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VALIDATION OF FENDL-3/A LIBRARY USING INTEGRAL MEASUREMENTS

Prepared by J. Kopecky

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The Netherlands

August 2012

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Contents

ABSTRACT

This report describes the validation of FENDL-3/A against integral activation experiments, applying the same procedures as successfully used for validation of the last four EAF libraries (EAF-2001 [1], EAF-2003 [2] and EAF-2005 [3] and EAF-2007 [4]) with the processing code SAFEPAQ-II [5]. This was done by comparing the predictions of the EASY code system with activation measurements made on materials relevant to fusion technology in well-characterised neutron fields. If the ratio of results from Calculation (C) and Experiment (E) is close to 1 then the data are described as validated. In other cases it may be possible to change the library data to improve the C/E ratio. For the present validation of the FENDL-3 library, which is based on data from EAF-2010, an extended set of integral measurements is used. This extension is primarily made by adding the large number of values in the literature for well-defined neutron spectra.

As a part of the EFDA Fusion Technology Programme, a series of measurements on fusion relevant materials in several complementary neutron fields have been carried out over the last few years. In addition, measurements performed outside Europe and outside the fusion programme have also been considered. All these measurements form the compilation of integral activation data (IED/10) and were used in validation of the EAF libraries. The results from these measurements, which include also the pathways responsible for production of the various radionuclides, are described in detail in Ref. [4]. The pathways show the reactions that dominate the formation of the measured radionuclides. Knowing the reactions enables the activity measurements to be transformed into effective cross sections (average value of the cross section in the neutron spectrum) which can be compared with the library value calculated in the same spectrum. Analysis of all experimental data from the compilation in Ref. [4] allowed the determination of effective cross sections for 470 reactions and these are presented in tabular form and also as plots of the C/E ratio. Plots were made for all reactions and also show the EAF cross section (including the uncertainty estimate) as a function of neutron energy and the available experimental differential data. Using these graphs, an assessment was made to determine if the reaction is validated or if changes are recommended.

For the present validation exercise the FENDL-3/A data library is used. A novel approach has been tested in this work, namely the integral data base IED/10 has been extended by Maxwellian cross sections at 30 keV (MACS) as integral quantities. Only those values which are based on experimental measurements are included, any calculated MACS data are excluded. This extension concerns capture data and brings the total number of reactions analysed and validated from 470 to 804. Quality assessments will be used with other information to enable improvements to be made to future version of FENDL libraries.

1. FENDL-3

FENDL-3 has been produced as an output of an IAEA CRP (http://www-nds.iaea.org/fendl3/). It comprises general purpose and activation data for neutron, proton and deuteron incident particles. The energy range extends above the 20 MeV value used for previous FENDL libraries and in the case of activation data is 60 MeV. The neutron-induced activation library (FENDL-3/A) is based on EAF-2010.

2. INTEGRAL EXPERIMENTAL DATA BASE (IED)

The extended IED (IED/11) version is used in this work and includes the data sources described in the following sections.

2.1 EFDA experiments

The main contribution comes from the results of measurements of several European laboratories carried out in the EFDA Fusion Technology Programme. They are the Technical University of Dresden (TUD), the Frascati Neutron Generator (FNG) group, the Forschungszentrum Karlsruhe (FZK) group and the Řež Nuclear Physics Group. Further the contribution from the Japanese Fusion Programme by the JAERI (FNS) group belongs to these fusion dedicated experiments. In Refs. [6-25] the experimental set ups and the spectra used are described and they should be consulted for details of the spectra and the original publications. These data sources can be characterized as:

Energy classification of neutron spectra	Energy range of Φ(E)	E of Φ(max)
SNEG – (d,^{3}He) mono-energetic source	14 MeV – 14.5MeV	14 MeV
FNG, FNS, TUD – (d,T) reaction	3 MeV – 14.5 MeV	14 MeV
FZK – (p,D_2O) reaction	0.01 MeV – 18 MeV	14 MeV
Rez_DF - (p,D_2O) reaction	0.004 MeV – 30 MeV	20 MeV
Rez foils - (p,D_2O) or (p,^{16}O) reaction	1.5 MeV – 30 MeV	flat curve

Measurements at FZK using a d-Li neutron source [15-19], similar to that proposed for IFMIF, but with much lower intensity. The source consists of a 40 MeV beam of deuterons incident on a thick lithium target (22 mm thickness enclosed in a stainless steel case). Although a 3 μA beam of 52 MeV deuterons was used, the approximate energy of the deuterons on entering the lithium was 40 MeV. The neutron flux was about 4.3 10^{11} $ncm^{-2}s^{-1}$. The data have been analysed using EASY-2005. The spectrum, which extends above 20 MeV, is shown in Fig. 5.

The measurements at Řež were carried out in a neutron field produced by a cyclotron. Considerable effort has been taken to characterise the spectrum in detail. Note that this spectrum extends in energy above 20 MeV and is therefore very important in the validation of libraries such as EAF-2010 or FENDL-3/A which extend to 60 MeV. Following considerable efforts a new spectrum (rez_DF) was produced by measurement and calculation [26-28] and this is shown in Fig. 6; this spectrum was used in the analysis of the various measurements including the new chromium measurements.

2.2 External experiments (outside EFDA)

The next group are results from measurements outside the fusion programmes, here belong the large compilation of measurements at different laboratories with the spontaneous fission of ^{252}Cf or thermal Maxwellian data and further the results of (d,Be) measurements experiments of the Jülich Group.

Energy classification of neutron spectra	**Energy range of Φ(E)**	**E of Φ(max)**
Maxw_300K - thermal spectrum	thermal spectrum	2.5 10^{-5} MeV
Spectra cf252 - spontaneous fission	0.2 – 8 MeV	2 MeV
Julich Spectra d-Be - (d,Be) reaction	10 – 40 MeV	22.5 MeV

The importance of integral data in spectra extending above 20 MeV led to a literature search for historical measurements that could be used for validation. A series of papers from the group in Jülich led by Qaim [29-40] has been used. Three different (d,Be) neutron spectra have been derived based on the work of Schweimer [41] and Meulders et al. [42]. The data have been fitted to the analytic shape shown in equation (1) below and then converted into the 211-group VITAMIN-J+ structure.

$$\phi(E) = Ca(1+y^2)^{-3/2} \quad (1)$$

In equation (1), $\phi(E)$ is the neutron flux at energy E, $a = (BE_d)^{-1/2}$ and $y = a(E - E_d/2 + E_s)$. E is the neutron energy, E_d is the deuteron energy, E_s and C are constants and B is the deuteron binding energy.

A typical spectrum is shown in Fig. 9. It was found that the C/E values for all reactions in the d-Be2 spectrum were large. Selecting a set of 'well-known' reactions ((n,α) reactions on ^{27}Al, ^{31}P, ^{51}V, ^{55}Mn, ^{59}Co and ^{93}Nb) it was found that the average C/E values was 2.15. It is believed that an error in the original data is present and it was decided to renormalize all the cross sections by a factor 2.15. In order to make this clear the spectrum is termed d-Be2a.

The references should be consulted for details of the spectra and the original publications. However, some typical spectra are reproduced here in order to show the shapes of the various neutron fields, see Figs. 1- 9.

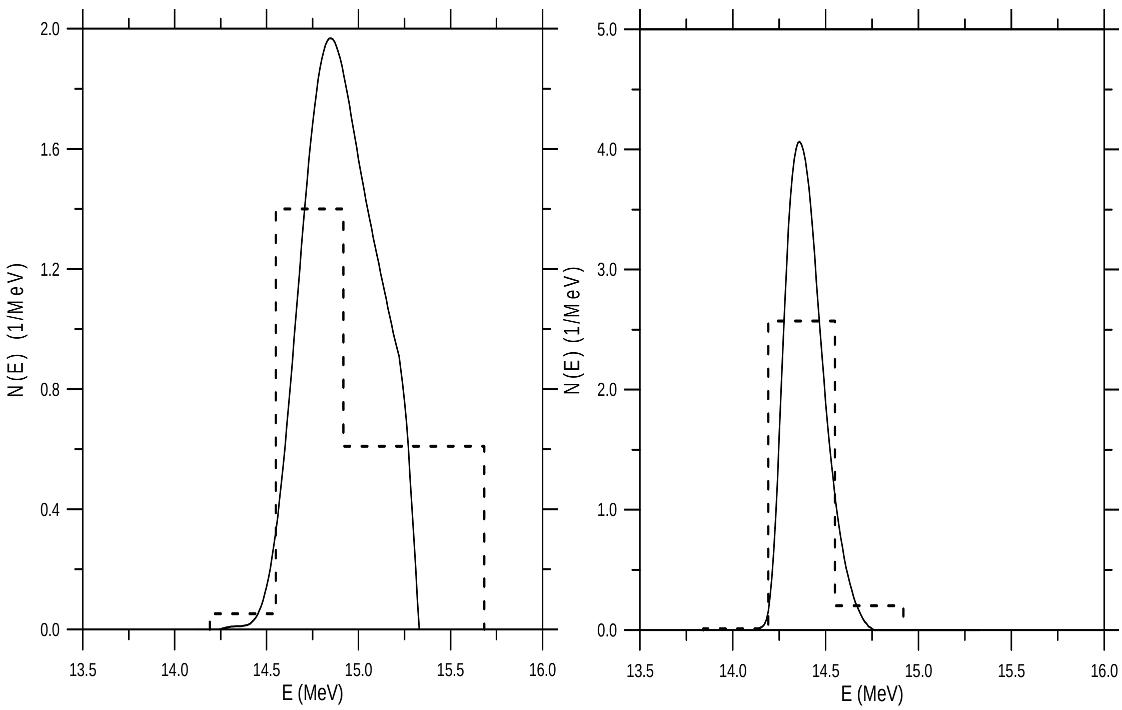


Fig. 1. TUD neutron spectrum at 4˚ and 73˚ normalised to unity as determined (solid line) and in VITAMIN-J group structure (dashed line).

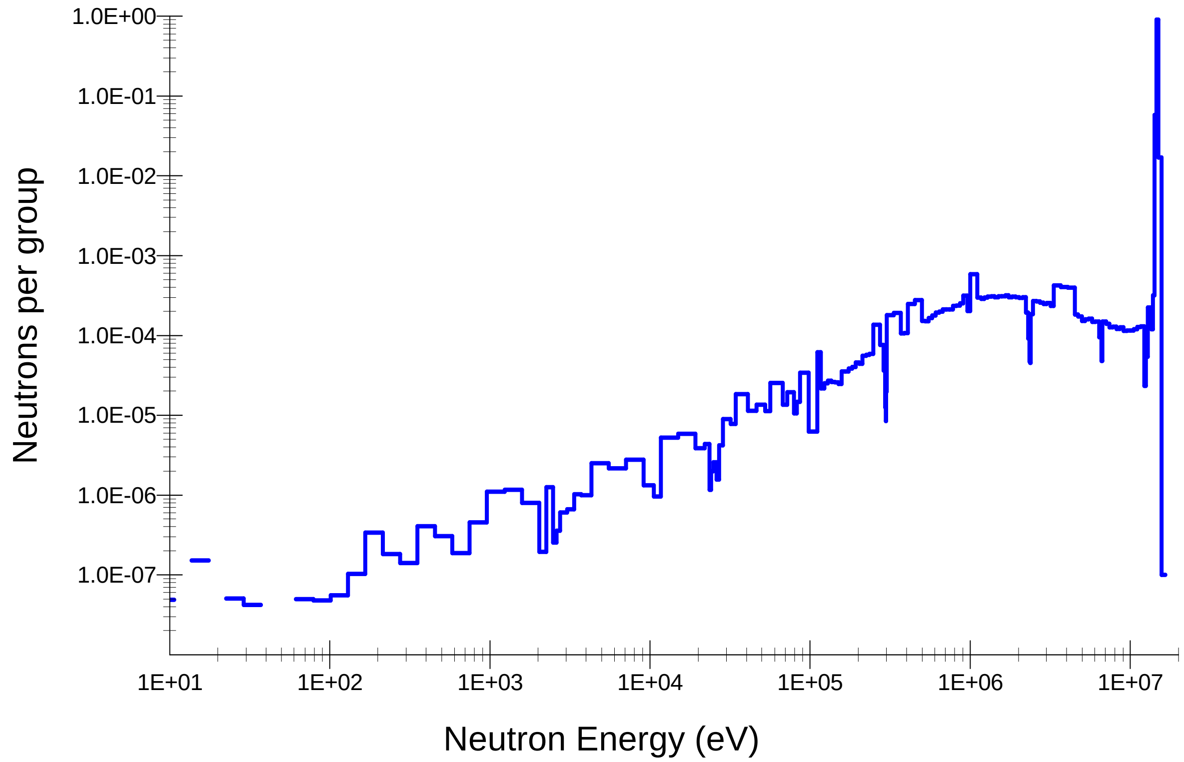


Fig. 2. TUD neutron spectrum normalised to unity plotted in the VITAMIN-J group structure.

