.0000+ 4 ~ 5.0000+ 4	8.5459+ 0	8.4934+ 0							5.2362- 2				2.7919- 2
5.0000+ 4 ~ 6.0000+ 4	8.6190+ 0	8.5734+ 0							4.5582- 2				3.4370- 2
6.0000+ 4 ~ 8.0000+ 4	8.7166+ 0	8.6771+ 0							3.9463- 2				4.4638- 2
8.0000+ 4 ~ 1.0000+ 5	8.8212+ 0	8.7865+ 0							3.4689- 2				5.8941- 2
1.0000+ 5 ~ 1.5000+ 5	8.8917+ 0	8.8596+ 0							3.2010- 2				8.8603- 2
1.5000+ 5 ~ 2.0000+ 5	8.9362+ 0	8.9059+ 0							3.0309- 2				1.2382- 1
2.0000+ 5 ~ 3.0000+ 5	8.8273+ 0	8.7968+ 0							3.0463- 2				1.7061- 1
3.0000+ 5 ~ 4.0000+ 5	8.5266+ 0	8.4945+ 0							3.2053- 2				2.2429- 1
4.0000+ 5 ~ 5.0000+ 5	8.1483+ 0	8.1147+ 0							3.3506- 2				2.6623- 1
5.0000+ 5 ~ 6.0000+ 5	7.7550+ 0	7.7201+ 0							3.4834- 2				2.9805- 1
6.0000+ 5 ~ 8.0000+ 5	7.1956+ 0	7.1589+ 0							3.6747- 2				3.3009- 1
8.0000+ 5 ~ 1.0000+ 6	6.5377+ 0	6.4981+ 0							3.9569- 2				3.5377- 1
1.0000+ 6 ~ 1.5000+ 6	5.6600+ 0	5.6125+ 0							4.7289- 2				3.5792- 1
1.5000+ 6 ~ 2.0000+ 6	4.7890+ 0	4.2180+ 0	5.2145- 1						4.1670- 2				3.7640- 1
2.0000+ 6 ~ 3.0000+ 6	4.0773+ 0	3.0410+ 0	1.0007+ 0						3.5136- 2				3.9023- 1
3.0000+ 6 ~ 4.0000+ 6	3.5883+ 0	2.3364+ 0	1.2276+ 0						2.4745- 2				4.5625- 1
4.0000+ 6 ~ 5.0000+ 6	3.8135+ 0	2.1730+ 0	1.6259+ 0						1.4653- 2				5.5355- 1
5.0000+ 6 ~ 6.0000+ 6	3.9978+ 0	2.2435+ 0	1.7477+ 0						6.9313- 3				6.4355- 1
6.0000+ 6 ~ 8.0000+ 6	4.2350+ 0	2.4488+ 0	1.7807+ 0						3.1396- 3				7.3757- 1
8.0000+ 6 ~ 1.0000+ 7	4.3729+ 0	2.6548+ 0	1.7165+ 0						1.2570- 3				8.1364- 1
1.0000+ 7 ~ 1.5000+ 7	4.1883+ 0	2.4982+ 0	1.6883+ 0						3.8195- 4				8.5822- 1

TABLE A1.30

Mo-94

MATERIAL 1422 — CROSS SECTION — MO-94

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU BAR
1.0000- 5 ~ 1.0000- 2	5.1399+ 0	5.0964+ 0							4.3491- 2				7.1637- 3
1.0000- 2 ~ 1.5000- 2	5.1166+ 0	5.0964+ 0							2.0185- 2				7.1642- 3
1.5000- 2 ~ 2.0000- 2	5.1134+ 0	5.0964+ 0							1.6983- 2				7.1644- 3
2.0000- 2 ~ 3.0000- 2	5.1107+ 0	5.0964+ 0							1.4276- 2				7.1645- 3
3.0000- 2 ~ 4.0000- 2	5.1084+ 0	5.0964+ 0							1.2010- 2				7.1647- 3
4.0000- 2 ~ 5.0000- 2	5.1070+ 0	5.0964+ 0							1.0618- 2				7.1648- 3
5.0000- 2 ~ 6.0000- 2	5.1059+ 0	5.0964+ 0							9.5732- 3				7.1649- 3
6.0000- 2 ~ 8.0000- 2	5.1049+ 0	5.0964+ 0							8.4927- 3				7.1650- 3
8.0000- 2 ~ 1.0000- 1	5.1039+ 0	5.0964+ 0							7.5088- 3				7.1651- 3
1.0000- 1 ~ 1.5000- 1	5.1027+ 0	5.0964+ 0							6.3750- 3				7.1653- 3
1.5000- 1 ~ 2.0000- 1	5.1018+ 0	5.0964+ 0							5.3865- 3				7.1654- 3
2.0000- 1 ~ 3.0000- 1	5.1009+ 0	5.0964+ 0							4.5091- 3				7.1656- 3
3.0000- 1 ~ 4.0000- 1	5.1002+ 0	5.0964+ 0							3.8103- 3				7.1657- 3
4.0000- 1 ~ 5.0000- 1	5.0997+ 0	5.0964+ 0							3.3523- 3				7.1658- 3
5.0000- 1 ~ 6.0000- 1	5.0994+ 0	5.0964+ 0							3.0281- 3				7.1659- 3
6.0000- 1 ~ 8.0000- 1	5.0990+ 0	5.0964+ 0							2.6965- 3				7.1660- 3
8.0000- 1 ~ 1.0000+ 0	5.0987+ 0	5.0963+ 0							2.3729- 3				7.1662- 3
1.0000+ 0 ~ 1.5000+ 0	5.0984+ 0	5.0963+ 0							2.0224- 3				7.1663- 3
1.5000+ 0 ~ 2.0000+ 0	5.0980+ 0	5.0963+ 0							1.7080- 3				7.1665- 3
2.0000+ 0 ~ 3.0000+ 0	5.0977+ 0	5.0963+ 0							1.4342- 3				7.1666- 3
3.0000+ 0 ~ 4.0000+ 0	5.0975+ 0	5.0962+ 0							1.2127- 3				7.1668- 3
4.0000+ 0 ~ 5.0000+ 0	5.0973+ 0	5.0962+ 0							1.0691- 3				7.1669- 3
5.0000+ 0 ~ 6.0000+ 0	5.0971+ 0	5.0962+ 0							9.7140- 4				7.1670- 3
6.0000+ 0 ~ 8.0000+ 0	5.0970+ 0	5.0961+ 0							8.6495- 4				7.1671- 3
8.0000+ 0 ~ 1.0000+ 1	5.0968+ 0	5.0960+ 0							7.6460- 4				7.1672- 3
1.0000+ 1 ~ 1.5000+ 1	5.0965+ 0	5.0959+ 0							6.5856- 4				7.1674- 3
1.5000+ 1 ~ 2.0000+ 1	5.0962+ 0	5.0957+ 0							5.6258- 4				7.1675- 3
2.0000+ 1 ~ 3.0000+ 1	5.0958+ 0	5.0953+ 0							4.8471- 4				7.1677- 3
3.0000+ 1 ~ 4.0000+ 1	5.0953+ 0	5.0949+ 0							4.2561- 4				7.1678- 3
4.0000+ 1 ~ 5.0000+ 1	5.0948+ 0	5.0944+ 0							3.9629- 4				7.1679- 3
5.0000+ 1 ~ 6.0000+ 1	5.0942+ 0	5.0938+ 0							3.8847- 4				7.1680- 3
6.0000+ 1 ~ 8.0000+ 1	5.0932+ 0	5.0928+ 0							4.3357- 4				7.1681- 3
8.0000+ 1 ~ 1.0000+ 2	5.0911+ 0	5.0901+ 0							1.0459- 3				7.1682- 3
1.0000+ 2 ~ 1.5000+ 2	5.2164+ 0	5.0938+ 0							1.2262- 1				7.1732- 3
1.5000+ 2 ~ 2.0000+ 2	5.0908+ 0	5.0906+ 0							2.2964- 4				7.1809- 3
2.0000+ 2 ~ 3.0000+ 2	5.0863+ 0	5.0861+ 0							1.8055- 4				7.1890- 3
3.0000+ 2 ~ 4.0000+ 2	5.0798+ 0	5.0796+ 0							1.6743- 4				7.2026- 3
4.0000+ 2 ~ 5.0000+ 2	5.0720+ 0	5.0719+ 0							1.6841- 4				7.2183- 3
5.0000+ 2 ~ 6.0000+ 2	5.0626+ 0	5.0624+ 0							1.7729- 4				7.2351- 3
6.0000+ 2 ~ 8.0000+ 2	5.0436+ 0	5.0433+ 0							2.0803- 4				7.2631- 3
8.0000+ 2 ~ 1.0000+ 3	5.0043+ 0	5.0040+ 0							3.3568- 4				7.3041- 3
1.0000+ 3 ~ 1.5000+ 3	4.6997+ 0	4.6488+ 0							5.0935- 2				7.4299- 3
1.5000+ 3 ~ 2.0000+ 3	1.1543+ 1	1.0814+ 1							7.2903- 1				7.5985- 3
2.0000+ 3 ~ 3.0000+ 3	5.9030+ 0	5.4799+ 0							4.2310- 1				7.7739- 3
3.0000+ 3 ~ 4.0000+ 3	6.2649+ 0	6.0960+ 0							1.6894- 1				8.0756- 3
4.0000+ 3 ~ 5.0000+ 3	5.7962+ 0	5.4250+ 0							3.7113- 1				8.4240- 3
5.0000+ 3 ~ 6.0000+ 3	8.7399+ 0	8.4053+ 0							3.3376- 1				8.7992- 3
6.0000+ 3 ~ 8.0000+ 3	8.5989+ 0	8.3071+ 0							2.9102- 1				9.4267- 3
8.0000+ 3 ~ 1.0000+ 4	8.4920+ 0	8.2422+ 0							2.4881- 1				1.0347- 2
1.0000+ 4 ~ 1.5000+ 4	8.4591+ 0	8.2516+ 0							1.9931- 1				1.3115- 2
1.5000+ 4 ~ 2.0000+ 4	8.4726+ 0	8.3045+ 0							1.5540- 1				1.6809- 2
2.0000+ 4 ~ 3.0000+ 4	8.4866+ 0	8.3598+ 0							1.2042- 1				2.0651- 2
3.0000+ 4 ~ 4.0000+ 4	8.5566+ 0	8.4617+ 0							9.3528- 2				2.6984- 2
4.0000+ 4 ~ 5.0000+ 4	8.6622+ 0	8.5838+ 0							7.7248- 2				3.4153- 2
5.0000+ 4 ~ 6.0000+ 4	8.7563+ 0	8.6891+ 0							6.6876- 2				4.1575- 2
6.0000+ 4 ~ 8.0000+ 4	8.8811+ 0	8.8235+ 0							5.7299- 2				5.3441- 2
8.0000+ 4 ~ 1.0000+ 5	9.0096+ 0	8.9597+ 0							4.9699- 2				6.9833- 2
1.0000+ 5 ~ 1.5000+ 5	9.1006+ 0	9.0558+ 0							4.4716- 2				1.0112- 1
1.5000+ 5 ~ 2.0000+ 5	9.1579+ 0	9.1163+ 0							4.1518- 2				1.3878- 1
2.0000+ 5 ~ 3.0000+ 5	9.0483+ 0	9.0069+ 0							4.1417- 2				1.8734- 1
3.0000+ 5 ~ 4.0000+ 5	8.7366+ 0	8.6926+ 0							4.3927- 2				2.4165- 1
4.0000+ 5 ~ 5.0000+ 5	8.3492+ 0	8.3026+ 0							4.6612- 2				2.8313- 1
5.0000+ 5 ~ 6.0000+ 5	7.9504+ 0	7.9013+ 0							4.9117- 2				3.1408- 1
6.0000+ 5 ~ 8.0000+ 5	7.3866+ 0	7.3339+ 0							5.2593- 2				3.4478- 1
8.0000+ 5 ~ 1.0000+ 6	6.6988+ 0	6.4842+ 0	1.6842- 1						4.3338- 2				3.7792- 1
1.0000+ 6 ~ 1.5000+ 6	5.8274+ 0	4.9668+ 0	8.2436- 1						3.0198- 2				4.3011- 1
1.5000+ 6 ~ 2.0000+ 6	4.9010+ 0	3.7957+ 0	1.0755+ 0						2.8881- 2				4.4268- 1
2.0000+ 6 ~ 3.0000+ 6	4.1443+ 0	2.6694+ 0	1.4506+ 0						2.3776- 2				4.6759- 1
3.0000+ 6 ~ 4.0000+ 6	3.7093+ 0	2.0778+ 0	1.6926+ 0						1.6078- 2				5.1750- 1
4.0000+ 6 ~ 5.0000+ 6	3.8135+ 0	2.0241+ 0	1.7780+ 0						9.6179- 3				5.8538- 1
5.0000+ 6 ~ 6.0000+ 6	3.9907+ 0	2.1730+ 0	1.8108+ 0						5.4139- 3				6.5123- 1
6.0000+ 6 ~ 8.0000+ 6	4.2253+ 0	2.4261+ 0	1.7937+ 0						2.5218- 3				7.3507- 1
8.0000+ 6 ~ 1.0000+ 7	4.3778+ 0	2.6544+ 0	1.7221+ 0						9.1016- 4				8.1211- 1
1.0000+ 7 ~ 1.5000+ 7	4.2444+ 0	2.5320+ 0	1.7108+ 0						2.6550- 4				8.5851- 1

TABLE A1.31

Mo-95

MATERIAL :1423 CROSS SECTION MO-95

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	4.9218+ 1	4.6172+ 0							4.4606+ 1				7.0851- 3
1.0000- 2 ~ 1.5000- 2	2.5307+ 1	4.6171+ 0							2.0674+ 1				7.0851- 3
1.5000- 2 ~ 2.0000- 2	2.2054+ 1	4.6169+ 0							1.7457+ 1				7.0851- 3
2.0000- 2 ~ 3.0000- 2	1.9250+ 1	4.6168+ 0							1.4622+ 1				7.0851- 3
3.0000- 2 ~ 4.0000- 2	1.6950+ 1	4.6165+ 0							1.2348+ 1				7.0851- 3
4.0000- 2 ~ 5.0000- 2	1.5496+ 1	4.6163+ 0							1.0869+ 1				7.0851- 3
5.0000- 2 ~ 6.0000- 2	1.4439+ 1	4.6161+ 0							9.8168+ 0				7.0851- 3
6.0000- 2 ~ 8.0000- 2	1.3342+ 1	4.6157+ 0							8.7361+ 0				7.0851- 3
8.0000- 2 ~ 1.0000- 1	1.2314+ 1	4.6153+ 0							7.6914+ 0				7.0851- 3
1.0000- 1 ~ 1.5000- 1	1.1164+ 1	4.6145+ 0							6.5503+ 0				7.0851- 3
1.5000- 1 ~ 2.0000- 1	1.0148+ 1	4.6133+ 0							5.5337+ 0				7.0851- 3
2.0000- 1 ~ 3.0000- 1	9.2525+ 0	4.6116+ 0							4.6412+ 0				7.0851- 3
3.0000- 1 ~ 4.0000- 1	8.5339+ 0	4.6092+ 0							3.9242+ 0				7.0851- 3
4.0000- 1 ~ 5.0000- 1	8.0657+ 0	4.6069+ 0							3.4565+ 0				7.0851- 3
5.0000- 1 ~ 6.0000- 1	7.7361+ 0	4.6046+ 0							3.1343+ 0				7.0851- 3
6.0000- 1 ~ 8.0000- 1	7.3924+ 0	4.6010+ 0							2.7911+ 0				7.0851- 3
8.0000- 1 ~ 1.0000+ 0	7.0607+ 0	4.5963+ 0							2.4628+ 0				7.0851- 3
1.0000+ 0 ~ 1.5000+ 0	6.6995+ 0	4.5878+ 0							2.1130+ 0				7.0851- 3
1.5000+ 0 ~ 2.0000+ 0	6.3722+ 0	4.5755+ 0							1.7950+ 0				7.08[illegible]- 3
2.0000+ 0 ~ 3.0000+ 0	6.0834+ 0	4.5565+ 0							1.5279+ 0				7.0853- 3
3.0000+ 0 ~ 4.0000+ 0	5.8427+ 0	4.5302+ 0							1.3114+ 0				7.0854- 3
4.0000+ 0 ~ 5.0000+ 0	5.6817+ 0	4.5024+ 0							1.1807+ 0				7.0856- 3
5.0000+ 0 ~ 6.0000+ 0	5.5630+ 0	4.4734+ 0							1.0895+ 0				7.085[illegible]- 3
6.0000+ 0 ~ 8.0000+ 0	5.4276+ 0	4.4269+ 0							9.9993- 1				7.085[illegible]- 3
8.0000+ 0 ~ 1.0000+ 1	5.2858+ 0	4.3588+ 0							9.2800- 1				7.086[illegible]- 3
1.0000+ 1 ~ 1.5000+ 1	5.0965+ 0	4.2205+ 0							8.7559- 1				7.0866- 3
1.5000+ 1 ~ 2.0000+ 1	4.8688+ 0	3.9738+ 0							8.9466- 1				7.0873- 3
2.0000+ 1 ~ 3.0000+ 1	4.6262+ 0	3.4264+ 0							1.1988+ 0				7.0887- 3
3.0000+ 1 ~ 4.0000+ 1	7.1019+ 0	3.0064+ 0							4.0949+ 0				7.0905- 3
4.0000+ 1 ~ 5.0000+ 1	1.0173+ 3	5.6478+ 2							4.5255+ 2				7.0918- 3
5.0000+ 1 ~ 6.0000+ 1	2.0058+ 1	1.6830+ 1							3.2272+ 0				7.0935- 3
6.0000+ 1 ~ 8.0000+ 1	9.6594+ 0	9.0911+ 0							5.6815- 1				7.0966- 3
8.0000+ 1 ~ 1.0000+ 2	7.6143+ 0	7.3644+ 0							2.4996- 1				7.0998- 3
1.0000+ 2 ~ 1.5000+ 2	6.8700+ 0	6.5843+ 0							2.8563- 1				7.1065- 3
1.5000+ 2 ~ 2.0000+ 2	1.0131+ 1	6.5125+ 0							3.6180+ 0				7.1167- 3
2.0000+ 2 ~ 3.0000+ 2	6.3244+ 0	5.9492+ 0							3.7476- 1				7.1334- 3
3.0000+ 2 ~ 4.0000+ 2	2.5708+ 1	1.8980+ 1							6.7470+ 0				7.1601- 3
4.0000+ 2 ~ 5.0000+ 2	6.9371+ 0	6.3124+ 0							6.2458- 1				7.1856- 3
5.0000+ 2 ~ 6.0000+ 2	9.1831+ 0	6.9794+ 0							2.2037+ 0				7.2124- 3
6.0000+ 2 ~ 8.0000+ 2	2.4015+ 1	1.9336+ 1							4.6794+ 0				7.2561- 3
8.0000+ 2 ~ 1.0000+ 3	9.8155+ 0	8.3179+ 0							1.4975+ 0				7.3190- 3
1.0000+ 3 ~ 1.5000+ 3	1.4100+ 1	1.1742+ 1							2.3581+ 0				7.4395- 3
1.5000+ 3 ~ 2.0000+ 3	1.2186+ 1	1.0545+ 1							1.6402+ 0				7.6192- 3
2.0000+ 3 ~ 3.0000+ 3	9.9919+ 0	8.0673+ 0							1.3243+ 0				7.9180- 3
3.0000+ 3 ~ 4.0000+ 3	9.0418+ 0	7.8416+ 0							1.1968+ 0				8.4016- 3
4.0000+ 3 ~ 5.0000+ 3	8.8181+ 0	7.7407+ 0							1.0748+ 0				8.8652- 3
5.0000+ 3 ~ 6.0000+ 3	8.6707+ 0	7.6843+ 0							9.8482- 1				9.3521- 3
6.0000+ 3 ~ 8.0000+ 3	8.5426+ 0	7.6562+ 0							8.8490- 1				1.0147- 2
8.0000+ 3 ~ 1.0000+ 4	8.4491+ 0	7.6631+ 0							7.8399- 1				1.1284- 2
1.0000+ 4 ~ 1.5000+ 4	8.3915+ 0	7.7264+ 0							6.6233- 1				1.3445- 2
1.5000+ 4 ~ 2.0000+ 4	8.3875+ 0	7.8411+ 0							5.4490- 1				1.6642- 2
2.0000+ 4 ~ 3.0000+ 4	8.4607+ 0	8.0220+ 0							4.3571- 1				2.2099- 2
3.0000+ 4 ~ 4.0000+ 4	8.5775+ 0	8.2304+ 0							3.4570- 1				2.9534- 2
4.0000+ 4 ~ 5.0000+ 4	8.6958+ 0	8.4063+ 0							2.8876- 1				3.7415- 2
5.0000+ 4 ~ 6.0000+ 4	8.8036+ 0	8.5536+ 0							2.4958- 1				4.5586- 2
6.0000+ 4 ~ 8.0000+ 4	8.9392+ 0	8.7287+ 0							2.1018- 1				5.8169- 2
8.0000+ 4 ~ 1.0000+ 5	9.0779+ 0	8.9023+ 0							1.7552- 1				7.5156- 2
1.0000+ 5 ~ 1.5000+ 5	9.1702+ 0	9.0240+ 0							1.4402- 1				1.0823- 1
1.5000+ 5 ~ 2.0000+ 5	9.2294+ 0	9.1095+ 0							1.1828- 1				1.4694- 1
2.0000+ 5 ~ 3.0000+ 5	9.1032+ 0	8.8012+ 0	2.0245- 1						9.6527- 2				2.0165- 1
3.0000+ 5 ~ 4.0000+ 5	8.8027+ 0	8.2163+ 0	5.0067- 1						8.3892- 2				2.6567- 1
4.0000+ 5 ~ 5.0000+ 5	8.4139+ 0	7.7171+ 0	6.1452- 1						8.1675- 2				3.1441- 1
5.0000+ 5 ~ 6.0000+ 5	8.0157+ 0	7.2910+ 0	6.4203- 1						8.2453- 2				3.4997- 1
6.0000+ 5 ~ 8.0000+ 5	7.4407+ 0	6.7265+ 0	6.3021- 1						8.3884- 2				3.8539- 1
8.0000+ 5 ~ 1.0000+ 6	6.7757+ 0	5.8186+ 0	8.8411- 1						7.2113- 2				4.3074- 1
1.0000+ 6 ~ 1.5000+ 6	5.8481+ 0	4.4534+ 0	1.3444+ 0						4.8923- 2				4.9139- 1
1.5000+ 6 ~ 2.0000+ 6	4.9830+ 0	3.3188+ 0	1.6256+ 0						3.7355- 2				5.1826- 1
2.0000+ 6 ~ 3.0000+ 6	4.2428+ 0	2.4342+ 0	1.7777+ 0						2.7302- 2				5.2290- 1
3.0000+ 6 ~ 4.0000+ 6	3.8976+ 0	2.0612+ 0	1.8174+ 0						1.7960- 2				5.5316- 1
4.0000+ 6 ~ 5.0000+ 6	3.8567+ 0	2.0270+ 0	1.8171+ 0						1.1765- 2				5.9487- 1
5.0000+ 6 ~ 6.0000+ 6	3.9396+ 0	2.1188+ 0	1.8067+ 0						7.6072- 3				6.4686- 1
6.0000+ 6 ~ 8.0000+ 6	4.2063+ 0	2.4138+ 0	1.7805+ 0						3.9582- 3				7.3409- 1
8.0000+ 6 ~ 1.0000+ 7	4.3808+ 0	2.6539+ 0	1.7247+ 0						1.7239- 3				8.1140- 1
1.0000+ 7 ~ 1.5000+ 7	4.2683+ 0	2.5428+ 0	1.7237+ 0						6.0379- 4				8.5880- 1

TABLE A1.32

Mo-96

MATERIAL :1424 CROSS SECTION MO-9E

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU BAR
1.0000- 5 ~ 1.0000- 2	7.3043+ 0	4.4037+ 0							2.9003+ 0				7.0048- 3
1.0000- 2 ~ 1.5000- 2	5.7494+ 0	4.4036+ 0							1.3460+ 0				7.0048- 3
1.5000- 2 ~ 2.0000- 2	5.5365+ 0	4.4036+ 0							1.1332+ 0				7.0048- 3
2.0000- 2 ~ 3.0000- 2	5.3559+ 0	4.4036+ 0							9.5117- 1				7.0048- 3
3.0000- 2 ~ 4.0000- 2	5.2055+ 0	4.4035+ 0							8.0145- 1				7.0048- 3
4.0000- 2 ~ 5.0000- 2	5.1106+ 0	4.4035+ 0							7.0760- 1				7.0048- 3
5.0000- 2 ~ 6.0000- 2	5.0420+ 0	4.4035+ 0							6.3890- 1				7.0048- 3
6.0000- 2 ~ 8.0000- 2	4.9705+ 0	4.4034+ 0							5.6691- 1				7.0048- 3
8.0000- 2 ~ 1.0000- 1	4.9035+ 0	4.4033+ 0							5.0011- 1				7.0048- 3
1.0000- 1 ~ 1.5000- 1	4.8288+ 0	4.4031+ 0							4.2553- 1				7.0048- 3
1.5000- 1 ~ 2.0000- 1	4.7626+ 0	4.4029+ 0							3.5950- 1				7.0048- 3
2.0000- 1 ~ 3.0000- 1	4.7039+ 0	4.4026+ 0							3.0135- 1				7.0048- 3
3.0000- 1 ~ 4.0000- 1	4.6568+ 0	4.4021+ 0							2.5464- 1				7.0048- 3
4.0000- 1 ~ 5.0000- 1	4.6261+ 0	4.4017+ 0							2.2440- 1				7.0048- 3
5.0000- 1 ~ 6.0000- 1	4.6041+ 0	4.4012+ 0							2.0284- 1				7.0048- 3
6.0000- 1 ~ 8.0000- 1	4.5814+ 0	4.4005+ 0							1.8069- 1				7.0048- 3
8.0000- 1 ~ 1.0000+ 0	4.5591+ 0	4.3996+ 0							1.5933- 1				7.0048- 3
1.0000+ 0 ~ 1.5000+ 0	4.5343+ 0	4.3980+ 0							1.3609- 1				7.0048- 3
1.5000+ 0 ~ 2.0000+ 0	4.5112+ 0	4.3957+ 0							1.1550- 1				7.0049- 3
2.0000+ 0 ~ 3.0000+ 0	4.4899+ 0	4.3922+ 0							9.7471- 2				7.0049- 3
3.0000+ 0 ~ 4.0000+ 0	4.4710+ 0	4.3875+ 0							8.3145- 2				7.0050- 3
4.0000+ 0 ~ 5.0000+ 0	4.4567+ 0	4.3827+ 0							7.3891- 2				7.0051- 3
5.0000+ 0 ~ 6.0000+ 0	4.4454+ 0	4.3778+ 0							6.7578- 2				7.0052- 3
6.0000+ 0 ~ 8.0000+ 0	4.4313+ 0	4.3702+ 0							6.1016- 2				7.0053- 3
8.0000+ 0 ~ 1.0000+ 1	4.4152+ 0	4.3599+ 0							5.4864- 2				7.0054- 3
1.0000+ 1 ~ 1.5000+ 1	4.3897+ 0	4.3408+ 0							4.8673- 2				7.0057- 3
1.5000+ 1 ~ 2.0000+ 1	4.3553+ 0	4.3114+ 0							4.3570- 2				7.0063- 3
2.0000+ 1 ~ 3.0000+ 1	4.3016+ 0	4.2611+ 0							4.0402- 2				7.0074- 3
3.0000+ 1 ~ 4.0000+ 1	4.2217+ 0	4.1818+ 0							3.9604- 2				7.0089- 3
4.0000+ 1 ~ 5.0000+ 1	4.1257+ 0	4.0839+ 0							4.1555- 2				7.0100- 3
5.0000+ 1 ~ 6.0000+ 1	4.0061+ 0	3.9598+ 0							4.6190- 2				7.0116- 3
6.0000+ 1 ~ 8.0000+ 1	3.7527+ 0	3.6914+ 0							6.1123- 2				7.0146- 3
8.0000+ 1 ~ 1.0000+ 2	3.1774+ 0	3.0617+ 0							1.1554- 1				7.0177- 3
1.0000+ 2 ~ 1.5000+ 2	1.8691+ 2	1.3964+ 2							4.7269+ 1				7.0245- 3
1.5000+ 2 ~ 2.0000+ 2	7.8681+ 0	7.7606+ 0							1.0740- 1				7.0351- 3
2.0000+ 2 ~ 3.0000+ 2	5.9234+ 0	5.9104+ 0							1.2968- 2				7.0529- 3
3.0000+ 2 ~ 4.0000+ 2	5.4925+ 0	5.4870+ 0							5.3890- 3				7.0821- 3
4.0000+ 2 ~ 5.0000+ 2	5.3314+ 0	5.3586+ 0							5.7274- 1				7.1102- 3
5.0000+ 2 ~ 6.0000+ 2	5.2322+ 0	5.2293+ 0							2.7822- 3				7.1399- 3
6.0000+ 2 ~ 8.0000+ 2	5.1538+ 0	5.1514+ 0							2.2933- 3				7.1885- 3
8.0000+ 2 ~ 1.0000+ 3	5.1292+ 0	5.0702+ 0							5.8899- 2				7.2586- 3
1.0000+ 3 ~ 1.5000+ 3	4.9640+ 0	4.8971+ 0							6.6967- 2				7.3928- 3
1.5000+ 3 ~ 2.0000+ 3	4.5206+ 0	4.5182+ 0							2.3787- 3				7.5926- 3
2.0000+ 3 ~ 3.0000+ 3	1.1611+ 1	1.1271+ 1							3.3994- 1				7.9239- 3
3.0000+ 3 ~ 4.0000+ 3	2.1752+ 1	2.1279+ 1							4.7240- 1				8.4593- 3
4.0000+ 3 ~ 5.0000+ 3	7.7201+ 0	7.4987+ 0							2.2139- 1				8.9722- 3
5.0000+ 3 ~ 6.0000+ 3	8.5987+ 0	8.3032+ 0							2.9467- 1				9.5106- 3
6.0000+ 3 ~ 8.0000+ 3	8.4844+ 0	8.2290+ 0							2.5459- 1				1.0389- 2
8.0000+ 3 ~ 1.0000+ 4	8.4051+ 0	8.1885+ 0							2.1564- 1				1.1646- 2
1.0000+ 4 ~ 1.5000+ 4	8.3658+ 0	8.1923+ 0							1.7224- 1				1.4029- 2
1.5000+ 4 ~ 2.0000+ 4	8.3810+ 0	8.2466+ 0							1.3383- 1				1.7544- 2
2.0000+ 4 ~ 3.0000+ 4	8.4741+ 0	8.3710+ 0							1.0218- 1				2.3505- 2
3.0000+ 4 ~ 4.0000+ 4	8.6099+ 0	8.5312+ 0							7.8383- 2				3.1571- 2
4.0000+ 4 ~ 5.0000+ 4	8.7415+ 0	8.6767+ 0							6.4653- 2				4.0052- 2
5.0000+ 4 ~ 6.0000+ 4	8.8591+ 0	8.8030+ 0							5.6042- 2				4.8782- 2
6.0000+ 4 ~ 8.0000+ 4	9.0046+ 0	8.9563+ 0							4.8196- 2				6.2119- 2
8.0000+ 4 ~ 1.0000+ 5	9.1515+ 0	9.1095+ 0							4.2035- 2				7.9967- 2
1.0000+ 5 ~ 1.5000+ 5	9.2826+ 0	9.2447+ 0							3.7809- 2				1.1148- 1
1.5000+ 5 ~ 2.0000+ 5	9.3389+ 0	9.3031+ 0							3.5603- 2				1.5146- 1
2.0000+ 5 ~ 3.0000+ 5	9.2125+ 0	9.1757+ 0							3.6781- 2				2.0304- 1
3.0000+ 5 ~ 4.0000+ 5	8.8853+ 0	8.8459+ 0							3.9400- 2				2.5787- 1
4.0000+ 5 ~ 5.0000+ 5	8.4917+ 0	8.4499+ 0							4.1812- 2				2.9857- 1
5.0000+ 5 ~ 6.0000+ 5	8.0887+ 0	8.0446+ 0							4.4055- 2				3.2812- 1
6.0000+ 5 ~ 8.0000+ 5	7.5102+ 0	7.4826+ 0	3.0678- 3						4.4524- 2				3.5820- 1
8.0000+ 5 ~ 1.0000+ 6	6.8727+ 0	6.3506+ 0	4.8930- 1						2.8383- 2				4.0644- 1
1.0000+ 6 ~ 1.5000+ 6	5.9540+ 0	4.9559+ 0	9.7088- 1						2.4659- 2				4.5384- 1
1.5000+ 6 ~ 2.0000+ 6	5.0171+ 0	3.6711+ 0	1.3248+ 0						2.0353- 2				4.8382- 1
2.0000+ 6 ~ 3.0000+ 6	4.2364+ 0	2.6114+ 0	1.6101+ 0						1.3661- 2				5.0142- 1
3.0000+ 6 ~ 4.0000+ 6	3.8267+ 0	2.0562+ 0	1.7577+ 0						1.0788- 2				5.3086- 1
4.0000+ 6 ~ 5.0000+ 6	3.7800+ 0	1.9688+ 0	1.8032+ 0						7.8558- 3				5.7977- 1
5.0000+ 6 ~ 6.0000+ 6	3.9506+ 0	2.1126+ 0	1.8324+ 0						4.9064- 3				6.4259- 1
6.0000+ 6 ~ 8.0000+ 6	4.2158+ 0	2.4064+ 0	1.8039+ 0						2.2586- 3				7.3188- 1
8.0000+ 6 ~ 1.0000+ 7	4.3837+ 0	2.6521+ 0	1.7303+ 0						8.0392- 4				8.1038- 1
1.0000+ 7 ~ 1.5000+ 7	4.2990+ 0	2.5605+ 0	1.7372+ 0						2.2369- 4				8.5900- 1

TABLE A1.33

Mo-97

MATERIAL :1425 CROSS SECTION MO-97

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	1.1865+ 1	5.1129+ 0							6.7522+ 0				6.9388- 3
1.0000- 2 ~ 1.5000- 2	8.2435+ 0	5.1129+ 0							3.1331+ 0				6.9388- 3
1.5000- 2 ~ 2.0000- 2	7.7537+ 0	5.1129+ 0							2.6388+ 0				6.9388- 3
2.0000- 2 ~ 3.0000- 2	7.3266+ 0	5.1129+ 0							2.2154+ 0				6.9388- 3
3.0000- 2 ~ 4.0000- 2	6.9803+ 0	5.1129+ 0							1.8654+ 0				6.9388- 3
4.0000- 2 ~ 5.0000- 2	6.7552+ 0	5.1129+ 0							1.6420+ 0				6.9388- 3
5.0000- 2 ~ 6.0000- 2	6.6014+ 0	5.1129+ 0							1.4913+ 0				6.9388- 3
6.0000- 2 ~ 8.0000- 2	6.4334+ 0	5.1129+ 0							1.3191+ 0				6.9388- 3
8.0000- 2 ~ 1.0000- 1	6.2742+ 0	5.1129+ 0							1.1611+ 0				6.9388- 3
1.0000- 1 ~ 1.5000- 1	6.1039+ 0	5.1129+ 0							9.9140- 1				6.9388- 3
1.5000- 1 ~ 2.0000- 1	5.9470+ 0	5.1129+ 0							8.3362- 1				6.9388- 3
2.0000- 1 ~ 3.0000- 1	5.8137+ 0	5.1128+ 0							7.0115- 1				6.9388- 3
3.0000- 1 ~ 4.0000- 1	5.7028+ 0	5.1128+ 0							5.8960- 1				6.9388- 3
4.0000- 1 ~ 5.0000- 1	5.6340+ 0	5.1128+ 0							5.2163- 1				6.9388- 3
5.0000- 1 ~ 6.0000- 1	5.5831+ 0	5.1128+ 0							4.7030- 1				6.9388- 3
6.0000- 1 ~ 8.0000- 1	5.5301+ 0	5.1127+ 0							4.1712- 1				6.9388- 3
8.0000- 1 ~ 1.0000+ 0	5.4814+ 0	5.1126+ 0							3.6909- 1				6.9388- 3
1.0000+ 0 ~ 1.5000+ 0	5.4260+ 0	5.1125+ 0							3.1336- 1				6.9390- 3
1.5000+ 0 ~ 2.0000+ 0	5.3772+ 0	5.1123+ 0							2.6504- 1				6.9392- 3
2.0000+ 0 ~ 3.0000+ 0	5.3341+ 0	5.1120+ 0							2.2200- 1				6.9394- 3
3.0000+ 0 ~ 4.0000+ 0	5.2995+ 0	5.1116+ 0							1.8793- 1				6.9397- 3
4.0000+ 0 ~ 5.0000+ 0	5.2768+ 0	5.1112+ 0							1.6552- 1				6.9401- 3
5.0000+ 0 ~ 6.0000+ 0	5.2606+ 0	5.1107+ 0							1.4976- 1				6.9403- 3
6.0000+ 0 ~ 8.0000+ 0	5.2437+ 0	5.1100+ 0							1.3376- 1				6.9407- 3
8.0000+ 0 ~ 1.0000+ 1	5.2272+ 0	5.1090+ 0							1.1817- 1				6.9410- 3
1.0000+ 1 ~ 1.5000+ 1	5.2097+ 0	5.1068+ 0							1.0267- 1				6.9419- 3
1.5000+ 1 ~ 2.0000+ 1	5.2532+ 0	5.1030+ 0							1.4993- 1				6.9431- 3
2.0000+ 1 ~ 3.0000+ 1	5.1695+ 0	5.0947+ 0							7.4732- 2				6.9458- 3
3.0000+ 1 ~ 4.0000+ 1	5.1442+ 0	5.0771+ 0							6.6061- 2				6.9488- 3
4.0000+ 1 ~ 5.0000+ 1	5.1122+ 0	5.0436+ 0							6.7092- 2				6.9511- 3
5.0000+ 1 ~ 6.0000+ 1	5.1809+ 0	4.9633+ 0							2.1736- 1				6.9543- 3
6.0000+ 1 ~ 8.0000+ 1	2.6668+ 1	7.6743+ 0							1.8994- 1				6.9599- 3
8.0000+ 1 ~ 1.0000+ 2	5.3409+ 0	5.2656+ 0							7.5321- 2				6.9657- 3
1.0000+ 2 ~ 1.5000+ 2	5.8545+ 0	5.1242+ 0							5.3029- 1				6.9776- 3
1.5000+ 2 ~ 2.0000+ 2	5.0851+ 0	5.0563+ 0							2.9720- 2				6.9956- 3
2.0000+ 2 ~ 3.0000+ 2	1.0059+ 1	5.7988+ 0							4.2600+ 0				7.0248- 3
3.0000+ 2 ~ 4.0000+ 2	1.1112+ 1	6.8129+ 0							4.4993+ 0				7.0707- 3
4.0000+ 2 ~ 5.0000+ 2	5.0467+ 0	4.9023+ 0							1.4435- 1				7.1141- 3
5.0000+ 2 ~ 6.0000+ 2	3.0490+ 1	2.3142+ 1							7.3479+ 0				7.1593- 3
6.0000+ 2 ~ 8.0000+ 2	1.6901+ 1	1.2570+ 1							4.3231+ 0				7.2322- 3
8.0000+ 2 ~ 1.0000+ 3	6.8127+ 0	6.0368+ 0							7.7588- 1				7.3356- 3
1.0000+ 3 ~ 1.5000+ 3	1.0517+ 1	8.2242+ 0							2.2928+ 0				7.5295- 3
1.5000+ 3 ~ 2.0000+ 3	1.0232+ 1	8.3365+ 0							1.8951+ 0				7.8133- 3
2.0000+ 3 ~ 3.0000+ 3	9.8623+ 0	7.8373+ 0							1.8247+ 0				8.2717- 3
3.0000+ 3 ~ 4.0000+ 3	9.2652+ 0	7.6894+ 0							1.5752+ 0				8.9872- 3
4.0000+ 3 ~ 5.0000+ 3	8.9744+ 0	7.6130+ 0							1.3600+ 0				9.6622- 3
5.0000+ 3 ~ 6.0000+ 3	8.7919+ 0	7.5767+ 0							1.2117+ 0				1.0355- 2
6.0000+ 3 ~ 8.0000+ 3	8.6288+ 0	7.5736+ 0							1.0521+ 0				1.1461- 2
8.0000+ 3 ~ 1.0000+ 4	8.5102+ 0	7.6071+ 0							8.9910- 1				1.3009- 2
1.0000+ 4 ~ 1.5000+ 4	8.4159+ 0	7.7038+ 0							7.0522- 1				1.5060- 2
1.5000+ 4 ~ 2.0000+ 4	8.3861+ 0	7.8526+ 0							5.3076- 1				1.9970- 2
2.0000+ 4 ~ 3.0000+ 4	8.4797+ 0	8.0672+ 0							4.0944- 1				2.6735- 2
3.0000+ 4 ~ 4.0000+ 4	8.6310+ 0	8.3067+ 0							3.2287- 1				3.5718- 2
4.0000+ 4 ~ 5.0000+ 4	8.7732+ 0	8.5037+ 0							2.6875- 1				4.5000- 2
5.0000+ 4 ~ 6.0000+ 4	8.8983+ 0	8.6660+ 0							2.3184- 1				5.4437- 2
6.0000+ 4 ~ 8.0000+ 4	9.0510+ 0	8.8558+ 0							1.9499- 1				6.8677- 2
8.0000+ 4 ~ 1.0000+ 5	9.2034+ 0	9.0404+ 0							1.6283- 1				8.7517- 2
1.0000+ 5 ~ 1.5000+ 5	9.2997+ 0	9.1636+ 0							1.3413- 1				1.2272- 1
1.5000+ 5 ~ 2.0000+ 5	9.3505+ 0	9.2463+ 0							1.1079- 1				1.6349- 1
2.0000+ 5 ~ 3.0000+ 5	9.2418+ 0	9.1453+ 0							9.6436- 2				2.1389- 1
3.0000+ 5 ~ 4.0000+ 5	8.9217+ 0	8.8313+ 0							9.0402- 2				2.6819- 1
4.0000+ 5 ~ 5.0000+ 5	8.5188+ 0	8.4268+ 0	2.6058- 3						8.9353- 2				3.0906- 1
5.0000+ 5 ~ 6.0000+ 5	8.1439+ 0	7.8825+ 0	1.6991- 1						8.8601- 2				3.4508- 1
6.0000+ 5 ~ 8.0000+ 5	7.5524+ 0	6.9203+ 0	5.5244- 1						7.8154- 2				3.9733- 1
8.0000+ 5 ~ 1.0000+ 6	6.9422+ 0	5.6912+ 0	1.1855+ 0						6.3785- 2				4.6374- 1
1.0000+ 6 ~ 1.5000+ 6	5.9974+ 0	4.5282+ 0	1.4198+ 0						4.8647- 2				5.0920- 1
1.5000+ 6 ~ 2.0000+ 6	5.1225+ 0	3.4268+ 0	1.6646+ 0						2.9206- 2				5.3213- 1
2.0000+ 6 ~ 3.0000+ 6	4.3246+ 0	2.4870+ 0	1.8150+ 0						1.8826- 2				5.3995- 1
3.0000+ 6 ~ 4.0000+ 6	3.9282+ 0	2.0727+ 0	1.8426+ 0						1.1790- 2				5.6180- 1
4.0000+ 6 ~ 5.0000+ 6	3.8609+ 0	2.0097+ 0	1.8430+ 0						7.4579- 3				5.9408- 1
5.0000+ 6 ~ 6.0000+ 6	3.9320+ 0	2.0916+ 0	1.8280+ 0						4.4794- 3				6.4247- 1
6.0000+ 6 ~ 8.0000+ 6	4.1963+ 0	2.3932+ 0	1.7924+ 0						1.9974- 3				7.3072- 1
8.0000+ 6 ~ 1.0000+ 7	4.3870+ 0	2.6500+ 0	1.7357+ 0						7.3761- 4				8.0924- 1
1.0000+ 7 ~ 1.5000+ 7	4.3294+ 0	2.5779+ 0	1.7503+ 0						2.4964- 4				8.5915- 1

TABLE A1.34

Mo-98

MATERIAL 1426 — CROSS SECTION — MO-98

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	5.9030+ 0	5.5011+ 0							4.0193- 1				6.8618- 3
1.0000- 2 ~ 1.5000- 2	5.6876+ 0	5.5010+ 0							1.8653- 1				6.8618- 3
1.5000- 2 ~ 2.0000- 2	5.6581+ 0	5.5010+ 0							1.5716- 1				6.8619- 3
2.0000- 2 ~ 3.0000- 2	5.6331+ 0	5.5010+ 0							1.3189- 1				6.8619- 3
3.0000- 2 ~ 4.0000- 2	5.6122+ 0	5.5010+ 0							1.1121- 1				6.8619- 3
4.0000- 2 ~ 5.0000- 2	5.5993+ 0	5.5010+ 0							9.8160- 2				6.8619- 3
5.0000- 2 ~ 6.0000- 2	5.5897+ 0	5.5010+ 0							8.8657- 2				6.8619- 3
6.0000- 2 ~ 8.0000- 2	5.5798+ 0	5.5010+ 0							7.8754- 2				6.8619- 3
8.0000- 2 ~ 1.0000- 1	5.5705+ 0	5.5010+ 0							6.9540- 2				6.8619- 3
1.0000- 1 ~ 1.5000- 1	5.5602+ 0	5.5010+ 0							5.9187- 2				6.8619- 3
1.5000- 1 ~ 2.0000- 1	5.5512+ 0	5.5010+ 0							5.0118- 2				6.8619- 3
2.0000- 1 ~ 3.0000- 1	5.5431+ 0	5.5010+ 0							4.2078- 2				6.8619- 3
3.0000- 1 ~ 4.0000- 1	5.5367+ 0	5.5009+ 0							3.5714- 2				6.8619- 3
4.0000- 1 ~ 5.0000- 1	5.5325+ 0	5.5009+ 0							3.1548- 2				6.8619- 3
5.0000- 1 ~ 6.0000- 1	5.5295+ 0	5.5008+ 0							2.8840- 2				6.8619- 3
6.0000- 1 ~ 8.0000- 1	5.5265+ 0	5.5008+ 0							2.5676- 2				6.8619- 3
8.0000- 1 ~ 1.0000+ 0	5.5235+ 0	5.5007+ 0							2.2808- 2				6.8620- 3
1.0000+ 0 ~ 1.5000+ 0	5.5204+ 0	5.5005+ 0							1.9827- 2				6.8620- 3
1.5000+ 0 ~ 2.0000+ 0	5.5176+ 0	5.5004+ 0							1.7224- 2				6.8621- 3
2.0000+ 0 ~ 3.0000+ 0	5.5154+ 0	5.5000+ 0							1.5313- 2				6.8622- 3
3.0000+ 0 ~ 4.0000+ 0	5.5139+ 0	5.4996+ 0							1.4215- 2				6.8623- 3
4.0000+ 0 ~ 5.0000+ 0	5.5136+ 0	5.4992+ 0							1.4282- 2				6.8625- 3
5.0000+ 0 ~ 6.0000+ 0	5.5144+ 0	5.4988+ 0							1.5418- 2				6.8626- 3
6.0000+ 0 ~ 8.0000+ 0	5.5189+ 0	5.4982+ 0							2.0625- 2				6.8628- 3
8.0000+ 0 ~ 1.0000+ 1	5.5464+ 0	5.4974+ 0							4.8887- 2				6.8630- 3
1.0000+ 1 ~ 1.5000+ 1	9.5768+ 0	5.4969+ 0							4.0799+ 0				6.8637- 3
1.5000+ 1 ~ 2.0000+ 1	5.5201+ 0	5.4937+ 0							2.6331- 2				6.8646- 3
2.0000+ 1 ~ 3.0000+ 1	5.4989+ 0	5.4903+ 0							8.4921- 3				6.8665- 3
3.0000+ 1 ~ 4.0000+ 1	5.4909+ 0	5.4856+ 0							5.2130- 3				6.8690- 3
4.0000+ 1 ~ 5.0000+ 1	5.4848+ 0	5.4805+ 0							4.2105- 3				6.8709- 3
5.0000+ 1 ~ 6.0000+ 1	5.4790+ 0	5.4753+ 0							3.7022- 3				6.8736- 3
6.0000+ 1 ~ 8.0000+ 1	5.4700+ 0	5.4666+ 0							3.2959- 3				6.8786- 3
8.0000+ 1 ~ 1.0000+ 2	5.4569+ 0	5.4538+ 0							3.0069- 3				6.8838- 3
1.0000+ 2 ~ 1.5000+ 2	5.4298+ 0	5.4269+ 0							2.8433- 3				6.8949- 3
1.5000+ 2 ~ 2.0000+ 2	5.3796+ 0	5.3765+ 0							2.9725- 3				6.9123- 3
2.0000+ 2 ~ 3.0000+ 2	5.2514+ 0	5.2471+ 0							4.1697- 3				6.9412- 3
3.0000+ 2 ~ 4.0000+ 2	4.8114+ 0	4.7942+ 0							1.7209- 2				6.9881- 3
4.0000+ 2 ~ 5.0000+ 2	6.5247+ 1	5.1932+ 1							1.3315+ 1				7.0329- 3
5.0000+ 2 ~ 6.0000+ 2	7.2527+ 0	7.2228+ 0							2.9899- 2				7.0798- 3
6.0000+ 2 ~ 8.0000+ 2	8.3667+ 0	6.8367+ 0							1.5300+ 0				7.1561- 3
8.0000+ 2 ~ 1.0000+ 3	9.8823+ 0	7.7243+ 0							2.1580+ 0				7.2648- 3
1.0000+ 3 ~ 1.5000+ 3	5.4861+ 0	5.3485+ 0							1.3763- 1				7.4694- 3
1.5000+ 3 ~ 2.0000+ 3	1.0462+ 1	1.0008+ 1							4.5453- 1				7.7690- 3
2.0000+ 3 ~ 3.0000+ 3	8.1268+ 0	7.7112+ 0							4.1557- 1				8.2535- 3
3.0000+ 3 ~ 4.0000+ 3	1.2553+ 1	1.2269+ 1							2.8431- 1				9.0112- 3
4.0000+ 3 ~ 5.0000+ 3	7.8961+ 0	7.5479+ 0							4.4817- 1				9.7269- 3
5.0000+ 3 ~ 6.0000+ 3	6.0745+ 0	5.9673+ 0							1.0717- 1				1.0464- 2
6.0000+ 3 ~ 8.0000+ 3	8.3693+ 0	8.0808+ 0							2.8788- 1				1.1642- 2
8.0000+ 3 ~ 1.0000+ 4	8.3119+ 0	8.0661+ 0							2.4466- 1				1.3295- 2
1.0000+ 4 ~ 1.5000+ 4	8.2994+ 0	8.1018+ 0							1.9618- 1				1.6346- 2
1.5000+ 4 ~ 2.0000+ 4	8.3418+ 0	8.1881+ 0							1.5303- 1				2.0745- 2
2.0000+ 4 ~ 3.0000+ 4	8.4620+ 0	8.3437+ 0							1.1721- 1				2.7959- 2
3.0000+ 4 ~ 4.0000+ 4	8.6225+ 0	8.5319+ 0							9.0152- 2				3.7494- 2
4.0000+ 4 ~ 5.0000+ 4	8.7706+ 0	8.6959+ 0							7.4457- 2				4.7287- 2
5.0000+ 4 ~ 6.0000+ 4	8.8994+ 0	8.8347+ 0							6.4549- 2				5.7188- 2
6.0000+ 4 ~ 8.0000+ 4	9.0550+ 0	8.9995+ 0							5.5458- 2				7.2035- 2
8.0000+ 4 ~ 1.0000+ 5	9.2088+ 0	9.1605+ 0							4.8279- 2				9.1544- 2
1.0000+ 5 ~ 1.5000+ 5	9.3405+ 0	9.2971+ 0							4.3318- 2				1.2505- 1
1.5000+ 5 ~ 2.0000+ 5	9.3932+ 0	9.3522+ 0							4.0992- 2				1.6676- 1
2.0000+ 5 ~ 3.0000+ 5	9.2618+ 0	9.2194+ 0							4.2369- 2				2.1915- 1
3.0000+ 5 ~ 4.0000+ 5	8.9366+ 0	8.8905+ 0							4.6114- 2				2.7360- 1
4.0000+ 5 ~ 5.0000+ 5	8.5529+ 0	8.5029+ 0							4.9941- 2				3.1322- 1
5.0000+ 5 ~ 6.0000+ 5	8.1630+ 0	8.1092+ 0							5.3758- 2				3.4156- 1
6.0000+ 5 ~ 8.0000+ 5	7.5969+ 0	7.5154+ 0	2.3884- 2						5.7363- 2				3.7162- 1
8.0000+ 5 ~ 1.0000+ 6	6.9793+ 0	6.3092+ 0	6.1017- 1						3.7784- 2				4.2625- 1
1.0000+ 6 ~ 1.5000+ 6	6.0755+ 0	4.9389+ 0	1.1070+ 0						2.7114- 2				4.7549- 1
1.5000+ 6 ~ 2.0000+ 6	5.1721+ 0	3.7801+ 0	1.3642+ 0						2.5395- 2				4.9370- 1
2.0000+ 6 ~ 3.0000+ 6	4.2950+ 0	2.6801+ 0	1.5940+ 0						1.9608- 2				5.1331- 1
3.0000+ 6 ~ 4.0000+ 6	3.8540+ 0	2.0690+ 0	1.7676+ 0						1.4944- 2				5.3796- 1
4.0000+ 6 ~ 5.0000+ 6	3.7857+ 0	1.9571+ 0	1.8180+ 0						1.0588- 2				5.7883- 1
5.0000+ 6 ~ 6.0000+ 6	3.9479+ 0	2.0897+ 0	1.8510+ 0						6.3155- 3				6.3940- 1
6.0000+ 6 ~ 8.0000+ 6	4.2090+ 0	2.3872+ 0	1.8155+ 0						2.5556- 3				7.2917- 1
8.0000+ 6 ~ 1.0000+ 7	4.3922+ 0	2.6489+ 0	1.7420+ 0						7.3087- 4				8.0854- 1
1.0000+ 7 ~ 1.5000+ 7	4.3560+ 0	2.5924+ 0	1.7626+ 0						1.8442- 4				8.5929- 1

TABLE A1.35

Mo-100

MATERIAL =1427 CROSS SECTION MO-100

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	5.3575+ 0	4.7416+ 0							6.1577- 1				6.7245- 3
1.0000- 2 ~ 1.5000- 2	5.0273+ 0	4.7416+ 0							2.8570- 1				6.7245- 3
1.5000- 2 ~ 2.0000- 2	4.9821+ 0	4.7416+ 0							2.4062- 1				6.7245- 3
2.0000- 2 ~ 3.0000- 2	4.9437+ 0	4.7416+ 0							2.0192- 1				6.7245- 3
3.0000- 2 ~ 4.0000- 2	4.9118+ 0	4.7416+ 0							1.7015- 1				6.7245- 3
4.0000- 2 ~ 5.0000- 2	4.8919+ 0	4.7416+ 0							1.5016- 1				6.7245- 3
5.0000- 2 ~ 6.0000- 2	4.8772+ 0	4.7416+ 0							1.3557- 1				6.7245- 3
6.0000- 2 ~ 8.0000- 2	4.8619+ 0	4.7416+ 0							1.2033- 1				6.7245- 3
8.0000- 2 ~ 1.0000- 1	4.8477+ 0	4.7415+ 0							1.0619- 1				6.7245- 3
1.0000- 1 ~ 1.5000- 1	4.8318+ 0	4.7415+ 0							9.0247- 2				6.7245- 3
1.5000- 1 ~ 2.0000- 1	4.8179+ 0	4.7415+ 0							7.6269- 2				6.7245- 3
2.0000- 1 ~ 3.0000- 1	4.8053+ 0	4.7414+ 0							6.3835- 2				6.7245- 3
3.0000- 1 ~ 4.0000- 1	4.7952+ 0	4.7413+ 0							5.3955- 2				6.7245- 3
4.0000- 1 ~ 5.0000- 1	4.7887+ 0	4.7412+ 0							4.7452- 2				6.7245- 3
5.0000- 1 ~ 6.0000- 1	4.7840+ 0	4.7411+ 0							4.2882- 2				6.7245- 3
6.0000- 1 ~ 8.0000- 1	4.7791+ 0	4.7409+ 0							3.8187- 2				6.7245- 3
8.0000- 1 ~ 1.0000+ 0	4.7744+ 0	4.7407+ 0							3.3589- 2				6.7245- 3
1.0000+ 0 ~ 1.5000+ 0	4.7691+ 0	4.7404+ 0							2.8668- 2				6.7246- 3
1.5000+ 0 ~ 2.0000+ 0	4.7641+ 0	4.7399+ 0							2.4162- 2				6.7246- 3
2.0000+ 0 ~ 3.0000+ 0	4.7595+ 0	4.7391+ 0							2.0342- 2				6.7247- 3
3.0000+ 0 ~ 4.0000+ 0	4.7553+ 0	4.7381+ 0							1.7164- 2				6.7250- 3
4.0000+ 0 ~ 5.0000+ 0	4.7523+ 0	4.7371+ 0							1.5166- 2				6.7252- 3
5.0000+ 0 ~ 6.0000+ 0	4.7498+ 0	4.7360+ 0							1.3793- 2				6.7255- 3
6.0000+ 0 ~ 8.0000+ 0	4.7467+ 0	4.7345+ 0							1.2252- 2				6.7257- 3
8.0000+ 0 ~ 1.0000+ 1	4.7433+ 0	4.7324+ 0							1.0856- 2				6.7260- 3
1.0000+ 1 ~ 1.5000+ 1	4.7380+ 0	4.7286+ 0							9.3477- 3				6.7269- 3
1.5000+ 1 ~ 2.0000+ 1	4.7311+ 0	4.7231+ 0							7.9809- 3				6.7280- 3
2.0000+ 1 ~ 3.0000+ 1	4.7214+ 0	4.7145+ 0							6.8582- 3				6.7307- 3
3.0000+ 1 ~ 4.0000+ 1	4.7085+ 0	4.7024+ 0							5.9636- 3				6.7343- 3
4.0000+ 1 ~ 5.0000+ 1	4.6949+ 0	4.6894+ 0							5.4608- 3				6.7369- 3
5.0000+ 1 ~ 6.0000+ 1	4.6807+ 0	4.6755+ 0							5.1418- 3				6.7357- 3
6.0000+ 1 ~ 8.0000+ 1	4.6578+ 0	4.6527+ 0							4.9938- 3				6.7446- 3
8.0000+ 1 ~ 1.0000+ 2	5.4337+ 0	4.6224+ 0							8.1119- 1				6.7540- 3
1.0000+ 2 ~ 1.5000+ 2	4.5476+ 0	4.5414+ 0							6.0820- 3				6.7704- 3
1.5000+ 2 ~ 2.0000+ 2	4.3882+ 0	4.3826+ 0							5.4884- 3				6.7947- 3
2.0000+ 2 ~ 3.0000+ 2	3.8358+ 0	3.8233+ 0							1.2397- 2				6.8349- 3
3.0000+ 2 ~ 4.0000+ 2	9.5374+ 1	8.8220+ 1							7.1538+ 0				6.8998- 3
4.0000+ 2 ~ 5.0000+ 2	7.3863+ 0	7.3461+ 0							2.0230- 2				6.9617- 3
5.0000+ 2 ~ 6.0000+ 2	6.6982+ 0	6.0516+ 0							6.4464- 1				7.0263- 3
6.0000+ 2 ~ 8.0000+ 2	5.7083+ 0	5.5682+ 0							1.4014- 1				7.1308- 3
8.0000+ 2 ~ 1.0000+ 3	5.4240+ 0	5.4217+ 0							2.2462- 3				7.2788- 3
1.0000+ 3 ~ 1.5000+ 3	9.8692+ 0	8.7918+ 0							1.0774+ 0				7.5550- 3
1.5000+ 3 ~ 2.0000+ 3	1.5090+ 1	1.4272+ 1							8.1737- 1				7.9560- 3
2.0000+ 3 ~ 3.0000+ 3	6.0052+ 0	5.6946+ 0							3.1067- 1				8.5958- 3
3.0000+ 3 ~ 4.0000+ 3	1.2076+ 1	1.1728+ 1							3.4681- 1				9.5787- 3
4.0000+ 3 ~ 5.0000+ 3	8.4514+ 0	8.1408+ 0							3.0978- 1				1.0500- 2
5.0000+ 3 ~ 6.0000+ 3	8.3459+ 0	8.0700+ 0							2.7489- 1				1.1437- 2
6.0000+ 3 ~ 8.0000+ 3	8.2653+ 0	8.0284+ 0							2.3601- 1				1.2918- 2
8.0000+ 3 ~ 1.0000+ 4	8.2207+ 0	8.0210+ 0							1.9869- 1				1.4969- 2
1.0000+ 4 ~ 1.5000+ 4	8.2243+ 0	8.0654+ 0							1.5769- 1				1.8686- 2
1.5000+ 4 ~ 2.0000+ 4	8.2832+ 0	8.1608+ 0							1.2185- 1				2.3958- 2
2.0000+ 4 ~ 3.0000+ 4	8.4189+ 0	8.3252+ 0							9.2775- 2				3.2393- 2
3.0000+ 4 ~ 4.0000+ 4	8.5924+ 0	8.5209+ 0							7.1145- 2				4.3339- 2
4.0000+ 4 ~ 5.0000+ 4	8.7481+ 0	8.6892+ 0							5.8810- 2				5.4371- 2
5.0000+ 4 ~ 6.0000+ 4	8.8813+ 0	8.8301+ 0							5.1193- 2				6.5361- 2
6.0000+ 4 ~ 8.0000+ 4	9.0396+ 0	8.9952+ 0							4.4378- 2				8.1585- 2
8.0000+ 4 ~ 1.0000+ 5	9.1737+ 0	9.1344+ 0							3.9017- 2				1.0455- 1
1.0000+ 5 ~ 1.5000+ 5	9.3044+ 0	9.2705+ 0							3.3606- 2				1.3931- 1
1.5000+ 5 ~ 2.0000+ 5	9.3684+ 0	9.3374+ 0							3.0974- 2				1.8078- 1
2.0000+ 5 ~ 3.0000+ 5	9.2370+ 0	9.2044+ 0							3.2560- 2				2.3358- 1
3.0000+ 5 ~ 4.0000+ 5	8.9236+ 0	8.8881+ 0							3.5435- 2				2.8725- 1
4.0000+ 5 ~ 5.0000+ 5	8.5587+ 0	8.5206+ 0							3.8090- 2				3.2552- 1
5.0000+ 5 ~ 6.0000+ 5	8.1007+ 0	7.9517+ 0	1.1838- 1						2.9073- 2				3.6149- 1
6.0000+ 5 ~ 8.0000+ 5	7.5780+ 0	6.9197+ 0	6.3513- 1						1.7676- 2				4.1571- 1
8.0000+ 5 ~ 1.0000+ 6	7.0601+ 0	5.9278+ 0	1.1166+ 0						1.4105- 2				4.6763- 1
1.0000+ 6 ~ 1.5000+ 6	6.1610+ 0	4.8455+ 0	1.3023+ 0						1.2074- 2				5.0278- 1
1.5000+ 6 ~ 2.0000+ 6	5.2733+ 0	3.7405+ 0	1.5191+ 0						1.2080- 2				5.2107- 1
2.0000+ 6 ~ 3.0000+ 6	4.3690+ 0	2.7027+ 0	1.6538+ 0						1.1888- 2				5.3180- 1
3.0000+ 6 ~ 4.0000+ 6	3.8808+ 0	2.0753+ 0	1.7935+ 0						8.6535- 3				5.4694- 1
4.0000+ 6 ~ 5.0000+ 6	3.7939+ 0	1.9383+ 0	1.8511+ 0						4.4678- 3				5.8101- 1
5.0000+ 6 ~ 6.0000+ 6	3.9471+ 0	2.0653+ 0	1.8788+ 0						2.1401- 3				6.3761- 1
6.0000+ 6 ~ 8.0000+ 6	4.2023+ 0	2.3669+ 0	1.9308+ 0						7.3635- 4				7.2666- 1
8.0000+ 6 ~ 1.0000+ 7	4.4009+ 0	2.6437+ 0	1.7564+ 0						1.7636- 4				8.0647- 1
1.0000+ 7 ~ 1.5000+ 7	4.4094+ 0	2.6217+ 0	1.7870+ 0						4.9402- 5				8.5942- 1

TABLE A1.36

Ta-181

MATERIAL :1731 CROSS SECTION TA-181

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	7.1452+ 1	6.1890+ 0							6.5263+ 1				3.7162- 3
1.0000- 2 ~ 1.5000- 2	3.6522+ 1	6.1876+ 0							3.0335+ 1				3.7162- 3
1.5000- 2 ~ 2.0000- 2	3.1800+ 1	6.1866+ 0							2.5613+ 1				3.7162- 3
2.0000- 2 ~ 3.0000- 2	2.7707+ 1	6.1852+ 0							2.1522+ 1				3.7162- 3
3.0000- 2 ~ 4.0000- 2	2.4380+ 1	6.1832+ 0							1.8197+ 1				3.7162- 3
4.0000- 2 ~ 5.0000- 2	2.2228+ 1	6.1812+ 0							1.6047+ 1				3.7162- 3
5.0000- 2 ~ 6.0000- 2	2.0776+ 1	6.1793+ 0							1.4596+ 1				3.7162- 3
6.0000- 2 ~ 8.0000- 2	1.9167+ 1	6.1763+ 0							1.2991+ 1				3.7162- 3
8.0000- 2 ~ 1.0000- 1	1.7661+ 1	6.1723+ 0							1.1489+ 1				3.7162- 3
1.0000- 1 ~ 1.5000- 1	1.6067+ 1	6.1651+ 0							9.9022+ 0				3.7162- 3
1.5000- 1 ~ 2.0000- 1	1.4608+ 1	6.1547+ 0							8.4536+ 0				3.7162- 3
2.0000- 1 ~ 3.0000- 1	1.3401+ 1	6.1384+ 0							7.2625+ 0				3.7162- 3
3.0000- 1 ~ 4.0000- 1	1.2421+ 1	6.1157+ 0							6.3055+ 0				3.7162- 3
4.0000- 1 ~ 5.0000- 1	1.1849+ 1	6.0916+ 0							5.7570+ 0				3.7162- 3
5.0000- 1 ~ 6.0000- 1	1.1441+ 1	6.0662+ 0							5.3752+ 0				3.7162- 3
6.0000- 1 ~ 8.0000- 1	1.1062+ 1	6.0249+ 0							5.0376+ 0				3.7162- 3
8.0000- 1 ~ 1.0000+ 0	1.0787+ 1	5.9628+ 0							4.8240+ 0				3.7162- 3
1.0000+ 0 ~ 1.5000+ 0	1.0652+ 1	5.8325+ 0							4.8195+ 0				3.7169- 3
1.5000+ 0 ~ 2.0000+ 0	1.1006+ 1	5.5842+ 0							5.4215+ 0				3.7180- 3
2.0000+ 0 ~ 3.0000+ 0	1.3735+ 1	4.9302+ 0							8.8049+ 0				3.7192- 3
3.0000+ 0 ~ 4.0000+ 0	5.8482+ 1	4.1900+ 0							5.4292+ 1				3.7203- 3
4.0000+ 0 ~ 5.0000+ 0	2.0406+ 3	1.4914+ 2							1.8915+ 3				3.7211- 3
5.0000+ 0 ~ 6.0000+ 0	2.4191+ 1	1.0401+ 1							1.3790+ 1				3.7218- 3
6.0000+ 0 ~ 8.0000+ 0	1.0633+ 1	7.1891+ 0							3.4440+ 0				3.7226- 3
8.0000+ 0 ~ 1.0000+ 1	1.5576+ 1	5.2944+ 0							1.0281+ 1				3.7234- 3
1.0000+ 1 ~ 1.5000+ 1	1.9992+ 2	2.0838+ 1							1.7909+ 2				3.7245- 3
1.5000+ 1 ~ 2.0000+ 1	7.7858+ 0	6.3045+ 0							1.4814+ 0				3.7256- 3
2.0000+ 1 ~ 3.0000+ 1	7.6143+ 1	1.1350+ 1							6.4787+ 1				3.7268- 3
3.0000+ 1 ~ 4.0000+ 1	3.8674+ 2	1.2090+ 2							2.6584+ 2				3.7279- 3
4.0000+ 1 ~ 5.0000+ 1	2.0877+ 1	1.3970+ 1							6.9067+ 0				3.7287- 3
5.0000+ 1 ~ 6.0000+ 1	9.3065+ 0	7.6158+ 0							1.6907+ 0				3.7294- 3
6.0000+ 1 ~ 8.0000+ 1	4.4307+ 1	1.0604+ 1							3.3700+ 1				3.7301- 3
8.0000+ 1 ~ 1.0000+ 2	1.5009+ 2	9.0172+ 1							5.9914+ 1				3.7310- 3
1.0000+ 2 ~ 1.5000+ 2	6.7063+ 1	3.0797+ 1							3.6267+ 1				3.7576- 3
1.5000+ 2 ~ 2.0000+ 2	7.5525+ 1	4.5646+ 1							2.9878+ 1				3.7990- 3
2.0000+ 2 ~ 3.0000+ 2	4.7870+ 1	2.2053+ 1							2.5826+ 1				3.8419- 3
3.0000+ 2 ~ 4.0000+ 2	3.5221+ 1	1.8903+ 1							1.6249+ 1				3.8832- 3
4.0000+ 2 ~ 5.0000+ 2	4.0039+ 1	2.2029+ 1							1.7205+ 1				3.9139- 3
5.0000+ 2 ~ 6.0000+ 2	3.6209+ 1	2.4456+ 1							1.1744+ 1				3.9384- 3
6.0000+ 2 ~ 8.0000+ 2	2.8571+ 1	1.9110+ 1							9.4566+ 0				3.9675- 3
8.0000+ 2 ~ 1.0000+ 3	3.4011+ 1	2.3706+ 1							1.0307+ 1				3.9982- 3
1.0000+ 3 ~ 1.5000+ 3	2.3357+ 1	1.2991+ 1							1.0323+ 1				4.1461- 3
1.5000+ 3 ~ 2.0000+ 3	2.0962+ 1	1.3108+ 1							7.8190+ 0				4.3579- 3
2.0000+ 3 ~ 3.0000+ 3	1.8744+ 1	1.2840+ 1							5.8740+ 0				4.7105- 3
3.0000+ 3 ~ 4.0000+ 3	1.6822+ 1	1.2350+ 1							4.4392+ 0				5.2783- 3
4.0000+ 3 ~ 5.0000+ 3	1.5523+ 1	1.1889+ 1							3.6094+ 0				5.8386- 3
5.0000+ 3 ~ 6.0000+ 3	1.4667+ 1	1.1597+ 1							3.0644+ 0				6.4007- 3
6.0000+ 3 ~ 8.0000+ 3	1.3850+ 1	1.1308+ 1	2.4201- 2						2.5124+ 0				7.3633- 3
8.0000+ 3 ~ 1.0000+ 4	1.3039+ 1	1.0937+ 1	5.0443- 2						2.0359+ 0				8.7395- 3
1.0000+ 4 ~ 1.5000+ 4	1.2120+ 1	1.0437+ 1	7.7440- 2						1.5807+ 0				1.1662- 2
1.5000+ 4 ~ 2.0000+ 4	1.1254+ 1	9.9185+ 0	1.0677- 1						1.2117+ 0				1.5294- 2
2.0000+ 4 ~ 3.0000+ 4	1.0423+ 1	9.3434+ 0	1.4052- 1						9.3540- 1				2.0948- 2
3.0000+ 4 ~ 4.0000+ 4	9.8501+ 0	8.9255+ 0	1.7672- 1						7.4254- 1				2.9284- 2
4.0000+ 4 ~ 5.0000+ 4	9.6032+ 0	8.7602+ 0	2.0527- 1						6.3349- 1				3.7121- 2
5.0000+ 4 ~ 6.0000+ 4	9.4350+ 0	8.6411+ 0	2.2911- 1						5.6342- 1				4.4725- 2
6.0000+ 4 ~ 8.0000+ 4	9.2714+ 0	8.5126+ 0	2.5930- 1						4.9846- 1				5.6083- 2
8.0000+ 4 ~ 1.0000+ 5	9.1014+ 0	8.3624+ 0	2.9331- 1						4.4475- 1				7.0617- 2
1.0000+ 5 ~ 1.5000+ 5	8.4588+ 0	7.7068+ 0	3.6115- 1						3.8973- 1				9.3253- 2
1.5000+ 5 ~ 2.0000+ 5	7.8959+ 0	6.9109+ 0	6.8121- 1						3.0376- 1				1.2405- 1
2.0000+ 5 ~ 3.0000+ 5	7.5151+ 0	6.4337+ 0	8.2650- 1						2.5427- 1	0.0000+ 0			1.5868- 1
3.0000+ 5 ~ 4.0000+ 5	7.1249+ 0	5.9301+ 0	9.8510- 1						2.0934- 1	0.0000+ 0			1.9539- 1
4.0000+ 5 ~ 5.0000+ 5	6.9918+ 0	5.6845+ 0	1.1204+ 0						1.8682- 1	0.0000+ 0			2.2745- 1
5.0000+ 5 ~ 6.0000+ 5	6.8293+ 0	5.3334+ 0	1.3323+ 0						1.6340- 1	0.0000+ 0			2.6292- 1
6.0000+ 5 ~ 8.0000+ 5	6.8590+ 0	5.2031+ 0	1.5076+ 0						1.4838- 1	0.0000+ 0			3.1469- 1
8.0000+ 5 ~ 1.0000+ 6	7.0358+ 0	5.1985+ 0	1.7048+ 0						1.3255- 1	0.0000+ 0			3.8663- 1
1.0000+ 6 ~ 1.5000+ 6	7.2263+ 0	5.1235+ 0	2.0106+ 0						9.1520- 2	0.0000+ 0			5.0362- 1
1.5000+ 6 ~ 2.0000+ 6	7.2976+ 0	5.0338+ 0	2.2117+ 0						5.1713- 2	0.0000+ 0			6.1080- 1
2.0000+ 6 ~ 3.0000+ 6	7.1388+ 0	4.8000+ 0	2.3102+ 0						2.7675- 2	0.0000+ 0			6.8868- 1
3.0000+ 6 ~ 4.0000+ 6	6.5742+ 0	4.1576+ 0	2.4031+ 0						1.1918- 2	0.0000+ 0			7.5112- 1
4.0000+ 6 ~ 5.0000+ 6	6.0532+ 0	3.5701+ 0	2.4761+ 0						4.8030- 3	0.0000+ 0			7.8260- 1
5.0000+ 6 ~ 6.0000+ 6	5.6535+ 0	3.1295+ 0	2.5192+ 0						1.7799- 3	0.0000+ 0			7.9024- 1
6.0000+ 6 ~ 8.0000+ 6	5.1640+ 0	2.6664+ 0	2.4781+ 0	1.8599- 2					4.8747- 4	0.0000+ 0			7.8193- 1
8.0000+ 6 ~ 1.0000+ 7	5.0907+ 0	2.6480+ 0	1.4681+ 0	9.6742- 1					7.5248- 5	0.0000+ 0			7.8100- 1
1.0000+ 7 ~ 1.5000+ 7	5.2550+ 0	2.8688+ 0	2.8837- 1	2.0955+ 0					2.9313- 6	1.5860- 3			8.3820- 1

TABLE A1.37

Th-232

MATERIAL =1901 CROSS SECTION TH-232

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	3.6057+ 1	1.2972+ 1							2.3080+ 1				3.1734- 3
1.0000- 2 ~ 1.5000- 2	2.3644+ 1	1.2970+ 1							1.0671+ 1				3.2297- 3
1.5000- 2 ~ 2.0000- 2	2.1945+ 1	1.2968+ 1							8.9761+ 0				3.2455- 3
2.0000- 2 ~ 3.0000- 2	2.0479+ 1	1.2965+ 1							7.5126+ 0				3.2619- 3
3.0000- 2 ~ 4.0000- 2	1.9276+ 1	1.2961+ 1							6.3081+ 0				3.2778- 3
4.0000- 2 ~ 5.0000- 2	1.8494+ 1	1.2957+ 1							5.5209+ 0				3.2885- 3
5.0000- 2 ~ 6.0000- 2	1.7960+ 1	1.2953+ 1							5.0036+ 0				3.2989- 3
6.0000- 2 ~ 8.0000- 2	1.7354+ 1	1.2947+ 1							4.4063+ 0				3.3100- 3
8.0000- 2 ~ 1.0000- 1	1.6789+ 1	1.2940+ 1							3.8486+ 0				3.3218- 3
1.0000- 1 ~ 1.5000- 1	1.6178+ 1	1.2926+ 1							3.2483+ 0				3.3369- 3
1.5000- 1 ~ 2.0000- 1	1.5599+ 1	1.2908+ 1							2.6846+ 0				3.3527- 3
2.0000- 1 ~ 3.0000- 1	1.5088+ 1	1.2880+ 1							2.2029+ 0				3.3691- 3
3.0000- 1 ~ 4.0000- 1	1.4637+ 1	1.2845+ 1							1.7918+ 0				3.3850- 3
4.0000- 1 ~ 5.0000- 1	1.4348+ 1	1.2811+ 1							1.5364+ 0				3.3967- 3
5.0000- 1 ~ 6.0000- 1	1.4119+ 1	1.2778+ 1							1.3413+ 0				3.4061- 3
6.0000- 1 ~ 8.0000- 1	1.3869+ 1	1.2730+ 1							1.1375+ 0				3.4172- 3
8.0000- 1 ~ 1.0000+ 0	1.3616+ 1	1.2670+ 1							9.4488- 1				3.4290- 3
1.0000+ 0 ~ 1.5000+ 0	1.3312+ 1	1.2574+ 1							7.3559- 1				3.4441- 3
1.5000+ 0 ~ 2.0000+ 0	1.3002+ 1	1.2451+ 1							5.4734- 1				3.4599- 3
2.0000+ 0 ~ 3.0000+ 0	1.2691+ 1	1.2292+ 1							3.9365- 1				3.4764- 3
3.0000+ 0 ~ 4.0000+ 0	1.2398+ 1	1.2114+ 1							2.7854- 1				3.4922- 3
4.0000+ 0 ~ 5.0000+ 0	1.2181+ 1	1.1962+ 1							2.1317- 1				3.5039- 3
5.0000+ 0 ~ 6.0000+ 0	1.2007+ 1	1.1829+ 1							1.7253- 1				3.5133- 3
6.0000+ 0 ~ 8.0000+ 0	1.1795+ 1	1.1654+ 1							1.3745- 1				3.5244- 3
8.0000+ 0 ~ 1.0000+ 1	1.1610+ 1	1.1442+ 1							1.6673- 1				3.5362- 3
1.0000+ 1 ~ 1.5000+ 1	1.1184+ 1	1.1069+ 1							1.1517- 1				3.5513- 3
1.5000+ 1 ~ 2.0000+ 1	1.0393+ 1	1.0160+ 1							2.3299- 1				3.5671- 3
2.0000+ 1 ~ 3.0000+ 1	1.0407+ 2	2.0538+ 1							8.3535+ 1				3.5836- 3
3.0000+ 1 ~ 4.0000+ 1	1.0398+ 1	1.0327+ 1							7.0634- 2				3.5994- 3
4.0000+ 1 ~ 5.0000+ 1	9.6600+ 0	9.5892+ 0							7.0734- 2				3.6111- 3
5.0000+ 1 ~ 6.0000+ 1	3.5199+ 1	1.1708+ 1							2.3492+ 1				3.6205- 3
6.0000+ 1 ~ 8.0000+ 1	1.4199+ 2	9.4405+ 1							4.7590+ 1				3.6317- 3
8.0000+ 1 ~ 1.0000+ 2	1.1406+ 1	1.1331+ 1							7.5782- 2				3.6434- 3
1.0000+ 2 ~ 1.5000+ 2	3.9050+ 1	2.3431+ 1							1.5619+ 1				3.6585- 3
1.5000+ 2 ~ 2.0000+ 2	5.4824+ 1	3.8896+ 1							1.5928+ 1				3.6743- 3
2.0000+ 2 ~ 3.0000+ 2	3.0208+ 1	2.2116+ 1							8.0917+ 0				3.6908- 3
3.0000+ 2 ~ 4.0000+ 2	3.5021+ 1	2.6827+ 1							8.1935+ 0				3.7066- 3
4.0000+ 2 ~ 5.0000+ 2	2.3371+ 1	1.9872+ 1							3.4994+ 0				3.7184- 3
5.0000+ 2 ~ 6.0000+ 2	1.5712+ 1	1.3277+ 1							2.4346+ 0				3.7277- 3
6.0000+ 2 ~ 8.0000+ 2	2.1798+ 1	1.8771+ 1							3.0269+ 0				3.7389- 3
8.0000+ 2 ~ 1.0000+ 3	2.1468+ 1	1.8981+ 1							2.4876+ 0				3.7506- 3
1.0000+ 3 ~ 1.5000+ 3	1.7252+ 1	1.5501+ 1							1.7512+ 0				4.0816- 3
1.5000+ 3 ~ 2.0000+ 3	2.4772+ 1	2.2772+ 1							2.0001+ 0				4.5935- 3
2.0000+ 3 ~ 3.0000+ 3	1.8929+ 1	1.7683+ 1							1.2458+ 0				5.5106- 3
3.0000+ 3 ~ 4.0000+ 3	1.7770+ 1	1.6550+ 1							1.2193+ 0				6.6268- 3
4.0000+ 3 ~ 5.0000+ 3	1.6984+ 1	1.5627+ 1							1.3568+ 0				7.8906- 3
5.0000+ 3 ~ 6.0000+ 3	1.6526+ 1	1.5317+ 1							1.2088+ 0				9.3069- 3
6.0000+ 3 ~ 8.0000+ 3	1.5983+ 1	1.4938+ 1							1.0447+ 0				1.0989- 2
8.0000+ 3 ~ 1.0000+ 4	1.5460+ 1	1.4510+ 1							9.4922- 1				1.3254- 2
1.0000+ 4 ~ 1.5000+ 4	1.4932+ 1	1.4070+ 1							8.6269- 1				1.8434- 2
1.5000+ 4 ~ 2.0000+ 4	1.4413+ 1	1.3697+ 1							7.1654- 1				2.4671- 2
2.0000+ 4 ~ 3.0000+ 4	1.3926+ 1	1.3317+ 1							6.0861- 1				3.4922- 2
3.0000+ 4 ~ 4.0000+ 4	1.3489+ 1	1.3002+ 1							4.8683- 1				4.7073- 2
4.0000+ 4 ~ 5.0000+ 4	1.3157+ 1	1.2766+ 1	4.9804- 7						3.9107- 1				5.9558- 2
5.0000+ 4 ~ 6.0000+ 4	1.2886+ 1	1.2508+ 1	4.1467- 2						3.3616- 1				7.2760- 2
6.0000+ 4 ~ 8.0000+ 4	1.2563+ 1	1.2114+ 1	1.4628- 1						3.0309- 1				8.8440- 2
8.0000+ 4 ~ 1.0000+ 5	1.2197+ 1	1.1669+ 1	2.5948- 1						2.6849- 1				1.0810- 1
1.0000+ 5 ~ 1.5000+ 5	1.1636+ 1	1.1005+ 1	3.9603- 1						2.3473- 1				1.4200- 1
1.5000+ 5 ~ 2.0000+ 5	1.0993+ 1	1.0252+ 1	5.2356- 1						2.1740- 1				1.8228- 1
2.0000+ 5 ~ 3.0000+ 5	1.0212+ 1	9.3754+ 0	6.3570- 1						2.0076- 1				2.2938- 1
3.0000+ 5 ~ 4.0000+ 5	9.3654+ 0	8.4554+ 0	7.2947- 1						1.8058- 1				2.7594- 1
4.0000+ 5 ~ 5.0000+ 5	8.6972+ 0	7.7275+ 0	7.9683- 1						1.7290- 1				3.0945- 1
5.0000+ 5 ~ 6.0000+ 5	8.1180+ 0	7.0783+ 0	8.5493- 1						1.8480- 1				3.3441- 1
6.0000+ 5 ~ 8.0000+ 5	7.5441+ 0	6.4003+ 0	9.4023- 1						2.0355- 1				3.6188- 1
8.0000+ 5 ~ 1.0000+ 6	7.0834+ 0	5.6594+ 0	1.2429+ 0			0.0000+ 0			1.8109- 1				3.9580- 1
1.0000+ 6 ~ 1.5000+ 6	6.8311+ 0	5.0309+ 0	1.6530+ 0			1.9140- 2			1.2801- 1				4.4835- 1
1.5000+ 6 ~ 2.0000+ 6	6.9029+ 0	4.6129+ 0	2.1160+ 0			9.1970- 2			8.2024- 2				5.3967- 1
2.0000+ 6 ~ 3.0000+ 6	7.3819+ 0	4.7935+ 0	2.4280+ 0			1.1675- 1			4.3858- 2				6.6402- 1
3.0000+ 6 ~ 4.0000+ 6	7.8452+ 0	5.2264+ 0	2.4588+ 0			1.3840- 1			2.1571- 2				7.4883- 1
4.0000+ 6 ~ 5.0000+ 6	7.7287+ 0	5.1494+ 0	2.4215+ 0			1.4465- 1			1.3121- 2				7.8523- 1
5.0000+ 6 ~ 6.0000+ 6	7.2377+ 0	4.6876+ 0	2.4105+ 0			1.3955- 1			0.0000+ 0				7.9753- 1
6.0000+ 6 ~ 8.0000+ 6	6.5206+ 0	4.0422+ 0	1.8553+ 0	3.2954- 1		2.9345- 1			0.0000+ 0				7.9256- 1
8.0000+ 6 ~ 1.0000+ 7	5.7828+ 0	3.2768+ 0	4.4912- 1	1.7575+ 0		2.9935- 1			0.0000+ 0				7.7066- 1
1.0000+ 7 ~ 1.5000+ 7	5.6776+ 0	3.2528+ 0	2.3221- 1	1.5094+ 0	3.5763- 1	3.2552- 1			0.0000+ 0				7.7782- 1
1.5000+ 7 ~ 2.0000+ 7	6.0405+ 0	3.7273+ 0	8.6572- 1	5.8600- 2	8.7350- 1	5.1541- 1			0.0000+ 0				8.4783- 1

TABLE A1.38

Pa-233

MATERIAL =1911 CROSS SECTION PA-233

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	1.1850+ 2	9.9279+ 0				0.0000+ 0			1.0852+ 2				3.1348- 3
1.0000- 2 ~ 1.5000- 2	7.7796+ 1	1.1020+ 1				0.0000+ 0			6.6791+ 1				3.1858- 3
1.5000- 2 ~ 2.0000- 2	6.5263+ 1	1.1020+ 1				0.0000+ 0			5.4219+ 1				3.2001- 3
2.0000- 2 ~ 3.0000- 2	5.4412+ 1	1.1020+ 1				0.0000+ 0			4.3379+ 1				3.2150- 3
3.0000- 2 ~ 4.0000- 2	4.5573+ 1	1.1020+ 1				0.0000+ 0			3.4525+ 1				3.2294- 3
4.0000- 2 ~ 5.0000- 2	4.0098+ 1	1.1020+ 1				0.0000+ 0			2.9063+ 1				3.2400- 3
5.0000- 2 ~ 6.0000- 2	3.6347+ 1	1.1020+ 1				0.0000+ 0			2.5318+ 1				3.2485- 3
6.0000- 2 ~ 8.0000- 2	3.2561+ 1	1.1020+ 1				0.0000+ 0			2.1539+ 1				3.2586- 3
8.0000- 2 ~ 1.0000- 1	2.9266+ 1	1.1020+ 1				0.0000+ 0			1.8245+ 1				3.2692- 3
1.0000- 1 ~ 1.5000- 1	2.6111+ 1	1.1020+ 1				0.0000+ 0			1.5086+ 1				3.2829- 3
1.5000- 1 ~ 2.0000- 1	2.3820+ 1	1.1022+ 1				0.0000+ 0			1.2797+ 1				3.2972- 3
2.0000- 1 ~ 3.0000- 1	2.2929+ 1	1.1030+ 1				0.0000+ 0			1.1899+ 1				3.3121- 3
3.0000- 1 ~ 4.0000- 1	2.0642+ 1	1.1030+ 1				0.0000+ 0			1.7584+ 1				3.3264- 3
4.0000- 1 ~ 5.0000- 1	4.7388+ 1	1.1038+ 1				0.0000+ 0			3.6307+ 1				3.3371- 3
5.0000- 1 ~ 6.0000- 1	2.4460+ 1	1.1044+ 1				0.0000+ 0			1.3411+ 1				3.3456- 3
6.0000- 1 ~ 8.0000- 1	3.2973+ 1	1.1060+ 1				0.0000+ 0			2.1852+ 1				3.3556- 3
8.0000- 1 ~ 1.0000+ 0	3.8696+ 1	1.1099+ 1				0.0000+ 0			2.7545+ 1				3.3663- 3
1.0000+ 0 ~ 1.5000+ 0	4.3810+ 2	1.3020+ 1				0.0000+ 0			4.2387+ 2				3.3799- 3
1.5000+ 0 ~ 2.0000+ 0	8.5110+ 2	1.8050+ 1				0.0000+ 0			6.3187+ 2				3.3943- 3
2.0000+ 0 ~ 3.0000+ 0	1.7494+ 2	1.1084+ 1				0.0000+ 0			1.6382+ 2				3.4092- 3
3.0000+ 0 ~ 4.0000+ 0	2.8059+ 2	1.3618+ 1				0.0000+ 0			2.4697+ 2				3.4235- 3
4.0000+ 0 ~ 5.0000+ 0	7.7650+ 1	1.0359+ 1				0.0000+ 0			6.7292+ 1				3.4341- 3
5.0000+ 0 ~ 6.0000+ 0	2.0896+ 2	1.3466+ 1				0.0000+ 0			1.9550+ 2				3.4426- 3
6.0000+ 0 ~ 8.0000+ 0	4.3140+ 1	1.0377+ 1				0.0000+ 0			3.2763+ 1				3.4527- 3
8.0000+ 0 ~ 1.0000+ 1	2.0526+ 2	1.3478+ 1				0.0000+ 0			1.9178+ 2				3.4634- 3
1.0000+ 1 ~ 1.5000+ 1	6.8820+ 1	1.1245+ 1				0.0000+ 0			5.7575+ 1				3.4770- 3
1.5000+ 1 ~ 2.0000+ 1	1.2117+ 2	1.2219+ 1				0.0000+ 0			1.0895+ 2				3.4913- 3
2.0000+ 1 ~ 3.0000+ 1	7.2591+ 1	1.1820+ 1				0.0000+ 0			6.0771+ 1				3.5062- 3
3.0000+ 1 ~ 4.0000+ 1	6.2806+ 1	1.1807+ 1				0.0000+ 0			5.0999+ 1				3.5205- 3
4.0000+ 1 ~ 5.0000+ 1	5.6487+ 1	1.1796+ 1				0.0000+ 0			4.4691+ 1				3.5312- 3
5.0000+ 1 ~ 6.0000+ 1	5.2232+ 1	1.1786+ 1				0.0000+ 0			4.0448+ 1				3.5397- 3
6.0000+ 1 ~ 8.0000+ 1	4.7401+ 1	1.1773+ 1				0.0000+ 0			3.5629+ 1				3.5498- 3
8.0000+ 1 ~ 1.0000+ 2	4.2954+ 1	1.1757+ 1				0.0000+ 0			3.1197+ 1				3.5604- 3
1.0000+ 2 ~ 1.5000+ 2	3.8137+ 1	1.1734+ 1				0.0000+ 0			2.6403+ 1				3.5740- 3
1.5000+ 2 ~ 2.0000+ 2	3.3752+ 1	1.1707+ 1				0.0000+ 0			2.2045+ 1				3.5884- 3
2.0000+ 2 ~ 3.0000+ 2	3.0009+ 1	1.1674+ 1				0.0000+ 0			1.8336+ 1				3.6033- 3
3.0000+ 2 ~ 4.0000+ 2	2.6896+ 1	1.1637+ 1				0.0000+ 0			1.5259+ 1				3.6176- 3
4.0000+ 2 ~ 5.0000+ 2	2.4985+ 1	1.1606+ 1				0.0000+ 0			1.3379+ 1				3.6282- 3
5.0000+ 2 ~ 6.0000+ 2	2.3555+ 1	1.1579+ 1				0.0000+ 0			1.1976+ 1				3.6367- 3
6.0000+ 2 ~ 8.0000+ 2	2.2072+ 1	1.1543+ 1				0.0000+ 0			1.0529+ 1				3.6468- 3
8.0000+ 2 ~ 1.0000+ 3	2.0728+ 1	1.1503+ 1				0.0000+ 0			9.2257+ 0				3.6575- 3
1.0000+ 3 ~ 1.5000+ 3	1.9821+ 1	1.2100+ 1				0.0000+ 0			7.7171+ 0				4.2520- 3
1.5000+ 3 ~ 2.0000+ 3	1.8470+ 1	1.2100+ 1				0.0000+ 0			6.3694+ 0				5.1785- 3
2.0000+ 3 ~ 3.0000+ 3	1.7490+ 1	1.2100+ 1				0.0000+ 0			5.3875+ 0				6.1420- 3
3.0000+ 3 ~ 4.0000+ 3	1.6880+ 1	1.2100+ 1				0.0000+ 0			4.5787+ 0				7.0685- 3
4.0000+ 3 ~ 5.0000+ 3	1.6123+ 1	1.2100+ 1				0.0000+ 0			4.0221+ 0				7.7574- 3
5.0000+ 3 ~ 6.0000+ 3	1.5765+ 1	1.2100+ 1				0.0000+ 0			3.6634+ 0				8.9109- 3
6.0000+ 3 ~ 8.0000+ 3	1.5447+ 1	1.2100+ 1	2.9842- 2			0.0000+ 0			3.3169+ 0				1.1102- 2
8.0000+ 3 ~ 1.0000+ 4	1.5193+ 1	1.2024+ 1	1.5234- 1			0.0000+ 0			3.0158+ 0				1.3417- 2
1.0000+ 4 ~ 1.5000+ 4	1.4923+ 1	1.2000+ 1	2.0489- 1			1.2077- 3			2.7139+ 0				1.7884- 2
1.5000+ 4 ~ 2.0000+ 4	1.4656+ 1	1.2000+ 1	1.9220- 1			3.1042- 3			2.4599+ 0				2.4406- 2
2.0000+ 4 ~ 3.0000+ 4	1.4130+ 1	1.1697+ 1	1.7280- 1			5.0762- 3			2.2548+ 0				3.4258- 2
3.0000+ 4 ~ 4.0000+ 4	1.3971+ 1	1.1795+ 1	1.6589- 1			6.9727- 3			2.0019+ 0				4.7148- 2
4.0000+ 4 ~ 5.0000+ 4	1.3550+ 1	1.1596+ 1	1.7079- 1			8.3829- 3			1.7736+ 0				5.9121- 2
5.0000+ 4 ~ 6.0000+ 4	1.3221+ 1	1.1448+ 1	1.6116- 1			9.5067- 3			1.5809+ 0				7.0568- 2
6.0000+ 4 ~ 8.0000+ 4	1.2827+ 1	1.1299+ 1	2.7233- 1			1.0000- 2			1.2428+ 0				8.6281- 2
8.0000+ 4 ~ 1.0000+ 5	1.2504+ 1	1.1089+ 1	5.3224- 1			1.2544- 2			8.5979- 1				1.0689- 1
1.0000+ 5 ~ 1.5000+ 5	1.2084+ 1	1.0568+ 1	8.5426- 1			2.0000- 2			6.3810- 1				1.4208- 1
1.5000+ 5 ~ 2.0000+ 5	1.1444+ 1	9.8291+ 0	1.0665+ 0			2.5239- 2			5.2341- 1				1.8443- 1
2.0000+ 5 ~ 3.0000+ 5	1.0659+ 1	8.8865+ 0	1.3054+ 0			5.0338- 2			4.1623- 1				2.3713- 1
3.0000+ 5 ~ 4.0000+ 5	9.8634+ 0	7.7654+ 0	1.5544+ 0			2.4290- 1			2.9732- 1				2.9170- 1
4.0000+ 5 ~ 5.0000+ 5	9.1252+ 0	6.9311+ 0	1.5429+ 0			4.2074- 1			2.3118- 1				3.3614- 1
5.0000+ 5 ~ 6.0000+ 5	8.4136+ 0	6.2860+ 0	1.4910+ 0			4.4515- 1			1.8888- 1				3.7309- 1
6.0000+ 5 ~ 8.0000+ 5	7.6758+ 0	5.4400+ 0	1.5078+ 0			5.7726- 1			1.4873- 1				4.1647- 1
8.0000+ 5 ~ 1.0000+ 6	7.1062+ 0	4.6956+ 0	1.3917+ 0			9.0268- 1			1.1526- 1				4.6427- 1
1.0000+ 6 ~ 1.5000+ 6	6.6031+ 0	3.9311+ 0	1.5659+ 0			1.0204+ 0			8.3783- 2				5.2394- 1
1.5000+ 6 ~ 2.0000+ 6	6.6843+ 0	3.7430+ 0	1.6879+ 0			1.1934+ 0			5.9915- 2				6.0450- 1
2.0000+ 6 ~ 3.0000+ 6	7.3461+ 0	4.3905+ 0	1.6352+ 0			1.2781+ 0			4.2101- 2				6.9903- 1
3.0000+ 6 ~ 4.0000+ 6	7.6455+ 0	4.8509+ 0	1.4544+ 0			1.3101+ 0			2.9772- 2				7.5959- 1
4.0000+ 6 ~ 5.0000+ 6	7.4850+ 0	4.7681+ 0	1.3710+ 0			1.3225+ 0			2.3177- 2				7.8930- 1
5.0000+ 6 ~ 6.0000+ 6	7.1420+ 0	4.4177+ 0	1.3651+ 0			1.3401+ 0			1.8922- 2				8.1074- 1
6.0000+ 6 ~ 8.0000+ 6	6.5147+ 0	3.7979+ 0	1.1835+ 0	1.5122- 1		1.3663+ 0			1.4887- 2				8.3327- 1
8.0000+ 6 ~ 1.0000+ 7	5.8507+ 0	3.1052+ 0	7.3980- 1	6.2237- 1		1.3712+ 0			1.1544- 2				8.4359- 1
1.0000+ 7 ~ 1.5000+ 7	5.6520+ 0	2.9620+ 0	3.9554- 1	6.0287- 1	1.7256- 1	1.5107+ 0			8.4076- 3				8.4289- 1

TABLE A1.39

U-234

MATERIAL =1921 CROSS SECTION U -234

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	3.1725+ 2	1.4838+ 1				1.9575- 2			3.0239+ 2				2.8871- 3
1.0000- 2 ~ 1.5000- 2	1.5353+ 2	1.4792+ 1				9.0922- 3			1.3873+ 2				2.8900- 3
1.5000- 2 ~ 2.0000- 2	1.3140+ 2	1.4761+ 1				7.6963- 3			1.1663+ 2				2.8908- 3
2.0000- 2 ~ 3.0000- 2	1.1153+ 2	1.4715+ 1				6.4538- 3			9.6810+ 1				2.8916- 3
3.0000- 2 ~ 4.0000- 2	9.5632+ 1	1.4655+ 1				5.4714- 3			8.0971+ 1				2.8924- 3
4.0000- 2 ~ 5.0000- 2	8.5042+ 1	1.4595+ 1				4.8257- 3			7.0442+ 1				2.8930- 3
5.0000- 2 ~ 6.0000- 2	7.7496+ 1	1.4537+ 1				4.3719- 3			6.2956+ 1				2.8935- 3
6.0000- 2 ~ 8.0000- 2	6.9687+ 1	1.4450+ 1				3.9110- 3			5.5233+ 1				2.8941- 3
8.0000- 2 ~ 1.0000- 1	6.1915+ 1	1.4337+ 1				3.4605- 3			4.7575+ 1				2.8947- 3
1.0000- 1 ~ 1.5000- 1	5.3351+ 1	1.4146+ 1				2.9814- 3			3.9202+ 1				2.8954- 3
1.5000- 1 ~ 2.0000- 1	4.5355+ 1	1.3887+ 1				2.5525- 3			3.1466+ 1				2.8962- 3
2.0000- 1 ~ 3.0000- 1	3.8142+ 1	1.3526+ 1				2.1896- 3			2.4614+ 1				2.8971- 3
3.0000- 1 ~ 4.0000- 1	3.2155+ 1	1.3089+ 1				1.9106- 3			1.9064+ 1				2.8979- 3
4.0000- 1 ~ 5.0000- 1	2.8177+ 1	1.2695+ 1				1.7408- 3			1.5481+ 1				2.8985- 3
5.0000- 1 ~ 6.0000- 1	2.5329+ 1	1.2337+ 1				1.6299- 3			1.2990+ 1				2.8990- 3
6.0000- 1 ~ 8.0000- 1	2.2307+ 1	1.1862+ 1				1.5274- 3			1.0444+ 1				2.8995- 3
8.0000- 1 ~ 1.0000+ 0	1.9527+ 1	1.1311+ 1				1.4548- 3			8.2148+ 0				2.9001- 3
1.0000+ 0 ~ 1.5000+ 0	1.6582+ 1	1.0521+ 1				1.4339- 3			6.0396+ 0				2.9009- 3
1.5000+ 0 ~ 2.0000+ 0	1.4117+ 1	9.5969+ 0				1.5395- 3			4.5186+ 0				2.9017- 3
2.0000+ 0 ~ 3.0000+ 0	1.2368+ 1	8.2548+ 0				2.0719- 3			4.1115+ 0				2.9025- 3
3.0000+ 0 ~ 4.0000+ 0	1.2812+ 1	5.9999+ 0				4.4842- 3			6.6074+ 0				2.9033- 3
4.0000+ 0 ~ 5.0000+ 0	6.0312+ 1	2.5488+ 0				4.3581- 2			5.7720+ 1				2.9039- 3
5.0000+ 0 ~ 6.0000+ 0	9.0482+ 3	4.3282+ 2				1.9845+ 0			2.6114+ 3				2.9044- 3
6.0000+ 0 ~ 8.0000+ 0	2.1378+ 1	1.6283+ 1				9.7754- 3			5.0908+ 0				2.9050- 3
8.0000+ 0 ~ 1.0000+ 1	1.2845+ 1	1.1989+ 1				6.1546- 4			8.5497- 1				2.9055- 3
1.0000+ 1 ~ 1.5000+ 1	1.0649+ 1	1.0384+ 1				2.0387- 4			2.6484- 1				2.9063- 3
1.5000+ 1 ~ 2.0000+ 1	9.5253+ 0	9.4082+ 0				1.0427- 4			1.1703- 1				2.9071- 3
2.0000+ 1 ~ 3.0000+ 1	1.1547+ 1	8.1131+ 0				1.9215- 4			3.4334+ 0				2.9079- 3
3.0000+ 1 ~ 4.0000+ 1	9.5978+ 1	2.7392+ 1				3.2636- 2			6.8553+ 1				2.9087- 3
4.0000+ 1 ~ 5.0000+ 1	7.8309+ 1	2.4530+ 1				1.9602- 2			5.3759+ 1				2.9093- 3
5.0000+ 1 ~ 6.0000+ 1	1.0241+ 1	1.0030+ 1				9.4978- 5			2.1024- 1				2.9098- 3
6.0000+ 1 ~ 8.0000+ 1	2.9128+ 1	1.3169+ 1				7.0874- 3			1.5952+ 1				2.9104- 3
8.0000+ 1 ~ 1.0000+ 2	9.7143+ 1	6.3308+ 1				5.4122- 2			3.3780+ 1				2.9110- 3
1.0000+ 2 ~ 1.5000+ 2	9.0113+ 1	1.8557+ 1				1.0129- 1			1.3455+ 1				2.9245- 3
1.5000+ 2 ~ 2.0000+ 2	7.4096+ 1	4.7805+ 1				8.1216- 2			2.6410+ 1				2.9504- 3
2.0000+ 2 ~ 3.0000+ 2	4.2399+ 1	3.1491+ 1				1.8043- 4			1.0904+ 1				2.9933- 3
3.0000+ 2 ~ 4.0000+ 2	4.1338+ 1	9.2158+ 1				1.0000- 4			9.1659+ 0				3.0570- 3
4.0000+ 2 ~ 5.0000+ 2	3.7781+ 1	9.0254+ 1				1.0000- 4			7.5188+ 0				3.1238- 3
5.0000+ 2 ~ 6.0000+ 2	3.5255+ 1	2.8832+ 1				1.0000- 4			6.4177+ 0				3.1949- 3
6.0000+ 2 ~ 8.0000+ 2	3.2582+ 1	2.7255+ 1				1.0000- 4			5.3251+ 0				3.3130- 3
8.0000+ 2 ~ 1.0000+ 3	3.0067+ 1	2.5702+ 1				1.0000- 4			4.3638+ 0				3.4710- 3
1.0000+ 3 ~ 1.5000+ 3	2.7302+ 1	2.3898+ 1				1.4704- 4			3.4022+ 0				3.7246- 3
1.5000+ 3 ~ 2.0000+ 3	2.4805+ 1	2.2183+ 1				1.7644- 3			2.6197+ 0				4.1532- 3
2.0000+ 3 ~ 3.0000+ 3	2.2641+ 1	2.0609+ 1				4.0169- 3			2.0265+ 0				4.8507- 3
3.0000+ 3 ~ 4.0000+ 3	2.0860+ 1	1.9254+ 1				6.0120- 3			1.6003+ 0				5.8220- 3
4.0000+ 3 ~ 5.0000+ 3	1.9717+ 1	1.8347+ 1				8.0093- 3			1.3617+ 0				6.8401- 3
5.0000+ 3 ~ 6.0000+ 3	1.8902+ 1	1.7682+ 1				9.5152- 3			1.2090+ 0				7.9058- 3
6.0000+ 3 ~ 8.0000+ 3	1.8028+ 1	1.6955+ 1				1.0000- 2			1.0627+ 0				9.5288- 3
8.0000+ 3 ~ 1.0000+ 4	1.7195+ 1	1.6247+ 1				1.0000- 2			9.3807- 1				1.1750- 2
1.0000+ 4 ~ 1.5000+ 4	1.6266+ 1	1.5437+ 1				1.1067- 2			8.1651- 1				1.5940- 2
1.5000+ 4 ~ 2.0000+ 4	1.5386+ 1	1.4661+ 1				1.2524- 2			7.1220- 1				2.1679- 2
2.0000+ 4 ~ 3.0000+ 4	1.4577+ 1	1.3938+ 1				1.4017- 2			6.2487- 1				3.0369- 2
3.0000+ 4 ~ 4.0000+ 4	1.3859+ 1	1.3290+ 1				1.6048- 2			5.5294- 1				4.2013- 2
4.0000+ 4 ~ 5.0000+ 4	1.3341+ 1	1.2819+ 1	1.1457- 2			1.7519- 2			4.9294- 1				5.3145- 2
5.0000+ 4 ~ 6.0000+ 4	1.2951+ 1	1.2427+ 1	7.0395- 2			1.8515- 2			4.3439- 1				6.4021- 2
6.0000+ 4 ~ 8.0000+ 4	1.2477+ 1	1.1930+ 1	1.5691- 1			2.0268- 2			3.6921- 1				7.9741- 2
8.0000+ 4 ~ 1.0000+ 5	1.1965+ 1	1.1375+ 1	2.5323- 1			2.3009- 2			3.1357- 1				9.9554- 2
1.0000+ 5 ~ 1.5000+ 5	1.1269+ 1	1.0596+ 1	3.7610- 1			2.8803- 2			2.6525- 1				1.3132- 1
1.5000+ 5 ~ 2.0000+ 5	1.0512+ 1	9.7392+ 0	5.0372- 1			3.8763- 2			2.2918- 1				1.6907- 1
2.0000+ 5 ~ 3.0000+ 5	9.6700+ 0	8.7605+ 0	6.2783- 1			7.4953- 2			2.0545- 1				2.1435- 1
3.0000+ 5 ~ 4.0000+ 5	8.8257+ 0	7.7191+ 0	7.1365- 1			2.0059- 1			1.8854- 1				2.6275- 1
4.0000+ 5 ~ 5.0000+ 5	8.2075+ 0	6.8948+ 0	7.3106- 1			4.0098- 1			1.7633- 1				3.0284- 1
5.0000+ 5 ~ 6.0000+ 5	7.7426+ 0	6.2416+ 0	7.2000- 1			6.0882- 1			1.6974- 1				3.3707- 1
6.0000+ 5 ~ 8.0000+ 5	7.2636+ 0	5.4553+ 0	6.2256- 1			1.0318+ 0			1.5141- 1				3.8538- 1
8.0000+ 5 ~ 1.0000+ 6	6.8910+ 0	4.8253+ 0	7.4440- 1			1.1732+ 0			1.4802- 1				4.3241- 1
1.0000+ 6 ~ 1.5000+ 6	6.7809+ 0	4.3154+ 0	1.1322+ 0			1.1959+ 0			1.3700- 1				4.9840- 1
1.5000+ 6 ~ 2.0000+ 6	6.9688+ 0	4.1053+ 0	1.3190+ 0			1.4389+ 0			1.0562- 1				5.9119- 1
2.0000+ 6 ~ 3.0000+ 6	7.2462+ 0	4.3382+ 0	1.3487+ 0			1.4965+ 0			5.6905- 2				6.8953- 1
3.0000+ 6 ~ 4.0000+ 6	7.4106+ 0	4.6180+ 0	1.2972+ 0			1.4715+ 0			2.1091- 2				7.5771- 1
4.0000+ 6 ~ 5.0000+ 6	7.3998+ 0	4.6771+ 0	1.2702+ 0			1.4449+ 0			6.8676- 3				7.8829- 1
5.0000+ 6 ~ 6.0000+ 6	7.2957+ 0	4.5637+ 0	1.1561+ 0			1.5738+ 0			1.9750- 3				8.1064- 1
6.0000+ 6 ~ 8.0000+ 6	6.9849+ 0	4.2504+ 0	5.3825- 1	3.8553- 2		2.1572+ 0			2.1803- 4				8.3383- 1
8.0000+ 6 ~ 1.0000+ 7	6.5861+ 0	3.8284+ 0	3.1837- 1	2.4471- 1		2.1935+ 0			1.9799- 5				8.4430- 1
1.0000+ 7 ~ 1.5000+ 7	5.9601+ 0	3.2648+ 0	3.6450- 1	2.8927- 1	5.0195- 2	1.9913+ 0			4.5915- 6				8.4363- 1

TABLE A1.40

U-235

MATERIAL =1022 CROSS SECTION U -235

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	****	****				****			****				2.8609- 3
1.0000- 2 ~ 1.5000- 2													2.8609- 3
1.5000- 2 ~ 2.0000- 2													2.8609- 3
2.0000- 2 ~ 3.0000- 2													2.8609- 3
3.0000- 2 ~ 4.0000- 2													2.8609- 3
4.0000- 2 ~ 5.0000- 2													2.8609- 3
5.0000- 2 ~ 6.0000- 2													2.8610- 3
6.0000- 2 ~ 8.0000- 2													2.8610- 3
8.0000- 2 ~ 1.0000- 1													2.8610- 3
1.0000- 1 ~ 1.5000- 1													2.8610- 3
1.5000- 1 ~ 2.0000- 1													2.8610- 3
2.0000- 1 ~ 3.0000- 1													2.8611- 3
3.0000- 1 ~ 4.0000- 1													2.8611- 3
4.0000- 1 ~ 5.0000- 1													2.8612- 3
5.0000- 1 ~ 6.0000- 1													2.8612- 3
6.0000- 1 ~ 8.0000- 1													2.8613- 3
8.0000- 1 ~ 1.0000+ 0													2.8614- 3
1.0000+ 0 ~ 1.5000+ 0													2.8616- 3
1.5000+ 0 ~ 2.0000+ 0													2.8619- 3
2.0000+ 0 ~ 3.0000+ 0													2.8623- 3
3.0000+ 0 ~ 4.0000+ 0													2.8628- 3
4.0000+ 0 ~ 5.0000+ 0													2.8634- 3
5.0000+ 0 ~ 6.0000+ 0													2.8639- 3
6.0000+ 0 ~ 8.0000+ 0													2.8647- 3
8.0000+ 0 ~ 1.0000+ 1													2.8658- 3
1.0000+ 1 ~ 1.5000+ 1													2.8678- 3
1.5000+ 1 ~ 2.0000+ 1													2.8705- 3
2.0000+ 1 ~ 3.0000+ 1													2.8746- 3
3.0000+ 1 ~ 4.0000+ 1													2.8801- 3
4.0000+ 1 ~ 5.0000+ 1													2.8855- 3
5.0000+ 1 ~ 6.0000+ 1													2.8910- 3
6.0000+ 1 ~ 8.0000+ 1													2.8992- 3
8.0000+ 1 ~ 1.0000+ 2	****	****	1.8548- 8			****			****				2.9102- 3
1.0000+ 2 ~ 1.5000+ 2	4.7885+ 1	1.2571+ 1	7.2421- 8			2.2380+ 1			1.2934+ 1				2.9293- 3
1.5000+ 2 ~ 2.0000+ 2	4.4368+ 1	1.2619+ 1	1.2896- 7			2.1015+ 1			1.0740+ 1				2.9567- 3
2.0000+ 2 ~ 3.0000+ 2	4.1276+ 1	1.2680+ 1	1.8775- 7			1.9751+ 1			8.8661+ 0				2.9977- 3
3.0000+ 2 ~ 4.0000+ 2	3.2935+ 1	1.2325+ 1	2.4429- 7			1.4195+ 1			6.4150+ 0				3.0524- 3
4.0000+ 2 ~ 5.0000+ 2	3.1225+ 1	1.2224+ 1	2.8633- 7			1.4090+ 1			4.9109+ 0				3.1071- 3
5.0000+ 2 ~ 6.0000+ 2	3.1674+ 1	1.2316+ 1	3.1984- 7			1.4838+ 1			4.5207+ 0				3.1618- 3
6.0000+ 2 ~ 8.0000+ 2	2.8423+ 1	1.2367+ 1	3.5962- 7			1.1508+ 1			4.5478+ 0				3.2439- 3
8.0000+ 2 ~ 1.0000+ 3	2.4869+ 1	1.2336+ 1	4.0166- 7			8.1515+ 0			4.3814+ 0				3.3533- 3
1.0000+ 3 ~ 1.5000+ 3	2.3511+ 1	1.2292+ 1	4.5554- 7			7.6124+ 0			3.6062+ 0				3.5914- 3
1.5000+ 3 ~ 2.0000+ 3	2.1554+ 1	1.2098+ 1	5.1208- 7			6.8703+ 0			2.5855+ 0				3.9717- 3
2.0000+ 3 ~ 3.0000+ 3	1.9487+ 1	1.1934+ 1	5.7087- 7			5.5904+ 0			1.9631+ 0				4.5852- 3
3.0000+ 3 ~ 4.0000+ 3	1.8194+ 1	1.1808+ 1	6.2741- 7			4.8742+ 0			1.5119+ 0				5.4512- 3
4.0000+ 3 ~ 5.0000+ 3	1.7627+ 1	1.1809+ 1	1.3034- 6			4.3579+ 0			1.4601+ 0				6.3581- 3
5.0000+ 3 ~ 6.0000+ 3	1.7008+ 1	1.1780+ 1	3.6152- 6			3.8316+ 0			1.3964+ 0				7.2948- 3
6.0000+ 3 ~ 8.0000+ 3	1.6519+ 1	1.1746+ 1	7.5912- 6			3.4491+ 0			1.3245+ 0				8.7438- 3
8.0000+ 3 ~ 1.0000+ 4	1.6154+ 1	1.1720+ 1	1.5299- 5			3.1407+ 0			1.2933+ 0				1.0727- 2
1.0000+ 4 ~ 1.5000+ 4	1.5354+ 1	1.1525+ 1	1.8284- 3			2.7694+ 0			1.0579+ 0				1.4355- 2
1.5000+ 4 ~ 2.0000+ 4	1.4707+ 1	1.1344+ 1	1.4744- 2			2.4403+ 0			9.0780- 1				1.9660- 2
2.0000+ 4 ~ 3.0000+ 4	1.4198+ 1	1.1179+ 1	2.7894- 2			2.1892+ 0			8.0096- 1				2.7770- 2
3.0000+ 4 ~ 4.0000+ 4	1.3773+ 1	1.1019+ 1	4.3112- 2			2.0000+ 0			7.0945- 1				3.8635- 2
4.0000+ 4 ~ 5.0000+ 4	1.3442+ 1	1.0856+ 1	6.4633- 2			1.8725+ 0			6.4710- 1				4.9644- 2
5.0000+ 4 ~ 6.0000+ 4	1.3158+ 1	1.0584+ 1	1.5512- 1			1.8100+ 0			6.0803- 1				6.2098- 2
6.0000+ 4 ~ 8.0000+ 4	1.2880+ 1	1.0327+ 1	2.6367- 1			1.7290+ 0			5.5970- 1				8.0041- 2
8.0000+ 4 ~ 1.0000+ 5	1.2464+ 1	9.9406+ 0	4.2374- 1			1.5953+ 0			5.0397- 1				1.0371- 1
1.0000+ 5 ~ 1.5000+ 5	1.1853+ 1	9.2582+ 0	6.1888- 1			1.5090+ 0			4.3234- 1				1.4121- 1
1.5000+ 5 ~ 2.0000+ 5	1.1126+ 1	8.4614+ 0	8.5474- 1			1.4265+ 0			3.6016- 1				1.9062- 1
2.0000+ 5 ~ 3.0000+ 5	1.0286+ 1	7.5717+ 0	1.0834+ 0			1.3348+ 0			2.8526- 1				2.5116- 1
3.0000+ 5 ~ 4.0000+ 5	9.4275+ 0	6.6520+ 0	1.2930+ 0			1.2528+ 0			2.2277- 1				3.1180- 1
4.0000+ 5 ~ 5.0000+ 5	8.7517+ 0	5.9124+ 0	1.4517+ 0			1.1955+ 0			1.8755- 1				3.5754- 1
5.0000+ 5 ~ 6.0000+ 5	8.1642+ 0	5.3297+ 0	1.4977+ 0			1.1658+ 0			1.6799- 1				3.9233- 1
6.0000+ 5 ~ 8.0000+ 5	7.5228+ 0	4.7133+ 0	1.5037+ 0			1.1584+ 0			1.4584- 1				4.2846- 1
8.0000+ 5 ~ 1.0000+ 6	6.9943+ 0	4.2212+ 0	1.4715+ 0			1.1838+ 0			1.1716- 1				4.6101- 1
1.0000+ 6 ~ 1.5000+ 6	6.7643+ 0	3.9541+ 0	1.4838+ 0			1.2408+ 0			8.4257- 2				5.1144- 1
1.5000+ 6 ~ 2.0000+ 6	6.9995+ 0	3.9434+ 0	1.7269+ 0			1.2738+ 0			5.7281- 2				5.9379- 1
2.0000+ 6 ~ 3.0000+ 6	7.5491+ 0	4.3143+ 0	1.9557+ 0			1.2445+ 0			3.9181- 2				6.9212- 1
3.0000+ 6 ~ 4.0000+ 6	7.8688+ 0	4.5552+ 0	2.1116+ 0			1.1768+ 0			2.5998- 2				7.8410- 1
4.0000+ 6 ~ 5.0000+ 6	7.7538+ 0	4.5307+ 0	2.0837+ 0			1.1190+ 0			1.9203- 2				7.9528- 1
5.0000+ 6 ~ 6.0000+ 6	7.3605+ 0	4.2710+ 0	1.8722+ 0	1.1654- 1		1.0818+ 0			1.4921- 2				8.0635- 1
6.0000+ 6 ~ 8.0000+ 6	6.6870+ 0	3.5357+ 0	1.1368+ 0	4.5537- 1		1.5254+ 0			1.0766- 2				7.9756- 1
8.0000+ 6 ~ 1.0000+ 7	5.9803+ 0	3.1122+ 0	4.8055- 1	6.0987- 1		1.7713+ 0			5.9697- 3				7.7419- 1
1.0000+ 7 ~ 1.5000+ 7	5.7730+ 0	3.1051+ 0	2.5133- 1	5.1530- 1	4.8714- 2	1.8497+ 0			2.7674- 3				7.9987- 1

TABLE A1.41

U-238

MATERIAL :1923 CROSS SECTION U -238

ENERGY	TOTAL	ELASTIC	INELA'	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	****	****				****			****				2.8248- 3
1.0000- 2 ~ 1.5000- 2													2.8248- 3
1.5000- 2 ~ 2.0000- 2													2.8248- 3
2.0000- 2 ~ 3.0000- 2													2.8248- 3
3.0000- 2 ~ 4.0000- 2													2.8248- 3
4.0000- 2 ~ 5.0000- 2													2.8248- 3
5.0000- 2 ~ 6.0000- 2													2.8248- 3
6.0000- 2 ~ 8.0000- 2													2.8248- 3
8.0000- 2 ~ 1.0000- 1													2.8248- 3
1.0000- 1 ~ 1.5000- 1													2.8248- 3
1.5000- 1 ~ 2.0000- 1													2.8248- 3
2.0000- 1 ~ 3.0000- 1													2.8249- 3
3.0000- 1 ~ 4.0000- 1													2.8249- 3
4.0000- 1 ~ 5.0000- 1													2.8249- 3
5.0000- 1 ~ 6.0000- 1													2.8250- 3
6.0000- 1 ~ 8.0000- 1													2.8250- 3
8.0000- 1 ~ 1.0000+ 0	****	****											2.8251- 3
1.0000+ 0 ~ 1.5000+ 0	9.7521+ 0	9.2506+ 0											2.8252- 3
1.5000+ 0 ~ 2.0000+ 0	9.6696+ 0	9.1881+ 0											2.8254- 3
2.0000+ 0 ~ 3.0000+ 0	9.5782+ 0	9.0649+ 0											2.8257- 3
3.0000+ 0 ~ 4.0000+ 0	9.4881+ 0	8.8176+ 0											2.8260- 3
4.0000+ 0 ~ 5.0000+ 0	9.5162+ 0	8.3567+ 0											2.8264- 3
5.0000+ 0 ~ 6.0000+ 0	1.1102+ 1	7.2852+ 0											2.8268- 3
6.0000+ 0 ~ 8.0000+ 0	4.6984+ 2	3.5313+ 1											2.8273- 3
8.0000+ 0 ~ 1.0000+ 1	1.0923+ 1	1.0026+ 1											2.8280- 3
1.0000+ 1 ~ 1.5000+ 1	9.2648+ 0	8.8270+ 0											2.8293- 3
1.5000+ 1 ~ 2.0000+ 1	8.1098+ 0	6.5749+ 0											2.8311- 3
2.0000+ 1 ~ 3.0000+ 1	1.8247+ 2	5.2344+ 1											2.8338- 3
3.0000+ 1 ~ 4.0000+ 1	3.5562+ 2	1.9730+ 2											2.8374- 3
4.0000+ 1 ~ 5.0000+ 1	1.3082+ 1	1.2709+ 1											2.8410- 3
5.0000+ 1 ~ 6.0000+ 1	9.3554+ 0	9.2315+ 0											2.8446- 3
6.0000+ 1 ~ 8.0000+ 1	8.8219+ 1	5.0181+ 1											2.8500- 3
8.0000+ 1 ~ 1.0000+ 2	1.2077+ 1	6.8870+ 0											2.8572- 3
1.0000+ 2 ~ 1.5000+ 2	8.7898+ 1	6.3085+ 1											2.8756- 3
1.5000+ 2 ~ 2.0000+ 2	8.2518+ 1	7.1612+ 1											2.9053- 3
2.0000+ 2 ~ 3.0000+ 2	3.3925+ 1	2.4973+ 1											2.9497- 3
3.0000+ 2 ~ 4.0000+ 2	2.0988+ 1	1.7938+ 1											3.0089- 3
4.0000+ 2 ~ 5.0000+ 2	1.3658+ 1	1.1061+ 1											3.0682- 3
5.0000+ 2 ~ 6.0000+ 2	2.5699+ 1	2.0720+ 1											3.1355- 3
6.0000+ 2 ~ 8.0000+ 2	1.7905+ 1	1.5204+ 1											3.2489- 3
8.0000+ 2 ~ 1.0000+ 3	3.0303+ 1	2.6710+ 1											3.3999- 3
1.0000+ 3 ~ 1.5000+ 3	1.9018+ 1	1.7009+ 1											3.6882- 3
1.5000+ 3 ~ 2.0000+ 3	2.4238+ 1	2.2544+ 1											4.1292- 3
2.0000+ 3 ~ 3.0000+ 3	2.0785+ 1	1.9358+ 1											4.8421- 3
3.0000+ 3 ~ 4.0000+ 3	1.9067+ 1	1.7806+ 1				****			****				5.8512- 3
4.0000+ 3 ~ 5.0000+ 3	1.6552+ 1	1.5567+ 1				0.0000+ 0			9.8511- 1				6.9100- 3
5.0000+ 3 ~ 6.0000+ 3	1.6053+ 1	1.5154+ 1				0.0000+ 0			8.9943- 1				8.0049- 3
6.0000+ 3 ~ 8.0000+ 3	1.5429+ 1	1.4621+ 1				0.0000+ 0			8.0751- 1				9.6975- 3
8.0000+ 3 ~ 1.0000+ 4	1.4868+ 1	1.4143+ 1				0.0000+ 0			7.2540- 1				1.2012- 2
1.0000+ 4 ~ 1.5000+ 4	1.4360+ 1	1.3718+ 1				7.0000- 5			6.4217- 1				1.6166- 2
1.5000+ 4 ~ 2.0000+ 4	1.3943+ 1	1.3379+ 1				7.0000- 5			5.6335- 1				2.2178- 2
2.0000+ 4 ~ 3.0000+ 4	1.3584+ 1	1.3098+ 1				7.0000- 5			4.8534- 1				3.1199- 2
3.0000+ 4 ~ 4.0000+ 4	1.3274+ 1	1.2862+ 1				4.0000- 5			4.1212- 1				4.3045- 2
4.0000+ 4 ~ 5.0000+ 4	1.3049+ 1	1.2666+ 1	2.4743- 2			4.0000- 5			3.5782- 1				5.4623- 2
5.0000+ 4 ~ 6.0000+ 4	1.2825+ 1	1.2366+ 1	1.6067- 1			4.0000- 5			2.9809- 1				6.6193- 2
6.0000+ 4 ~ 8.0000+ 4	1.2588+ 1	1.1987+ 1	3.6998- 1			4.0000- 5			2.3060- 1				8.3332- 2
8.0000+ 4 ~ 1.0000+ 5	1.2275+ 1	1.1509+ 1	5.8084- 1			4.0000- 5			1.8558- 1				1.0523- 1
1.0000+ 5 ~ 1.5000+ 5	1.1721+ 1	1.0782+ 1	7.7620- 1			4.0000- 5			1.6218- 1				1.3778- 1
1.5000+ 5 ~ 2.0000+ 5	1.0984+ 1	9.8378+ 0	1.0037+ 0			4.0000- 5			1.4201- 1				1.8081- 1
2.0000+ 5 ~ 3.0000+ 5	1.0143+ 1	8.7784+ 0	1.2384+ 0			4.2000- 5			1.2582- 1				2.3269- 1
3.0000+ 5 ~ 4.0000+ 5	9.3550+ 0	7.8030+ 0	1.4359+ 0			4.9500- 5			1.1596- 1				2.8541- 1
4.0000+ 5 ~ 5.0000+ 5	8.8100+ 0	7.1257+ 0	1.5724+ 0			1.1750- 4			1.1174- 1				3.2499- 1
5.0000+ 5 ~ 6.0000+ 5	8.3768+ 0	6.5814+ 0	1.6803+ 0			6.0250- 4			1.1452- 1				3.5606- 1
6.0000+ 5 ~ 8.0000+ 5	7.8516+ 0	5.8876+ 0	1.8390+ 0			2.0175- 3			1.2301- 1				3.9566- 1
8.0000+ 5 ~ 1.0000+ 6	7.3617+ 0	5.1030+ 0	2.1194+ 0			1.1100- 2			1.2824- 1				4.4324- 1
1.0000+ 6 ~ 1.5000+ 6	7.0147+ 0	4.3304+ 0	2.5009+ 0			8.8865- 2			9.4526- 2				5.1964- 1
1.5000+ 6 ~ 2.0000+ 6	7.1496+ 0	3.9224+ 0	2.7211+ 0			4.5020- 1			5.5830- 2				6.1888- 1
2.0000+ 6 ~ 3.0000+ 6	7.5535+ 0	4.6581+ 0	2.3334+ 0			5.3075- 1			3.1275- 2				7.0560- 1
3.0000+ 6 ~ 4.0000+ 6	7.8949+ 0	5.2234+ 0	2.1180+ 0			5.3600- 1			1.7468- 2				7.6246- 1
4.0000+ 6 ~ 5.0000+ 6	7.7958+ 0	5.1932+ 0	2.0335+ 0			5.5775- 1			1.1300- 2				7.9283- 1
5.0000+ 6 ~ 6.0000+ 6	7.3885+ 0	4.8685+ 0	1.9325+ 0			5.7900- 1			8.4581- 3				8.1074- 1
6.0000+ 6 ~ 8.0000+ 6	6.6148+ 0	3.8325+ 0	1.3562+ 0	5.1277- 1		9.0738- 1			6.2676- 3				8.1902- 1
8.0000+ 6 ~ 1.0000+ 7	6.0139+ 0	3.0275+ 0	5.5050- 1	1.4065+ 0		1.0246+ 0			4.7477- 3				8.0650- 1
1.0000+ 7 ~ 1.5000+ 7	5.7931+ 0	2.9427+ 0	2.7750- 1	1.2167+ 0	3.0710- 1	1.0456+ 0			3.6629- 3				8.1299- 1
1.5000+ 7 ~ 2.0000+ 7	6.0601+ 0	3.7507+ 0	4.3800- 2	1.3980- 1	8.7060- 1	1.2523+ 0			2.9492- 3				8.6738- 1

TABLE A1.42

Np-239

MATERIAL =1931 CROSS SECTION NP-239

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	1.2502+ 2	1.0500+ 1							1.1410+ 2				2.8140- 3
1.0000- 2 ~ 1.5000- 2	6.3593+ 1	1.0500+ 1							5.2955+ 1				2.8142- 3
1.5000- 2 ~ 2.0000- 2	5.5385+ 1	1.0500+ 1							4.4634+ 1				2.8143- 3
2.0000- 2 ~ 3.0000- 2	4.8016+ 1	1.0500+ 1							3.7420+ 1				2.8143- 3
3.0000- 2 ~ 4.0000- 2	4.2200+ 1	1.0500+ 1							3.1534+ 1				2.8144- 3
4.0000- 2 ~ 5.0000- 2	3.8350+ 1	1.0500+ 1							2.7764+ 1				2.8144- 3
5.0000- 2 ~ 6.0000- 2	3.5650+ 1	1.0500+ 1							2.5097+ 1				2.8145- 3
6.0000- 2 ~ 8.0000- 2	3.2900+ 1	1.0500+ 1							2.2285+ 1				2.8145- 3
8.0000- 2 ~ 1.0000- 1	3.0200+ 1	1.0500+ 1							1.9639+ 1				2.8146- 3
1.0000- 1 ~ 1.5000- 1	2.7400+ 1	1.0500+ 1							1.6728+ 1				2.8146- 3
1.5000- 1 ~ 2.0000- 1	2.4700+ 1	1.0500+ 1							1.4129+ 1				2.8147- 3
2.0000- 1 ~ 3.0000- 1	2.2450+ 1	1.0500+ 1							1.1822+ 1				2.8148- 3
3.0000- 1 ~ 4.0000- 1	2.0500+ 1	1.0500+ 1							9.9502+ 0				2.8148- 3
4.0000- 1 ~ 5.0000- 1	1.9300+ 1	1.0500+ 1							8.7720+ 0				2.8149- 3
5.0000- 1 ~ 6.0000- 1	1.8450+ 1	1.0500+ 1							7.9340+ 0				2.8149- 3
6.0000- 1 ~ 8.0000- 1	1.7600+ 1	1.0500+ 1							7.0643+ 0				2.8149- 3
8.0000- 1 ~ 1.0000+ 0	1.6750+ 1	1.0500+ 1							6.2305+ 0				2.8150- 3
1.0000+ 0 ~ 1.5000+ 0	1.5850+ 1	1.0500+ 1							5.2941+ 0				2.8150- 3
1.5000+ 0 ~ 2.0000+ 0	1.5000+ 1	1.0500+ 1							4.4790+ 0				2.8151- 3
2.0000+ 0 ~ 3.0000+ 0	1.4300+ 1	1.0500+ 1							3.7590+ 0				2.8152- 3
3.0000+ 0 ~ 4.0000+ 0	1.3650+ 1	1.0500+ 1							3.1314+ 0				2.8152- 3
4.0000+ 0 ~ 5.0000+ 0	2.3281+ 2	2.7450+ 1							2.0536+ 2				2.8157- 3
5.0000+ 0 ~ 6.0000+ 0	2.1138+ 2	2.5722+ 1							1.8566+ 2				2.8164- 3
6.0000+ 0 ~ 8.0000+ 0	1.8874+ 2	2.3893+ 1							1.6485+ 2				2.8176- 3
8.0000+ 0 ~ 1.0000+ 1	1.6741+ 2	2.2157+ 1							1.4525+ 2				2.8194- 3
1.0000+ 1 ~ 1.5000+ 1	1.4400+ 2	2.0312+ 1							1.2367+ 2				2.8234- 3
1.5000+ 1 ~ 2.0000+ 1	1.2288+ 2	1.8609+ 1							1.0426+ 2				2.8284- 3
2.0000+ 1 ~ 3.0000+ 1	1.0462+ 2	1.7157+ 1							8.7445+ 1				2.8376- 3
3.0000+ 1 ~ 4.0000+ 1	8.9683+ 1	1.5956+ 1							7.3720+ 1				2.8489- 3
4.0000+ 1 ~ 5.0000+ 1	8.0123+ 1	1.5171+ 1							6.4946+ 1				2.8607- 3
5.0000+ 1 ~ 6.0000+ 1	7.3355+ 1	1.4623+ 1							5.8728+ 1				2.8732- 3
6.0000+ 1 ~ 8.0000+ 1	6.6209+ 1	1.4073+ 1							5.2126+ 1				2.8943- 3
8.0000+ 1 ~ 1.0000+ 2	5.9472+ 1	1.3558+ 1							4.5908+ 1				2.9204- 3
1.0000+ 2 ~ 1.5000+ 2	5.2104+ 1	1.2990+ 1							3.9096+ 1				2.9759- 3
1.5000+ 2 ~ 2.0000+ 2	4.5439+ 1	1.2449+ 1							3.2982+ 1				3.0457- 3
2.0000+ 2 ~ 3.0000+ 2	3.9702+ 1	1.2020+ 1							2.7661+ 1				3.1518- 3
3.0000+ 2 ~ 4.0000+ 2	3.5053+ 1	1.1712+ 1							2.3332+ 1				3.3393- 3
4.0000+ 2 ~ 5.0000+ 2	3.2102+ 1	1.1511+ 1							2.0586+ 1				3.5393- 3
5.0000+ 2 ~ 6.0000+ 2	2.9968+ 1	1.1353+ 1							1.8611+ 1				3.6987- 3
6.0000+ 2 ~ 8.0000+ 2	2.7691+ 1	1.1168+ 1							1.6514+ 1				3.8880- 3
8.0000+ 2 ~ 1.0000+ 3	2.5557+ 1	1.0997+ 1							1.4556+ 1				4.1633- 3
1.0000+ 3 ~ 1.5000+ 3	2.3284+ 1	1.0897+ 1							1.2367+ 1				5.2140- 3
1.5000+ 3 ~ 2.0000+ 3	2.1243+ 1	1.0838+ 1							1.0396+ 1				6.6204- 3
2.0000+ 3 ~ 3.0000+ 3	1.9502+ 1	1.0777+ 1							8.7087+ 0				8.0830- 3
3.0000+ 3 ~ 4.0000+ 3	1.8090+ 1	1.0719+ 1							7.3648+ 0				9.4894- 3
4.0000+ 3 ~ 5.0000+ 3	1.7211+ 1	1.0677+ 1							6.5308+ 0				1.0535- 2
5.0000+ 3 ~ 6.0000+ 3	1.6561+ 1	1.0672+ 1							5.8857+ 0				1.2134- 2
6.0000+ 3 ~ 8.0000+ 3	1.5938+ 1	1.0707+ 1							5.2255+ 0				1.5073- 2
8.0000+ 3 ~ 1.0000+ 4	1.5383+ 1	1.0744+ 1							4.6362+ 0				1.8179- 2
1.0000+ 4 ~ 1.5000+ 4	1.4799+ 1	1.0828+ 1							3.9597+ 0				2.4773- 2
1.5000+ 4 ~ 2.0000+ 4	1.4485+ 1	1.0938+ 1							3.5474+ 0				3.3054- 2
2.0000+ 4 ~ 3.0000+ 4	1.4035+ 1	1.1073+ 1				0.0000+ 0			2.9384+ 0				4.5129- 2
3.0000+ 4 ~ 4.0000+ 4	1.3505+ 1	1.1047+ 1	1.0065- 1			0.0000+ 0			2.3396+ 0				6.2015- 2
4.0000+ 4 ~ 5.0000+ 4	1.3314+ 1	1.0943+ 1	2.9152- 1			0.0000+ 0			2.0407+ 0				7.8858- 2
5.0000+ 4 ~ 6.0000+ 4	1.3158+ 1	1.0867+ 1	4.0172- 1			0.0000+ 0			1.8480+ 0				9.5234- 2
6.0000+ 4 ~ 8.0000+ 4	1.2950+ 1	1.0744+ 1	5.4340- 1			2.0000- 2			1.6219+ 0				1.1879- 1
8.0000+ 4 ~ 1.0000+ 5	1.2755+ 1	1.0365+ 1	8.6739- 1			4.7500- 2			1.4743+ 0				1.5133- 1
1.0000+ 5 ~ 1.5000+ 5	1.2349+ 1	9.8577+ 0	1.1671+ 0			6.0000- 2			1.2625+ 0				2.0317- 1
1.5000+ 5 ~ 2.0000+ 5	1.1938+ 1	9.3002+ 0	1.5059+ 0			9.5000- 2			1.0364+ 0				2.6352- 1
2.0000+ 5 ~ 3.0000+ 5	1.1335+ 1	8.6509+ 0	1.6548+ 0			2.4000- 1			7.8553- 1				3.3143- 1
3.0000+ 5 ~ 4.0000+ 5	1.0586+ 1	7.8657+ 0	1.5965+ 0			5.5000- 1			5.6673- 1				3.9773- 1
4.0000+ 5 ~ 5.0000+ 5	9.9452+ 0	7.1484+ 0	1.4520+ 0			9.1000- 1			4.3063- 1				4.4804- 1
5.0000+ 5 ~ 6.0000+ 5	9.4358+ 0	6.4967+ 0	1.4204+ 0			1.1700+ 0			3.4275- 1				4.8855- 1
6.0000+ 5 ~ 8.0000+ 5	8.7902+ 0	5.6935+ 0	1.4434+ 0			1.3875+ 0			2.6131- 1				5.3468- 1
8.0000+ 5 ~ 1.0000+ 6	8.1336+ 0	4.9052+ 0	1.4425+ 0			1.5925+ 0			1.9199- 1				5.7515- 1
1.0000+ 6 ~ 1.5000+ 6	7.4382+ 0	4.1424+ 0	1.4878+ 0			1.6700+ 0			1.2312- 1				6.0890- 1
1.5000+ 6 ~ 2.0000+ 6	6.9012+ 0	3.6266+ 0	1.4645+ 0			1.7350+ 0			7.3274- 2				6.4368- 1
2.0000+ 6 ~ 3.0000+ 6	6.7206+ 0	3.5636+ 0	1.4234+ 0			1.6875+ 0			4.6756- 2				6.9049- 1
3.0000+ 6 ~ 4.0000+ 6	6.8956+ 0	3.8114+ 0	1.5215+ 0			1.5400+ 0			2.4425- 2				7.4993- 1
4.0000+ 6 ~ 5.0000+ 6	7.0685+ 0	3.9898+ 0	1.5942+ 0			1.4650+ 0			2.0000- 2				7.9935- 1
5.0000+ 6 ~ 6.0000+ 6	7.0668+ 0	3.9829+ 0	1.5674+ 0			1.5000+ 0			1.4277- 2				8.3417- 1
6.0000+ 6 ~ 8.0000+ 6	6.7279+ 0	3.6914+ 0	1.0757+ 0	1.1425- 1		1.8438+ 0			5.6890- 3				8.5743- 1
8.0000+ 6 ~ 1.0000+ 7	6.1973+ 0	3.1692+ 0	5.3537- 1	3.2843- 1		2.1650+ 0			1.0000- 5				8.5903- 1
1.0000+ 7 ~ 1.5000+ 7	5.6434+ 0	2.7070+ 0	2.1780- 1	2.7570- 1	1.0909- 1	2.3340+ 0			1.0000- 5				8.5746- 1

TABLE A1.43

Pu-239

MATERIAL =1941 CROSS SECTION PU-239

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	****	****				****			****				3.4743- 3
1.0000- 2 ~ 1.5000- 2													3.6095- 3
1.5000- 2 ~ 2.0000- 2													3.6475- 3
2.0000- 2 ~ 3.0000- 2													3.6870- 3
3.0000- 2 ~ 4.0000- 2													3.7250- 3
4.0000- 2 ~ 5.0000- 2													3.7533- 3
5.0000- 2 ~ 6.0000- 2													3.7758- 3
6.0000- 2 ~ 8.0000- 2													3.8025- 3
8.0000- 2 ~ 1.0000- 1													3.8308- 3
1.0000- 1 ~ 1.5000- 1													3.8670- 3
1.5000- 1 ~ 2.0000- 1													3.9050- 3
2.0000- 1 ~ 3.0000- 1													3.9445- 3
3.0000- 1 ~ 4.0000- 1													3.9825- 3
4.0000- 1 ~ 5.0000- 1													4.0107- 3
5.0000- 1 ~ 6.0000- 1	****								****				4.0332- 3
6.0000- 1 ~ 8.0000- 1	1.1239+ 2								2.7636+ 1				4.0600- 3
8.0000- 1 ~ 1.0000+ 0	6.7896+ 1	****				****			1.3151+ 1				4.0882- 3
1.0000+ 0 ~ 1.5000+ 0	4.2961+ 1	1.0092+ 1				2.6800+ 1			6.0695+ 0				4.1244- 3
1.5000+ 0 ~ 2.0000+ 0	2.9998+ 1	9.7322+ 0				1.7304+ 1			2.9617+ 0				4.1624- 3
2.0000+ 0 ~ 3.0000+ 0	2.3385+ 1	9.4543+ 0				1.2169+ 1			1.7612+ 0				4.2019- 3
3.0000+ 0 ~ 4.0000+ 0	1.9953+ 1	9.1893+ 0				9.5101+ 0			1.2537+ 0				4.2399- 3
4.0000+ 0 ~ 5.0000+ 0	1.8302+ 1	8.9356+ 0				8.2606+ 0			1.1056+ 0				4.2682- 3
5.0000+ 0 ~ 6.0000+ 0	1.7632+ 1	8.5806+ 0				7.8716+ 0			1.1799+ 0				4.2907- 3
6.0000+ 0 ~ 8.0000+ 0	1.5826+ 2	8.3416+ 0				8.3390+ 1			6.6525+ 1				4.3174- 3
8.0000+ 0 ~ 1.0000+ 1	2.6577+ 1	6.9419+ 0				1.2288+ 1			7.3473+ 0				4.3457- 3
1.0000+ 1 ~ 1.5000+ 1	2.7494+ 2	1.0766+ 1				1.4812+ 2			1.1606+ 2				4.3819- 3
1.5000+ 1 ~ 2.0000+ 1	9.6595+ 1	1.0747+ 1				4.9880+ 1			3.5969+ 1				4.4199- 3
2.0000+ 1 ~ 3.0000+ 1	6.5820+ 1	9.4746+ 0				3.1745+ 1			2.4601+ 1				4.4594- 3
3.0000+ 1 ~ 4.0000+ 1	1.4059+ 1	7.0069+ 0				3.6492+ 0			3.4027+ 0				4.4974- 3
4.0000+ 1 ~ 5.0000+ 1	1.1527+ 2	1.4300+ 1				2.8923+ 1			7.2049+ 1				4.5256- 3
5.0000+ 1 ~ 6.0000+ 1	1.7353+ 2	1.9833+ 1				8.2586+ 1			7.1118+ 1				4.5481- 3
6.0000+ 1 ~ 8.0000+ 1	1.0563+ 2	1.8522+ 1				5.8690+ 1			2.8423+ 1				4.5749- 3
8.0000+ 1 ~ 1.0000+ 2	9.5401+ 1	1.6733+ 1				5.0788+ 1			2.7880+ 1				4.6031- 3
1.0000+ 2 ~ 1.5000+ 2	5.1842+ 1	1.3563+ 1				1.9805+ 1			1.8470+ 1				4.6393- 3
1.5000+ 2 ~ 2.0000+ 2	4.3386+ 1	1.4529+ 1				1.7044+ 1			1.1812+ 1				4.6773- 3
2.0000+ 2 ~ 3.0000+ 2	4.8803+ 1	1.5541+ 1				1.7497+ 1			1.5568+ 1				4.7168- 3
3.0000+ 2 ~ 4.0000+ 2	3.1981+ 1	1.3876+ 1				9.4996+ 0			8.5994+ 0				4.7548- 3
4.0000+ 2 ~ 5.0000+ 2	2.4856+ 1	1.1325+ 1				9.6632+ 0			3.8707+ 0				4.7831- 3
5.0000+ 2 ~ 6.0000+ 2	4.3007+ 1	1.7556+ 1				1.6198+ 1			9.2468+ 0				4.8056- 3
6.0000+ 2 ~ 8.0000+ 2	2.5367+ 1	1.3379+ 1				5.6057+ 0			6.3827+ 0				4.8323- 3
8.0000+ 2 ~ 1.0000+ 3	2.4798+ 1	1.3301+ 1				6.5420+ 0			4.9554+ 0				4.8606- 3
1.0000+ 3 ~ 1.5000+ 3	2.3841+ 1	1.3576+ 1				5.7284+ 0			4.5359+ 0				4.8968- 3
1.5000+ 3 ~ 2.0000+ 3	2.0939+ 1	1.3156+ 1				4.0425+ 0			3.7398+ 0				5.4874- 3
2.0000+ 3 ~ 3.0000+ 3	1.9900+ 1	1.3309+ 1				3.2931+ 0			3.2979+ 0				6.8223- 3
3.0000+ 3 ~ 4.0000+ 3	1.7912+ 1	1.2639+ 1				2.8231+ 0			2.4495+ 0				8.1061- 3
4.0000+ 3 ~ 5.0000+ 3	1.6959+ 1	1.2403+ 1				2.4761+ 0			2.0804+ 0				9.6252- 3
5.0000+ 3 ~ 6.0000+ 3	1.6441+ 1	1.2334+ 1				2.2162+ 0			1.8909+ 0				1.1368- 2
6.0000+ 3 ~ 8.0000+ 3	1.5573+ 1	1.1944+ 1				2.1069+ 0			1.5222+ 0				1.3438- 2
8.0000+ 3 ~ 1.0000+ 4	1.5216+ 1	1.1803+ 1	9.0101- 2			2.0730+ 0			1.2500+ 0				1.6254- 2
1.0000+ 4 ~ 1.5000+ 4	1.4321+ 1	1.1372+ 1	1.5865- 1			1.8332+ 0			9.5724- 1				2.2002- 2
1.5000+ 4 ~ 2.0000+ 4	1.3767+ 1	1.1102+ 1	1.7949- 1			1.7197+ 0			7.6551- 1				2.9977- 2
2.0000+ 4 ~ 3.0000+ 4	1.3430+ 1	1.0978+ 1	1.9255- 1			1.6488+ 0			6.1081- 1				4.1981- 2
3.0000+ 4 ~ 4.0000+ 4	1.3255+ 1	1.0954+ 1	2.1354- 1			1.6132+ 0			4.7313- 1				5.7995- 2
4.0000+ 4 ~ 5.0000+ 4	1.3122+ 1	1.0884+ 1	2.3338- 1			1.5976+ 0			4.0767- 1				7.3285- 2
5.0000+ 4 ~ 6.0000+ 4	1.2962+ 1	1.0752+ 1	2.5229- 1			1.5857+ 0			3.7233- 1				8.8113- 2
6.0000+ 4 ~ 8.0000+ 4	1.2752+ 1	1.0555+ 1	2.9420- 1			1.5688+ 0			3.3466- 1				1.0935- 1
8.0000+ 4 ~ 1.0000+ 5	1.2484+ 1	1.0278+ 1	3.5640- 1			1.5503+ 0			2.9932- 1				1.3595- 1
1.0000+ 5 ~ 1.5000+ 5	1.2008+ 1	9.7796+ 0	4.4743- 1			1.5211+ 0			2.6022- 1				1.7713- 1
1.5000+ 5 ~ 2.0000+ 5	1.1397+ 1	9.0786+ 0	5.3443- 1			1.4974+ 0			2.2646- 1				2.2692- 1
2.0000+ 5 ~ 3.0000+ 5	1.0431+ 1	8.1335+ 0	5.9065- 1			1.5144+ 0			1.9228- 1				2.8436- 1
3.0000+ 5 ~ 4.0000+ 5	9.4477+ 0	7.1340+ 0	6.0817- 1			1.5510+ 0			1.5391- 1				3.4210- 1
4.0000+ 5 ~ 5.0000+ 5	8.7120+ 0	6.3880+ 0	6.1265- 1			1.5882+ 0			1.2381- 1				3.8412- 1
5.0000+ 5 ~ 6.0000+ 5	8.1778+ 0	5.7972+ 0	6.5730- 1			1.6223+ 0			1.0084- 1				4.1626- 1
6.0000+ 5 ~ 8.0000+ 5	7.6630+ 0	5.2157+ 0	7.0339- 1			1.6672+ 0			7.6664- 2				4.4716- 1
8.0000+ 5 ~ 1.0000+ 6	7.2257+ 0	4.6652+ 0	7.8643- 1			1.7169+ 0			5.7087- 2				4.7119- 1
1.0000+ 6 ~ 1.5000+ 6	6.9057+ 0	4.0570+ 0	9.3518- 1			1.8670+ 0			4.6486- 2				5.0825- 1
1.5000+ 6 ~ 2.0000+ 6	7.0309+ 0	4.0016+ 0	1.0302+ 0			1.9596+ 0			3.9386- 2				5.7629- 1
2.0000+ 6 ~ 3.0000+ 6	7.5694+ 0	4.5884+ 0	1.0349+ 0			1.9230+ 0			2.3106- 2				6.8265- 1
3.0000+ 6 ~ 4.0000+ 6	7.9207+ 0	5.1021+ 0	9.6994- 1			1.8403+ 0			8.2325- 3				7.6156- 1
4.0000+ 6 ~ 5.0000+ 6	7.7914+ 0	5.0430+ 0	9.8670- 1			1.7590+ 0			2.6457- 3				7.9657- 1
5.0000+ 6 ~ 6.0000+ 6	7.3808+ 0	4.6033+ 0	1.0502+ 0	1.8585- 2		1.7075+ 0			1.0539- 3				8.1089- 1
6.0000+ 6 ~ 8.0000+ 6	6.7439+ 0	3.9223+ 0	3.2017- 1	4.4663- 1		2.0530+ 0			4.0894- 4				8.1293- 1
8.0000+ 6 ~ 1.0000+ 7	6.1168+ 0	3.2890+ 0	1.8259- 2	5.4462- 1		2.2639+ 0			1.0303- 3				8.0877- 1
1.0000+ 7 ~ 1.5000+ 7	5.8617+ 0	3.0327+ 0	2.0050- 3	4.9065- 1	9.3401- 2	2.2405+ 0			2.4523- 3				8.3656- 1

TABLE A1.44

Pu-240

MATERIAL =1942 CROSS SECTION PU-240

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	****	****				****			****				2.8012- 3
1.0000- 2 ~ 1.5000- 2													2.8012- 3
1.5000- 2 ~ 2.0000- 2													2.8012- 3
2.0000- 2 ~ 3.0000- 2													2.8012- 3
3.0000- 2 ~ 4.0000- 2													2.8013- 3
4.0000- 2 ~ 5.0000- 2													2.8013- 3
5.0000- 2 ~ 6.0000- 2													2.8013- 3
6.0000- 2 ~ 8.0000- 2													2.8013- 3
8.0000- 2 ~ 1.0000- 1													2.8013- 3
1.0000- 1 ~ 1.5000- 1													2.8013- 3
1.5000- 1 ~ 2.0000- 1													2.8014- 3
2.0000- 1 ~ 3.0000- 1													2.8015- 3
3.0000- 1 ~ 4.0000- 1													2.8016- 3
4.0000- 1 ~ 5.0000- 1													2.8017- 3
5.0000- 1 ~ 6.0000- 1													2.8018- 3
6.0000- 1 ~ 8.0000- 1													2.8019- 3
8.0000- 1 ~ 1.0000+ 0													2.8021- 3
1.0000+ 0 ~ 1.5000+ 0													2.8025- 3
1.5000+ 0 ~ 2.0000+ 0													2.8030- 3
2.0000+ 0 ~ 3.0000+ 0													2.8037- 3
3.0000+ 0 ~ 4.0000+ 0													2.8047- 3
4.0000+ 0 ~ 5.0000+ 0													2.8057- 3
5.0000+ 0 ~ 6.0000+ 0													2.8068- 3
6.0000+ 0 ~ 8.0000+ 0													2.8083- 3
8.0000+ 0 ~ 1.0000+ 1													2.8103- 3
1.0000+ 1 ~ 1.5000+ 1													2.8138- 3
1.5000+ 1 ~ 2.0000+ 1													2.8188- 3
2.0000+ 1 ~ 3.0000+ 1													2.8264- 3
3.0000+ 1 ~ 4.0000+ 1													2.8364- 3
4.0000+ 1 ~ 5.0000+ 1													2.8465- 3
5.0000+ 1 ~ 6.0000+ 1													2.8566- 3
6.0000+ 1 ~ 8.0000+ 1													2.8717- 3
8.0000+ 1 ~ 1.0000+ 2													2.8918- 3
1.0000+ 2 ~ 1.5000+ 2													2.9270- 3
1.5000+ 2 ~ 2.0000+ 2													2.9774- 3
2.0000+ 2 ~ 3.0000+ 2													3.0529- 3
3.0000+ 2 ~ 4.0000+ 2													3.1535- 3
4.0000+ 2 ~ 5.0000+ 2													3.2542- 3
5.0000+ 2 ~ 6.0000+ 2													3.3548- 3
6.0000+ 2 ~ 8.0000+ 2													3.5058- 3
8.0000+ 2 ~ 1.0000+ 3													3.7071- 3
1.0000+ 3 ~ 1.5000+ 3													4.0932- 3
1.5000+ 3 ~ 2.0000+ 3													4.6639- 3
2.0000+ 3 ~ 3.0000+ 3													5.5200- 3
3.0000+ 3 ~ 4.0000+ 3	****	****				****			****				6.7149- 3
4.0000+ 3 ~ 5.0000+ 3	1.7437+ 1	1.5707+ 1				1.1426- 1			1.6156+ 0				7.9633- 3
5.0000+ 3 ~ 6.0000+ 3	1.6745+ 1	1.5184+ 1				8.7644- 2			1.4733+ 0				9.2116- 3
6.0000+ 3 ~ 8.0000+ 3	1.5914+ 1	1.4533+ 1				6.4218- 2			1.3163+ 0				1.1084- 2
8.0000+ 3 ~ 1.0000+ 4	1.5760+ 1	1.4462+ 1				5.4778- 2			1.2438+ 0				1.3581- 2
1.0000+ 4 ~ 1.5000+ 4	1.5248+ 1	1.4067+ 1				7.9178- 2			1.1018+ 0				1.8037- 2
1.5000+ 4 ~ 2.0000+ 4	1.4685+ 1	1.3627+ 1				1.1197- 1			9.4593- 1				2.4454- 2
2.0000+ 4 ~ 3.0000+ 4	1.4438+ 1	1.3487+ 1				1.2722- 1			8.2382- 1				3.4079- 2
3.0000+ 4 ~ 4.0000+ 4	1.4155+ 1	1.3328+ 1				1.2140- 1			7.0536- 1				4.6528- 2
4.0000+ 4 ~ 5.0000+ 4	1.3798+ 1	1.3054+ 1	3.1126- 2			1.0756- 1			6.0494- 1				5.8593- 2
5.0000+ 4 ~ 6.0000+ 4	1.3325+ 1	1.2535+ 1	1.6725- 1			9.2193- 2			5.2977- 1				7.0658- 2
6.0000+ 4 ~ 8.0000+ 4	1.2760+ 1	1.1845+ 1	3.9050- 1			7.8985- 2			4.4427- 1				8.8606- 2
8.0000+ 4 ~ 1.0000+ 5	1.2132+ 1	1.1086+ 1	6.0737- 1			7.4626- 2			3.6360- 1				1.1168- 1
1.0000+ 5 ~ 1.5000+ 5	1.1417+ 1	1.0210+ 1	8.2484- 1			8.2967- 2			2.9763- 1				1.4593- 1
1.5000+ 5 ~ 2.0000+ 5	1.0712+ 1	9.3573+ 0	1.0141+ 0			9.8844- 2			2.4156- 1				1.9154- 1
2.0000+ 5 ~ 3.0000+ 5	9.9205+ 0	8.3924+ 0	1.1999+ 0			1.2505- 1			2.0296- 1				2.4563- 1
3.0000+ 5 ~ 4.0000+ 5	9.1654+ 0	7.4170+ 0	1.3828+ 0			1.8221- 1			1.8243- 1				2.9642- 1
4.0000+ 5 ~ 5.0000+ 5	8.6444+ 0	6.6914+ 0	1.4873+ 0			2.9172- 1			1.7372- 1				3.3372- 1
5.0000+ 5 ~ 6.0000+ 5	8.2242+ 0	6.0218+ 0	1.5311+ 0			5.0845- 1			1.6270- 1				3.5628- 1
6.0000+ 5 ~ 8.0000+ 5	7.7090+ 0	5.1489+ 0	1.5293+ 0			8.9640- 1			1.3444- 1				3.7759- 1
8.0000+ 5 ~ 1.0000+ 6	7.2221+ 0	4.3072+ 0	1.5115+ 0			1.2937+ 0			1.0961- 1				4.0227- 1
1.0000+ 6 ~ 1.5000+ 6	6.8585+ 0	3.5317+ 0	1.6782+ 0			1.5665+ 0			8.1546- 2				4.5083- 1
1.5000+ 6 ~ 2.0000+ 6	6.9571+ 0	3.3386+ 0	1.9218+ 0			1.6484+ 0			4.8276- 2				5.2307- 1
2.0000+ 6 ~ 3.0000+ 6	7.3323+ 0	3.9366+ 0	1.7523+ 0			1.6183+ 0			2.5473- 2				6.1796- 1
3.0000+ 6 ~ 4.0000+ 6	7.6649+ 0	4.6312+ 0	1.5128+ 0			1.5081+ 0			1.4208- 2				6.8638- 1
4.0000+ 6 ~ 5.0000+ 6	7.6001+ 0	4.9498+ 0	1.2600+ 0			1.3821+ 0			9.2358- 3				7.3648- 1
5.0000+ 6 ~ 6.0000+ 6	7.2144+ 0	4.7367+ 0	1.1013+ 0			1.3699+ 0			6.9924- 3				7.7934- 1
6.0000+ 6 ~ 8.0000+ 6	6.4710+ 0	3.7270+ 0	8.3464- 1	1.4740- 1		1.7570+ 0			5.1187- 3				8.1066- 1
8.0000+ 6 ~ 1.0000+ 7	5.8760+ 0	2.9166+ 0	3.3538- 1	6.4150- 1		1.9785+ 0			4.1237- 3				8.0467- 1
1.0000+ 7 ~ 1.5000+ 7	5.6469+ 0	2.7935+ 0	1.3005- 1	5.6489- 1	6.5368- 2	2.0903+ 0			3.2985- 3				8.1135- 1

TABLE A1.45

Pu-241

MATERIAL =1943 CROSS SECTION Pu-241

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	****	1.0573+ 1				****			1.3349+ 3				2.8380- 3
1.0000- 2 ~ 1.5000- 2		1.0477+ 1							5.7022+ 2				2.8477- 3
1.5000- 2 ~ 2.0000- 2		1.0413+ 1							4.6313+ 2				2.8505- 3
2.0000- 2 ~ 3.0000- 2		1.0320+ 1							3.7190+ 2				2.8533- 3
3.0000- 2 ~ 4.0000- 2		1.0198+ 1							2.9579+ 2				2.8561- 3
4.0000- 2 ~ 5.0000- 2		1.0078+ 1							2.4865+ 2				2.8581- 3
5.0000- 2 ~ 6.0000- 2		9.9602+ 0							2.1990+ 2				2.8597- 3
6.0000- 2 ~ 8.0000- 2		9.7845+ 0							1.9240+ 2				2.8617- 3
8.0000- 2 ~ 1.0000- 1		9.5513+ 0							1.7756+ 2				2.8637- 3
1.0000- 1 ~ 1.5000- 1		9.1472+ 0							1.9299+ 2				2.8663- 3
1.5000- 1 ~ 2.0000- 1		8.7211+ 0							2.9708+ 2				2.8691- 3
2.0000- 1 ~ 3.0000- 1		1.1041+ 1							5.9247+ 2				2.8719- 3
3.0000- 1 ~ 4.0000- 1		1.3091+ 1							2.0510+ 2				2.8747- 3
4.0000- 1 ~ 5.0000- 1		1.1947+ 1							4.9488+ 1				2.8767- 3
5.0000- 1 ~ 6.0000- 1		1.1287+ 1							2.1269+ 1				2.8783- 3
6.0000- 1 ~ 8.0000- 1		1.0784+ 1							1.1408+ 1				2.8803- 3
8.0000- 1 ~ 1.0000+ 0	****	1.0359+ 1				****			6.7157+ 0				2.8823- 3
1.0000+ 0 ~ 1.5000+ 0	4.2299+ 1	9.9472+ 0				2.8723+ 1			3.6286+ 0				2.8849- 3
1.5000+ 0 ~ 2.0000+ 0	3.7893+ 1	9.5277+ 0				2.5979+ 1			2.3859+ 0				2.8877- 3
2.0000+ 0 ~ 3.0000+ 0	4.1184+ 1	8.9303+ 0				2.9903+ 1			2.3514+ 0				2.8905- 3
3.0000+ 0 ~ 4.0000+ 0	6.6183+ 1	7.4932+ 0				5.2114+ 1			6.5761+ 0				2.8933- 3
4.0000+ 0 ~ 5.0000+ 0	4.6732+ 2	1.0329+ 1				3.2989+ 2			1.2710+ 2				2.8953- 3
5.0000+ 0 ~ 6.0000+ 0	3.3423+ 2	9.2732+ 0				3.1338+ 2			1.1580+ 1				2.8969- 3
6.0000+ 0 ~ 8.0000+ 0	2.9360+ 2	1.2142+ 1				2.5252+ 2			2.8940+ 1				2.8989- 3
8.0000+ 0 ~ 1.0000+ 1	2.0931+ 2	1.0769+ 1				1.7005+ 2			2.8484+ 1				2.9009- 3
1.0000+ 1 ~ 1.5000+ 1	3.1019+ 2	1.7840+ 1				2.0607+ 2			8.6286+ 1				2.9035- 3
1.5000+ 1 ~ 2.0000+ 1	1.7392+ 2	1.9987+ 1				9.6478+ 1			5.7454+ 1				2.9063- 3
2.0000+ 1 ~ 3.0000+ 1	1.1982+ 2	1.3108+ 1				8.8784+ 1			1.7925+ 1				2.9091- 3
3.0000+ 1 ~ 4.0000+ 1	7.2028+ 1	1.3316+ 1				4.6261+ 1			1.2452+ 1				2.9118- 3
4.0000+ 1 ~ 5.0000+ 1	6.1373+ 1	1.3362+ 1				4.2502+ 1			5.5090+ 0				2.9139- 3
5.0000+ 1 ~ 6.0000+ 1	3.0648+ 1	1.1763+ 1				1.7352+ 1			1.5331+ 0				2.9155- 3
6.0000+ 1 ~ 8.0000+ 1	7.1600+ 1	1.3562+ 1				4.4812+ 1			1.3226+ 1				2.9174- 3
8.0000+ 1 ~ 1.0000+ 2	7.7272+ 1	1.5917+ 1				4.8501+ 1			1.2854+ 1				2.9195- 3
1.0000+ 2 ~ 1.5000+ 2	4.7004+ 1	1.2108+ 1				2.6702+ 1			8.1935+ 0				2.9970- 3
1.5000+ 2 ~ 2.0000+ 2	4.6407+ 1	1.2342+ 1				2.6768+ 1			7.2976+ 0				3.1173- 3
2.0000+ 2 ~ 3.0000+ 2	4.5217+ 1	1.2687+ 1				2.5979+ 1			6.5509+ 0				3.2424- 3
3.0000+ 2 ~ 4.0000+ 2	4.4170+ 1	1.4236+ 1				2.0688+ 1			9.2460+ 0				3.3627- 3
4.0000+ 2 ~ 5.0000+ 2	3.8983+ 1	1.3771+ 1				1.7665+ 1			7.5472+ 0				3.4522- 3
5.0000+ 2 ~ 6.0000+ 2	3.3877+ 1	1.3108+ 1				1.4910+ 1			5.8592+ 0				3.5440- 3
6.0000+ 2 ~ 8.0000+ 2	2.9081+ 1	1.2988+ 1				1.0554+ 1			5.5377+ 0				3.8293- 3
8.0000+ 2 ~ 1.0000+ 3	2.7593+ 1	1.2988+ 1				9.8587+ 0			4.7462+ 0				4.1538- 3
1.0000+ 3 ~ 1.5000+ 3	2.5670+ 1	1.2761+ 1				9.1994+ 0			3.7103+ 0				4.5697- 3
1.5000+ 3 ~ 2.0000+ 3	2.2712+ 1	1.2308+ 1				7.7408+ 0			2.6632+ 0				5.4610- 3
2.0000+ 3 ~ 3.0000+ 3	2.0783+ 1	1.2165+ 1				6.4543+ 0			2.1640+ 0				6.9814- 3
3.0000+ 3 ~ 4.0000+ 3	1.9410+ 1	1.1831+ 1				6.0550+ 0			1.5245+ 0				8.4435- 3
4.0000+ 3 ~ 5.0000+ 3	1.8442+ 1	1.1760+ 1				5.3255+ 0			1.3563+ 0				9.5307- 3
5.0000+ 3 ~ 6.0000+ 3	1.6867+ 1	1.1389+ 1				4.4880+ 0			9.9000- 1				1.0605- 2
6.0000+ 3 ~ 8.0000+ 3	1.6654+ 1	1.1407+ 1				4.2903+ 0			9.5563- 1				1.3662- 2
8.0000+ 3 ~ 1.0000+ 4	1.6278+ 1	1.1415+ 1				3.9252+ 0			9.3719- 1				1.7126- 2
1.0000+ 4 ~ 1.5000+ 4	1.5779+ 1	1.1390+ 1				3.4828+ 0			9.0637- 1				2.1565- 2
1.5000+ 4 ~ 2.0000+ 4	1.5092+ 1	1.1182+ 1				3.1250+ 0			7.8514- 1				2.7603- 2
2.0000+ 4 ~ 3.0000+ 4	1.4286+ 1	1.0911+ 1				2.7379+ 0			6.3742- 1				3.7646- 2
3.0000+ 4 ~ 4.0000+ 4	1.3718+ 1	1.0696+ 1				2.5167+ 0			5.0448- 1				5.1629- 2
4.0000+ 4 ~ 5.0000+ 4	1.3272+ 1	1.0438+ 1	1.9859- 2			2.3917+ 0			4.2218- 1				6.5349- 2
5.0000+ 4 ~ 6.0000+ 4	1.2917+ 1	1.0257+ 1	4.0452- 2			2.2245+ 0			3.9484- 1				7.8374- 2
6.0000+ 4 ~ 8.0000+ 4	1.2516+ 1	9.9367+ 0	5.0410- 2			2.1650+ 0			3.6419- 1				9.7736- 2
8.0000+ 4 ~ 1.0000+ 5	1.2079+ 1	9.6043+ 0	6.8197- 2			2.0899+ 0			3.1607- 1				1.2163- 1
1.0000+ 5 ~ 1.5000+ 5	1.1461+ 1	9.0782+ 0	9.9614- 2			2.0142+ 0			2.6837- 1				1.5968- 1
1.5000+ 5 ~ 2.0000+ 5	1.0747+ 1	8.4505+ 0	1.6195- 1			1.9120+ 0			2.2271- 1				2.0617- 1
2.0000+ 5 ~ 3.0000+ 5	9.9544+ 0	7.6552+ 0	3.0053- 1			1.8072+ 0			1.9127- 1				2.6271- 1
3.0000+ 5 ~ 4.0000+ 5	9.1291+ 0	6.8327+ 0	4.7518- 1			1.6434+ 0			1.7772- 1				3.2024- 1
4.0000+ 5 ~ 5.0000+ 5	8.4998+ 0	6.1951+ 0	6.0684- 1			1.5198+ 0			1.7765- 1				3.6359- 1
5.0000+ 5 ~ 6.0000+ 5	8.0191+ 0	5.6702+ 0	6.8507- 1			1.4899+ 0			1.7365- 1				3.9875- 1
6.0000+ 5 ~ 8.0000+ 5	7.5202+ 0	5.0982+ 0	7.5313- 1			1.4850+ 0			1.8371- 1				4.3760- 1
8.0000+ 5 ~ 1.0000+ 6	7.1290+ 0	4.5812+ 0	8.1859- 1			1.5213+ 0			2.0779- 1				4.7506- 1
1.0000+ 6 ~ 1.5000+ 6	6.9479+ 0	4.1135+ 0	1.0177+ 0			1.6282+ 0			1.8830- 1				5.3045- 1
1.5000+ 6 ~ 2.0000+ 6	7.0276+ 0	3.9651+ 0	1.2532+ 0			1.6929+ 0			1.1619- 1				6.0912- 1
2.0000+ 6 ~ 3.0000+ 6	7.2263+ 0	4.2539+ 0	1.3450+ 0			1.5722+ 0			5.5397- 2				6.9279- 1
3.0000+ 6 ~ 4.0000+ 6	7.3935+ 0	4.6064+ 0	1.3157+ 0			1.4520+ 0			1.8675- 2				7.4802- 1
4.0000+ 6 ~ 5.0000+ 6	7.4548+ 0	4.7061+ 0	1.3551+ 0			1.3874+ 0			6.0878- 3				7.8149- 1
5.0000+ 6 ~ 6.0000+ 6	7.4088+ 0	4.6353+ 0	1.2373+ 0	1.4952- 1		1.3851+ 0			1.7088- 3				8.1052- 1
6.0000+ 6 ~ 8.0000+ 6	7.1665+ 0	4.3867+ 0	6.7085- 1	3.6750- 1		1.7407+ 0			2.4972- 4				8.3787- 1
8.0000+ 6 ~ 1.0000+ 7	6.7884+ 0	3.9934+ 0	2.9596- 1	5.2375- 1		1.9751+ 0			1.9168- 5				8.4879- 1
1.0000+ 7 ~ 1.5000+ 7	6.1457+ 0	3.4087+ 0	1.4577- 1	4.0027- 1	1.4644- 1	2.0445+ 0			2.3014- 6				8.4864- 1

TABLE A1.46

Am-241

MATERIAL :1951 CROSS SECTION AM-241

ENERGY	TOTAL	ELASTIC	INELA	(N,2N)	(N,3N)	FISSION	(N,NA)	(N,NP)	CAPTURE	(N,P)	(N,D)	(N,A)	MU-BAR
1.0000- 5 ~ 1.0000- 2	2.5302+ 3	6.8715+ 0				9.3670+ 0			2.5140+ 3				2.8252- 3
1.0000- 2 ~ 1.5000- 2	1.1868+ 3	6.8393+ 0				4.4076+ 0			1.1755+ 3				2.8324- 3
1.5000- 2 ~ 2.0000- 2	1.0094+ 3	6.8172+ 0				3.7586+ 0			9.9882+ 2				2.8344- 3
2.0000- 2 ~ 3.0000- 2	8.5255+ 2	6.7828+ 0				3.1891+ 0			8.4258+ 2				2.8365- 3
3.0000- 2 ~ 4.0000- 2	7.3071+ 2	6.7347+ 0				2.7510+ 0			7.2123+ 2				2.8385- 3
4.0000- 2 ~ 5.0000- 2	6.5202+ 2	6.6840+ 0				2.4745+ 0			6.4286+ 2				2.8400- 3
5.0000- 2 ~ 6.0000- 2	5.9837+ 2	6.6304+ 0				2.2905+ 0			5.8945+ 2				2.8412- 3
6.0000- 2 ~ 8.0000- 2	5.4672+ 2	6.5425+ 0				2.1234+ 0			5.3806+ 2				2.8426- 3
8.0000- 2 ~ 1.0000- 1	5.0086+ 2	6.4131+ 0				1.9905+ 0			4.9246+ 2				2.8441- 3
1.0000- 1 ~ 1.5000- 1	4.6977+ 2	6.1311+ 0				1.9681+ 0			4.6167+ 2				2.8460- 3
1.5000- 1 ~ 2.0000- 1	5.0187+ 2	5.5621+ 0				2.3395+ 0			4.9396+ 2				2.8480- 3
2.0000- 1 ~ 3.0000- 1	1.6417+ 3	4.6074+ 0				9.9667+ 0			1.6271+ 3				2.8501- 3
3.0000- 1 ~ 4.0000- 1	2.3422+ 3	1.3722+ 1				1.4559+ 1			2.3139+ 3				2.8521- 3
4.0000- 1 ~ 5.0000- 1	4.5690+ 2	8.1741+ 0				1.9149+ 0			4.4681+ 2				2.8536- 3
5.0000- 1 ~ 6.0000- 1	2.0250+ 3	9.6656+ 0				6.6040+ 0			2.0087+ 3				2.8548- 3
6.0000- 1 ~ 8.0000- 1	4.3035+ 2	1.1119+ 1				1.4558+ 0			4.1777+ 2				2.8562- 3
8.0000- 1 ~ 1.0000+ 0	1.7707+ 2	8.0213+ 0				7.1798- 1			1.6833+ 2				2.8577- 3
1.0000+ 0 ~ 1.5000+ 0	1.0925+ 3	1.5347+ 1				8.0181+ 0			1.0691+ 3				2.8596- 3
1.5000+ 0 ~ 2.0000+ 0	3.3140+ 2	1.0440+ 1				8.2929- 1			3.2013+ 2				2.8616- 3
2.0000+ 0 ~ 3.0000+ 0	2.6593+ 2	1.0558+ 1				9.3446- 1			2.5443+ 2				2.8637- 3
3.0000+ 0 ~ 4.0000+ 0	1.5332+ 2	9.0312+ 0				5.0546- 1			1.4378+ 2				2.8657- 3
4.0000+ 0 ~ 5.0000+ 0	1.4450+ 2	9.1895+ 0				8.7477- 1			1.3444+ 2				2.8672- 3
5.0000+ 0 ~ 6.0000+ 0	3.5340+ 2	1.4953+ 1				4.1883+ 0			3.3426+ 2				2.8684- 3
6.0000+ 0 ~ 8.0000+ 0	8.0934+ 1	9.9904+ 0				3.6773- 1			7.0576+ 1				2.8698- 3
8.0000+ 0 ~ 1.0000+ 1	1.4207+ 2	9.6190+ 0				1.1745+ 0			1.3128+ 2				2.8713- 3
1.0000+ 1 ~ 1.5000+ 1	1.4462+ 2	1.3150+ 1				6.2617- 1			1.3084+ 2				2.8732- 3
1.5000+ 1 ~ 2.0000+ 1	1.0533+ 2	1.2120+ 1				3.8225- 1			9.2831+ 1				2.8752- 3
2.0000+ 1 ~ 3.0000+ 1	8.5512+ 1	1.0677+ 1				3.0577- 1			7.4530+ 1				2.8773- 3
3.0000+ 1 ~ 4.0000+ 1	8.8156+ 1	1.1664+ 1				4.4599- 1			7.6046+ 1				2.8793- 3
4.0000+ 1 ~ 5.0000+ 1	5.6942+ 1	1.0721+ 1				2.3487- 1			4.5986+ 1				2.8808- 3
5.0000+ 1 ~ 6.0000+ 1	7.4791+ 1	1.1080+ 1				1.7782- 1			6.3533+ 1				2.8820- 3
6.0000+ 1 ~ 8.0000+ 1	6.9235+ 1	1.1765+ 1				1.9443- 1			5.7275+ 1				2.8834- 3
8.0000+ 1 ~ 1.0000+ 2	5.7676+ 1	1.2285+ 1				1.9521- 1			4.5197+ 1				2.8849- 3
1.0000+ 2 ~ 1.5000+ 2	6.4519+ 1	1.5106+ 1				2.2697- 1			4.9186+ 1				2.9104- 3
1.5000+ 2 ~ 2.0000+ 2	4.6247+ 1	1.5880+ 1				2.3126- 1			3.0133+ 1				2.9601- 3
2.0000+ 2 ~ 3.0000+ 2	4.0638+ 1	1.5705+ 1				2.3130- 1			2.4701+ 1				3.0360- 3
3.0000+ 2 ~ 4.0000+ 2	3.6060+ 1	1.5521+ 1				2.3089- 1			2.0304+ 1				3.1394- 3
4.0000+ 2 ~ 5.0000+ 2	3.3133+ 1	1.5374+ 1				2.2994- 1			1.7527+ 1				3.2437- 3
5.0000+ 2 ~ 6.0000+ 2	3.1054+ 1	1.5250+ 1				2.2845- 1			1.5573+ 1				3.3494- 3
6.0000+ 2 ~ 8.0000+ 2	2.8856+ 1	1.5098+ 1				2.2523- 1			1.3532+ 1				3.5102- 3
8.0000+ 2 ~ 1.0000+ 3	2.6787+ 1	1.4930+ 1				2.1942- 1			1.1637+ 1				3.7285- 3
1.0000+ 3 ~ 1.5000+ 3	2.4515+ 1	1.4703+ 1				2.0577- 1			9.6016+ 0				4.1190- 3
1.5000+ 3 ~ 2.0000+ 3	2.2464+ 1	1.4457+ 1				1.8327- 1			7.8225+ 0				4.6843- 3
2.0000+ 3 ~ 3.0000+ 3	2.0688+ 1	1.4191+ 1				1.5064- 1			6.3457+ 0				5.5534- 3
3.0000+ 3 ~ 4.0000+ 3	1.9238+ 1	1.3926+ 1				1.1783- 1			5.1917+ 0				6.7448- 3
4.0000+ 3 ~ 5.0000+ 3	1.8305+ 1	1.3720+ 1				9.8380- 2			4.4859+ 0				7.9526- 3
5.0000+ 3 ~ 6.0000+ 3	1.7641+ 1	1.3551+ 1				8.8816- 2			4.0013+ 0				9.1798- 3
6.0000+ 3 ~ 8.0000+ 3	1.6934+ 1	1.3340+ 1				8.7961- 2			3.5063+ 0				1.1051- 2
8.0000+ 3 ~ 1.0000+ 4	1.6263+ 1	1.3104+ 1				1.0414- 1			3.0543+ 0				1.3597- 2
1.0000+ 4 ~ 1.5000+ 4	1.5512+ 1	1.2784+ 1				1.4628- 1			2.5809+ 0				1.8142- 2
1.5000+ 4 ~ 2.0000+ 4	1.4811+ 1	1.2475+ 1				9.9461- 2			2.2351+ 0				2.4593- 2
2.0000+ 4 ~ 3.0000+ 4	1.4167+ 1	1.2146+ 1				4.8218- 2			1.9723+ 0				3.4259- 2
3.0000+ 4 ~ 4.0000+ 4	1.3595+ 1	1.1805+ 1				2.7085- 2			1.7613+ 0				4.7034- 2
4.0000+ 4 ~ 5.0000+ 4	1.3177+ 1	1.1511+ 1	5.5059- 2			1.3938- 2			1.5974+ 0				5.9527- 2
5.0000+ 4 ~ 6.0000+ 4	1.2862+ 1	1.1256+ 1	1.2805- 1			1.1361- 2			1.4659+ 0				7.1670- 2
6.0000+ 4 ~ 8.0000+ 4	1.2470+ 1	1.0948+ 1	1.7712- 1			1.0533- 2			1.3341+ 0				8.8942- 2
8.0000+ 4 ~ 1.0000+ 5	1.2038+ 1	1.0592+ 1	2.2910- 1			1.0961- 2			1.2060+ 0				1.1058- 1
1.0000+ 5 ~ 1.5000+ 5	1.1441+ 1	1.0049+ 1	3.2678- 1			1.8594- 2			1.0451+ 0				1.4445- 1
1.5000+ 5 ~ 2.0000+ 5	1.0758+ 1	9.3694+ 0	4.4171- 1			5.3083- 2			8.9175- 1				1.8617- 1
2.0000+ 5 ~ 3.0000+ 5	9.9501+ 0	8.4908+ 0	7.0051- 1			1.9156- 2			7.3932- 1				2.3718- 1
3.0000+ 5 ~ 4.0000+ 5	9.1270+ 0	7.5184+ 0	9.7608- 1			2.9599- 2			6.0221- 1				2.9129- 1
4.0000+ 5 ~ 5.0000+ 5	8.4967+ 0	6.7889+ 0	1.1053+ 0			5.5652- 2			5.4595- 1				3.3203- 1
5.0000+ 5 ~ 6.0000+ 5	8.0174+ 0	6.1771+ 0	1.2259+ 0			1.0960- 1			5.0322- 1				3.6632- 1
6.0000+ 5 ~ 8.0000+ 5	7.5175+ 0	5.4283+ 0	1.3407+ 0			3.1004- 1			4.3601- 1				4.1150- 1
8.0000+ 5 ~ 1.0000+ 6	7.1228+ 0	4.7076+ 0	1.2138+ 0			8.5725- 1			3.3685- 1				4.6279- 1
1.0000+ 6 ~ 1.5000+ 6	6.9527+ 0	4.1089+ 0	1.0356+ 0			1.6170+ 0			1.8357- 1				5.3219- 1
1.5000+ 6 ~ 2.0000+ 6	7.0282+ 0	3.9576+ 0	1.1370+ 0			1.8307+ 0			1.0253- 1				6.1069- 1
2.0000+ 6 ~ 3.0000+ 6	7.2263+ 0	4.2504+ 0	1.0740+ 0			1.8563+ 0			4.5272- 2				6.9330- 1
3.0000+ 6 ~ 4.0000+ 6	7.3935+ 0	4.6060+ 0	8.6673- 1			1.9073+ 0			1.2744- 2				7.4809- 1
4.0000+ 6 ~ 5.0000+ 6	7.4548+ 0	4.7060+ 0	7.4511- 1			1.9999+ 0			3.5417- 3				7.8150- 1
5.0000+ 6 ~ 6.0000+ 6	7.4093+ 0	4.6344+ 0	6.3776- 1			2.1360+ 0			9.6001- 4				8.1051- 1
6.0000+ 6 ~ 8.0000+ 6	7.1663+ 0	4.3865+ 0	4.1910- 1	1.8969- 2		2.3413+ 0			1.6366- 4				8.3784- 1
8.0000+ 6 ~ 1.0000+ 7	6.7854+ 0	3.9919+ 0	2.1488- 1	9.6386- 2		2.4820+ 0			1.6366- 5				8.4869- 1
1.0000+ 7 ~ 1.5000+ 7	6.1485+ 0	3.4104+ 0	8.8746- 2	1.0697- 1	1.8191- 2	2.5244+ 0			1.6014- 6				8.4875- 1
1.5000+ 7 ~ 1.6000+ 7	5.8042+ 0	3.0969+ 0	5.0320- 2	3.5094- 2	9.2776- 2	2.5291+ 0			3.3958- 7				8.5165- 1