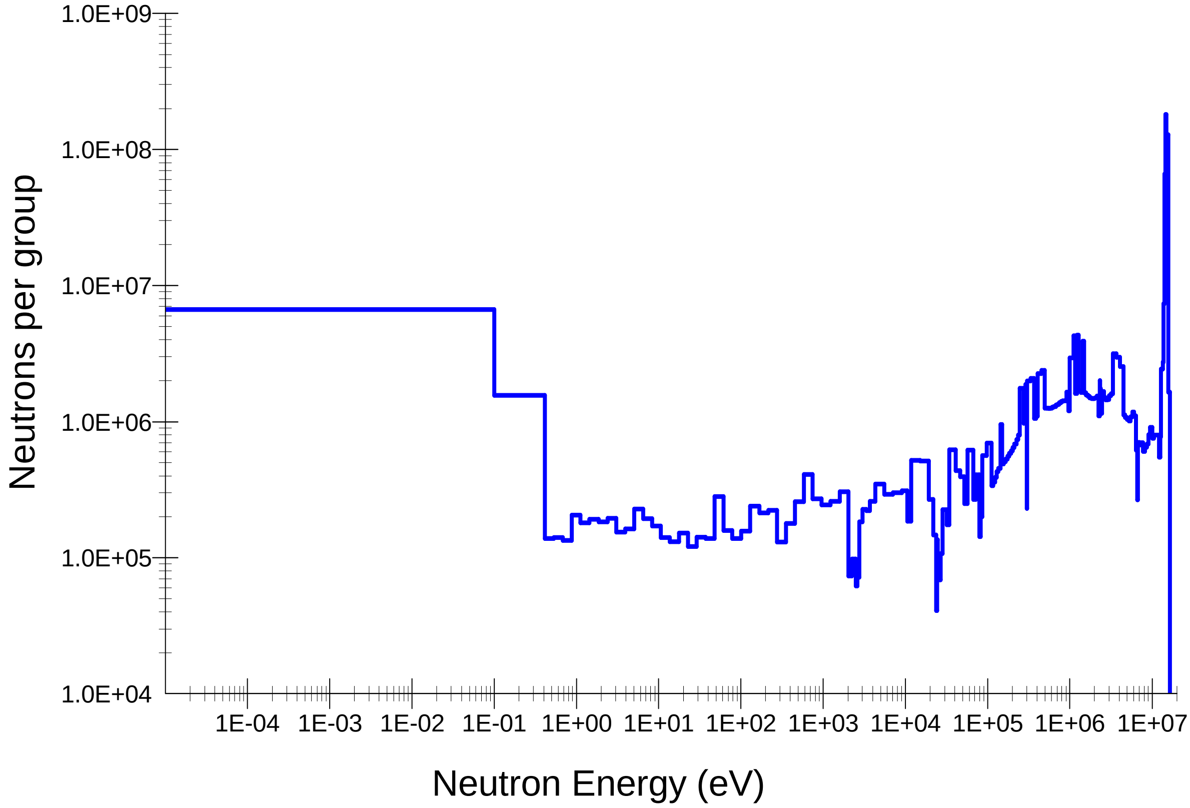


Fig. 3. FNG neutron spectrum as measured for the vanadium measurements in the VITAMIN-J group structure.

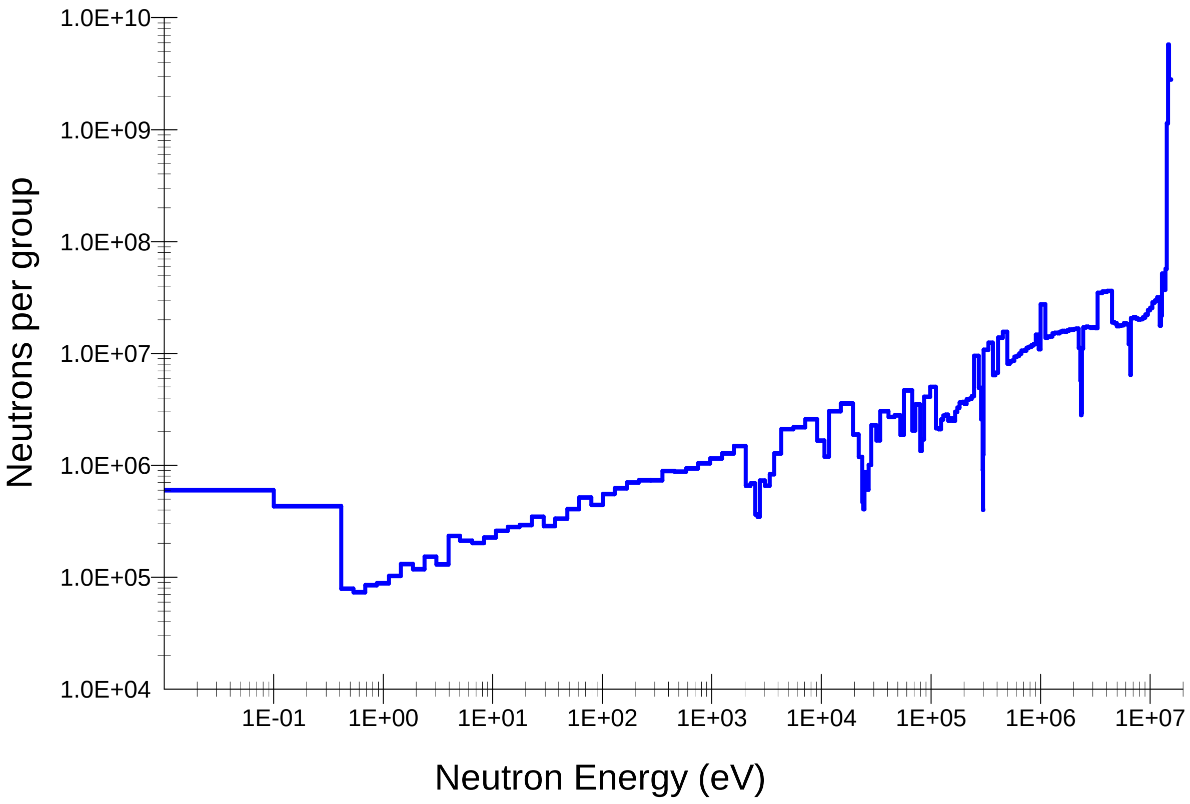


Fig. 4. FNS neutron spectrum for 5 minute irradiations plotted in the VITAMIN-J group structure.

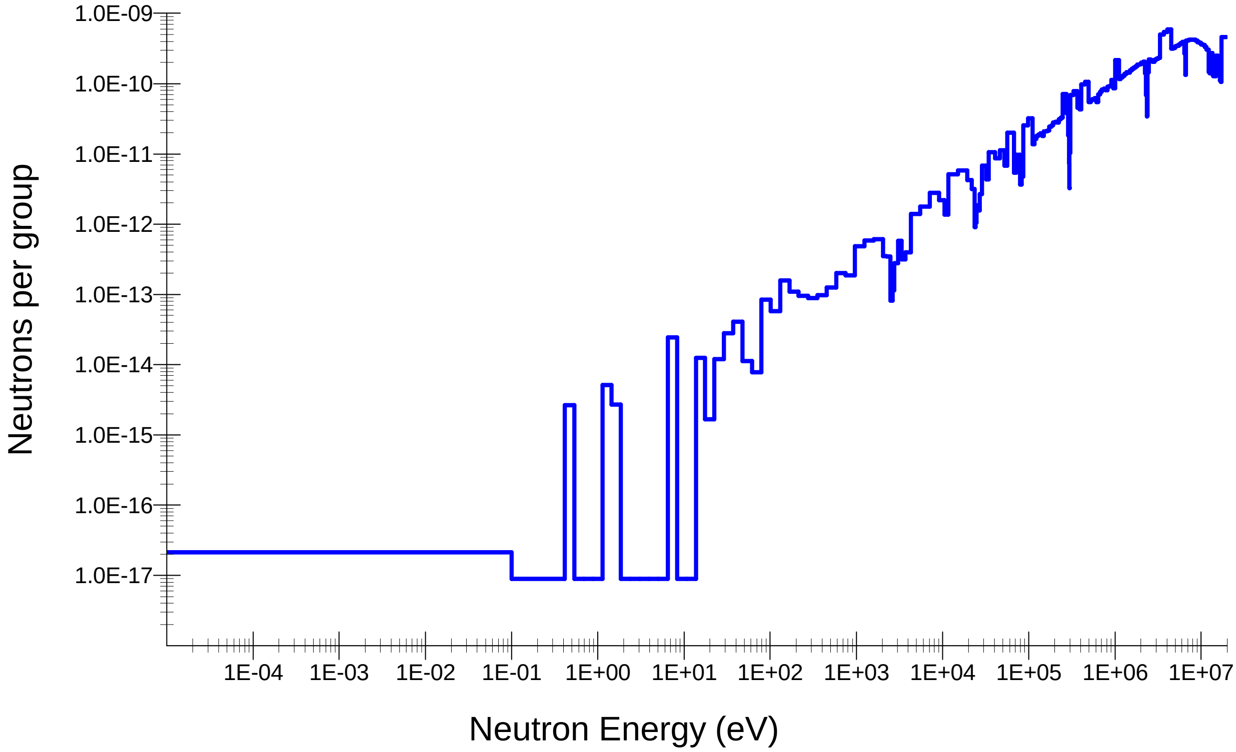


Fig. 5. FZK neutron spectrum as measured in the VITAMIN-J group structure.

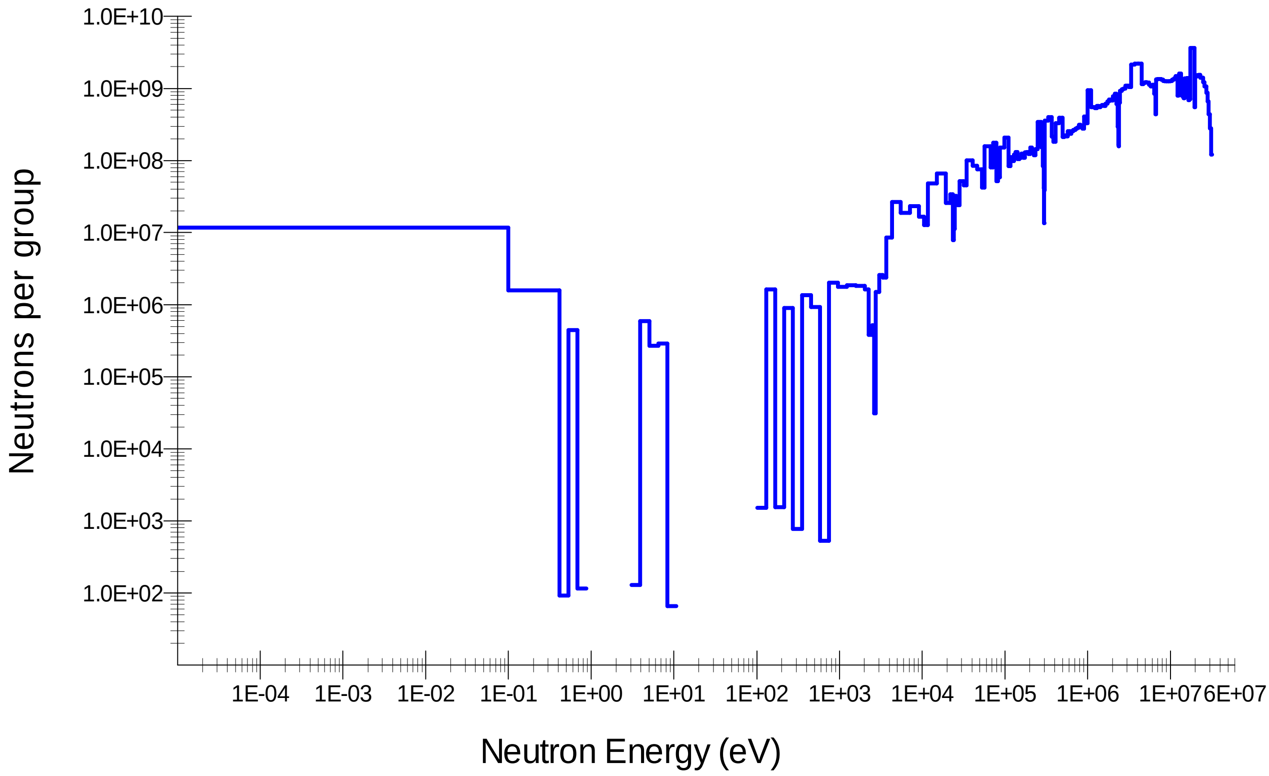


Fig. 6. Řež neutron spectrum used for the analyses of the measurements in the VITAMIN-J+ group structure.

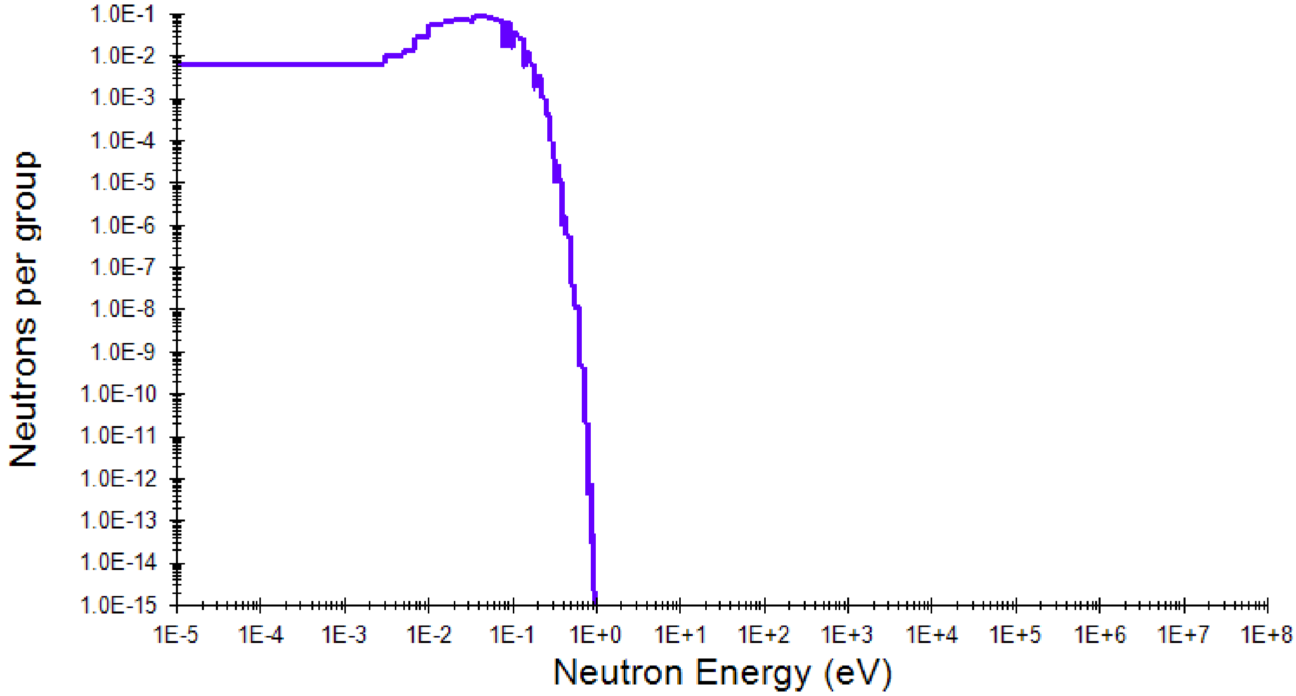


Fig. 7. Maxw_300kT neutron spectrum in the VITAMIN-J+ group structure.

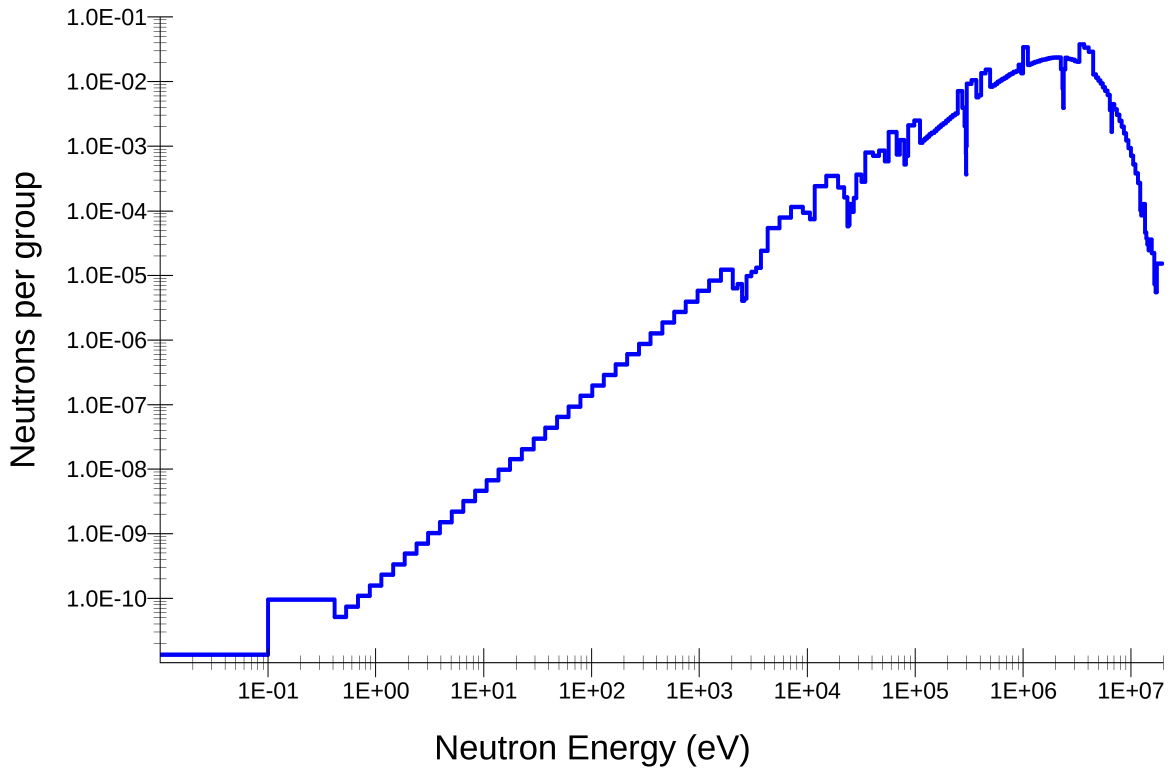


Fig. 8. ^{252}Cf spontaneous fission neutron spectrum plotted in the VITAMIN-J group structure.

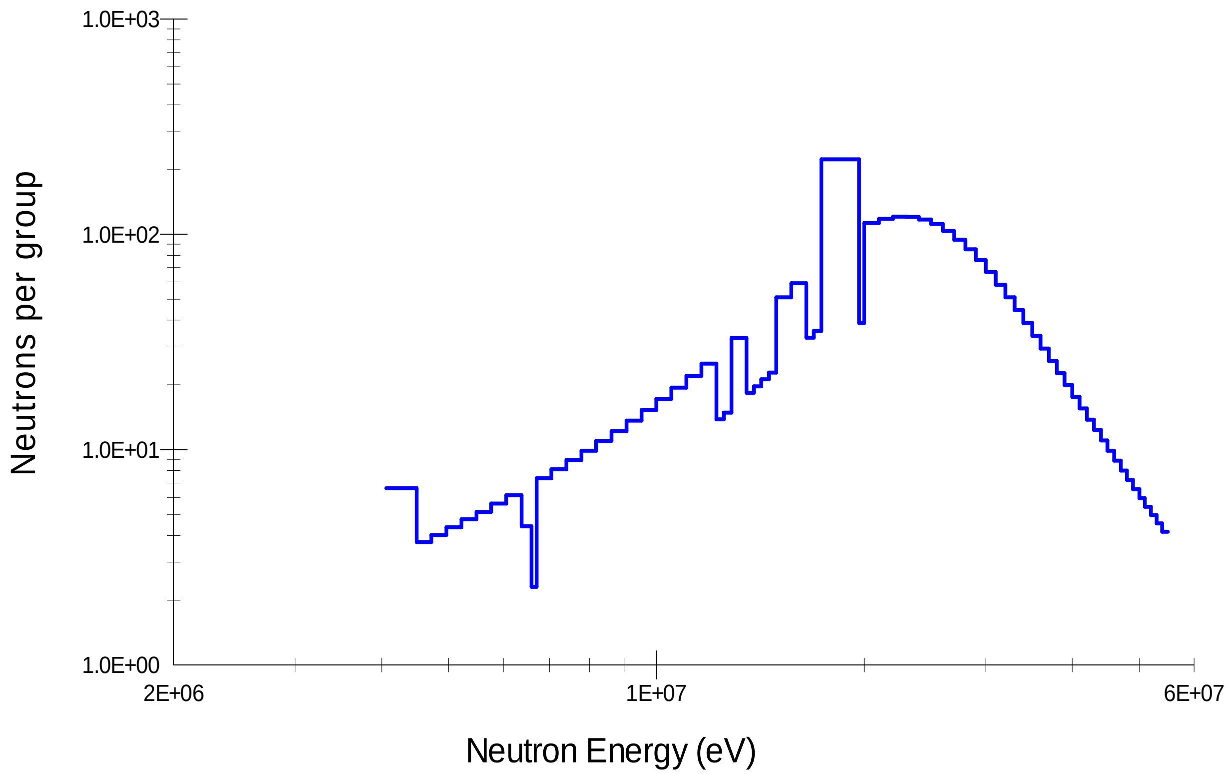


Fig. 9. d-Be2a neutron spectrum in the VITAMIN-J+ group structure.

2.3 The (n,γ) integral experiments

The integral cross sections at 30 keV, σ_{MACS}, mainly used as quasi mono-energetic cross sections, were for the first time interpreted as an integral quantity in Ref. [43]. The power and features of this approach is described in detail in this paper and also visually demonstrated in Figs. 10 and 11. The theoretically calculated Maxwell-Boltzmann spectrum for kT = 30 keV is shown in Fig. 10. Note the rather broad spectrum shape.

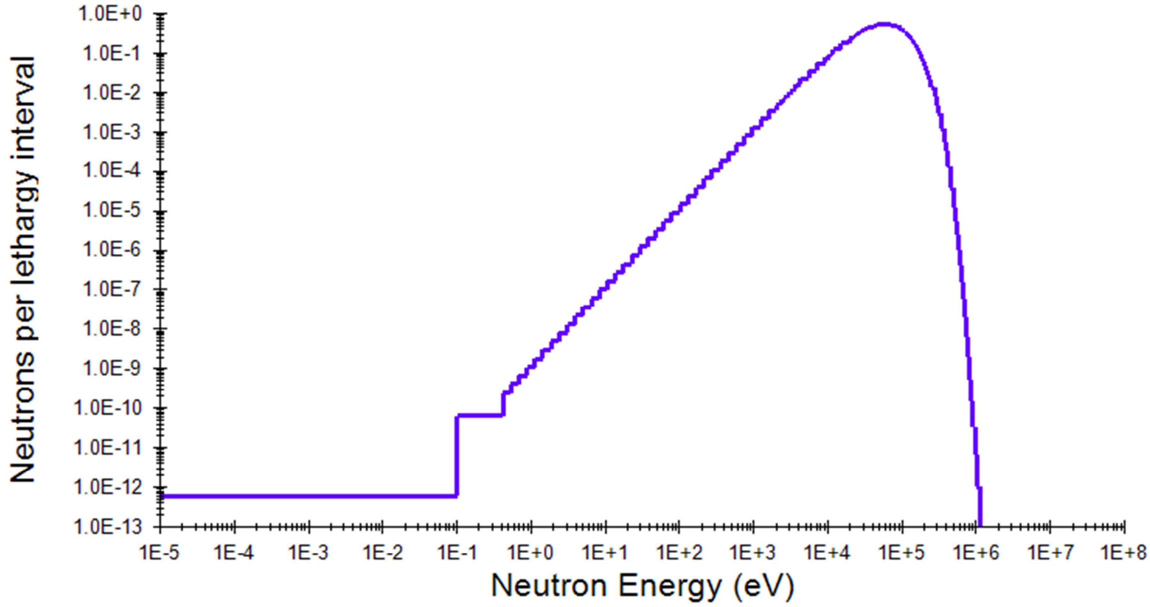
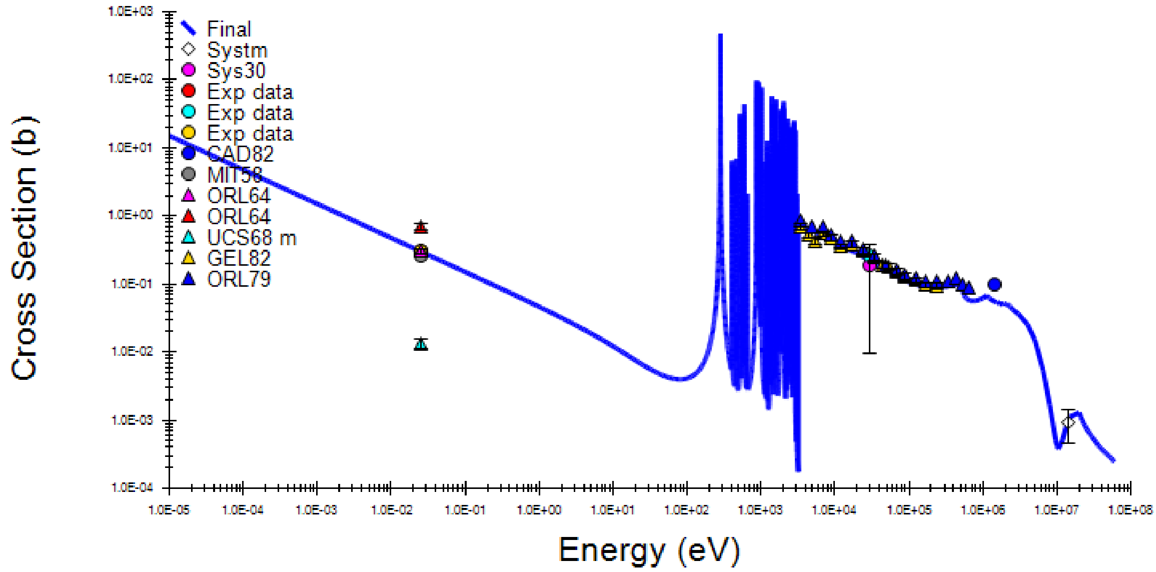


Fig. 10. Maxwell-Boltzmann neutron spectrum for kT = 30 keV in the VITAMIN-J group structure.