TABLE A2.1

Li-6

MATERIAL =1031 CROSS SECTION LI-6

ENERGY	1 ST L	2 ND L Q=-3.5620+0	3 RD L	4 TH L	5 TH L	6 TH L	7 TH L	8 TH L	9 TH L	10 TH L	11 TH L	CONT. L Q=-1.4710+0	INELA Q=-1.4710+0
1.5000+ 6 ~ 2.0000+ 6												****	6.1920- 3
2.0000+ 6 ~ 3.0000+ 6													1.4165- 1
3.0000+ 6 ~ 4.0000+ 6													5.0376- 1
4.0000+ 6 ~ 5.0000+ 6		4.9752- 3											5.3622- 1
5.0000+ 6 ~ 6.0000+ 6		7.0950- 3											6.5463- 1
6.0000+ 6 ~ 8.0000+ 6		5.6412- 3											6.5169- 1
8.0000+ 6 ~ 1.0000+ 7		3.7918- 3											6.0997- 1
1.0000+ 7 ~ 1.5000+ 7		2.3793- 3											4.8396- 1
1.5000+ 7 ~ 2.0000+ 7		1.3283- 3										****	3.7172- 1

TABLE A2.2

Na-23

MATERIAL =1111 CROSS SECTION NA-23

ENERGY	1 ST L Q=-4.3900-1	2 ND L Q=-2.0780+0	3 RD L Q=-2.9930+0	4 TH L Q=-2.6410+0	5 TH L Q=-2.7050+0	6 TH L Q=-2.9830+0	7 TH L Q=-3.6800+0	8 TH L	9 TH L	10 TH L	11 TH L	CONT. L Q=-3.8319+0	INELA Q=-4.3900-1
4.0000+ 5 ~ 5.0000+ 5	6.2610- 3												6.2610- 3
5.0000+ 5 ~ 6.0000+ 5	1.3750- 1												1.3750- 1
6.0000+ 5 ~ 8.0000+ 5	3.6825- 1												3.6825- 1
8.0000+ 5 ~ 1.0000+ 6	3.8612- 1												3.8612- 1
1.0000+ 6 ~ 1.5000+ 6	5.8170- 1												5.8170- 1
1.5000+ 6 ~ 2.0000+ 6	6.0050- 1												6.0050- 1
2.0000+ 6 ~ 3.0000+ 6	6.1429- 1	6.1757- 2	2.0709- 2	1.9126- 3	3.7398- 3								7.0241- 1
3.0000+ 6 ~ 4.0000+ 6	3.8463- 1	1.4870- 1	4.8100- 2	4.8300- 2	5.5555- 2	1.3360- 1	2.6213- 3					0.0000+ 0	8.2150- 1
4.0000+ 6 ~ 5.0000+ 6	2.4750- 1	1.6000- 1	4.4500- 2	4.0500- 2	7.0500- 2	8.5000- 2	2.7500- 2					0.0000+ 0	8.7500- 1
5.0000+ 6 ~ 6.0000+ 6	8.5000- 5	5.5000- 5	1.0000- 5	1.0500- 5	3.0000- 5	3.5000- 5	1.5000- 5					8.9411- 1	8.9499- 1
6.0000+ 6 ~ 8.0000+ 6	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0					9.1975- 1	9.1975- 1
8.0000+ 6 ~ 1.0000+ 7	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0					8.6425- 1	8.6425- 1
1.0000+ 7 ~ 1.5000+ 7	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0					6.5200- 1	6.5200- 1

TABLE A2.3

Al-27

MATERIAL =1131 CROSS SECTION AL-27

ENERGY	1 ST L Q=-8.4200-1	2 ND L Q=-1.0130+0	3 RD L Q=-1.6500+0	4 TH L Q=-1.8300+0	5 TH L Q=-2.2100+0	6 TH L Q=-2.7300+0	7 TH L Q=-2.9800+0	8 TH L Q=-3.0000+0	9 TH L	10 TH L	11 TH L	CONT. L Q=-3.7000+0	INELA Q=-8.4200-1
8.0000+ 5 ~ 1.0000+ 6	8.8822- 3												8.8822- 3
1.0000+ 6 ~ 1.5000+ 6	4.8280- 2	6.1644- 2											1.0992- 1
1.5000+ 6 ~ 2.0000+ 6	6.9926- 2	1.4403- 1	2.8000- 2	3.7178- 3									2.4568- 1
2.0000+ 6 ~ 3.0000+ 6	6.4644- 2	1.3903- 1	1.2573- 1	8.9648- 2	4.5552- 2	1.9525- 3							4.6656- 1
3.0000+ 6 ~ 4.0000+ 6	5.3776- 2	1.0947- 1	1.3907- 1	1.2816- 1	1.3119- 1	5.8299- 2	2.1341- 2	5.3971- 2				7.1072- 4	6.9598- 1
4.0000+ 6 ~ 5.0000+ 6	4.4633- 2	8.7921- 2	1.1313- 1	1.0666- 1	1.1822- 1	7.6264- 2	4.2118- 2	1.0338- 1				1.2127- 1	8.1360- 1
5.0000+ 6 ~ 6.0000+ 6	2.9993- 2	5.9550- 2	7.9968- 2	7.5979- 2	8.4574- 2	5.7083- 2	3.2960- 2	8.0463- 2				3.7427- 1	8.7485- 1
6.0000+ 6 ~ 8.0000+ 6	1.4420- 2	2.9185- 2	4.2035- 2	4.0822- 2	4.7310- 2	3.3711- 2	1.9862- 2	4.6954- 2				5.8026- 1	8.5455- 1
8.0000+ 6 ~ 1.0000+ 7	4.9703- 3	1.0176- 2	1.5201- 2	1.4952- 2	1.8349- 2	1.3635- 2	8.4061- 3	1.9989- 2				6.4220- 1	7.4796- 1
1.0000+ 7 ~ 1.5000+ 7	1.1139- 3	2.3117- 3	3.6030- 3	3.5431- 3	4.4697- 3	3.2510- 3	1.9519- 3	5.1668- 3				6.1166- 1	6.3707- 1
1.5000+ 7 ~ 2.0000+ 7	8.1500- 5	1.7148- 4	2.8053- 4	2.7789- 4	3.5284- 4	2.6240- 4	1.5331- 4	4.2160- 4				3.6115- 1	3.6315- 1

TABLE A2.4

Si

MATERIAL =1140 CROSS SECTION SI-0

ENERGY	1 ST L Q=-1.2730+0	2 ND L Q=-1.7990+0	3 RD L Q=-2.0280+0	4 TH L Q=-2.2350+0	5 TH L Q=-2.4250+0	6 TH L Q=-3.0070+0	7 TH L Q=-3.4980+0	8 TH L Q=-3.6230+0	9 TH L Q=-3.7700+0	10 TH L Q=-3.7880+0	11 TH L Q=-4.0800+0	CONT. L Q=-5.2000+0	INELA Q=-1.2730+0
1.0000+ 6 ~ 1.5000+ 6	1.1665- 3												1.1665- 3
1.5000+ 6 ~ 2.0000+ 6	1.3693- 2	3.2589- 2											4.6282- 2
2.0000+ 6 ~ 3.0000+ 6	1.9576- 2	4.0617- 1	8.2611- 3	6.7575- 3	1.9763- 3								4.4274- 1
3.0000+ 6 ~ 4.0000+ 6	1.5949- 2	5.5597- 1	1.3282- 2	1.6322- 2	9.1550- 3	4.1397- 3	1.3585- 3	3.3533- 4	9.0170- 5	2.1692- 5			6.1662- 1
4.0000+ 6 ~ 5.0000+ 6	1.2806- 2	6.0568- 1	1.1847- 2	1.4306- 2	9.2758- 3	7.8850- 3	7.7714- 3	4.2397- 3	3.6170- 3	1.3956- 3	1.7466- 3		6.8680- 1
5.0000+ 6 ~ 6.0000+ 6	9.4501- 3	5.3703- 1	9.4268- 3	1.0981- 2	7.5501- 3	7.2083- 3	7.6309- 3	4.9107- 3	4.5207- 3	1.7820- 3	3.8687- 3	2.1227- 3	7.5431- 1
6.0000+ 6 ~ 8.0000+ 6	4.0755- 3	3.0323- 1	4.4903- 3	5.8745- 3	3.4849- 3	3.7652- 3	4.6994- 3	3.0998- 3	3.0781- 3	1.2288- 3	2.7068- 3	2.4821- 2	6.2817- 1
8.0000+ 6 ~ 1.0000+ 7	1.2812- 3	8.7778- 2	1.5576- 3	2.0768- 3	1.1486- 3	1.3995- 3	1.8159- 3	1.3737- 3	1.1592- 3	4.5239- 4	1.2697- 3	1.3512- 1	5.1513- 1
1.0000+ 7 ~ 1.5000+ 7	2.9653- 4	1.6911- 2	3.8279- 4	4.1741- 4	2.7188- 4	3.5434- 4	3.7854- 4	3.8411- 4	2.3434- 4	9.0912- 5	3.6754- 4	5.8142- 1	6.9749- 1

TABLE A2.5 — Cr

MATERIAL =1240 — CROSS SECTION — CR-0

ENERGY	1 ST L Q=-5.6410-1	2 ND L Q=-7.8310-1	3 RD L Q=-8.3483-1	4 TH L Q=-1.0060+0	5 TH L Q=-1.2870+0	6 TH L Q=-1.4342+0	7 TH L Q=-1.5390+0	8 TH L Q=-1.8260+0	9 TH L Q=-1.8790+0	10 TH L Q=-1.9730+0	11 TH L Q=-2.1710+0	CONT. L Q=-2.7700+0	INELA Q=-5.6410-1
5.0000+ 5 ~ 6.0000+ 5	1.1152- 3												1.1152- 3
6.0000+ 5 ~ 8.0000+ 5	1.2380- 2	1.9187- 5											1.2398- 2
8.0000+ 5 ~ 1.0000+ 6	1.7535- 2	1.5771- 2	6.0644- 3										3.9370- 2
1.0000+ 6 ~ 1.5000+ 6	2.2143- 2	2.5982- 2	1.3935- 2	1.9807- 2	3.4360- 3	1.0268- 2							9.5571- 2
1.5000+ 6 ~ 2.0000+ 6	2.2933- 2	3.2774- 2	1.7698- 2	3.1995- 2	2.0082- 2	3.7645- 1	6.8093- 3	8.8093- 5	6.3792- 5				5.0889- 1
2.0000+ 6 ~ 3.0000+ 6	1.6280- 2	3.2338- 2	1.6698- 2	2.7434- 2	2.0876- 2	5.3430- 1	1.6720- 2	2.9035- 3	4.5609- 3	9.9107- 3	2.9755- 3	4.4826- 4	7.4208- 1
3.0000+ 6 ~ 4.0000+ 6	7.7058- 3	2.3106- 2	1.0412- 2	1.4961- 2	1.3352- 2	3.7252- 1	1.2159- 2	4.5921- 3	9.5435- 3	9.9458- 3	3.9770- 3	3.4398- 2	1.0383+ 0
4.0000+ 6 ~ 5.0000+ 6	3.6373- 3	1.1932- 2	5.2481- 3	7.5621- 3	7.2830- 3	1.9060- 1	6.8944- 3	2.9706- 3	6.7125- 3	6.1005- 3	2.5870- 3	3.2565- 1	1.2298+ 0
5.0000+ 6 ~ 6.0000+ 6	1.8059- 3	5.6045- 3	2.5577- 3	3.9338- 3	3.9530- 3	9.7004- 2	3.7633- 3	1.7325- 3	3.8596- 3	3.2689- 3	1.3486- 3	7.2354- 1	1.3282+ 0
6.0000+ 6 ~ 8.0000+ 6	6.8123- 4	1.9974- 3	9.1348- 4	1.5706- 3	1.6559- 3	3.8644- 2	1.5898- 3	7.5068- 4	1.6382- 3	1.3449- 3	5.3269- 4	1.0898+ 0	1.3693+ 0
8.0000+ 6 ~ 1.0000+ 7	1.5165- 4	4.3406- 4	2.0380- 4	3.7274- 4	4.1719- 4	1.0582- 2	4.0562- 4	2.0649- 4	4.2721- 4	3.3429- 4	1.2752- 4	1.2141+ 0	1.3031+ 0
1.0000+ 7 ~ 1.5000+ 7	9.1127- 6	4.3974- 5	1.8211- 5	2.3233- 5	2.6925- 5	1.4017- 3	2.6316- 5	2.0868- 5	4.9808- 5	2.1216- 5	7.8602- 6	9.6337- 1	9.7664- 1

TABLE A2.6 — Cr-50

MATERIAL =1241 — CROSS SECTION — CR-50

ENERGY	1 ST L Q=-7.8310-1	2 ND L Q=-1.8790+0	3 RD L Q=-2.9220+0	4 TH L Q=-3.1580+0	5 TH L Q=-3.3200+0	6 TH L Q=-3.5880+0	7 TH L Q=-3.6030+0	8 TH L Q=-3.6210+0	9 TH L Q=-3.6930+0	10 TH L Q=-3.7870+0	11 TH L	CONT. L Q=-3.8200+0	INELA Q=-7.8310-1
6.0000+ 5 ~ 8.0000+ 5	4.1810- 4												4.1810- 4
8.0000+ 5 ~ 1.0000+ 6	3.6255- 1												3.6255- 1
1.0000+ 6 ~ 1.5000+ 6	5.9730- 1												5.9730- 1
1.5000+ 6 ~ 2.0000+ 6	7.5343- 1	1.4665- 3											7.5490- 1
2.0000+ 6 ~ 3.0000+ 6	7.4340- 1	1.0485- 1	3.5118- 4										8.4860- 1
3.0000+ 6 ~ 4.0000+ 6	5.3117- 1	2.1939- 1	1.0068- 1	5.4124- 2	2.2645- 2	2.6948- 2	7.8694- 3	1.0329- 2	5.3956- 3	1.3031- 3		1.2578- 3	9.8111- 1
4.0000+ 6 ~ 5.0000+ 6	2.7429- 1	1.5431- 1	1.0004- 1	8.3851- 2	5.4830- 2	9.7770- 2	5.0579- 2	4.6516- 2	4.6086- 2	2.3798- 2		2.3163- 1	1.1637+ 0
5.0000+ 6 ~ 6.0000+ 6	1.2884- 1	8.8726- 2	6.2762- 2	5.8693- 2	4.7032- 2	8.0789- 2	5.7426- 2	3.8295- 2	4.7023- 2	3.1409- 2		6.2314- 1	1.2641+ 0
6.0000+ 6 ~ 8.0000+ 6	4.5917- 2	3.7660- 2	2.6746- 2	2.5740- 2	2.5485- 2	3.4339- 2	2.9536- 2	1.7087- 2	2.3344- 2	1.9070- 2		9.9299- 1	1.2779+ 0
8.0000+ 6 ~ 1.0000+ 7	9.9784- 3	9.8209- 3	7.0008- 3	6.7614- 3	8.1886- 3	7.5888- 3	7.8870- 3	4.2895- 3	6.2319- 3	6.0008- 3		9.8956- 1	1.0633+ 0
1.0000+ 7 ~ 1.5000+ 7	1.0109- 3	1.1450- 3	8.1400- 4	7.9693- 4	1.0876- 3	7.9854- 4	9.6572- 4	4.8696- 4	7.5548- 4	8.5334- 4		7.5893- 1	7.6764- 1

TABLE A2.7 — Cr-52

MATERIAL =1242 — CROSS SECTION — CR-52

ENERGY	1 ST L Q=-1.4342+0	2 ND L Q=-2.3698+0	3 RD L Q=-2.6470+0	4 TH L Q=-2.7680+0	5 TH L Q=-2.9650+0	6 TH L Q=-3.1138+0	7 TH L Q=-3.1620+0	8 TH L Q=-3.4140+0	9 TH L Q=-3.4720+0	10 TH L Q=-3.6166+0	11 TH L Q=-3.7710+0	CONT. L Q=-4.0000+0	INELA Q=-1.4342+0
1.0000+ 6 ~ 1.5000+ 6	1.2254- 2												1.2254- 2
1.5000+ 6 ~ 2.0000+ 6	4.4927- 1												4.4927- 1
2.0000+ 6 ~ 3.0000+ 6	6.3767- 1	3.7868- 2	1.1865- 2	3.1832- 3									6.9059- 1
3.0000+ 6 ~ 4.0000+ 6	4.4459- 1	1.3817- 1	7.0760- 2	8.0939- 2	1.4097- 1	3.2182- 3	8.2740- 2	3.0904- 2	1.1296- 2	2.8570- 3	6.3462- 3		1.0128+ 0
4.0000+ 6 ~ 5.0000+ 6	2.2747- 1	1.1740- 1	5.3457- 2	9.7059- 2	1.4175- 1	1.2828- 2	1.2484- 1	8.7955- 2	5.4117- 2	2.4343- 2	7.0587- 2	1.5962- 1	1.2178+ 0
5.0000+ 6 ~ 6.0000+ 6	1.1577- 1	7.6811- 2	2.8112- 2	6.9912- 2	8.8714- 2	1.5879- 2	8.4177- 2	7.5250- 2	5.5630- 2	3.0129- 2	6.5885- 2	5.5419- 1	1.3219+ 0
6.0000+ 6 ~ 8.0000+ 6	4.6120- 2	3.7405- 2	1.0598- 2	3.4658- 2	3.6704- 2	1.2672- 2	3.5556- 2	3.5860- 2	3.0112- 2	1.9767- 2	3.1863- 2	1.0019+ 0	1.3680+ 0
8.0000+ 6 ~ 1.0000+ 7	1.2629- 2	1.2557- 2	2.8448- 3	1.1847- 2	1.0545- 2	6.6357- 3	1.0262- 2	1.1184- 2	1.0577- 2	8.3955- 3	9.3944- 3	1.2107+ 0	1.3294+ 0
1.0000+ 7 ~ 1.5000+ 7	1.6729- 3	1.9277- 3	3.8245- 4	1.8528- 3	1.4618- 3	1.3761- 3	1.4333- 3	1.6702- 3	1.7160- 3	1.5560- 3	1.3428- 3	1.0525+ 0	1.0710+ 0

TABLE A2.8 — Cr-53

MATERIAL =1243 — CROSS SECTION — CR-53

ENERGY	1 ST L Q=-5.6410-1	2 ND L Q=-1.0060+0	3 RD L Q=-1.2870+0	4 TH L Q=-1.5390+0	5 TH L Q=-1.9730+0	6 TH L Q=-2.1710+0	7 TH L Q=-2.2330+0	8 TH L Q=-2.3210+0	9 TH L Q=-2.4550+0	10 TH L Q=-2.6610+0	11 TH L Q=-2.6704+0	CONT. L Q=-2.7700+0	INELA Q=-5.6410-1
5.0000+ 5 ~ 6.0000+ 5	1.1739- 2												1.1739- 2
6.0000+ 5 ~ 8.0000+ 5	1.3032- 1												1.3032- 1
8.0000+ 5 ~ 1.0000+ 6	1.8458- 1												1.8458- 1
1.0000+ 6 ~ 1.5000+ 6	2.3308- 1	2.0849- 1	3.6169- 2										4.7774- 1
1.5000+ 6 ~ 2.0000+ 6	2.4140- 1	3.3679- 1	2.1139- 1	7.1677- 2									8.6126- 1
2.0000+ 6 ~ 3.0000+ 6	1.7137- 1	2.8878- 1	2.1975- 1	1.7600- 1	1.0432- 1	3.1321- 2	3.3022- 2	3.7794- 2	2.3717- 2	1.1968- 2	9.6261- 3	4.7186- 3	1.1161+ 0
3.0000+ 6 ~ 4.0000+ 6	8.1114- 2	1.5748- 1	1.4055- 1	1.2799- 1	1.0469- 1	4.1864- 2	6.3688- 2	6.7510- 2	6.8782- 2	5.7105- 2	4.7630- 2	2.9432- 1	1.2771+ 0
4.0000+ 6 ~ 5.0000+ 6	3.8287- 2	7.9602- 2	7.6663- 2	7.2573- 2	6.4215- 2	2.7232- 2	5.0196- 2	4.7154- 2	5.5621- 2	4.9900- 2	4.0635- 2	7.3007- 1	1.3540+ 0
5.0000+ 6 ~ 6.0000+ 6	1.9005- 2	4.1408- 2	4.1611- 2	3.9614- 2	3.4410- 2	1.4196- 2	3.0396- 2	2.5416- 2	3.2849- 2	2.9782- 2	2.3550- 2	1.0547+ 0	1.3997+ 0
6.0000+ 6 ~ 8.0000+ 6	7.1708- 3	1.6533- 2	1.7430- 2	1.6735- 2	1.4157- 2	5.6073- 3	1.3901- 2	1.0253- 2	1.4279- 2	1.2551- 2	9.6338- 3	1.2638+ 0	1.4072+ 0
8.0000+ 6 ~ 1.0000+ 7	1.5963- 3	3.9236- 3	4.3915- 3	4.2697- 3	3.5189- 3	1.3423- 3	3.9074- 3	2.5163- 3	3.8005- 3	3.2088- 3	2.3964- 3	1.1160+ 0	1.1521+ 0
1.0000+ 7 ~ 1.5000+ 7	9.5923- 5	2.4456- 4	2.8342- 4	2.7701- 4	2.2333- 4	8.2739- 5	2.7138- 4	1.5826- 4	2.5316- 4	2.0790- 4	1.5232- 4	3.2156- 1	3.2388- 1

TABLE A2.9

Cr-54

MATERIAL =1244 — CROSS SECTION — CR-54

ENERGY	1 ST L Q=-8.3483-1	2 ND L Q=-1.8260+0	3 RD L Q=-2.6195+0	4 TH L Q=-2.8294+0	5 TH L Q=-3.0739+0	6 TH L Q=-3.1600+0	7 TH L Q=-3.2220+0	8 TH L Q=-3.3930+0	9 TH L Q=-3.4366+0	10 TH L Q=-3.4600+0	11 TH L Q=-3.4870+0	CONT. L Q=-4.0000+0	INELA Q=-8.3483-1
8.0000+ 5 ~ 1.0000+ 6	2.5697- 1												2.5697- 1
1.0000+ 6 ~ 1.5000+ 6	5.9048- 1												5.9048- 1
1.5000+ 6 ~ 2.0000+ 6	7.4992- 1	3.7328- 3											7.5365- 1
2.0000+ 6 ~ 3.0000+ 6	7.0753- 1	1.2303- 1	3.5635- 2	2.0595- 3									8.6825- 1
3.0000+ 6 ~ 4.0000+ 6	4.4119- 1	1.9458- 1	1.9951- 1	4.9579- 2	9.8523- 2	2.7851- 3	2.7168- 2	1.2889- 2	3.6150- 2	3.5565- 6	1.0299- 2		1.0860+ 0
4.0000+ 6 ~ 5.0000+ 6	2.2238- 1	1.2587- 1	1.4474- 1	4.0470- 2	1.1345- 1	1.0697- 2	6.1841- 2	2.6961- 2	8.4146- 2	1.4601- 4	4.6405- 2	1.8358- 1	1.2747+ 0
5.0000+ 6 ~ 6.0000+ 6	1.0838- 1	7.3409- 2	7.6324- 2	2.1193- 2	6.7888- 2	1.2690- 2	4.8907- 2	1.7773- 2	5.9992- 2	5.6878- 4	4.3877- 2	6.2349- 1	1.3837+ 0
6.0000+ 6 ~ 8.0000+ 6	3.8707- 2	3.1809- 2	2.8548- 2	7.5687- 3	2.6086- 2	9.4965- 3	2.2998- 2	6.6465- 3	2.4180- 2	1.2912- 3	2.1509- 2	1.0978+ 0	1.4302+ 0
8.0000+ 6 ~ 1.0000+ 7	8.6356- 3	8.7495- 3	7.0958- 3	1.7966- 3	6.6545- 3	4.3642- 3	7.0690- 3	1.6359- 3	6.2919- 3	1.2863- 3	6.7340- 3	1.3240+ 0	1.4185+ 0
1.0000+ 7 ~ 1.5000+ 7	7.7166- 4	8.8425- 4	6.6490- 4	1.6433- 4	6.3586- 4	5.8485- 4	7.6566- 4	1.5300- 4	6.1207- 4	2.5320- 4	7.4203- 4	6.3048- 1	6.4044- 1

TABLE A2.10

Fe

MATERIAL =1260 — CROSS SECTION — FE-0

ENERGY	1 ST L Q=-1.4410-2	2 ND L Q=-1.3646-1	3 RD L Q=-3.6680-1	4 TH L Q=-7.0660-1	5 TH L Q=-8.1060-1	6 TH L Q=-8.4675-1	7 TH L Q=-1.0040+0	8 TH L Q=-1.1960+0	9 TH L Q=-1.2650+0	10 TH L Q=-1.3560+0	11 TH L Q=-1.4077+0	CONT. L Q=-1.9000+0	INELA Q=-1.4410-2
1.0000+ 4 ~ 1.5000+ 4	6.0765- 4												6.0765- 4
1.5000+ 4 ~ 2.0000+ 4	2.6054- 2												2.6054- 2
2.0000+ 4 ~ 3.0000+ 4	3.2675- 2												3.2675- 2
3.0000+ 4 ~ 4.0000+ 4	2.9771- 2												2.9771- 2
4.0000+ 4 ~ 5.0000+ 4	2.6886- 2												2.6886- 2
5.0000+ 4 ~ 6.0000+ 4	2.4573- 2												2.4573- 2
6.0000+ 4 ~ 8.0000+ 4	2.2016- 2												2.2016- 2
8.0000+ 4 ~ 1.0000+ 5	1.9604- 2												1.9604- 2
1.0000+ 5 ~ 1.5000+ 5	1.7088- 2	1.0277- 4											1.7191- 2
1.5000+ 5 ~ 2.0000+ 5	1.4508- 2	1.3945- 3											1.5903- 2
2.0000+ 5 ~ 3.0000+ 5	1.2761- 2	2.6307- 3											1.5391- 2
3.0000+ 5 ~ 4.0000+ 5	1.1635- 2	4.0188- 3	4.8329- 4										1.6137- 2
4.0000+ 5 ~ 5.0000+ 5	1.0134- 2	4.8471- 3	4.3426- 3										1.9323- 2
5.0000+ 5 ~ 6.0000+ 5	9.0005- 3	5.6860- 3	5.3344- 3										2.0821- 2
6.0000+ 5 ~ 8.0000+ 5	9.6890- 3	6.5857- 3	5.9300- 3	4.4983- 4									2.2655- 2
8.0000+ 5 ~ 1.0000+ 6	9.2539- 3	6.8858- 3	6.2606- 3	2.7689- 3	7.7161- 4	1.8209- 1							2.0803- 1
1.0000+ 6 ~ 1.5000+ 6	8.4487- 3	7.0497- 3	6.4164- 3	3.8570- 3	1.6355- 3	4.6985- 1	1.0232- 3	7.2699- 4	6.0520- 4	1.3349- 4	1.1855- 3		5.0094- 1
1.5000+ 6 ~ 2.0000+ 6	6.5063- 3	6.1588- 3	5.4966- 3	4.3280- 3	2.0266- 3	6.2007- 1	2.0288- 3	1.7083- 3	2.3629- 3	1.3469- 3	2.4520- 2	9.6821- 6	6.7798- 1
2.0000+ 6 ~ 3.0000+ 6	4.4851- 3	4.6067- 3	4.0422- 3	3.7597- 3	1.6837- 3	6.5050- 1	2.3984- 3	1.7191- 3	2.5775- 3	1.5270- 3	3.4693- 2	2.9724- 3	8.0250- 1
3.0000+ 6 ~ 4.0000+ 6	2.8105- 3	3.0576- 3	2.6011- 3	2.6576- 3	1.0585- 3	4.1988- 1	2.0050- 3	1.2860- 3	2.0235- 3	1.2141- 3	2.4483- 2	1.2096- 2	1.0825+ 0
4.0000+ 6 ~ 5.0000+ 6	1.7125- 3	1.9429- 3	1.6026- 3	1.7233- 3	6.3561- 4	2.2453- 1	1.4230- 3	8.1845- 4	1.3202- 3	7.8795- 4	1.2861- 2	1.9033- 1	1.2948+ 0
5.0000+ 6 ~ 6.0000+ 6	9.6733- 4	1.1324- 3	9.1591- 4	1.0257- 3	3.6083- 4	1.2705- 1	9.0243- 4	4.7536- 4	7.8020- 4	4.6064- 4	6.8469- 3	5.4674- 1	1.3959+ 0
6.0000+ 6 ~ 8.0000+ 6	3.8063- 4	4.6218- 4	3.6585- 4	4.3015- 4	1.3756- 4	5.5643- 2	4.0504- 4	1.9306- 4	3.2529- 4	1.8868- 4	2.8270- 3	9.9348- 1	1.4372+ 0
8.0000+ 6 ~ 1.0000+ 7	8.1959- 5	1.0409- 4	7.9659- 5	9.9011- 5	3.0501- 5	1.5573- 2	1.0053- 4	4.1948- 5	7.3460- 5	4.1318- 5	8.6397- 4	1.2601+ 0	1.4087+ 0
1.0000+ 7 ~ 1.5000+ 7	5.7805- 6	7.5481- 6	5.6539- 6	7.2730- 6	2.7081- 6	1.9726- 3	7.8226- 6	2.9486- 6	5.3109- 6	2.9136- 6	1.4488- 4	1.0774+ 0	1.0993+ 0

TABLE A2.11

Fe-54

MATERIAL =1261 — CROSS SECTION — FE-54

ENERGY	1 ST L Q=-1.4077+0	2 ND L Q=-2.5389+0	3 RD L Q=-2.5640+0	4 TH L Q=-2.9480+0	5 TH L Q=-2.9607+0	6 TH L Q=-3.1632+0	7 TH L Q=-3.2972+0	8 TH L Q=-3.3448+0	9 TH L Q=-3.8359+0	10 TH L	11 TH L	CONT. L Q=-4.0000+0	INELA Q=-1.4077+0
1.0000+ 6 ~ 1.5000+ 6	1.8582- 2												1.8582- 2
1.5000+ 6 ~ 2.0000+ 6	3.8432- 1												3.8432- 1
2.0000+ 6 ~ 3.0000+ 6	5.4378- 1	1.5837- 2	1.1643- 2										5.7126- 1
3.0000+ 6 ~ 4.0000+ 6	3.8375- 1	9.1061- 2	6.3625- 2	3.7276- 3	1.1391- 1	7.0650- 2	1.6167- 2	2.6230- 2	4.2535- 4				7.6955- 1
4.0000+ 6 ~ 5.0000+ 6	2.0158- 1	8.3854- 2	4.8253- 2	9.5066- 3	1.1919- 1	1.0386- 1	4.7716- 2	8.7114- 2	2.3579- 2			8.2079- 2	8.0673- 1
5.0000+ 6 ~ 6.0000+ 6	1.0732- 1	6.0025- 2	2.7026- 2	1.1974- 2	7.7680- 2	7.2660- 2	4.5948- 2	7.7271- 2	3.4561- 2			2.7816- 1	7.9262- 1
6.0000+ 6 ~ 8.0000+ 6	4.4310- 2	3.1798- 2	1.0810- 2	1.0819- 2	3.4278- 2	3.2952- 2	2.6623- 2	3.9379- 2	2.3045- 2			4.9576- 1	7.4978- 1
8.0000+ 6 ~ 1.0000+ 7	1.3542- 2	1.2485- 2	3.1821- 3	6.6629- 3	1.1202- 2	1.0879- 2	1.1019- 2	1.2922- 2	9.9762- 3			6.3918- 1	7.3105- 1
1.0000+ 7 ~ 1.5000+ 7	2.2709- 3	2.5062- 3	5.1649- 4	1.7743- 3	1.9823- 3	1.9427- 3	2.3115- 3	2.3011- 3	2.1688- 3			6.6496- 1	6.8273- 1

TABLE A2.12 — Fe-56

MATERIAL =1262 — CROSS SECTION — FE-56

ENERGY	1 ST L Q=-8.4675-1	2 ND L Q=-2.0850+0	3 RD L Q=-2.6577+0	4 TH L Q=-2.9400+0	5 TH L Q=-2.9597+0	6 TH L Q=-3.1200+0	7 TH L Q=-3.3699+0	8 TH L Q=-3.3830+0	9 TH L Q=-3.4453+0	10 TH L Q=-3.4500+0	11 TH L Q=-3.6000+0	CONT. L Q=-4.0000+0	INELA Q=-8.4675-1
8.0000+ 5 ~ 1.0000+ 6	1.8052- 1												1.8052- 1
1.0000+ 6 ~ 1.5000+ 6	4.6580- 1												4.6580- 1
1.5000+ 6 ~ 2.0000+ 6	6.1472- 1												6.1472- 1
2.0000+ 6 ~ 3.0000+ 6	6.4489- 1	5.7401- 2	2.2630- 2	4.4202- 5									7.2497- 1
3.0000+ 6 ~ 4.0000+ 6	4.1626- 1	1.3515- 1	1.6887- 1	4.0769- 2	1.0865- 1	1.2255- 2	3.8496- 2	8.4466- 4	2.8627- 2	2.0518- 2	1.3899- 2		9.8898- 1
4.0000+ 6 ~ 5.0000+ 6	2.2260- 1	1.0451- 1	1.3490- 1	3.8658- 2	1.1458- 1	2.9185- 2	8.4423- 2	6.5456- 3	9.0420- 2	6.7825- 2	6.7763- 2	1.2207- 1	1.1957+ 0
5.0000+ 6 ~ 6.0000+ 6	1.2595- 1	7.4803- 2	8.6832- 2	2.4796- 2	7.9673- 2	3.0318- 2	6.8896- 2	1.0775- 2	8.5381- 2	6.3418- 2	6.2307- 2	4.4495- 1	1.2957+ 0
6.0000+ 6 ~ 8.0000+ 6	5.5163- 2	4.0976- 2	4.0838- 2	1.1249- 2	3.8398- 2	2.1719- 2	3.5075- 2	1.1076- 2	4.4798- 2	3.5254- 2	3.3194- 2	8.8763- 1	1.3390+ 0
8.0000+ 6 ~ 1.0000+ 7	1.5439- 2	1.4438- 2	1.2584- 2	3.2638- 3	1.2060- 2	9.9017- 3	1.1326- 2	6.6135- 3	1.3558- 2	1.2332- 2	1.0907- 2	1.1659+ 0	1.3179+ 0
1.0000+ 7 ~ 1.5000+ 7	1.9556- 3	2.1496- 3	1.6918- 3	4.1262- 4	1.6441- 3	1.7439- 3	1.5778- 3	1.3566- 3	1.8593- 3	1.8328- 3	1.5396- 3	1.0093+ 0	1.0316+ 0

TABLE A2.13 — Fe-57

MATERIAL =1263 — CROSS SECTION — FE-57

ENERGY	1 ST L Q=-1.4410-2	2 ND L Q=-1.3646-1	3 RD L Q=-3.6680-1	4 TH L Q=-7.0660-1	5 TH L Q=-1.0040+0	6 TH L Q=-1.1960+0	7 TH L Q=-1.2650+0	8 TH L Q=-1.3560+0	9 TH L Q=-1.6270+0	10 TH L Q=-1.7250+0	11 TH L	CONT. L Q=-1.9000+0	INELA Q=-1.4410-2
1.0000+ 4 ~ 1.5000+ 4	2.5224- 2												2.5224- 2
1.5000+ 4 ~ 2.0000+ 4	1.0815+ 0												1.0815+ 0
2.0000+ 4 ~ 3.0000+ 4	1.3564+ 0												1.3564+ 0
3.0000+ 4 ~ 4.0000+ 4	1.2358+ 0												1.2358+ 0
4.0000+ 4 ~ 5.0000+ 4	1.1161+ 0												1.1161+ 0
5.0000+ 4 ~ 6.0000+ 4	1.0201+ 0												1.0201+ 0
6.0000+ 4 ~ 8.0000+ 4	9.1391- 1												9.1391- 1
8.0000+ 4 ~ 1.0000+ 5	8.1379- 1												8.1379- 1
1.0000+ 5 ~ 1.5000+ 5	7.0935- 1	4.2660- 3											7.1362- 1
1.5000+ 5 ~ 2.0000+ 5	6.0224- 1	5.7887- 2											6.6013- 1
2.0000+ 5 ~ 3.0000+ 5	5.2970- 1	1.0920- 1											6.3890- 1
3.0000+ 5 ~ 4.0000+ 5	4.8299- 1	1.6682- 1	2.0062- 2										6.6987- 1
4.0000+ 5 ~ 5.0000+ 5	4.2066- 1	2.0121- 1	1.8026- 1										8.0213- 1
5.0000+ 5 ~ 6.0000+ 5	4.0683- 1	2.3603- 1	2.2144- 1										8.6430- 1
6.0000+ 5 ~ 8.0000+ 5	4.0220- 1	2.7338- 1	2.4616- 1	1.8673- 2									9.4041- 1
8.0000+ 5 ~ 1.0000+ 6	3.8414- 1	2.8584- 1	2.5989- 1	1.1494- 1									1.0448+ 0
1.0000+ 6 ~ 1.5000+ 6	3.5071- 1	2.9264- 1	2.6635- 1	1.6011- 1	4.2475- 2	3.0178- 2	2.5122- 2	5.5412- 3					1.1731+ 0
1.5000+ 6 ~ 2.0000+ 6	2.7009- 1	2.5566- 1	2.2817- 1	1.7966- 1	8.4219- 2	7.0913- 2	9.8085- 2	5.5912- 2	3.3132- 2	1.6225- 2		4.0191- 4	1.2925+ 0
2.0000+ 6 ~ 3.0000+ 6	1.8618- 1	1.9123- 1	1.6780- 1	1.5607- 1	9.9559- 2	7.1362- 2	1.0699- 1	6.3388- 2	7.8325- 2	7.0548- 2		1.2339- 1	1.3148+ 0
3.0000+ 6 ~ 4.0000+ 6	1.1667- 1	1.2692- 1	1.0797- 1	1.1032- 1	8.3229- 2	5.3384- 2	8.3998- 2	5.0400- 2	7.2526- 2	6.9132- 2		4.5482- 1	1.3294+ 0
4.0000+ 6 ~ 5.0000+ 6	7.1087- 2	8.0650- 2	6.6524- 2	7.1536- 2	5.9070- 2	3.3975- 2	5.4801- 2	3.2708- 2	5.0129- 2	4.8812- 2		7.9676- 1	1.3661+ 0
5.0000+ 6 ~ 6.0000+ 6	4.0155- 2	4.7008- 2	3.8020- 2	4.2579- 2	3.7461- 2	1.9733- 2	3.2387- 2	1.9122- 2	3.0106- 2	2.9790- 2		1.0642+ 0	1.4003+ 0
6.0000+ 6 ~ 8.0000+ 6	1.5800- 2	1.9186- 2	1.5187- 2	1.7856- 2	1.6814- 2	8.0143- 3	1.3503- 2	7.8324- 3	1.2783- 2	1.2585- 2		1.2672+ 0	1.4067+ 0
8.0000+ 6 ~ 1.0000+ 7	3.4022- 3	4.3207- 3	3.3067- 3	4.1101- 3	4.1730- 3	1.7413- 3	3.0494- 3	1.7151- 3	2.9394- 3	2.9089- 3		1.4250+ 0	1.1566+ 0
1.0000+ 7 ~ 1.5000+ 7	2.3995- 4	3.1333- 4	2.3470- 4	3.0191- 4	3.2473- 4	1.2240- 4	2.2046- 4	1.2095- 4	2.1441- 4	2.1275- 4		5.1901- 1	5.2131- 1

TABLE A2.14 — Fe-58

MATERIAL =1264 — CROSS SECTION — FE-58

ENERGY	1 ST L Q=-8.1060-1	2 ND L Q=-1.6745+0	3 RD L Q=-2.1330+0	4 TH L Q=-2.2570+0	5 TH L Q=-2.5960+0	6 TH L Q=-2.7820+0	7 TH L Q=-2.8760+0	8 TH L Q=-3.0840+0	9 TH L	10 TH L	11 TH L	CONT. L Q=-3.1500+0	INELA Q=-8.1060-1
8.0000+ 5 ~ 1.0000+ 6	2.2628- 1												2.2628- 1
1.0000+ 6 ~ 1.5000+ 6	4.7960- 1												4.7960- 1
1.5000+ 6 ~ 2.0000+ 6	5.9430- 1	6.7592- 2											6.6189- 1
2.0000+ 6 ~ 3.0000+ 6	4.9375- 1	2.7688- 1	9.3807- 2	3.1035- 2	6.5669- 3	6.6099- 3	2.0490- 3						9.1070- 1
3.0000+ 6 ~ 4.0000+ 6	3.1041- 1	2.3239- 1	1.5750- 1	5.4230- 2	6.0278- 2	7.6932- 2	8.7751- 2	5.3802- 2				9.4950- 2	1.1283+ 0
4.0000+ 6 ~ 5.0000+ 6	1.8640- 1	1.4940- 1	1.2301- 1	3.8590- 2	7.1285- 2	7.2815- 2	9.1601- 2	7.9854- 2				4.5542- 1	1.2684+ 0
5.0000+ 6 ~ 6.0000+ 6	1.0582- 1	8.7524- 2	7.8604- 2	2.2917- 2	5.3375- 2	4.7254- 2	6.2531- 2	5.8130- 2				8.4469- 1	1.3608+ 0
6.0000+ 6 ~ 8.0000+ 6	4.0340- 2	3.5058- 2	3.3973- 2	1.2063- 2	2.6194- 2	1.9848- 2	2.7260- 2	2.5914- 2				1.2002+ 0	1.4180+ 0
8.0000+ 6 ~ 1.0000+ 7	8.9446- 3	8.2090- 3	8.7161- 3	2.0776- 3	7.7196- 3	4.8834- 3	7.0566- 3	6.8398- 3				1.3671+ 0	1.4215+ 0
1.0000+ 7 ~ 1.5000+ 7	7.9416- 4	7.4635- 4	8.4276- 4	1.7967- 4	8.1676- 4	4.5133- 4	6.7350- 4	6.6010- 4				7.8022- 1	7.8539- 1

TABLE A2.15

Ni

MATERIAL =1280 CROSS SECTION NI-0

ENERGY	1 ST L Q=-6.7420-2	2 ND L Q=-2.8300-1	3 RD L Q=-6.5600-1	4 TH L Q=-9.0880-1	5 TH L Q=-1.0150+0	6 TH L Q=-1.1000+0	7 TH L Q=-1.1323+0	8 TH L Q=-1.1730+0	9 TH L Q=-1.1857+0	10 TH L Q=-1.3325+0	11 TH L Q=-1.3459+0	CONT. L Q=-1.8000+0	INELA Q=-6.7420-2
6.0000+ 4 ~ 8.0000+ 4	2.0782- 3												2.0782- 3
8.0000+ 4 ~ 1.0000+ 5	5.2739- 3												5.2739- 3
1.0000+ 5 ~ 1.5000+ 5	5.3895- 3												5.3895- 3
1.5000+ 5 ~ 2.0000+ 5	5.2475- 3												5.2475- 3
2.0000+ 5 ~ 3.0000+ 5	5.1496- 3	6.1049- 5											5.2107- 3
3.0000+ 5 ~ 4.0000+ 5	5.1137- 3	1.2759- 3											6.3896- 3
4.0000+ 5 ~ 5.0000+ 5	5.2078- 3	1.6172- 3											6.8250- 3
5.0000+ 5 ~ 6.0000+ 5	5.3490- 3	1.7480- 3											7.0970- 3
6.0000+ 5 ~ 8.0000+ 5	5.3480- 3	1.8068- 3	8.5852- 4										8.0133- 3
8.0000+ 5 ~ 1.0000+ 6	5.1646- 3	1.8212- 3	1.9634- 3	2.2159- 4									9.1708- 3
1.0000+ 6 ~ 1.5000+ 6	3.9040- 3	1.5929- 3	1.9698- 3	1.4376- 3	8.9021- 4	6.3418- 4	5.8577- 4	5.8060- 3	3.8484- 4	1.1460- 2	3.5531- 4		3.1798- 2
1.5000+ 6 ~ 2.0000+ 6	2.7257- 3	1.2158- 3	1.7183- 3	1.5515- 3	1.2359- 3	1.1076- 3	1.1930- 3	1.5731- 2	9.8869- 4	1.0141- 1	3.7221- 3	4.7399- 5	3.5810- 1
2.0000+ 6 ~ 3.0000+ 6	1.8097- 3	8.0553- 4	1.2536- 3	1.2898- 3	1.1335- 3	9.9594- 4	1.1300- 3	1.6931- 2	9.4181- 4	1.1500- 1	4.8288- 3	1.8251- 3	5.3817- 1
3.0000+ 6 ~ 4.0000+ 6	1.1071- 3	4.7671- 4	7.8040- 4	8.5815- 4	8.0935- 4	6.7460- 4	7.9307- 4	1.1030- 2	6.5393- 4	7.0486- 2	3.4648- 3	9.4969- 2	7.5871- 1
4.0000+ 6 ~ 5.0000+ 6	6.6316- 4	2.7756- 4	4.6978- 4	5.3382- 4	5.2707- 4	4.1552- 4	5.0018- 4	5.6918- 3	4.0527- 4	3.9401- 2	1.8304- 3	3.5491- 1	8.2945- 1
5.0000+ 6 ~ 6.0000+ 6	3.6110- 4	1.4940- 4	2.6132- 4	3.0583- 4	3.1199- 4	2.3694- 4	2.9017- 4	3.0967- 3	2.3211- 4	2.3184- 2	8.6425- 4	5.0554- 1	8.0669- 1
6.0000+ 6 ~ 8.0000+ 6	1.3234- 4	5.4147- 5	9.7809- 5	1.1917- 4	1.2602- 4	9.1939- 5	1.1522- 4	1.1033- 3	9.0735- 5	9.5747- 3	2.6347- 4	6.1049- 1	7.4777- 1
8.0000+ 6 ~ 1.0000+ 7	2.4798- 5	9.8990- 6	1.8225- 5	2.3252- 5	2.5624- 5	1.7603- 5	2.2818- 5	2.1099- 4	1.7478- 5	2.2147- 3	4.3171- 5	6.2914- 1	6.6896- 1
1.0000+ 7 ~ 1.5000+ 7	1.5866- 6	6.1034- 7	1.1331- 6	1.4950- 6	1.7142- 6	1.0977- 6	1.4710- 6	1.8957- 5	1.0909- 6	2.5339- 4	2.7914- 6	4.4047- 1	4.4555- 1

TABLE A2.16

Ni-58

MATERIAL =1281 CROSS SECTION NI-58

ENERGY	1 ST L Q=-1.4540+0	2 ND L Q=-2.4591+0	3 RD L Q=-2.7753+0	4 TH L Q=-2.9017+0	5 TH L Q=-2.9424+0	6 TH L Q=-3.0378+0	7 TH L Q=-3.2635+0	8 TH L Q=-3.4203+0	9 TH L Q=-3.5260+0	10 TH L Q=-3.5309+0	11 TH L Q=-3.5934+0	CONT. L Q=-4.2500+0	INELA Q=-1.4540+0
1.0000+ 6 ~ 1.5000+ 6	4.0855- 3												4.0855- 3
1.5000+ 6 ~ 2.0000+ 6	3.3072- 1												3.3072- 1
2.0000+ 6 ~ 3.0000+ 6	4.5181- 1	1.7549- 2	1.1081- 2	1.3746- 3	3.2487- 5								4.8184- 1
3.0000+ 6 ~ 4.0000+ 6	2.5493- 1	7.5874- 2	1.0811- 1	7.2110- 2	2.7468- 2	6.2730- 2	3.4750- 2	1.5701- 2	5.4150- 3	5.5619- 4	8.9330- 3		6.7144- 1
4.0000+ 6 ~ 5.0000+ 6	1.2060- 1	5.9629- 2	7.7637- 2	5.6343- 2	2.2708- 2	6.7250- 2	5.7615- 2	4.4506- 2	2.7729- 2	4.8126- 3	3.4282- 2	2.4610- 2	6.9772- 1
5.0000+ 6 ~ 6.0000+ 6	6.7338- 2	4.1997- 2	4.7597- 2	3.3722- 2	1.3750- 2	4.3680- 2	4.0201- 2	3.6455- 2	2.6998- 2	6.9640- 3	2.5972- 2	1.3892- 1	6.3442- 1
6.0000+ 6 ~ 8.0000+ 6	2.8076- 2	2.1795- 2	2.1513- 2	1.4779- 2	6.1730- 3	2.0208- 2	1.9099- 2	1.9170- 2	1.6049- 2	6.4869- 3	1.2458- 2	3.0804- 1	5.5774- 1
8.0000+ 6 ~ 1.0000+ 7	7.7791- 3	7.5859- 3	6.7086- 3	4.5259- 3	1.8746- 3	6.4620- 3	6.2422- 3	6.8006- 3	6.3867- 3	3.8235- 3	4.0694- 3	4.0527- 1	4.9115- 1
1.0000+ 7 ~ 1.5000+ 7	9.6355- 4	1.1026- 3	8.7644- 4	5.7545- 4	2.2392- 4	8.5805- 4	8.4131- 4	9.7781- 4	1.0051- 3	7.7823- 4	5.4235- 4	2.5747- 1	2.6972- 1

TABLE A2.17

Ni-60

MATERIAL =1282 CROSS SECTION NI-60

ENERGY	1 ST L Q=-1.3325+0	2 ND L Q=-2.1589+0	3 RD L Q=-2.2848+0	4 TH L Q=-2.5058+0	5 TH L Q=-2.6262+0	6 TH L Q=-3.1190+0	7 TH L Q=-3.1241+0	8 TH L Q=-3.1300+0	9 TH L Q=-3.1864+0	10 TH L Q=-3.1941+0	11 TH L Q=-3.2694+0	CONT. L Q=-4.0700+0	INELA Q=-1.3325+0
1.0000+ 6 ~ 1.5000+ 6	4.3706- 2												4.3706- 2
1.5000+ 6 ~ 2.0000+ 6	3.8678- 1												3.8678- 1
2.0000+ 6 ~ 3.0000+ 6	4.3861- 1	1.4256- 1	3.3848- 2	1.3941- 2	1.3704- 2								6.4266- 1
3.0000+ 6 ~ 4.0000+ 6	2.6883- 1	1.8563- 1	5.9153- 2	7.0431- 2	9.8854- 2	5.3500- 2	5.2696- 2	2.2336- 2	3.2334- 2	3.8462- 2	3.3769- 2		9.3871- 1
4.0000+ 6 ~ 5.0000+ 6	1.5027- 1	1.1725- 1	3.6800- 2	6.8830- 2	8.8312- 2	7.3785- 2	7.3522- 2	4.6487- 2	6.1837- 2	5.5972- 2	6.5960- 2	9.4686- 2	1.0994+ 0
5.0000+ 6 ~ 6.0000+ 6	8.8422- 2	7.1594- 2	2.1731- 2	5.2364- 2	6.1835- 2	5.2910- 2	5.2810- 2	4.0705- 2	5.0088- 2	3.8384- 2	4.9952- 2	3.8756- 1	1.1603+ 0
6.0000+ 6 ~ 8.0000+ 6	3.6517- 2	3.1307- 2	9.4215- 3	2.7209- 2	2.9875- 2	2.4937- 2	2.4904- 2	2.2702- 2	2.5652- 2	1.7479- 2	2.3955- 2	7.6046- 1	1.1369+ 0
8.0000+ 6 ~ 1.0000+ 7	8.4465- 3	7.8051- 3	2.2192- 3	8.0586- 3	8.2695- 3	6.8915- 3	6.8862- 3	7.3347- 3	7.6046- 3	4.7300- 3	6.7314- 3	9.2661- 1	1.0317+ 0
1.0000+ 7 ~ 1.5000+ 7	9.6639- 4	9.1370- 4	2.3270- 4	1.0857- 3	1.0394- 3	8.4949- 4	8.4913- 4	1.0315- 3	9.9250- 4	5.6413- 4	8.3887- 4	8.2976- 1	8.4315- 1

TABLE A2.18

Ni-61

MATERIAL =1283 CROSS SECTION NI-61

ENERGY	1 ST L Q=-6.7420-2	2 ND L Q=-2.8300-1	3 RD L Q=-6.5600-1	4 TH L Q=-9.0880-1	5 TH L Q=-1.0150+0	6 TH L Q=-1.1000+0	7 TH L Q=-1.1323+0	8 TH L Q=-1.1857+0	9 TH L Q=-1.4580+0	10 TH L Q=-1.6100+0	11 TH L Q=-1.7298+0	CONT. L Q=-1.8000+0	INELA Q=-6.7420-2
6.0000+ 4 ~ 8.0000+ 4	1.7464- 1												1.7464- 1
8.0000+ 4 ~ 1.0000+ 5	4.4318- 1												4.4318- 1
1.0000+ 5 ~ 1.5000+ 5	4.5290- 1												4.5290- 1
1.5000+ 5 ~ 2.0000+ 5	4.4097- 1												4.4097- 1
2.0000+ 5 ~ 3.0000+ 5	4.3274- 1	5.1302- 3											4.3787- 1
3.0000+ 5 ~ 4.0000+ 5	4.2972- 1	1.0722- 1											5.3694- 1
4.0000+ 5 ~ 5.0000+ 5	4.3763- 1	1.3590- 1											5.7353- 1
5.0000+ 5 ~ 6.0000+ 5	4.4950- 1	1.4689- 1											5.9639- 1
6.0000+ 5 ~ 8.0000+ 5	4.4941- 1	1.5183- 1	7.2144- 2										6.7339- 1
8.0000+ 5 ~ 1.0000+ 6	4.3400- 1	1.5304- 1	1.6499- 1	1.8621- 2									7.7066- 1
1.0000+ 6 ~ 1.5000+ 6	3.2807- 1	1.3386- 1	1.6553- 1	1.2080- 1	7.4807- 2	5.3293- 2	4.9225- 2	3.2339- 2	4.1711- 4				9.5833- 1
1.5000+ 6 ~ 2.0000+ 6	2.2905- 1	1.0216- 1	1.4439- 1	1.3038- 1	1.0386- 1	9.3076- 2	1.0025- 1	8.3083- 2	5.0392- 2	2.8664- 2	7.1706- 3	3.9831- 3	1.0765+ 0
2.0000+ 6 ~ 3.0000+ 6	1.5208- 1	6.7692- 2	1.0534- 1	1.0839- 1	9.5252- 2	8.3692- 2	9.4958- 2	7.9143- 2	6.9055- 2	6.3909- 2	2.6848- 2	1.5337- 1	1.0997+ 0
3.0000+ 6 ~ 4.0000+ 6	9.3036- 2	4.0060- 2	5.5580- 2	7.2114- 2	6.8013- 2	5.6689- 2	6.6644- 2	5.4952- 2	5.6870- 2	5.4545- 2	2.4197- 2	4.5249- 1	1.1052+ 0
4.0000+ 6 ~ 5.0000+ 6	5.5728- 2	2.3325- 2	3.9477- 2	4.4859- 2	4.4292- 2	3.4918- 2	4.2032- 2	3.4052- 2	3.8475- 2	3.6225- 2	1.5827- 2	7.1416- 1	1.1234+ 0
5.0000+ 6 ~ 6.0000+ 6	3.0344- 2	1.2555- 2	2.1959- 2	2.5700- 2	2.6218- 2	1.9911- 2	2.4384- 2	1.9505- 2	2.3389- 2	2.1563- 2	9.1533- 3	8.8384- 1	1.1185+ 0
6.0000+ 6 ~ 8.0000+ 6	1.1121- 2	4.5502- 3	8.2193- 3	1.0014- 2	1.0590- 2	7.7259- 3	9.6822- 3	7.6248- 3	9.8361- 3	8.9209- 3	3.6938- 3	9.7678- 1	1.0688+ 0
8.0000+ 6 ~ 1.0000+ 7	2.0839- 3	8.3185- 4	1.5315- 3	1.9539- 3	2.1532- 3	1.4792- 3	1.9175- 3	1.4687- 3	2.0683- 3	1.8347- 3	7.3872- 4	7.6364- 1	7.8170- 1
1.0000+ 7 ~ 1.5000+ 7	1.3333- 4	5.1289- 5	9.5221- 5	1.2563- 4	1.4405- 4	9.2241- 5	1.2362- 4	9.1672- 5	1.3939- 4	1.1936- 4	4.6255- 5	3.5241- 1	3.5357- 1

TABLE A2.19

Ni-62

MATERIAL =1284 CROSS SECTION NI-62

ENERGY	1 ST L Q=-1.1730+0	2 ND L Q=-2.0488+0	3 RD L Q=-2.3020+0	4 TH L Q=-2.3365+0	5 TH L Q=-2.8907+0	6 TH L Q=-3.0593+0	7 TH L Q=-3.1582+0	8 TH L Q=-3.1768+0	9 TH L Q=-3.2576+0	10 TH L Q=-3.2710+0	11 TH L Q=-3.2776+0	CONT. L Q=-3.9700+0	INELA Q=-1.1730+0
1.0000+ 6 ~ 1.5000+ 6	1.5907- 1												1.5907- 1
1.5000+ 6 ~ 2.0000+ 6	4.3098- 1												4.3098- 1
2.0000+ 6 ~ 3.0000+ 6	4.6386- 1	5.6404- 2	9.4671- 2	2.8908- 2	5.4851- 4								6.4439- 1
3.0000+ 6 ~ 4.0000+ 6	3.0220- 1	6.4929- 2	1.7830- 1	1.0360- 1	2.9261- 2	3.6990- 3	4.9635- 2	4.6449- 2	2.8597- 2	3.5315- 2	3.0622- 2		9.3411- 1
4.0000+ 6 ~ 5.0000+ 6	1.5594- 1	3.5634- 2	1.0694- 1	8.1782- 2	2.3758- 2	1.0005- 2	6.6858- 2	6.5904- 2	4.4708- 2	6.1042- 2	5.4047- 2	1.6804- 1	1.1466+ 0
5.0000+ 6 ~ 6.0000+ 6	8.4841- 2	2.0784- 2	6.2033- 2	5.3558- 2	1.5071- 2	1.1209- 2	4.5934- 2	4.5592- 2	3.1200- 2	4.3859- 2	3.7769- 2	5.4091- 1	1.2296+ 0
6.0000+ 6 ~ 8.0000+ 6	3.0226- 2	8.0701- 3	2.4405- 2	2.3121- 2	6.4290- 3	7.9411- 3	1.9567- 2	1.9462- 2	1.3467- 2	1.8934- 2	1.4183- 2	9.3138- 1	1.2233+ 0
8.0000+ 6 ~ 1.0000+ 7	5.7806- 3	1.5354- 3	5.2187- 3	5.5646- 3	1.4001- 3	2.9937- 3	4.6708- 3	4.6575- 3	3.2142- 3	4.5895- 3	2.9423- 3	1.0943+ 0	1.1635+ 0
1.0000+ 7 ~ 1.5000+ 7	5.1937- 4	1.2546- 4	4.8138- 4	5.7666- 4	1.1815- 4	4.0140- 4	4.5131- 4	4.5063- 4	3.0148- 4	4.4716- 4	2.7123- 4	8.2312- 1	8.2997- 1

TABLE A2.20

Ni-64

MATERIAL =1285 CROSS SECTION NI-64

ENERGY	1 ST L Q=-1.3459+0	2 ND L Q=-2.2750+0	3 RD L Q=-2.6080+0	4 TH L Q=-2.8650+0	5 TH L Q=-2.8850+0	6 TH L Q=-2.9710+0	7 TH L Q=-3.0280+0	8 TH L Q=-3.1650+0	9 TH L Q=-3.2730+0	10 TH L Q=-3.3930+0	11 TH L Q=-3.4590+0	CONT. L Q=-3.6400+0	INELA Q=-1.3459+0
1.0000+ 6 ~ 1.5000+ 6	3.2899- 2												3.2899- 2
1.5000+ 6 ~ 2.0000+ 6	3.4464- 1												3.4464- 1
2.0000+ 6 ~ 3.0000+ 6	4.4712- 1	1.0412- 1	1.0435- 2	1.3524- 3	2.8853- 5								5.6305- 1
3.0000+ 6 ~ 4.0000+ 6	3.2082- 1	2.0348- 1	8.4143- 2	3.5189- 2	4.8573- 3	9.0028- 2	2.4830- 2	2.6458- 2	4.0063- 2	2.4380- 2	6.2501- 4	1.4953- 2	8.9776- 1
4.0000+ 6 ~ 5.0000+ 6	1.6948- 1	1.2251- 1	7.0408- 2	2.8798- 2	9.2659- 3	8.5840- 2	2.5935- 2	4.6619- 2	6.7954- 2	5.3179- 2	4.2835- 3	3.7224- 1	1.1575+ 0
5.0000+ 6 ~ 6.0000+ 6	8.0023- 2	6.1353- 2	4.3271- 2	1.5630- 2	1.0231- 2	4.8024- 2	1.4609- 2	3.3353- 2	4.2455- 2	3.4279- 2	6.2473- 3	8.0783- 1	1.2739+ 0
6.0000+ 6 ~ 8.0000+ 6	2.4395- 2	2.0527- 2	1.7332- 2	5.5202- 3	6.6978- 3	1.7215- 2	5.2481- 3	1.4496- 2	1.5744- 2	1.1136- 2	5.0434- 3	1.1085+ 0	1.2813+ 0
8.0000+ 6 ~ 1.0000+ 7	3.9973- 3	3.6791- 3	3.7471- 3	9.8653- 4	2.1202- 3	3.4012- 3	9.6656- 4	3.4696- 3	3.2493- 3	2.0035- 3	1.9068- 3	1.2026+ 0	1.2386+ 0
1.0000+ 7 ~ 1.5000+ 7	2.5846- 4	2.4284- 4	2.8030- 4	5.9407- 5	1.9572- 4	2.3086- 4	5.8694- 5	2.6794- 4	2.2549- 4	1.3335- 4	1.8544- 4	6.4011- 1	6.4275- 1

TABLE A2.21

Cu

MATERIAL =1290 CROSS SECTION CU-0

ENERGY	1 ST L Q=-6.6962-1	2 ND L Q=-7.7060-1	3 RD L Q=-9.6206-1	4 TH L Q=-1.1155+0	5 TH L Q=-1.3270+0	6 TH L Q=-1.4120+0	7 TH L Q=-1.4818+0	8 TH L Q=-1.5470+0	9 TH L Q=-1.6234+0	10 TH L Q=-1.7249+0	11 TH L Q=-1.8613+0	CONT. L Q=-2.0500+0	INELA Q=-6.6962-1
6.0000+ 5 ~ 8.0000+ 5	2.1759- 2	6.5280- 4											2.2411- 2
8.0000+ 5 ~ 1.0000+ 6	8.7705- 2	2.4181- 2	4.6063- 3										1.1649- 1
1.0000+ 6 ~ 1.5000+ 6	1.2612- 1	4.9256- 2	1.6501- 1	3.9732- 2	1.1261- 2	3.2310- 3							3.9461- 1
1.5000+ 6 ~ 2.0000+ 6	1.2269- 1	5.5337- 2	1.9681- 1	8.5338- 2	1.0285- 1	8.6887- 2	3.2655- 2	3.4159- 2	1.4440- 2	6.4783- 3	4.0339- 3		7.4166- 1
2.0000+ 6 ~ 3.0000+ 6	8.0315- 2	4.0077- 2	1.4883- 1	7.3145- 2	1.1259- 1	1.0425- 1	5.4914- 2	7.5691- 2	4.4929- 2	3.2078- 2	5.7514- 2	1.7393- 1	1.0778+ 0
3.0000+ 6 ~ 4.0000+ 6	3.9905- 2	2.0672- 2	7.8561- 2	4.0018- 2	6.6821- 2	6.3121- 2	3.4080- 2	4.8711- 2	3.0564- 2	2.3623- 2	4.8692- 2	7.7449- 1	1.3965+ 0
4.0000+ 6 ~ 5.0000+ 6	1.8976- 2	8.8352- 3	3.9208- 2	1.7914- 2	3.5241- 2	3.2934- 2	1.6021- 2	2.5455- 2	1.4481- 2	1.1288- 2	2.7036- 2	1.2073+ 0	1.5251+ 0
5.0000+ 6 ~ 6.0000+ 6	8.9090- 3	3.5662- 3	1.9563- 2	7.7060- 3	1.8864- 2	1.7315- 2	7.3775- 3	1.3342- 2	6.6739- 3	5.1983- 3	1.4922- 2	1.3690+ 0	1.5278+ 0
6.0000+ 6 ~ 8.0000+ 6	2.9396- 3	1.0092- 3	6.7925- 3	2.3076- 3	6.9995- 3	6.3458- 3	2.3655- 3	4.8772- 3	2.1360- 3	1.6542- 3	5.8377- 3	1.4090+ 0	1.4651+ 0
8.0000+ 6 ~ 1.0000+ 7	6.1674- 4	1.7424- 4	1.4981- 3	4.1922- 4	1.6327- 3	1.4422- 3	4.5421- 4	1.0855- 3	4.0186- 4	3.0421- 4	1.3836- 3	1.4118+ 0	1.4240+ 0
1.0000+ 7 ~ 1.5000+ 7	5.4331- 5	1.1043- 5	1.3783- 4	2.7631- 5	1.5667- 4	1.3293- 4	3.1129- 5	9.6752- 5	2.6475- 5	1.9400- 5	1.2819- 4	1.1683+ 0	1.1693+ 0

TABLE A2.22

Cu-63

MATERIAL =1291 CROSS SECTION CU-63

ENERGY	1 ST L Q=-6.6962-1	2 ND L Q=-9.6206-1	3 RD L Q=-1.3270+0	4 TH L Q=-1.4120+0	5 TH L Q=-1.5470+0	6 TH L Q=-1.8613+0	7 TH L Q=-2.0111+0	8 TH L	9 TH L	10 TH L	11 TH L	CONT. L Q=-2.0500+0	INELA Q=-6.6962-1
6.0000+ 5 ~ 8.0000+ 5	3.1489- 2												3.1489- 2
8.0000+ 5 ~ 1.0000+ 6	1.2693- 1	6.6662- 3											1.3359- 1
1.0000+ 6 ~ 1.5000+ 6	1.8252- 1	2.3880- 1	1.6297- 2	4.6759- 3									4.4229- 1
1.5000+ 6 ~ 2.0000+ 6	1.7755- 1	2.8481- 1	1.4884- 1	1.2574- 1	4.9434- 2	5.8378- 3							7.9221- 1
2.0000+ 6 ~ 3.0000+ 6	1.1623- 1	2.1539- 1	1.6294- 1	1.5087- 1	1.0954- 1	8.3234- 2	4.5971- 2					2.2685- 1	1.1110+ 0
3.0000+ 6 ~ 4.0000+ 6	5.7749- 2	1.1369- 1	9.6701- 2	9.1348- 2	7.0494- 2	7.0466- 2	5.2880- 2					8.4402- 1	1.3974+ 0
4.0000+ 6 ~ 5.0000+ 6	2.7461- 2	5.6740- 2	5.1000- 2	4.7661- 2	3.6837- 2	3.9125- 2	2.9905- 2					1.2284+ 0	1.5172+ 0
5.0000+ 6 ~ 6.0000+ 6	1.2893- 2	2.8311- 2	2.7299- 2	2.5058- 2	1.9308- 2	2.1595- 2	1.6428- 2					1.3707+ 0	1.5216+ 0
6.0000+ 6 ~ 8.0000+ 6	4.2542- 3	9.8300- 3	1.0130- 2	9.1836- 3	7.0582- 3	8.4482- 3	6.4477- 3					1.4058+ 0	1.4611+ 0
8.0000+ 6 ~ 1.0000+ 7	8.9253- 4	2.1680- 3	2.3628- 3	2.0872- 3	1.5710- 3	2.0024- 3	1.5047- 3					1.4032+ 0	1.4158+ 0
1.0000+ 7 ~ 1.5000+ 7	7.8626- 5	1.9947- 4	2.2673- 4	1.9238- 4	1.4002- 4	1.8552- 4	1.3477- 4					1.2591+ 0	1.2603+ 0

TABLE A2.23

Cu-65

MATERIAL =1292 CROSS SECTION CU-65

ENERGY	1 ST L Q=-7.7060-1	2 ND L Q=-1.1155+0	3 RD L Q=-1.4818+0	4 TH L Q=-1.6234+0	5 TH L Q=-1.7249+0	6 TH L Q=-2.0930+0	7 TH L Q=-2.2123+0	8 TH L Q=-2.2800+0	9 TH L Q=-2.3280+0	10 TH L Q=-2.5310+0	11 TH L	CONT. L Q=-2.5400+0	INELA Q=-7.7060-1
6.0000+ 5 ~ 8.0000+ 5	2.1126- 3												2.1126- 3
8.0000+ 5 ~ 1.0000+ 6	7.8254- 2												7.8254- 2
1.0000+ 6 ~ 1.5000+ 6	1.5940- 1	1.2858- 1											2.8799- 1
1.5000+ 6 ~ 2.0000+ 6	1.7909- 1	2.7617- 1	1.0568- 1	4.6730- 2	2.0965- 2								6.2863- 1
2.0000+ 6 ~ 3.0000+ 6	1.2970- 1	2.3672- 1	1.7771- 1	1.4540- 1	1.0381- 1	5.5070- 2	3.2643- 2	3.3013- 2	2.2661- 2	1.1219- 2		5.5575- 2	1.0035+ 0
3.0000+ 6 ~ 4.0000+ 6	6.6898- 2	1.2951- 1	1.1029- 1	9.8913- 2	7.6450- 2	7.1954- 2	5.3691- 2	6.2154- 2	4.8194- 2	5.7582- 2		6.1901- 1	1.3947+ 0
4.0000+ 6 ~ 5.0000+ 6	2.8593- 2	5.7975- 2	5.1847- 2	4.6864- 2	3.6529- 2	3.7378- 2	2.8761- 2	3.4832- 2	2.7048- 2	3.2631- 2		1.1602+ 0	1.5427+ 0
5.0000+ 6 ~ 6.0000+ 6	1.1541- 2	2.4939- 2	2.3876- 2	2.1599- 2	1.6823- 2	1.8259- 2	1.4039- 2	1.7815- 2	1.3390- 2	1.4278- 2		1.3650+ 0	1.5415+ 0
6.0000+ 6 ~ 8.0000+ 6	3.2660- 3	7.4680- 3	7.6553- 3	6.9128- 3	5.3533- 3	6.3082- 3	4.8488- 3	6.5245- 3	4.7178- 3	4.8270- 3		1.4161+ 0	1.4740+ 0
8.0000+ 6 ~ 1.0000+ 7	5.6389- 4	1.3567- 3	1.4699- 3	1.3005- 3	9.8451- 4	1.2469- 3	9.4182- 4	1.3647- 3	9.3075- 4	1.0857- 3		1.4312+ 0	1.4424+ 0
1.0000+ 7 ~ 1.5000+ 7	3.5739- 5	8.9419- 5	1.0074- 4	8.5679- 5	6.2782- 5	8.2483- 5	6.0331- 5	9.4336- 5	5.9770- 5	8.8346- 5		9.6529- 1	9.6605- 1

TABLE A2.24

Mo

MATERIAL 1420 CROSS SECTION MO-0

ENERGY	1 ST L Q=-2.0394-1	2 ND L Q= 4.8090-1	3 RD L Q=-5.3560-1	4 TH L Q=-6.5820-1	5 TH L Q=-6.7960-1	6 TH L Q=-6.9440-1	7 TH L Q=-7.1900-1	8 TH L Q=-7.2110-1	9 TH L Q=-7.3490-1	10 TH L Q=-7.6583-1	11 TH L Q=-7.7830-1	CONT. L Q=-1.5400+0	INELA Q=-2.0394-1
2.0000+ 5 ~ 3.0000+ 5	3.1825- 2												3.1825- 2
3.0000+ 5 ~ 4.0000+ 5	7.8705- 2												7.8705- 2
4.0000+ 5 ~ 5.0000+ 5	9.6603- 2	2.4651- 4											9.6849- 2
5.0000+ 5 ~ 6.0000+ 5	1.0093- 1	1.6073- 2	1.1400- 2										1.2840- 1
6.0000+ 5 ~ 8.0000+ 5	9.8395- 2	3.4811- 2	5.7123- 2	1.1595- 2	1.6292- 3	4.0396- 3	2.7425- 3	1.4826- 3	5.5897- 3	6.6961- 4	5.0711- 4		2.1868- 1
8.0000+ 5 ~ 1.0000+ 6	8.0243- 2	2.9370- 2	8.1975- 2	3.7367- 2	6.9047- 3	2.5557- 2	2.4136- 2	1.3681- 2	6.0724- 2	4.0501- 2	8.0881- 2		5.9987- 1
1.0000+ 6 ~ 1.5000+ 6	4.7073- 2	1.9658- 2	7.0137- 2	3.3026- 2	6.6067- 3	2.6614- 2	2.5981- 2	1.5246- 2	7.8438- 2	5.2394- 2	1.4551- 1		9.6932- 1
1.5000+ 6 ~ 2.0000+ 6	2.7012- 2	1.2935- 2	5.1030- 2	1.9925- 2	5.2719- 3	1.8066- 2	1.7189- 2	1.1207- 2	5.7435- 2	3.5384- 2	1.1561- 1	1.0637- 1	1.2825+ 0
2.0000+ 6 ~ 3.0000+ 6	1.4850- 2	6.4583- 3	2.9543- 2	8.8431- 3	2.9958- 3	9.2486- 3	8.0252- 3	5.7759- 3	2.8255- 2	1.8439- 2	6.1017- 2	7.2564- 1	1.5452+ 0
3.0000+ 6 ~ 4.0000+ 6	6.2282- 3	2.4475- 3	1.1391- 2	3.3792- 3	1.2082- 3	3.4421- 3	3.0443- 3	2.2507- 3	1.0701- 2	7.7286- 3	2.6337- 2	1.3121+ 0	1.6911+ 0
4.0000+ 6 ~ 5.0000+ 6	2.5878- 3	9.6755- 4	2.6963- 3	1.3550- 3	4.8228- 4	7.8264- 4	1.2158- 3	8.9828- 4	3.3609- 3	3.3156- 3	8.9132- 3	1.6396+ 0	1.7869+ 0
5.0000+ 6 ~ 6.0000+ 6	8.4035- 4	2.7265- 4	6.6671- 4	3.9864- 4	1.3994- 4	1.9273- 4	3.5338- 4	2.6058- 4	1.0457- 3	1.1643- 3	3.0247- 3	1.7708+ 0	1.8215+ 0
6.0000+ 6 ~ 8.0000+ 6	3.3203- 4	1.0544- 4	1.4431- 4	1.5488- 4	5.4127- 5	4.1759- 5	1.3704- 4	1.0091- 4	2.5539- 4	4.6408- 4	7.9226- 4	1.7872+ 0	1.7999+ 0
8.0000+ 6 ~ 1.0000+ 7	2.2214- 5	5.1630- 6	9.2762- 6	8.1723- 6	2.6598- 6	2.5483- 6	7.0173- 6	5.0556- 6	1.9359- 5	3.4341- 5	7.8246- 5	1.7312+ 0	1.7323+ 0
1.0000+ 7 ~ 1.5000+ 7	1.3277- 6	2.7732- 7	3.4000- 7	4.5014- 7	1.4267- 7	8.6035- 8	3.7973- 7	2.7254- 7	6.8560- 7	2.1127- 6	3.6754- 6	1.7369+ 0	1.7370+ 0

TABLE A2.25

Mo-92

MATERIAL =1421 CROSS SECTION MO-92

ENERGY	1 ST L Q=-1.5090+0	2 ND L Q=-2.2830+0	3 RD L Q=-2.5200+0	4 TH L Q=-2.5260+0	5 TH L Q=-2.6120+0	6 TH L Q=-2.7590+0	7 TH L Q=-2.8490+0	8 TH L Q=-3.0920+0	9 TH L Q=-3.5350+0	10 TH L Q=-3.6210+0	11 TH L Q=-3.6230+0	CONT. L Q=-3.7260+0	INELA Q=-1.5090+0
1.5000+ 6 ~ 2.0000+ 6	5.2145- 1												5.2145- 1
2.0000+ 6 ~ 3.0000+ 6	8.2353- 1	1.3297- 1	2.6337- 2	1.1628- 2	9.5897- 4	9.8213- 7	5.2314- 3						1.0007+ 0
3.0000+ 6 ~ 4.0000+ 6	5.2547- 1	2.4116- 1	9.2622- 2	6.8672- 2	1.9121- 2	6.7745- 4	1.1510- 1	9.0713- 2	2.9956- 2	1.1861- 2	2.4872- 4	2.3983- 2	1.2276+ 0
4.0000+ 6 ~ 5.0000+ 6	2.5782- 1	1.4891- 1	5.4170- 2	6.5023- 2	2.4728- 2	1.2773- 3	1.0559- 1	1.4716- 1	1.0279- 1	5.3286- 2	2.1613- 3	6.1748- 1	1.6259+ 0
5.0000+ 6 ~ 6.0000+ 6	9.3257- 2	5.7670- 2	2.0054- 2	3.0335- 2	1.2517- 2	1.2644- 3	4.4305- 2	5.6283- 2	4.1547- 2	2.6111- 2	3.3926- 3	1.3374+ 0	1.7477+ 0
6.0000+ 6 ~ 8.0000+ 6	1.1334- 2	9.7208- 3	2.7387- 3	8.4461- 3	4.2056- 3	9.0477- 4	9.5814- 3	8.8802- 3	7.9859- 3	7.9250- 3	2.4168- 3	1.6988+ 0	1.7807+ 0
8.0000+ 6 ~ 1.0000+ 7	1.3968- 3	1.4260- 3	3.3885- 4	1.3362- 3	8.8118- 4	3.5562- 4	1.3760- 3	1.1436- 3	1.0705- 3	1.2501- 3	5.9766- 4	1.7041+ 0	1.7165+ 0
1.0000+ 7 ~ 1.5000+ 7	8.1649- 5	9.6839- 5	1.9673- 5	8.9598- 5	7.5730- 5	4.1616- 5	8.6867- 5	7.3081- 5	7.0188- 5	8.2279- 5	5.1652- 5	1.6874+ 0	1.6883+ 0

TABLE A2.26

Mo-94

MATERIAL 1422 — CROSS SECTION — MO-94

ENERGY	1 ST L Q= 8.7100-1	2 ND L Q=-1.5740+0	3 RD L Q=-1.7400+0	4 TH L Q=-1.8640+0	5 TH L Q=-2.0670+0	6 TH L Q=-2.3000+0	7 TH L Q=-2.3930+0	8 TH L Q=-2.4230+0	9 TH L Q=-2.5340+0	10 TH L Q=-2.5680+0	11 TH L Q=-2.6080+0	CONT. L Q=-2.9910+0	INELA Q=-8.7100-1
8.0000+ 5 ~ 1.0000+ 6	1.6842- 1												1.6842- 1
1.0000+ 6 ~ 1.5000+ 6	8.2436- 1												8.2436- 1
1.5000+ 6 ~ 2.0000+ 6	9.1242- 1	1.1504- 1	2.8521- 2	1.9562- 2									1.0755+ 0
2.0000+ 6 ~ 3.0000+ 6	5.3557- 1	2.0576- 1	1.0537- 1	2.6192- 1	1.7251- 1	4.9758- 2	6.2454- 2	1.2996- 3	2.8141- 2	1.6179- 2	4.8573- 4		1.4506+ 0
3.0000+ 6 ~ 4.0000+ 6	2.2102- 1	1.1351- 1	5.2373- 2	1.5564- 1	1.4247- 1	7.4324- 2	1.1835- 1	7.4082- 3	1.0573- 1	5.8047- 2	5.4456- 3	5.6098- 1	1.6926+ 0
4.0000+ 6 ~ 5.0000+ 6	7.7384- 2	4.9245- 2	1.8696- 2	5.8561- 2	5.4423- 2	3.5388- 2	4.7805- 2	8.1162- 3	6.5952- 2	3.0579- 2	6.6796- 3	1.2784+ 0	1.7780+ 0
5.0000+ 6 ~ 6.0000+ 6	3.1075- 2	2.1543- 2	7.5452- 3	2.4218- 2	2.2738- 2	1.6335- 2	2.0373- 2	4.9505- 3	2.7156- 2	1.4526- 2	4.3479- 3	1.5935+ 0	1.8108+ 0
6.0000+ 6 ~ 8.0000+ 6	5.7691- 3	5.1496- 3	1.4291- 3	4.9404- 3	4.7755- 3	4.4054- 3	4.5136- 3	2.0811- 3	5.4440- 3	4.1429- 3	1.9511- 3	1.7423+ 0	1.7937+ 0
8.0000+ 6 ~ 1.0000+ 7	6.7792- 4	7.1781- 4	1.7321- 4	6.1309- 4	5.9814- 4	6.4590- 4	5.7333- 4	4.1834- 4	6.5236- 4	6.1774- 4	4.0098- 4	1.7148+ 0	1.7221+ 0
1.0000+ 7 ~ 1.5000+ 7	3.5019- 5	4.2046- 5	8.5331- 6	3.3049- 5	3.2628- 5	3.9893- 5	3.1935- 5	3.1691- 5	3.6349- 5	3.9049- 5	3.1140- 5	1.7104+ 0	1.7108+ 0

TABLE A2.27

Mo-95

MATERIAL =1423 — CROSS SECTION — MO-95

ENERGY	1 ST L Q=-2.0394-1	2 ND L Q=-7.6583-1	3 RD L Q=-7.8620-1	4 TH L Q=-8.2065-1	5 TH L Q=-9.4780-1	6 TH L Q=-1.0391+0	7 TH L Q=-1.0590+0	8 TH L Q=-1.0741+0	9 TH L Q=-1.2225+0	10 TH L Q=-1.3100+0	11 TH L Q=-1.3760+0	CONT. L Q=-1.6200+0	INELA Q=-2.0394-1
2.0000+ 5 ~ 3.0000+ 5	2.0245- 1												2.0245- 1
3.0000+ 5 ~ 4.0000+ 5	5.0067- 1												5.0067- 1
4.0000+ 5 ~ 5.0000+ 5	6.1452- 1												6.1452- 1
5.0000+ 5 ~ 6.0000+ 5	6.4203- 1												6.4203- 1
6.0000+ 5 ~ 8.0000+ 5	6.2592- 1	4.2596- 3	2.7972- 5										6.3021- 1
8.0000+ 5 ~ 1.0000+ 6	5.1045- 1	2.5764- 1	4.1274- 2	6.8137- 2	6.6017- 3								8.8411- 1
1.0000+ 6 ~ 1.5000+ 6	2.9945- 1	3.3329- 1	7.0188- 2	1.5768- 1	1.8999- 1	2.9990- 2	1.0722- 1	1.1301- 1	3.4806- 2	4.0027- 3	3.5780- 3		1.3444+ 0
1.5000+ 6 ~ 2.0000+ 6	1.7183- 1	2.2509- 1	5.4331- 2	1.1899- 1	1.9817- 1	4.4004- 2	1.5679- 1	1.8075- 1	1.3000- 1	3.0360- 2	5.3919- 2	7.1835- 2	1.6256+ 0
2.0000+ 6 ~ 3.0000+ 6	9.4463- 2	1.1730- 1	3.5846- 2	7.1053- 2	1.0152- 1	3.0907- 2	9.0530- 2	1.0106- 1	8.2892- 2	2.6015- 2	5.1743- 2	7.7823- 1	1.7777+ 0
3.0000+ 6 ~ 4.0000+ 6	3.9620- 2	4.9164- 2	1.7073- 2	3.2084- 2	4.3637- 2	1.5302- 2	3.9608- 2	4.3404- 2	3.6888- 2	1.3455- 2	2.5080- 2	1.3695+ 0	1.8174+ 0
4.0000+ 6 ~ 5.0000+ 6	1.6462- 2	2.1091- 2	7.3036- 3	1.3714- 2	1.9196- 2	6.6709- 3	1.7207- 2	1.8989- 2	1.6223- 2	6.0121- 3	1.1202- 2	1.6203+ 0	1.8171+ 0
5.0000+ 6 ~ 6.0000+ 6	5.3458- 3	7.4062- 3	2.5463- 3	4.7731- 3	7.1280- 3	2.4266- 3	6.2142- 3	6.9658- 3	6.0167- 3	2.3029- 3	4.2888- 3	1.7338+ 0	1.8067+ 0
6.0000+ 6 ~ 8.0000+ 6	2.1122- 3	2.9521- 3	1.0094- 3	1.8946- 3	2.8596- 3	9.6365- 4	2.4756- 3	2.7832- 3	2.3997- 3	9.1618- 4	1.7088- 3	1.7514+ 0	1.7805+ 0
8.0000+ 6 ~ 1.0000+ 7	1.4131- 4	2.1845- 4	7.0184- 5	1.3374- 4	2.2652- 4	6.8428- 5	1.8203- 4	2.1142- 4	1.7879- 4	6.6450- 5	1.2606- 4	1.7225+ 0	1.7247+ 0
1.0000+ 7 ~ 1.5000+ 7	8.4460- 6	1.3440- 5	4.2199- 6	8.0759- 6	1.4266- 5	4.1460- 6	1.1108- 5	1.3144- 5	1.0983- 5	4.0700- 6	7.7733- 6	1.7236+ 0	1.7237+ 0

TABLE A2.28

Mo-96

MATERIAL =1424 — CROSS SECTION — MO-96

ENERGY	1 ST L Q=-7.7830-1	2 ND L Q=-1.1479+0	3 RD L Q=-1.4978+0	4 TH L Q=-1.6260+0	5 TH L Q=-1.6280+0	6 TH L Q=-1.8695+0	7 TH L Q=-1.9783+0	8 TH L Q=-2.0956+0	9 TH L Q=-2.2190+0	10 TH L Q=-2.2345+0	11 TH L Q=-2.4262+0	CONT. L Q=-2.5410+0	INELA Q=-7.7830-1
6.0000+ 5 ~ 8.0000+ 5	3.0678- 3												3.0678- 3
8.0000+ 5 ~ 1.0000+ 6	4.8930- 1												4.8930- 1
1.0000+ 6 ~ 1.5000+ 6	8.8028- 1	9.0598- 2											9.7088- 1
1.5000+ 6 ~ 2.0000+ 6	6.9941- 1	1.9254- 1	2.3958- 1	1.2680- 1	6.0908- 2	5.5198- 3	1.2816- 6						1.3248+ 0
2.0000+ 6 ~ 3.0000+ 6	3.6913- 1	1.1231- 1	2.6504- 1	2.4103- 1	1.1754- 1	8.2131- 2	1.0817- 1	1.1050- 1	3.7227- 2	6.5161- 2	2.7781- 2	5.4435- 2	1.6101+ 0
3.0000+ 6 ~ 4.0000+ 6	1.5933- 1	4.7168- 2	1.2567- 1	1.1972- 1	7.0515- 2	6.1351- 2	8.7257- 2	9.8582- 2	4.9216- 2	9.7179- 2	6.6085- 2	7.1112- 1	1.7577+ 0
4.0000+ 6 ~ 5.0000+ 6	5.3921- 2	1.4955- 2	4.5193- 2	4.3559- 2	3.3714- 2	3.0636- 2	3.7250- 2	3.7407- 2	2.6210- 2	5.2306- 2	3.0833- 2	1.3534+ 0	1.8032+ 0
5.0000+ 6 ~ 6.0000+ 6	1.8298- 2	4.9740- 3	1.5908- 2	1.5493- 2	1.3994- 2	1.3083- 2	1.4711- 2	1.3969- 2	1.1797- 2	1.8648- 2	1.3009- 2	1.6556+ 0	1.8324+ 0
6.0000+ 6 ~ 8.0000+ 6	4.7928- 3	1.3118- 3	4.2618- 3	4.1687- 3	4.1266- 3	3.9053- 3	4.1771- 3	3.8348- 3	3.5963- 3	4.6332- 3	3.8079- 3	1.7537+ 0	1.8039+ 0
8.0000+ 6 ~ 1.0000+ 7	4.7336- 4	1.2821- 4	4.4311- 4	4.3704- 4	4.9337- 4	4.7719- 4	4.7429- 4	4.1326- 4	4.5258- 4	4.6183- 4	4.4479- 4	1.7245+ 0	1.7303+ 0
1.0000+ 7 ~ 1.5000+ 7	2.2235- 5	5.6078- 6	2.1311- 5	2.1140- 5	2.6087- 5	2.5617- 5	2.4378- 5	2.0495- 5	2.4928- 5	2.2986- 5	2.3568- 5	1.7368+ 0	1.7372+ 0

TABLE A2.29

Mo-97

MATERIAL =1425 CROSS SECTION MO-97

ENERGY	1 ST L Q=-4.8090-1	2 ND L Q=-6.5820-1	3 RD L Q=-6.7960-1	4 TH L Q=-7.1900-1	5 TH L Q=-7.2110-1	6 TH L Q=-8.8800-1	7 TH L Q=-1.0246+0	8 TH L Q=-1.0926+0	9 TH L Q=-1.1167+0	10 TH L Q=-1.2688+0	11 TH L Q=-1.2845+0	CONT. L Q=-1.5400+0	INELA Q=-4.8090-1
4.0000+ 5 ~ 5.0000+ 5	2.6058- 3												2.6058- 3
5.0000+ 5 ~ 6.0000+ 5	1.6991- 1												1.6991- 1
6.0000+ 5 ~ 8.0000+ 5	3.6798- 1	1.2257- 1	1.7222- 2	2.8990- 2	1.5672- 2								5.5244- 1
8.0000+ 5 ~ 1.0000+ 6	3.1047- 1	3.9500- 1	7.2989- 2	2.5514- 1	1.4462- 1	7.2866- 3							1.1855+ 0
1.0000+ 6 ~ 1.5000+ 6	2.0780- 1	3.4911- 1	6.9838- 2	2.7464- 1	1.6117- 1	4.6240- 2	1.3597- 1	4.8820- 2	8.4773- 2	2.6307- 2	1.1815- 2		1.4198+ 0
1.5000+ 6 ~ 2.0000+ 6	1.3673- 1	2.1062- 1	5.5729- 2	1.8170- 1	1.1846- 1	4.7714- 2	1.6780- 1	9.0181- 2	1.4266- 1	1.2714- 1	7.0409- 2	1.5904- 1	1.6646+ 0
2.0000+ 6 ~ 3.0000+ 6	6.8376- 2	9.3479- 2	3.1666- 2	8.4833- 2	6.1056- 2	2.8229- 2	7.8914- 2	5.0384- 2	6.6452- 2	6.9510- 2	4.5159- 2	1.0039+ 0	1.8150+ 0
3.0000+ 6 ~ 4.0000+ 6	2.5872- 2	3.5722- 2	1.2772- 2	3.2181- 2	2.3791- 2	1.1738- 2	3.1107- 2	2.0412- 2	2.7651- 2	2.8031- 2	1.8705- 2	1.5092+ 0	1.8426+ 0
4.0000+ 6 ~ 5.0000+ 6	1.0228- 2	1.4324- 2	5.0981- 3	1.2852- 2	9.4956- 3	4.7395- 3	1.2681- 2	8.3197- 3	1.1533- 2	1.1593- 2	7.7272- 3	1.7061+ 0	1.8430+ 0
5.0000+ 6 ~ 6.0000+ 6	2.8822- 3	4.2139- 3	1.4793- 3	3.7355- 3	2.7545- 3	1.4217- 3	3.9091- 3	2.5626- 3	3.7775- 3	3.7145- 3	2.4673- 3	1.7858+ 0	1.8288+ 0
6.0000+ 6 ~ 8.0000+ 6	1.1146- 3	1.6372- 3	5.7217- 4	1.4486- 3	1.0667- 3	5.5055- 4	1.5224- 3	9.9451- 4	1.4779- 3	1.4488- 3	9.5850- 4	1.7756+ 0	1.7924+ 0
8.0000+ 6 ~ 1.0000+ 7	5.4577- 5	8.6388- 5	2.8116- 5	7.4179- 5	5.3442- 5	2.7579- 5	8.3274- 5	5.1548- 5	8.6348- 5	8.1047- 5	5.0501- 5	1.7348+ 0	1.7357+ 0
1.0000+ 7 ~ 1.5000+ 7	2.9315- 6	4.7584- 6	1.5081- 6	4.0141- 6	2.8809- 6	1.4859- 6	4.6329- 6	2.8068- 6	4.9145- 6	4.5533- 6	2.7702- 6	1.7502+ 0	1.7503+ 0

TABLE A2.30

Mo-98

MATERIAL =1426 CROSS SECTION MO-98

ENERGY	1 ST L Q=-7.3490-1	2 ND L Q=-7.8742-1	3 RD L Q=-1.4323+0	4 TH L Q=-1.5101+0	5 TH L Q=-1.7585+0	6 TH L Q=-1.9650+0	7 TH L Q=-2.0176+0	8 TH L Q=-2.1049+0	9 TH L Q=-2.2069+0	10 TH L Q=-2.2240+0	11 TH L Q=-2.3334+0	CONT. L Q=-2.5063+0	INELA Q=-7.3490-1
6.0000+ 5 ~ 8.0000+ 5	2.3506- 2	3.7770- 4											2.3884- 2
8.0000+ 5 ~ 1.0000+ 6	2.5536- 1	3.5482- 1											6.1017- 1
1.0000+ 6 ~ 1.5000+ 6	3.2985- 1	7.7155- 1	5.6259- 3										1.1070+ 0
1.5000+ 6 ~ 2.0000+ 6	2.4153- 1	6.6328- 1	3.0480- 1	1.0573- 1	4.8816- 2	6.9452- 5							1.3642+ 0
2.0000+ 6 ~ 3.0000+ 6	1.1882- 1	3.5470- 1	2.6422- 1	1.3645- 1	1.9942- 1	4.4019- 2	9.3975- 2	1.0089- 1	7.8987- 2	4.0010- 2	5.1436- 2	6.8431- 2	1.5940+ 0
3.0000+ 6 ~ 4.0000+ 6	4.5002- 2	1.4213- 1	1.1503- 1	7.2160- 2	1.0142- 1	3.0275- 2	9.0061- 2	8.7421- 2	8.3133- 2	4.8016- 2	7.7427- 2	7.5870- 1	1.7676+ 0
4.0000+ 6 ~ 5.0000+ 6	1.4133- 2	4.6557- 2	3.9923- 2	3.0673- 2	3.6355- 2	1.0399- 2	4.4897- 2	3.2398- 2	3.1220- 2	2.2741- 2	2.9758- 2	1.4140+ 0	1.8180+ 0
5.0000+ 6 ~ 6.0000+ 6	4.3975- 3	1.4762- 2	1.3011- 2	1.1625- 2	1.2155- 2	3.3679- 3	1.4862- 2	1.1243- 2	1.0971- 2	9.4367- 3	1.0628- 2	1.7086+ 0	1.8510+ 0
6.0000+ 6 ~ 8.0000+ 6	1.0740- 3	3.6171- 3	3.2449- 3	3.1797- 3	3.0590- 3	8.4572- 4	3.5107- 3	2.8659- 3	2.8101- 3	2.6717- 3	2.7415- 3	1.7787+ 0	1.8155+ 0
8.0000+ 6 ~ 1.0000+ 7	8.1409- 5	2.9110- 4	2.7473- 4	3.0806- 4	2.6519- 4	7.2644- 5	2.8620- 4	2.5423- 4	2.5087- 4	2.7826- 4	2.4660- 4	1.7386+ 0	1.7420+ 0
1.0000+ 7 ~ 1.5000+ 7	2.8831- 6	1.1215- 5	1.0796- 5	1.3250- 5	1.0576- 5	2.6992- 6	1.1627- 5	1.0335- 5	1.0264- 5	1.2554- 5	1.0177- 5	1.7624+ 0	1.7626+ 0

TABLE A2.31

Mo-100

MATERIAL =1427 CROSS SECTION MO-100

ENERGY	1 ST L Q=-5.3560-1	2 ND L Q=-6.9440-1	3 RD L Q=-1.0637+0	4 TH L Q=-1.1361+0	5 TH L Q=-1.4633+0	6 TH L Q=-1.7657+0	7 TH L Q=-1.7704+0	8 TH L Q=-1.9081+0	9 TH L Q=-2.0330+0	10 TH L Q=-2.0400+0	11 TH L Q=-2.1014+0	CONT. L Q=-2.6700+0	INELA Q=-5.3560-1
5.0000+ 5 ~ 6.0000+ 5	1.1838- 1												1.1838- 1
6.0000+ 5 ~ 8.0000+ 5	5.9318- 1	4.1948- 2											6.3513- 1
8.0000+ 5 ~ 1.0000+ 6	8.5125- 1	2.6539- 1											1.1166+ 0
1.0000+ 6 ~ 1.5000+ 6	7.2832- 1	2.7636- 1	2.3961- 1	5.7470- 2	5.7834- 4								1.3023+ 0
1.5000+ 6 ~ 2.0000+ 6	5.2991- 1	1.8761- 1	3.9427- 1	1.5442- 1	1.9645- 1	2.8247- 2	2.4878- 2	3.3725- 3					1.5191+ 0
2.0000+ 6 ~ 3.0000+ 6	3.0678- 1	9.6040- 2	2.4811- 1	1.3305- 1	2.0271- 1	1.2889- 1	1.2879- 1	1.0553- 1	3.1922- 2	9.3036- 2	4.2014- 2	3.9584- 2	1.6536+ 0
3.0000+ 6 ~ 4.0000+ 6	1.1828- 1	3.5744- 2	1.0101- 1	6.4683- 2	8.7081- 2	6.1887- 2	6.7076- 2	7.6258- 2	2.2753- 2	6.7850- 2	3.7004- 2	8.4708- 1	1.7935+ 0
4.0000+ 6 ~ 5.0000+ 6	2.7999- 2	8.1271- 3	2.4698- 2	1.9579- 2	2.2182- 2	1.5119- 2	1.9425- 2	2.7169- 2	5.6475- 3	1.8364- 2	1.3194- 2	1.5760+ 0	1.8511+ 0
5.0000+ 6 ~ 6.0000+ 6	6.9232- 3	2.0014- 3	6.2549- 3	5.7148- 3	5.7544- 3	3.8762- 3	5.5105- 3	6.5861- 3	1.4828- 3	5.0561- 3	4.2947- 3	1.8029+ 0	1.8788+ 0
6.0000+ 6 ~ 8.0000+ 6	1.4985- 3	4.3363- 4	1.3866- 3	1.3865- 3	1.2898- 3	8.5912- 4	1.2989- 3	1.3948- 3	3.3369- 4	1.1531- 3	1.0916- 3	1.8132+ 0	1.8308+ 0
8.0000+ 6 ~ 1.0000+ 7	9.6326- 5	2.6462- 5	9.2574- 5	1.0438- 4	8.9234- 5	5.9929- 5	9.7731- 5	9.2743- 5	2.3490- 5	8.3519- 5	9.1992- 5	1.7551+ 0	1.7564+ 0
1.0000+ 7 ~ 1.5000+ 7	3.5306- 6	8.9340- 7	3.4254- 6	4.2214- 6	3.3438- 6	2.2253- 6	3.8726- 6	3.5994- 6	8.3024- 7	3.2223- 6	3.9341- 6	1.7869+ 0	1.7870+ 0

TABLE A2.32 MATERIAL =1731 CROSS SECTION TA-181

Ta-181

ENERGY	1 ST L Q=-6.2100-3	2 ND L Q=-1.3625-1	3 RD L Q=-1.5870-1	4 TH L Q=-3.0140-1	5 TH L Q=-3.3900-1	6 TH L Q=-4.8210-1	7 TH L Q=-4.9510-1	8 TH L Q=-5.4800-1	9 TH L Q=-6.1510-1	10 TH L Q=-6.1900-1	11 TH L Q=-7.1660-1	CONT. L Q=-7.8000-1	INELA Q=-6.2100-3
6.0000+ 3 ~ 8.0000+ 3	2.4201- 2												2.4201- 2
8.0000+ 3 ~ 1.0000+ 4	5.0443- 2												5.0443- 2
1.0000+ 4 ~ 1.5000+ 4	7.7440- 2												7.7440- 2
1.5000+ 4 ~ 2.0000+ 4	1.0677- 1												1.0677- 1
2.0000+ 4 ~ 3.0000+ 4	1.4052- 1												1.4052- 1
3.0000+ 4 ~ 4.0000+ 4	1.7672- 1												1.7672- 1
4.0000+ 4 ~ 5.0000+ 4	2.0527- 1												2.0527- 1
5.0000+ 4 ~ 6.0000+ 4	2.2911- 1												2.2911- 1
6.0000+ 4 ~ 8.0000+ 4	2.5930- 1												2.5930- 1
8.0000+ 4 ~ 1.0000+ 5	2.9331- 1												2.9331- 1
1.0000+ 5 ~ 1.5000+ 5	3.3729- 1	2.3856- 2											3.6115- 1
1.5000+ 5 ~ 2.0000+ 5	3.4480- 1	3.1832- 1	1.8084- 2										6.8121- 1
2.0000+ 5 ~ 3.0000+ 5	3.5883- 1	3.9922- 1	6.8449- 2										8.2650- 1
3.0000+ 5 ~ 4.0000+ 5	3.6452- 1	4.3921- 1	1.0154- 1	7.7858- 2	1.9783- 3								9.8510- 1
4.0000+ 5 ~ 5.0000+ 5	3.5972- 1	4.7184- 1	1.2399- 1	1.4320- 1	1.3088- 2	8.4226- 3	1.0289- 4						1.1204+ 0
5.0000+ 5 ~ 6.0000+ 5	3.4269- 1	4.7825- 1	1.3781- 1	1.7657- 1	2.4074- 2	1.4585- 1	2.6603- 2	4.3033- 4					1.3323+ 0
6.0000+ 5 ~ 8.0000+ 5	3.1925- 1	4.7391- 1	1.4925- 1	2.1724- 1	3.8581- 2	1.9876- 1	5.1817- 2	4.6928- 3	1.4042- 2	3.9354- 2	3.1864- 4	4.3403- 4	1.5076+ 0
8.0000+ 5 ~ 1.0000+ 6	2.7322- 1	4.1166- 1	1.4635- 1	2.2657- 1	5.0441- 2	2.1350- 1	7.3583- 2	1.0294- 2	2.8185- 2	7.7793- 2	5.3840- 3	1.8786- 1	1.7048+ 0
1.0000+ 6 ~ 1.5000+ 6	1.6441- 1	2.2811- 1	1.0204- 1	1.4510- 1	4.6211- 2	1.4190- 1	6.2444- 2	1.4652- 2	2.8258- 2	6.8336- 2	1.3864- 2	9.9531- 1	2.0106+ 0
1.5000+ 6 ~ 2.0000+ 6	6.6949- 2	7.5928- 2	4.9013- 2	5.5033- 2	2.8861- 2	5.3497- 2	5.0097- 2	1.3033- 2	1.4212- 2	3.1272- 2	1.1464- 2	1.7824+ 0	2.2117+ 0
2.0000+ 6 ~ 3.0000+ 6	2.1309- 2	2.1204- 2	1.7305- 2	1.6678- 2	1.1910- 2	1.5360- 2	1.0607- 2	6.6140- 3	4.6783- 3	9.6916- 3	5.2828- 3	2.1696+ 0	2.3102+ 0
3.0000+ 6 ~ 4.0000+ 6	4.6133- 3	4.4340- 3	4.0509- 3	3.7931- 3	3.1188- 3	3.2210- 3	2.7736- 3	2.0236- 3	1.0835- 3	2.1403- 3	1.7009- 3	2.3702+ 0	2.4031+ 0
4.0000+ 6 ~ 5.0000+ 6	8.6159- 4	8.5321- 4	7.9210- 4	7.7267- 4	6.5534- 4	6.2160- 4	6.1861- 4	4.7541- 4	2.1807- 4	4.2352- 4	4.3553- 4	2.4693+ 0	2.4761+ 0
5.0000+ 6 ~ 6.0000+ 6	1.5045- 4	1.5673- 4	1.4274- 4	1.4754- 4	1.2379- 4	1.1396- 4	1.2539- 4	9.6484- 5	4.0811- 5	7.8725- 5	9.6219- 5	2.5180+ 0	2.5192+ 0
6.0000+ 6 ~ 8.0000+ 6	1.6237- 5	1.7837- 5	1.5727- 5	1.7229- 5	1.4061- 5	1.3114- 5	1.5266- 5	1.1486- 5	4.7561- 6	9.1598- 6	1.2424- 5	2.4780+ 0	2.4781+ 0
8.0000+ 6 ~ 1.0000+ 7	9.2238- 7	1.0161- 6	9.1301- 7	1.0045- 6	8.4125- 7	7.5250- 7	9.2203- 7	7.1870- 7	2.7270- 7	5.2767- 7	7.8764- 7	1.4681+ 0	1.4681+ 0
1.0000+ 7 ~ 1.5000+ 7	5.9711- 9	6.1883- 9	6.0634- 9	6.2450- 9	5.7846- 9	4.5413- 9	5.9081- 9	5.1950- 9	1.6516- 9	3.1915- 9	5.2657- 9	2.8837- 1	2.8837- 1

TABLE A2.33 MATERIAL =1901 CROSS SECTION TH-232

Th-232

ENERGY	1 ST L Q=-4.9750-2	2 ND L Q=-1.6240-1	3 RD L Q=-3.3400-1	4 TH L Q=-5.5780-1	5 TH L Q=-7.3010-1	6 TH L Q=-7.7410-1	7 TH L Q=-7.8520-1	8 TH L Q=-8.2810-1	9 TH L Q=-8.7300-1	10 TH L Q=-1.0230+0	11 TH L Q=-1.0450+0	CONT. L Q=-1.2000+0	INELA Q=-4.9750-2
4.0000+ 4 ~ 5.0000+ 4	4.9804- 7												4.9804- 7
5.0000+ 4 ~ 6.0000+ 4	4.1467- 2												4.1467- 2
6.0000+ 4 ~ 8.0000+ 4	1.4628- 1												1.4628- 1
8.0000+ 4 ~ 1.0000+ 5	2.5948- 1												2.5948- 1
1.0000+ 5 ~ 1.5000+ 5	3.9603- 1												3.9603- 1
1.5000+ 5 ~ 2.0000+ 5	5.2261- 1	9.4556- 4											5.2356- 1
2.0000+ 5 ~ 3.0000+ 5	6.2582- 1	9.8808- 3											6.3570- 1
3.0000+ 5 ~ 4.0000+ 5	6.9635- 1	3.3110- 2	1.8927- 6										7.2947- 1
4.0000+ 5 ~ 5.0000+ 5	7.3161- 1	6.5106- 2	1.1351- 4										7.9683- 1
5.0000+ 5 ~ 6.0000+ 5	7.5003- 1	1.0433- 1	5.8249- 4	2.2028- 8									8.5493- 1
6.0000+ 5 ~ 8.0000+ 5	7.5554- 1	1.6972- 1	3.0984- 3	9.9661- 7	9.1933- 3	2.0518- 3	6.2579- 4						9.4023- 1
8.0000+ 5 ~ 1.0000+ 6	6.6987- 1	2.3161- 1	1.0464- 2	1.6901- 5	8.5209- 2	1.2383- 1	1.1239- 1	6.2628- 8	9.4763- 3				1.2429+ 0
1.0000+ 6 ~ 1.5000+ 6	5.1690- 1	2.6724- 1	3.0707- 2	2.7038- 4	9.9345- 2	2.2466- 1	2.1971- 1	3.1400- 7	7.8560- 2	1.6313- 3	7.3533- 2	1.0004- 1	1.6530+ 0
1.5000+ 6 ~ 2.0000+ 6	2.8101- 1	1.8710- 1	3.8629- 2	8.8350- 4	5.9746- 2	1.6298- 1	1.6121- 1	2.0031- 6	8.6556- 2	7.6364- 3	7.6458- 2	9.9280- 1	2.1160+ 0
2.0000+ 6 ~ 3.0000+ 6	7.4736- 2	5.6300- 2	1.6325- 2	9.7751- 4	1.7808- 2	5.3569- 2	5.3193- 2	1.1309- 5	3.5978- 2	7.7180- 3	2.3662- 2	2.0637+ 0	2.4280+ 0
3.0000+ 6 ~ 4.0000+ 6	9.9751- 3	8.3739- 3	3.1255- 3	4.1820- 4	2.5646- 3	8.4747- 3	8.4456- 3	1.5862- 5	6.7674- 3	2.2619- 3	3.6655- 3	2.4001+ 0	2.4588+ 0
4.0000+ 6 ~ 5.0000+ 6	9.3021- 4	8.7350- 4	4.1159- 4	9.9671- 5	2.4076- 4	8.5990- 4	8.5855- 4	9.5567- 6	7.7894- 4	3.4101- 4	3.8299- 4	2.4152+ 0	2.4215+ 0
5.0000+ 6 ~ 6.0000+ 6	8.0769- 5	8.2050- 5	4.6787- 5	1.6795- 5	2.0981- 5	7.7128- 5	7.7059- 5	3.4707- 6	7.6163- 5	4.0747- 5	3.8778- 5	2.4099+ 0	2.4105+ 0
6.0000+ 6 ~ 8.0000+ 6	4.0442- 6	4.4614- 6	3.1117- 6	1.5419- 6	1.0302- 6	3.8276- 6	3.8241- 6	5.3288- 7	4.1052- 6	2.7009- 6	2.1553- 6	1.8553+ 0	1.8553+ 0
8.0000+ 6 ~ 1.0000+ 7	2.1959- 8	2.7445- 8	2.3864- 8	1.5262- 8	5.3332- 9	2.0929- 8	2.0911- 8	7.1274- 9	2.5712- 8	2.1849- 8	1.1782- 8	4.4912- 1	4.4912- 1
1.0000+ 7 ~ 1.5000+ 7	5.5355-11	7.4037-11	7.0616-11	4.9520-11	1.3218-11	5.3475-11	5.3443-11	2.5359-11	7.1121-11	6.7446-11	2.9206-11	2.3221- 1	2.3221- 1
1.5000+ 7 ~ 2.0000+ 7	1.0994-13	1.5768-13	1.7092-13	1.5352-13	2.5612-14	1.0796-13	1.0793-13	1.1246-13	1.5445-13	1.6648-13	6.1128-14	8.6572- 1	8.6572- 1

TABLE A2.34

Pa-233

MATERIAL =1911 CROSS SECTION PA-233

ENERGY	1 ST L Q=-6.7000-3	2 ND L Q=-5.7100-2	3 RD L Q=-7.1000-2	4 TH L Q=-8.6500-2	5 TH L Q=-9.4700-2	6 TH L Q=-1.0370-1	7 TH L Q=-1.0900-1	8 TH L Q=-1.6330-1	9 TH L Q=-1.6920-1	10 TH L Q=-1.8000-1	11 TH L Q=-2.0170-1	CONT. L Q=-4.0000-1	INELA Q=-6.7000-3
6.0000+ 3 ~ 8.0000+ 3	2.9842- 2												2.9842- 2
8.0000+ 3 ~ 1.0000+ 4	1.5234- 1												1.5234- 1
1.0000+ 4 ~ 1.5000+ 4	2.0489- 1												2.0489- 1
1.5000+ 4 ~ 2.0000+ 4	1.9220- 1												1.9220- 1
2.0000+ 4 ~ 3.0000+ 4	1.7280- 1												1.7280- 1
3.0000+ 4 ~ 4.0000+ 4	1.6589- 1												1.6589- 1
4.0000+ 4 ~ 5.0000+ 4	1.7079- 1												1.7079- 1
5.0000+ 4 ~ 6.0000+ 4	1.7926- 1	1.8988- 3											1.8116- 1
6.0000+ 4 ~ 8.0000+ 4	2.0559- 1	3.8650- 2	2.8086- 2										2.7233- 1
8.0000+ 4 ~ 1.0000+ 5	2.2659- 1	6.8445- 2	1.6269- 1	6.5379- 2	9.1407- 3								5.3224- 1
1.0000+ 5 ~ 1.5000+ 5	2.1250- 1	8.9623- 2	2.0520- 1	1.7267- 1	1.3155- 1	3.9609- 2	3.1139- 3						8.5426- 1
1.5000+ 5 ~ 2.0000+ 5	1.9835- 1	1.1183- 1	2.2566- 1	2.1426- 1	1.9588- 1	9.1669- 2	1.1404- 2	1.7334- 4	1.5673- 2	1.5687- 3			1.0665+ 0
2.0000+ 5 ~ 3.0000+ 5	1.7094- 1	1.2197- 1	2.1685- 1	2.1255- 1	2.0305- 1	1.0384- 1	2.2291- 2	1.7394- 3	7.2151- 2	1.7159- 2	6.9705- 2		1.3054+ 0
3.0000+ 5 ~ 4.0000+ 5	1.5442- 1	1.2676- 1	2.0539- 1	2.0043- 1	1.9779- 1	1.0805- 1	3.4037- 2	5.2601- 3	9.3055- 2	2.9849- 2	1.2559- 1		1.5544+ 0
4.0000+ 5 ~ 5.0000+ 5	1.3191- 1	1.1780- 1	1.8098- 1	1.7471- 1	1.7382- 1	1.0042- 1	3.8202- 2	8.2355- 3	8.9825- 2	3.4459- 2	1.2823- 1	2.8709- 2	1.5429+ 0
5.0000+ 5 ~ 6.0000+ 5	1.0914- 1	1.0566- 1	1.5509- 1	1.4776- 1	1.4651- 1	9.0315- 2	3.9305- 2	1.0974- 2	7.9752- 2	3.6325- 2	1.1719- 1	1.1252- 1	1.4910+ 0
6.0000+ 5 ~ 8.0000+ 5	8.8489- 2	9.4326- 2	1.3118- 1	1.2221- 1	1.2000- 1	7.9891- 2	3.9483- 2	1.4351- 2	6.7728- 2	3.8048- 2	1.0186- 1	2.8411- 1	1.5078+ 0
8.0000+ 5 ~ 1.0000+ 6	5.9034- 2	7.1549- 2	9.2726- 2	8.2352- 2	7.9342- 2	5.8143- 2	3.2595- 2	1.5754- 2	4.5805- 2	3.4083- 2	7.0563- 2	4.9919- 1	1.3917+ 0
1.0000+ 6 ~ 1.5000+ 6	3.8229- 2	5.4878- 2	6.5239- 2	5.1753- 2	4.8320- 2	3.9796- 2	2.5156- 2	1.7323- 2	2.8045- 2	3.1225- 2	4.4453- 2	9.4435- 1	1.5659+ 0
1.5000+ 6 ~ 2.0000+ 6	1.7293- 2	2.9308- 2	3.2388- 2	2.1621- 2	1.9416- 2	1.8125- 2	1.2704- 2	1.2289- 2	1.1221- 2	1.9614- 2	1.8401- 2	1.3926+ 0	1.6879+ 0
2.0000+ 6 ~ 3.0000+ 6	4.2497- 3	7.8614- 3	8.4137- 3	5.1788- 3	4.5083- 3	4.6228- 3	3.4847- 3	3.8485- 3	2.5869- 3	5.8146- 3	4.3566- 3	1.5587+ 0	1.6352+ 0
3.0000+ 6 ~ 4.0000+ 6	5.2023- 4	1.0294- 3	1.0727- 3	7.0731- 4	5.9346- 4	6.7373- 4	5.5023- 4	5.6858- 4	3.3568- 4	8.1606- 4	5.8003- 4	1.4438+ 0	1.4544+ 0
4.0000+ 6 ~ 5.0000+ 6	4.0474- 5	8.7703- 5	8.7518- 5	7.1015- 5	5.6804- 5	7.2738- 5	6.5043- 5	5.6554- 5	3.1377- 5	7.4553- 5	5.5843- 5	1.3699+ 0	1.3710+ 0
5.0000+ 6 ~ 6.0000+ 6	3.5632- 6	8.5053- 6	8.0815- 6	7.5769- 6	5.8463- 6	8.1645- 6	7.7767- 6	6.3981- 6	3.1707- 6	7.7050- 6	5.7700- 6	1.3650+ 0	1.3651+ 0
6.0000+ 6 ~ 8.0000+ 6	2.2086- 7	5.7608- 7	5.2418- 7	4.9928- 7	3.7709- 7	5.5459- 7	5.4852- 7	4.9248- 7	2.0243- 7	5.5253- 7	3.7351- 7	1.1835+ 0	1.1835+ 0
8.0000+ 6 ~ 1.0000+ 7	3.0037- 9	8.5674- 9	7.4796- 9	6.8201- 9	5.0459- 9	7.8355- 9	8.1015- 9	8.2548- 9	2.6755- 9	8.7127- 9	5.0075- 9	7.3980- 1	7.3980- 1
1.0000+ 7 ~ 1.5000+ 7	2.9512-11	8.8384-11	7.5470-11	7.0966-11	5.1356-11	8.4278-11	9.1047-11	9.1852-11	2.6960-11	9.3203-11	5.1102-11	3.9554- 1	3.9554- 1

TABLE A2.35

U-234

MATERIAL =1921 CROSS SECTION U -234

ENERGY	1 ST L Q=-4.4000-2	2 ND L Q=-1.4400-1	3 RD L Q=-2.9700-1	4 TH L Q=-4.9900-1	5 TH L Q=-7.9000-1	6 TH L Q=-8.1100-1	7 TH L Q=-8.4960-1	8 TH L Q=-8.5160-1	9 TH L Q=-9.2690-1	10 TH L Q=-9.4800-1	11 TH L Q=-9.6500-1	CONT. L Q=-1.0600+0	INELA Q=-4.4000-2
4.0000+ 4 ~ 5.0000+ 4	1.1457- 2												1.1457- 2
5.0000+ 4 ~ 6.0000+ 4	7.0395- 2												7.0395- 2
6.0000+ 4 ~ 8.0000+ 4	1.5691- 1												1.5691- 1
8.0000+ 4 ~ 1.0000+ 5	2.5323- 1												2.5323- 1
1.0000+ 5 ~ 1.5000+ 5	3.7610- 1	4.8468- 6											3.7610- 1
1.5000+ 5 ~ 2.0000+ 5	5.0167- 1	2.0488- 3											5.0372- 1
2.0000+ 5 ~ 3.0000+ 5	6.1466- 1	1.3164- 2	4.0413- 9										6.2783- 1
3.0000+ 5 ~ 4.0000+ 5	6.7432- 1	3.9325- 2	1.2776- 5										7.1365- 1
4.0000+ 5 ~ 5.0000+ 5	6.6389- 1	6.7047- 2	1.1935- 4										7.3106- 1
5.0000+ 5 ~ 6.0000+ 5	6.2548- 1	9.3944- 2	5.7265- 4	2.0178- 8									7.2000- 1
6.0000+ 5 ~ 8.0000+ 5	5.0611- 1	1.1400- 1	2.0892- 3	9.3515- 7	3.6348- 4								6.2256- 1
8.0000+ 5 ~ 1.0000+ 6	4.2241- 1	1.4372- 1	6.7170- 3	1.3218- 5	7.8229- 2	2.7423- 2	2.1760- 2	3.4784- 2	7.6218- 3	6.3663- 4	1.0754- 3		7.4440- 1
1.0000+ 6 ~ 1.5000+ 6	3.0029- 1	1.4592- 1	1.6283- 2	1.6334- 4	1.0672- 1	4.7394- 2	6.7666- 2	1.0129- 1	8.0437- 2	2.7919- 2	5.0809- 2	1.3156- 1	1.1322+ 0
1.5000+ 6 ~ 2.0000+ 6	1.4569- 1	9.3037- 2	1.8999- 2	4.7133- 4	6.0023- 2	2.8495- 2	5.2226- 2	7.5106- 2	6.8718- 2	3.5831- 2	5.4774- 2	6.2148- 1	1.3190+ 0
2.0000+ 6 ~ 3.0000+ 6	4.8906- 2	3.4534- 2	9.0972- 3	4.7165- 4	2.0909- 2	1.0560- 2	2.0895- 2	3.0314- 2	2.8460- 2	1.7768- 2	2.4765- 2	1.0751+ 0	1.3487+ 0
3.0000+ 6 ~ 4.0000+ 6	5.6223- 3	4.5335- 3	1.6459- 3	2.2379- 4	2.7351- 3	1.4536- 3	3.3784- 3	4.7165- 3	4.5968- 3	3.5754- 3	4.4717- 3	1.2557+ 0	1.2972+ 0
4.0000+ 6 ~ 5.0000+ 6	5.1368- 4	4.6954- 4	2.2127- 4	5.6301- 5	2.8266- 4	1.3656- 4	4.0542- 4	4.7477- 4	4.7001- 4	4.1414- 4	4.8336- 4	1.2657+ 0	1.2702+ 0
5.0000+ 6 ~ 6.0000+ 6	3.7339- 5	3.9154- 5	2.4109- 5	9.6021- 6	2.2315- 5	9.5383- 6	3.6009- 5	3.4548- 5	3.4278- 5	3.4670- 5	3.7142- 5	1.1558+ 0	1.1561+ 0
6.0000+ 6 ~ 8.0000+ 6	1.8357- 6	2.0973- 6	1.4977- 6	7.2939- 7	1.1026- 6	4.5095- 7	1.8742- 6	1.6844- 6	1.6695- 6	1.8584- 6	1.8787- 6	5.3823- 1	5.3825- 1
8.0000+ 6 ~ 1.0000+ 7	1.2917- 8	1.6532- 8	1.4118- 8	8.5315- 9	7.4636- 9	3.0101- 9	1.3511- 8	1.2181- 8	1.2103- 8	1.5385- 8	1.4442- 8	3.1837- 1	3.1837- 1
1.0000+ 7 ~ 1.5000+ 7	1.7174-10	2.3106-10	2.1768-10	1.5272-10	1.0064-10	4.0357-11	1.9203-10	1.6509-10	1.6439-10	2.2095-10	2.0111-10	3.6450- 1	3.6450- 1

TABLE A2.36 MATERIAL =1922 CROSS SECTION U -235

U-235

ENERGY	1 ST L Q=-8.0000-5	2 ND L Q=-1.3100-2	3 RD L Q=-4.6200-2	4 TH L Q=-5.1700-2	5 TH L Q=-8.1700-2	6 TH L Q=-1.0300-1	7 TH L Q=-1.2930-1	8 TH L Q=-1.5040-1	9 TH L Q=-1.7000-1	10 TH L Q=-1.7140-1	11 TH L Q=-1.9700-1	CONT. L Q=-9.0000-1	INELA Q=-8.0000-5
8.0000+ 1 ~ 1.0000+ 2	1.8548- 8												1.8548- 8
1.0000+ 2 ~ 1.5000+ 2	7.2421- 8												7.2421- 8
1.5000+ 2 ~ 2.0000+ 2	1.2896- 7												1.2896- 7
2.0000+ 2 ~ 3.0000+ 2	1.8775- 7												1.8775- 7
3.0000+ 2 ~ 4.0000+ 2	2.4429- 7												2.4429- 7
4.0000+ 2 ~ 5.0000+ 2	2.8633- 7												2.8633- 7
5.0000+ 2 ~ 6.0000+ 2	3.1984- 7												3.1984- 7
6.0000+ 2 ~ 8.0000+ 2	3.5962- 7												3.5962- 7
8.0000+ 2 ~ 1.0000+ 3	4.0166- 7												4.0166- 7
1.0000+ 3 ~ 1.5000+ 3	4.5554- 7												4.5554- 7
1.5000+ 3 ~ 2.0000+ 3	5.1208- 7												5.1208- 7
2.0000+ 3 ~ 3.0000+ 3	5.7087- 7												5.7087- 7
3.0000+ 3 ~ 4.0000+ 3	6.2741- 7												6.2741- 7
4.0000+ 3 ~ 5.0000+ 3	1.3034- 6												1.3034- 6
5.0000+ 3 ~ 6.0000+ 3	3.6152- 6												3.6152- 6
6.0000+ 3 ~ 8.0000+ 3	7.5912- 6												7.5912- 6
8.0000+ 3 ~ 1.0000+ 4	1.5299- 5												1.5299- 5
1.0000+ 4 ~ 1.5000+ 4	8.7186- 5	1.7412- 3											1.8284- 3
1.5000+ 4 ~ 2.0000+ 4	2.1129- 4	1.4533- 2											1.4744- 2
2.0000+ 4 ~ 3.0000+ 4	4.0089- 4	2.7494- 2											2.7894- 2
3.0000+ 4 ~ 4.0000+ 4	7.2433- 4	4.2388- 2											4.3112- 2
4.0000+ 4 ~ 5.0000+ 4	1.1307- 3	5.4039- 2	9.4628- 3										6.4633- 2
5.0000+ 4 ~ 6.0000+ 4	1.2714- 3	5.3672- 2	7.4668- 2	2.5513- 2									1.5512- 1
6.0000+ 4 ~ 8.0000+ 4	1.7564- 3	5.9451- 2	1.3034- 1	7.2115- 2									2.6367- 1
8.0000+ 4 ~ 1.0000+ 5	2.7554- 3	7.0739- 2	1.8684- 1	1.0761- 1	5.5798- 2								4.2374- 1
1.0000+ 5 ~ 1.5000+ 5	4.8127- 3	7.5318- 2	2.3436- 1	1.3670- 1	1.3032- 1	2.8781- 2	8.5941- 3						6.1888- 1
1.5000+ 5 ~ 2.0000+ 5	7.7610- 3	7.5339- 2	2.5107- 1	1.5176- 1	1.6721- 1	7.3435- 2	6.1606- 2	4.7568- 2	2.8221- 3	1.5997- 2	1.7768- 4		8.5474- 1
2.0000+ 5 ~ 3.0000+ 5	1.2126- 2	7.1986- 2	2.3068- 1	1.4474- 1	1.6515- 1	9.7191- 2	9.1837- 2	1.0465- 1	1.9546- 2	8.3464- 2	3.0644- 2		1.0834+ 0
3.0000+ 5 ~ 4.0000+ 5	1.8078- 2	7.3021- 2	2.3317- 1	1.4003- 1	1.6473- 1	1.1950- 1	1.0685- 1	1.2318- 1	3.5735- 2	1.1514- 1	5.4465- 2		1.2930+ 0
4.0000+ 5 ~ 5.0000+ 5	2.1601- 2	7.0125- 2	2.2613- 1	1.2952- 1	1.5615- 1	1.2966- 1	1.0624- 1	1.2687- 1	4.6906- 2	1.2181- 1	6.5471- 2		1.4517+ 0
5.0000+ 5 ~ 6.0000+ 5	2.2748- 2	6.3838- 2	2.0361- 1	1.1317- 1	1.3756- 1	1.2693- 1	9.6816- 2	1.1763- 1	5.3332- 2	1.1381- 1	6.7779- 2		1.4977+ 0
6.0000+ 5 ~ 8.0000+ 5	2.3027- 2	5.7178- 2	1.7999- 1	9.6495- 2	1.1761- 1	1.2364- 1	8.5607- 2	1.0542- 1	6.1778- 2	1.0212- 1	6.8114- 2		1.5037+ 0
8.0000+ 5 ~ 1.0000+ 6	2.1488- 2	4.9288- 2	1.5939- 1	7.9996- 2	9.8335- 2	1.2136- 1	7.3041- 2	9.2697- 2	7.1499- 2	8.8631- 2	6.6977- 2	7.7662- 3	1.4715+ 0
1.0000+ 6 ~ 1.5000+ 6	1.6818- 2	3.5424- 2	1.1044- 1	5.3945- 2	6.4845- 2	8.8269- 2	5.0532- 2	6.1944- 2	5.6986- 2	6.0228- 2	4.7526- 2	3.9705- 1	1.4838+ 0
1.5000+ 6 ~ 2.0000+ 6	1.0124- 2	1.9749- 2	5.3907- 2	2.7778- 2	3.1706- 2	4.3344- 2	2.6647- 2	2.9673- 2	2.9266- 2	3.0239- 2	2.3146- 2	1.1478+ 0	1.7269+ 0
2.0000+ 6 ~ 3.0000+ 6	3.3191- 3	6.2482- 3	1.4938- 2	8.4050- 3	9.2968- 3	1.2107- 2	8.1666- 3	8.6352- 3	8.4448- 3	8.9929- 3	6.8643- 3	1.7784+ 0	1.9557+ 0
3.0000+ 6 ~ 4.0000+ 6	4.7258- 4	8.7671- 4	1.8057- 3	1.1535- 3	1.2666- 3	1.5079- 3	1.1310- 3	1.1962- 3	1.1112- 3	1.2374- 3	9.9875- 4	2.0870+ 0	2.1116+ 0
4.0000+ 6 ~ 5.0000+ 6	5.4167- 5	1.0080- 4	1.8651- 4	1.3319- 4	1.4849- 4	1.6176- 4	1.3129- 4	1.4446- 4	1.2601- 4	1.4589- 4	1.2686- 4	2.0808+ 0	2.0837+ 0
5.0000+ 6 ~ 6.0000+ 6	5.6426- 6	1.0565- 5	1.8072- 5	1.4110- 5	1.6016- 5	1.6226- 5	1.3972- 5	1.6012- 5	1.3247- 5	1.5821- 5	1.4625- 5	1.8719+ 0	1.8722+ 0
6.0000+ 6 ~ 8.0000+ 6	6.6304- 7	1.2466- 6	2.0715- 6	1.6783- 6	1.9255- 6	1.9033- 6	1.6655- 6	1.9561- 6	1.6018- 6	1.9077- 6	1.8239- 6	1.1368+ 0	1.1368+ 0
8.0000+ 6 ~ 1.0000+ 7												4.8055- 1	
1.0000+ 7 ~ 1.5000+ 7												2.5133- 1	

TABLE A2.37 MATERIAL =1923 CROSS SECTION U -238

U-238

ENERGY	1 ST L Q=-4.4700-2	2 ND L Q=-1.4800-1	3 RD L Q=-3.1000-1	4 TH L Q=-5.2000-1	5 TH L Q=-6.8000-1	6 TH L Q=-7.3200-1	7 TH L Q=-7.9000-1	8 TH L Q=-8.3800-1	9 TH L Q=-9.3900-1	10 TH L Q=-9.6800-1	11 TH L Q=-1.0060+0	CONT. L Q=-1.5000+0	INELA Q=-4.4700-2
4.0000+ 4 ~ 5.0000+ 4	2.4743- 2												2.4743- 2
5.0000+ 4 ~ 6.0000+ 4	1.6067- 1												1.6067- 1
6.0000+ 4 ~ 8.0000+ 4	3.6998- 1												3.6998- 1
8.0000+ 4 ~ 1.0000+ 5	5.8084- 1												5.8084- 1
1.0000+ 5 ~ 1.5000+ 5	7.7619- 1	1.8787- 6											7.7620- 1
1.5000+ 5 ~ 2.0000+ 5	1.0011+ 0	2.6283- 3											1.0037+ 0
2.0000+ 5 ~ 3.0000+ 5	1.2201+ 0	1.8297- 2											1.2384+ 0
3.0000+ 5 ~ 4.0000+ 5	1.3808+ 0	5.5134- 2	9.5641- 6										1.4359+ 0
4.0000+ 5 ~ 5.0000+ 5	1.4618+ 0	1.1042- 1	1.4821- 4										1.5724+ 0
5.0000+ 5 ~ 6.0000+ 5	1.5005+ 0	1.7890- 1	8.5601- 4	8.4598- 9									1.6803+ 0
6.0000+ 5 ~ 8.0000+ 5	1.4362+ 0	2.8334- 1	4.4664- 3	1.2568- 6	1.0353- 1	1.1416- 2	0.0000+ 0						1.8390+ 0
8.0000+ 5 ~ 1.0000+ 6	1.2017+ 0	3.7405- 1	1.5336- 2	1.6869- 5	3.6999- 1	1.4106- 1	0.0000+ 0	2.1517- 3	1.1806- 2	3.2643- 3			2.1194+ 0
1.0000+ 6 ~ 1.5000+ 6	7.2080- 1	3.6461- 1	4.1680- 2	3.2860- 4	3.0774- 1	2.1080- 1	1.6762- 7	2.7637- 2	1.7954- 1	1.5981- 1	5.8936- 2		2.5009+ 0
1.5000+ 6 ~ 2.0000+ 6	1.8115- 1	1.1552- 1	2.1832- 2	3.2454- 4	8.6908- 2	7.6812- 2	4.2951- 7	1.7949- 2	8.5225- 2	8.1948- 2	3.0105- 2	1.5328+ 0	2.7211+ 0
2.0000+ 6 ~ 3.0000+ 6	1.2618- 2	8.3033- 3	1.9693- 3	7.1373- 5	6.6111- 3	6.2612- 3	7.3886- 7	1.8981- 3	8.0737- 3	7.8996- 3	2.8502- 3	2.2167+ 0	2.3334+ 0
3.0000+ 6 ~ 4.0000+ 6	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	2.1180+ 0	2.1180+ 0
4.0000+ 6 ~ 5.0000+ 6	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	2.0335+ 0	2.0335+ 0
5.0000+ 6 ~ 6.0000+ 6	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	1.9325+ 0	1.9325+ 0
6.0000+ 6 ~ 8.0000+ 6	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	1.3562+ 0	1.3562+ 0
8.0000+ 6 ~ 1.0000+ 7	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	5.5050- 1	5.5050- 1
1.0000+ 7 ~ 1.5000+ 7	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	2.7750- 1	2.7750- 1
1.5000+ 7 ~ 2.0000+ 7	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	4.3800- 2	4.3800- 2

TABLE A2.38

Np-239

MATERIAL =1931 CROSS SECTION NP-239

ENERGY	1 ST L Q=-3.1140-2	2 ND L Q=-7.1120-2	3 RD L Q=-7.4670-2	4 TH L Q=-1.1766-1	5 TH L Q=-1.2300-1	6 TH L Q=-1.7305-1	7 TH L Q=-2.4140-1	8 TH L Q=-3.2000-1	9 TH L	10 TH L	11 TH L	CONT. L Q=-4.3000-1	INELA Q=-3.1140-2
3.0000+ 4 ~ 4.0000+ 4	1.0065- 1												1.0065- 1
4.0000+ 4 ~ 5.0000+ 4	2.9152- 1												2.9152- 1
5.0000+ 4 ~ 6.0000+ 4	4.0172- 1												4.0172- 1
6.0000+ 4 ~ 8.0000+ 4	5.1692- 1	8.3981- 3	1.8081- 2										5.4340- 1
8.0000+ 4 ~ 1.0000+ 5	5.6457- 1	7.8667- 2	2.2416- 1										8.6739- 1
1.0000+ 5 ~ 1.5000+ 5	5.9230- 1	1.6764- 1	3.5190- 1	9.3968- 3	4.5896- 2								1.1671+ 0
1.5000+ 5 ~ 2.0000+ 5	5.9617- 1	2.3079- 1	4.1329- 1	4.1712- 2	2.0976- 1	1.3594- 2							1.5053+ 0
2.0000+ 5 ~ 3.0000+ 5	5.7003- 1	2.5816- 1	4.1053- 1	6.5294- 2	2.6625- 1	8.1173- 2	3.3242- 3						1.6548+ 0
3.0000+ 5 ~ 4.0000+ 5	5.0162- 1	2.5030- 1	3.7394- 1	7.5205- 2	2.6688- 1	1.0805- 1	1.8583- 2	1.8878- 3					1.5965+ 0
4.0000+ 5 ~ 5.0000+ 5	4.1522- 1	2.2116- 1	3.2057- 1	7.5133- 2	2.4080- 1	1.1151- 1	2.9032- 2	6.3450- 3				3.2168- 2	1.4520+ 0
5.0000+ 5 ~ 6.0000+ 5	3.2703- 1	1.8442- 1	2.5744- 1	6.9776- 2	2.0176- 1	1.0287- 1	3.3274- 2	8.6448- 3				2.3519- 1	1.4204+ 0
6.0000+ 5 ~ 8.0000+ 5	2.1712- 1	1.3144- 1	1.7112- 1	5.6495- 2	1.4088- 1	7.9460- 2	3.0934- 2	9.1882- 3				6.0679- 1	1.4434+ 0
8.0000+ 5 ~ 1.0000+ 6	1.2231- 1	8.0746- 2	9.5479- 2	4.0213- 2	8.2640- 2	5.1741- 2	2.3900- 2	8.2623- 3				9.3725- 1	1.4425+ 0
1.0000+ 6 ~ 1.5000+ 6	6.0589- 2	4.3112- 2	4.6523- 2	2.4251- 2	4.1809- 2	2.8415- 2	1.4992- 2	6.0957- 3				1.2220+ 0	1.4878+ 0
1.5000+ 6 ~ 2.0000+ 6	1.9679- 2	1.5517- 2	1.4768- 2	1.0118- 2	1.4002- 2	1.0647- 2	6.6305- 3	3.3007- 3				1.3698+ 0	1.4645+ 0
2.0000+ 6 ~ 3.0000+ 6	4.1782- 3	3.5132- 3	3.2172- 3	2.5130- 3	3.1857- 3	2.6287- 3	1.8471- 3	1.0879- 3				1.4012+ 0	1.4234+ 0
3.0000+ 6 ~ 4.0000+ 6	5.6884- 4	5.0744- 4	4.7142- 4	3.9531- 4	4.8910- 4	4.3583- 4	3.4124- 4	2.3316- 4				1.5180+ 0	1.5215+ 0
4.0000+ 6 ~ 5.0000+ 6	6.5595- 5	6.1846- 5	5.7205- 5	5.2048- 5	6.1859- 5	5.8591- 5	4.9758- 5	3.7836- 5				1.5937+ 0	1.5942+ 0
5.0000+ 6 ~ 6.0000+ 6	7.6259- 6	7.4761- 6	6.6956- 6	6.6288- 6	7.4420- 6	7.3224- 6	6.5324- 6	5.2965- 6				1.5674+ 0	1.5674+ 0
6.0000+ 6 ~ 8.0000+ 6	5.0767- 7	5.1274- 7	4.3802- 7	4.7248- 7	4.9728- 7	5.0308- 7	4.6477- 7	3.9421- 7				1.0757+ 0	1.0757+ 0
8.0000+ 6 ~ 1.0000+ 7	6.0642- 9	6.3652- 9	5.0340- 9	6.1594- 9	5.8789- 9	6.1680- 9	5.9622- 9	5.3544- 9				5.3537- 1	5.3537- 1
1.0000+ 7 ~ 1.5000+ 7	6.0105-11	6.4875-11	4.9224-11	4.4971-11	5.8753-11	6.3468-11	6.3607-11	5.9728-11				2.1780- 1	2.1780- 1

TABLE A2.39

Pu-239

MATERIAL =1941 CROSS SECTION PU-239

ENERGY	1 ST L Q=-8.0000-3	2 ND L Q=-5.7000-2	3 RD L Q=-7.6000-2	4 TH L Q=-1.6400-1	5 TH L Q=-1.9300-1	6 TH L Q=-2.8600-1	7 TH L Q=-3.3000-1	8 TH L Q=-3.8800-1	9 TH L Q=-3.9200-1	10 TH L Q=-4.3200-1	11 TH L Q=-4.3400-1	CONT. L Q=-8.7500-1	INELA Q=-8.0000-3
8.0000+ 3 ~ 1.0000+ 4	9.0101- 2												9.0101- 2
1.0000+ 4 ~ 1.5000+ 4	1.5865- 1												1.5865- 1
1.5000+ 4 ~ 2.0000+ 4	1.7949- 1												1.7949- 1
2.0000+ 4 ~ 3.0000+ 4	1.9255- 1												1.9255- 1
3.0000+ 4 ~ 4.0000+ 4	2.1354- 1												2.1354- 1
4.0000+ 4 ~ 5.0000+ 4	2.3338- 1												2.3338- 1
5.0000+ 4 ~ 6.0000+ 4	2.5184- 1	4.5284- 4											2.5229- 1
6.0000+ 4 ~ 8.0000+ 4	2.7403- 1	2.0037- 2	1.3325- 4										2.9420- 1
8.0000+ 4 ~ 1.0000+ 5	2.9566- 1	5.4383- 2	6.3578- 3										3.5640- 1
1.0000+ 5 ~ 1.5000+ 5	3.2182- 1	1.0224- 1	2.3363- 2										4.4743- 1
1.5000+ 5 ~ 2.0000+ 5	3.4365- 1	1.4865- 1	4.2008- 2	1.1955- 4	7.4223- 7								5.3443- 1
2.0000+ 5 ~ 3.0000+ 5	3.4659- 1	1.8252- 1	5.8584- 2	1.8618- 3	3.7168- 4	7.2833- 4							5.9065- 1
3.0000+ 5 ~ 4.0000+ 5	3.0754- 1	1.8358- 1	6.5712- 2	5.8067- 3	1.5113- 3	3.9120- 2	4.8651- 3	6.5566- 6	3.0418- 5				6.0817- 1
4.0000+ 5 ~ 5.0000+ 5	2.5663- 1	1.6430- 1	6.4304- 2	9.7179- 3	2.7247- 3	7.4027- 2	2.0125- 2	1.4178- 3	6.2515- 3	8.8272- 3	7.4015- 4		6.1265- 1
5.0000+ 5 ~ 6.0000+ 5	2.0088- 1	1.3623- 1	5.8527- 2	1.2774- 2	3.8170- 3	7.9556- 2	2.7145- 2	4.3849- 3	1.3416- 2	3.5462- 2	3.0861- 3		6.5730- 1
6.0000+ 5 ~ 8.0000+ 5	1.5352- 1	1.1289- 1	5.6008- 2	1.7680- 2	5.7787- 3	7.7577- 2	3.2499- 2	8.9896- 3	1.8015- 2	5.2365- 2	5.3972- 3		7.0339- 1
8.0000+ 5 ~ 1.0000+ 6	1.2005- 1	9.8927- 2	5.9541- 2	2.5513- 2	9.3891- 3	7.4419- 2	3.9206- 2	1.5728- 2	2.1843- 2	5.9040- 2	8.1526- 3	5.3008- 3	7.8643- 1
1.0000+ 6 ~ 1.5000+ 6	8.4119- 2	7.8518- 2	5.7458- 2	3.1127- 2	1.3619- 2	6.2623- 2	4.1825- 2	2.2016- 2	2.1291- 2	5.3085- 2	1.0012- 2	1.7529- 1	9.3518- 1
1.5000+ 6 ~ 2.0000+ 6	3.9610- 2	4.2139- 2	3.5607- 2	2.2890- 2	1.1922- 2	3.6558- 2	2.9587- 2	1.8739- 2	1.3935- 2	3.2746- 2	8.1394- 3	5.4139- 1	1.0302+ 0
2.0000+ 6 ~ 3.0000+ 6	1.0777- 2	1.2056- 2	1.0737- 2	7.5354- 3	4.3853- 3	1.1228- 2	9.8243- 3	6.8609- 3	5.0674- 3	1.0618- 2	3.4586- 3	8.6985- 1	1.0349+ 0
3.0000+ 6 ~ 4.0000+ 6	1.2133- 3	1.4132- 3	1.3284- 3	1.0235- 3	6.7219- 4	1.3687- 3	1.2736- 3	9.7656- 4	8.1398- 4	1.3372- 3	6.4819- 4	9.4725- 1	9.6994- 1
4.0000+ 6 ~ 5.0000+ 6	1.3133- 4	1.5802- 4	1.5596- 4	1.2997- 4	9.4452- 5	1.5462- 4	1.5137- 4	1.2558- 4	1.1815- 4	1.5229- 4	1.0402- 4	9.8386- 1	9.8670- 1
5.0000+ 6 ~ 6.0000+ 6	1.5352- 5	1.9015- 5	1.9603- 5	1.7469- 5	1.3926- 5	1.8615- 5	1.9048- 5	1.6917- 5	1.7393- 5	1.8354- 5	1.6404- 5	1.0498+ 0	1.0502+ 0
6.0000+ 6 ~ 8.0000+ 6	6.3968- 7	8.1172- 7	8.6757- 7	8.1577- 7	6.9978- 7	7.9383- 7	8.4273- 7	7.9064- 7	8.1420- 7	7.8213- 7	8.0143- 7	3.2015- 1	3.2017- 1
8.0000+ 6 ~ 1.0000+ 7	1.1431- 9	1.4967- 9	1.6814- 9	1.6994- 9	1.5910- 9	1.4716- 9	1.6462- 9	1.6630- 9	1.5710- 9	1.4549- 9	1.6179- 9	1.8258- 2	1.8259- 2
1.0000+ 7 ~ 1.5000+ 7	6.1850-13	8.2965-13	9.6706-13	1.0288-12	1.0210-12	8.2037-13	9.5409-13	1.0155-12	9.1604-13	8.1425-13	9.8339-13	2.0050- 3	2.0050- 3

TABLE A2.40

Pu-240

MATERIAL =1942 CROSS SECTION PU-240

ENERGY	1 ST L Q=-4.2800-2	2 ND L Q=-1.4170-1	3 RD L Q=-2.9390-1	4 TH L Q=-5.0000-1	5 TH L Q=-5.9740-1	6 TH L Q=-6.4890-1	7 TH L Q=-7.4220-1	8 TH L Q=-8.6070-1	9 TH L Q=-9.0030-1	10 TH L Q=-9.3810-1	11 TH L Q=-9.5890-1	CONT. L Q=-1.0000+0	INELA Q=-4.2800-2
4.0000+ 4 ~ 5.0000+ 4	3.1126- 2												3.1126- 2
5.0000+ 4 ~ 6.0000+ 4	1.6725- 1												1.6725- 1
6.0000+ 4 ~ 8.0000+ 4	3.9050- 1												3.9050- 1
8.0000+ 4 ~ 1.0000+ 5	6.0737- 1												6.0737- 1
1.0000+ 5 ~ 1.5000+ 5	8.2481- 1	9.4650- 5											8.2484- 1
1.5000+ 5 ~ 2.0000+ 5	1.0106+ 0	3.5250- 3											1.0141+ 0
2.0000+ 5 ~ 3.0000+ 5	1.1753+ 0	2.4595- 2	4.4100-10										1.1999+ 0
3.0000+ 5 ~ 4.0000+ 5	1.3070+ 0	7.5750- 2	5.7005- 5										1.3828+ 0
4.0000+ 5 ~ 5.0000+ 5	1.3363+ 0	1.5000- 1	1.0475- 3										1.4873+ 0
5.0000+ 5 ~ 6.0000+ 5	1.2908+ 0	2.3492- 1	5.3705- 3	2.6420- 8	1.8200- 5								1.5311+ 0
6.0000+ 5 ~ 8.0000+ 5	9.6662- 1	2.9396- 1	2.0938- 2	1.8722- 6	2.0632- 1	4.1350- 2	7.9455- 5						1.5293+ 0
8.0000+ 5 ~ 1.0000+ 6	6.8969- 1	3.3809- 1	5.9823- 2	2.2693- 5	2.5927- 1	1.1819- 1	2.8544- 3	1.8257- 2	1.7139- 2	6.0484- 3	2.1574- 3		1.5115+ 0
1.0000+ 6 ~ 1.5000+ 6	3.6742- 1	2.6890- 1	1.0953- 1	1.7852- 4	1.5145- 1	1.0402- 1	9.8198- 3	4.5312- 2	9.7784- 2	8.5525- 2	4.6894- 2	3.9135- 1	1.6782+ 0
1.5000+ 6 ~ 2.0000+ 6	1.3670- 1	1.2317- 1	8.8369- 2	4.0800- 4	5.8025- 2	5.3210- 2	9.9930- 3	2.3122- 2	6.1587- 2	5.9417- 2	3.2278- 2	1.2755+ 0	1.9218+ 0
2.0000+ 6 ~ 3.0000+ 6	2.9095- 2	2.9746- 2	2.9357- 2	3.9500- 4	1.3758- 2	1.5521- 2	4.7070- 3	5.9590- 3	1.7490- 2	1.6955- 2	9.4170- 3	1.5799+ 0	1.7523+ 0
3.0000+ 6 ~ 4.0000+ 6	3.3175- 3	3.6075- 3	4.7500- 3	1.5750- 4	1.8475- 3	2.5225- 3	1.0725- 3	7.0250- 4	2.3725- 3	2.3450- 3	1.5550- 3	1.4885+ 0	1.5128+ 0
4.0000+ 6 ~ 5.0000+ 6	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	0.0000+ 0	1.2600+ 0	1.2600+ 0
5.0000+ 6 ~ 6.0000+ 6												1.1013+ 0	1.1013+ 0
6.0000+ 6 ~ 8.0000+ 6												8.3464- 1	8.3464- 1
8.0000+ 6 ~ 1.0000+ 7												3.3538- 1	3.3538- 1
1.0000+ 7 ~ 1.5000+ 7												1.3005- 1	1.3005- 1

TABLE A2.41

Pu-241

MATERIAL =1943 CROSS SECTION PU-241

ENERGY	1 ST L Q=-4.0000-2	2 ND L Q=-9.5000-2	3 RD L Q=-1.6300-1	4 TH L Q=-1.6900-1	5 TH L Q=-1.7400-1	6 TH L Q=-2.3100-1	7 TH L Q=-2.4500-1	8 TH L Q=-3.0000-1	9 TH L Q=-3.3500-1	10 TH L Q=-4.4800-1	11 TH L Q=-7.5300-1	CONT. L Q=-9.5000-1	INELA Q -4.0000-2
4.0000+ 4 ~ 5.0000+ 4	1.9859- 2												1.9859- 2
5.0000+ 4 ~ 6.0000+ 4	4.0452- 2												4.0452- 2
6.0000+ 4 ~ 8.0000+ 4	5.0410- 2												5.0410- 2
8.0000+ 4 ~ 1.0000+ 5	6.7997- 2	2.0016- 4											6.8197- 2
1.0000+ 5 ~ 1.5000+ 5	8.8409- 2	1.1205- 2											9.9614- 2
1.5000+ 5 ~ 2.0000+ 5	1.1246- 1	3.0076- 2	3.2094- 3	9.3050- 3	6.8964- 3								1.6195- 1
2.0000+ 5 ~ 3.0000+ 5	1.2508- 1	4.8357- 2	1.7396- 2	4.4775- 2	4.8504- 2	6.5036- 3	9.9135- 3						3.0053- 1
3.0000+ 5 ~ 4.0000+ 5	1.3601- 1	6.3751- 2	3.1820- 2	7.2960- 2	8.1596- 2	2.9218- 2	5.0276- 2	4.5551- 3	4.9993- 3				4.7518- 1
4.0000+ 5 ~ 5.0000+ 5	1.4139- 1	7.3404- 2	4.1330- 2	8.8455- 2	9.9247- 2	4.5340- 2	7.5374- 2	1.2384- 2	2.3324- 2	6.5976- 3			6.0684- 1
5.0000+ 5 ~ 6.0000+ 5	1.3573- 1	7.6993- 2	4.4621- 2	9.1146- 2	1.0342- 1	5.4371- 2	8.5547- 2	1.8796- 2	3.6717- 2	3.7732- 2			6.8507- 1
6.0000+ 5 ~ 8.0000+ 5	1.3075- 1	8.2180- 2	4.6580- 2	9.1635- 2	1.0603- 1	6.3663- 2	9.2844- 2	2.7463- 2	4.9716- 2	6.1881- 2	3.9226- 4		7.5313- 1
8.0000+ 5 ~ 1.0000+ 6	1.2597- 1	8.8431- 2	4.5334- 2	8.7615- 2	1.0656- 1	7.2625- 2	9.6547- 2	3.7926- 2	6.1154- 2	7.4418- 2	8.8577- 3	1.5930- 3	8.1859- 1
1.0000+ 6 ~ 1.5000+ 6	8.8349- 2	6.8940- 2	3.2117- 2	6.0539- 2	7.7502- 2	5.9317- 2	7.1835- 2	3.6359- 2	5.2237- 2	5.7680- 2	1.3341- 2	3.2962- 1	1.0177+ 0
1.5000+ 6 ~ 2.0000+ 6	3.5097- 2	2.9073- 2	1.3826- 2	2.5268- 2	3.2305- 2	2.6457- 2	3.0757- 2	1.7948- 2	2.4371- 2	2.6199- 2	8.1055- 3	9.3394- 1	1.2532+ 0
2.0000+ 6 ~ 3.0000+ 6	8.0974- 3	6.9306- 3	3.3436- 3	6.0503- 3	7.7474- 3	6.5943- 3	7.5478- 3	4.7735- 3	6.3154- 3	6.8377- 3	2.5102- 3	1.2621+ 0	1.3450+ 0
3.0000+ 6 ~ 4.0000+ 6	8.8548- 4	7.9203- 4	3.6091- 4	6.5548- 4	8.6685- 4	7.7273- 4	8.5654- 4	6.0077- 4	7.5738- 4	7.9575- 4	3.2387- 4	1.3058+ 0	1.3157+ 0
4.0000+ 6 ~ 5.0000+ 6	9.5429- 5	8.9722- 5	3.6447- 5	6.6984- 5	9.3553- 5	8.7677- 5	9.2580- 5	7.3169- 5	8.6156- 5	8.3944- 5	3.3915- 5	1.3540+ 0	1.3551+ 0
5.0000+ 6 ~ 6.0000+ 6	1.0079- 5	9.9278- 6	3.5880- 6	6.6785- 6	9.8705- 6	9.6939- 6	9.7592- 6	8.6117- 6	9.5135- 6	8.5252- 6	3.3033- 6	1.2372+ 0	1.2373+ 0
6.0000+ 6 ~ 8.0000+ 6	6.2039- 7	6.2907- 7	2.1136- 7	3.9715- 7	6.0949- 7	6.1683- 7	6.0361- 7	5.6997- 7	6.0728- 7	5.1689- 7	1.9589- 7	6.7084- 1	6.7085- 1
8.0000+ 6 ~ 1.0000+ 7	5.6221- 9	5.9136- 9	1.8254- 9	3.4676- 9	5.5693- 9	5.8519- 9	5.5405- 9	5.6680- 9	5.8033- 9	4.6707- 9	1.7492- 9	2.9596- 1	2.9596- 1
1.0000+ 7 ~ 1.5000+ 7	4.7070-11	5.0847-11	1.4780-11	2.8247-11	4.6768-11	5.0483-11	4.6605-11	5.0607-11	5.0198-11	3.8781-11	1.4379-11	1.4577- 1	1.4577- 1

TABLE A2.42

Am-241

MATERIAL =1951 CROSS SECTION AM-241

ENERGY	1 ST L Q=-4.2000-2	2 ND L Q=-9.5000-2	3 RD L Q=-1.5800-1	4 TH L Q=-2.0600-1	5 TH L Q=-2.3500-1	6 TH L Q=-2.7200-1	7 TH L Q=-3.2300-1	8 TH L Q=-3.8000-1	9 TH L Q=-4.7500-1	10 TH L Q=-5.0400-1	11 TH L Q=-5.4900-1	CONT. L Q=-8.5000-1	INELA Q=-4.2000-2
4.0000+ 4 ~ 5.0000+ 4	5.5059- 2												5.5059- 2
5.0000+ 4 ~ 6.0000+ 4	1.2805- 1												1.2805- 1
6.0000+ 4 ~ 8.0000+ 4	1.7712- 1												1.7712- 1
8.0000+ 4 ~ 1.0000+ 5	2.2845- 1	6.4740- 4											2.2910- 1
1.0000+ 5 ~ 1.5000+ 5	2.9085- 1	3.5928- 2											3.2678- 1
1.5000+ 5 ~ 2.0000+ 5	3.4535- 1	9.0647- 2	5.7187- 3										4.4171- 1
2.0000+ 5 ~ 3.0000+ 5	3.6818- 1	1.3735- 1	2.6203- 2	1.1493- 1	4.9155- 2	4.6844- 3							7.0051- 1
3.0000+ 5 ~ 4.0000+ 5	3.5872- 1	1.6310- 1	4.3796- 2	2.1064- 1	1.4631- 1	4.9643- 2	3.7691- 3	9.9884- 5					9.7608- 1
4.0000+ 5 ~ 5.0000+ 5	3.4941- 1	1.7696- 1	5.6449- 2	2.3968- 1	1.8165- 1	7.9004- 2	1.6294- 2	3.1107- 3	2.7201- 3				1.1053+ 0
5.0000+ 5 ~ 6.0000+ 5	3.2757- 1	1.8106- 1	6.6630- 2	2.3510- 1	1.8868- 1	9.4289- 2	2.7965- 2	7.1945- 3	5.0596- 2	3.9038- 2	7.7478- 3		1.2259+ 0
6.0000+ 5 ~ 8.0000+ 5	2.7143- 1	1.6834- 1	7.4449- 2	1.9593- 1	1.6884- 1	9.7345- 2	3.8633- 2	1.2367- 2	8.5258- 2	9.8075- 2	6.4287- 2		1.3407+ 0
8.0000+ 5 ~ 1.0000+ 6	1.8750- 1	1.3007- 1	6.7974- 2	1.3018- 1	1.1993- 1	7.8212- 2	3.7943- 2	1.4345- 2	7.5282- 2	9.5296- 2	7.8753- 2	4.3239- 2	1.2138+ 0
1.0000+ 6 ~ 1.5000+ 6	8.2687- 2	6.2935- 2	3.8174- 2	5.2620- 2	5.0169- 2	3.6037- 2	2.0472- 2	9.1393- 3	3.8797- 2	4.9367- 2	4.4622- 2	4.4128- 1	1.0356+ 0
1.5000+ 6 ~ 2.0000+ 6	2.9470- 2	2.4279- 2	1.6691- 2	1.6796- 2	1.6434- 2	1.2932- 2	8.4629- 3	4.4680- 3	1.6726- 2	2.0823- 2	1.9822- 2	8.9523- 1	1.1370+ 0
2.0000+ 6 ~ 3.0000+ 6	6.4401- 3	5.5175- 3	4.0373- 3	3.7265- 3	3.7411- 3	3.1350- 3	2.2512- 3	1.3590- 3	4.2621- 3	5.3014- 3	5.2394- 3	1.0133+ 0	1.0740+ 0
3.0000+ 6 ~ 4.0000+ 6	6.0305- 4	5.3882- 4	4.2041- 4	4.1606- 4	4.3591- 4	3.9365- 4	3.1347- 4	2.1951- 4	4.2827- 4	5.4055- 4	5.5489- 4	8.5993- 1	8.6673- 1
4.0000+ 6 ~ 5.0000+ 6	5.4486- 5	5.1186- 5	4.2870- 5	4.4884- 5	4.8983- 5	4.6989- 5	4.0514- 5	3.1509- 5	3.7055- 5	4.7822- 5	5.0780- 5	7.4441- 1	7.4511- 1
5.0000+ 6 ~ 6.0000+ 6	5.8506- 6	5.7532- 6	5.1227- 6	4.9615- 6	5.5597- 6	5.5270- 6	4.9896- 6	4.1119- 6	3.7262- 6	4.9213- 6	5.3935- 6	6.3768- 1	6.3776- 1
6.0000+ 6 ~ 8.0000+ 6	3.8202- 7	3.8817- 7	3.6065- 7	3.0509- 7	3.4781- 7	3.5350- 7	3.2847- 7	2.8071- 7	2.3494- 7	3.1577- 7	3.5625- 7	4.1910- 1	4.1910- 1
8.0000+ 6 ~ 1.0000+ 7	6.8339- 9	7.1760- 9	6.9461- 9	5.2393- 9	6.1417- 9	6.4819- 9	6.3184- 9	5.7378- 9	4.1294- 9	5.6516- 9	6.5658- 9	2.1488- 1	2.1488- 1
1.0000+ 7 ~ 1.5000+ 7	9.6845-11	1.0412-10	1.0381-10	7.6644-11	9.2184-11	1.0060-10	1.0204-10	9.7111-11	5.7556-11	7.9738-11	9.4211-11	8.8746- 2	8.8746- 2
1.5000+ 7 ~ 1.6000+ 7	2.1146-13	2.3636-13	2.4774-13	1.6818-13	2.0707-13	2.3291-13	2.4514-13	2.4409-13	1.2027-13	1.6995-13	2.0705-13	5.0320- 2	5.0320- 2

Appendix B. Cross-section Curves

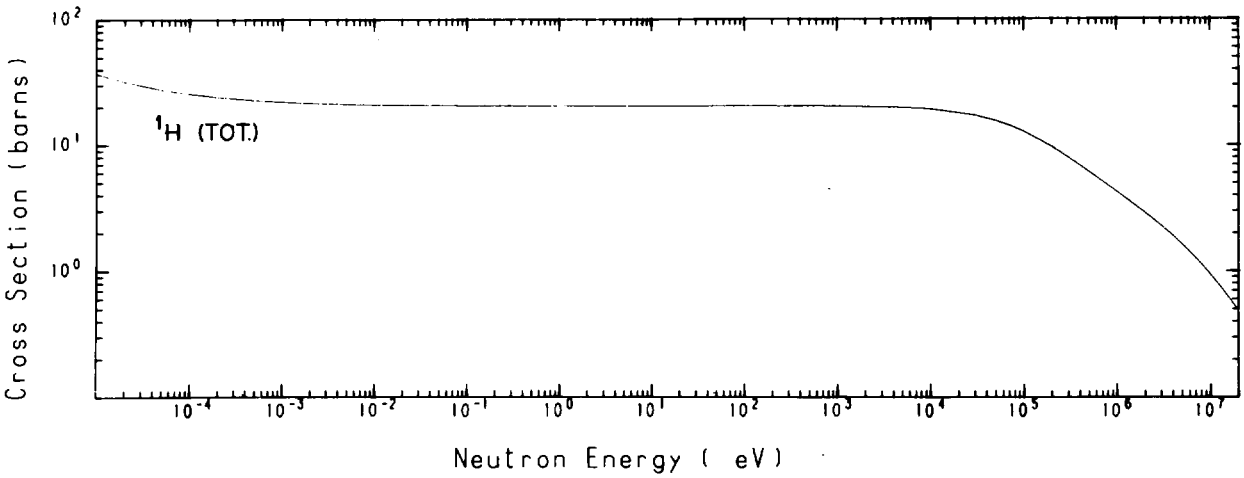


Fig. B1.1

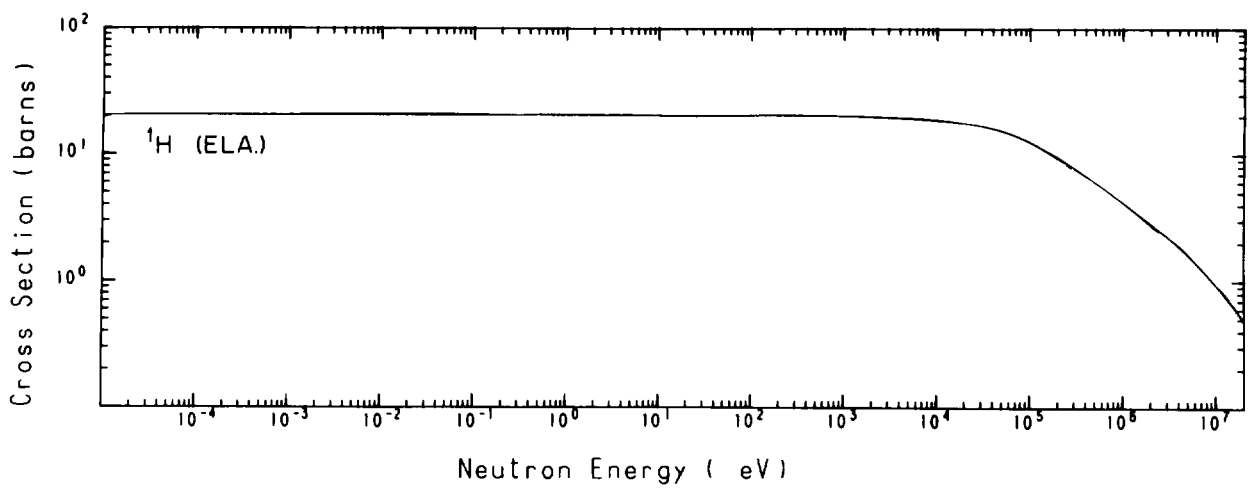
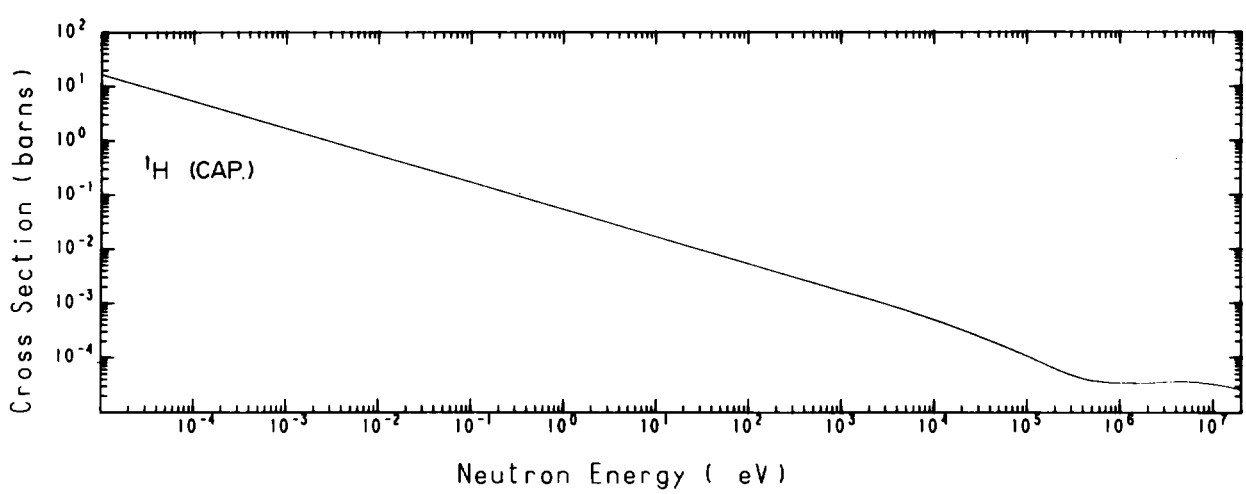


Fig. B1.2



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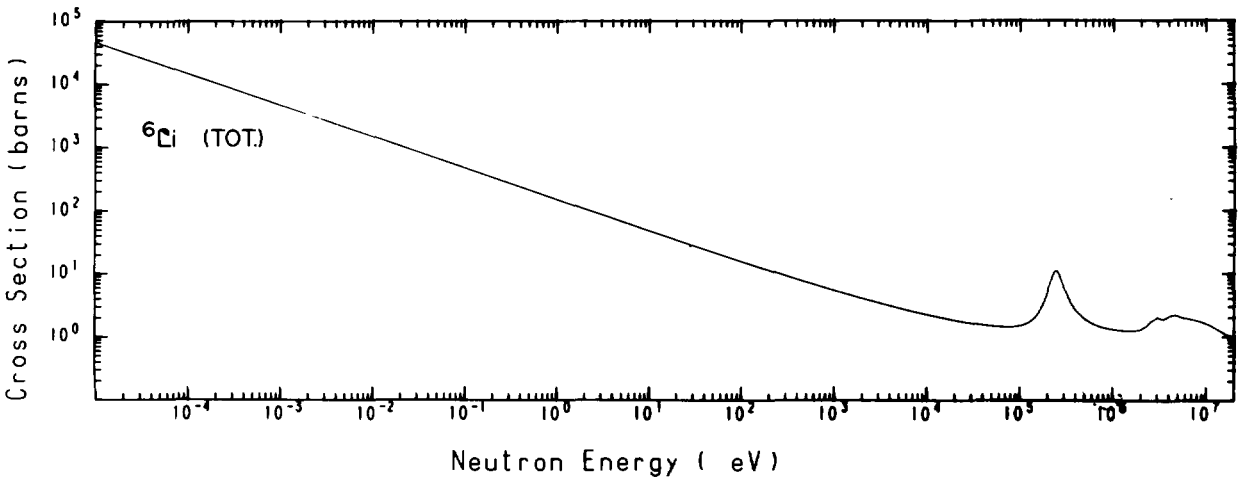


Fig. B1.4

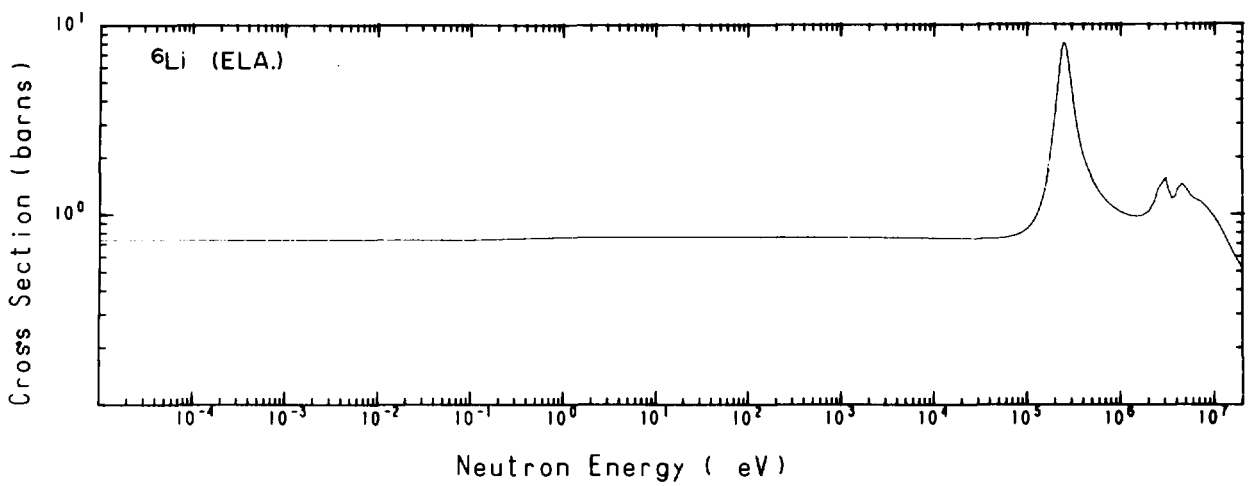
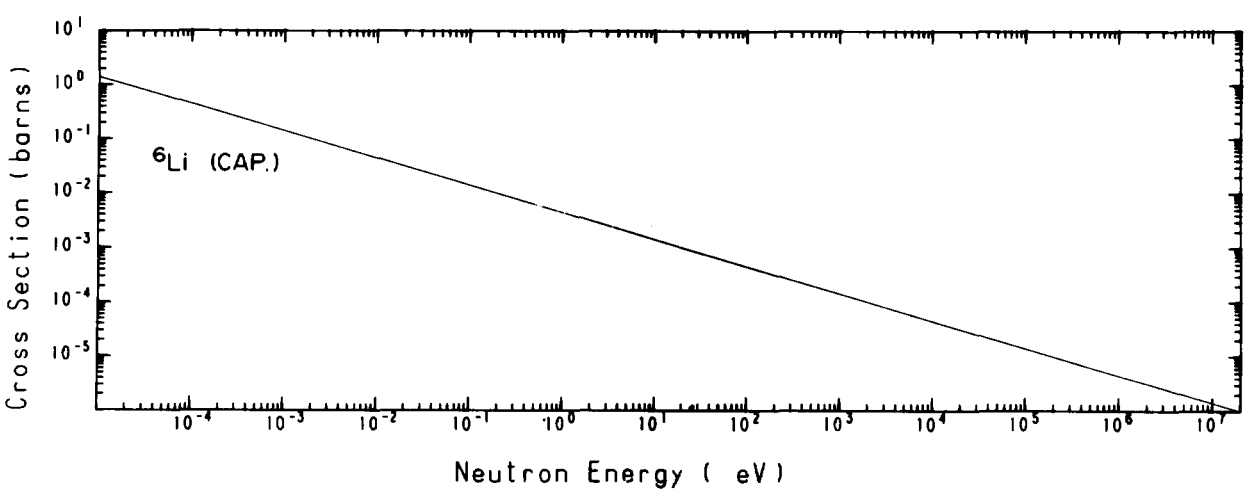


Fig. B1.5



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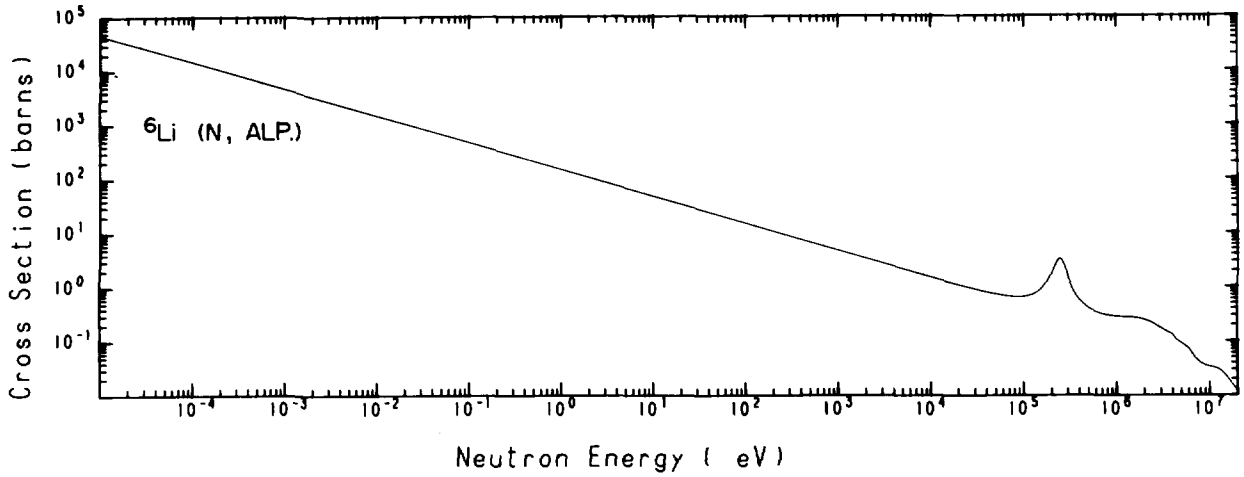


Fig. B1.7

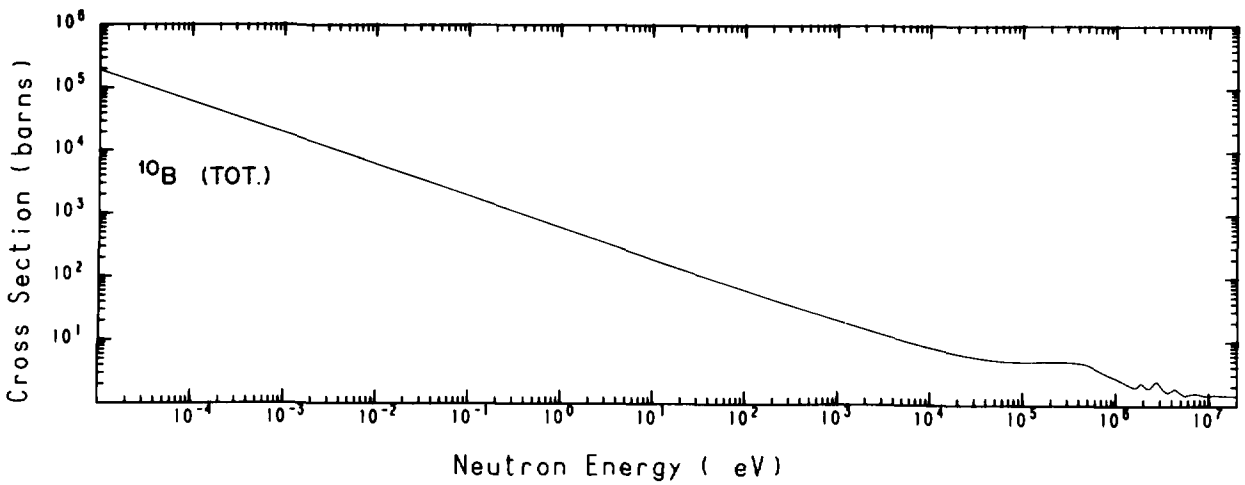
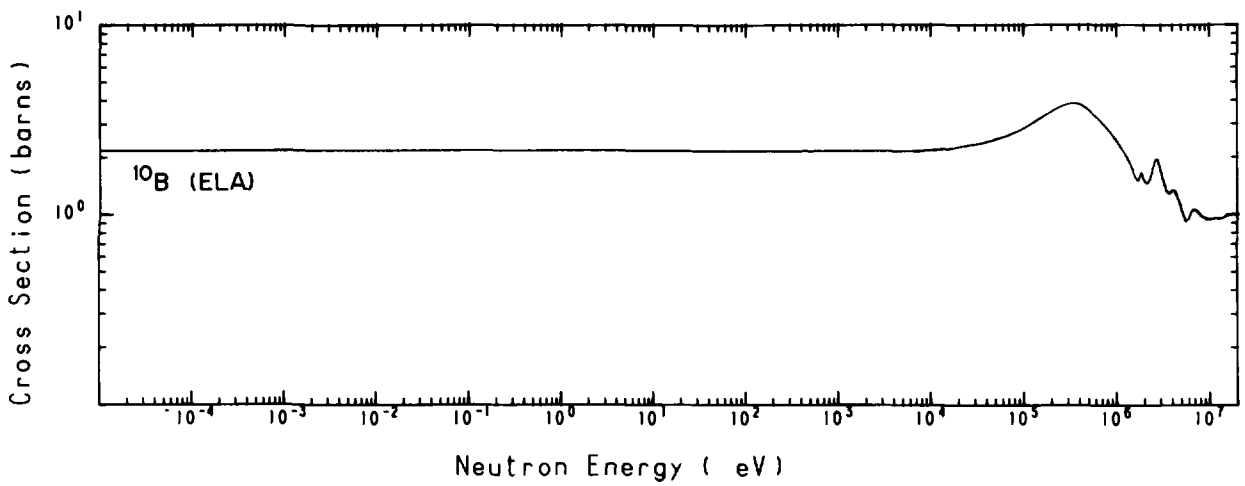