The advantage of using the MACS data as integral experiments compared to the quasi mono-energetic approach is clearly demonstrated in Fig. 11. The integral data fully covers the resolved resonance region (RR) and a large part of the smooth statistical component while the mono-energetic value tests the statistical region only in one energy point. The use of all MACS data from the KADoNiS compilation [44] is described in detail in Ref. [43] and these values are added to the experimental integral data base IAED/11. This extension includes 396 reactions.



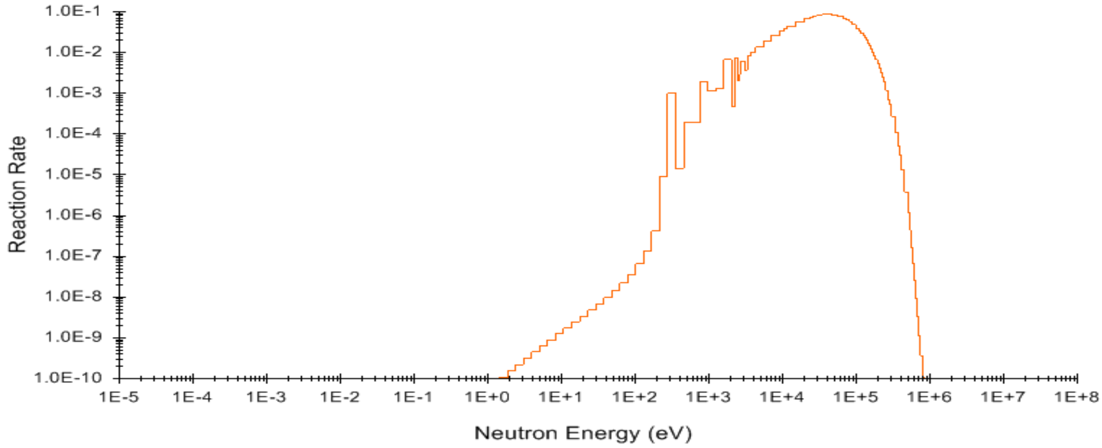


Fig. 11. The cross section (upper) and reaction rate (lower) of the $^{106}Pd(n,\gamma)$ reaction. The energy spread of 90% of the reaction rate spans from 10 eV to 600 keV. Both the resolved resonance region as well as the smooth reason are tested.

There is, however, another experimental quantity which can be interpreted as an integral experiment and that is the resonance integral. The resonance integral is defined in equation 2

$$I_{\gamma} = \int_{0.5eV}^{\infty} \sigma(E) d(E) / E \qquad (2)$$

where the cross section is folded with 1/*E* spectrum from the Cd cut off (0.5 eV) to infinity (often the upper limit is chosen as 100 keV). The use of 1/*E* spectrum favours the influence of 1/*v* component close to E_V and the lower part of the resonance region, while the higher energy contribution becomes negligible due to the 1/*E* weighing. This is nicely demonstrated in Fig. 12, taken from the ENDF/B-VII.1 documentation.

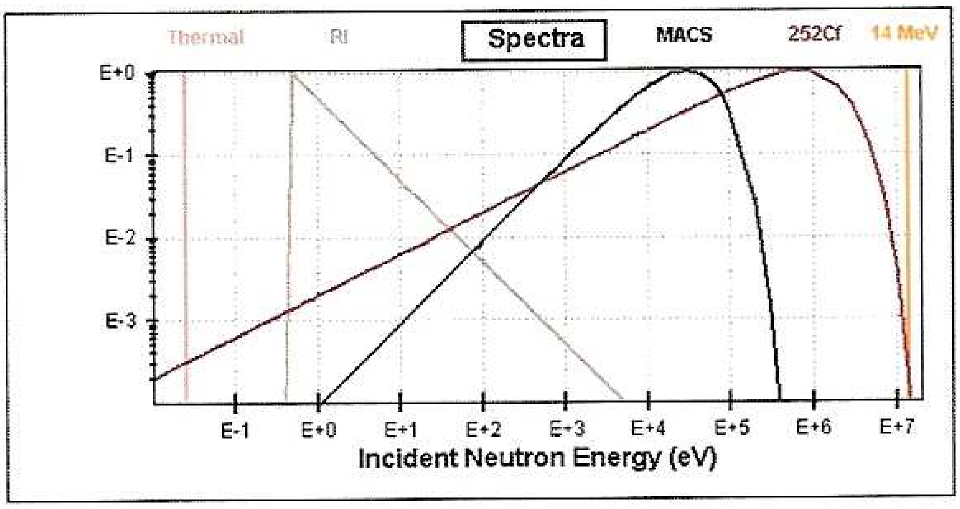


Fig. 12. Different weighting neutron spectra used in validation of non-threshold reactions.

The use of this quantity looks to be a good additional test of the resonance region especially in the low energy part. The compilation of resonance integral is included in the latest barn book of Mughabghab [45]. The use of resonance integrals [45] to validate the EAF-2010 library data is described in Ref. [46], however, they are used only to derive the uncertainty factors of the resonance region. The application of resonance integrals for validation is currently in a testing phase and will be included routinely in the future.

The final neutron spectra used in (n,γ) integral experiments are:

Energy classification of neutron spectra	**Energy range of Φ(E)**	**E of Φ(max)**
MACS_theory_30keV	0.01 – 0.5 MeV	$3.0\ 10^{-2}$ MeV
Resonance integral	0.5E-6 MeV – infinity	-

The combined use of MACS and I_γ data is demonstrated in the analysis of the $^{28}Si(n,\gamma)$ reaction comparing the FENDL-3/A and ENDF/B-VII data. The following validation ratios are available:

Ratio of integral cross section FENDL-3 vs MACS - $<\sigma_{30}>/\sigma_{MACS}$ = 1.06
Ratio of integral cross section ENDF/B-VII vs MACS - $<\sigma_{30}>/\sigma_{MACS}$ = 2.54
Ratio of resonance integral I_γ C/E (FENDL) = 1.08
Ratio of resonance integral I_γ C/E (ENDF) = 1.06

The strong discrepancy in $<\sigma_{30}>/\sigma_{MACS}$ values between FENDL-3 and ENDF/B-VII.1 can be explained by the difference in resonance parameters (see Fig. 13) used in these two libraries (FENDL-3 = EAF-2010 = JENDL-4). However, the C/E(I_γ) values are in good agreement for both libraries. The resonance integral for ^{28}Si is based on a calculation from resonance parameters, no measurements are available. The calculated value I_γ is dominated by the four lowest resonances and the 1/*E* shape of the spectrum makes the contribution above 100 keV negligible. This may explain the good C/E(I_γ) values for both libraries, while the $<\sigma_{30}>/\sigma_{MACS}$ ratio is in disagreement (note the difference in resonances above 100 keV between the two libraries considered).

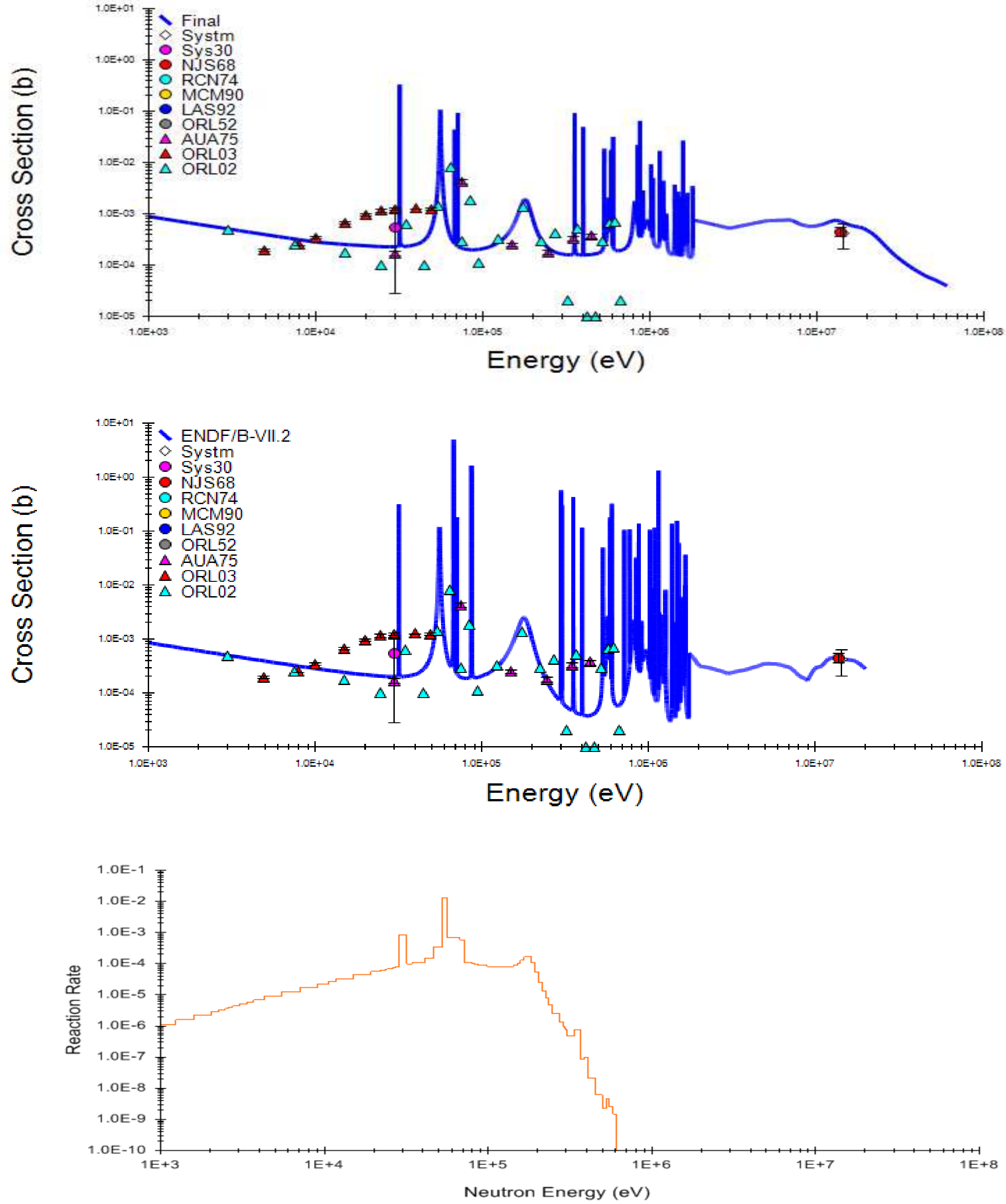


Fig. 13. The cross sections (FENDL-3/A and ENDF/B-VII.1) and the reaction rate of the ^{28}Si(n,γ) reaction in the MACS_theory_30keV spectrum. The energy spread of 90% of the reaction rate extends up to 600 keV. Note the contribution above 100 keV to the reaction rate.