Fig. B1.8



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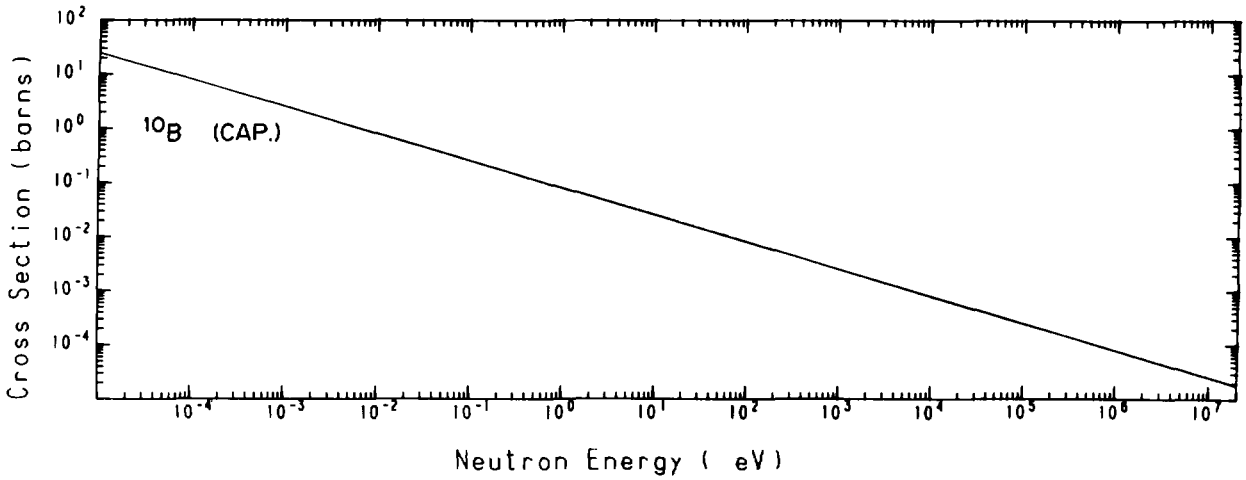

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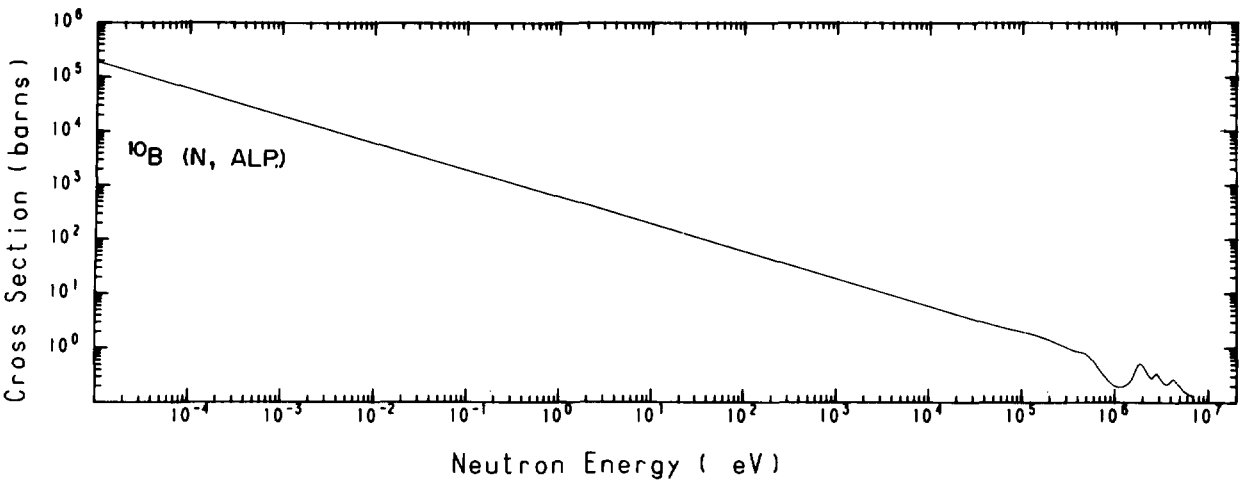


Fig. B1.11

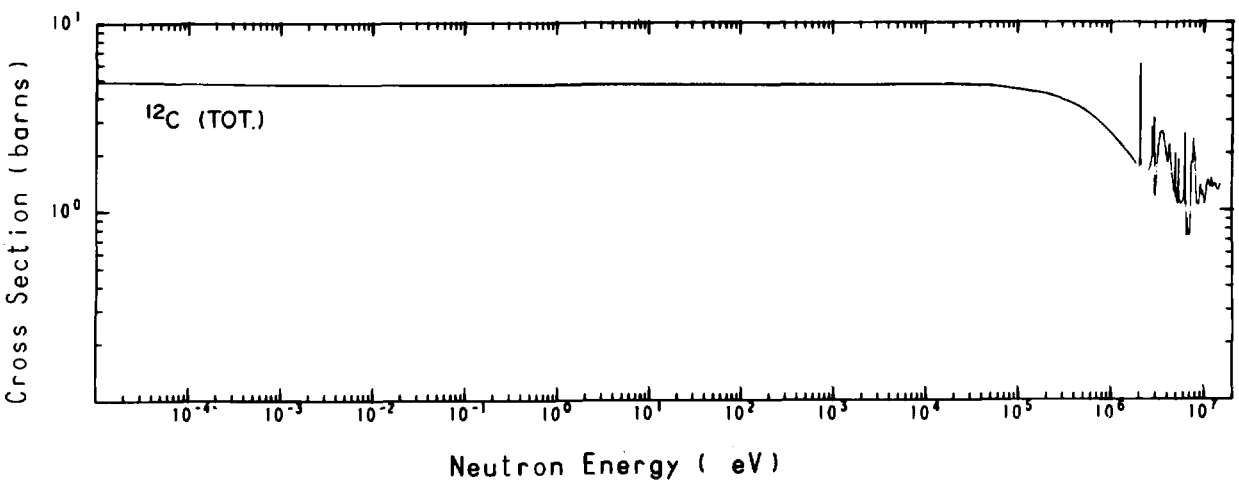
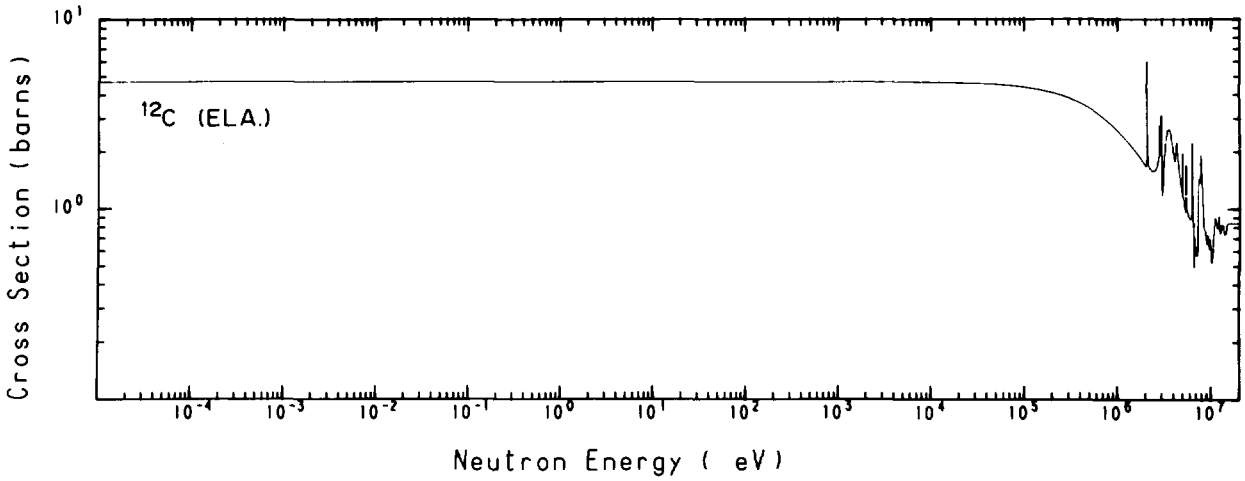


Fig. B1.12



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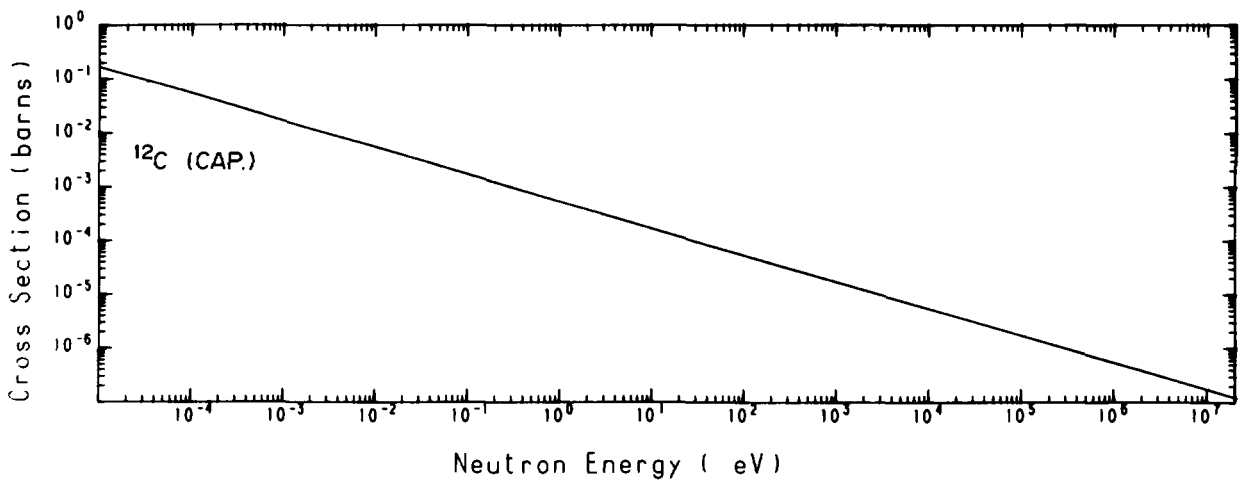

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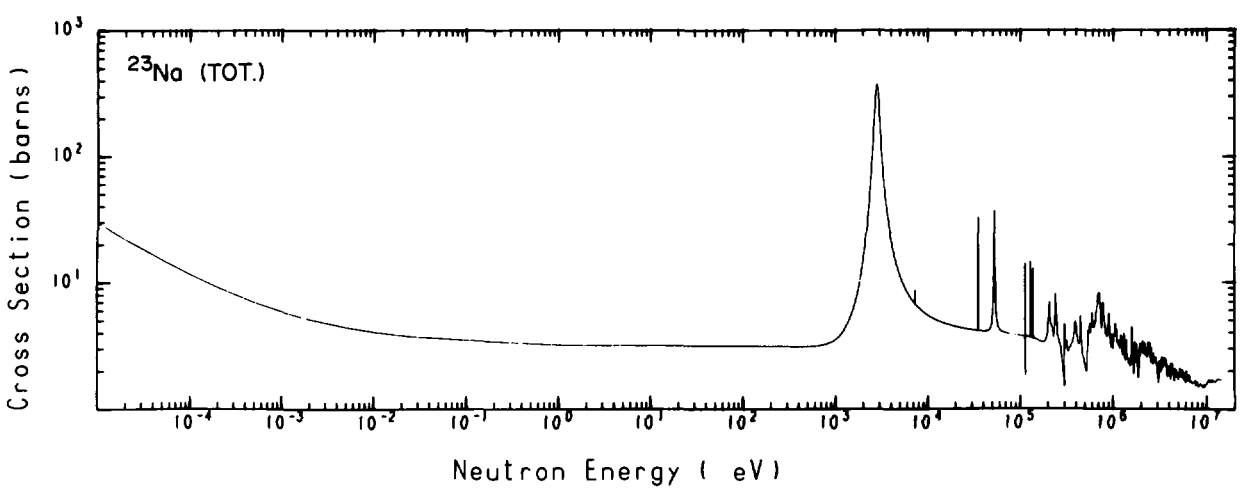

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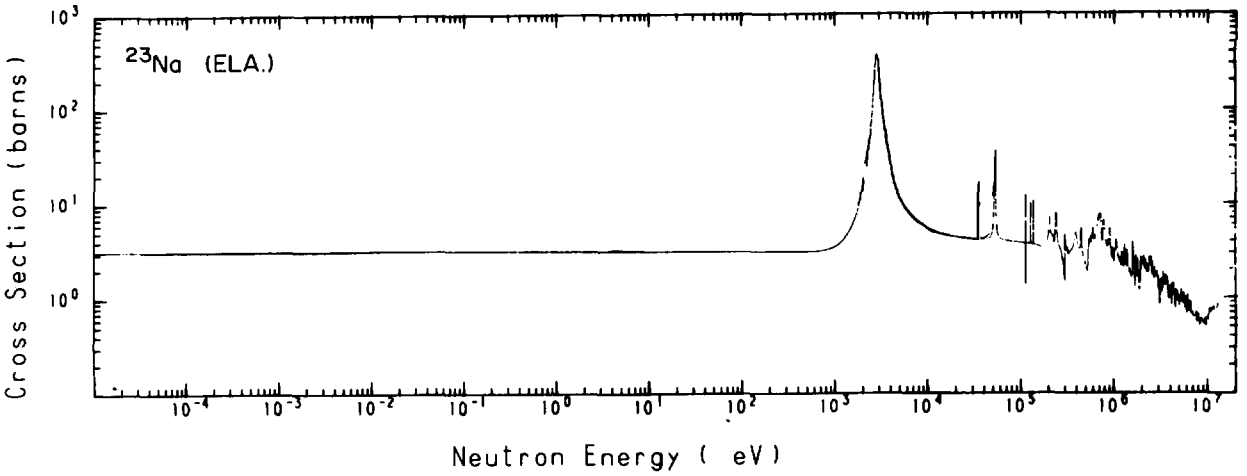


Fig. B1.16

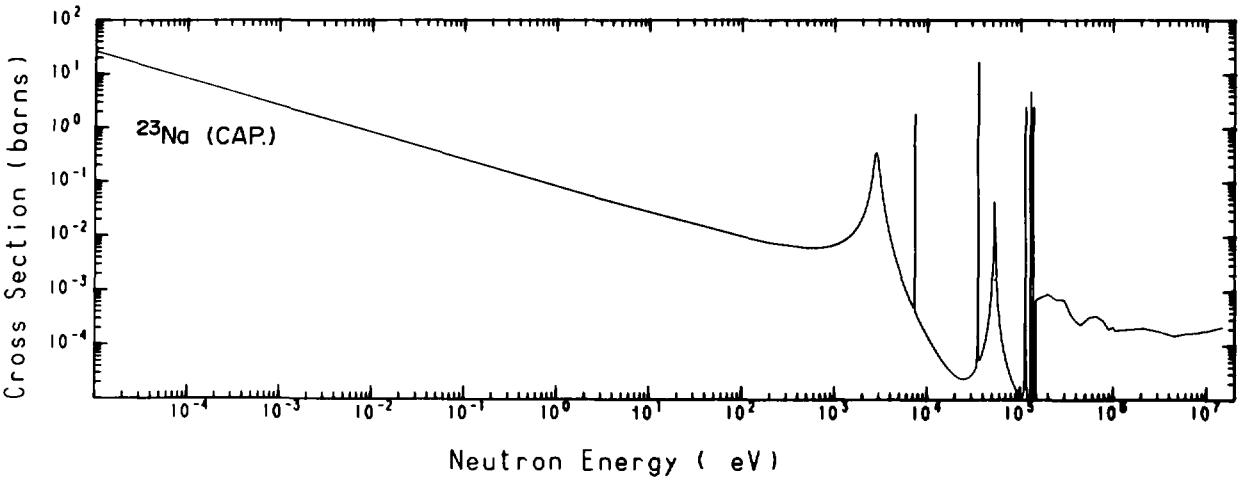
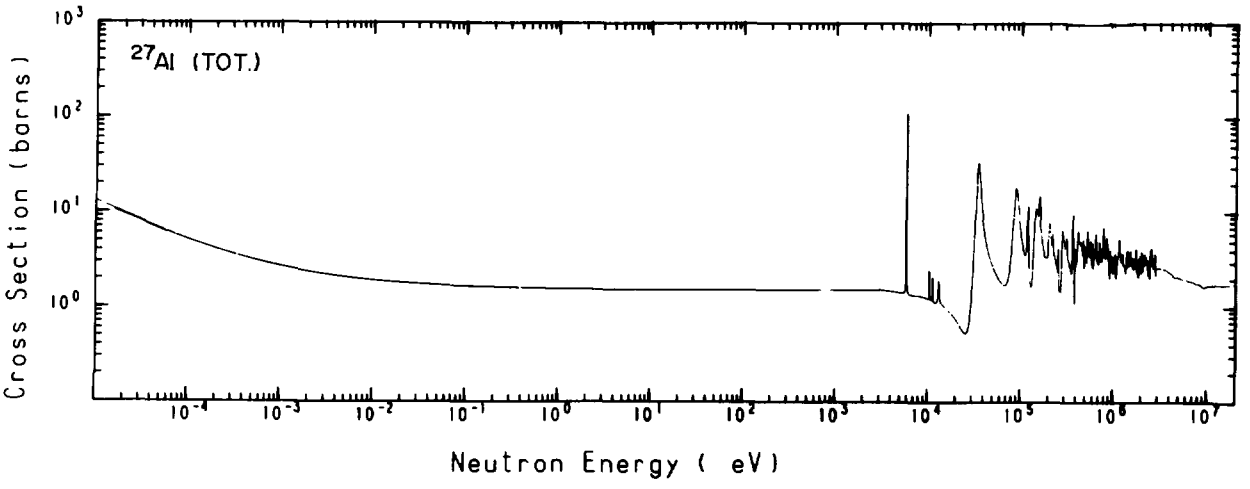


Fig. B1.17



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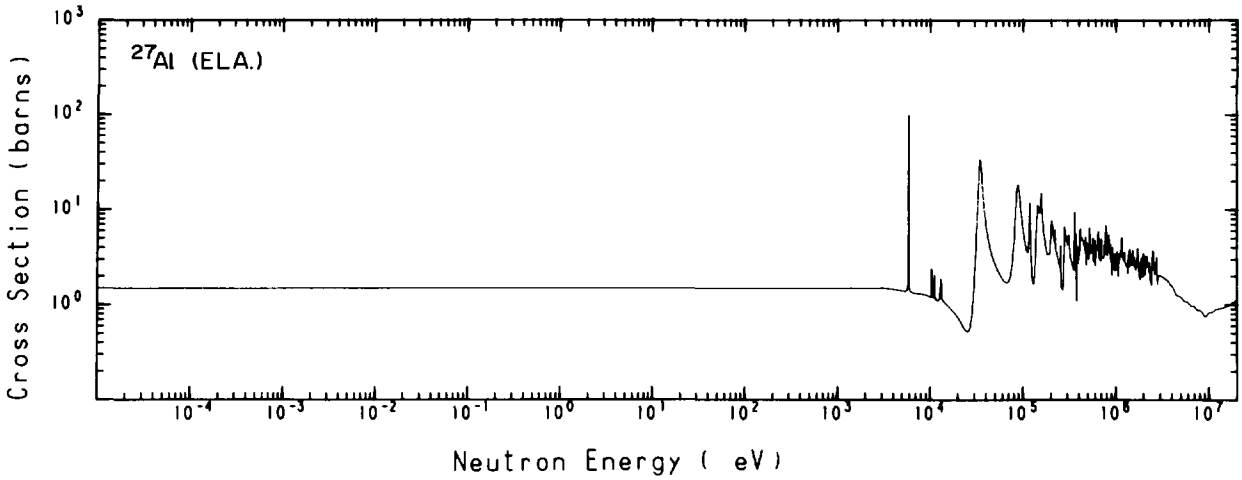

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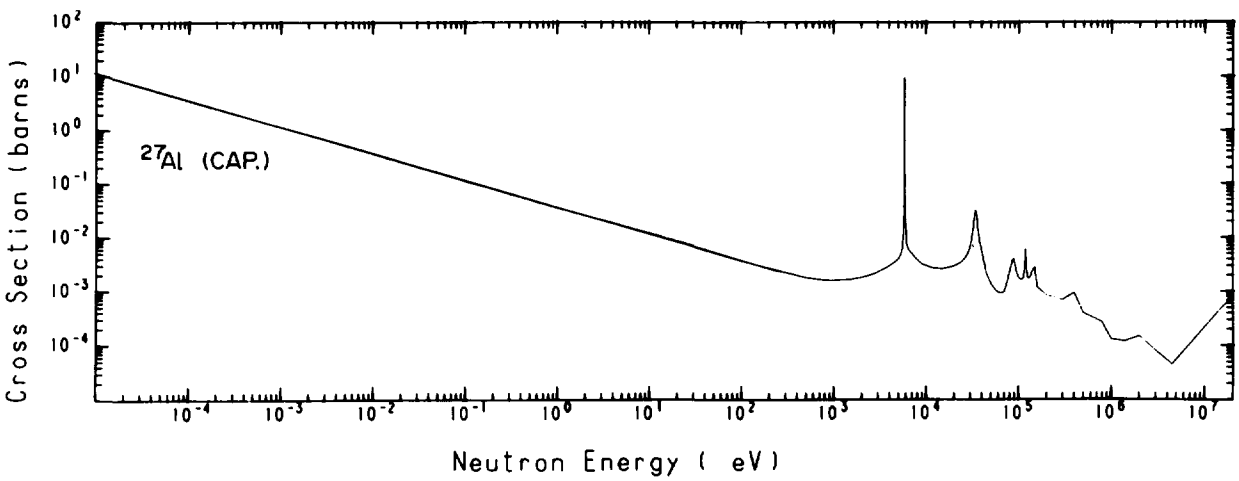

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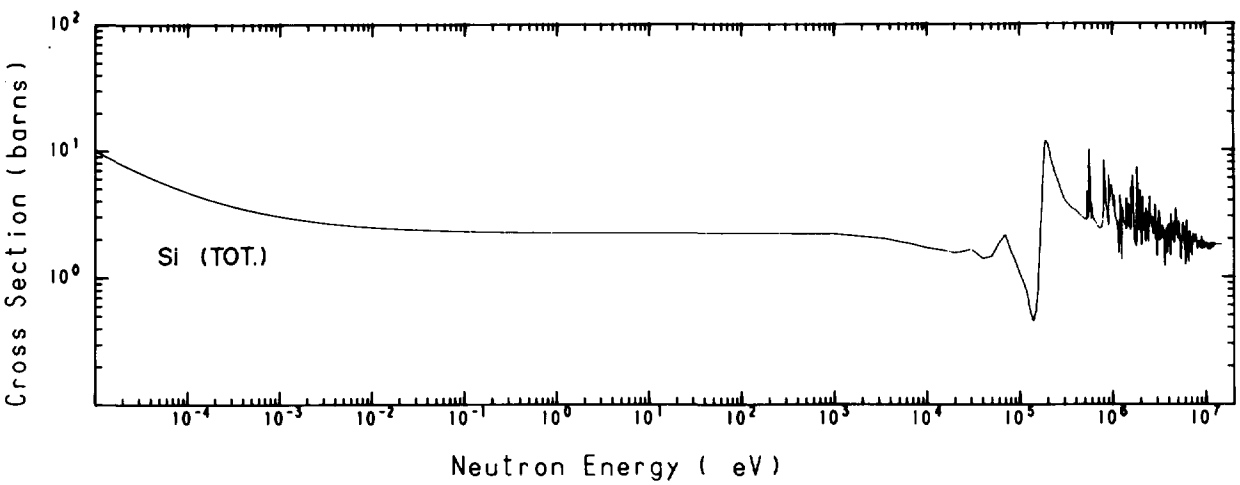

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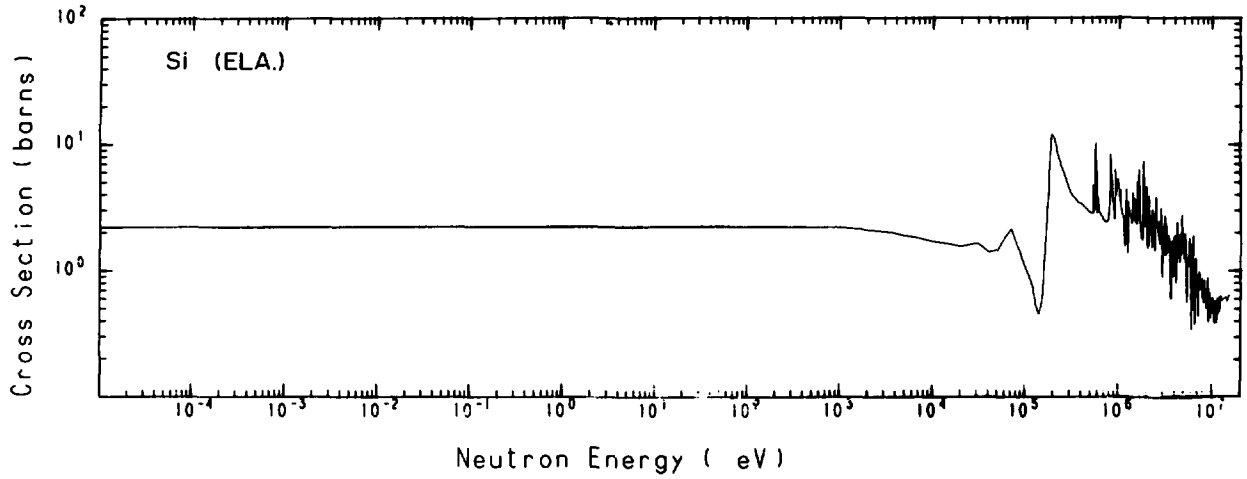


Fig. B1.22

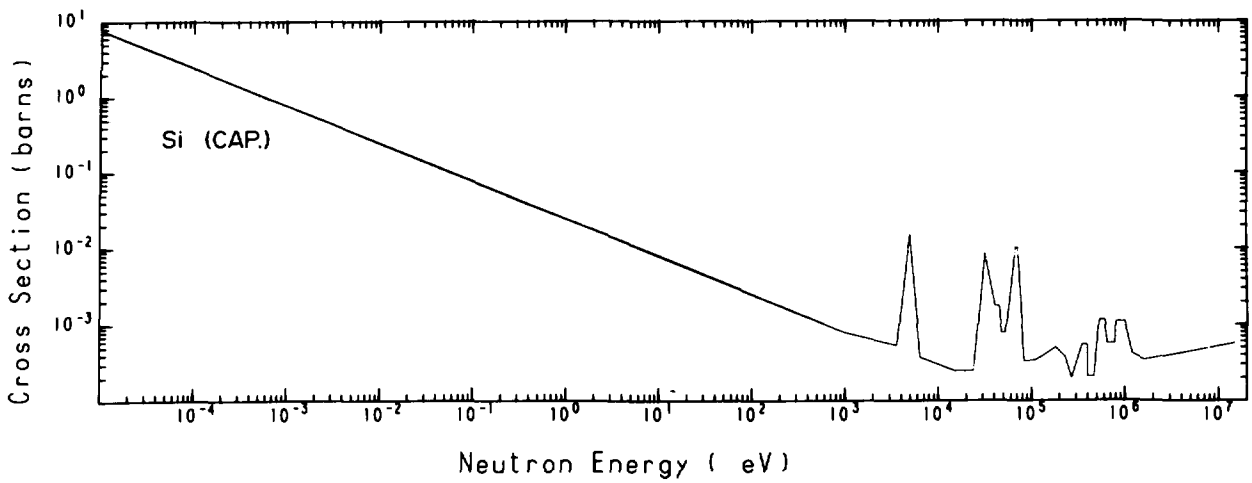
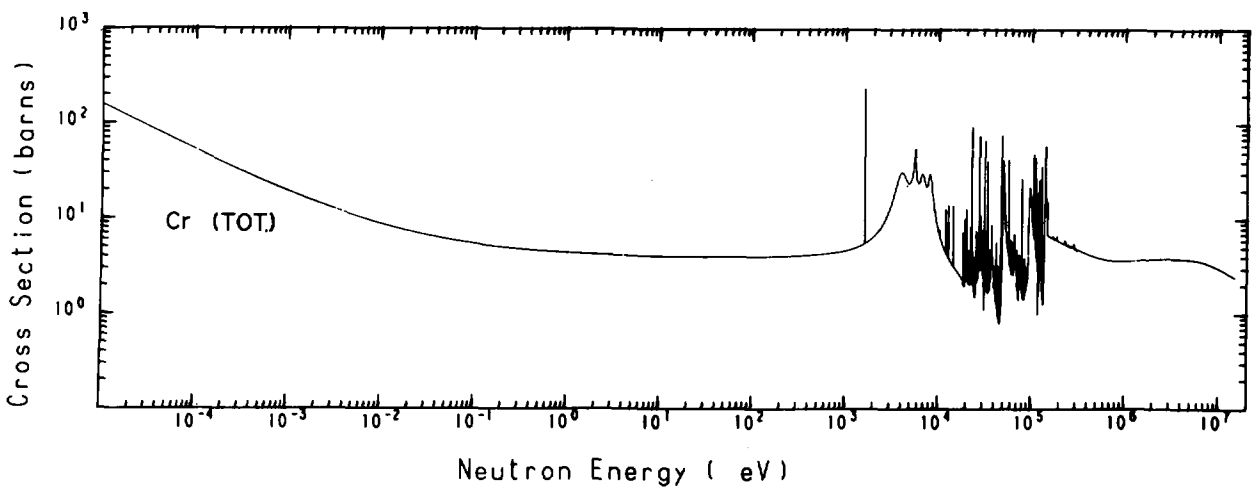


Fig. B1.23



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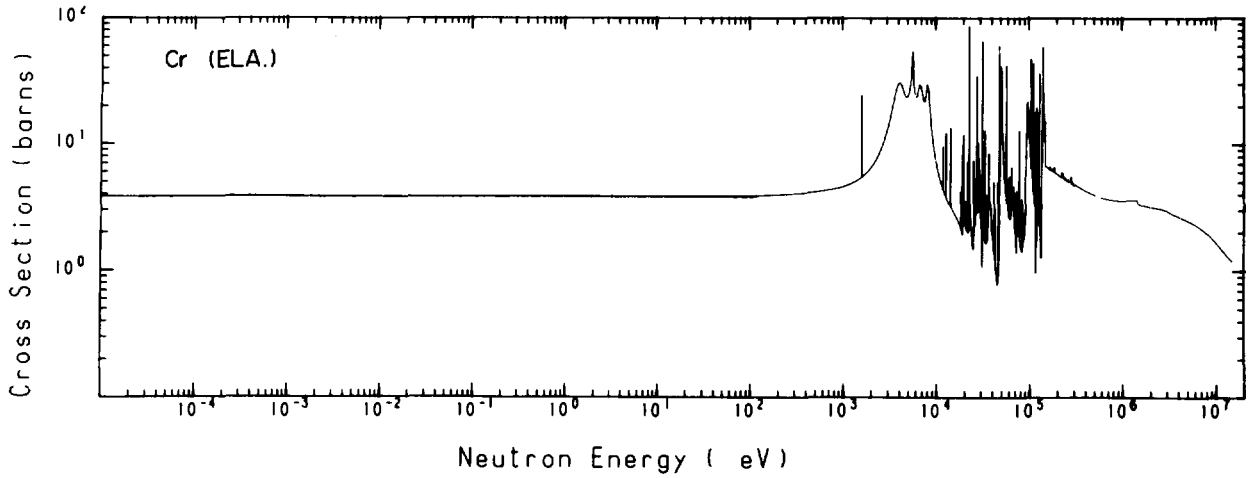

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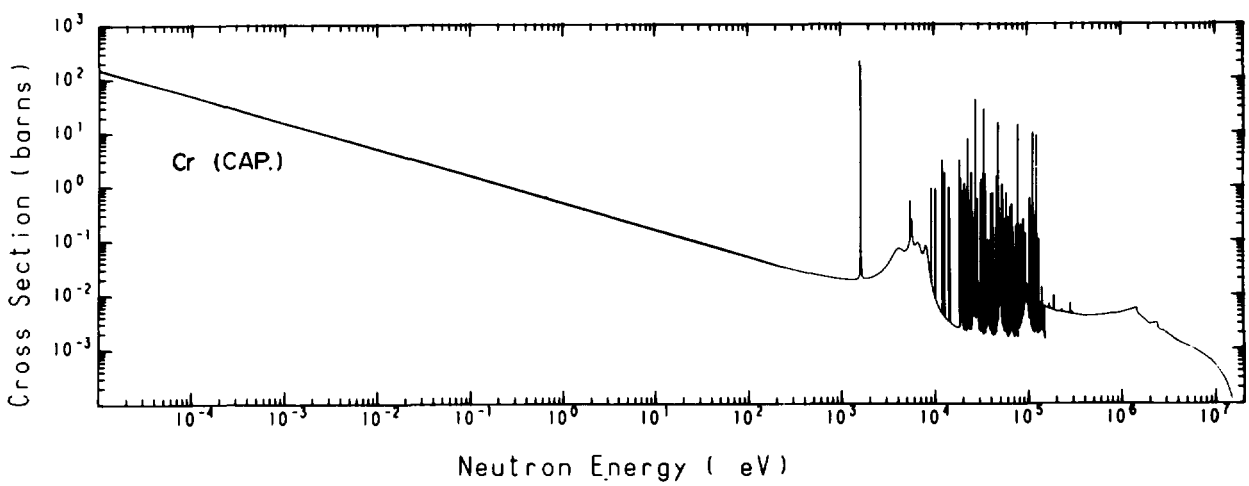

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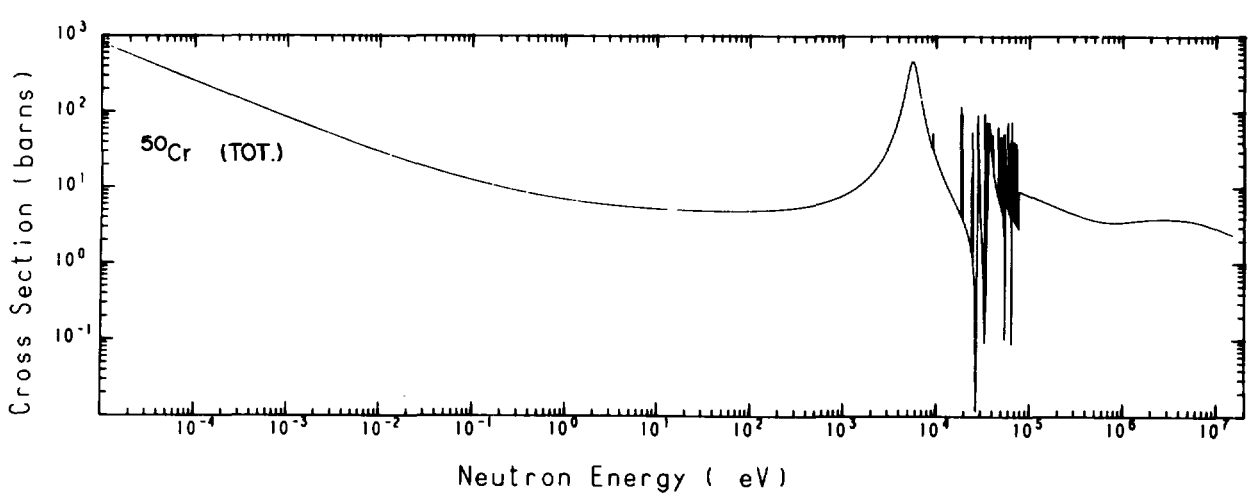

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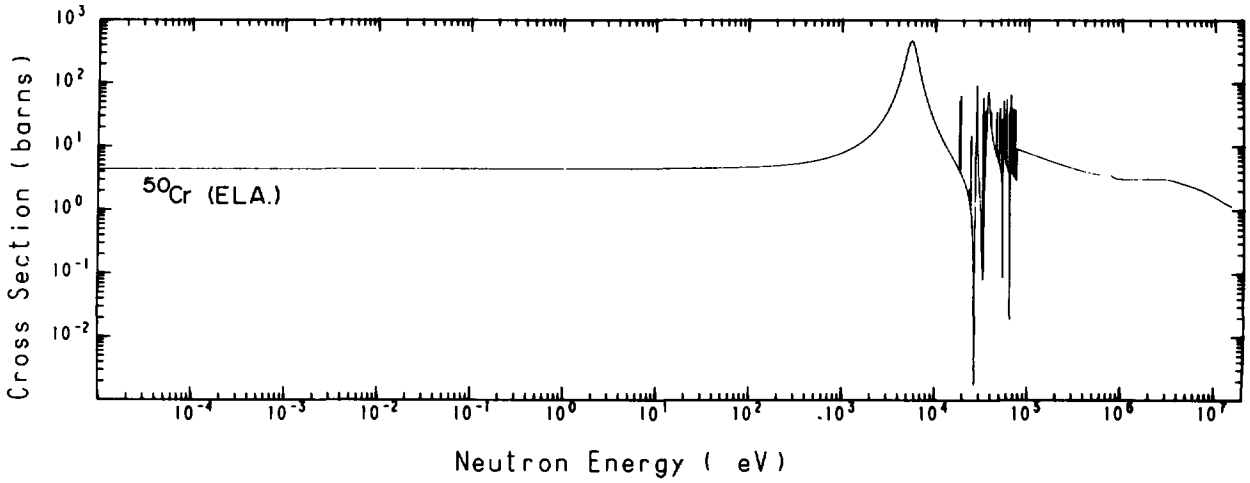

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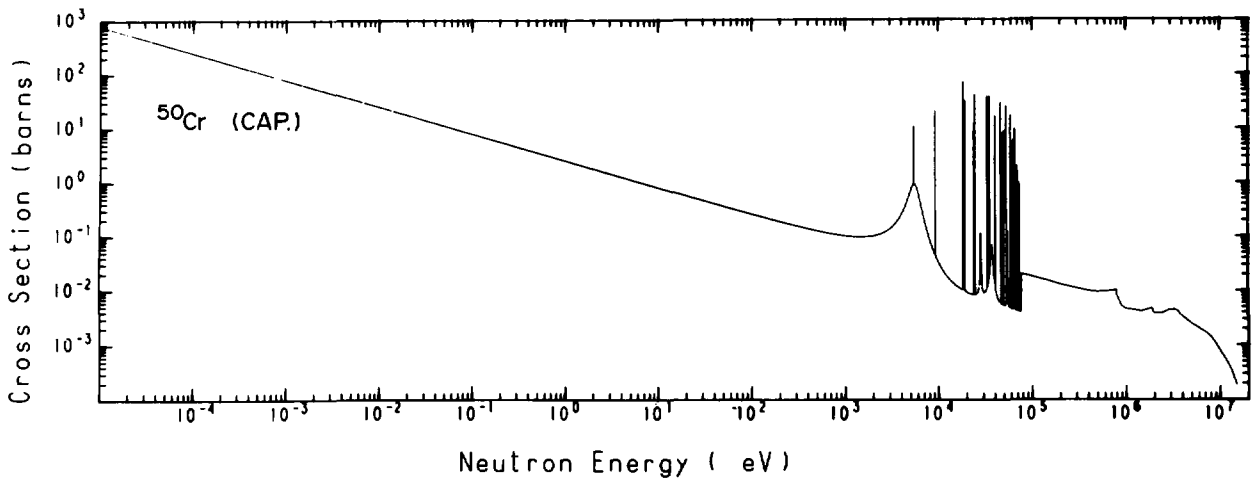

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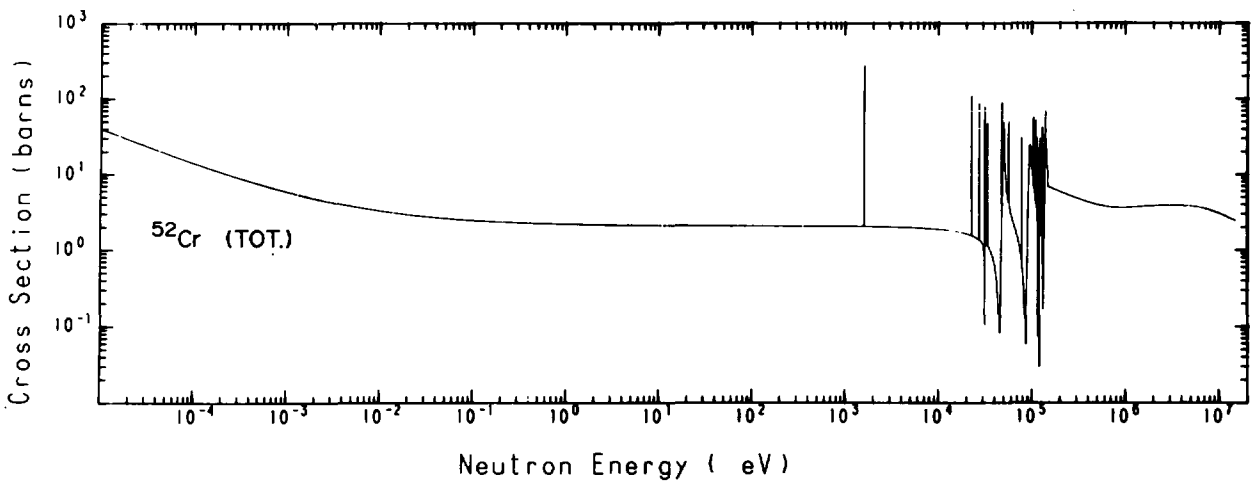

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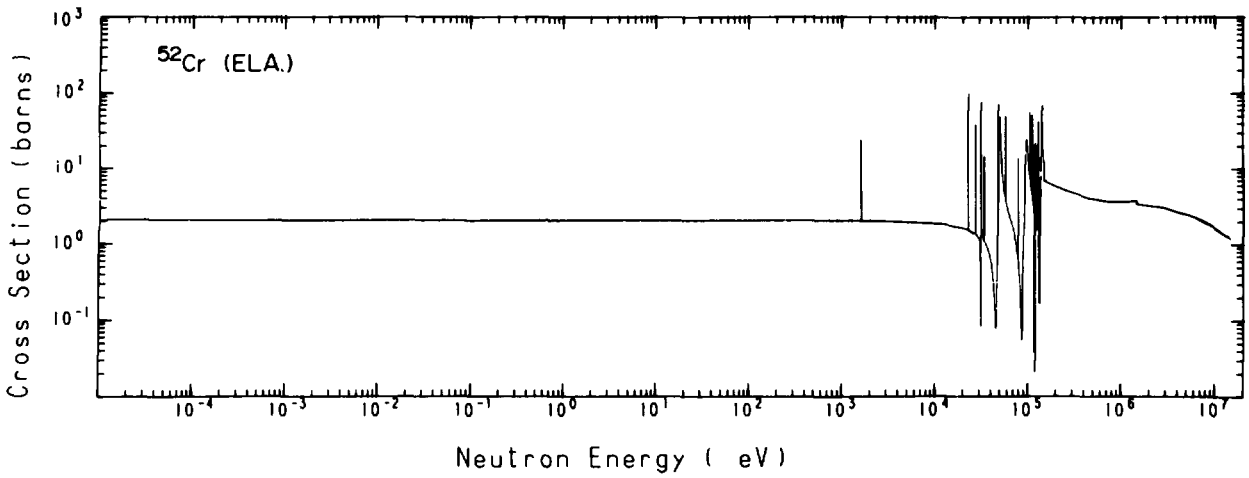

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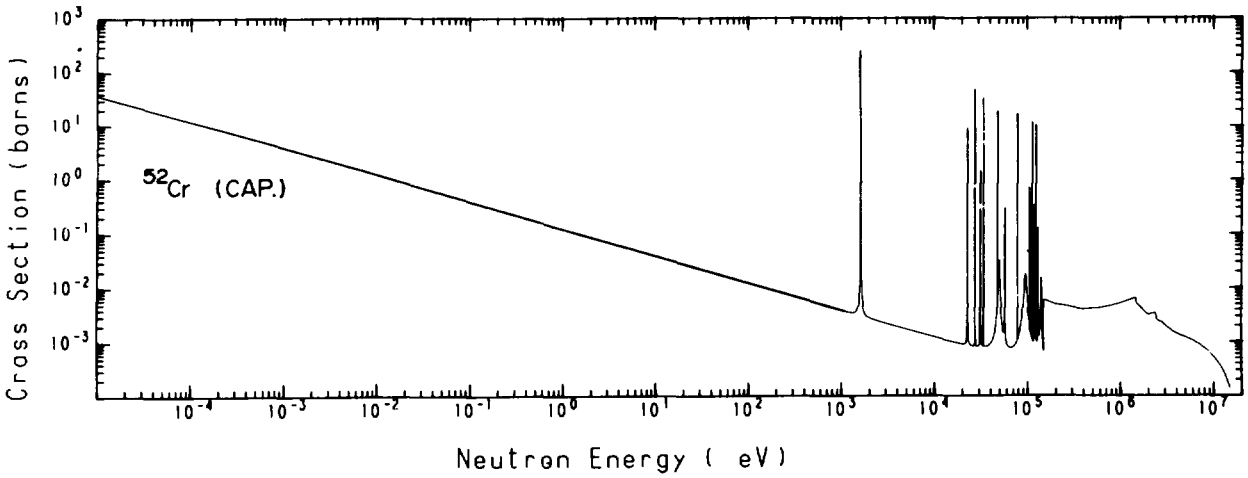

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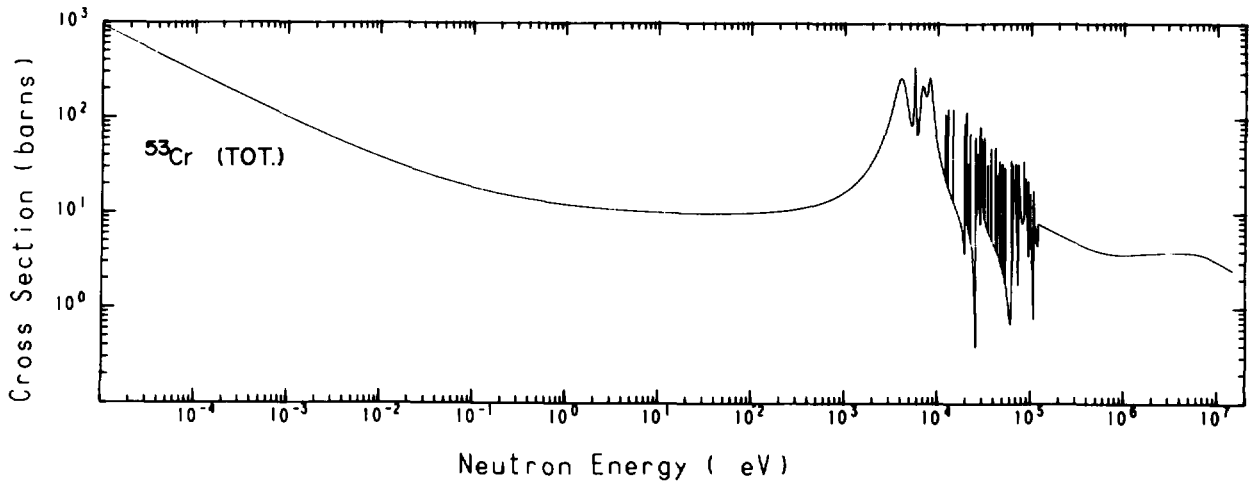

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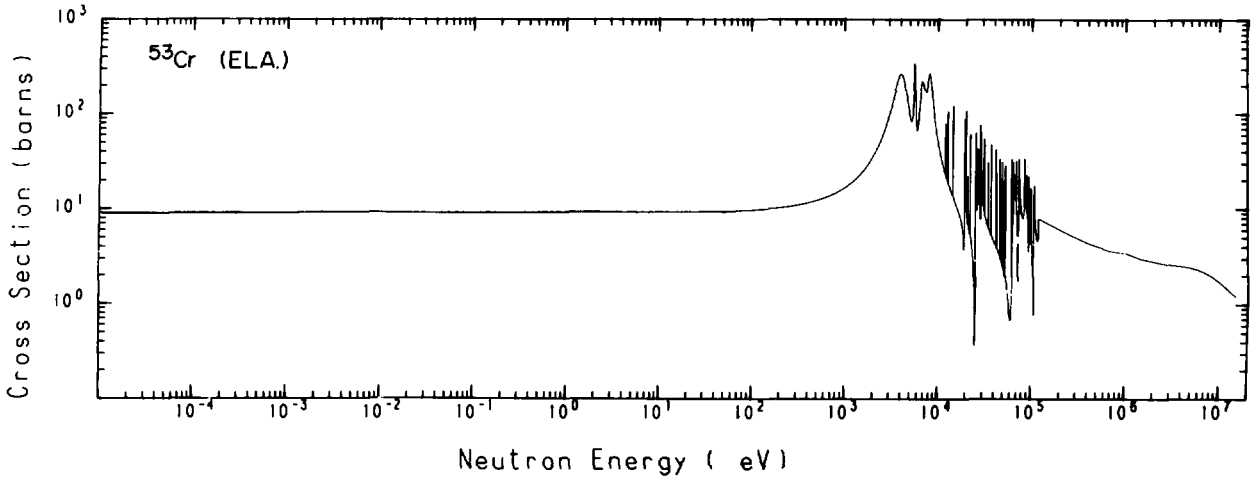
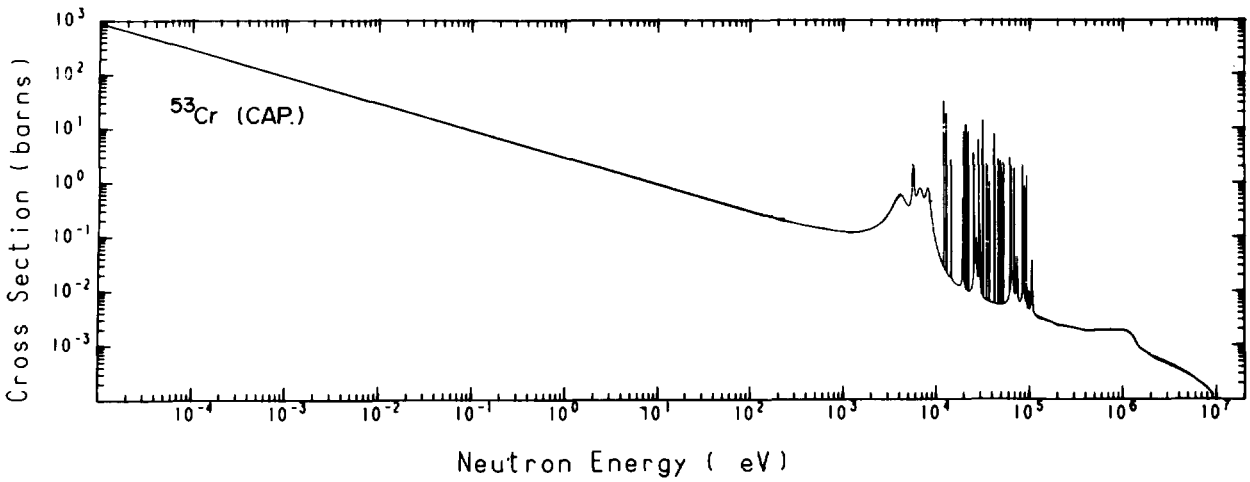


Fig. B1.34



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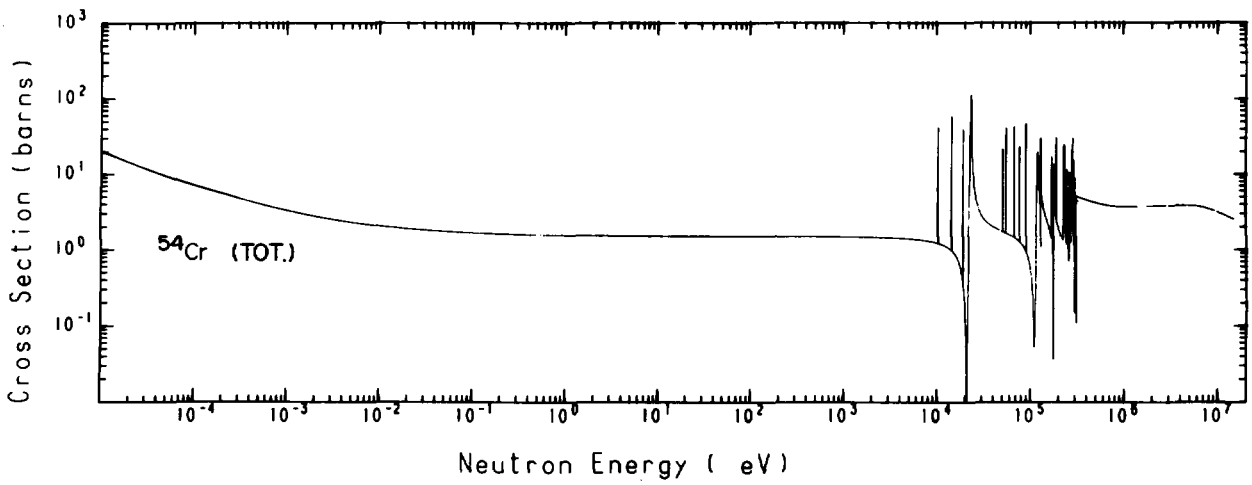

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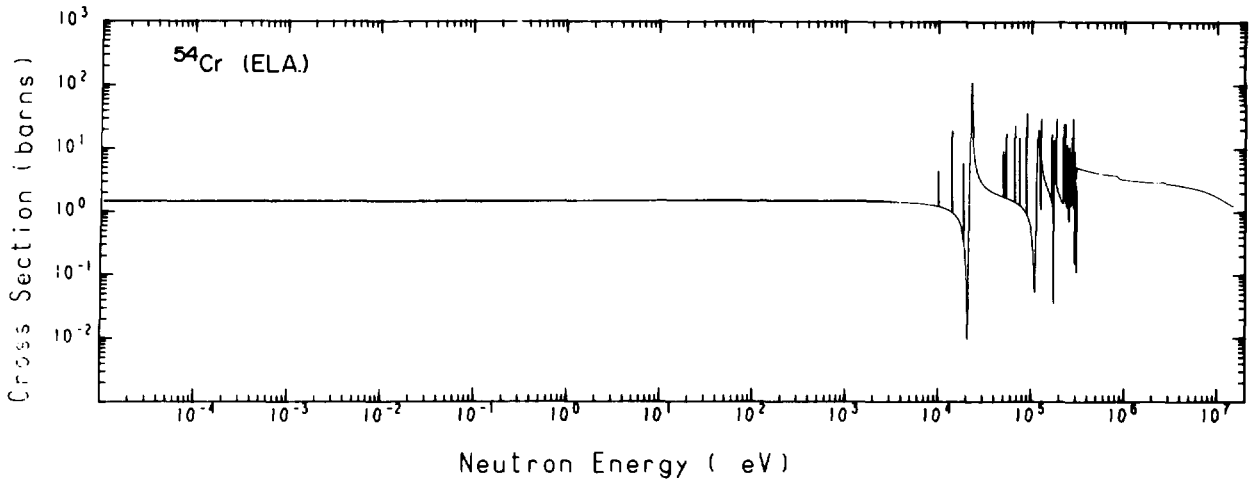

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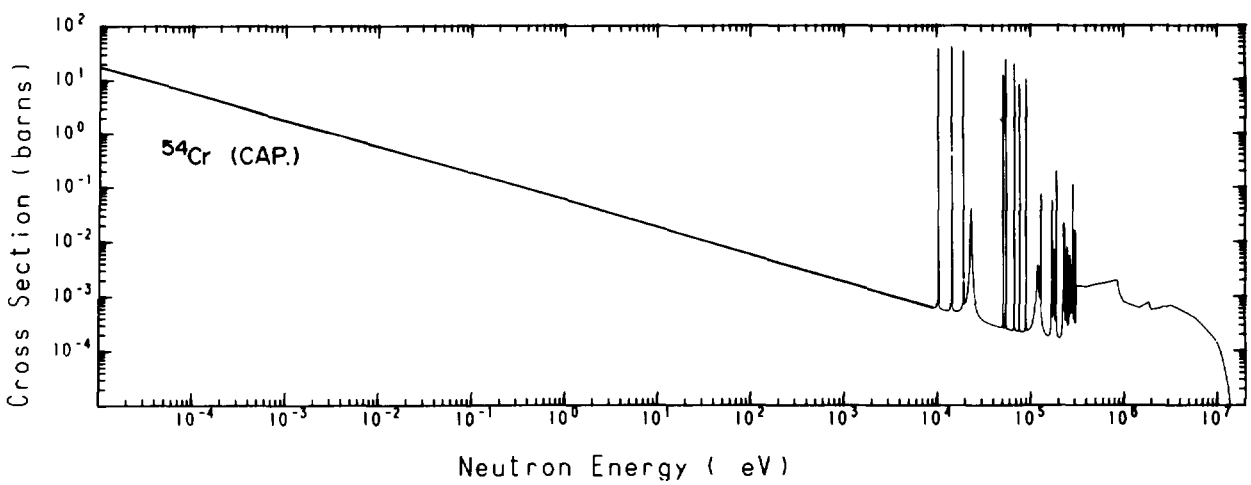

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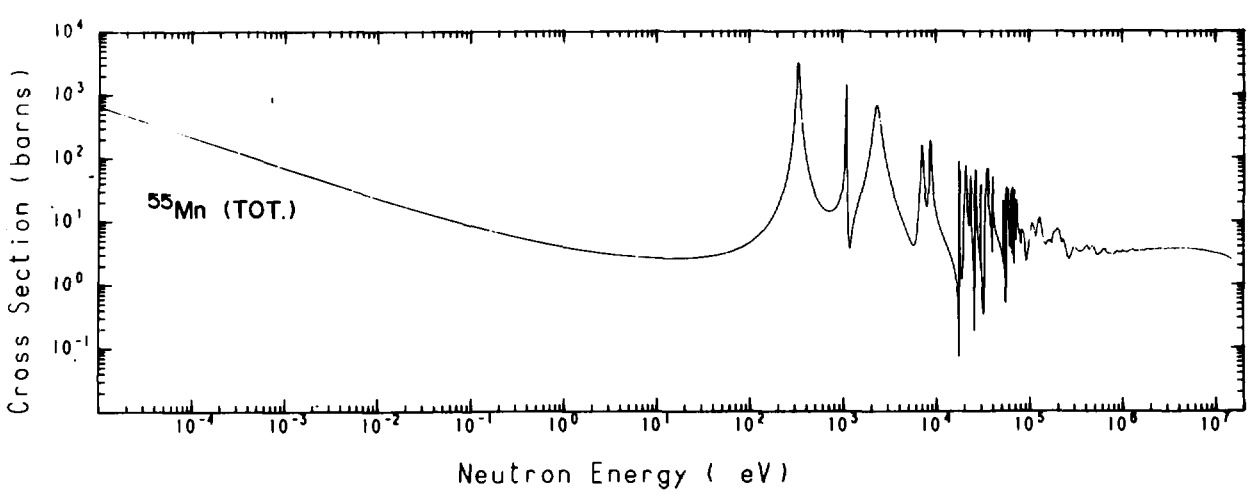
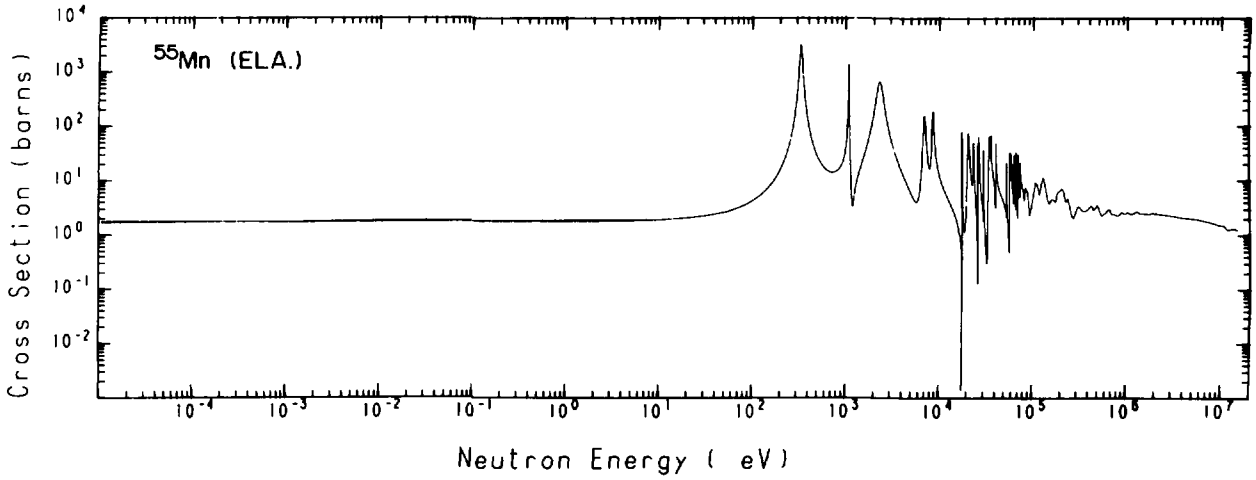


Fig. B1.39



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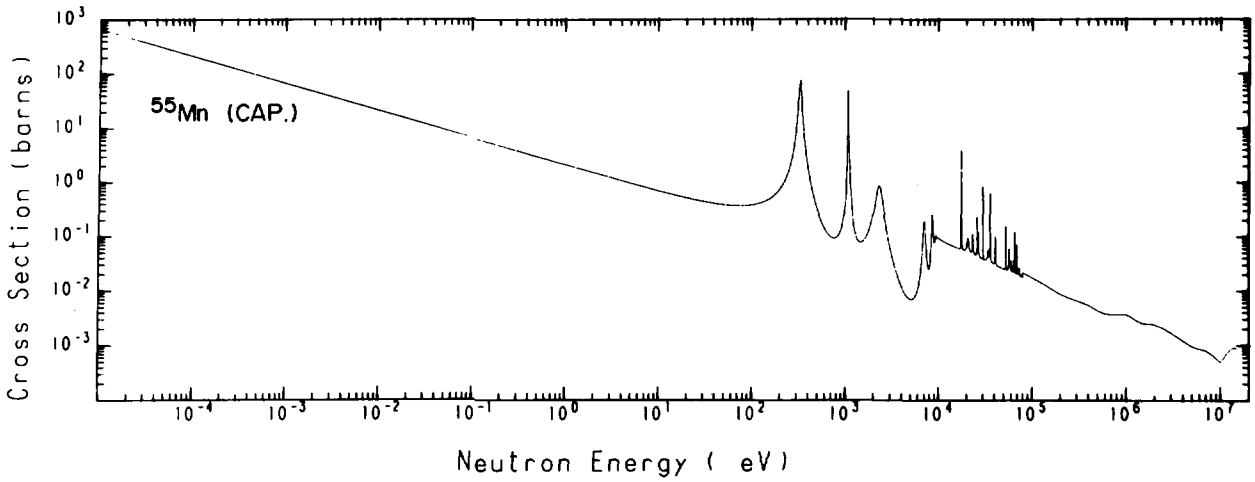

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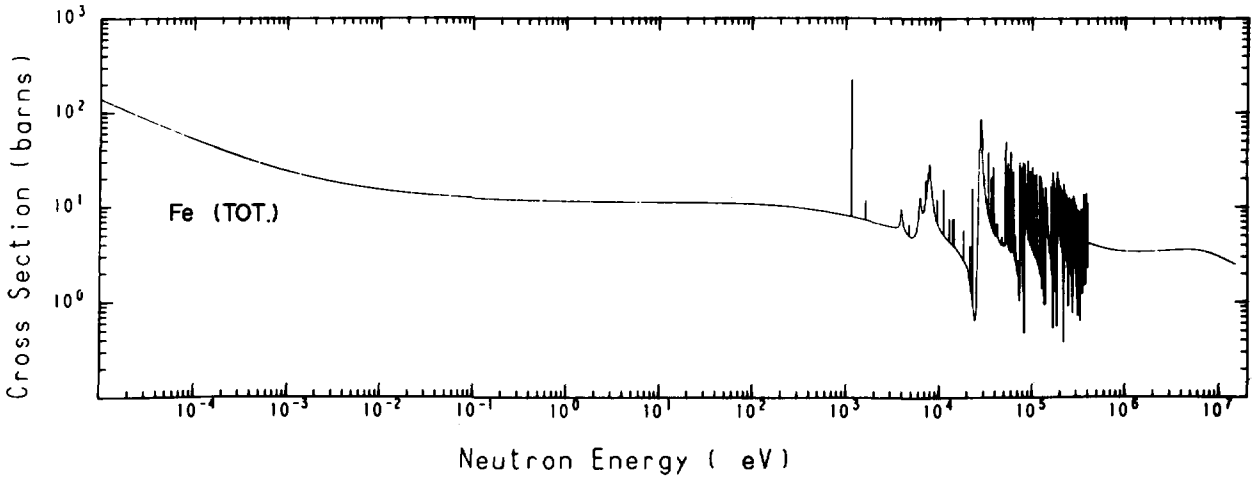

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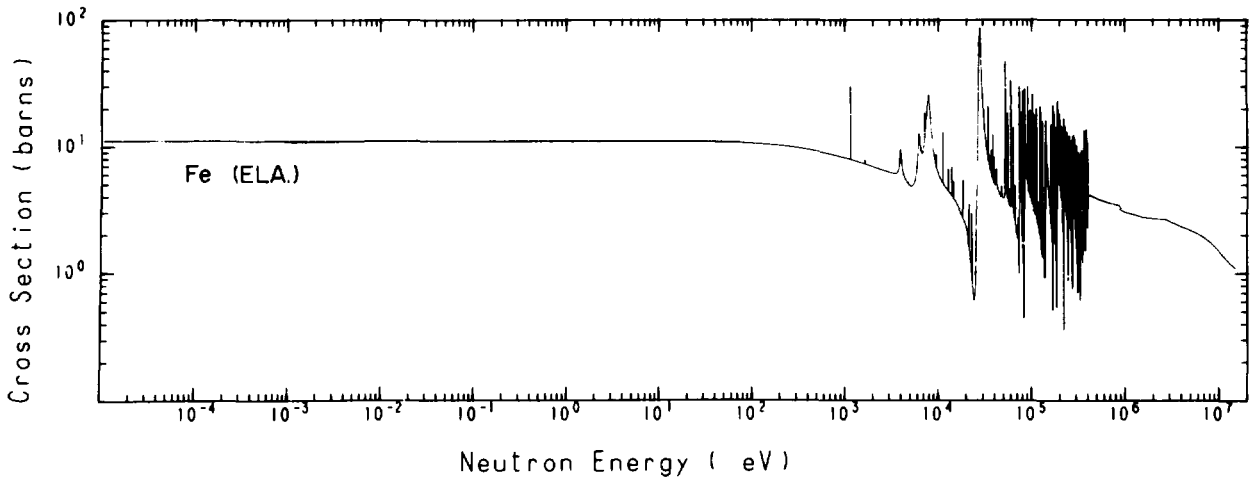

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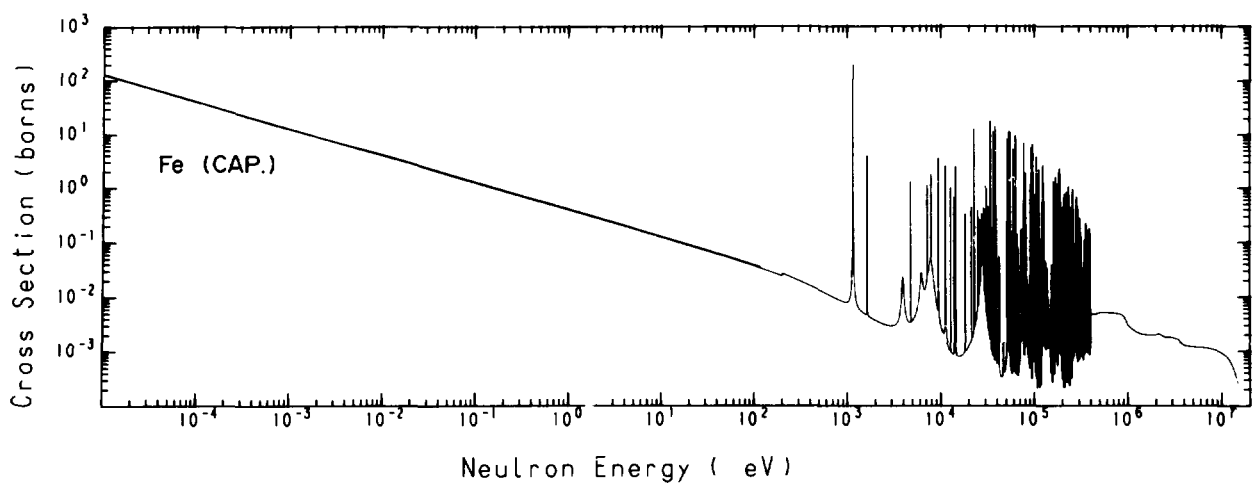

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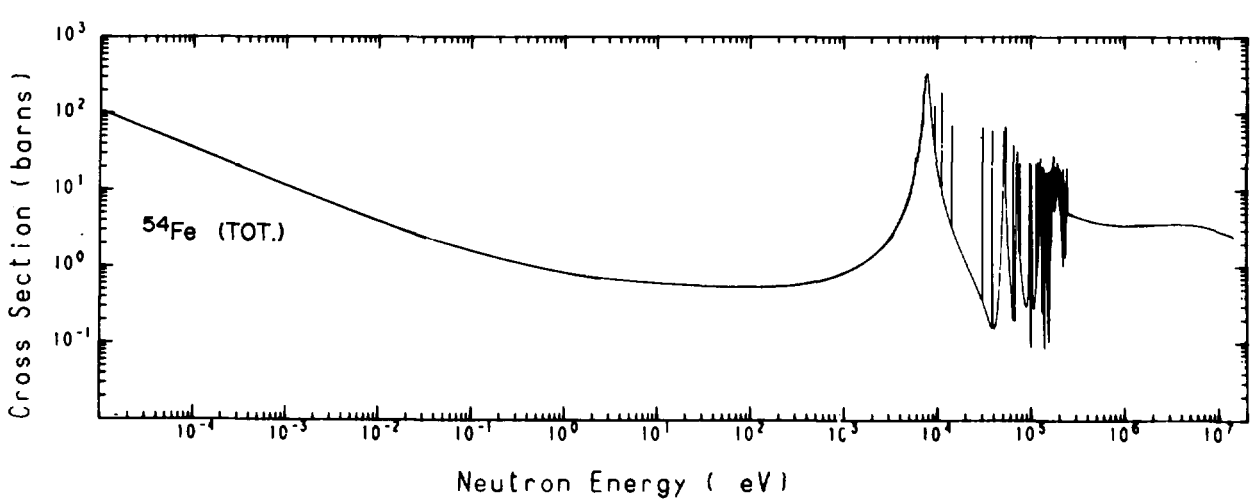

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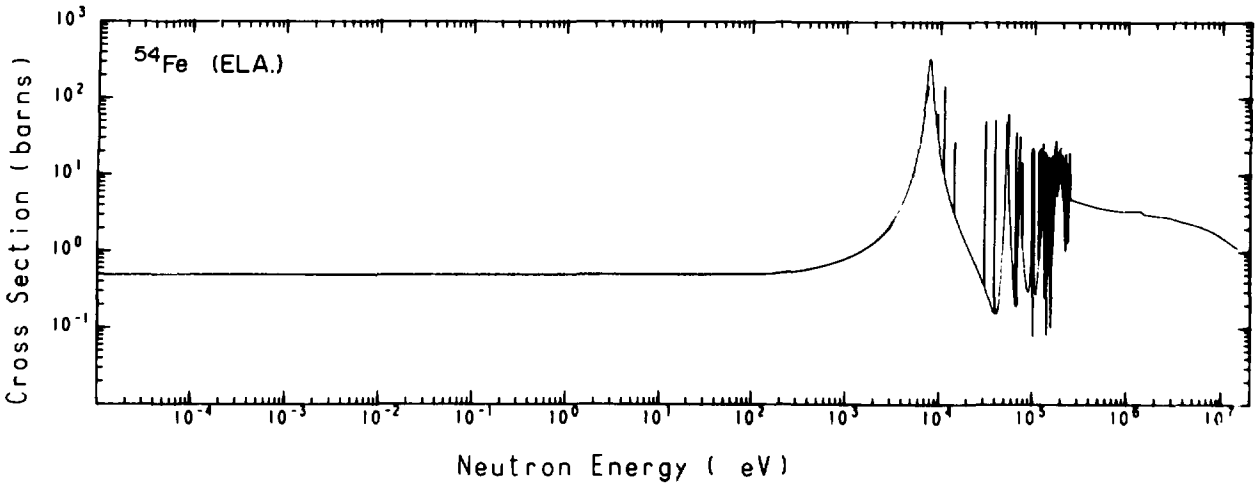

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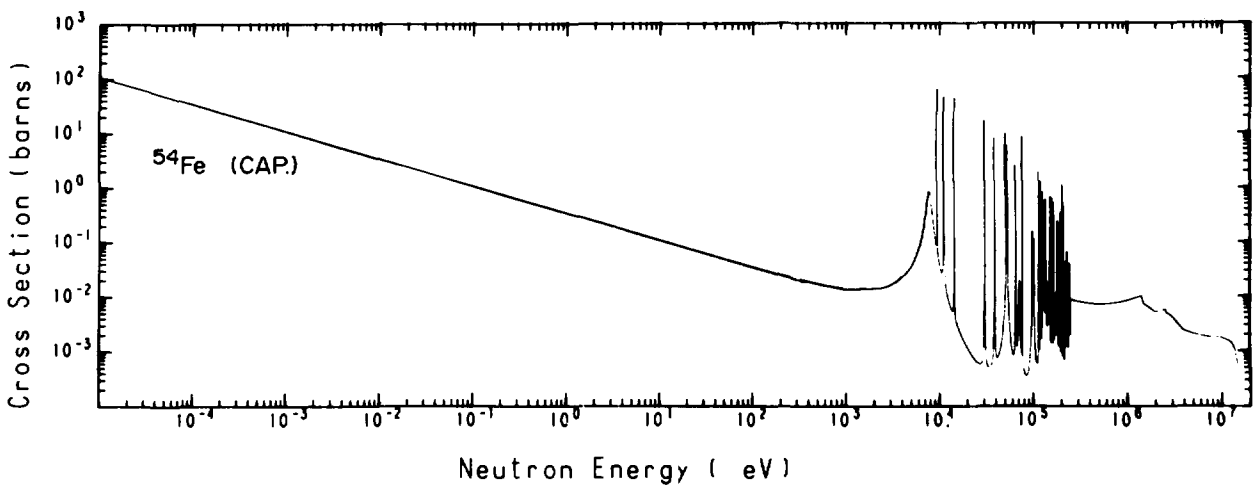

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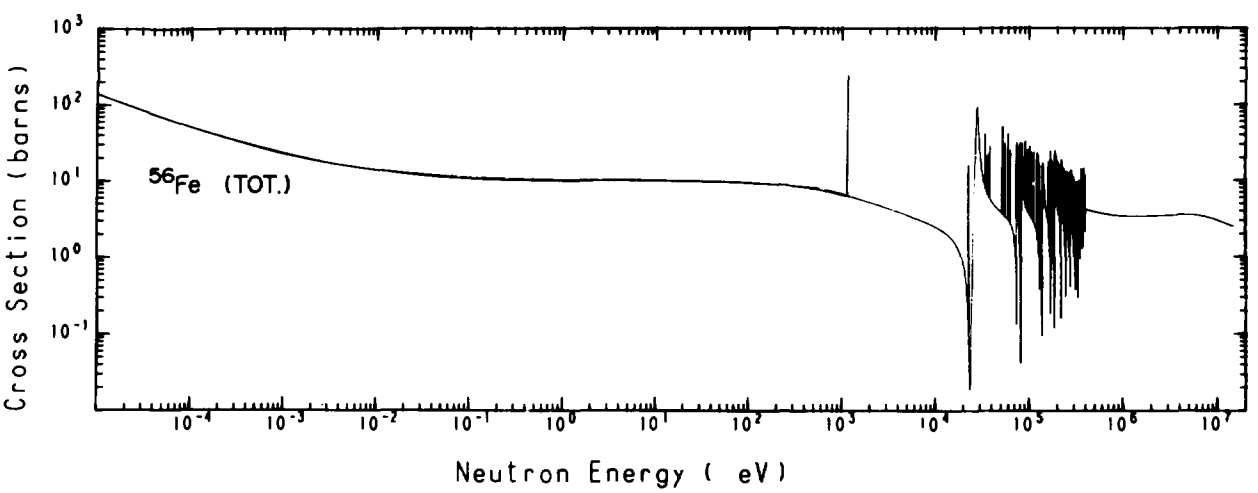

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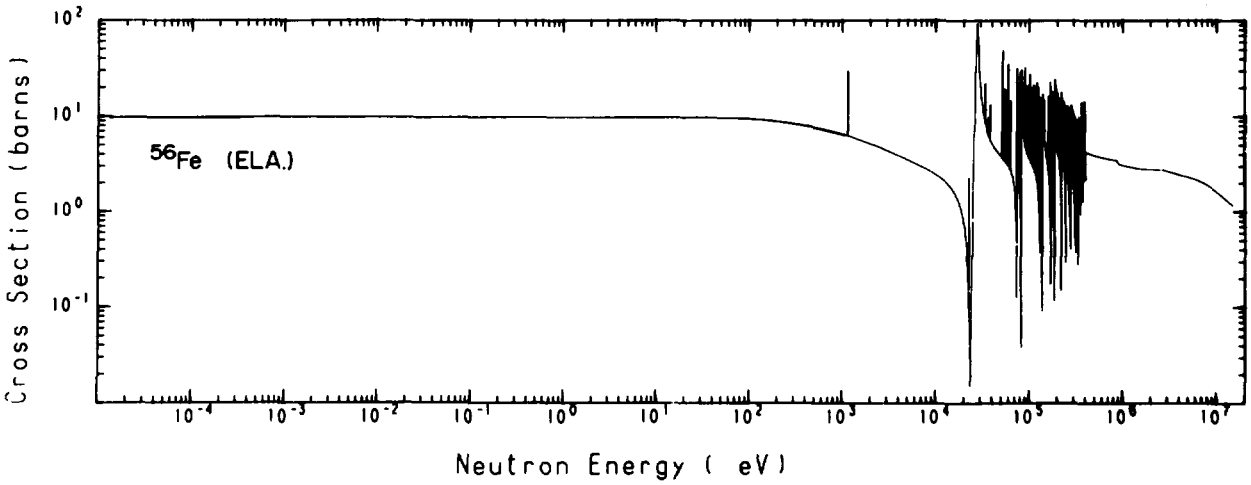

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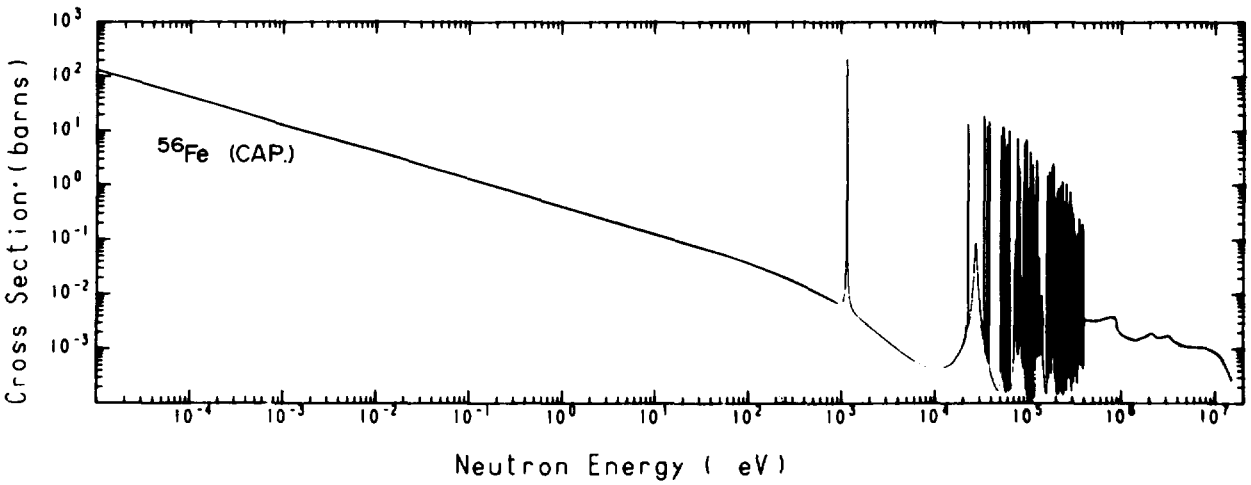

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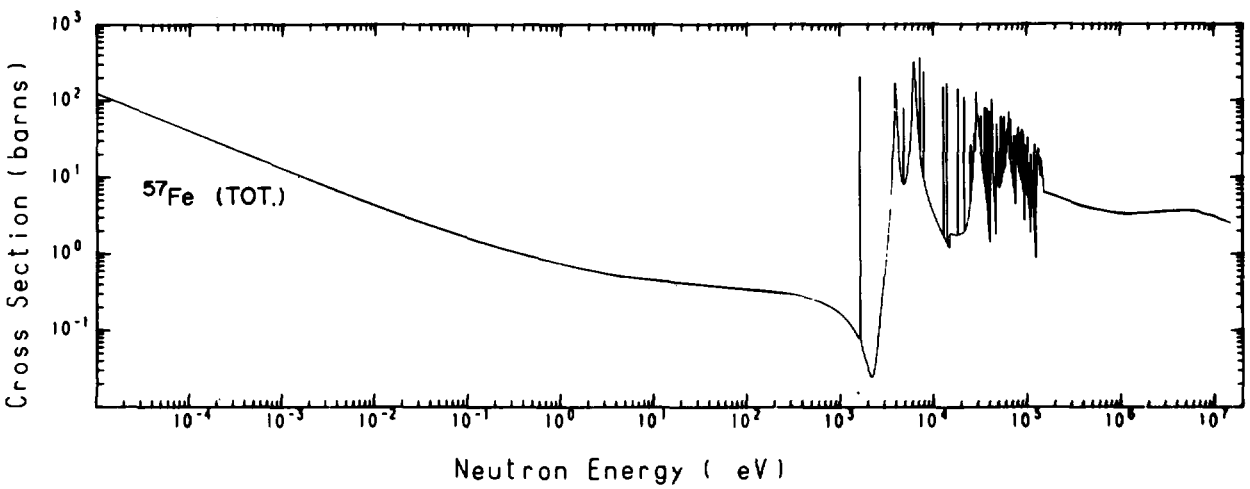

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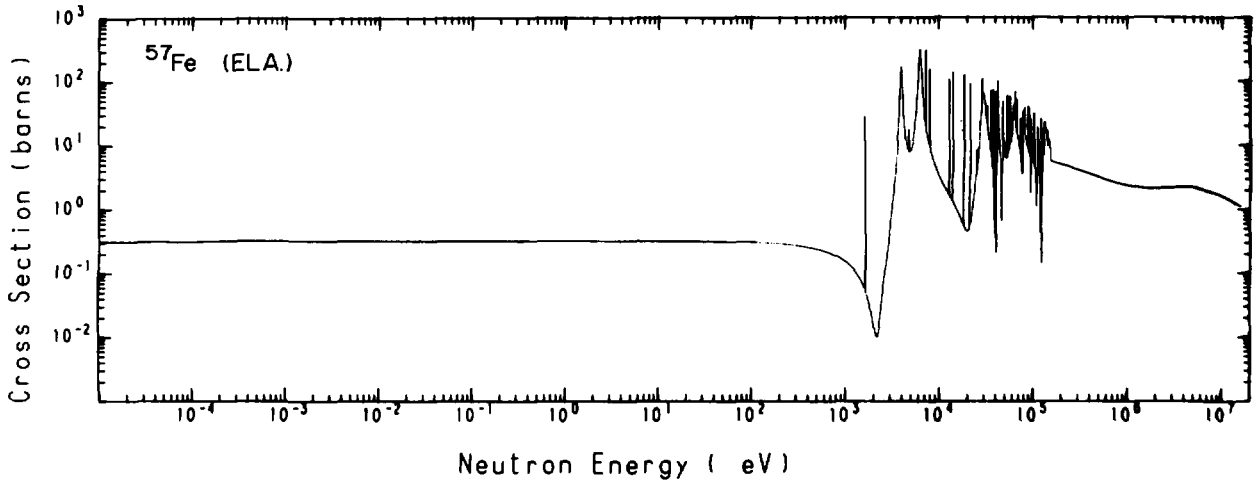

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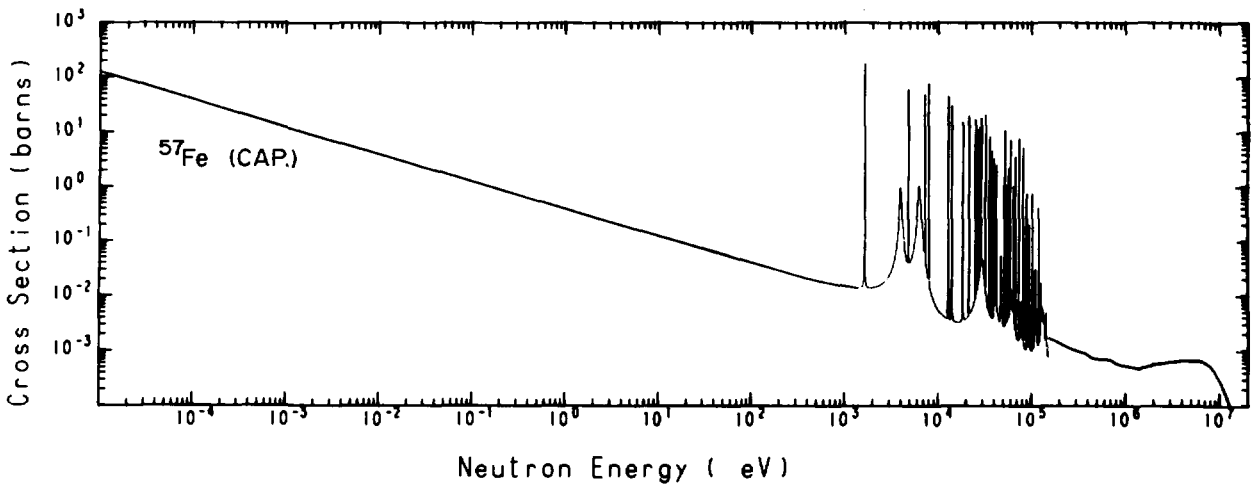

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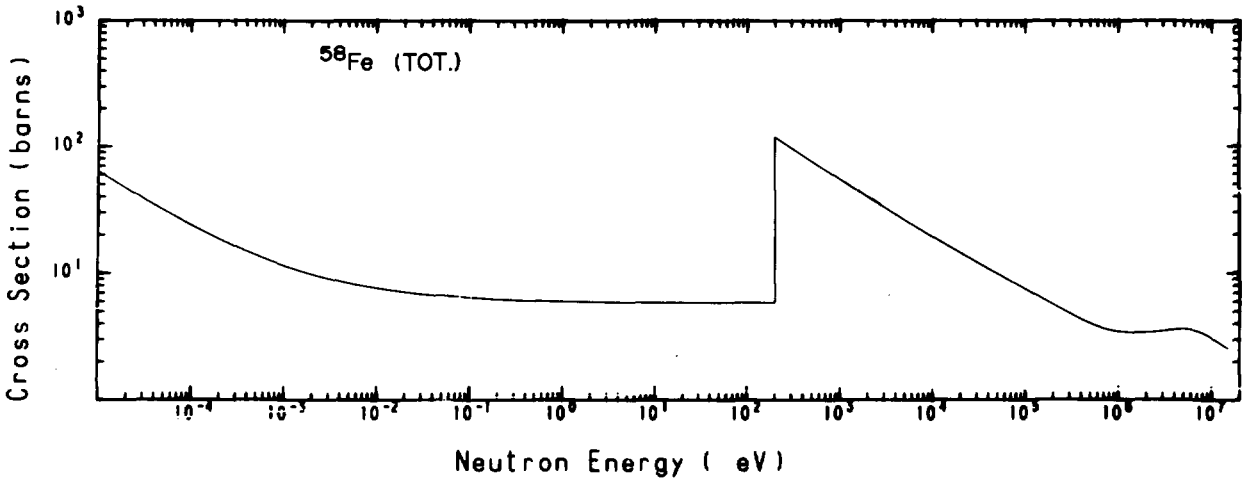

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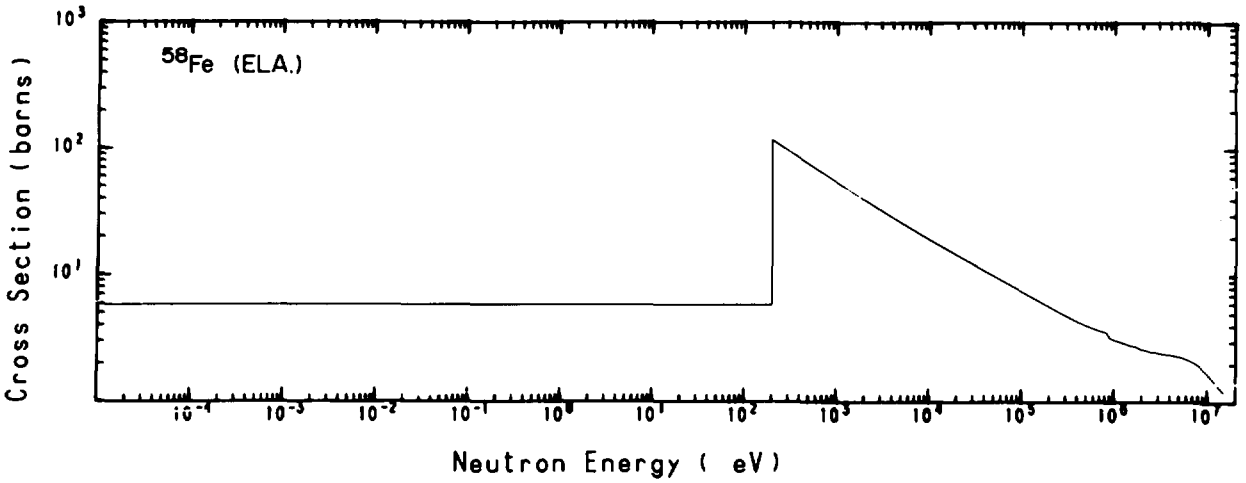

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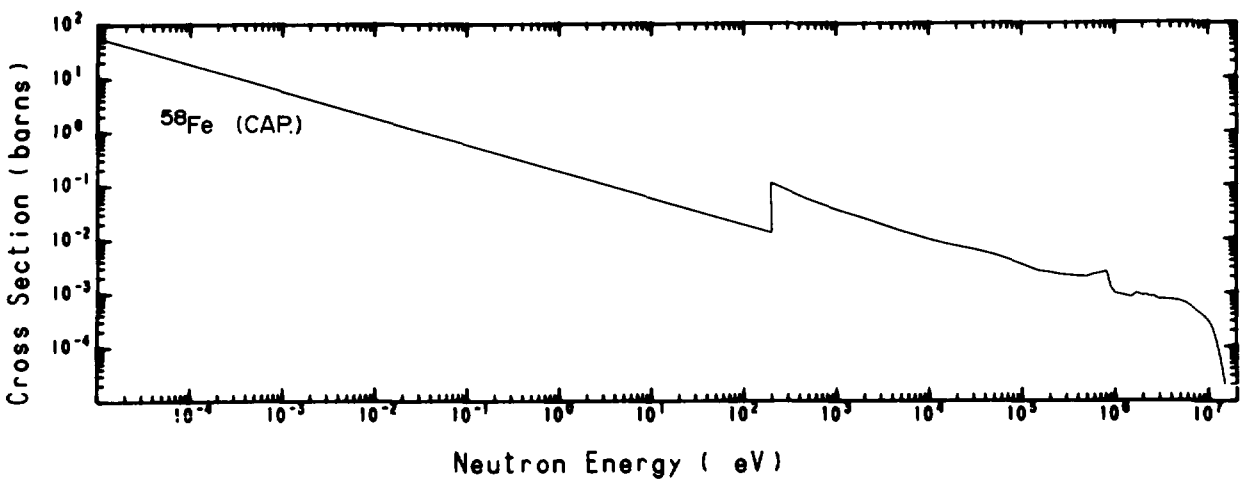

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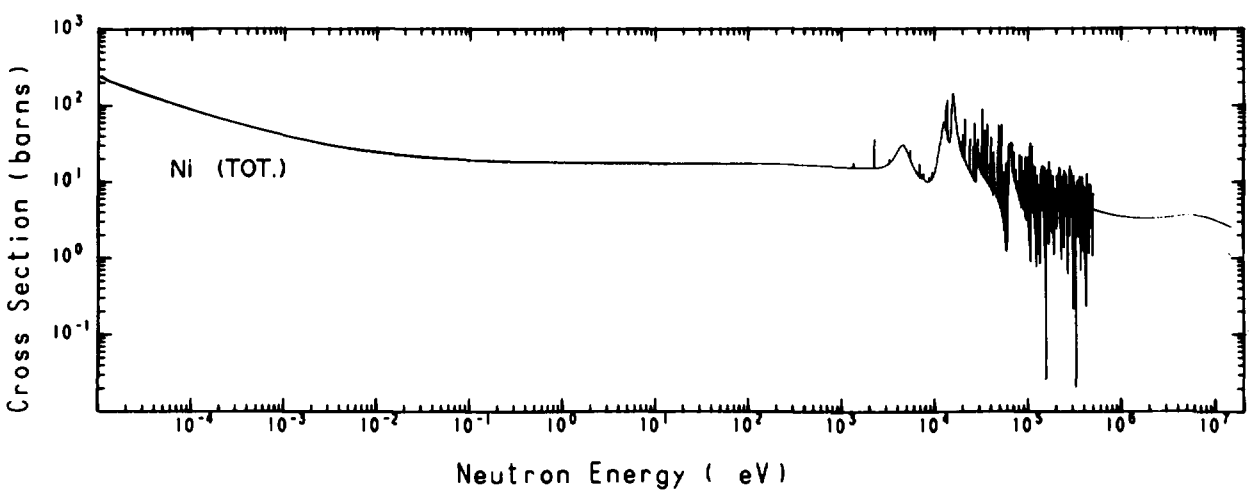

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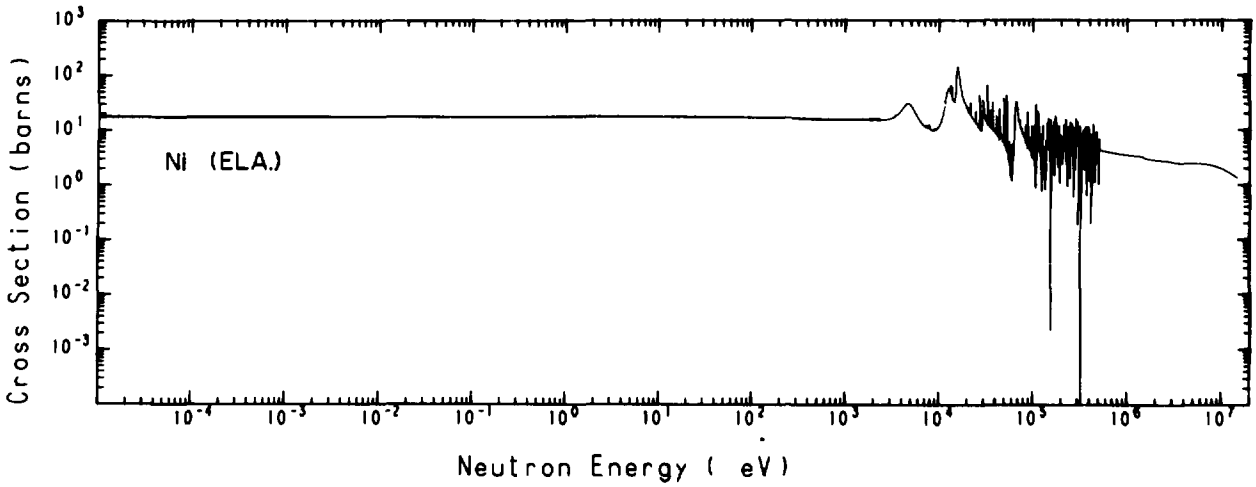

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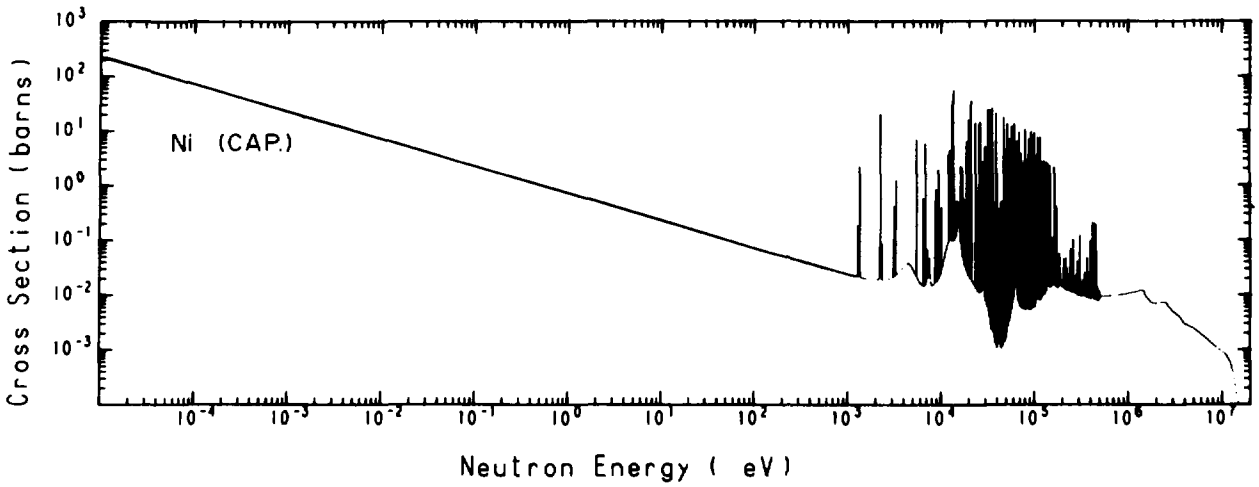

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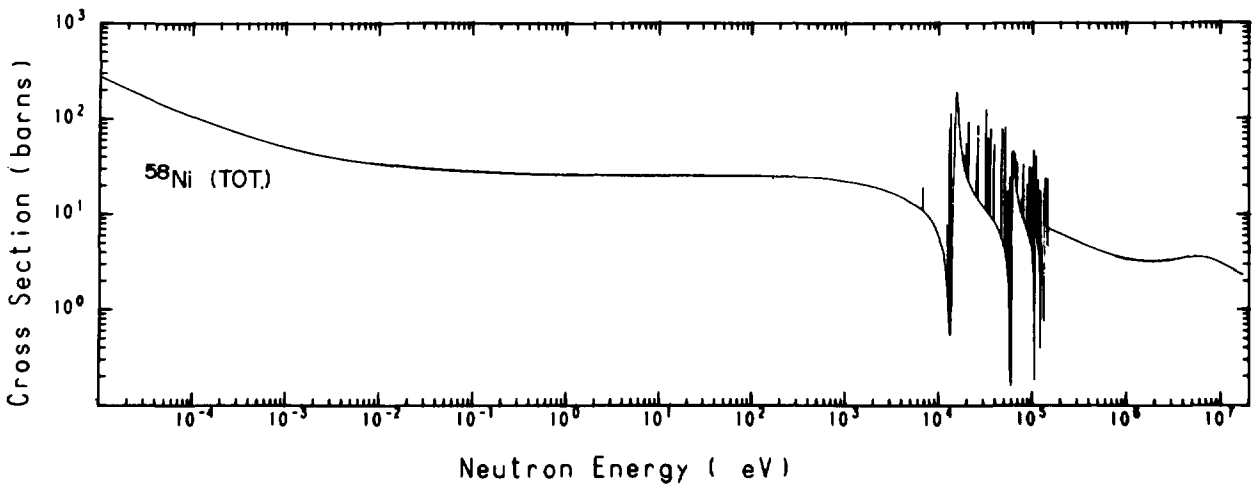

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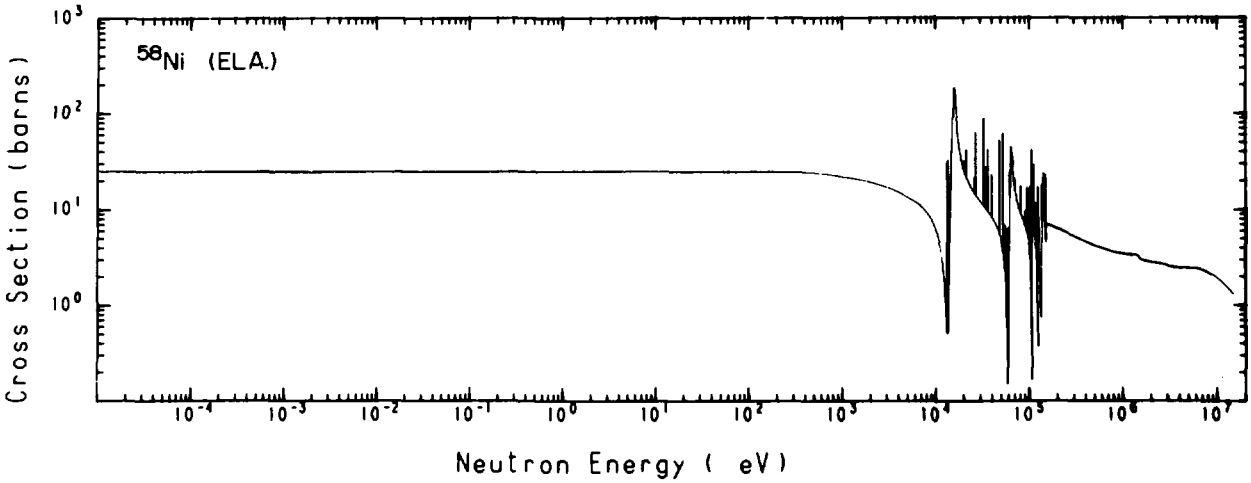

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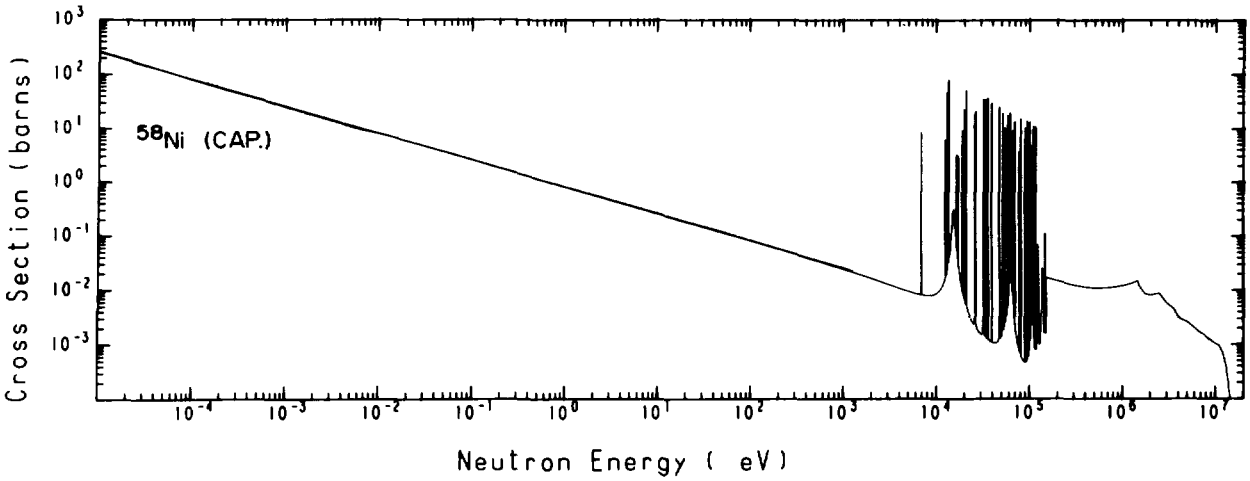

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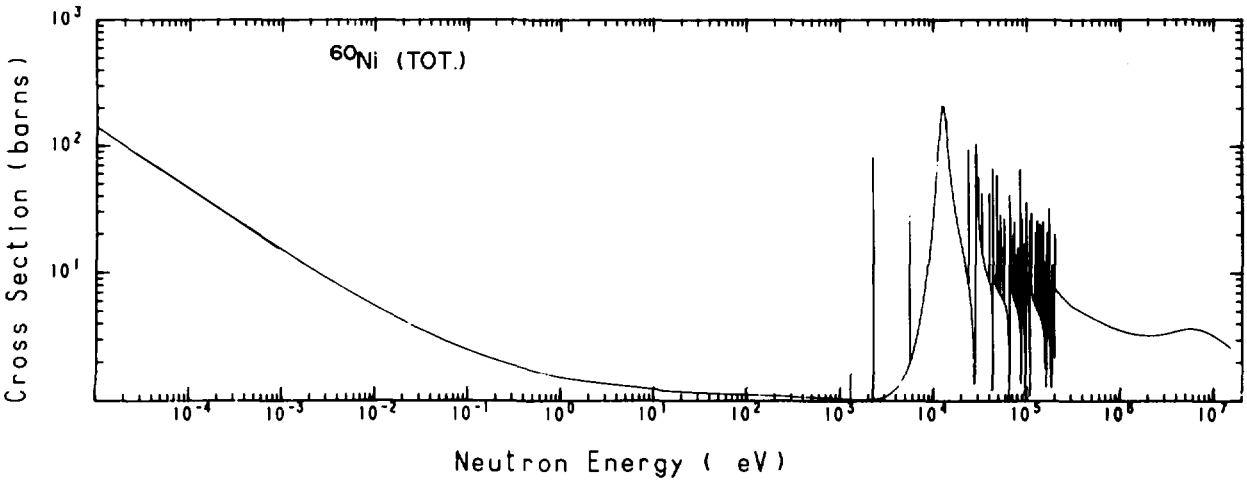

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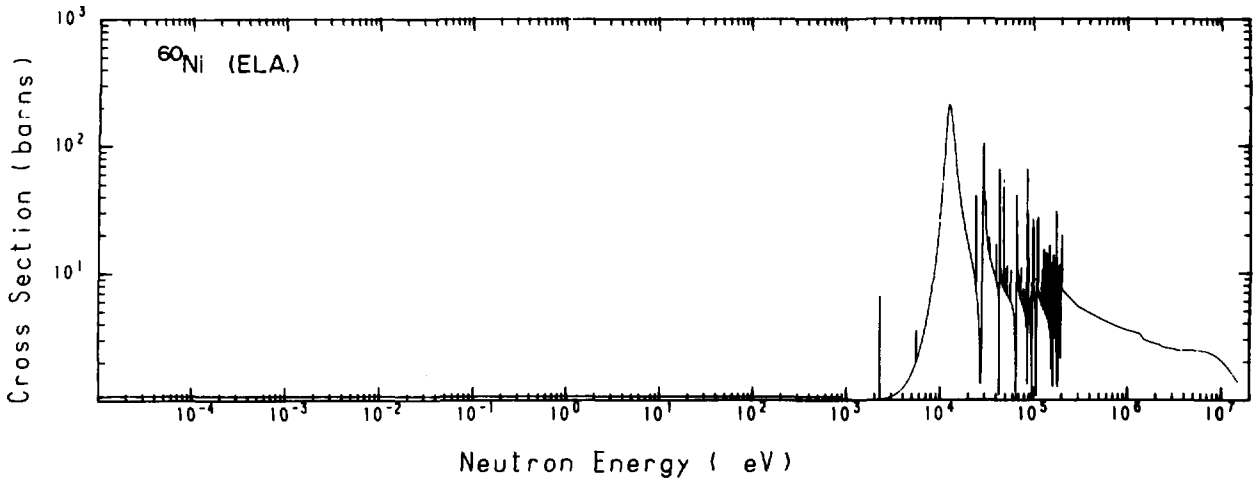

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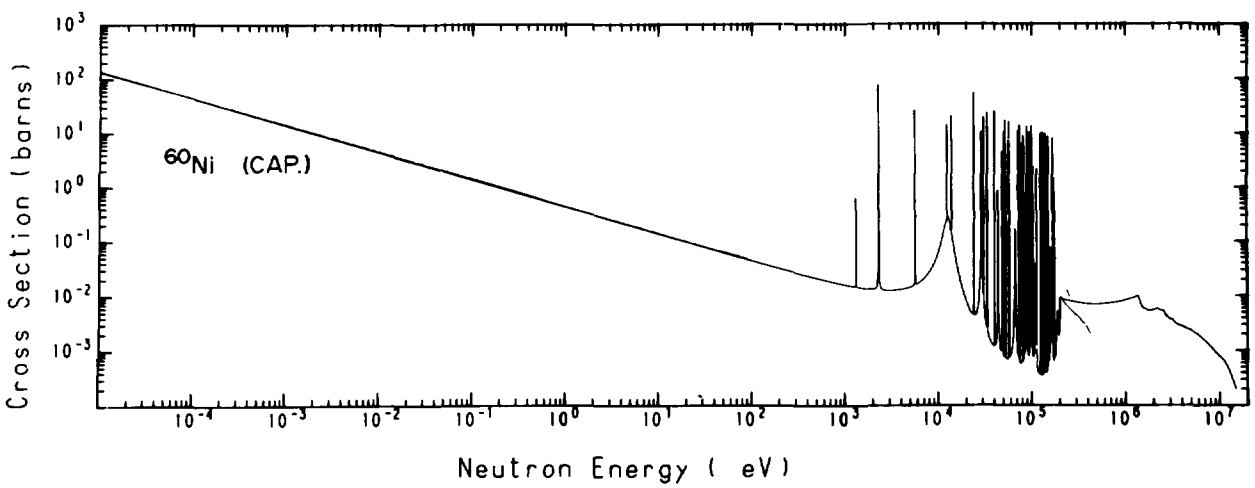

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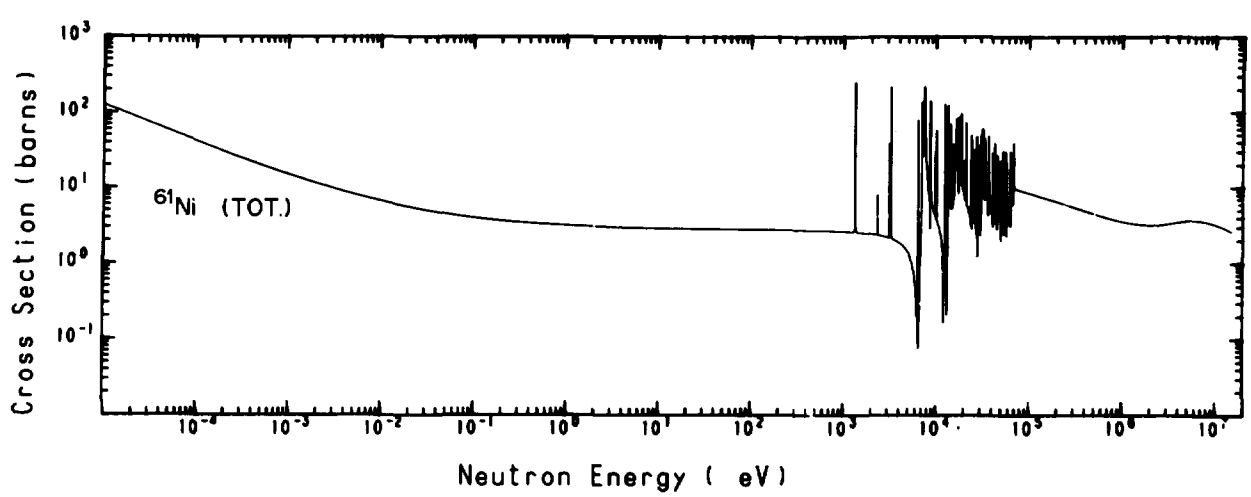

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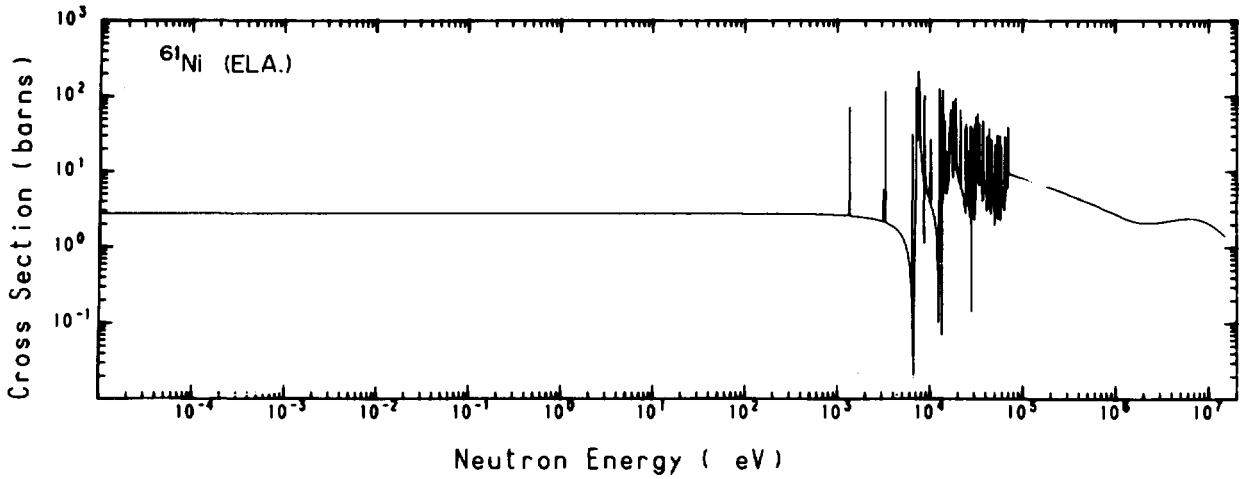

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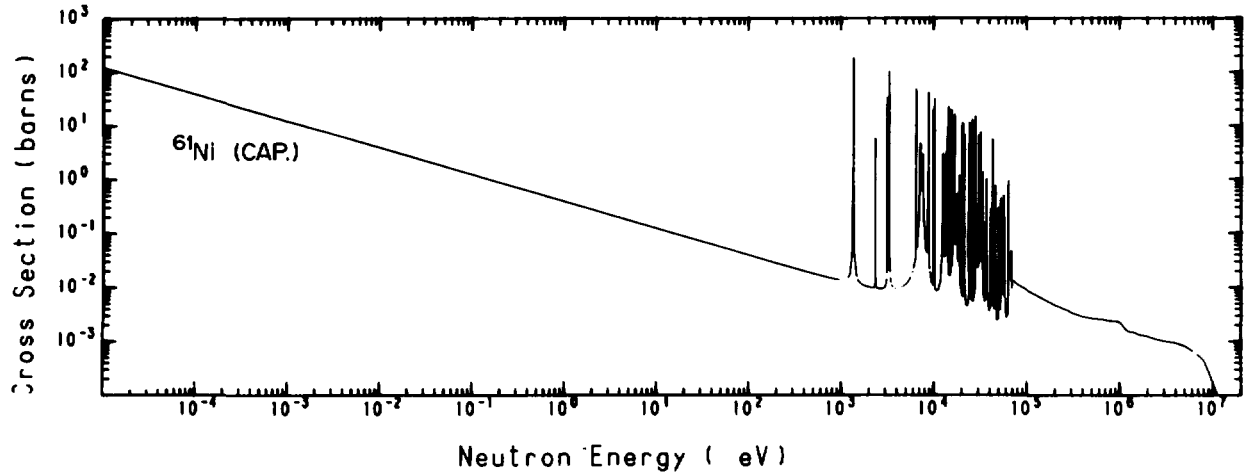

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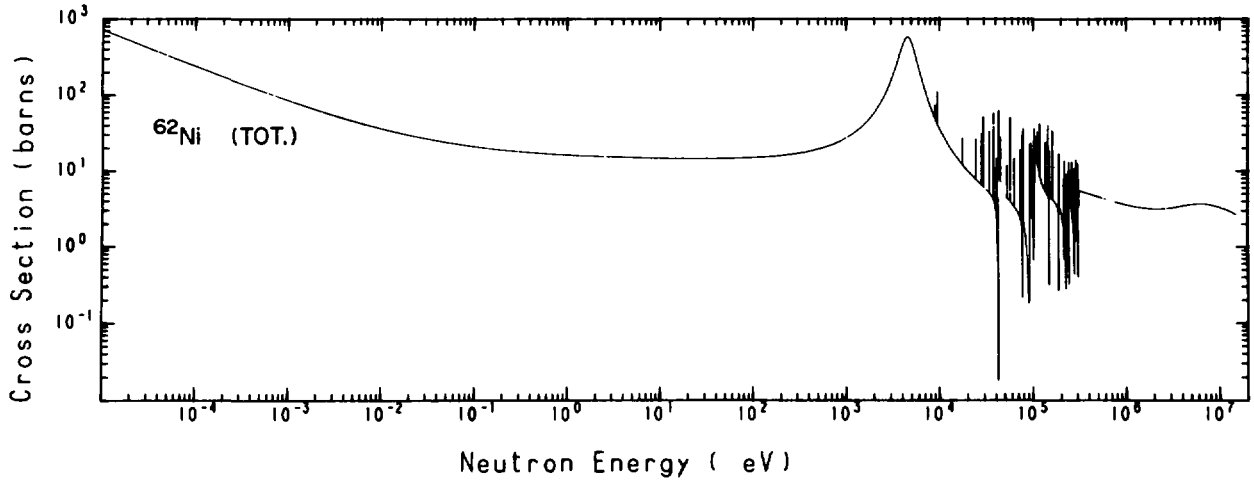

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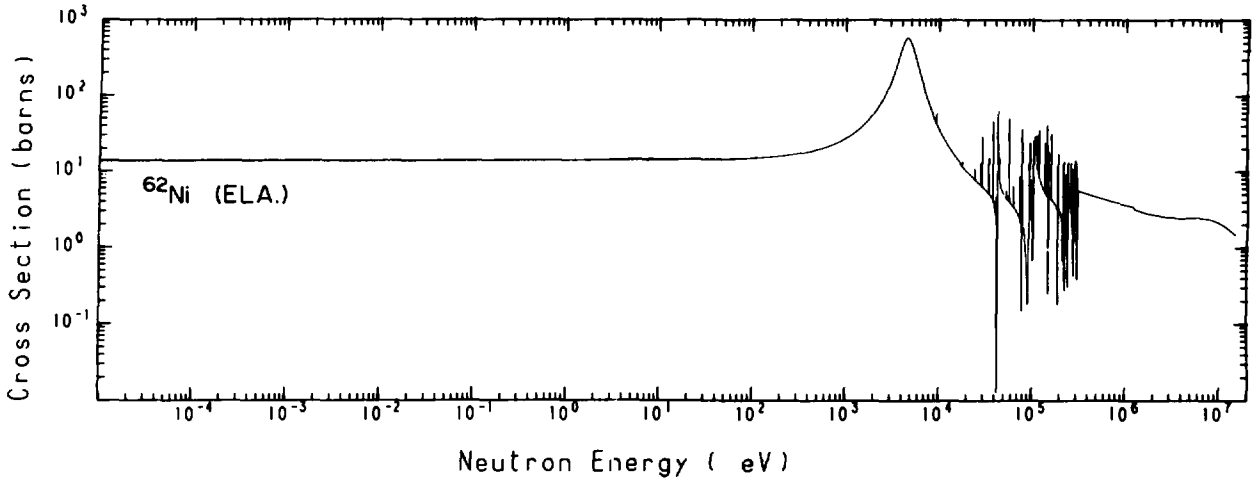

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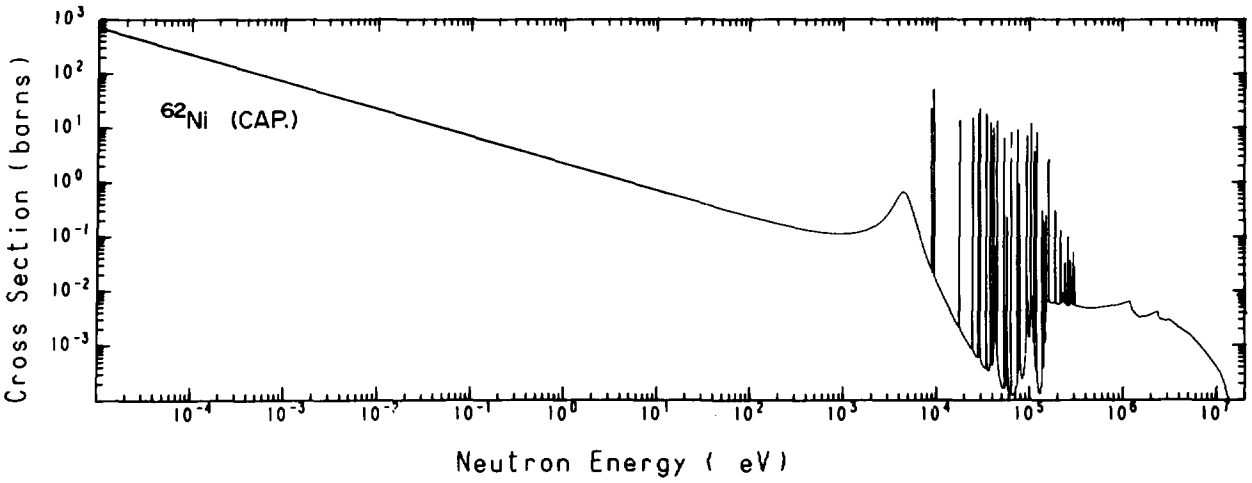

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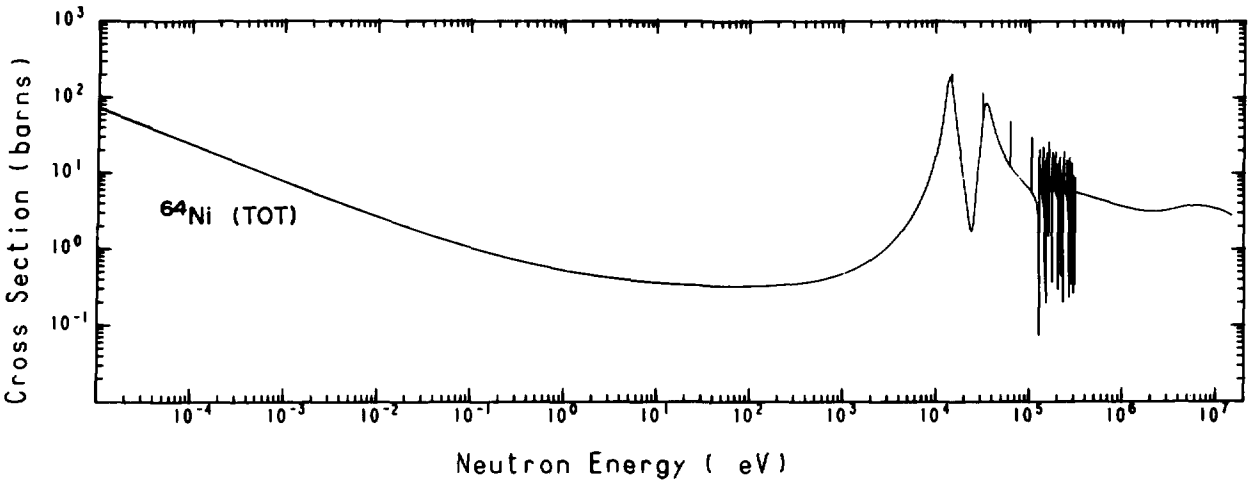

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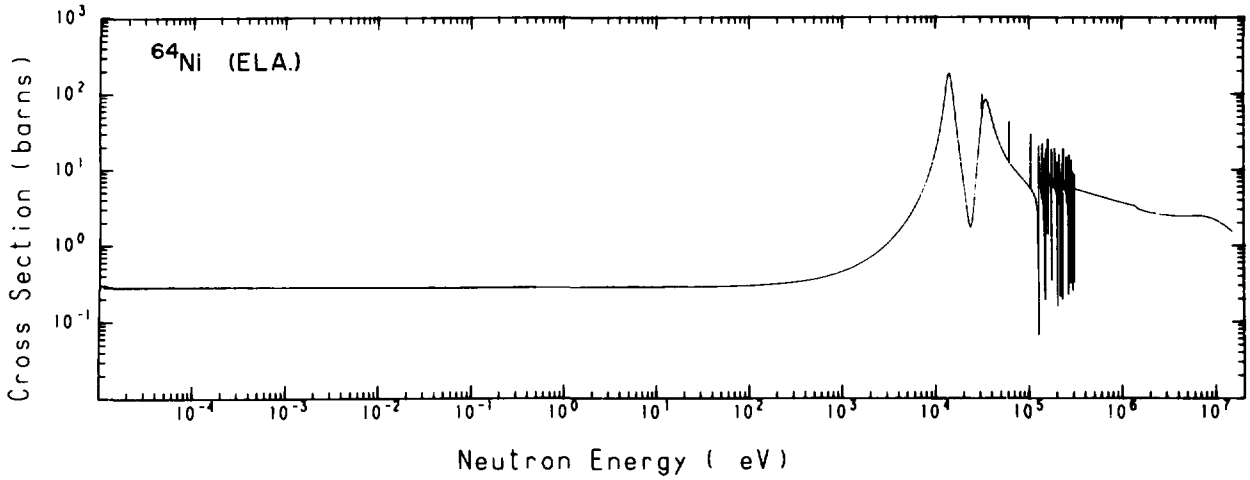

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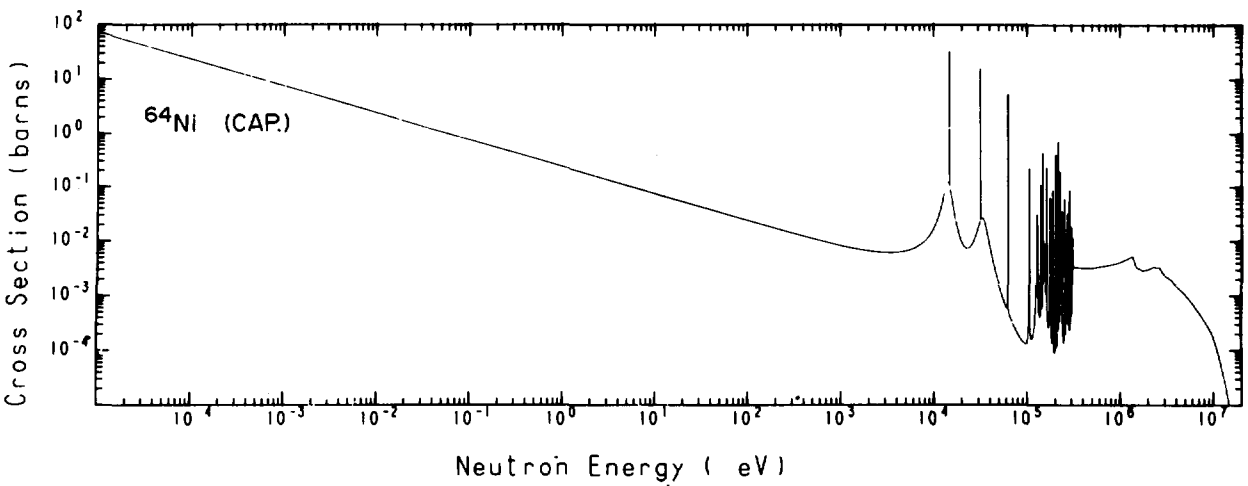

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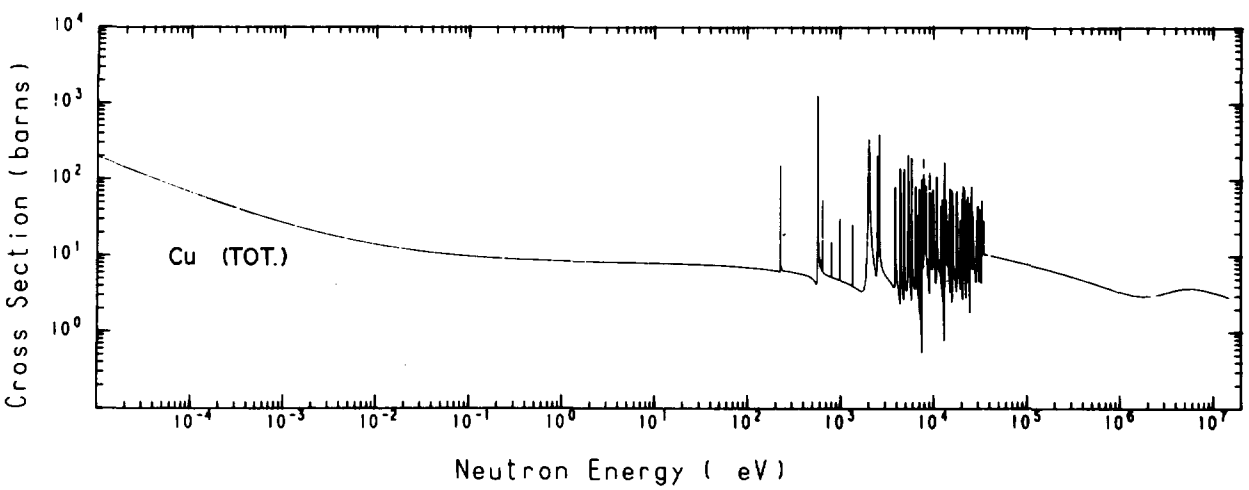

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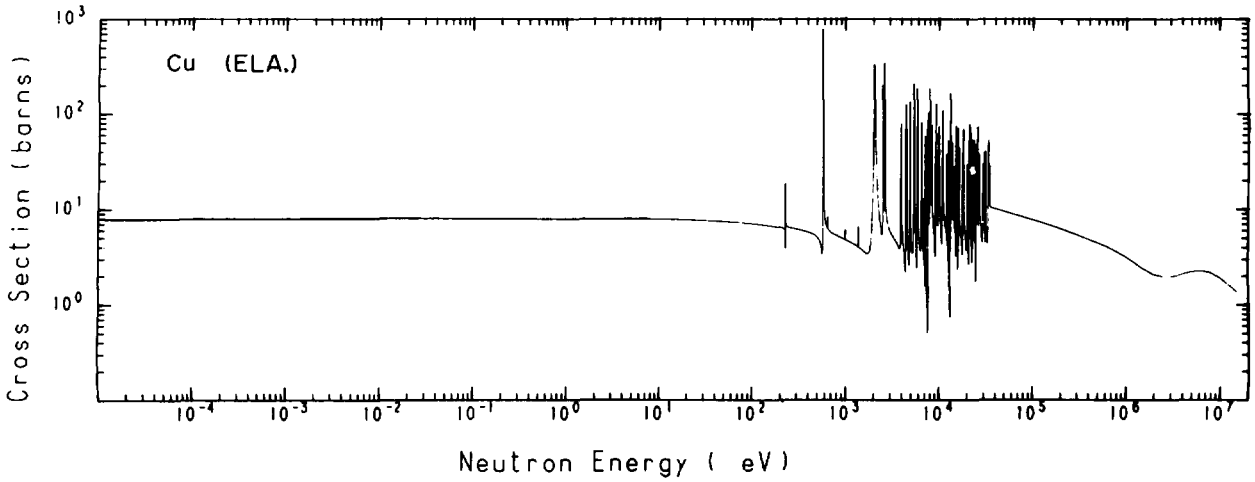

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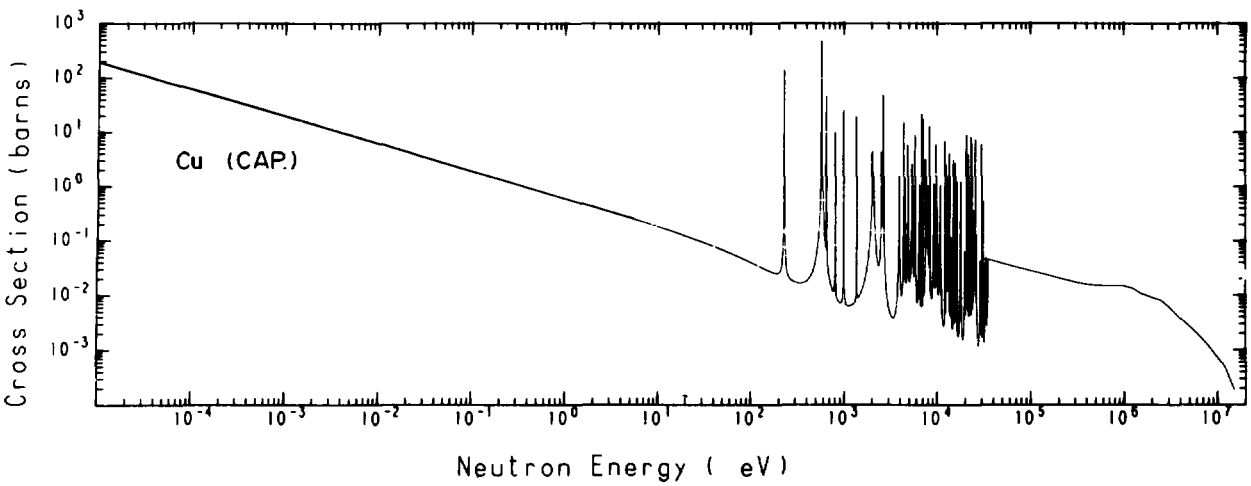

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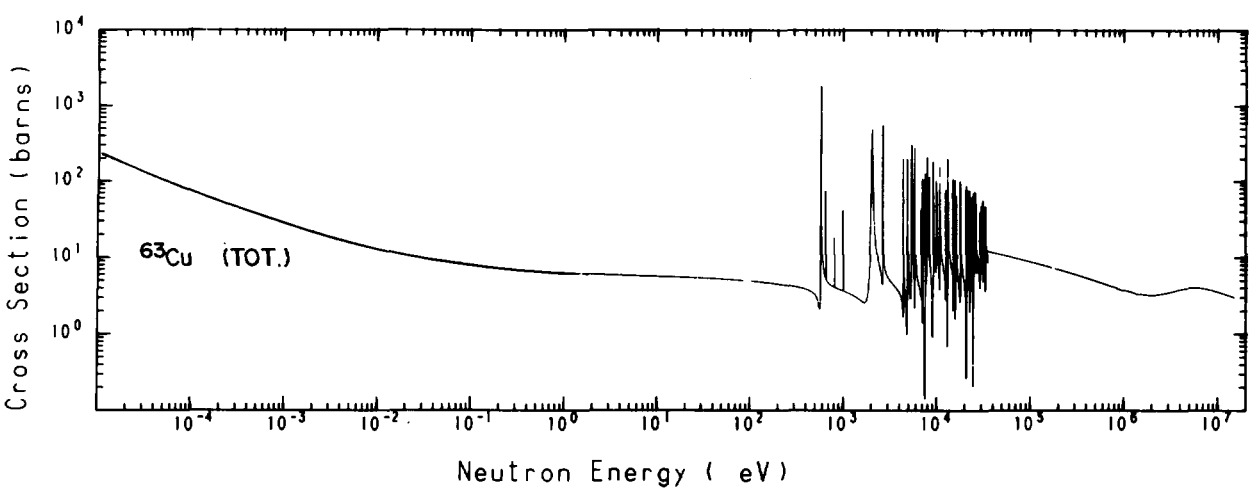

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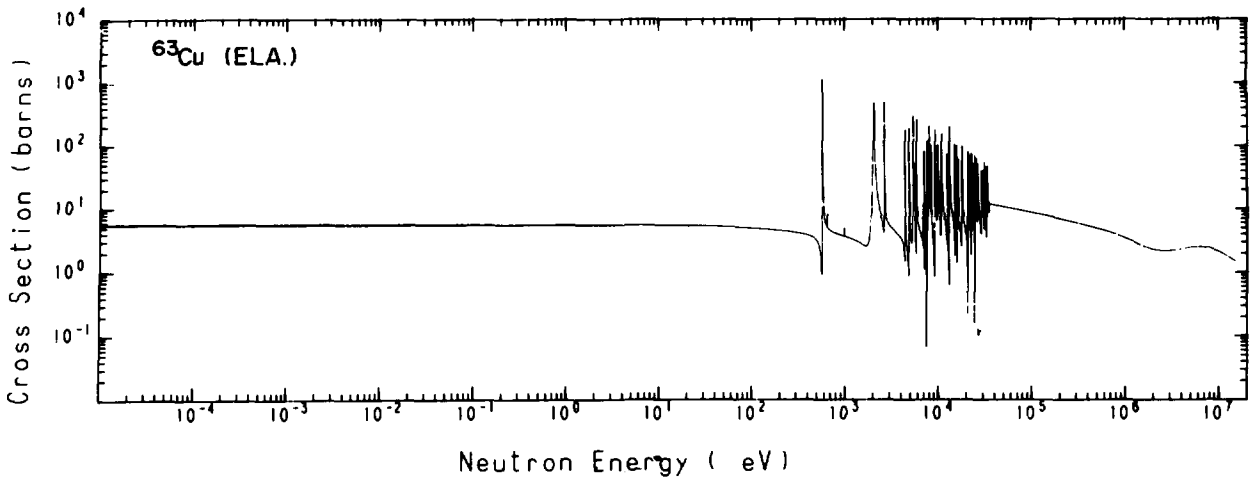

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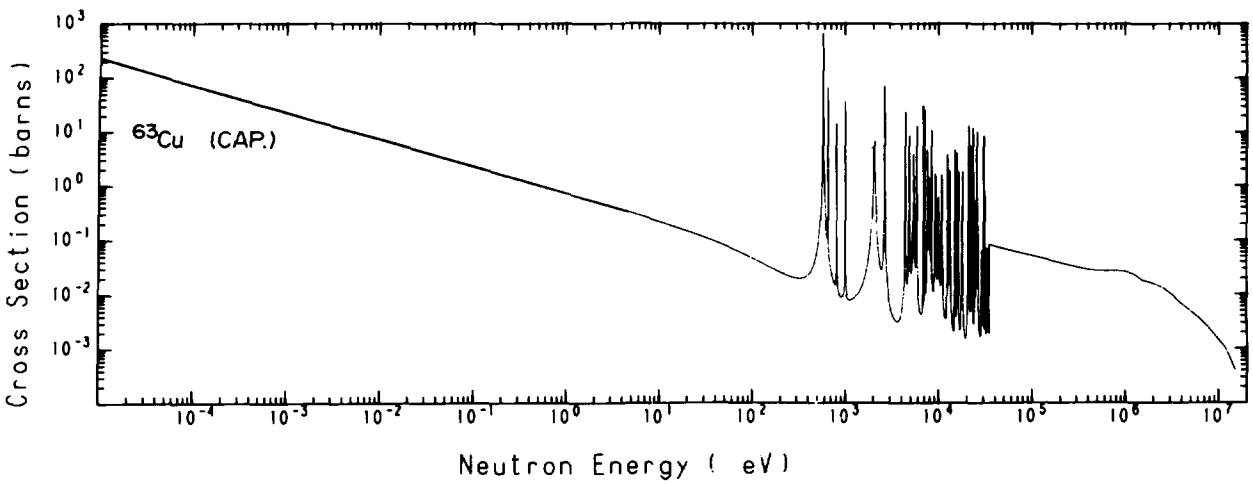

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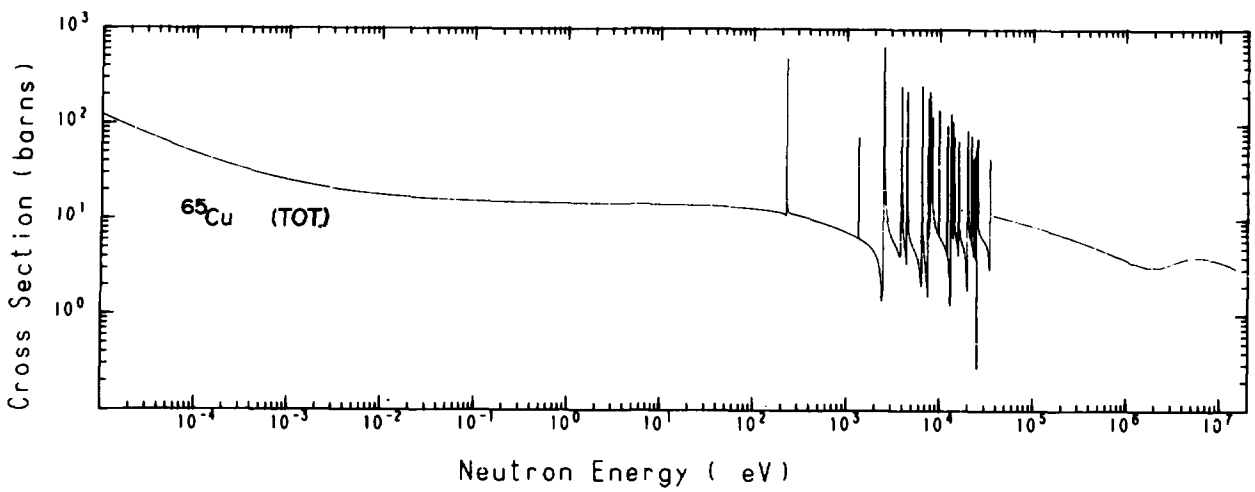

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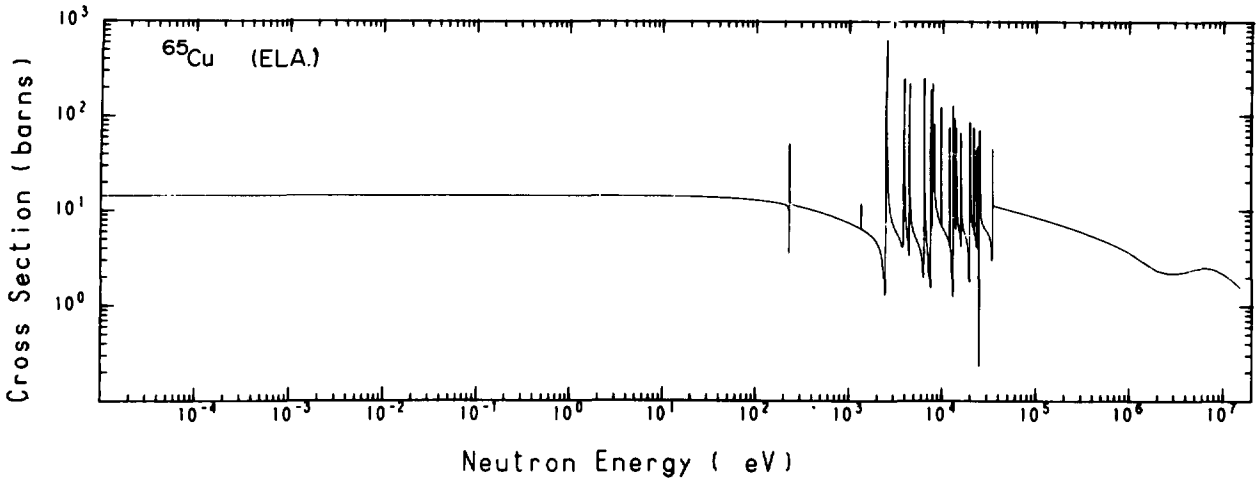

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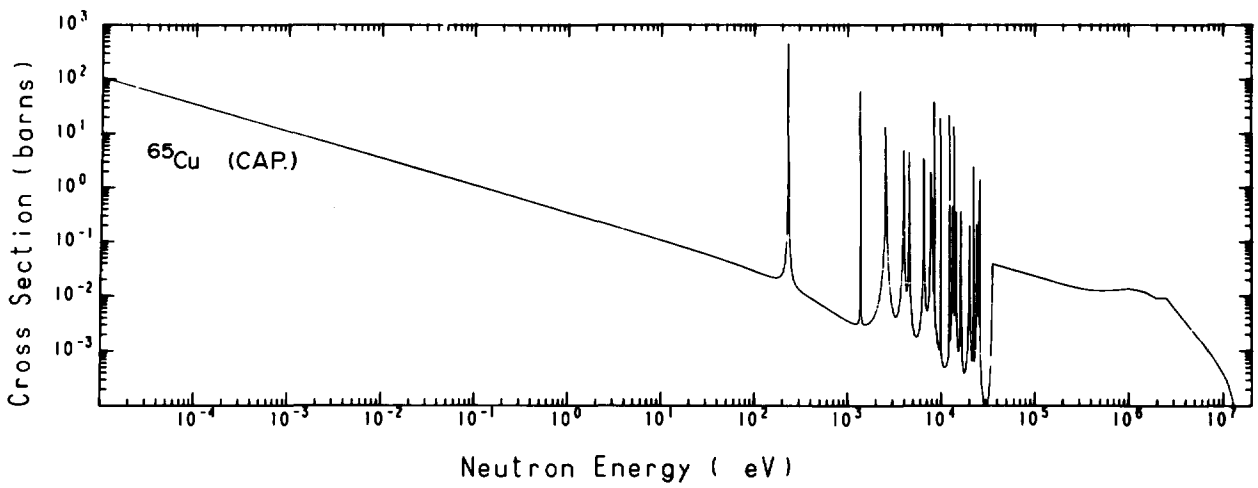

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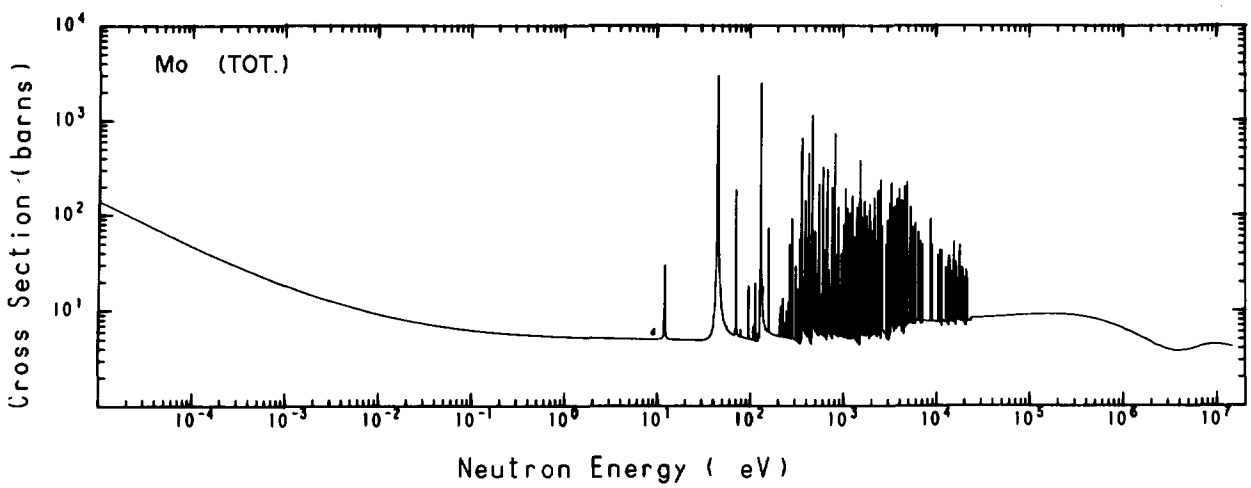

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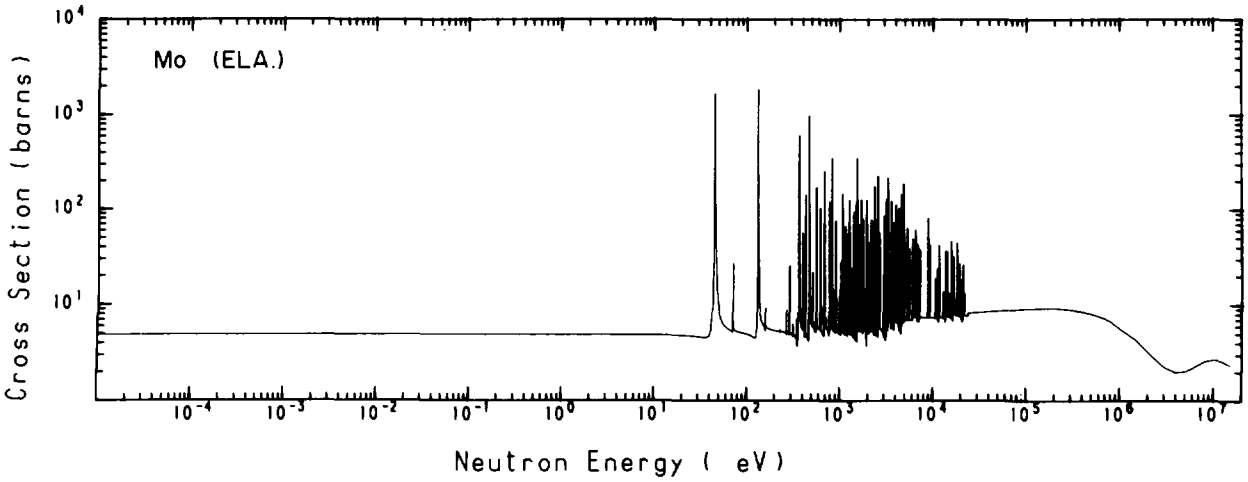

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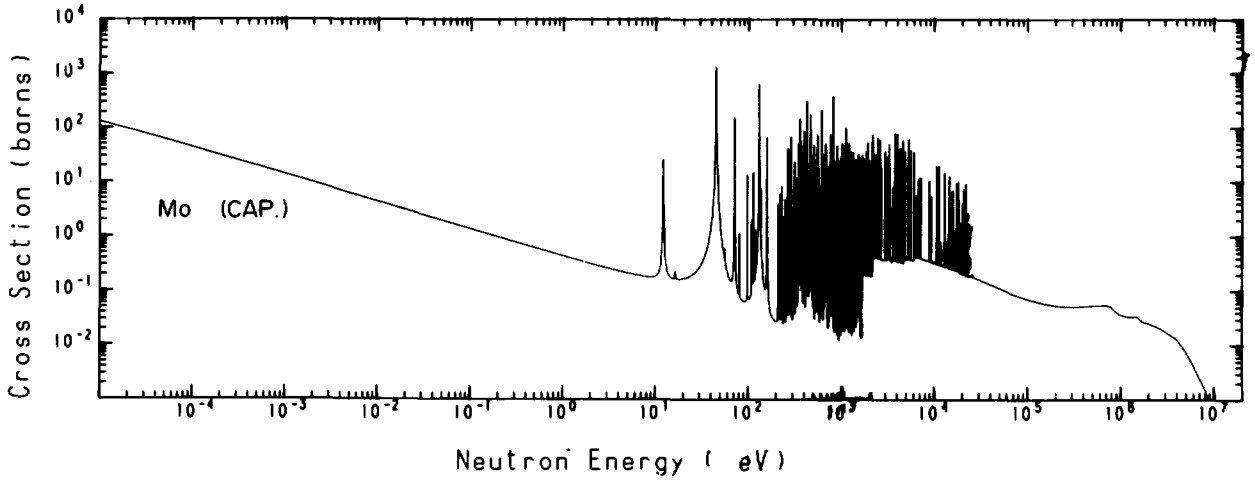

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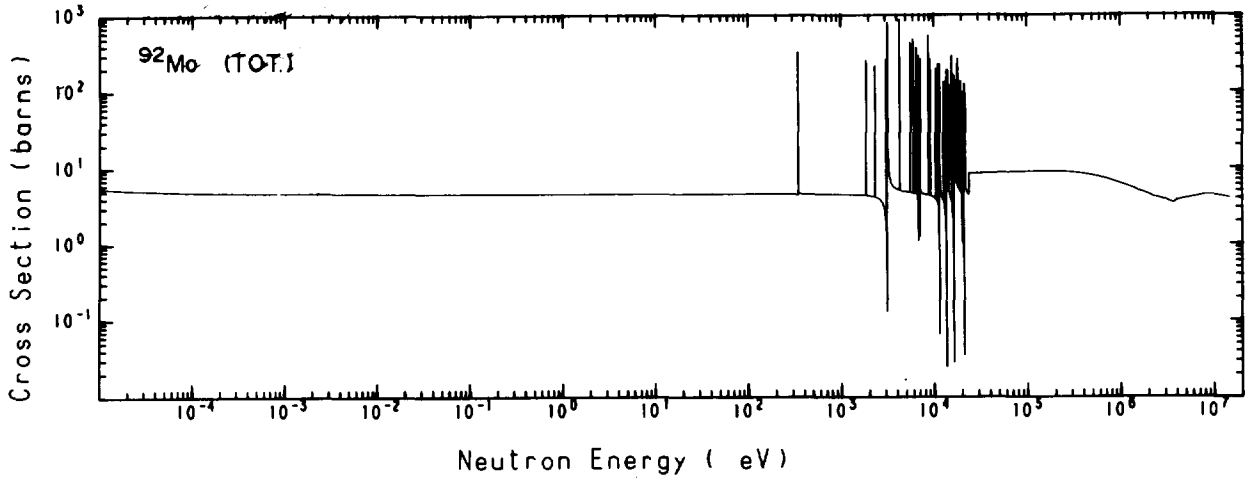

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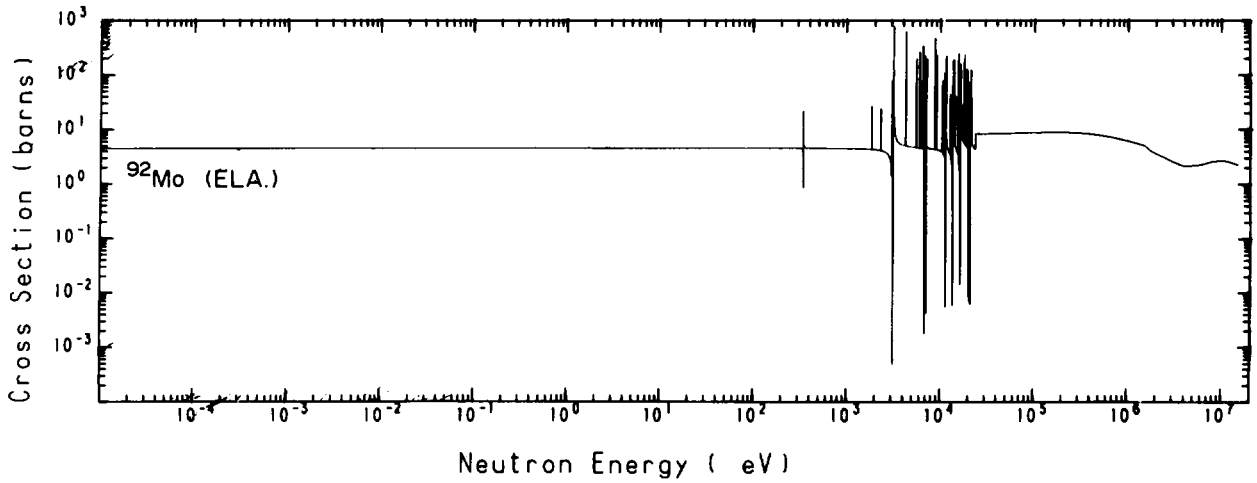

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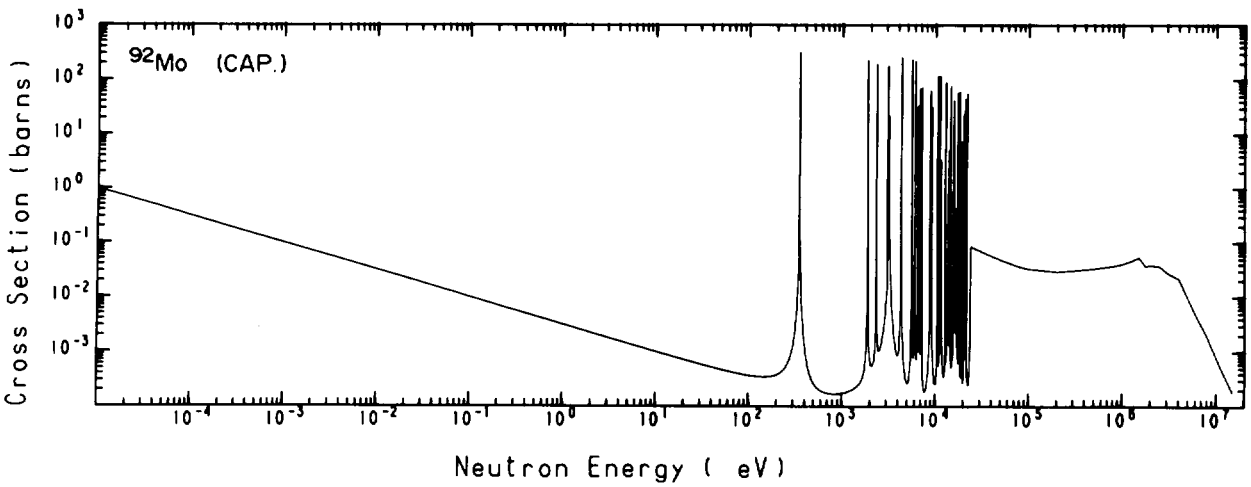

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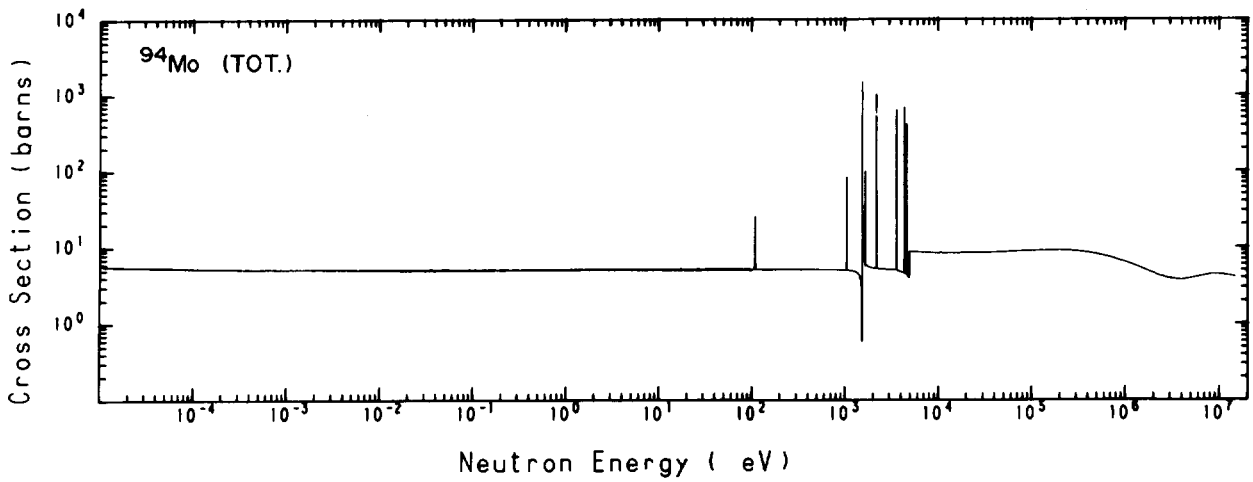

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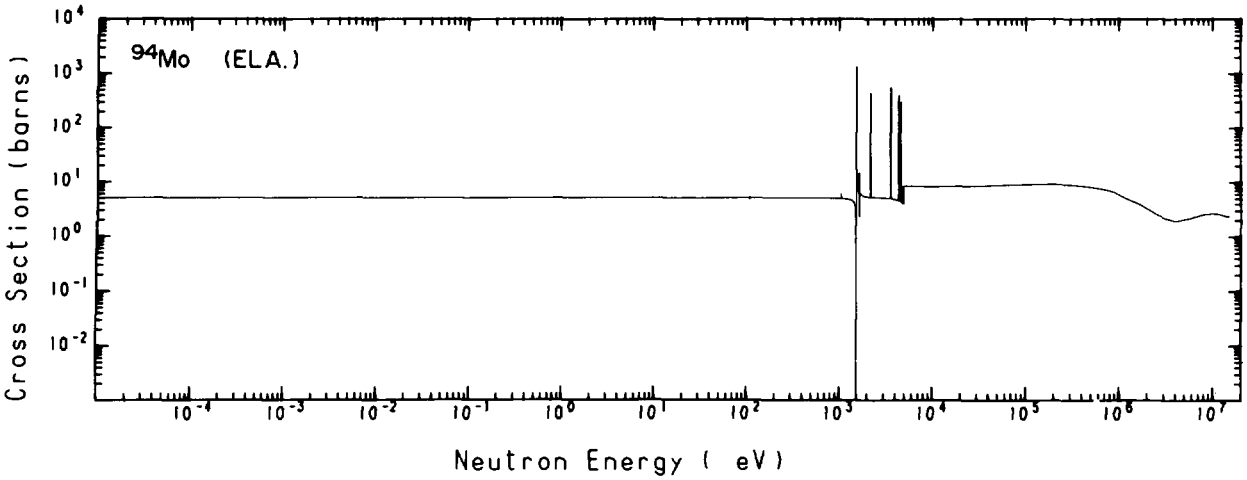

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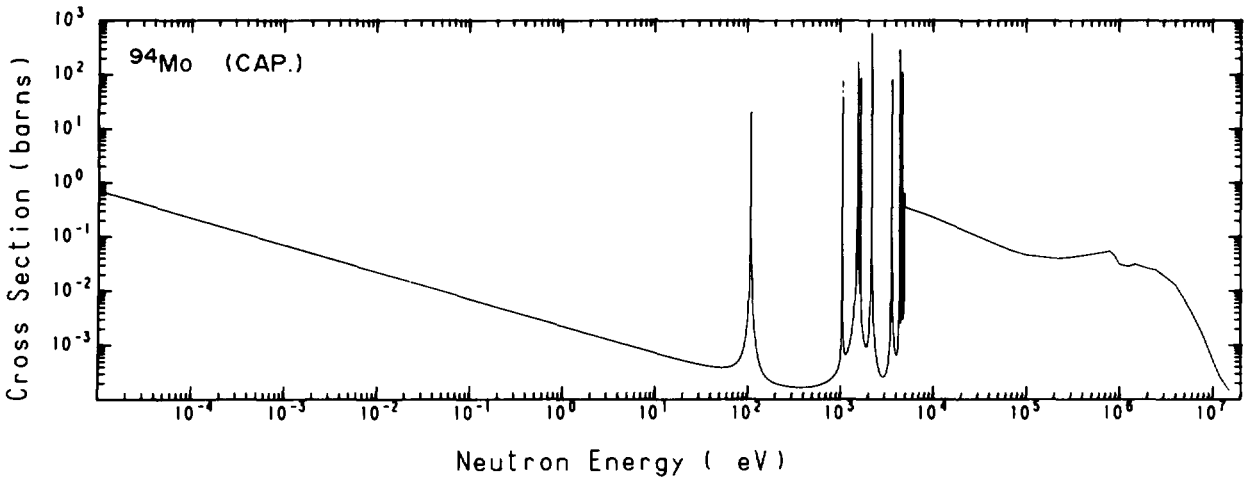

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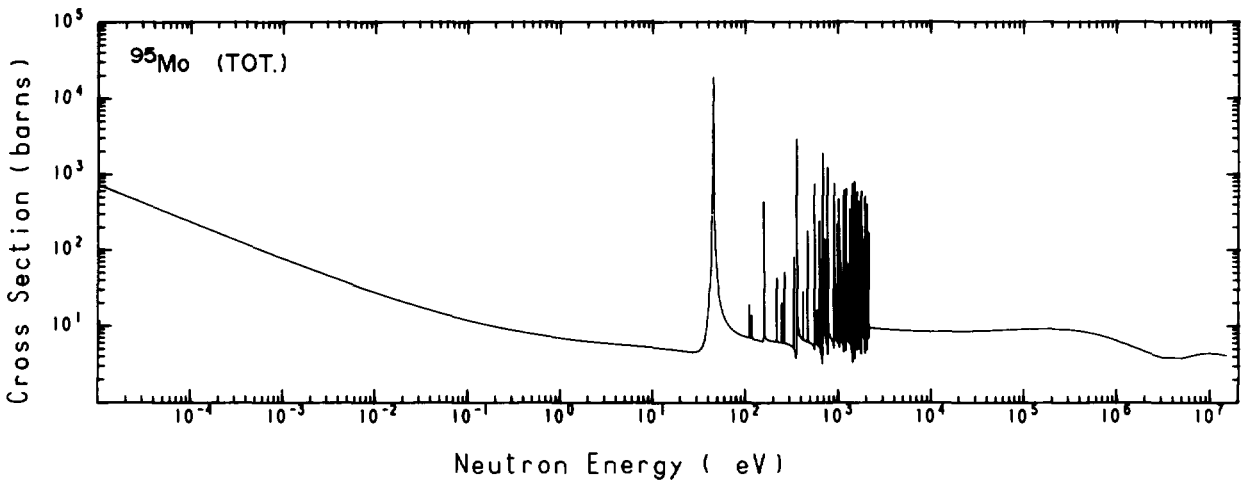

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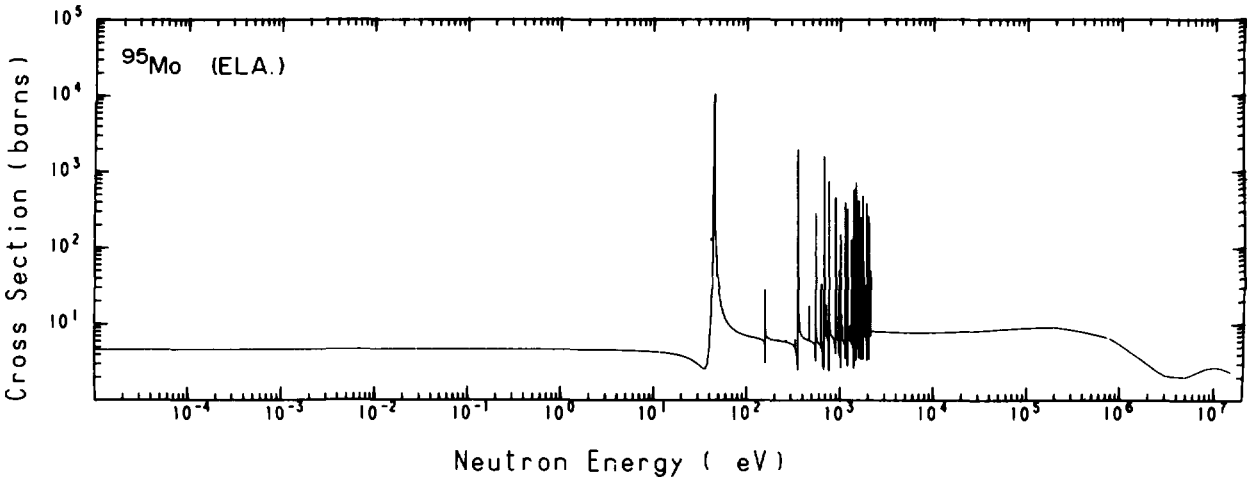

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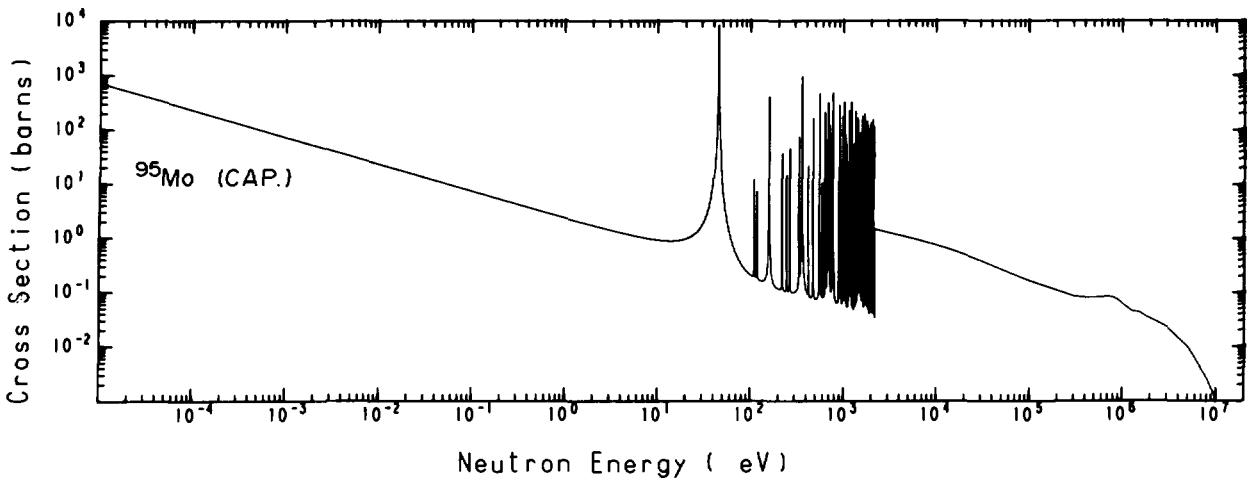

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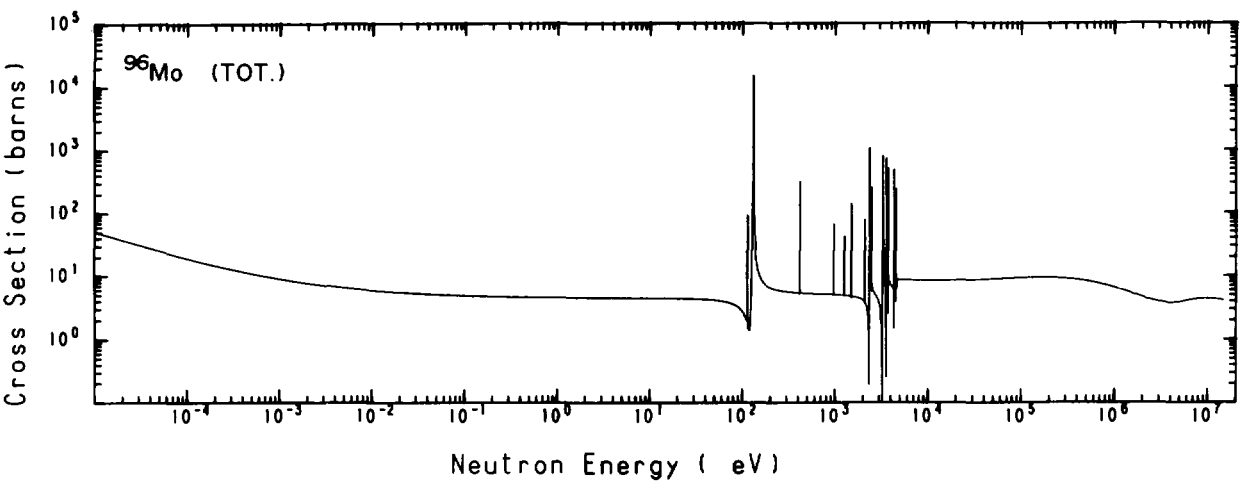
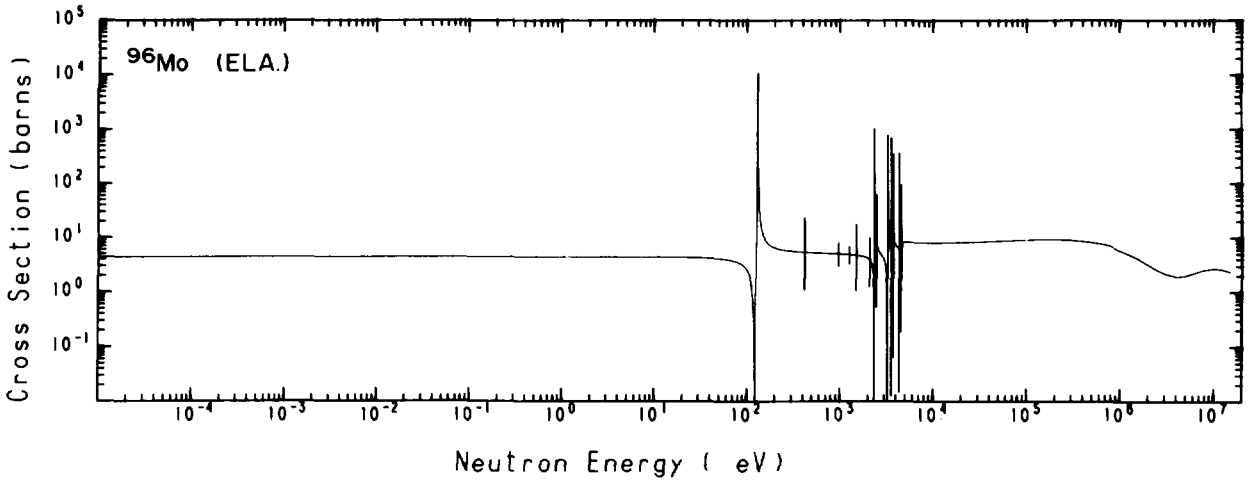


Fig. B1.96



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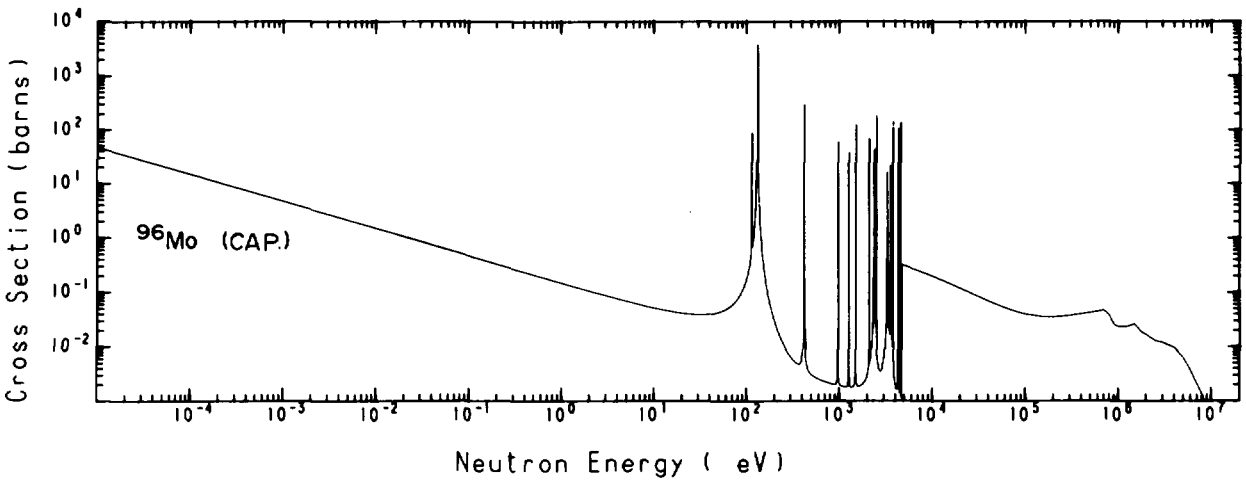

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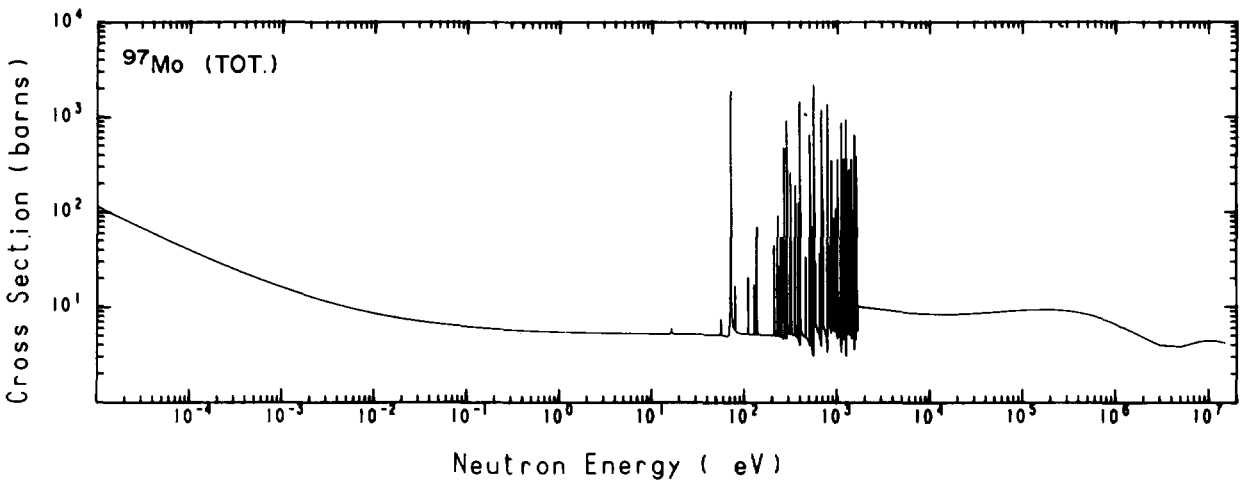

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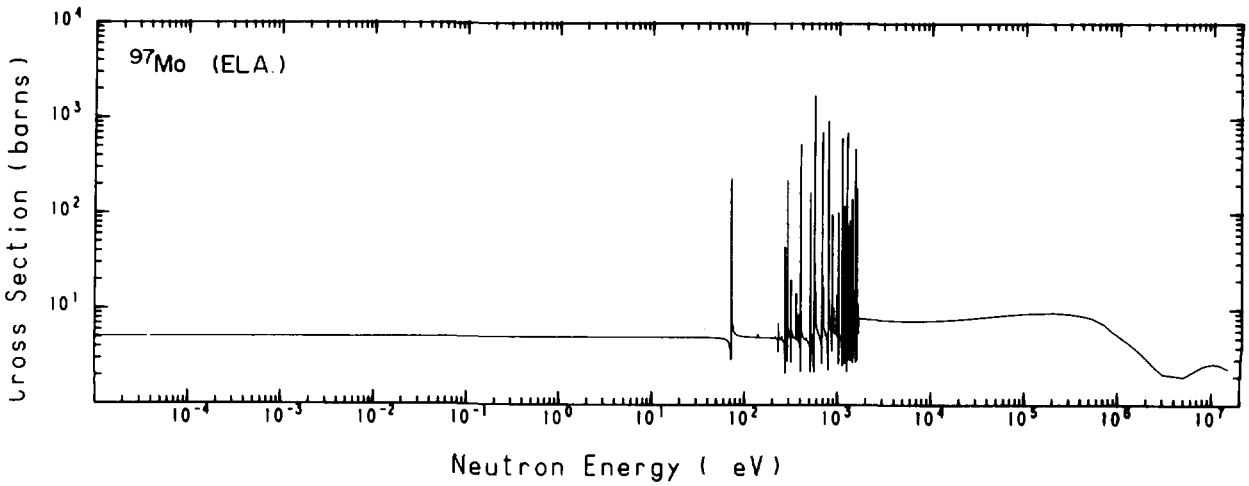