3. RESULTS OF EXPERIMENTAL DATA ANALYSIS

3.1 Calculational method

In Reference [4] the activity calculations were made using the EASY-2007 system [47]. Details of the experimental set-up (material composition, irradiation time, flux etc) were used to create the FISPACT input file to model each experiment. FISPACT-2007 contains options to calculate the pathways of formation of the measured radionuclides, so that the reactions involved and their importance (percentage contribution) can be easily found. The uncertainty in the calculated activity can also be obtained. This is based on the uncertainty in the reaction cross sections (uncertainty in the half-lives can be included, but typically these are insignificant). Thus for each set of measurements the experimental activities at specified decay times are tabulated and the C/E values are calculated and given in Tables 1–11 of Ref. [4] and the pathways that are important in producing the product calculated. Using the pathway information the effective cross sections were calculated for all 470 reactions. Cross section curves calculation were taken from EAF-2007 [48] and later compared with EAF-2010 [49] (used in FENDL-3/A) and adopted for this validation exercise. All 396 reactions provided with MACS cross sections have single pathways and the effective cross sections are taken from the experiments directly. The derivation procedure of the effective cross section is described in the next section.

3.2 Effective cross sections

For many of the product nuclides a single pathway dominates the production. In such cases it is possible to extract an effective cross section (cross section averaged in the neutron spectrum) that can be used directly in SAFEPAQ-II.

$$\sigma^{eff} = \int_0^E \sigma(E)\Phi(E)\,dE$$

Generally an integral experiment measures activity (sometimes heat production) of the target material. The following description considers the measured quantities. At a time the experiment obtains a value of the activity or heat production (H_E). An inventory code calculates the same quantity (H_C) using library nuclear data. A comparison of the two values gives the C/E ratio (*r*). If only a single pathway is important at this time then:

$$H_C = \lambda N q = \lambda N_0 \phi \sigma^C q \qquad (3)$$

where q is the energy emitted per decay
- λ is the decay constant
- N_0 is the number of target atoms
- ϕ is the neutron flux
- σ^C is the cross section in the library.

Equation (3) gives the calculated activity, a similar expression applies for the experimental activity (containing the *effective cross section* σ^E) and the C/E ratio (*r*) is given by equation (4).

$$r = H_C / H_E \qquad (4)$$

The ratio of the calculated to the effective cross section (*k*) is given by equation 5.

$$k = \sigma^C / \sigma^E \tag{5}$$

Then so long as the decay data (λ and q) are correct, then by using Equation (3) the two ratios are identical, $k = r$. It is then possible to alter the value of σ^C so that $r = 1$, this is termed *renormalisation*. If more than one pathway contributes to the heat production then if we make some additional assumptions using the FISPACT calculation it is still possible to extract cross section *renormalisation* data from the experiment. The detailed description of this approach is given in Refs. [2,3].

The practical essence of the present approach is as follows: If there is only one pathway (reaction) producing the nuclide (our understanding of that is given by results from FISPACT) then the conversion is trivial. But if there are two pathways giving the same daughter then what we measure and what we calculate is the (weighted) sum of contributions from both reactions. What the formalism does is, by making the assumption that for the minor reaction the cross sections are known exactly, to calculate what the spectrum averaged cross section must be so as to give the measured data.

So there is a transformation from activities (as given by all experimentalists) to effective cross sections (only given by the EASY team) so that we can directly compare with EAF data during the evaluation of a new library. This is a unique capability, if we didn't do this then we would have to wait until the new EAF library was available and then use it to rerun all the FISPACT cases and compare calculated activities with the measured ones. So this unique approach allows the integral data to be used during library development.

3.3 C/E validation for FENDL-3/A

C/E values in Table 2 have been calculated with ‘Integral Data’ mode of the processing code SAFEPAQ-II [5] and now includes 804 reaction channels. In this mode, the reaction effective cross sections are generated (C-calculation) and compared with the experimental ones (E-experiment), which have been input into SAFEPAQ-II. They form the integral database of activation benchmarks and can be used for validation of any evaluation. For details see Refs. [1-4].

For the validation of the 470 reactions (prior to the addition of MACS) the plots of C/E and corresponding excitation curves are included in Ref. [4] and the majority of these data are the same as the FENDL-3/A data. Therefore the user is recommended to use Ref. [4] for details. In this report only plots of those reactions which differ in EAF-2010 (FENDL-3/A) to previous EAF libraries are shown. In addition plots of reactions with severe C/E disagreements are also included. For reactions where there are several integral measurements in different neutron spectra it is useful to indicate the energies that the measurements cover. This can be done by plotting the C/E values as a function of energy. The measurement is shown at an energy that corresponds to the peak in the reaction rate and an energy ‘error bar’ is shown. The error bar covers energies within which 90% of the reaction rate occurs. A total of 30 such extended C/E plots are shown in this report after Table 2.

The excellent performance of the FENDL-3/A capture cross sections against MACS data is demonstrated in Fig. 14 by the $\langle\sigma_{30}\rangle/\sigma_{MACS}$ ratio taken from Ref. [43].

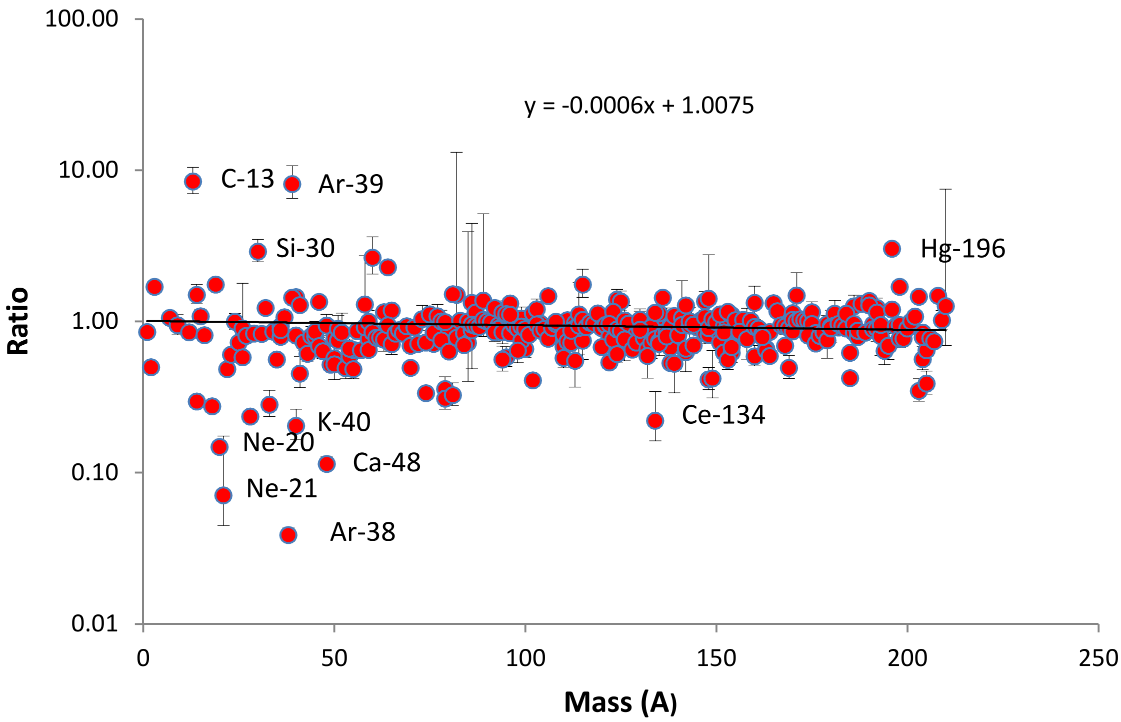


Fig. 14. $<\sigma_{30}>/\sigma_{MACS}$ from EAF-2010 and KADoNiS, for the analytical Maxwell-Boltzmann neutron spectrum, as a function of *A*. The significant outliers are labelled by the target. The equation shown refers to the line of best fit.

4. CONCLUSIONS

The present report gives detailed information on the validation of activation predictions against integral experiments for the activation library FENDL-3/A and covers 804 reactions. The increase of studied reactions is the major difference with the previous validations of EAF-2007 and 2010 [4] where only 470 reactions were considered. The total number of reactions in FENDL-3/A is 66,256, but it should be noted that many of the major materials for fusion technology have been addressed by this work.

For each of the experimental irradiations the C/E values of the measured radionuclides, the dominant pathways and uncertainty information are summarised in Table 2. The detailed information of experiments is either in references [1-4] or in the publications from the various laboratories. In cases where either a single reaction pathway or one of the parallel pathways dominates the formation of a particular nuclide a measured effective cross section for the reaction was extracted. This effective cross section is directly compared with the EAF cross section averaged in the appropriate neutron spectrum. Values of the C/E ratios for the effective cross sections are studied in SAFEPAQ-II and graphs of these ratios plotted with the EAF and experimental uncertainties. From these graphs and plots of the cross section excitation function shown with the available differential experimental data, judgements were made on whether a reaction has been validated by the experimental data or whether it may be possible to improve the data for a future version of FENDL. For the validation the Quality Score (QS) classification from Ref. [4] has been used.

The energy dependent C/E plots emphasise that even when several integral measurements have been made, then typically the energy range covered is limited and only in a few cases includes energies above 20 MeV. Thus even for reactions that are classified as 'validated' additional measurements are desirable so that cross sections at all energies in the library can be tested. The statement that a reaction has been validated by the integral and differential measurements only refers to the energy range over which experimental data are available. Note that if activation of a material is considered in a neutron spectrum very different from those studied here, then there is no guarantee that the predictions would be as accurate as indicated by the present results.

For the classification of the validation the EAF Quality Score system for differential data has been applied and extended for the use with integral data using QS = 5 and 6 assignments. It is based on the following rules of the agreement of adopted cross sections :

QS = 5 assignments: [5_0] = differential data are missing and unsatisfactory agreement with integral data. [5_1] = unsatisfactory agreement with differential and integral data. [5_2] = satisfactory agreement with differential and unsatisfactory agreement with integral data. [5_3] = differential data are missing and satisfactory agreement with integral data. [5_4] = unsatisfactory agreement with differential data and satisfactory agreement with integral data.

QS = 6 assignments: [6] = differential data are in satisfactory agreement with integral data.

A few observations concerning the data QS system are presented:

1. The validation by integral experiments is strictly valid only for the effective range of the neutron spectrum used in the experiment.
2. For MACS validation the $0.7 < C/E < 1.3$ range has been arbitrarily chosen to indicate a good agreement.
3. The differential data considered for MACS validation are average cross section measurements above E_V up to several MeV only. No differential quasi mono-energetic 30 keV data have been considered since they are used as integral information. Further no generated resonance cross section curve is taken as experimental information.
4. A Quality Score of 5_2 for MACS data usually gives a warning that the MACS cross section should be revisited. This assignment describes satisfactory (or good) agreement with differential and unsatisfactory agreement with integral data and often indicates a suspicious result of the integral experiment.

A total of 804 reactions have been validated by both differential and integral data and several reactions are recommended to be improved in the future. A summary of the numbers of reactions covered by the report is given in Fig 15. The growing database of integral measurements is a valuable resource for validating and improving each version of activation libraries and so maintaining the claim that EAF and FENDL libraries are the most thoroughly tested and validated activation data world-wide.

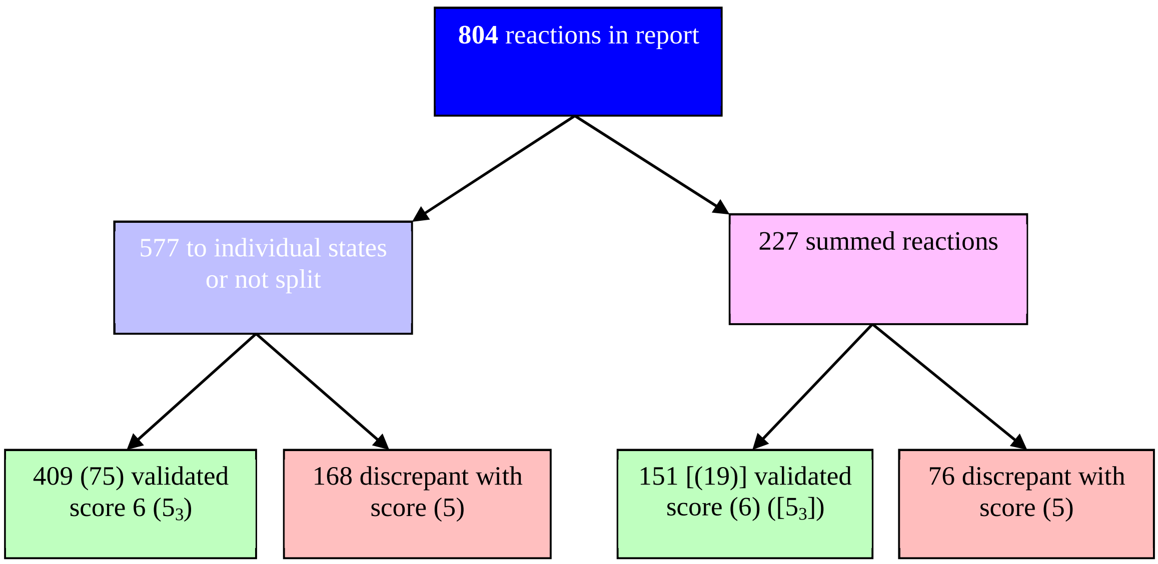


Fig. 15. Summary of reactions.

From the total of 804 reactions 560 reactions (70%) are validated with integral data and of the remaining 244 reactions 104 (Score 5_2) reactions are in agreement with the differential data but are discrepant with the integral data.

The final conclusions and practical observations of the present validation can be summarized as:

1. The main result of the present validation is an extension of the studied (n,γ) reactions by using the 30 keV MACS cross sections. In general it may be concluded that the majority of capture reactions are now well validated through comparisons of the cross sections at 0.0253 eV [49], resonance integrals [49] and interpretation of MACS cross sections as integral data as in the present work. Further the pre-equilibrium region was also tested through experimental data or systematic predictions [49]. A large number of differential data were visually used to clarify the agreement of the adopted excitation curves in the smooth statistical region above 1 MeV.

2. The overall visual improvement of the data fit with the differential data sometimes worsens the C/E value, especially if the neutron spectrum covers only a small part of the excitation curve. This explains why the C/E(EAF-2005) value is sometimes better, however, with a rather poor visual agreement. There is a very important conclusion, namely, that integral data can only test the cross section curve in the region of overlap with the neutron spectrum, which often is relatively narrow compared to the whole range of the excitation curve above the threshold.

3. A detail analysis of the capture data validated against MACS cross sections can be found in Ref. [43].

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Many of the references for experimental results of EFDA program, used already in Ref. [1-4], are not repeated here. In the following references some refer to the EFF-Doc series. JEFF members with the necessary password can download these documents from the NEA Data Bank web site (http://www.nea.fr/html/dbdata/nds_eval_effdoc.htm), the others can contact the authors.

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Table 1. Summary of neutron spectra

ID	Name	Groups	Original description	Reference
1	am-be_flux	175	Standard (IAEA) spectrum from Am-Be	FO97
2	cf252_flux	175	Standard (IAEA) Cf-252 spontaneous fission spectrum	FO97
3	fission_flux	172	PWR spectrum used in FISPACT test cases	FO97
4	fusion_flux	175	EFF first wall spectrum used in FISPACT test cases	FO97
5	fng_sic.asc	175	Contains the flux FLUSSO NELL IRRAGIAMENTO SIC A FNG, supplied by M Pillon used at FNG for integral exps [175 group Vitamin-E weighting].	UKAEA-FUS-547
6	fng_f82h.asc	175	Contains the flux F82H cavity 9 foils unfol tot=2.59e-2, supplied by M Pillon used at FNG for integral exps [175 group Vitamin-E weighting].	UKAEA-FUS-547
7	fng_tung.asc	175	Contains the flux flusso per il tungsteno tot=2.74e+08, supplied by M Pillon used at FNG for integral exps [175 group Vitamin-E weighting].	UKAEA-FUS-547
8	fng_vanad.asc	175	Contains the FLUX IN VANADIUM IRRADIATION TOT=6.07E+08, supplied by M Pillon used at FNG for integral exps [175 group Vitamin-E weighting].	UKAEA-FUS-547
9	Maxwell_300K.asc	172	Maxwellian spectrum at 300 K, supplied by C. Dean using NJOY97	UKAEA-FUS-547
10	sneg_1	175	Contains the neutron spectrum at sample position 1 (4 deg), measured by TUD, supplied by K Seidel	SE98
11	sneg_2	175	Contains the neutron spectrum at sample position 2 (73 deg), measured by TUD, supplied by K Seidel	SE98
12	fzk_1	175	Contains the flux used at Karlsruhe d-Be source, supplied by U von Mollendorff at FZK for integral exps spectrum # 1 [175 group flat].	MO00
13	fzk_2	175	Contains the flux used at Karlsruhe d-Be source, supplied by U von Mollendorff at FZK for integral exps spectrum # 2 [175 group flat].	MO00
14	fng_eurofer.asc	175	Contains the flux flusso in esperimento decay-heat eurofer nuovo modello tot=2.855E+08, supplied by M Pillon used at FNG for integral exps [175 group Vitamin-E weighting].	UKAEA-FUS-547
15	fng_chromium.asc	175	Contains the flux FLUSSO CROMO LOW TOT=3.31E+08, supplied by M Pillon used at FNG for integral exps [175 group Vitamin-E	UKAEA-FUS-547
16	fng_hafnium.asc	175	Contains the flux FLUSSO CROMO HIGH TOT=4.10E+08, supplied by M Pillon used at FNG for integral exps [175 group Vitamin-E]	UKAEA-FUS-547
17	fns_7hour	175	Supplied by J-Ch Sublet from the JAERI 1996 FNS 7 hour irradiation.	SUB98
18	fns_5min	175	Supplied by J-Ch Sublet from the JAERI 1999 FNS 5 min irradiation.	SUB98
19	fng_heat	175	Contains the FLUSSO NUOVI MATERIALI TOT=9.32539E-03, supplied by M Pillon used at FNG for integral exps - decay heat measurements [175 group Vitamin-E weighting]	UKAEA-FUS-547
20	fng_cucrzr	175	Contains the Flusso CuCrZr D-T, supplied by M Pillon used at FNG for integral exps - CuCrZr measurements [175 group Vitamin-E weighting]	UKAEA-FUS-547
21	tud_cucrzr	175	Contains the spectrum used for CuCrZr used at TUD for integral exps supplied by Klaus Seidel [175 group Vitamin-E weighting]	EI02
22	cf252_flux_1	175	Extracted from ENDF-B/VI	MA89
23	fng_ScSmGd	175	Contains the FLUSSO new decay heat med=6.88E+08, supplied by M Pillon used at FNG for integral exps - decay heat measurements on Sc, Sm, Gd [175 group Vitamin-E weighting]	UKAEA-FUS-547
24	fng_Dy	175	Contains the FLUSSO new decay heat med=9.18E+08, supplied by M Pillon used at FNG for integral exps - decay heat measurements on Dy [175 group Vitamin-E weighting]	UKAEA-FUS-547
25	fzk_ss316	211	Spectrum for the SS-316 cyclotron irradiation experiment of Ulrich von Moellendorff	FI03
26	fng_Y	175	Contains the FLUSSO ITTRIO med=1.307E+08, supplied by M Pillon used at FNG for integral exps - decay heat measurements on Y [175 group Vitamin-E weighting].	UKAEA-FUS-547
27	tud_Y	175	Contains the neutron spectrum qypvij, supplied by K Seidel used at TUD for integral exps - activation measurements on Y [175 group Vitamin-E weighting].	UKAEA-FUS-547
28	fng_Ta	175	Contains the flusso tantalio secondo run =2.164e+08, supplied by M Pillon used at FNG for integral exps - measurements on Ta [175 group Vitamin-E weighting].	UKAEA-FUS-547
29	Rez_foils	211	Contains the spectrum for the Rez p+D2O cyclotron irradiation experiment described in report NPI ASCR Rez: EXP(EFDA)-08/2004 supplied by P Bem [211 group flat weighting].	BE04

ID	Name	Groups	Original description	Reference
30	d-Be	211	Contains the spectrum of n produced by bombarding Be with 53 MeV d. Fit to data from Schweimer, Nuc. Phys. A100, 537-544, 1967 and used by Qaim. [211 group flat weighting].	SCH67
31	d-Be2	211	Contains the spectrum of n produced by bombarding Be with 53 MeV d. Fit as in d-Be but peak at 22.5 MeV and data down to 4 MeV. ME75. Used by Qaim. [211 group flat weighting].	ME75
32	d-Be3	211	Contains the spectrum of n produced by bombarding Be with 30 MeV deuterons. Analytical fit based on Nethaway, Used by Qaim in several papers in 1980s. [211 group flat weighting].	NE77
33	fission_PARR	175	Contains the spectrum of research reactor PARR-I produced by Mannan et al in Radiochimica Acta 51, 49-53, 1990. Used by Qaim. [175 group flat weighting].	MAN90
34	tud_Pb	175	Contains the neutron spectrum in TUD-IKTP/01-04 used at TUD for integral exps - activation measurements on Pb [175 group Vitamin-E weighting]	EI04
35	fng_Mo	175	Contains the flusso molibdeno =3.993E+08, supplied by M Pillon used at FNG for integral exps - measurements on Mo (orig 211, changed to 175) [175 group Vitamin-E weighting].	UKAEA-FUS-547
36	d-Be2a	211	This is d-Be2 / 2.15, renormalised by J Kopecky based on six well measured (n,a) reactions.	ME75
37	tud_Ta	175	Contains the neutron spectrum in TUD-IKTP/01-05 used at TUD for integral exps - activation measurements on Ta	EI05
38	rez_NE	211	Contains the spectrum for the Rez p+D2O cyclotron irradiation experiment supplied by Simakov for Eurofer exp (Foil #3, dia.10mm, 947.4mg, at 1.7mm)	BE04A
39	rez_DF	211	Contains the spectrum for the Rez p+D2O cyclotron irradiation experiment supplied by Simakov. Obtained by SAND code analysis of dosimetry foils.	BE04A
40	fng_Sn	175	Contains the flusso stagno =7.953E+08, supplied by M Pillon used at FNG for integral exps measurements on Sn	UKAEA-FUS-547
41	fng_Re	175	Contains the flusso renio = 4.534E+08, supplied by M Pillon used at FNG for integral exps - measurements on Re	UKAEA-FUS-547
42	tud_Er	175	Contains the neutron spectrum dtraErvij, supplied by A Klix used at TUD for integral exps - activation measurements on Er [175 group Vitamin-E weighting].	UKAEA-FUS-547
43	Maxwell_30 keV	175	30 keV spectrum calculated with MCNPX by Lee Packer	[43]
44	MACS_theory_30 keV	175	Contains a theoretical version of the 30 keV neutron spectrum, calculated by R.A. Forrest	[43]

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Table 2. Summary of reactions with integral data

Reaction (**bold**) - new or modified data used in EAF-2010 (compared to EAF-2007), the earlier C/E values (from EAF-2005 or 2007) are shown in the Comment column for comparison, as C/E(5) C/E(7), if they differ from the present value. **Reactions** in yellow are provided with extended plots.

//Reaction (bold), spectrum (bold) - new integral data not available for validation of EAF-2007 (none at this moment.//

- <u>(n,t) and (n,h) data</u> - Data from all three d-Be spectra are treated as pure (n,t) and (n,h) reactions with corresponding (n,xt) for tritium counting and (n,t+) and (n,h+) for activation data. The latter C/E's are shown in the Comment. For pairs of reactions, the one that has cross section data shown is indicated by *italics*.

- <u>(n,n′p) and (n,d) data</u> – For most reactions σ(n,n′p) > σ(n,d) and (n,n′p) data are show. The (n,d+) C/E's are given in the Comment column. For pairs of reactions, the one with cross section data shown is printed in *italics*.

QS - the Quality Score, scores in (brackets) are not used as the total cross section (FS=99) is measured in the integral experiment and only partial data (FS=0,1or 2) exist in the EAF data file.

Comments on QS = 5 assignments: [5_0] = differential data are missing and unsatisfactory agreement with integral data. [5_1] = unsatisfactory agreement with differential and integral data. [5_2] = satisfactory agreement with differential and unsatisfactory agreement with integral data. [5_3] = differential data are missing and satisfactory agreement with integral data. [5_4] = unsatisfactory agreement with differential data and satisfactory agreement with integral data.

Comments on QS = 6 assignments: [6] = differential data are in satisfactory agreement with integral data.

Spectrum - the irradiation spectrum.

- <u>d_Be2a data</u> - Cross sections measured with d_Be2 spectrum have been increased by a factor of 2.15, as described in the text.