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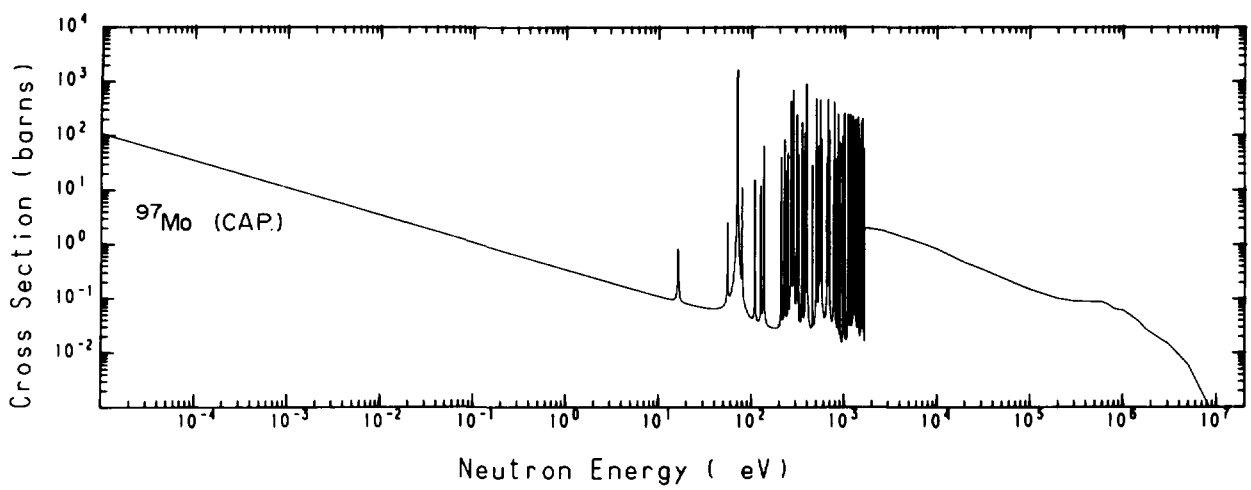

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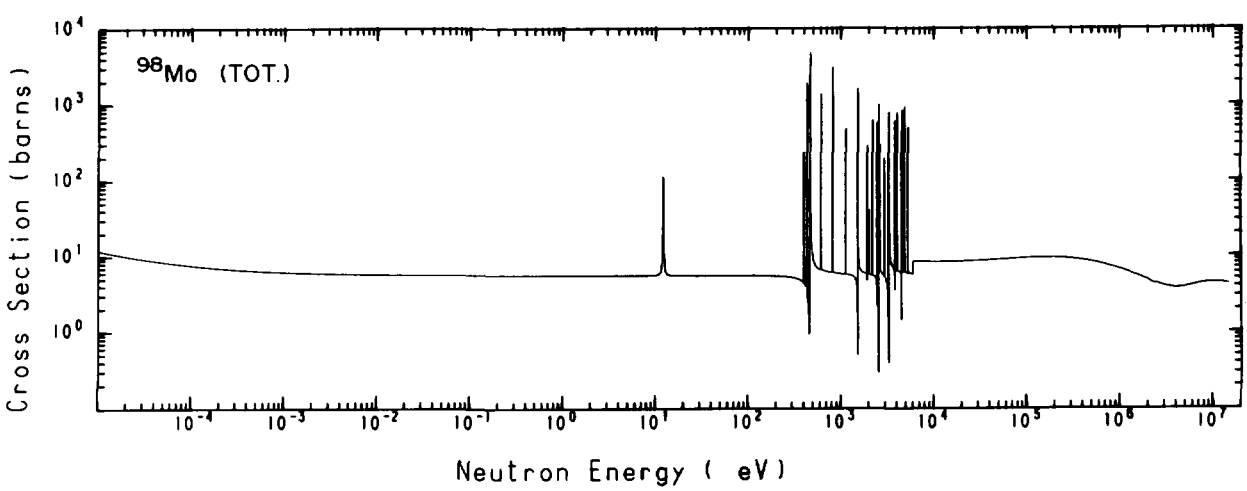

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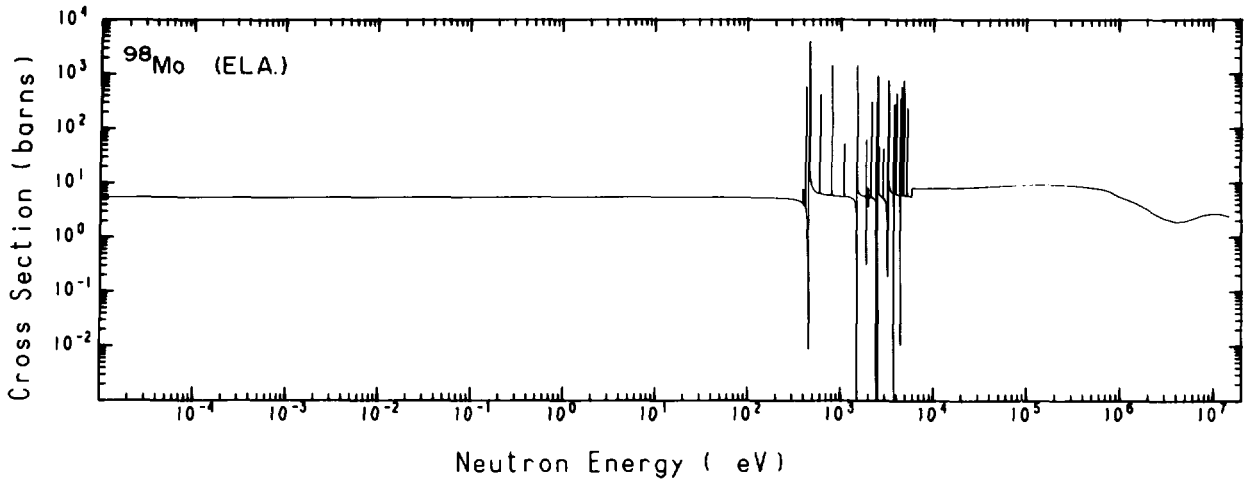

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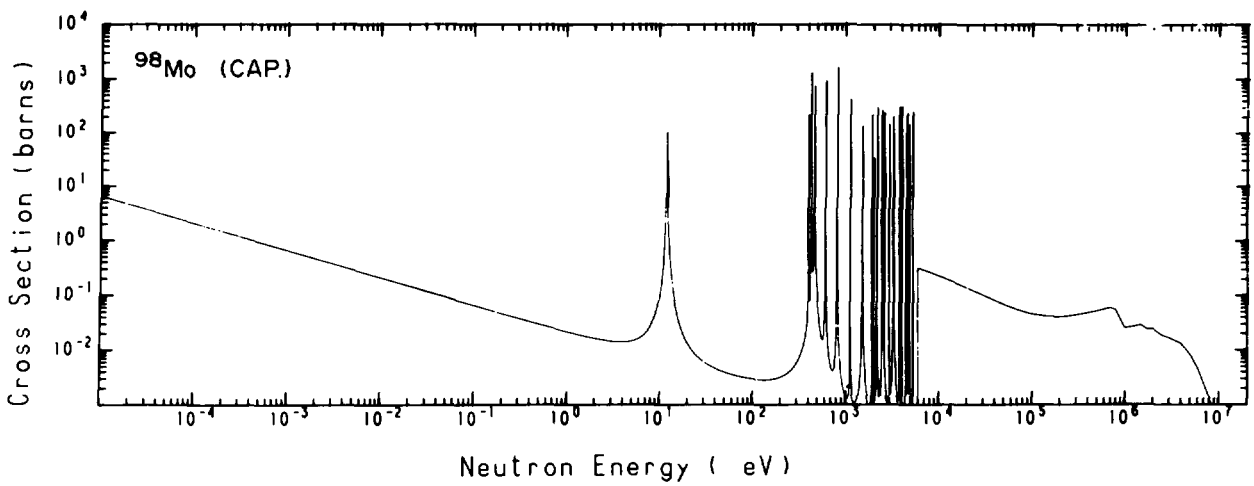

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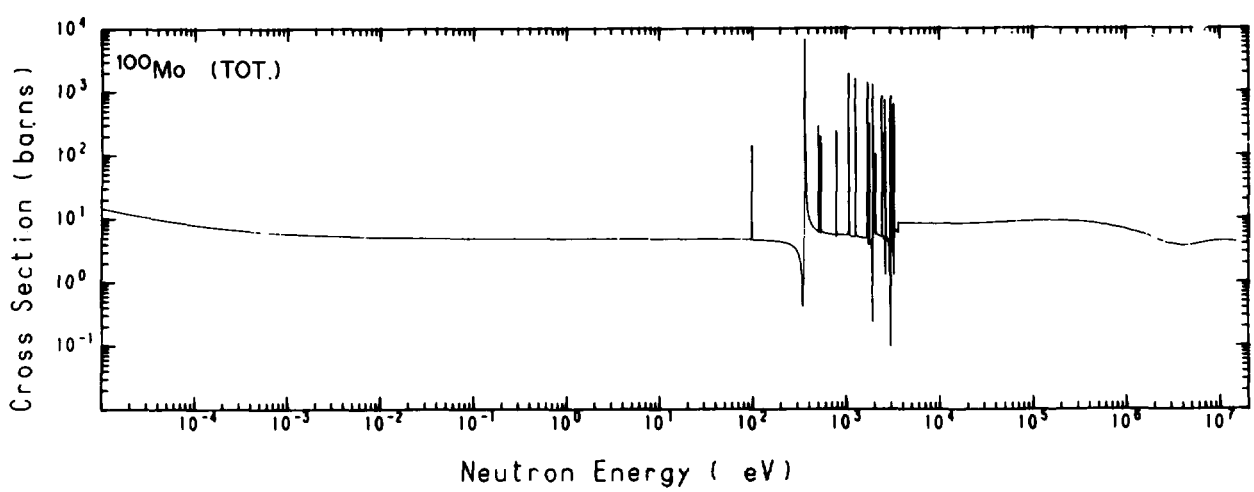

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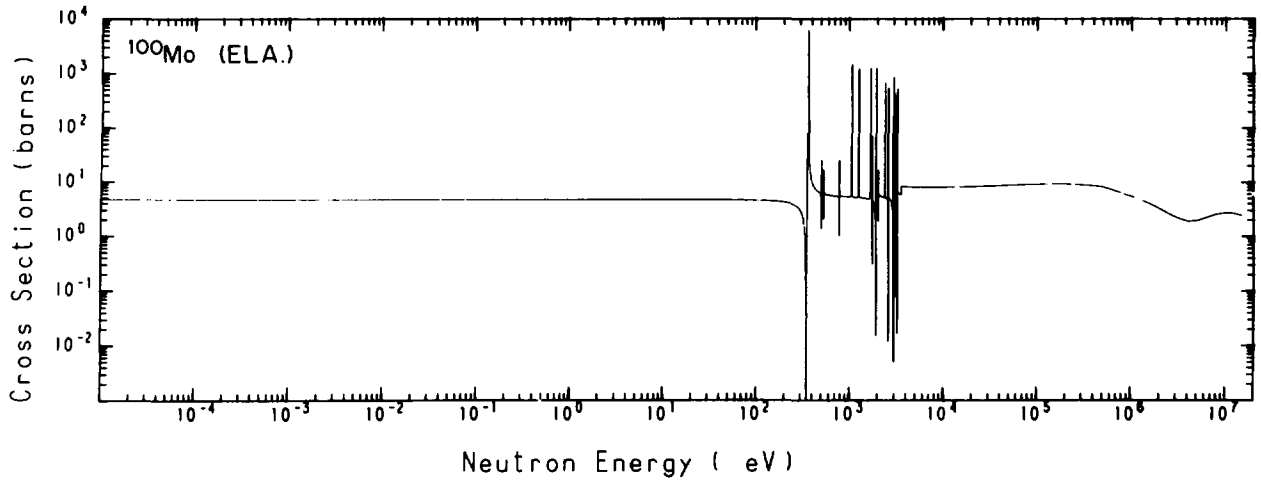

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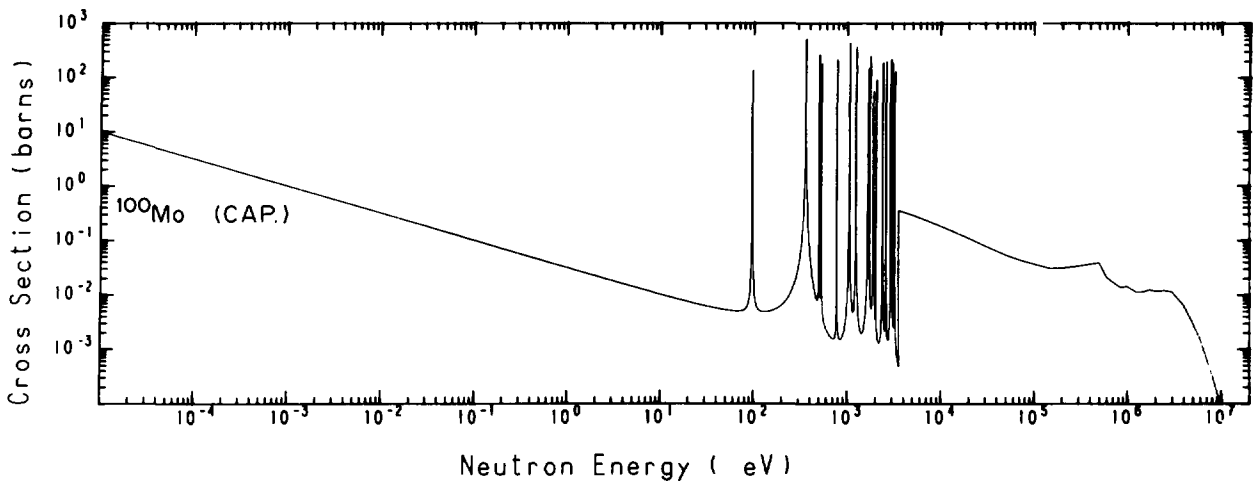

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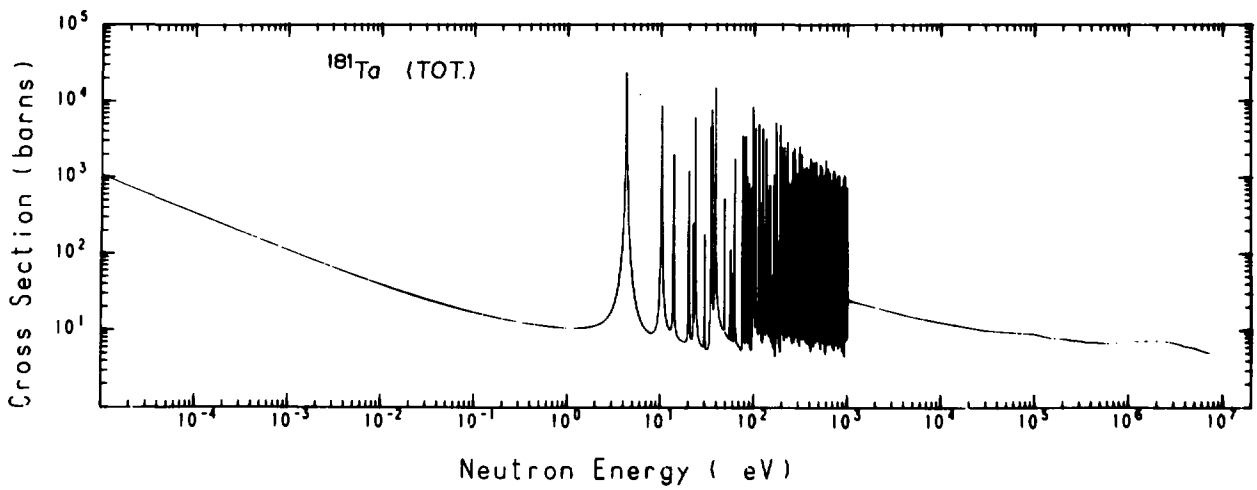

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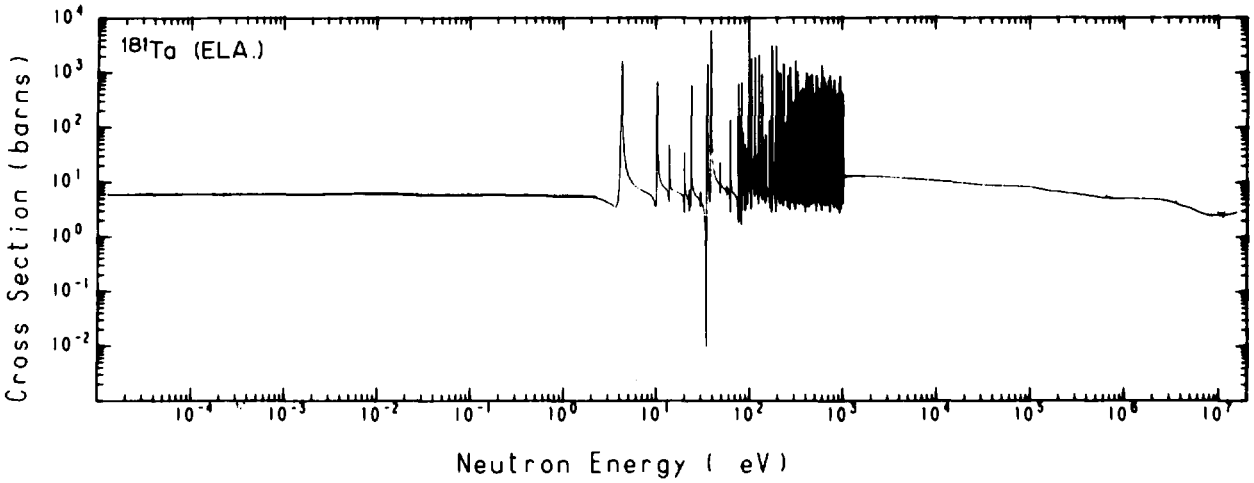

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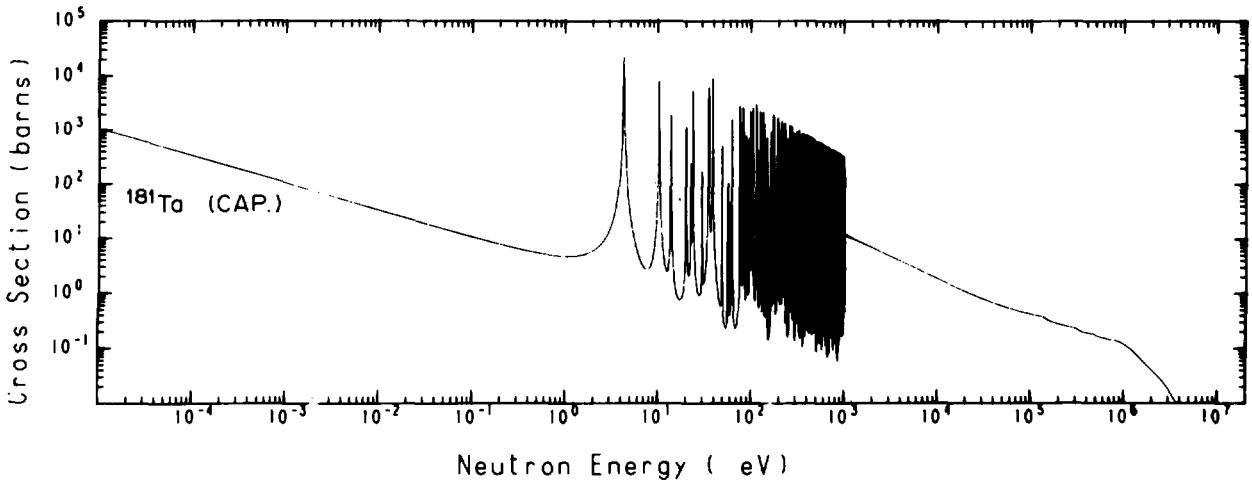

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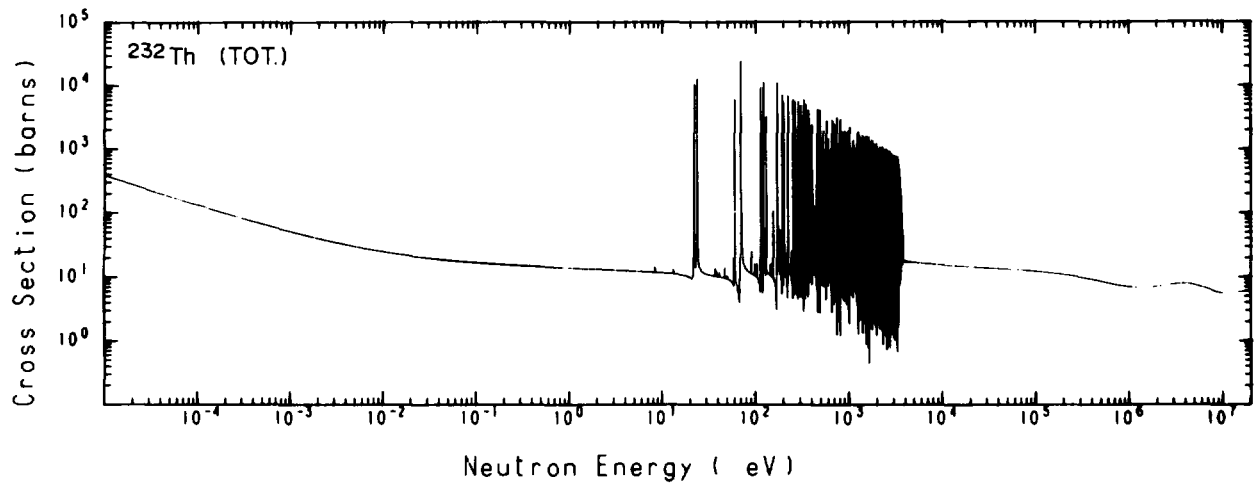

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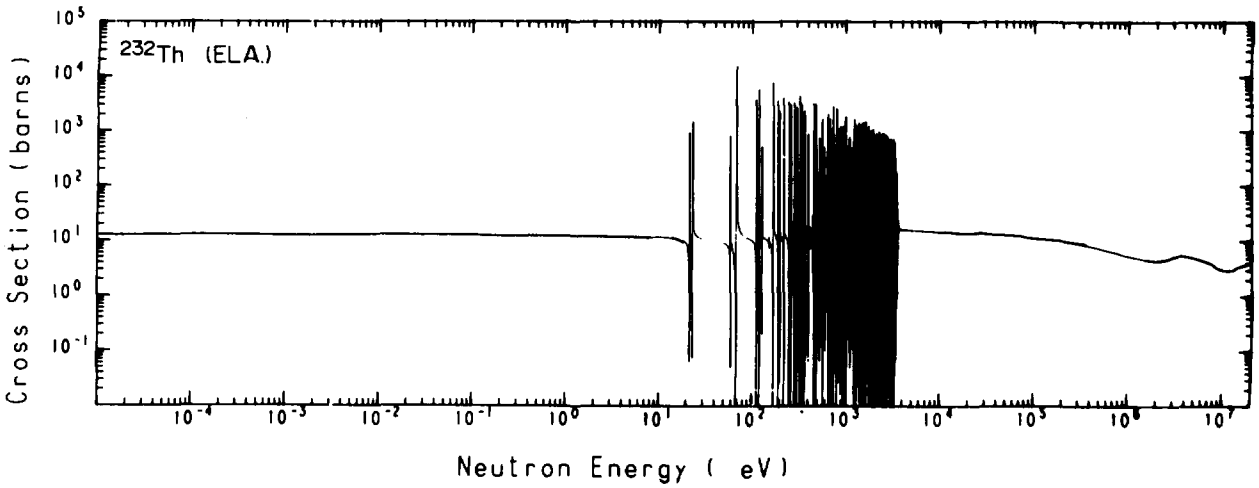

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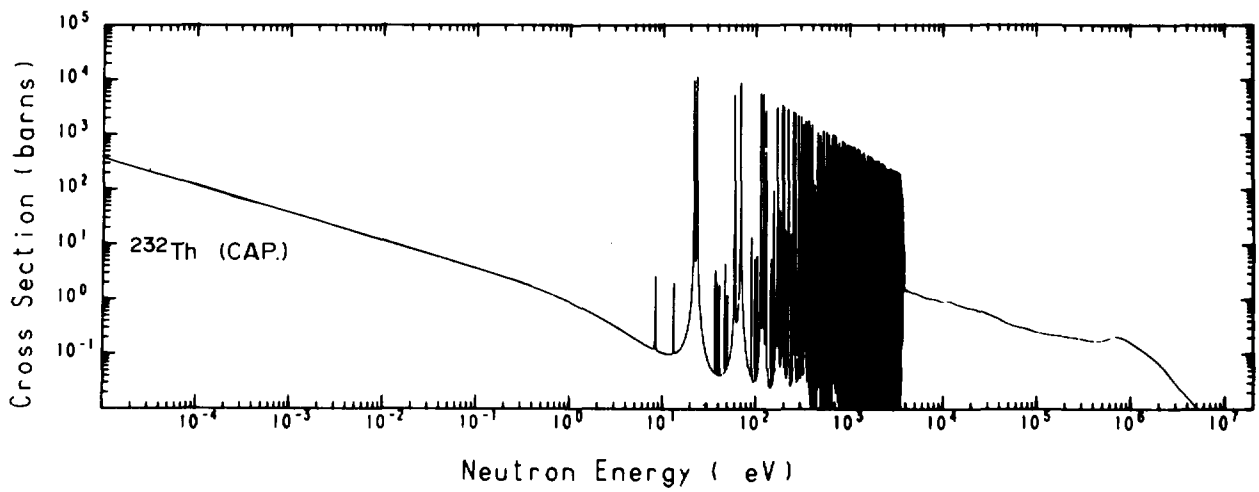

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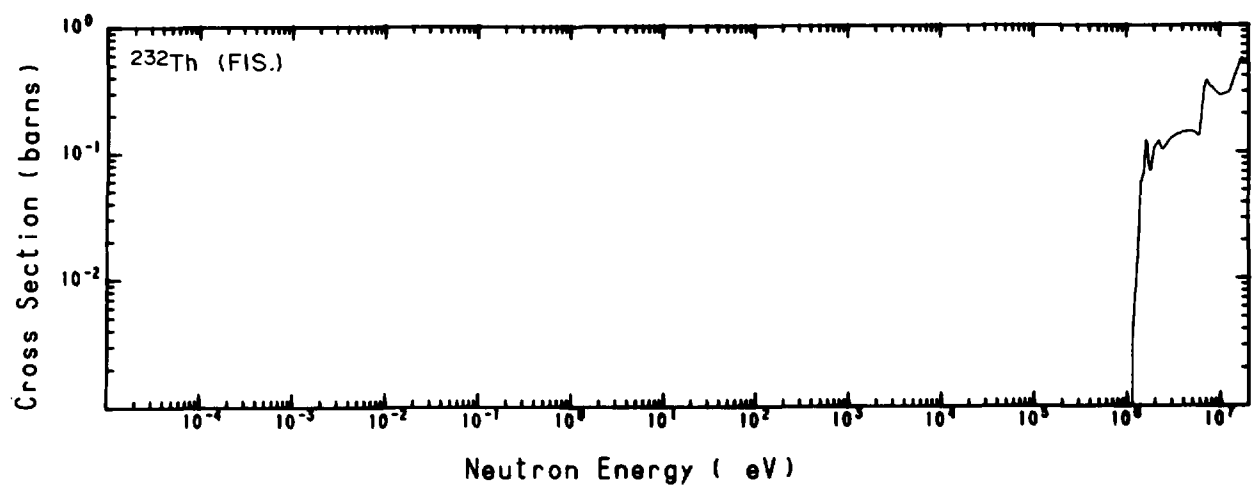

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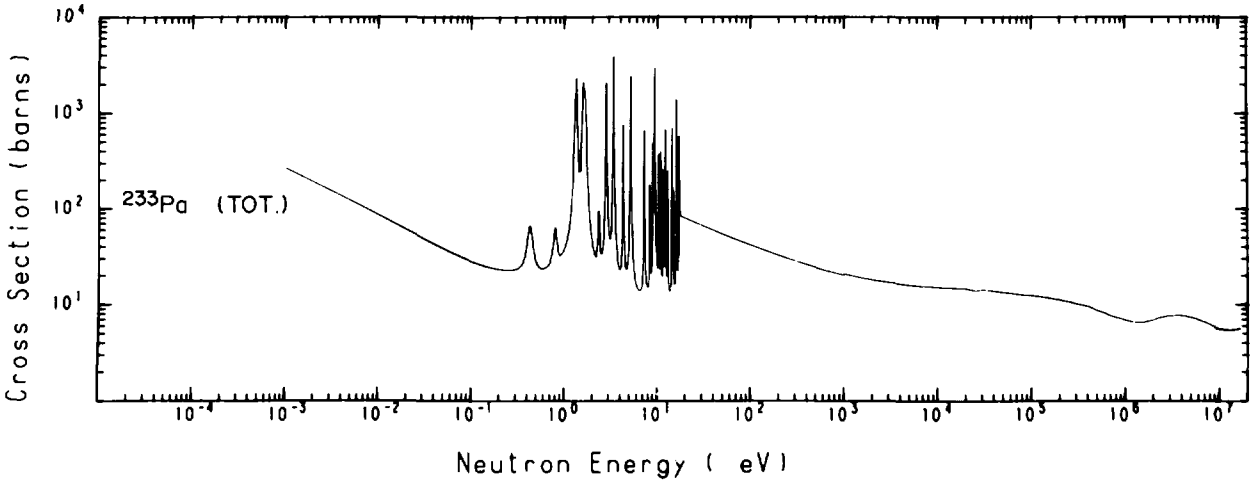

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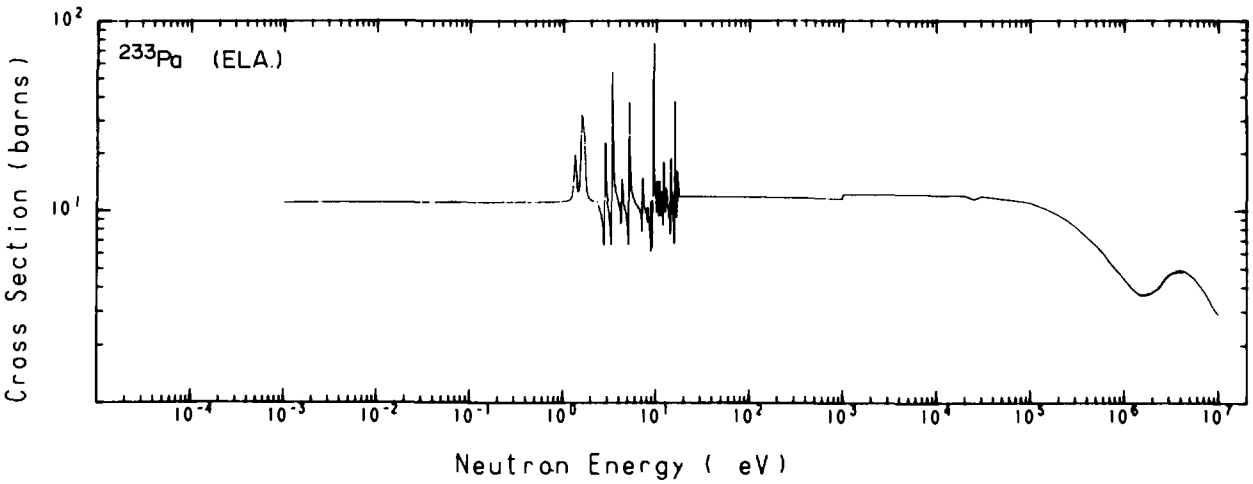

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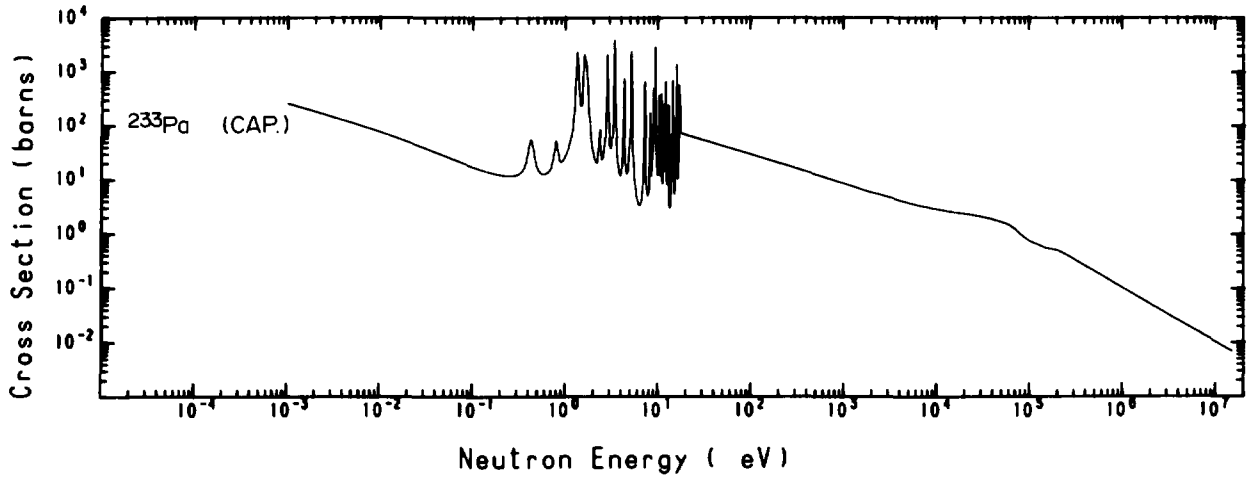

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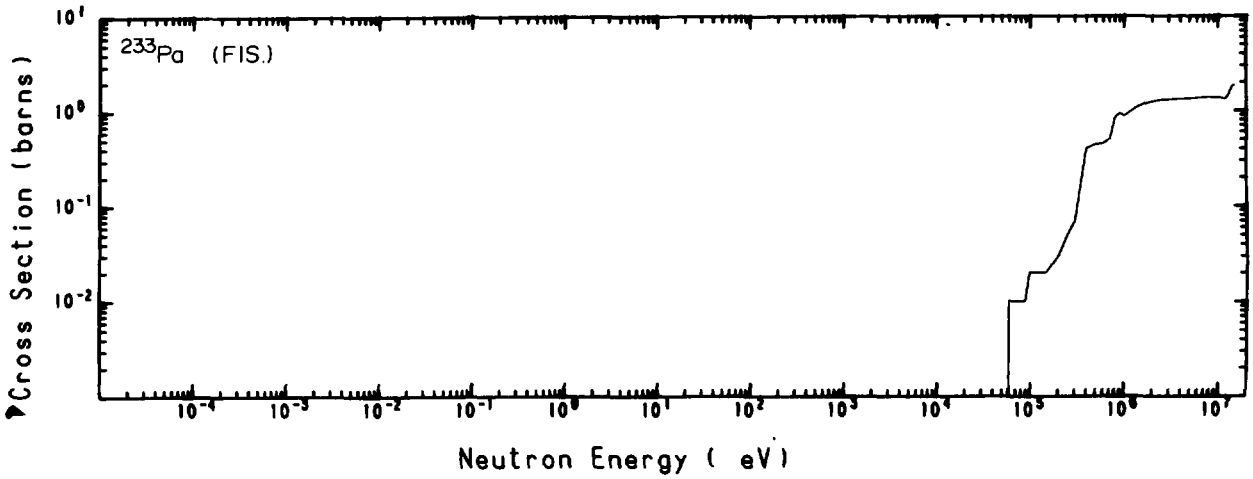

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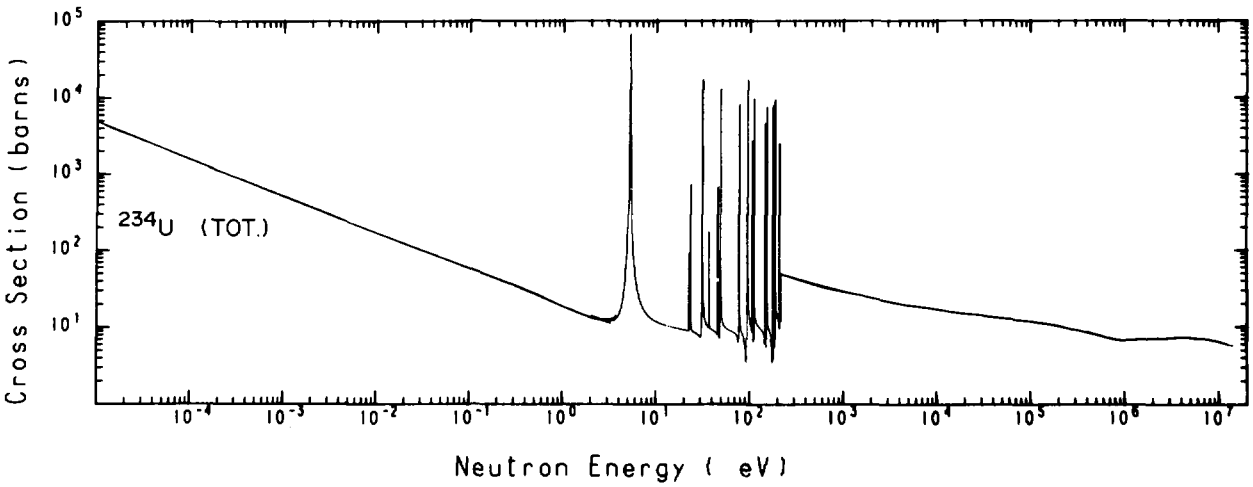

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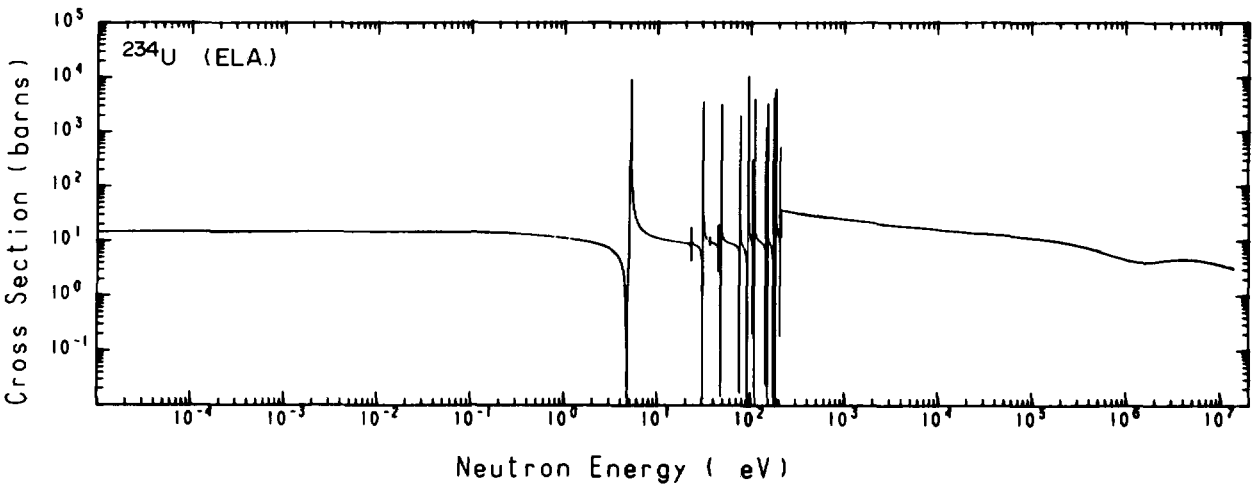

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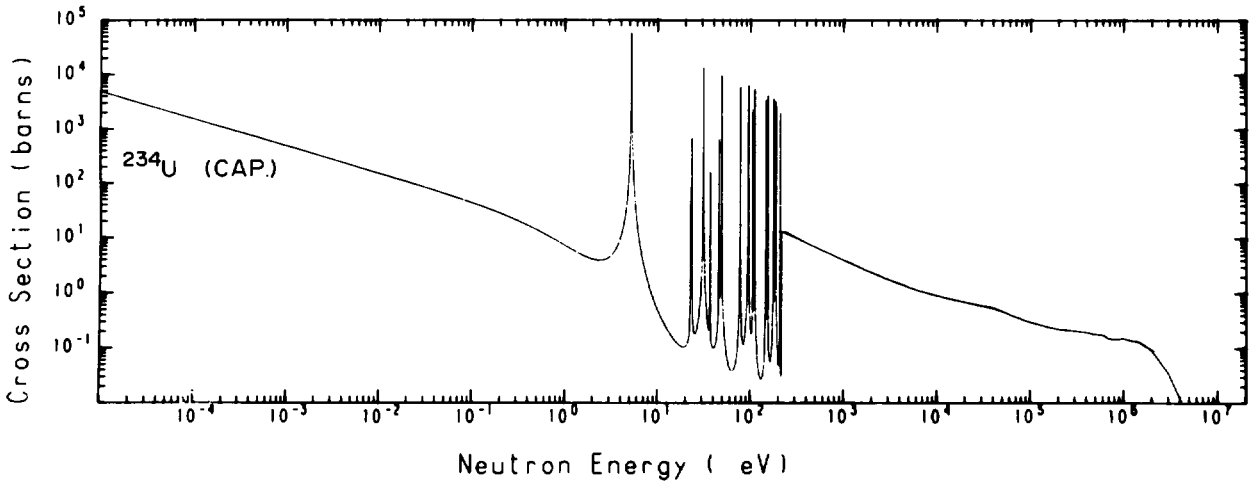

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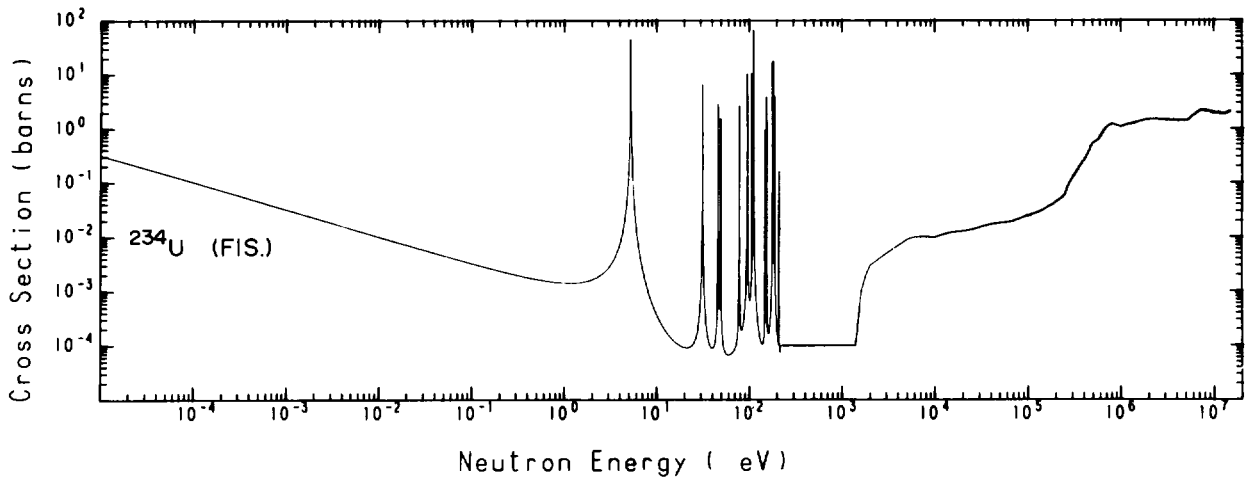

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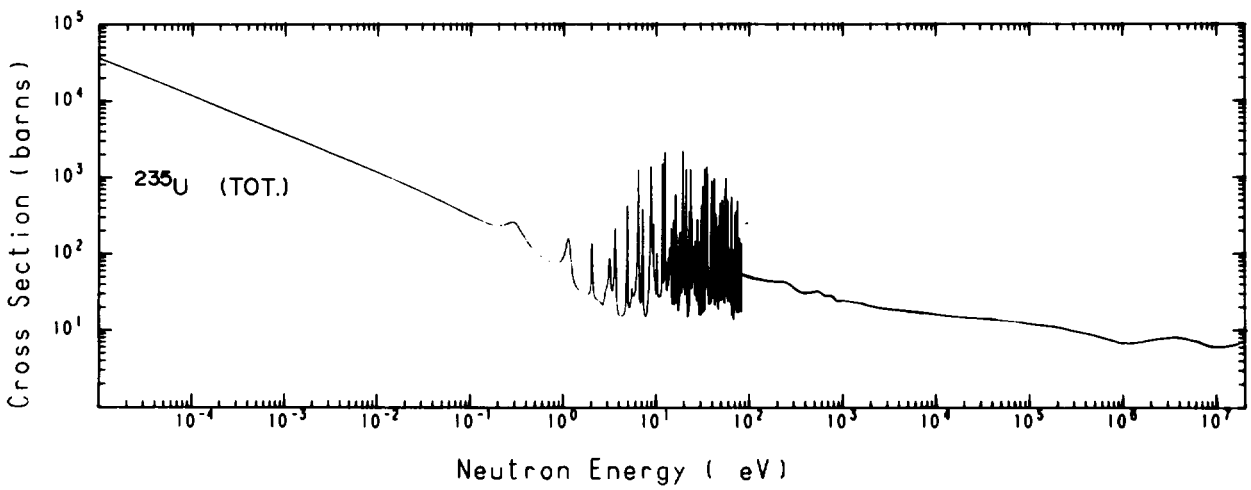

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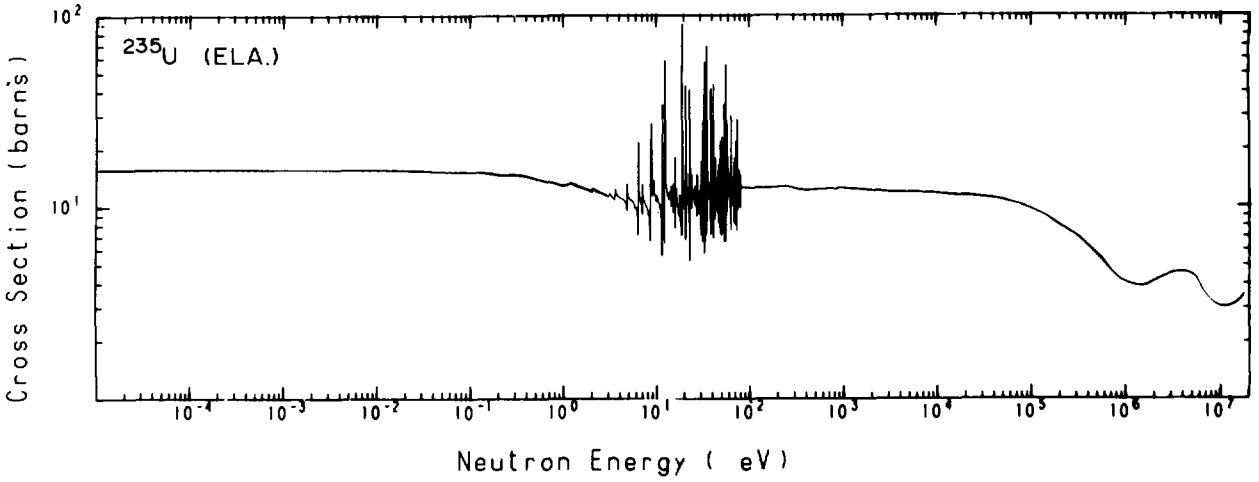

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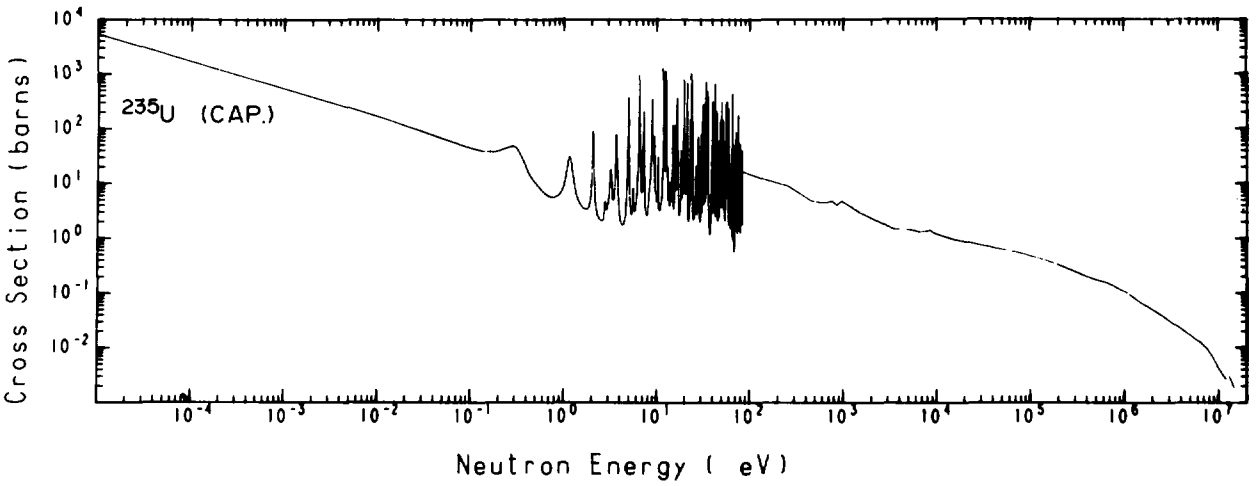

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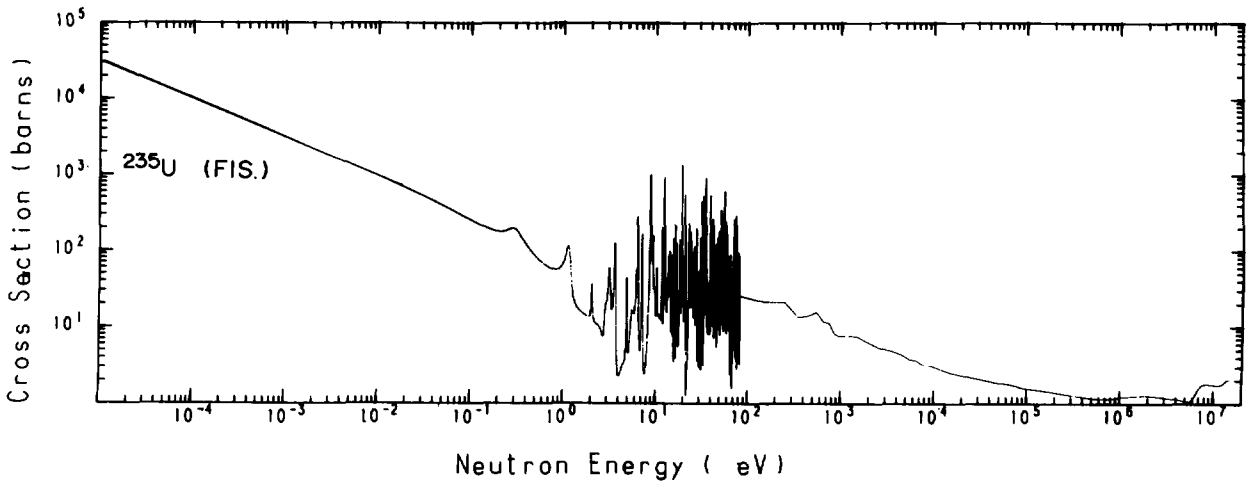

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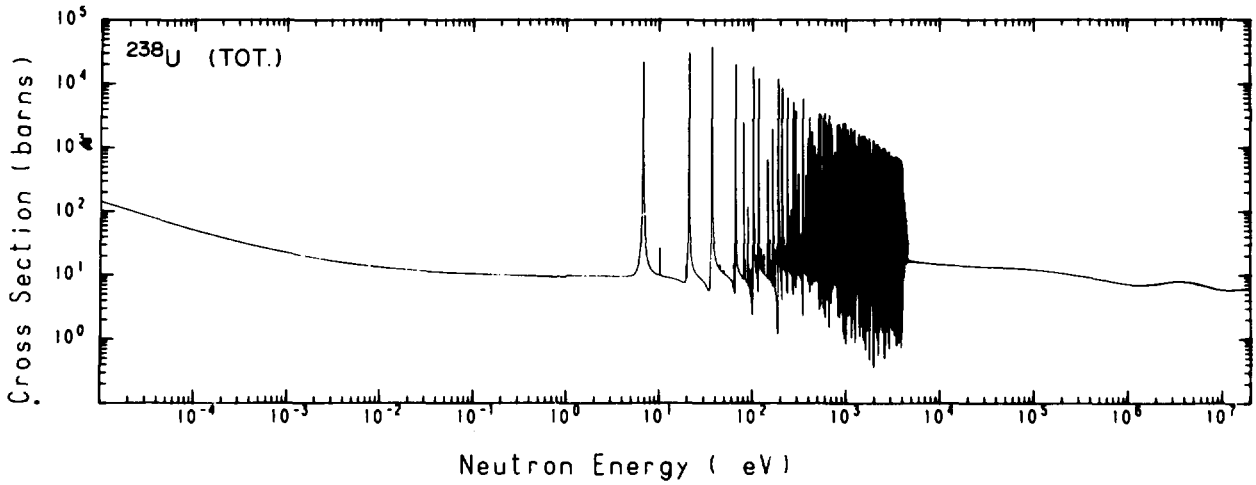

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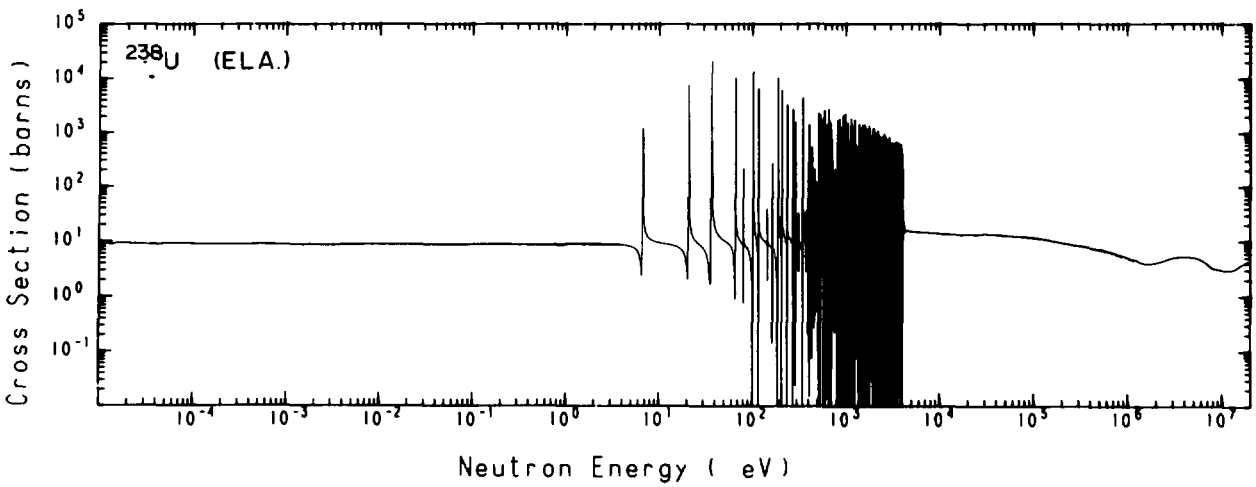

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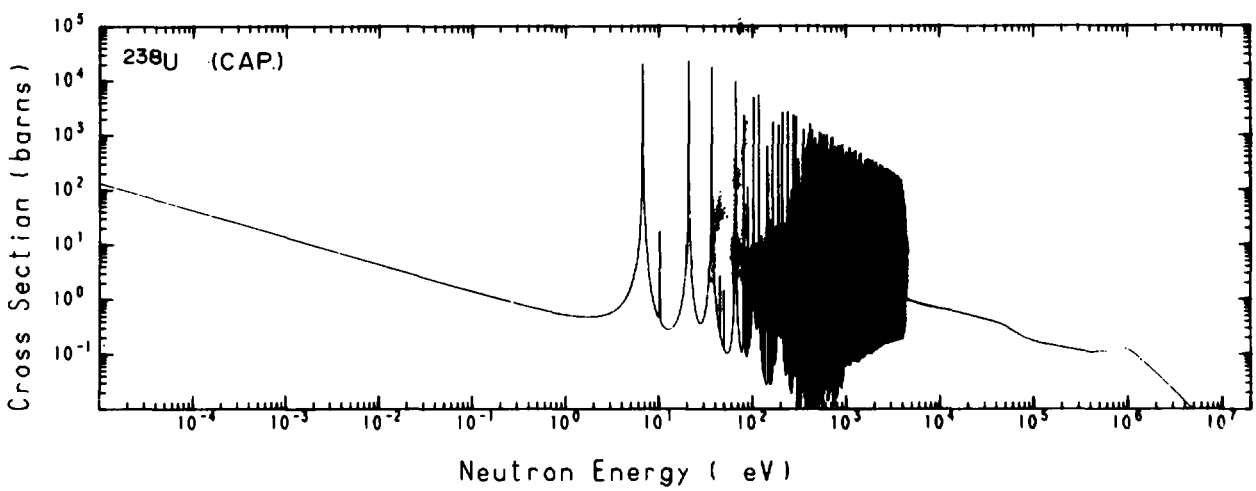

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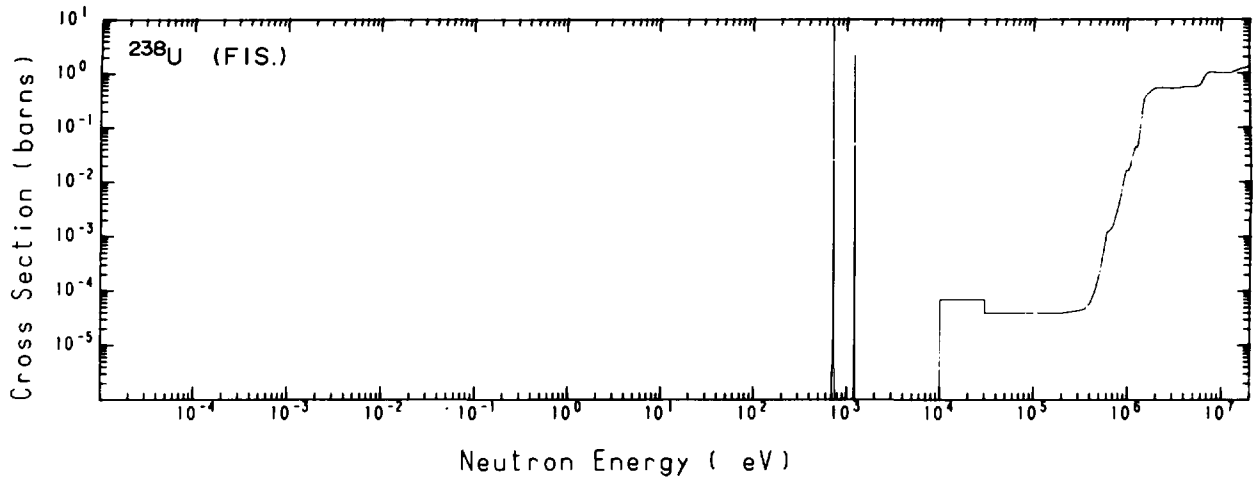

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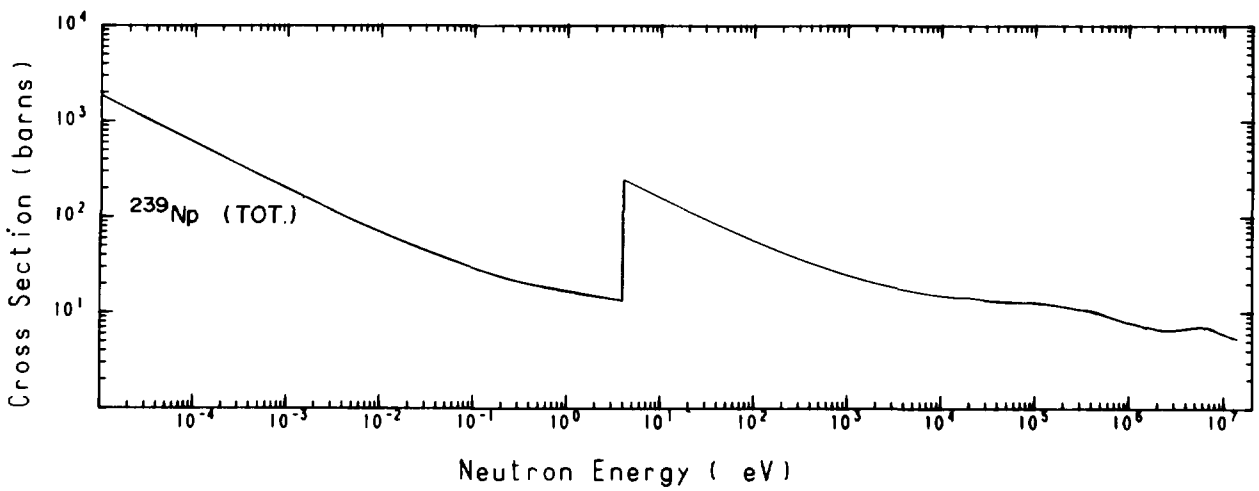

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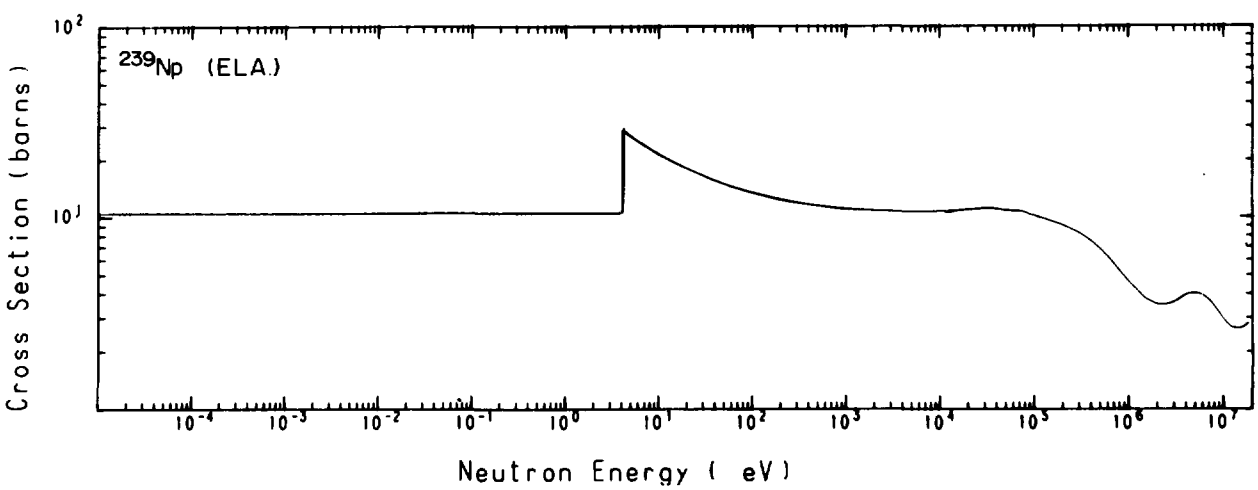

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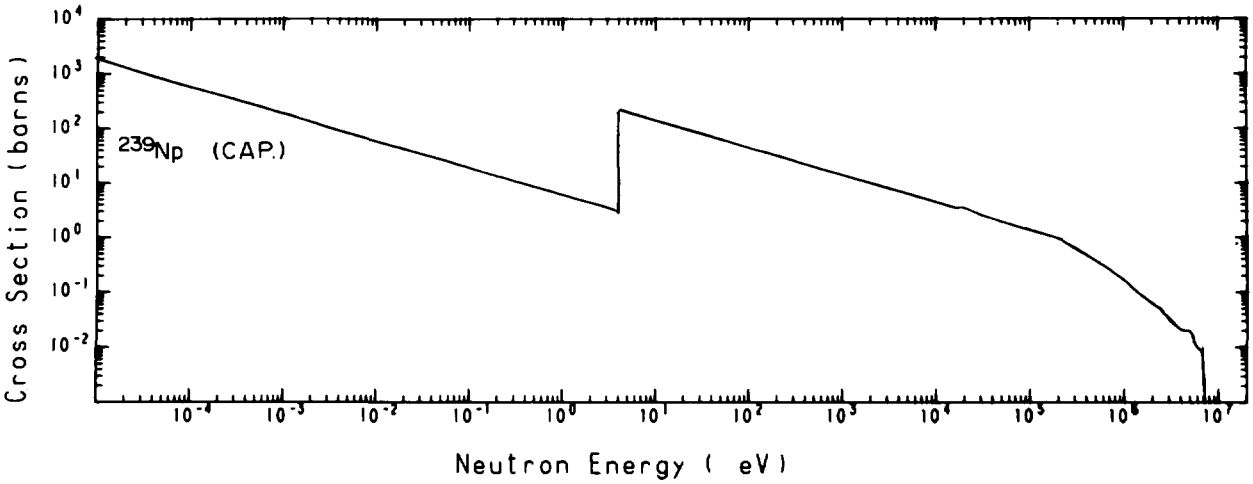

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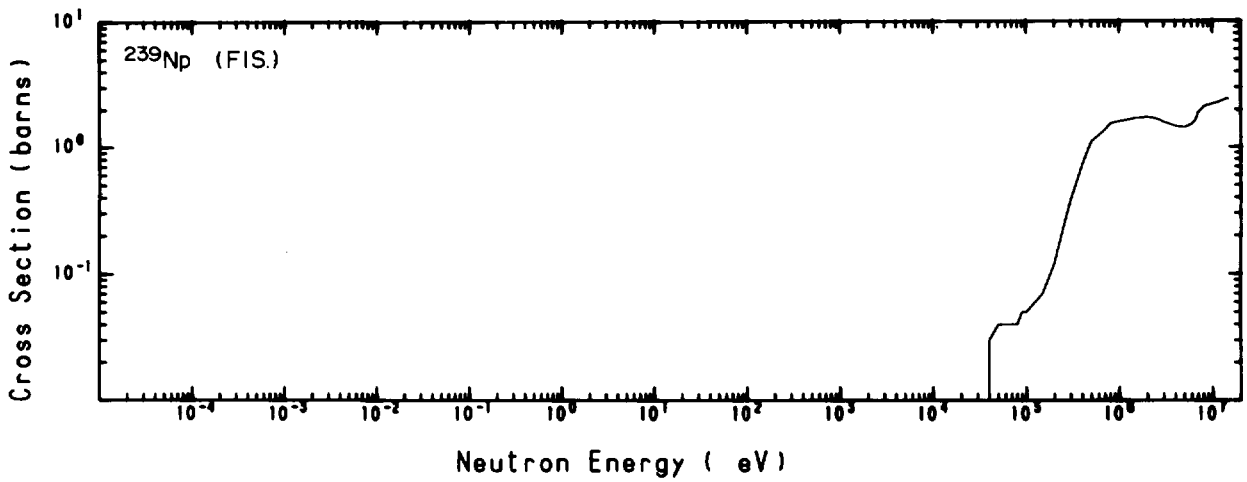

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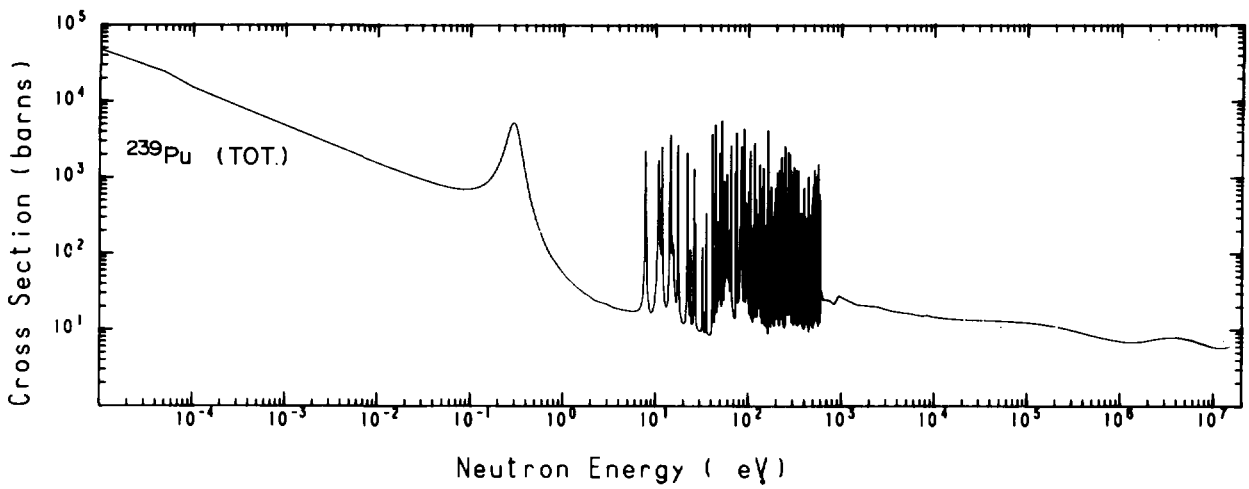

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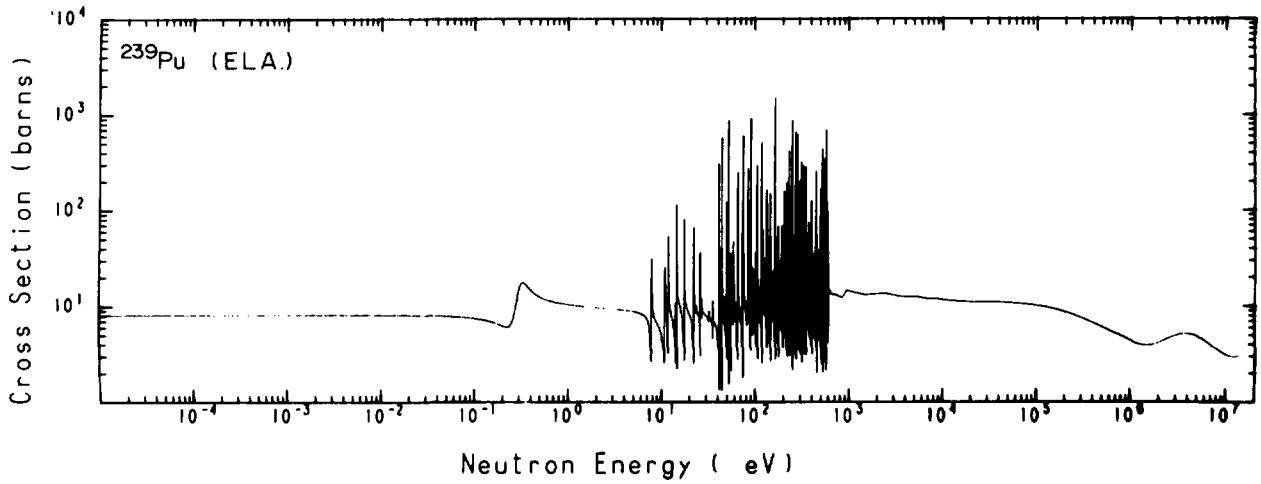

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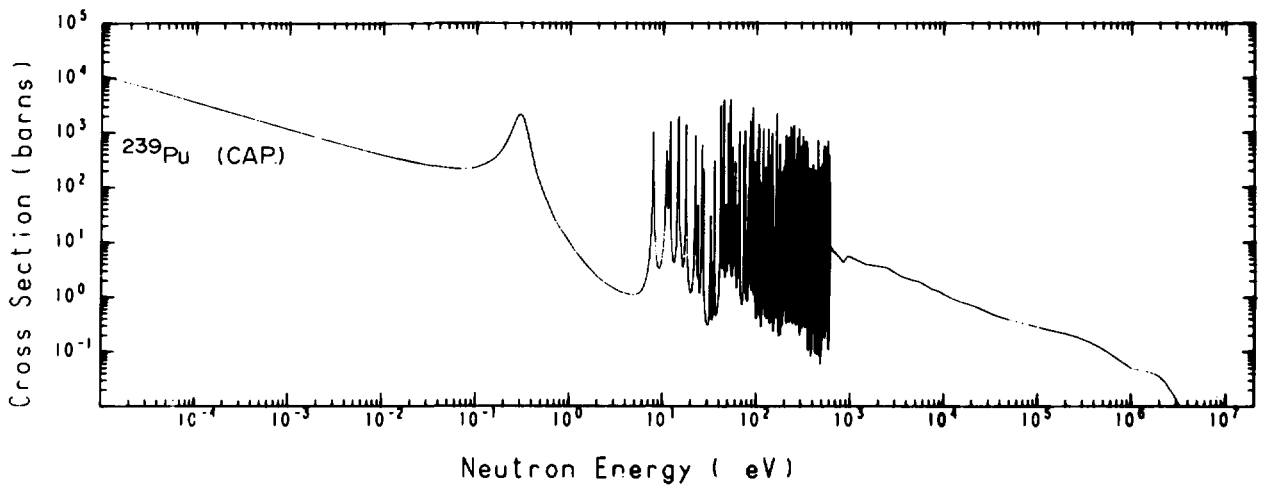

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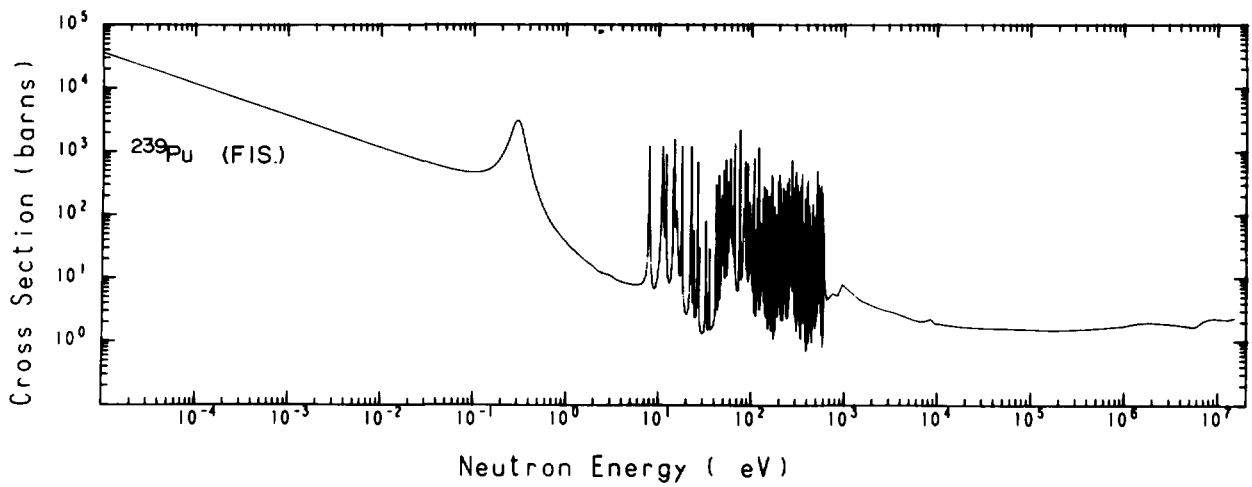

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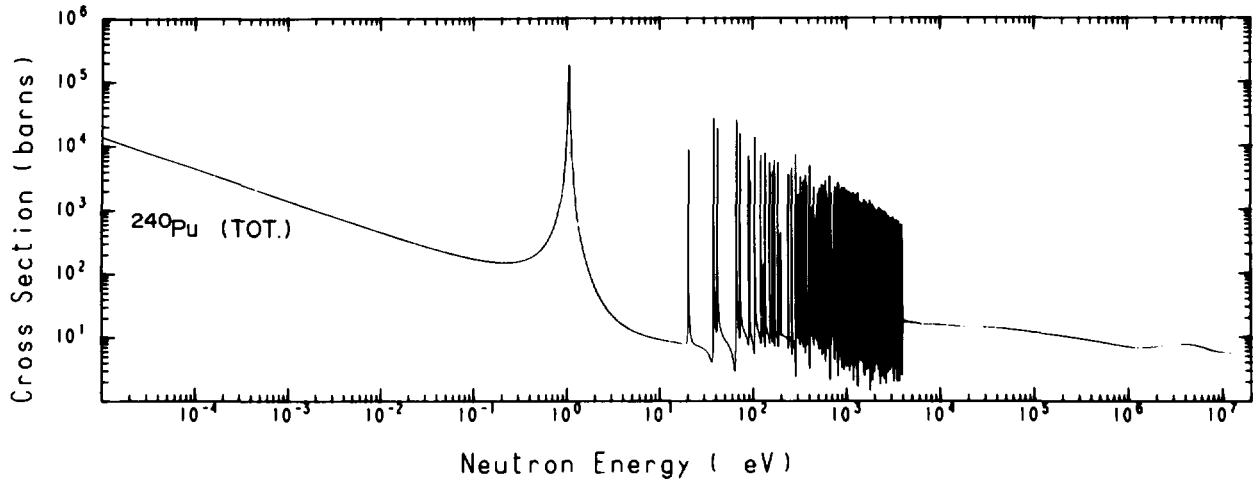

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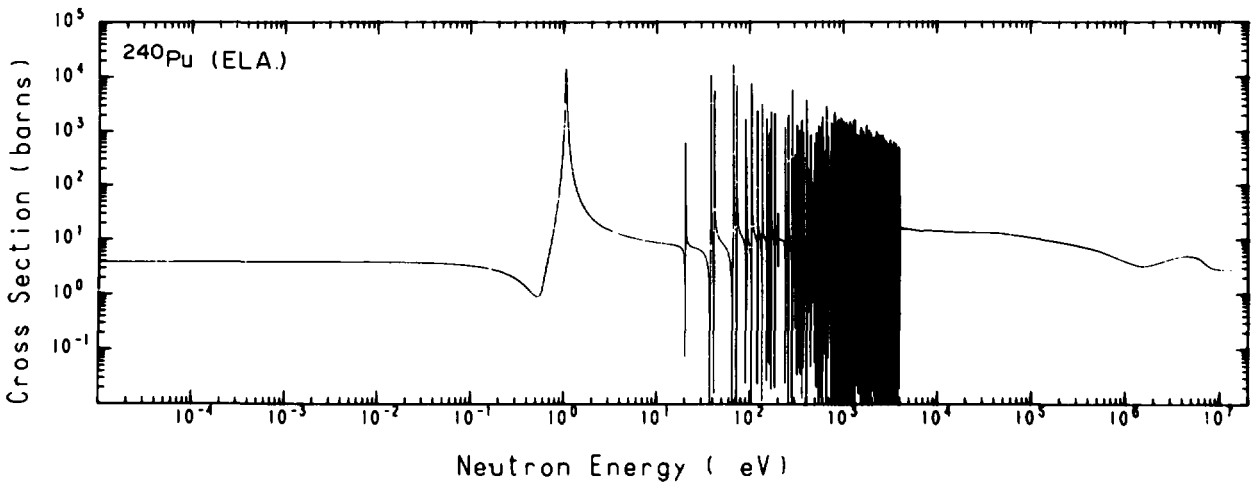

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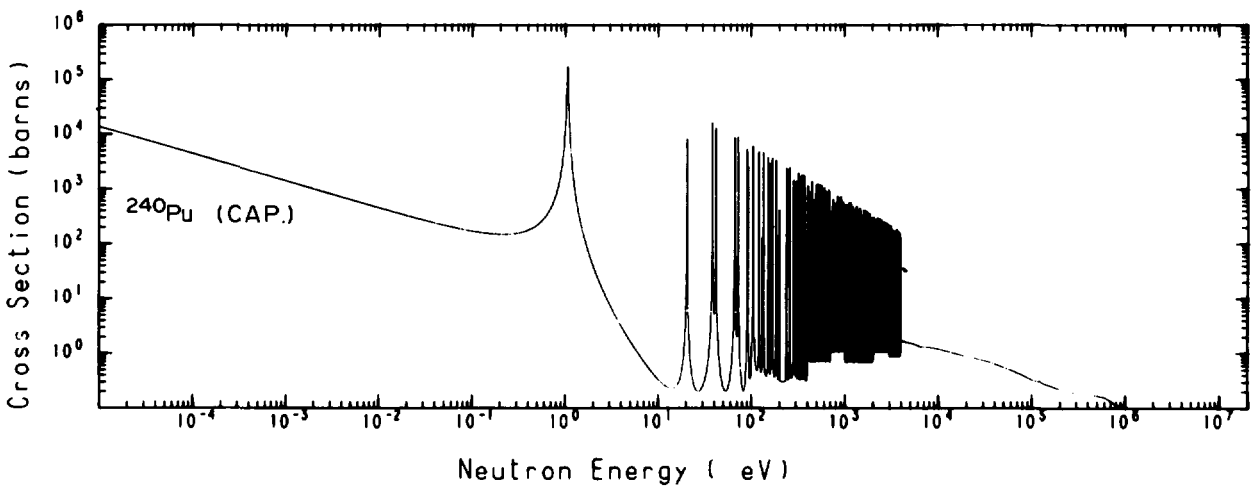

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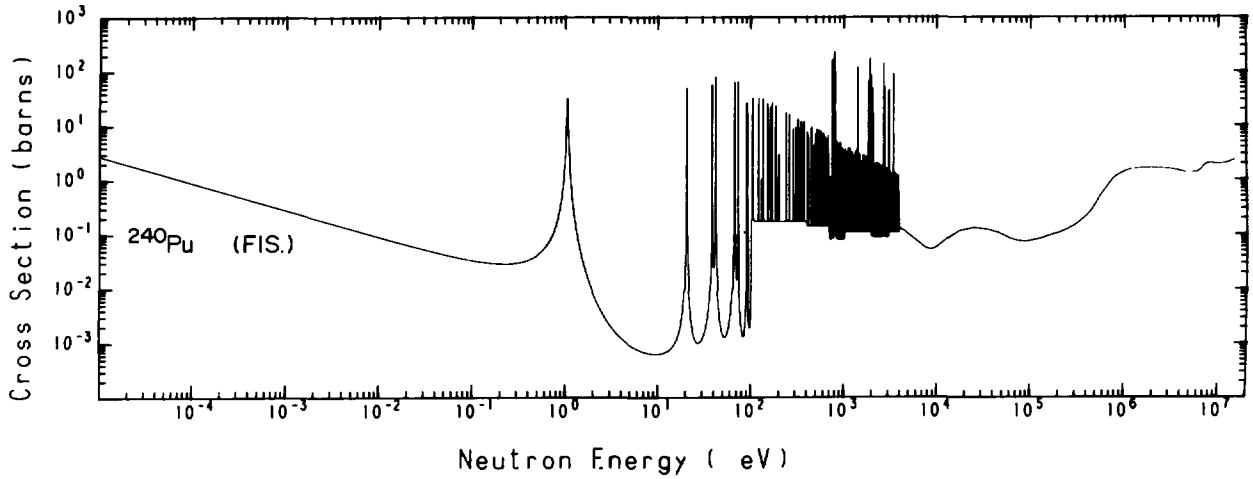

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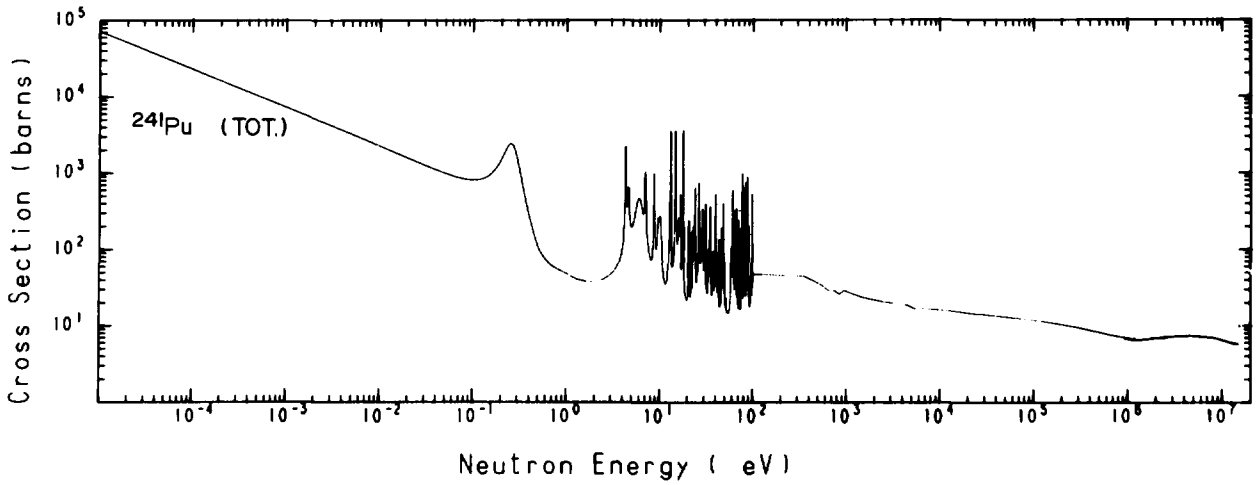

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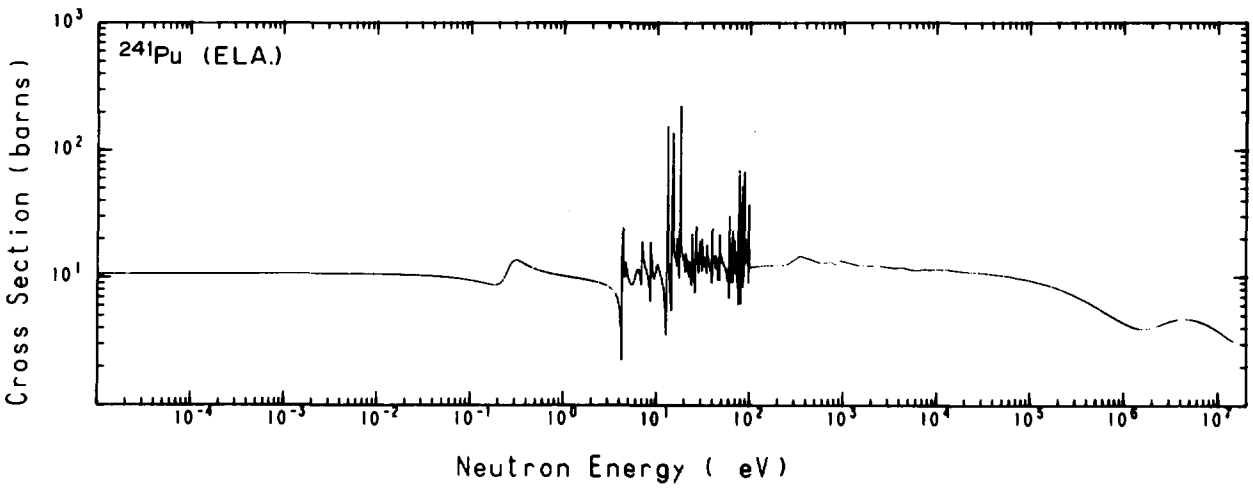

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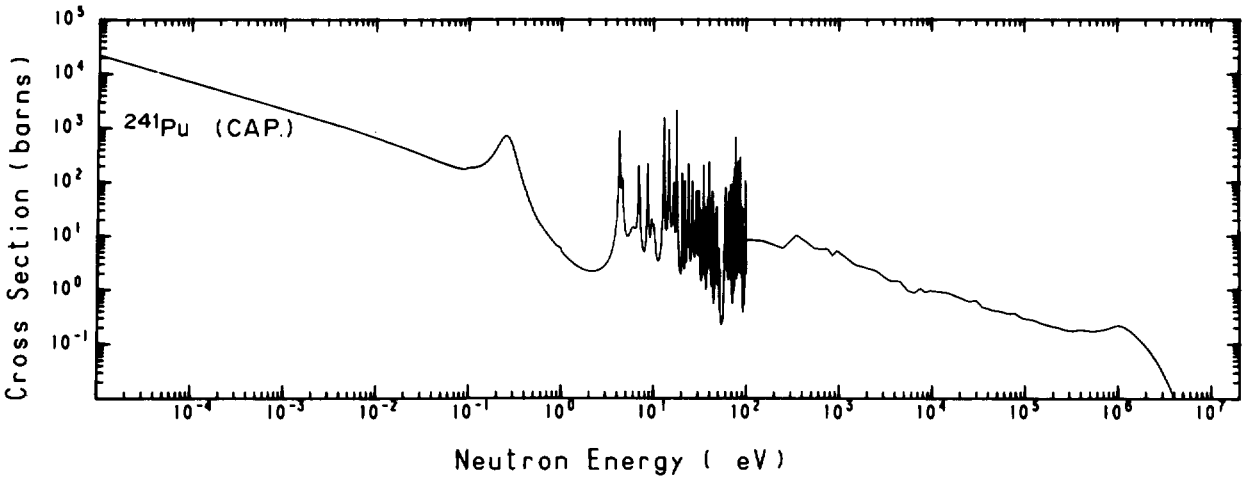

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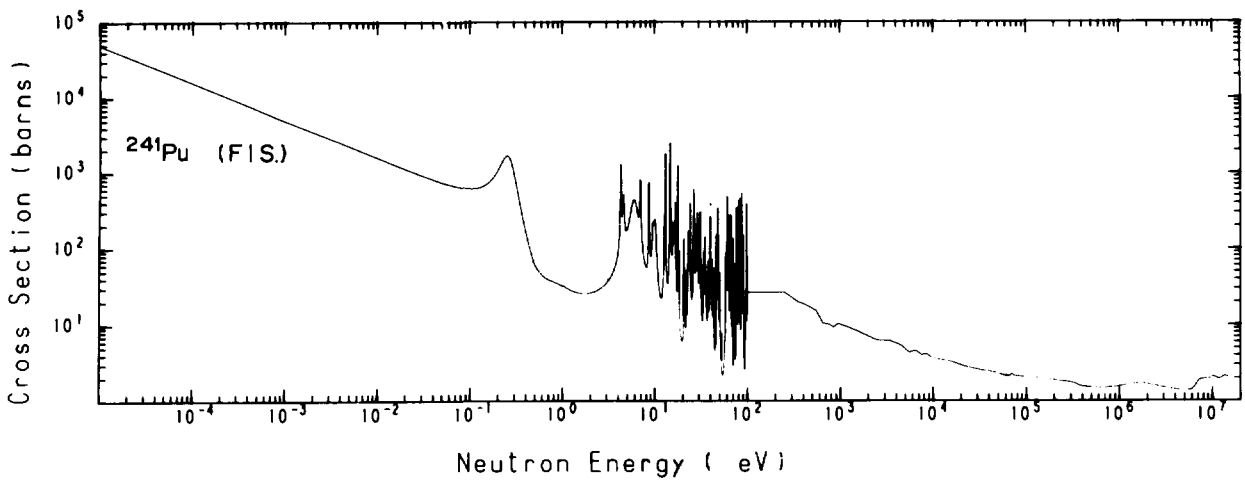