- <u>Energy classification of neutron spectra</u> – range Φ(max) in <energy> and E[Φ(max)]

Maxw_300K-		thermal spectrum	2.5E-5 MeV
MACS_theory_30keV	> range	<0.01 MeV – 0.5 MeV>	0.03 MeV
Sneg – (d,^{3}He) monoenergetic source	>0.01 range	<14 MeV – 14.5MeV>	14 MeV
Fzk – (p,D_2O) reaction	>0.01 range	<0.01 MeV – 18 MeV>	14 MeV
Rez DF - (p,D_2O) reaction (p,D)	>0.01 range	<0.004 MeV – 30 MeV>	20 MeV
Rez foils - (p,D_2O) reaction (p, ^{16}O)	>0.01 range	<1.5 MeV – 30 MeV>	flat curve
Spectra cf*252* - spontaneous fission -	>0.1 range	<0.2 – 8 MeV>	2 MeV
Spectra fng, fns, tud – (d,T) reaction -	>0.01 range	<3 MeV – 14.5 MeV>	14 MeV
Spectra d-Be - (d,Be) reaction -	>0.01 range	<10 – 40 MeV>	22.5 MeV

MACS_theory_30keV is in the table denoted as **MACS_30keV**

C/E† indicates that the integral data should be disregarded, the C/E values is either so large or small compared to other results.

C/E in green have a very large discrepancy and need further study

Comment -

- The earlier C/E values (from EAF-2005 or 2007) are shown in the Comment, as C/E(5) or C/E(7), if they are better then the present value.
- MACS – cross section calculated with NON-SMOKER code only, no measured data.

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
H-1(n,γ)	6	Maxw_300K MACS_30keV	3.28E-01 2.54E-04	4.00E-03 2.00E-05	0.897 0.848	
H-2(n,γ)	6	Maxw_300K MACS_30keV	5.08E-04 3.00E-06	1.50E-05 2.00E-07	0.883 0.498	
He-3(n,γ)	6	Maxw_300K MACS_30keV	5.50E-05 7.60E-06	3.00E-06 6.00E-7	0.870 1.694	
Li-7(n,nα)	5_3	d-Be	3.92E-01	6.50E-02	0.418	C/E(5) = 0.661
Li-7(n,γ)	6	MACS_30keV	4.20E-05	3.00E-06	1.051	
Be-9(n,γ)	5_3	MACS_30keV	1.04E-05	1.60E-06	0.939	
Be-9(n,t)/*(n,xt)*	5_2	d-Be	4.40E-02	1.20E-02	0.531	/0.616
B-10(n,t)	6	cf252_flux_1	5.00E-02	2.50E-02	1.093	
B-11(n,t)/*(n,xt)*	5_2	d-Be	7.09E-02	1.18E-02	0.131	/0.227 C/E(5) = 0.140
C-12(n,γ)	6	MACS_30keV	1.54E-05	1.00E-06	0.847	
C-12(n,t)/*(n,xt)*	5_1	d-Be	8.60E-03	2.40E-03	0.562	/1.072
C-13(n,γ)	5_1	MACS_30keV	2.10E-05	4.00E-06	8.404	
C-14(n,γ)	5_1	MACS_30keV	8.48E-06	5.70E-06	0.295	
N-14(n,2n)	6	fns_5min	6.62E-03	9.94E-04	1.053	
N-14(n,γ)	5_2	cf252_flux_1 MACS_30keV	4.80E-06 4.10E-05	2.40E-06 6.00E-05	26.92 1.495	1/
N-14(n,t)/*(n,xt)*	5_2/6	d-Be	3.00E-02	8.00E-03	0.311	/0.546 C/E(5) = 0.316
N-15(n,γ)	5_3	MACS_30keV	5.80E-06	6.00E-07	1.078	
O-16(n,γ)	5_3	MACS_30keV	3.80E-05	4.00E-06	0.809	
O-16(n,p)	6	fns_5min	3.23E-02	8.45E-04	1.019	C/E(5) =1.000
O-16(n,t)/*(n,xt)*	5_2/6	d-Be	8.47E-03	1.49E-03	0.492	/0.791
O-18(n,γ)	5_2	MACS_30keV	8.89E-06	8.00E-07	0.274	
F-19(n,2n)	6	fns_5min cf252_flux_1 cf252_flux_1	4.78E-02 1.08E-05 1.63E-05	2.39E-03 1.60E-06 5.00E-07	0.917 1.639[†] 1.086	
F-19(n,γ)	5_2	MACS_30keV	3.20E-03	1.00E-04	1.749	
F-19(n,p)	6	fns_5min	1.62E-02	8.11E-04	1.010	
F-19(n,t)/*(n,xt)*	5_0/5_3	d-Be	2.70E-02	6.00E-03	0.255	/0.842
Ne-20(n,t)/*(n,xt)*	5_0/5_3	d-Be	6.82E-03	1.50E-03	0.457	/0.833
Ne-20(n,t)/*(n,t+)*	5_0/5_3	d-Be	7.50E-03	1.50E-03	0.414	/1.932
Na-22(n,γ)	5	Maxw_300K	1.98E+02	2.24E+02	1.131	
Na-23(n,2n)	6	fns_7hour fzk_1	3.90E-02 4.60E-03	1.95E-03 2.76E-03	0.704[†] 1.080	C/E(5) =0.861
Na-23(n,γ)	(6)	cf252_flux_1 fns_7hour fns_5min MACS_30keV	3.35E-04 3.09E-04 2.92E-04 2.10E-03	1.50E-05 4.01E-05 1.17E-04 2.00E-04	0.639 1.033 1.352 0.603	
Na-23(n,p)	6	fns_5min	3.03E-02	1.51E-03	1.190	
Na-23(n,t)/*(n,xt)*	5_2/6	d-Be	1.45E-02	2.50E-03	0.649	/0.951
Mg-24(n,γ)	5_3	MACS_30keV	3.30E-03	4.00E-04	0.991	
Mg-24(n,p)	(5_2)	fns_5min cf252_flux_1 cf252_flux_1	1.57E-01 1.94E-03 2.01E-03	1.73E-02 9.29E-05 6.00E-05	1.165 1.347 1.300	C/E(5) =1.088 C/E(5) =1.131 C/E(5) =1.091
Mg-24(n,t)/*(n,xt)*	5_0/5_3	d-Be	4.38E-03	8.11E-04	0.447	/0.697
Mg-24(n,t)/*(n,t+)*	5_0/5_3	d-Be	6.90E-03	1.00E-03	0.279	/2.571
Mg-25(n,γ)	5_3	MACS_30keV	6.50E-03	4.00E-04	0.723	
Mg-25(n,p)	6	fns_5min	5.71E-02	6.29E-03	1.000	
Mg-26(n,γ)	5_1	MACS_30keV	1.26E-04	9.00E-05	0.578	
Mg-26(n,α)	6	fns_5min fng_heat	5.27E-02 8.69E-02	5.80E-03 9.56E-03	0.990 0.622[†]	
Al-26(n,γ)	5_0	MACS_30keV	3.70E-03	1.85E-04	0.897	
Al-27(n,γ)	6	MACS_30keV	3.74E-03	3.00E-04	0.802	
Al-27(n,p)	6	fns_5min cf252_flux_1	5.71E-02 4.89E-03	2.86E-03 1.79E-04	1.074 0.962	

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
		cf252_flux_1	4.80E-03	9.00E-05	0.980	
Al-27(n,t)/*(n,xt)*	6	d-Be3	1.40E-03	4.20E-04	1.090	/1.189 C/E(5) =1.081
		d-Be3	1.51E-03	3.00E-04	1.011	/1.103 C/E(5) =1.002
		d-Be	7.80E-03	1.20E-03	0.557	/0.951 C/E(5) =0.546
Al-27(n,h)/*(n,h+)*	5	d-Be2a	3.18E-03	5.80E-04	0.157	/0.560 C/E(5) =0.089
		d-Be2a	2.80E-03	5.60E-04	0.178	/0.636 C/E(5) =0.100
Al-27(n,α)	(6)	fzk_1	3.40E-02	6.80E-03	0.876	
		fng_vanad	9.46E-02	8.92E-03	0.869	
		sneg_1	1.25E-01	2.25E-02	0.874	
		sneg_2	1.35E-01	2.29E-02	0.870	
		fng_f82h	6.66E-02	6.86E-03	1.470†	
		cf252_flux_1	1.01E-03	2.20E-05	1.043	C/E(5) =1.044
		cf252_flux_1	8.60E-04	5.00E-05	1.220	
		rez_DF	2.47E-02	2.90E-04	1.260	C/E(5) =1.253
		d-Be2a	4.45E-02	6.45E-03	0.757	C/E(5) =0.741
		d-Be3	4.50E-02	8.00E-03	1.189	C/E(5) =1.187
		rez_DF	1.37E-01	2.65E-03	0.227†	C/E(5) =0.226
		fns_7hour	1.11E-01	6.63E-03	0.990	
Al-27(n,2nα)	5_3	rez_DF	3.76E-05	7.52E-06	0.331	
Si-28(n,γ)	6	MACS_30keV	6.40E-03	1.30E-04	1.063	
Si-28(n,p)	6	fns_5min	1.94E-01	1.75E-02	1.099	C/E(5) =1.078
		fng_SiC	2.10E-01	6.29E-03	0.993	
		fzk_1	6.30E-02	1.57E-02	1.529	
		sneg_1	2.79E-01	1.24E-02	0.817	
		cf252_flux_1	7.12E-03	2.35E-04	1.035	
		cf252_flux_1	9.66E-03	5.50E-04	0.763†	
Si-28(n,t)/*(n,xt)*	(5_0/5_3)	d-Be	3.75E-03	8.23E-04	0.330	/0.582 C/E(5) =0.392
Si-29(n,γ)	6	MACS_30keV	6.58E-03	1.60E-04	0.828	
Si-29(n,p)	6	fns_5min	1.13E-01	9.05E-03	1.032	C/E(5) =1.047
		fng_SiC	1.16E-01	5.79E-03	0.989	
		fzk_1	3.20E-02	4.80E-03	1.213	
		sneg_1	1.32E-01	4.11E-03	0.970	
		cf252_flux_1	1.79E-03	7.90E-04	2.028	
Si-29(n,2p)	5_4	fzk_1	8.60E-06	1.03E-06	0.403	
Si-30(n,γ)	5_1	MACS_30keV	1.82E-03	3.30E-04	2.900	
Si-30(n,p)	6	sneg_1	7.35E-02	3.27E-03	0.912	
Si-30(n,α)	6	fns_5min	5.93E-02	4.74E-03	1.042	
		fng_SiC	5.47E-02	2.19E-03	1.114	
		sneg_1	7.36E-02	4.42E-03	0.949	
P-31(n,γ)	5_4	MACS_30keV	1.74E-03	9.00E-05	0.824	
P-31(n,p)	6	cf252_flux_1	3.35E-02	2.00E-03	0.918	
P-31(n,t)/*(n,xt)*	5_3/5_3	d-Be	7.80E-03	1.20E-03	0.763	/1.208
P-31(n,h)/*(n,h+)*	5_1/5_4	d-Be2a	2.88E-03	5.80E-04	0.234	/1.186 C/E(5) =2.049
P-31(n,α)	6	fns_5min	1.21E-01	1.81E-02	0.870	
		d-Be2a	3.74E-02	6.45E-03	0.950	
P-31(n,2α)	(5_0)	d-Be2a	6.45E-05	2.15E-05	10.30	C/E(5) =9.223
S-32(n,γ)	5_3	MACS_30keV	4.10E-03	2.00E-04	1.224	
S-32(n,p)	6	fns_7hour	2.25E-01	1.57E-02	0.980	
		cf252_flux_1	6.46E-02	3.80E-03	1.164	C/E(5) =1.092
		cf252_flux_1	7.25E-02	2.95E-03	1.037	C/E(5) =0.973
		cf252_flux_1	6.84E-02	3.42E-04	1.099	C/E(5) =1.031
S-32(n,t)/*(n,xt)*	5_2/6	d-Be	4.13E-03	7.86E-04	0.608	/1.114
S-33(n,γ)	5_0	MACS_30keV	7.40E-03	1.50E-03	0.282	
S-34(n,γ)	5_3	MACS_30keV	2.26E-04	1.00E-05	0.853	
S-34(n,p)	6	fns_5min	7.23E-02	4.34E-03	0.971	
S-34(n,α)	6	fns_5min	1.16E-01	8.13E-03	1.019	
S-36(n,γ)	5_3	MACS_30keV	1.71E-04	1.40E-05	0.789	
Cl-35(n,2n)m	5_2	fns_5min	6.32E-03	3.16E-04	1.429	C/E(5) =1.103
Cl-35(n,γ)	5_2	MACS_30keV	9.68E-03	2.10E-04	0.559	