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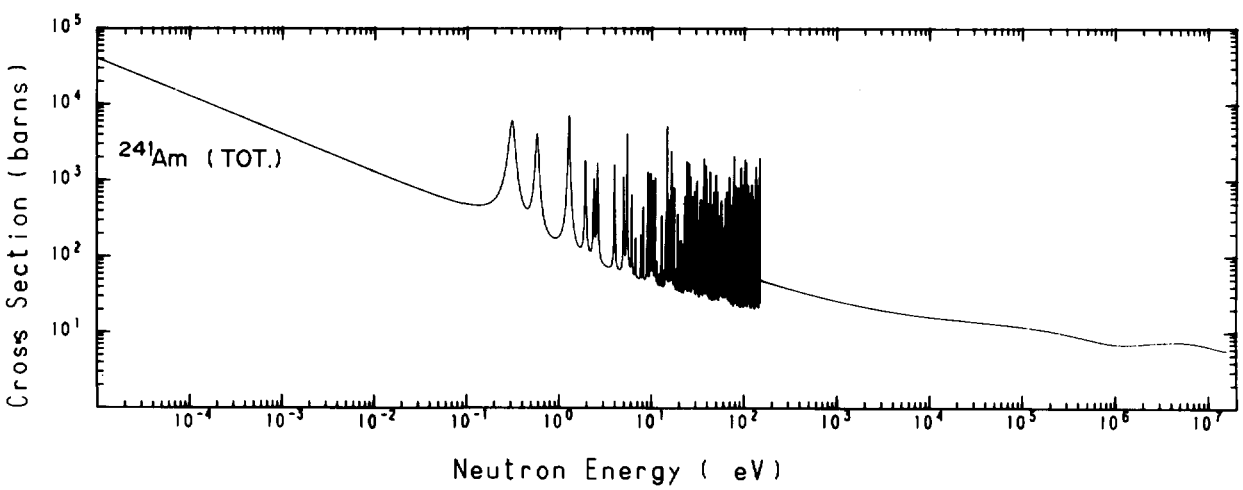

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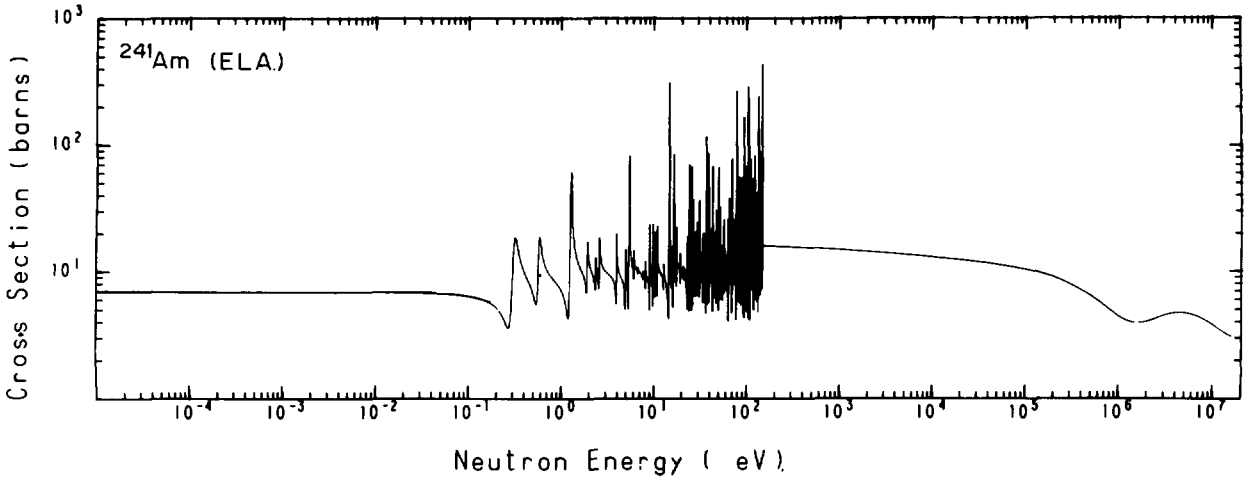

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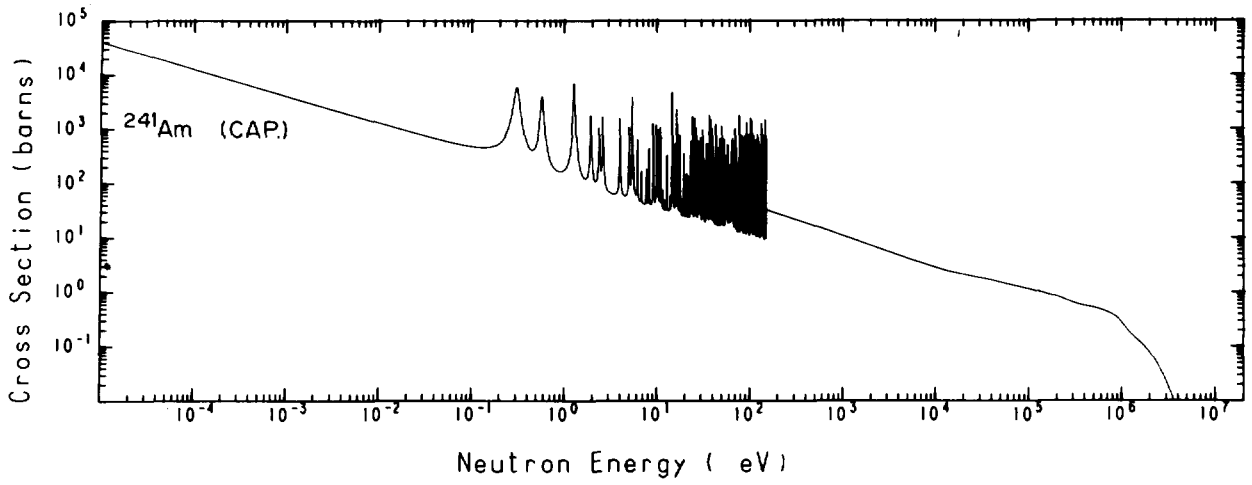

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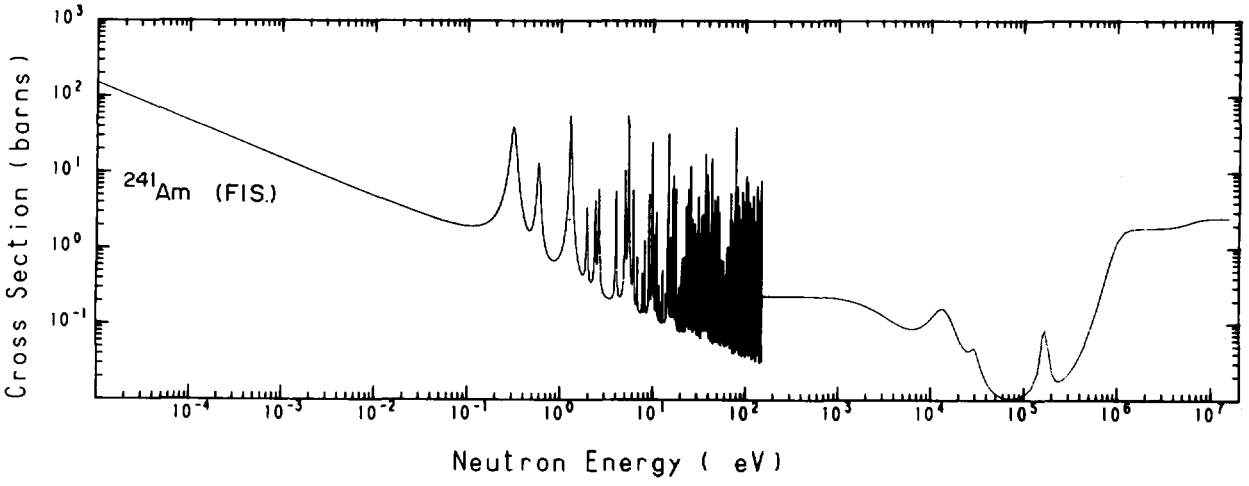
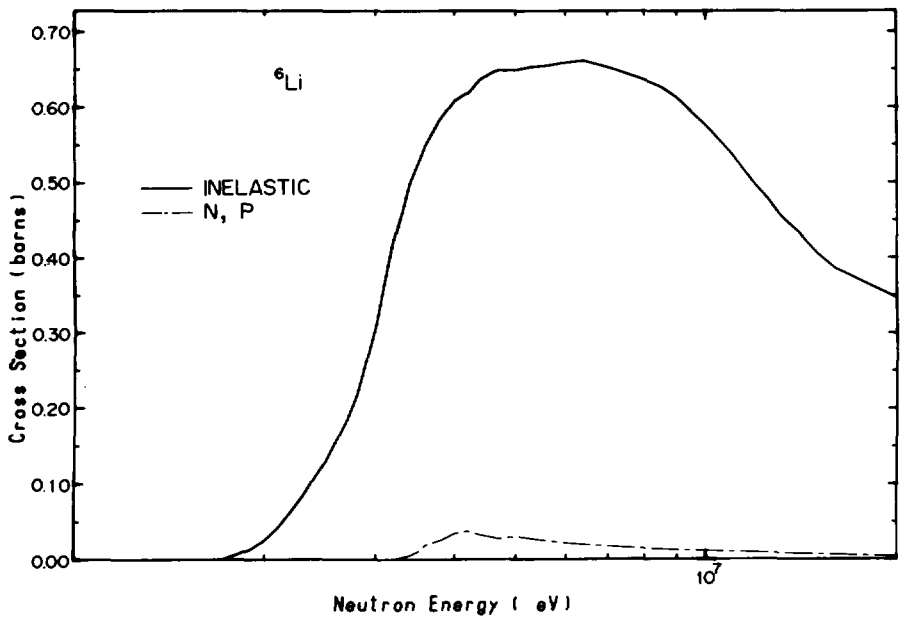


Fig. B1.150



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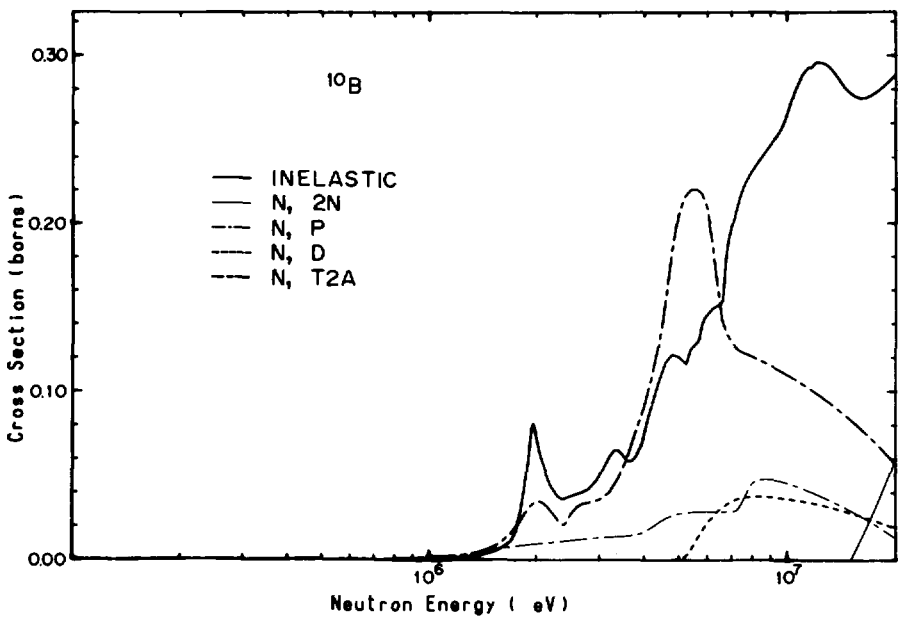

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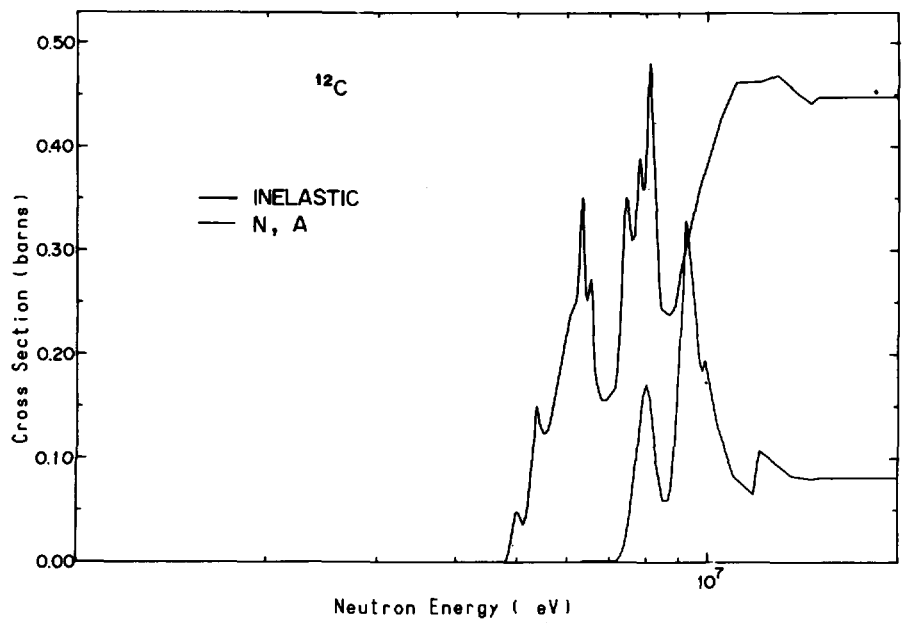

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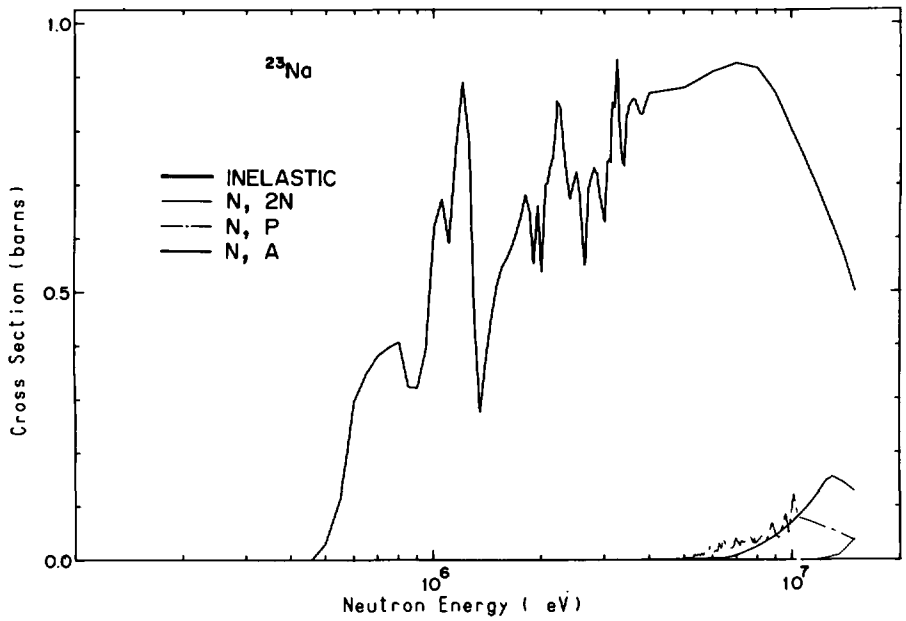

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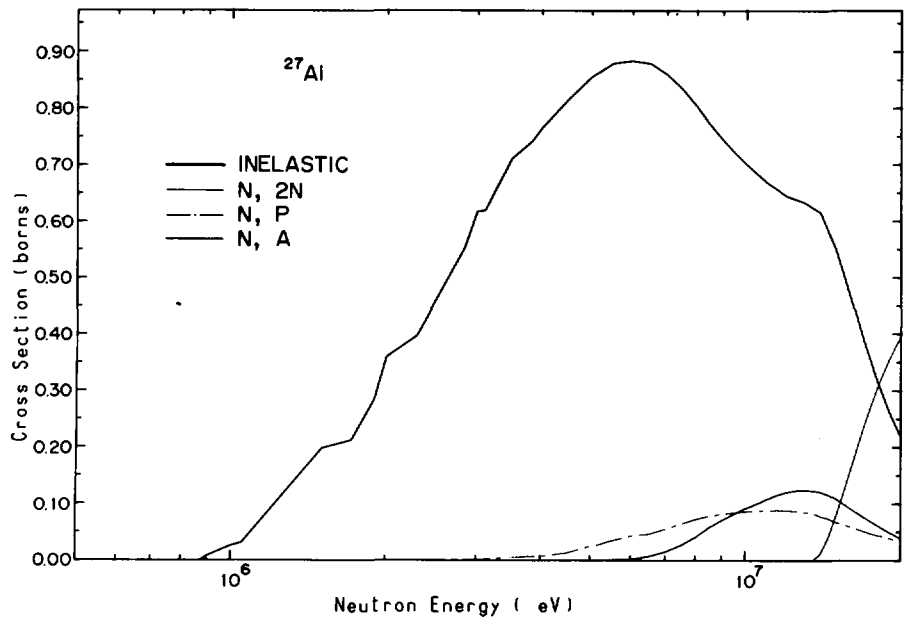

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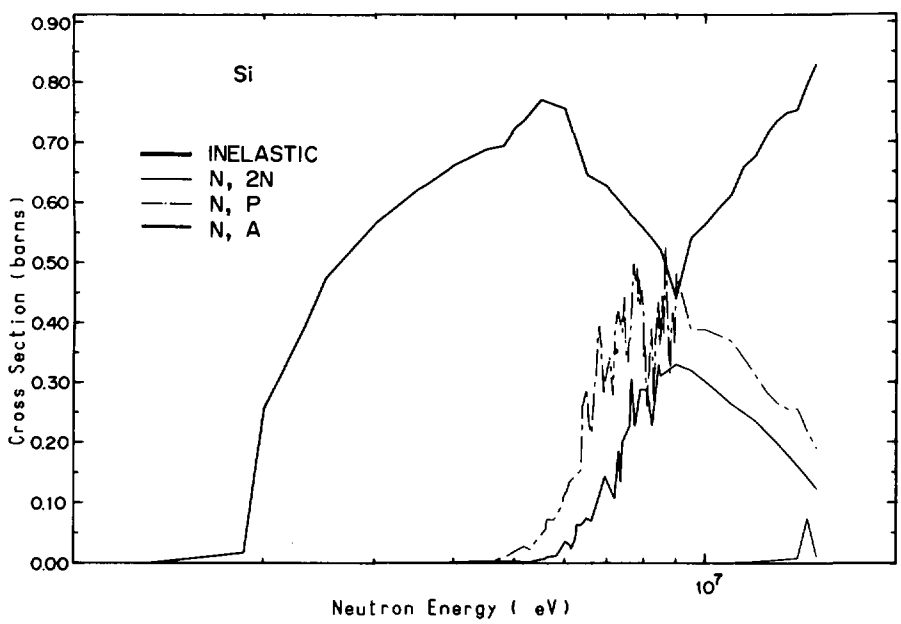

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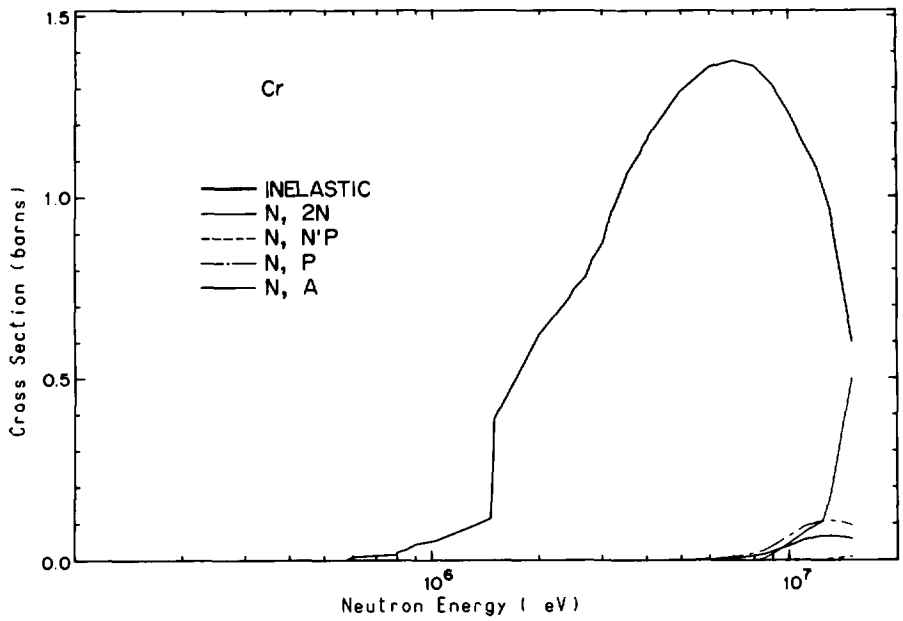

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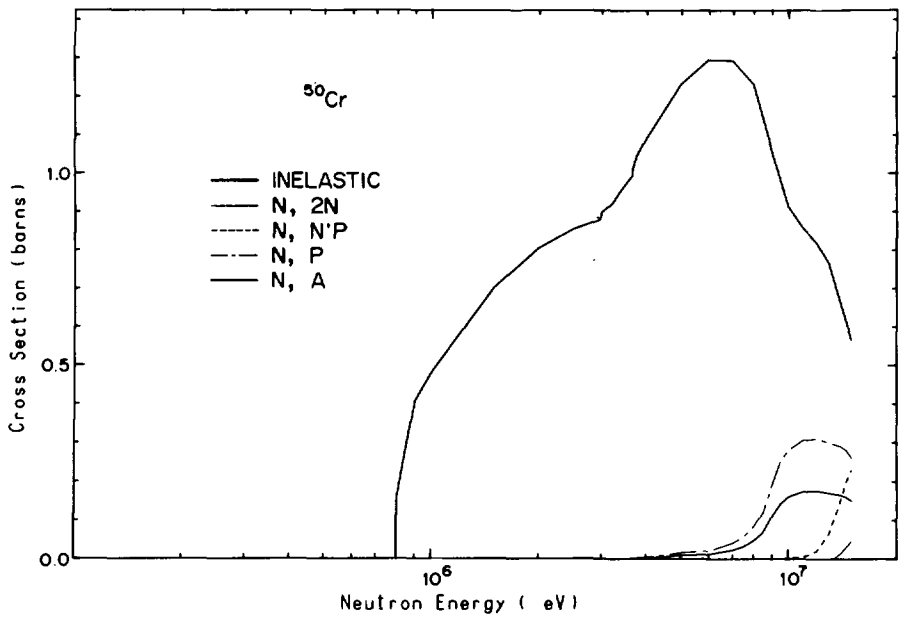

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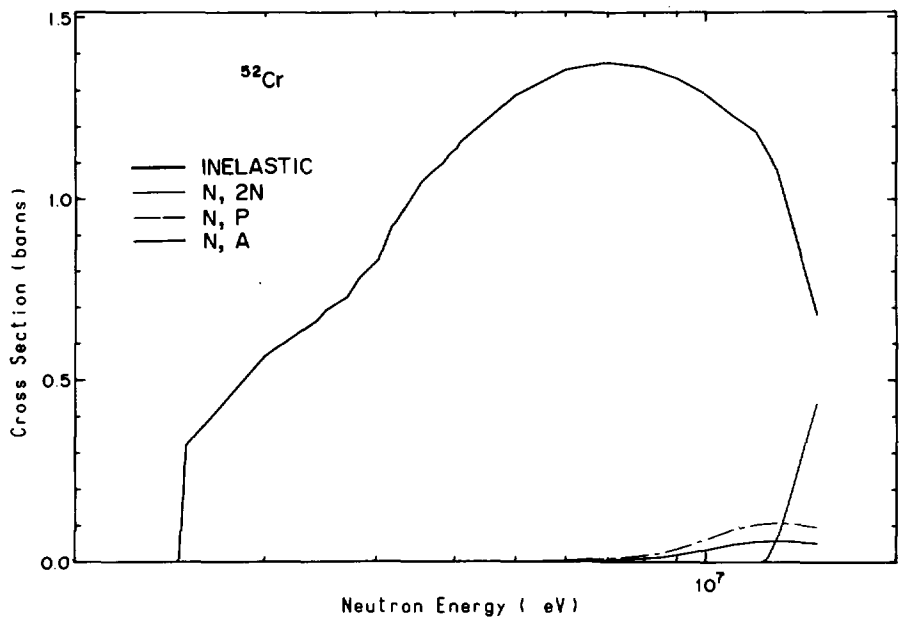

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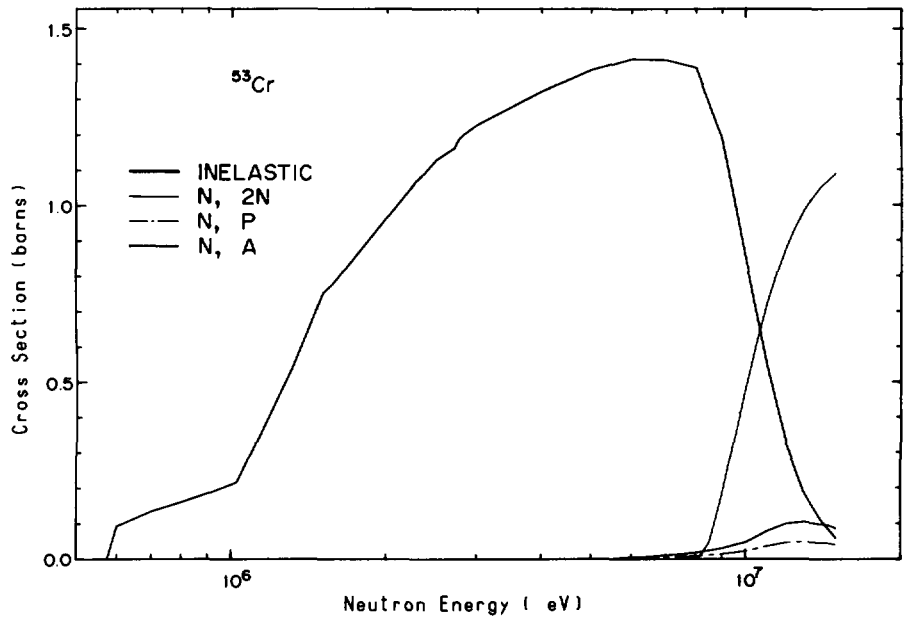

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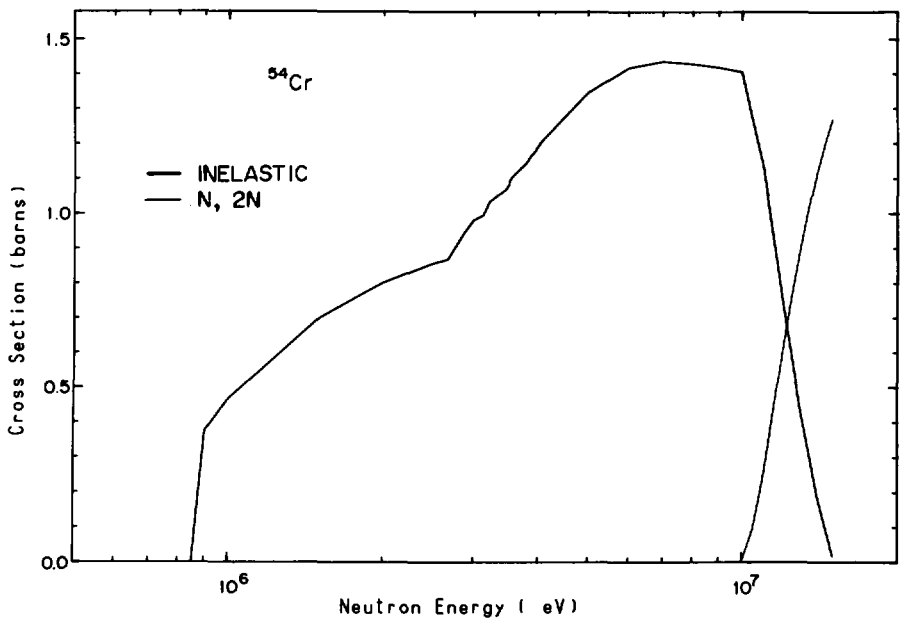

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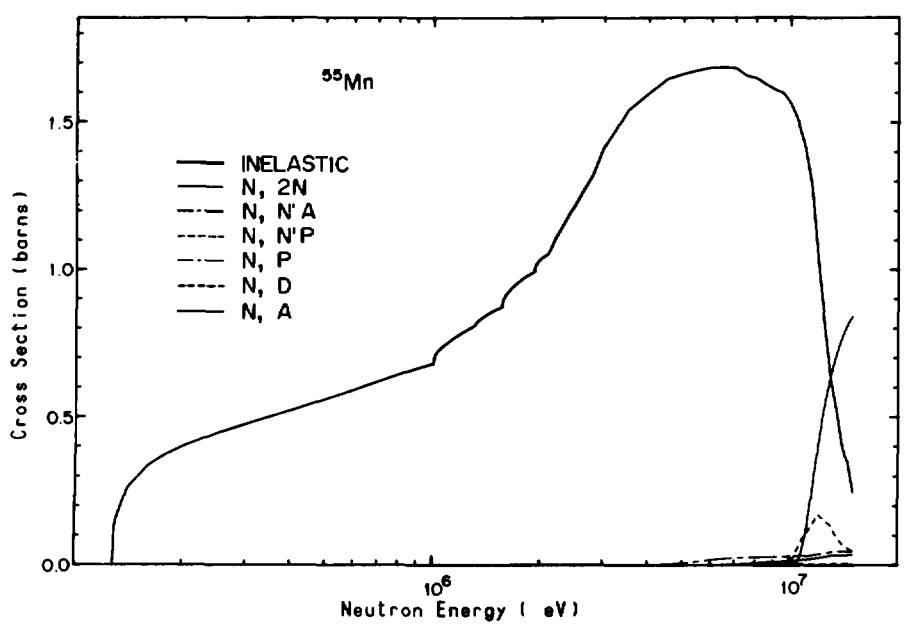

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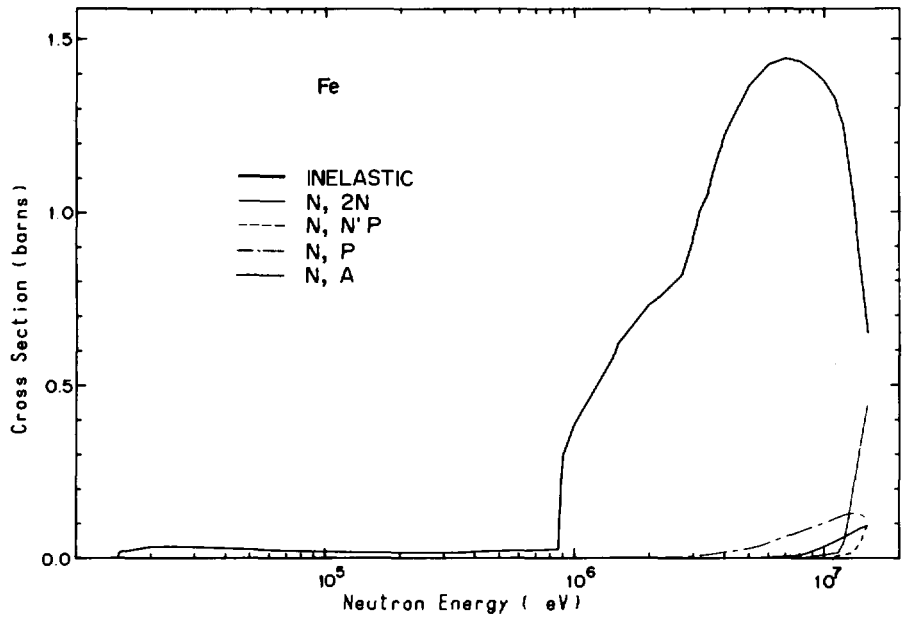

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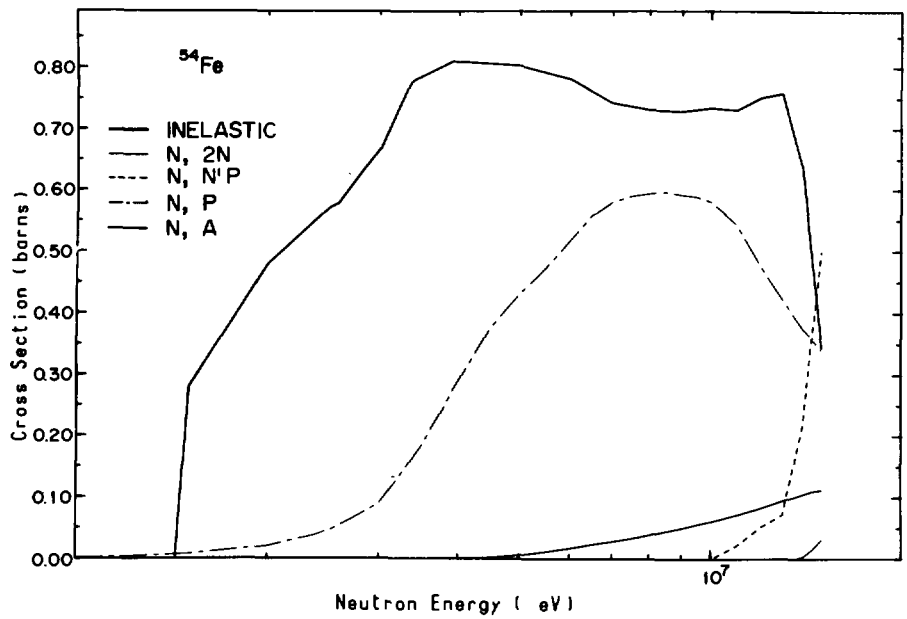

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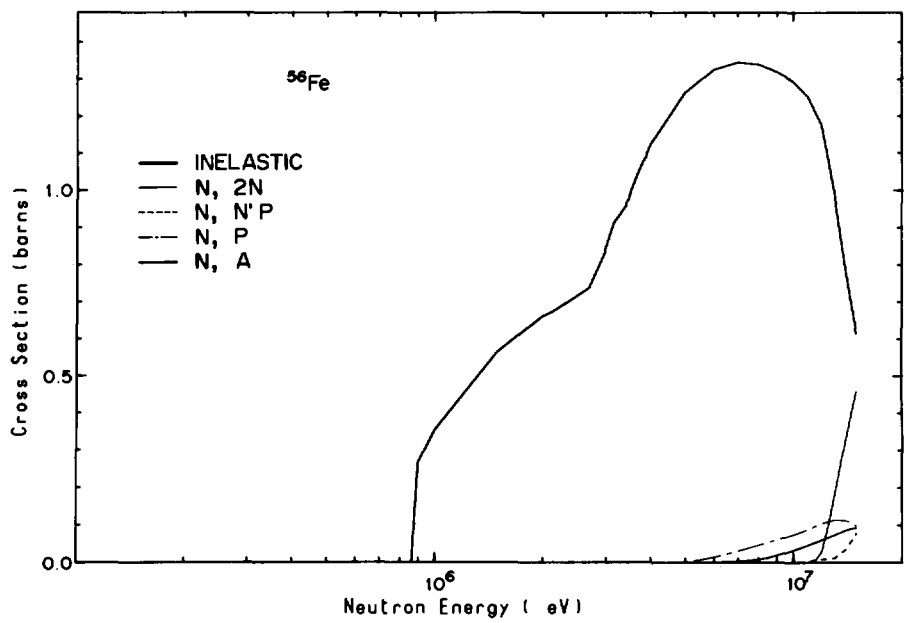

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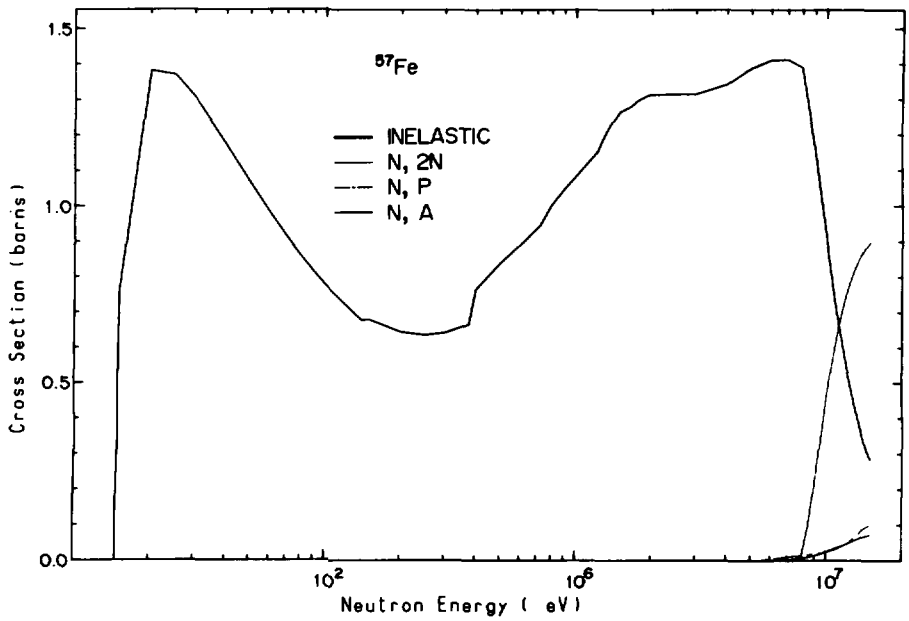

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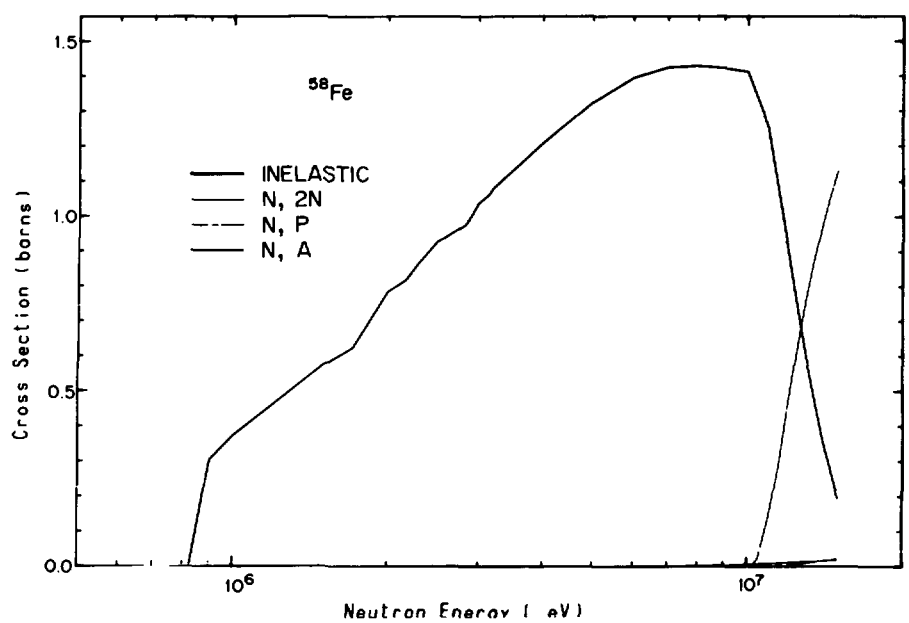

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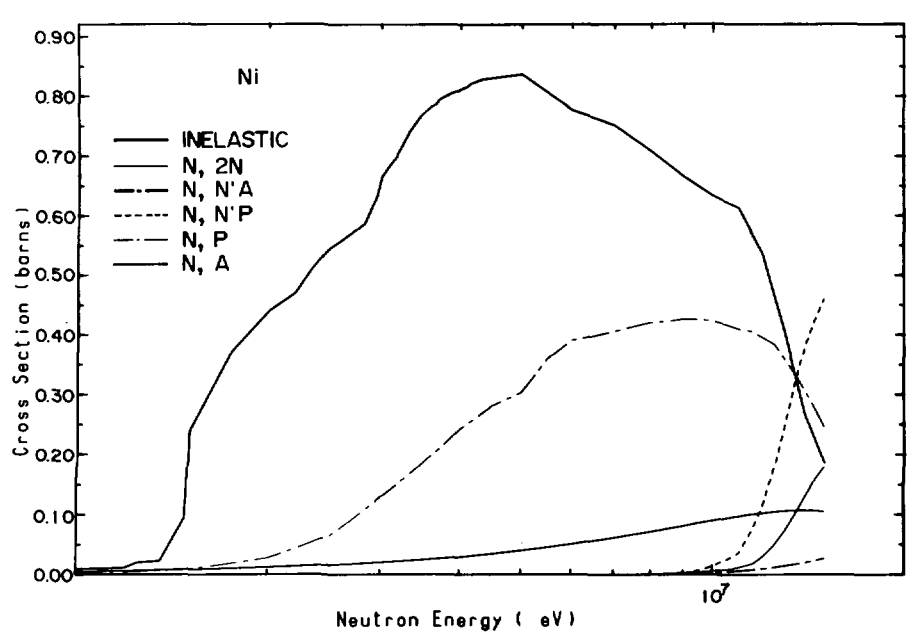

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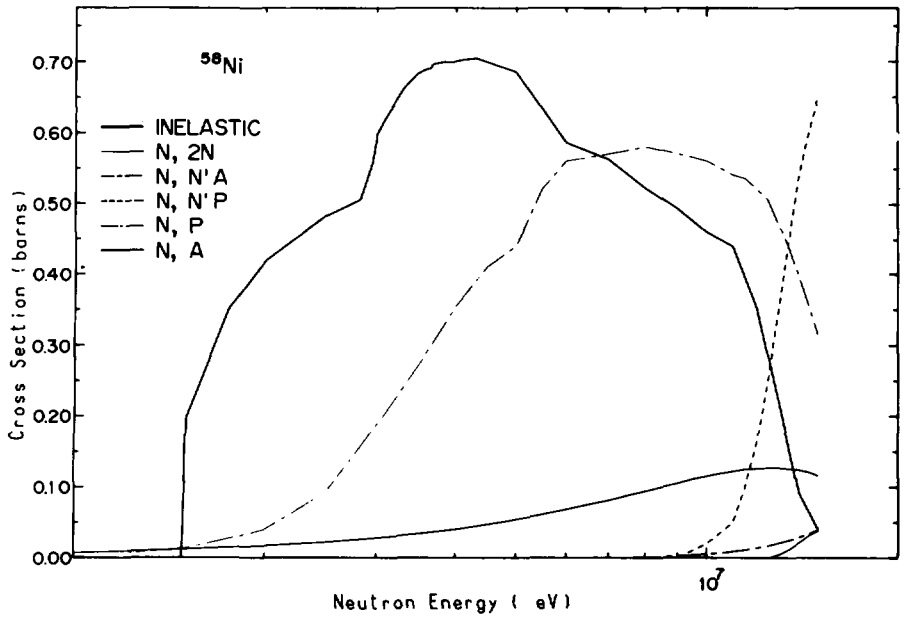

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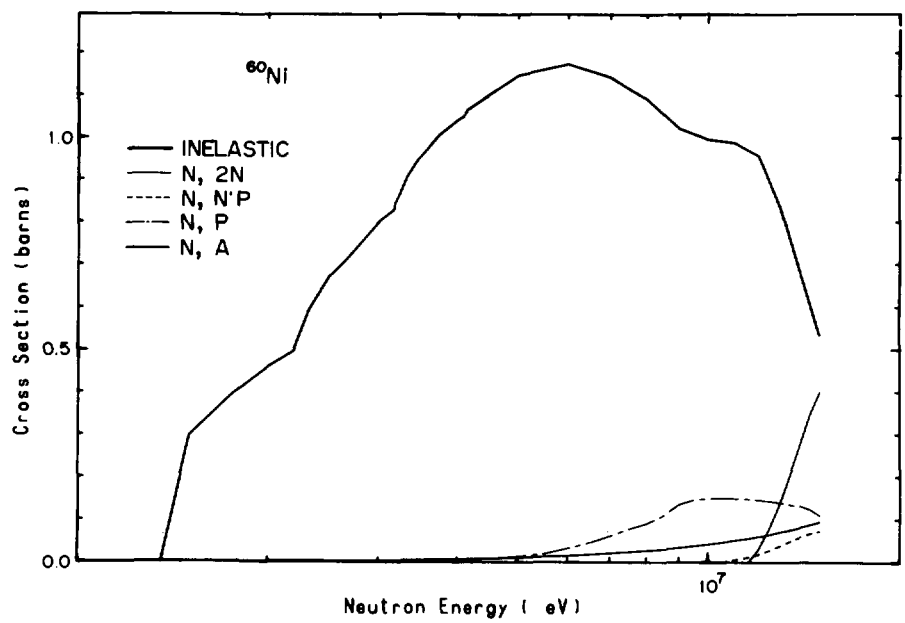

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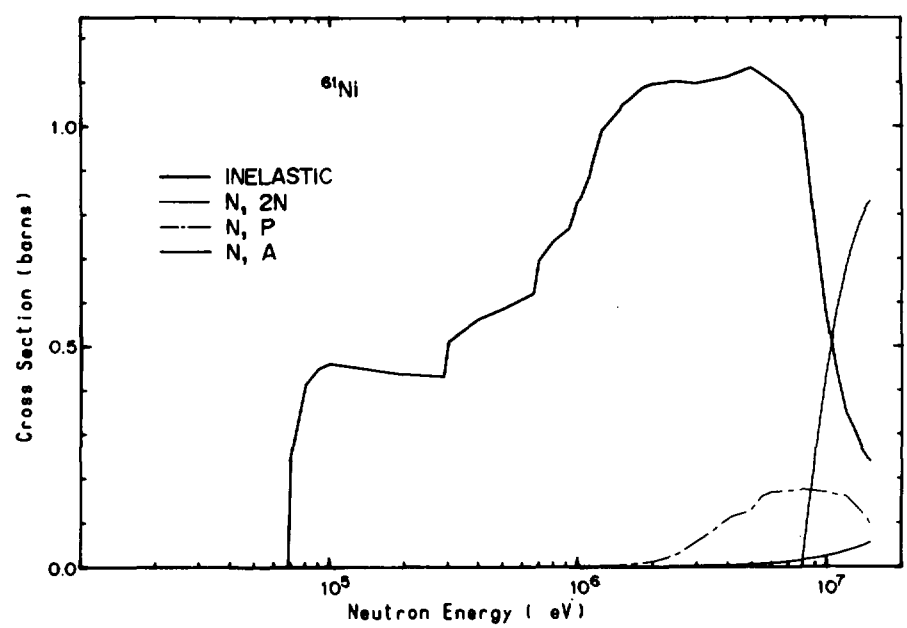

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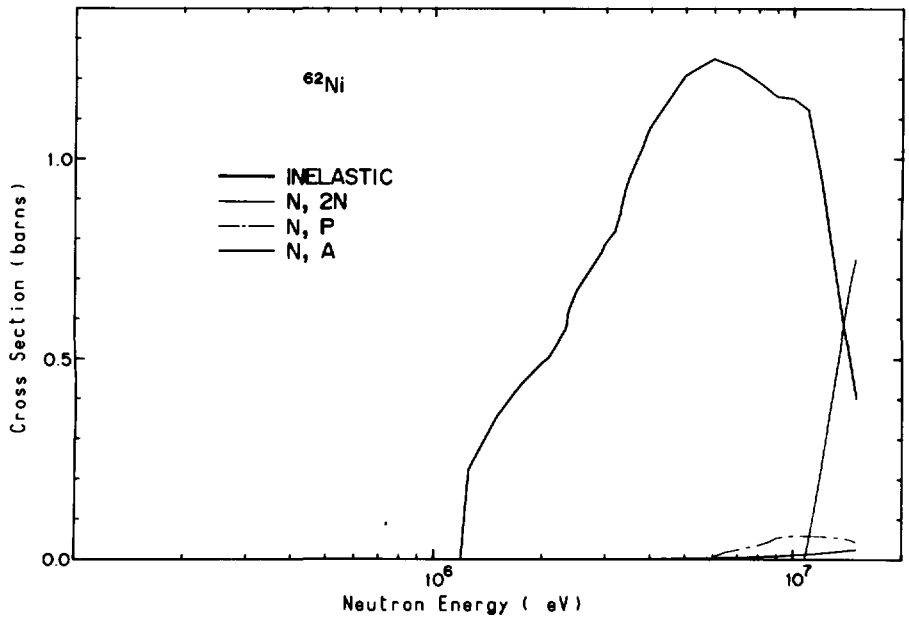

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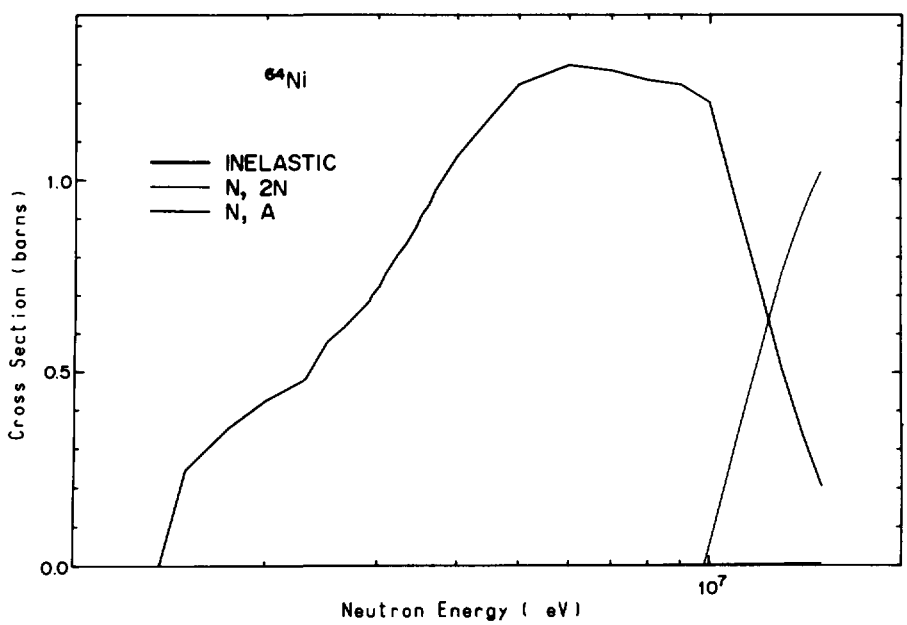

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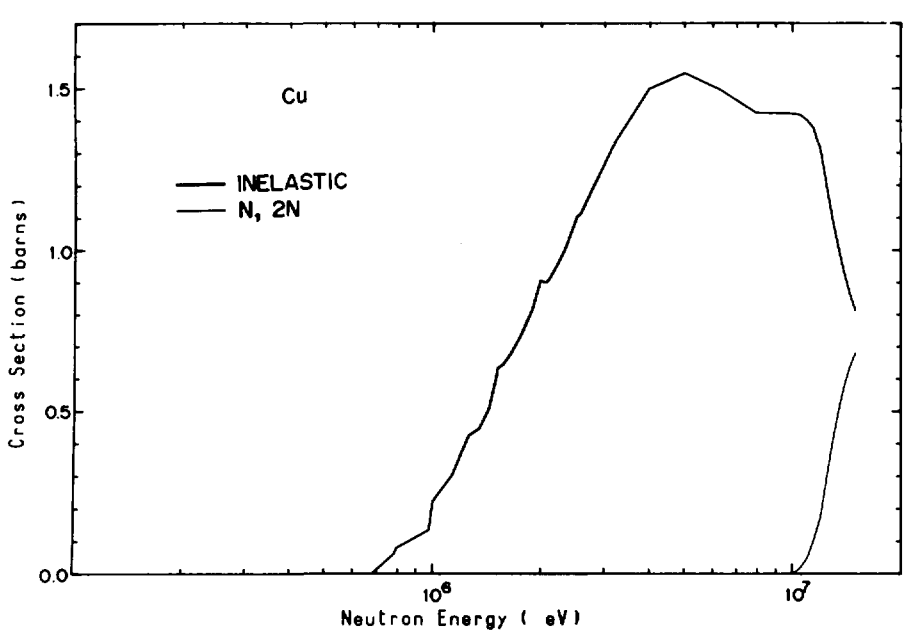

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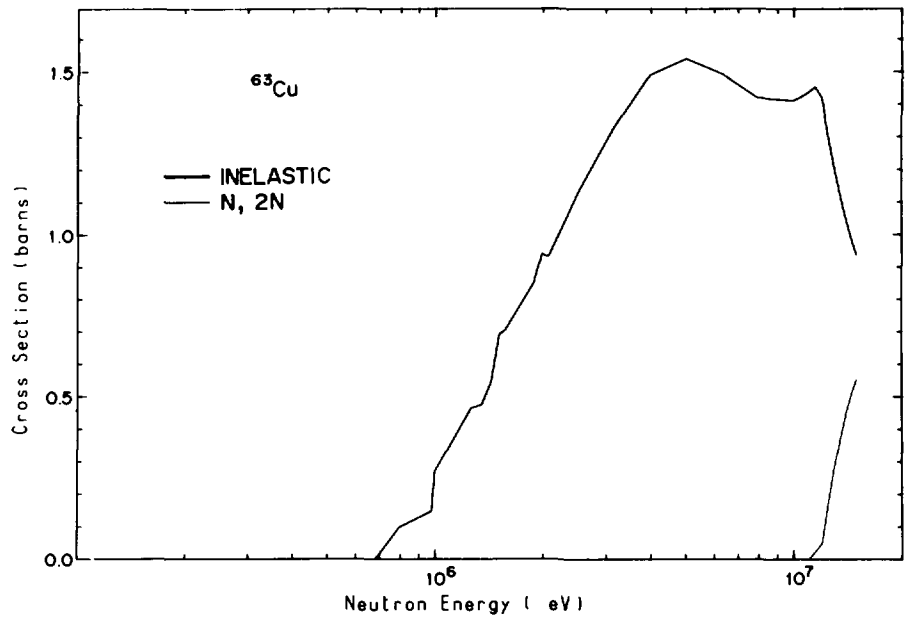

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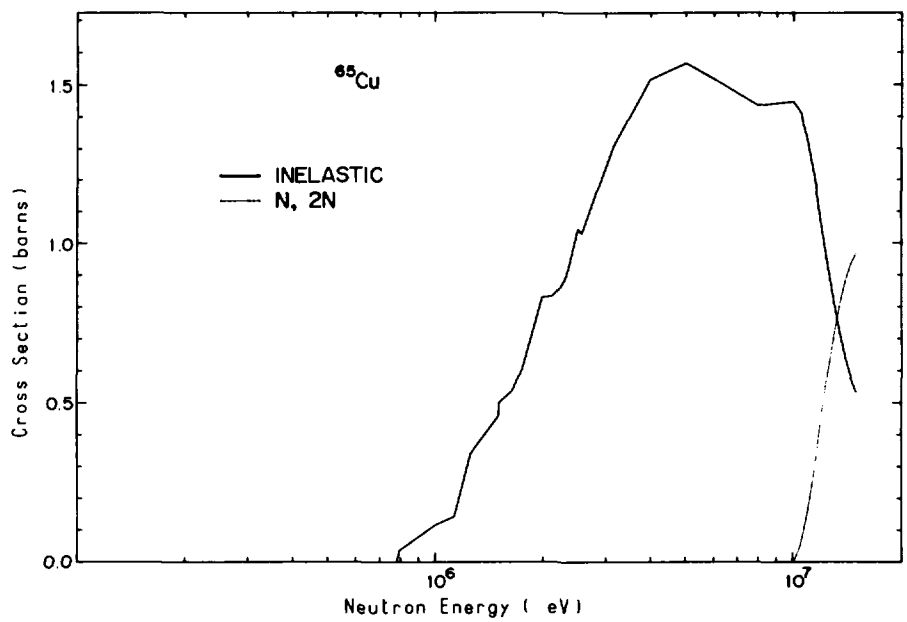

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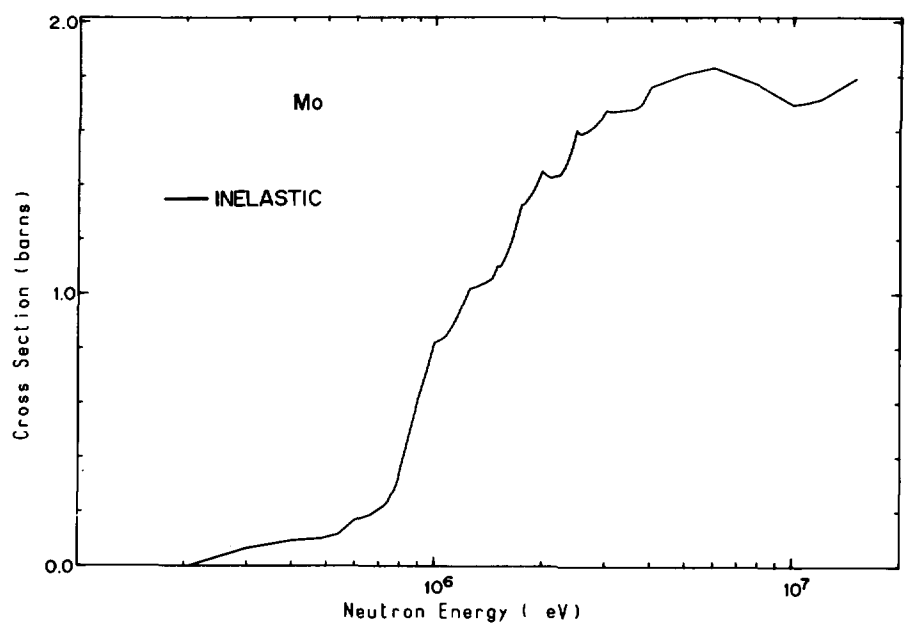

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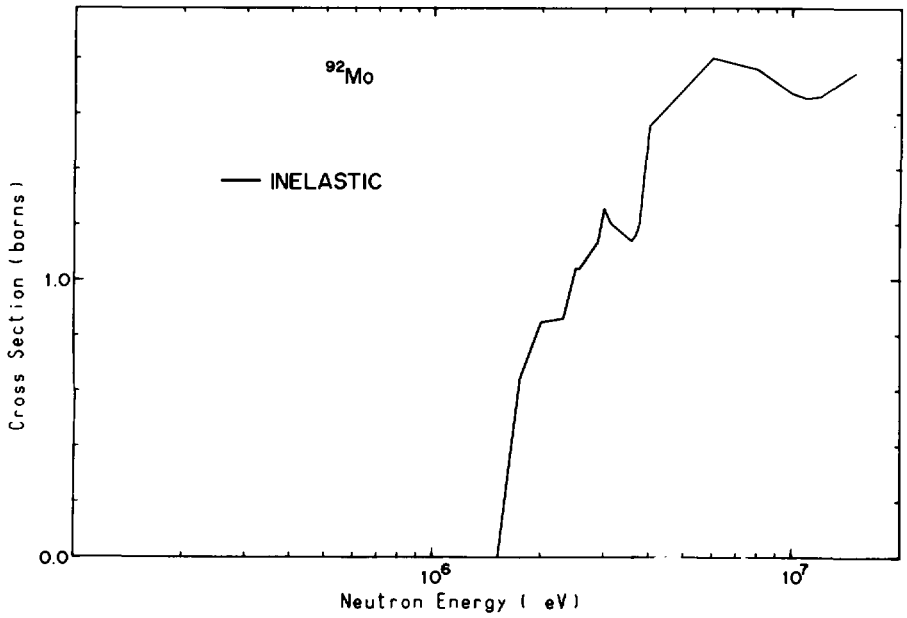

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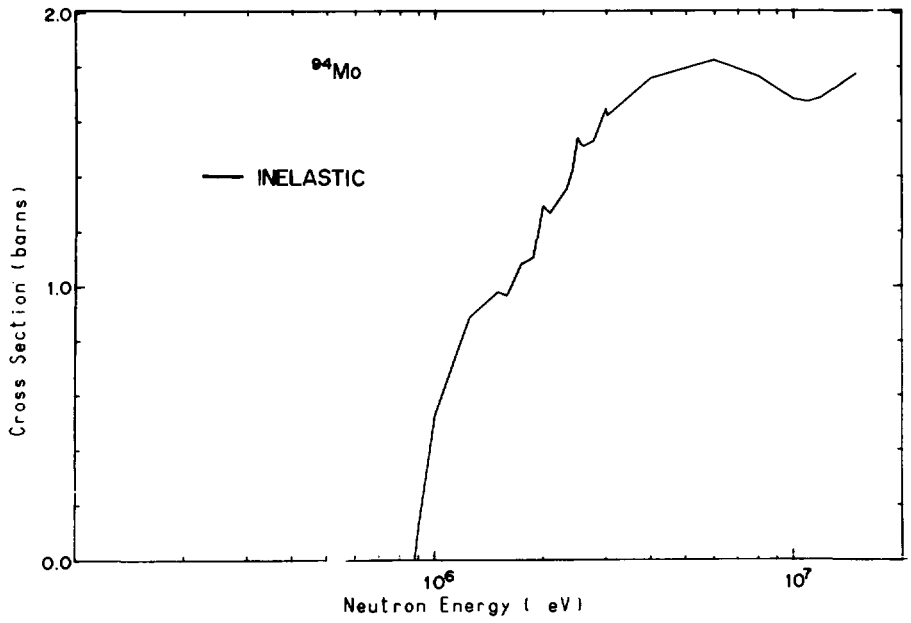

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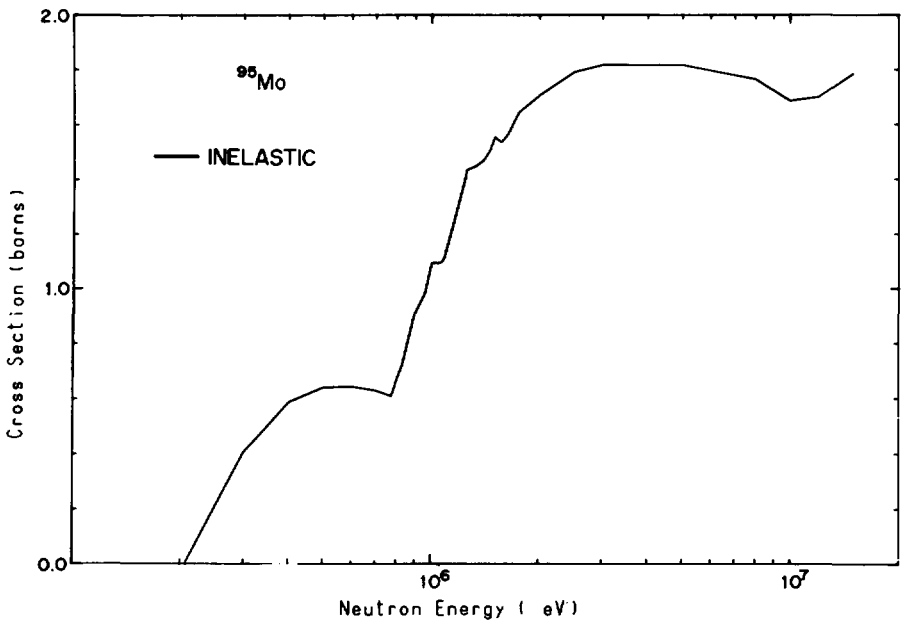

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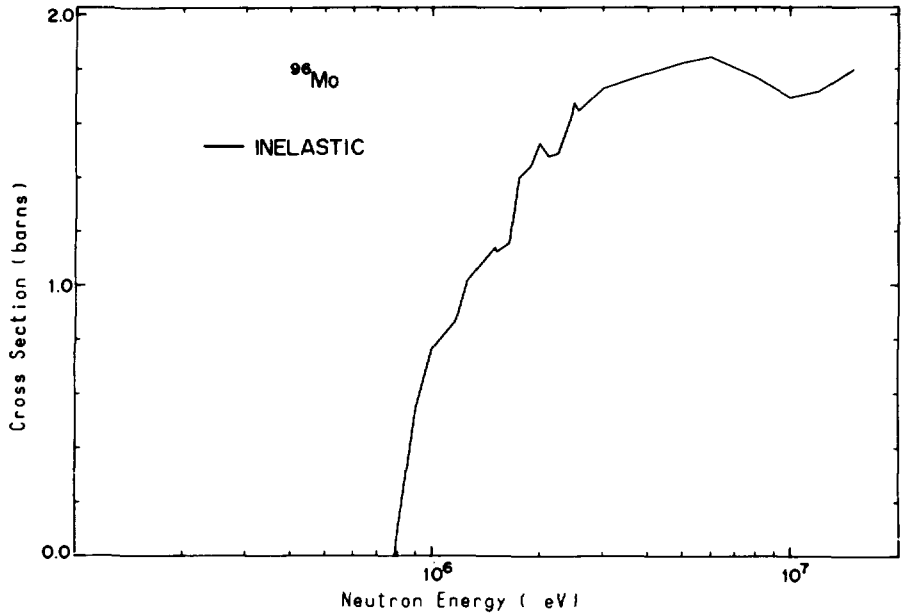

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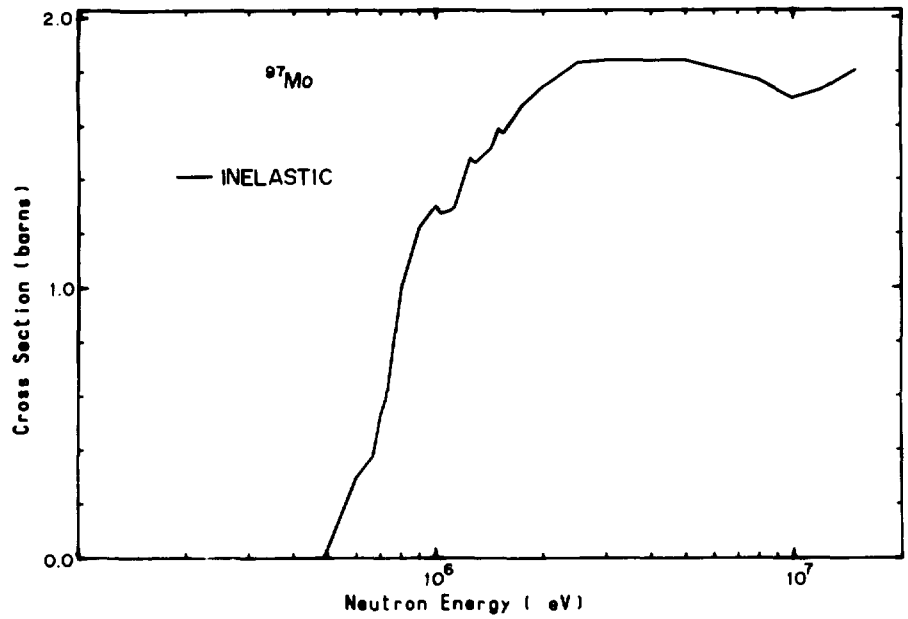

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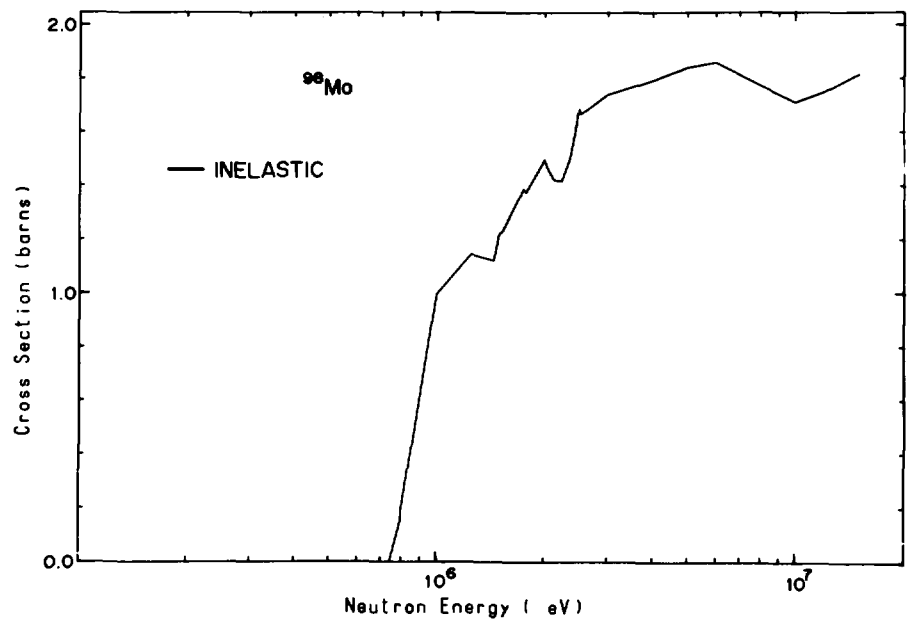

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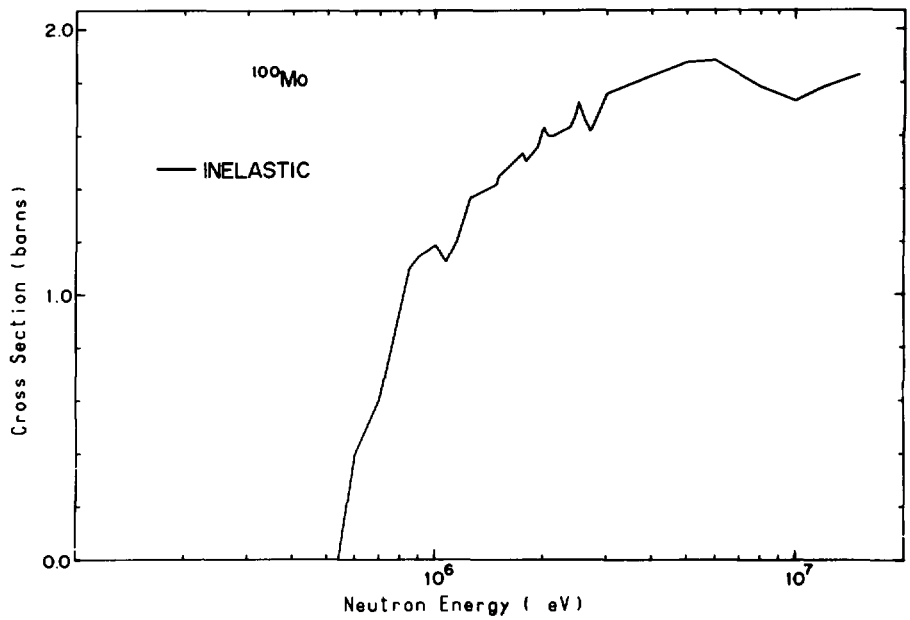

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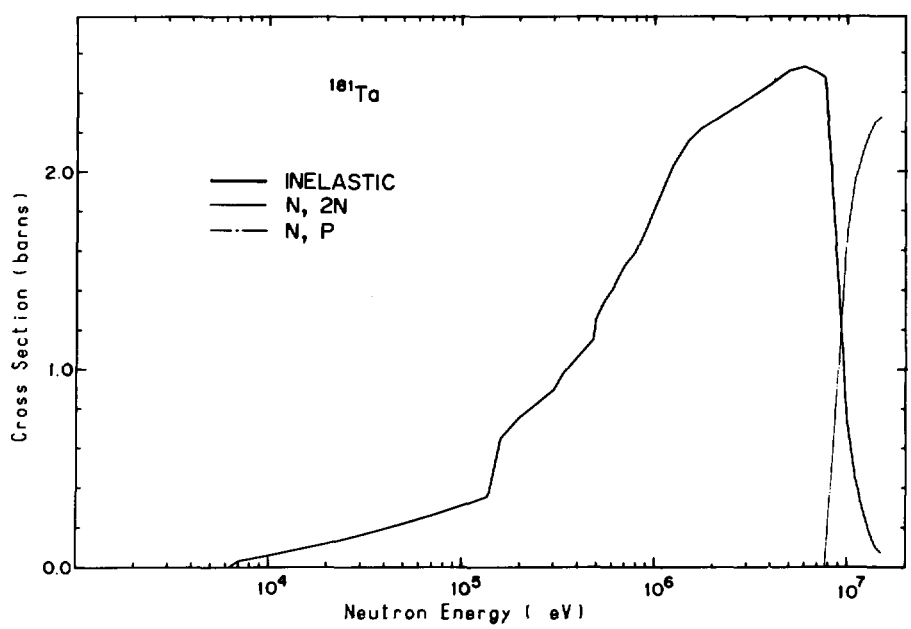

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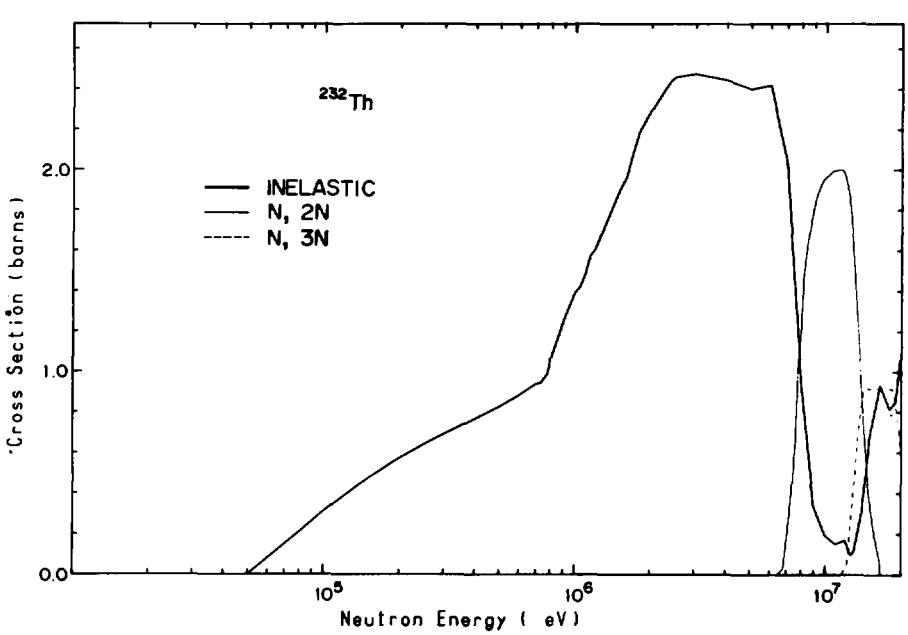

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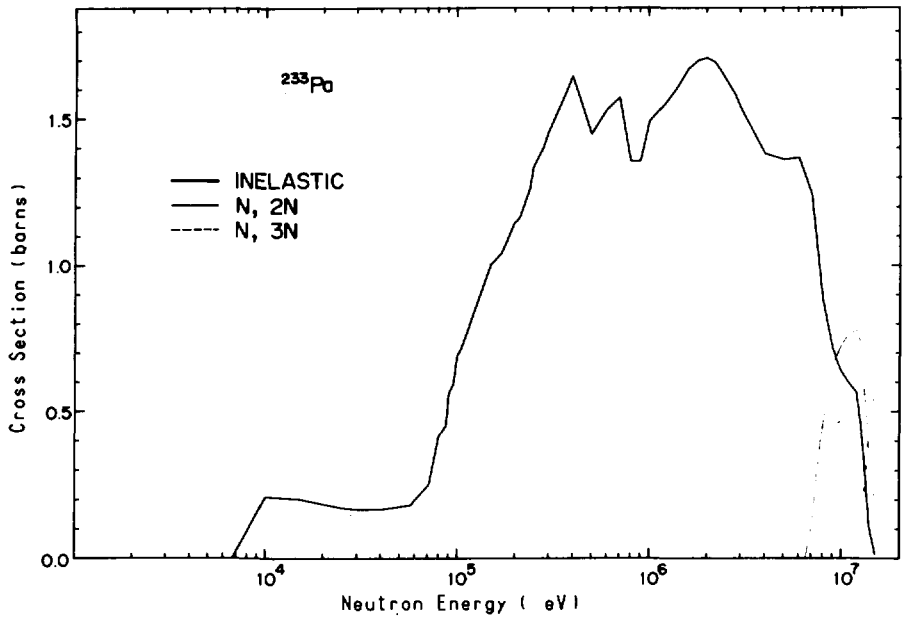

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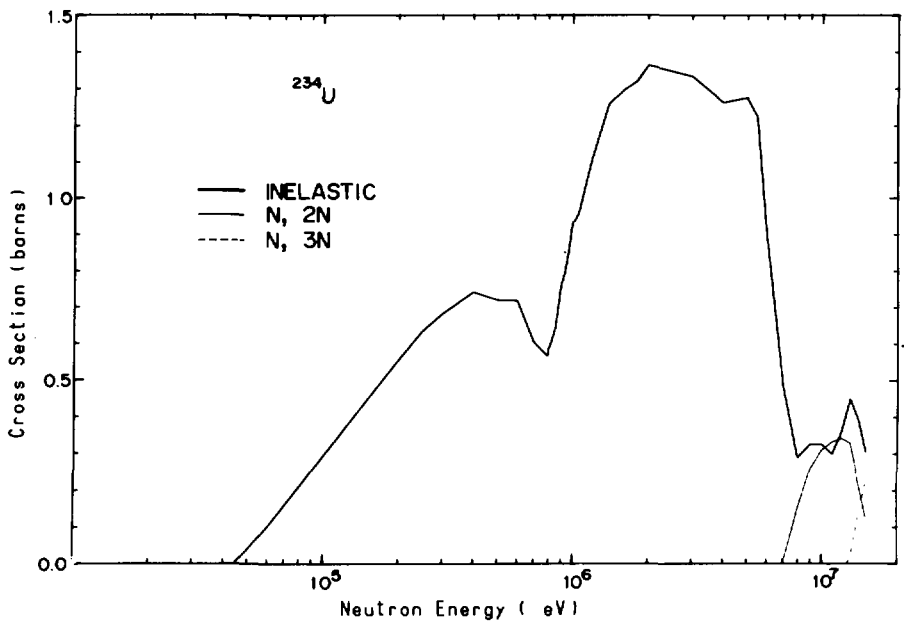

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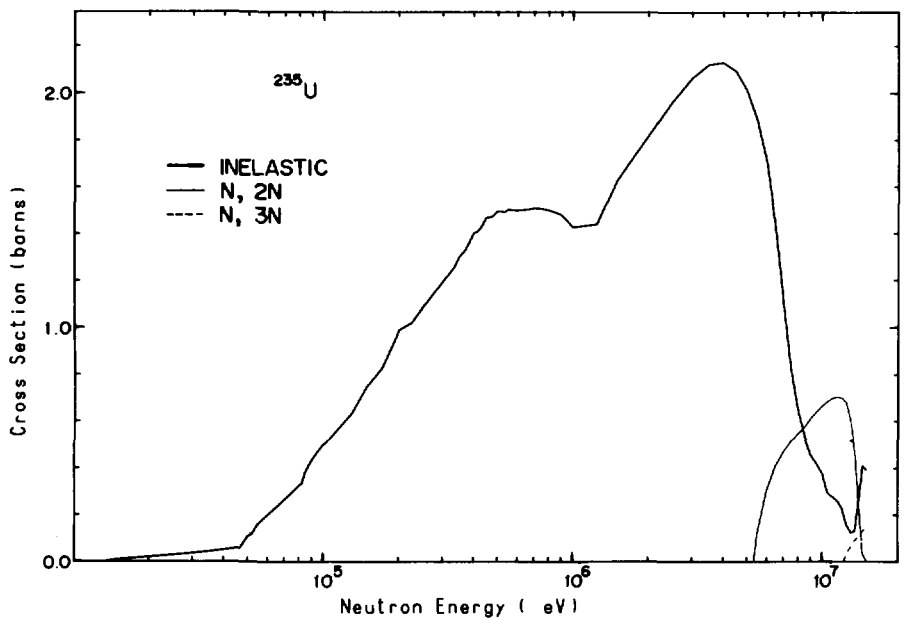

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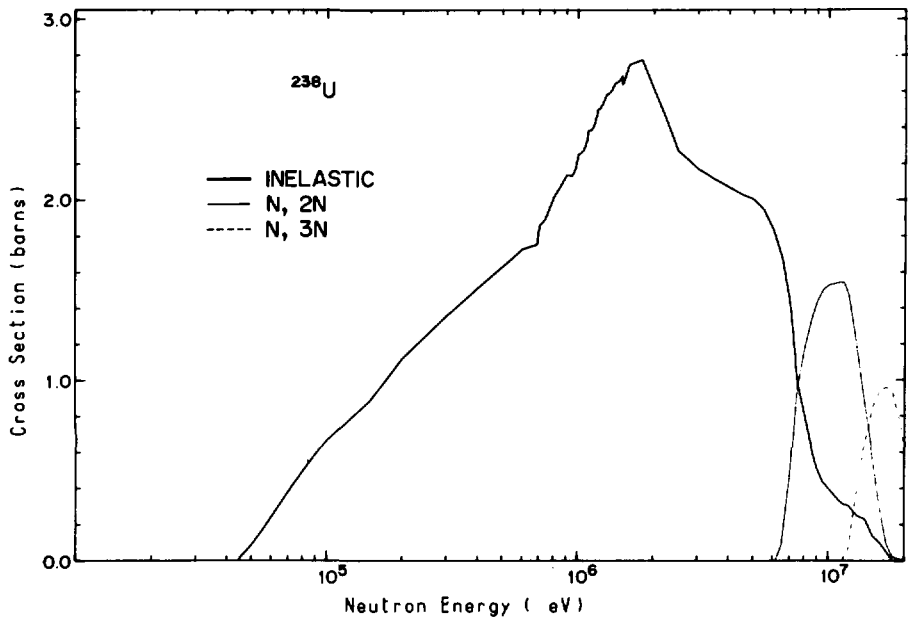

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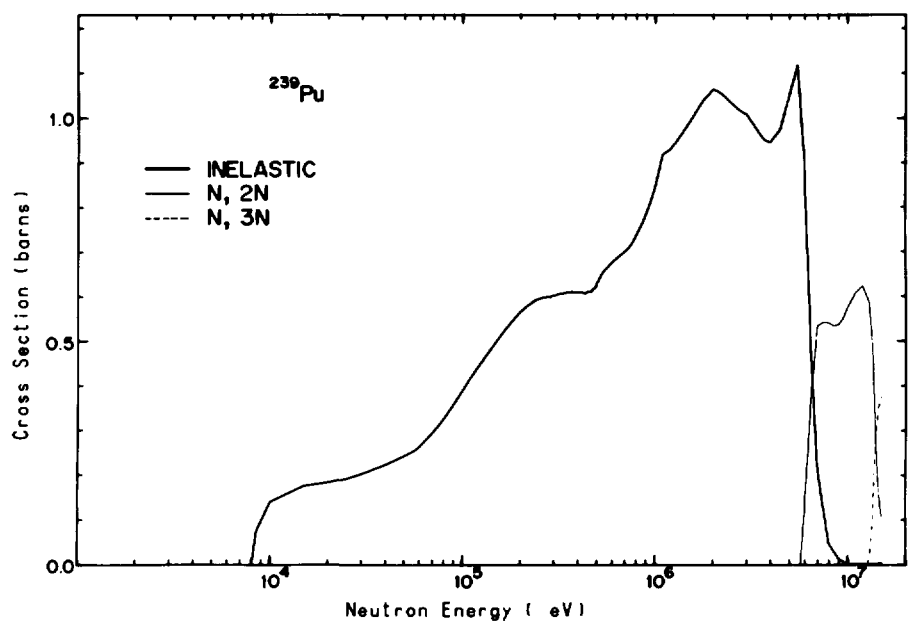

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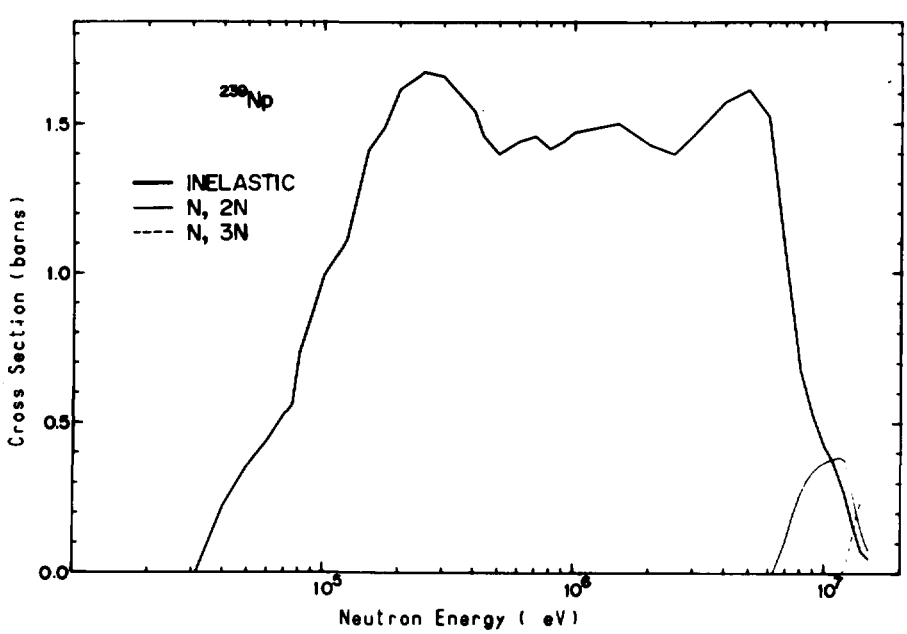

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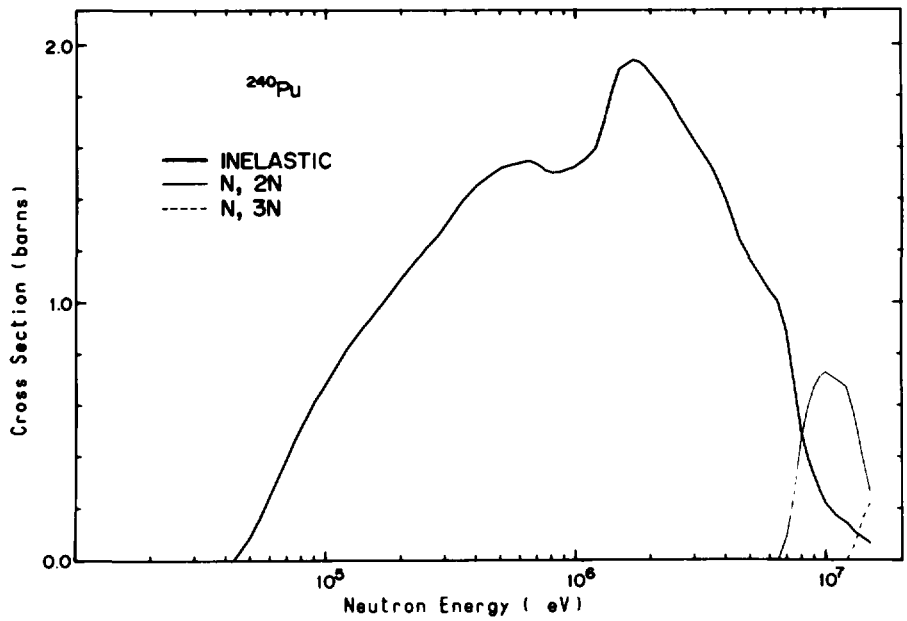

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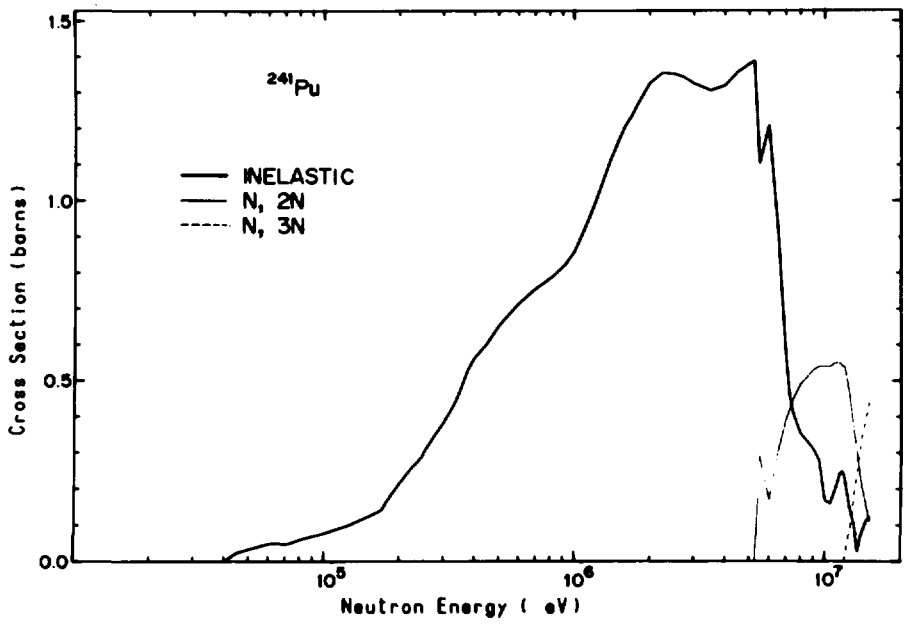

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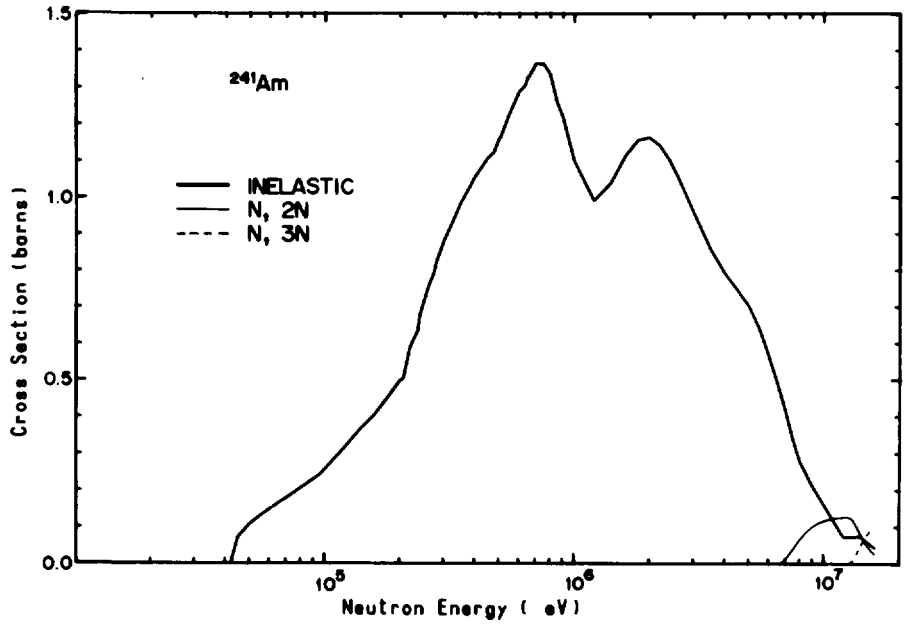

Fig. B2.45