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
Cl-35(n,t)/*(n,xt)*	$5_3/5_3$	d-Be	7.61E-03	1.52E-03	0.684	/1.104
Cl-36(n,γ)	5_3	MACS_30keV	1.20E-02	1.00E-03	0.926	
Cl-37(n,γ)	(6)	MACS_30keV	2.12E-03	7.00E-05	1.062	
Cl-37(n,p)	6	fns_5min	1.79E-02	8.94E-04	1.368	C/E(5) =1.251 C/E(7) =1.250 EXFOR GE00 used
Cl-37(n,α)	6	fns_5min	2.75E-02	1.37E-03	0.980	
Ar-36(n,γ)	5_3	MACS_30keV	9.00E-03	1.50E-03	0.877	
Ar-38(n,γ)	5_0	MACS_30keV	3.00E-03	3.00E-04	0.037	
Ar-39(n,γ)	5_0	MACS_30keV	8.00E-03	2.00E-03	8.085	
Ar-40(n,γ)	5_1	MACS_30keV	2.54E-03	1.00E-04	1.449	
Ar-40(n,t)/*(n,xt)*	$(5_0/5_3)$	d-Be	5.20E-03	1.20E-03	0.425	/0.972
Ar-40(n,t)/*(n,t+)*	$(5_0/5_3)$	d-Be	1.90E-02	5.00E-03	0.116	/1.342
K-39(n,2n)g	6	fns_5min	4.93E-03	2.96E-04	1.282	
K-39(n,2α)	5_1	d-Be2a	2.15E-04	1.08E-04	14.15	
K-40(n,γ)	5_0	MACS_30keV	3.10E-02	7.00E-03	0.204	
K-41(n,γ)	6	fns_7hour MACS_30keV	9.95E-04 2.54E-04	2.09E-04 2.00E-05	0.794 0.848	
K-41(n,h)/*(n,h+)*	$5_1/5_4$	d-Be2a	1.44E-03	4.30E-04	0.329	/0.583 C/E(5) =4.313
K-41(n,p)	6	fns_5min	3.63E-02	2.18E-03	1.176	
K-41(n,α)	5_2	fns_5min	2.38E-02	1.43E-03	1.214	C/E(5)=1.095
Ca-40(n,γ)	6	MACS_30keV	5.73E-03	3.40E-04	0.804	
Ca-40(n,t)/*(n,xt)*	$(5_1/5_4)$	d-Be	4.94E-03	8.24E-04	0.338	/0.684
Ca-40(n,t)/*(n,t+)*	$(5_1/5_4)$	d-Be	9.50E-03	1.50E-03	0.176	/1.345
Ca-40(n,h)/*(n,h+)*	$5_3/5_0$	d-Be2a	6.02E-03	1.20E-03	0.460	/19.872
Ca-41(n,γ)	5_0	MACS_30keV	3.00E-02	7.00E-03	0.452	
Ca-42(n,γ)	5_2	MACS_30keV	1.56E-02	2.00E-03	0.722	
Ca-42(n,p)	5_3	fns_7hour	2.07E-01	1.65E-02	0.829	
Ca-43(n,γ)	6	MACS_30keV	5.10E-02	6.00E-03	0.609	
Ca-44(n,γ)	6	MACS_30keV	9.40E-03	1.30E-03	0.796	
Ca-44(n,p)	6	fns_5min	3.76E-02	3.01E-03	1.034	C/E(5)=1.042 C/E(7)=0.962
Ca-44(n,t)/*(n,t+)*	$5_0/5_3$	d-Be	2.10E-02	4.00E-03	0.094	/1.376
Ca-45(n,γ)	5_3	MACS_30keV	1.70E-02	3.50E-03	0.795	
Ca-46(n,γ)	5_1	MACS_30keV	5.30E-03	5.00E-04	1.347	
Ca-48(n,2n)	6	fns_7hour	9.03E-01	1.63E-01	0.885	
Ca-48(n,γ)	5_1	MACS_30keV	8.70E-04	9.00E-05	0.114	
Sc-45(n,2n)g	5_2	fns_5min fng_ScSmGd	1.69E-01 1.19E-01	8.43E-03 3.81E-04	1.075 1.630	
Sc-45(n,2n)m	6	fng_ScSmGd	1.09E-01	5.11E-03	1.090	
Sc-45(n,γ)	(6)	MACS_30keV	6.90E-02	5.00E-03	0.852	
Sc-45(n,h)/*(n,h+)*	$5_1/5_4$	d-Be2a d-Be2a	1.87E-03 3.18E-03	4.30E-04 6.35E-04	0.390 0.230	/1.144 /0.673
Sc-45(n,α)	6	fng_ScSmGd d-Be2a	4.74E-02 1.38E-02	4.13E-03 2.37E-03	1.100 1.379†	 C/E(5)=1.370
Ti-46(n,2n)	6	sneg_1 cf252_flux_1	5.82E-02 9.30E-05	7.57E-03 3.10E-05	1.106 0.150†	 C/E(5)=0.156
Ti-46(n,n't)	5_0	fzk_ss316	1.97E-03	5.11E-04	0.031	
Ti-46(n,γ)	5_2	MACS_30keV	2.68E-02	3.20E-03	0.686	
Ti-46(n,p)g	6	fns_7hour	2.18E-01	1.09E-02	0.826	
Ti-46(n,p)	(6)	fzk_2 cf252_flux_1 cf252_flux_1 cf252_flux_1 cf252_flux_1 rez_DF sneg_1 fng_vanad	1.21E-01 1.38E-02 1.36E-02 1.24E-02 1.39E-02 6.07E-02 4.31E-01 1.03E-01	1.32E-02 3.00E-04 1.21E-03 1.20E-03 1.21E-03 1.82E-03 3.58E-02 6.29E-03	0.909 0.976 0.990 1.086 0.969 1.713† 0.519 1.673†	

Reaction	QS	**Spectrum**	**σ (b)**	**Δσ (b)**	**C/E**	**Comment**
		fzk_1	8.10E-02	1.10E-02	1.349	
		d-Be3	1.26E-01	2.40E-02	1.168	
		fns_7hour	2.48E-01	1.24E-02	0.914	
Ti-46(n,t)g	5_1	fzk_ss316	4.35E-03	6.05E-04	0.089	C/E(5)=6.018
Ti-46(n,t)m	5_1	fzk_ss316	2.59E-03	7.25E-04	0.042	C/E(5)=2.226
Ti-47(n,3n)	5_3	d-Be3	1.10E-03	2.50E-04	0.736	
Ti-47(n,γ)	5_2	MACS_30keV	6.44E-02	7.70E-03	0.636	
Ti-47(n,p)	6	cf252_flux_1	2.03E-02	1.10E-03	1.010	
		cf252_flux_1	1.89E-02	4.00E-04	1.085	
		cf252_flux_1	1.94E-02	9.70E-05	1.057	
		cf252_flux_1	2.20E-02	9.00E-04	0.932	
		cf252_flux_1	2.16E-02	1.18E-03	0.949	
Ti-48(n,γ)	6	MACS_30keV	3.18E-02	5.10E-03	0.938	
Ti-48(n,p)	6	fns_7hour	6.31E-02	3.16E-03	0.935	
		fns_5min	5.23E-02	2.61E-03	1.053	
		fng_heat	8.53E-02	1.15E-02	0.666	
		cf252_flux_1	4.20E-04	1.00E-05	0.959	
		cf252_flux_1	4.17E-04	1.59E-05	0.966	
		cf252_flux_1	3.80E-04	2.00E-05	1.060	
		fzk_ss316	9.52E-03	6.32E-04	2.099†	
		fzk_1	4.61E-03	4.61E-04	2.806†	
Ti-48(n,n′p)/*(n,d+)*	$5_0/5_2$	fzk_ss316	1.37E-01	3.24E-03	0.296	/0.352
Ti-48(n,t)g/*(n,t+)g*	$5_0/5_3$	d-Be	1.16E-02	1.50E-03	0.126	/2.265
Ti-48(n,t)m/*(n,t+)m*	$5_0/5_3$	d-Be	8.20E-03	1.00E-03	0.058	/0.799
Ti-48(n,t)/*(n,xt)*	$(5_0/5_3)$	d-Be	9.61E-04	2.29E-04	2.939	/3.239
		d-Be3	7.03E-05	2.05E-05	2.896	/2.911
Ti-49(n,γ)	5_2	MACS_30keV	2.21E-02	2.10E-03	0.518	
Ti-49(n,p)	6	fng_heat	2.36E-02	4.25E-03	1.369	
Ti-50(n,γ)	6	MACS_30keV	3.60E-03	4.00E-04	0.769	
Ti-50(n,p)	(6)	fns_5min	1.33E-02	6.65E-04	0.971	
		fng_heat	1.34E-02	2.43E-03	1.004	
Ti-50(n,α)	5_2	fng_vanad	9.19E-03	2.05E-03	0.714	
V-50(n,γ)	5_1	MACS_30keV	5.00E-02	9.00E-03	0.569	
V-51(n,4n)	5_3	fzk_ss316	3.65E-04	1.47E-05	0.580	
		fzk_ss316	3.15E-04	1.25E-05	0.673	
V-51(n,n′α)	6	fzk_ss316	5.33E-03	1.27E-04	1.333	
		d-Be2a	9.03E-03	2.15E-03	2.792†	C/E(5)=0.534
		d-Be3	3.50E-03	8.00E-04	1.144	
		rez_DF	4.58E-03	6.01E-05	1.300	
V-51(n,γ)	6	fng_vanad	6.53E-02	3.98E-03	1.045	
		sneg_1	1.60E-03	2.40E-04	0.376†	
		cf252_flux_1	2.80E-03	3.00E-04	0.748	
		MACS_30keV	3.80E-02	4.00E-03	0.746	
V-51(n,p)	6	fns_5min	2.36E-02	1.18E-03	1.136	
		fng_vanad	2.01E-02	1.11E-03	1.094	
		sneg_1	2.75E-02	1.92E-03	1.071	
		cf252_flux_1	7.10E-04	1.10E-04	1.000	
		cf252_flux_1	9.30E-04	1.00E-04	0.763	
		cf252_flux_1	7.13E-04	5.88E-05	0.996	
V-51(n,t)/*(n,xt)*	6	d-Be3	5.00E-04	1.50E-04	0.839	/0.922
		d-Be	4.40E-03	1.00E-03	0.648	/1.092
V-51(n,h)/*(n,h+)*	$5_0/5_3$	d-Be2a	1.59E-03	4.30E-04	0.319	/0.469
		d-Be2a	1.34E-03	2.69E-04	0.378	/0.555
		d-Be3	2.50E-04	8.00E-05	0.085	/0.089
V-51(n,α)	6	fns_7hour	1.72E-02	8.62E-04	0.909	
		fng_f82h	1.67E-02	4.00E-03	0.879	
		sneg_1	1.70E-02	6.38E-04	1.034	
		sneg_2	1.59E-02	7.39E-04	1.008	
		cf252_flux_1	3.88E-05	1.20E-06	1.015	
		fzk_ss316	6.69E-03	2.78E-04	0.847	

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
		fzk_ss316	6.27E-03	1.54E-04	0.902	
		fzk_ss316	5.80E-03	1.36E-04	0.976	
		fng_vanad	1.34E-02	6.97E-04	0.933	
		d-Be2a	1.05E-02	1.72E-03	0.839	
		rez_DF	5.29E-03	9.40E-05	0.881	
V-51(n,pα)	5_3	fzk_ss316	3.27E-05	5.40E-06	0.415	
		fzk_ss316	3.12E-05	3.61E-06	0.434	
V-51(n,2nα)	(5_3)	fzk_ss316	5.25E-04	1.34E-05	0.912	
		fzk_ss316	6.66E-04	2.38E-05	0.720	
Cr-50(n,2n)	5_2	fng_vanad	2.29E-02	4.29E-03	0.787	C/E(5)=0.954
		fng_Cr	3.01E-02	5.82E-03	0.731	C/E(5)=0.888
		fzk_ss316	3.50E-02	1.23E-02	0.761	
		fzk_ss316	6.79E-02	1.90E-02	0.393	RPL cancelled,
		fzk_ss316	3.61E-02	1.34E-02	0.738	disproved overall fit
		rez_DF	2.27E-02	4.54E-04	0.977	
		rez_DF	2.79E-02	1.68E-03	0.793	
		fns_5min	4.28E-02	2.14E-03	0.513	
Cr-50(n,3n)	5_4	fzk_ss316	2.14E-04	5.36E-05	1.492	
		fzk_ss316	2.89E-04	8.68E-05	1.106	
		d-Be3	7.00E-05	3.00E-05	0.808	
		rez_DF	9.10E-05	3.10E-06	1.479	
		rez_DF	6.72E-05	3.36E-05	2.003	
		rez_DF	5.47E-05	4.38E-06	2.461	
Cr-50(n,γ)	5_2	MACS_30keV	4.90E-02	1.30E-02	0.521	
Cr-50(n,t)	5_2	fzk_2	2.70E-04	5.40E-05	0.040	C/E(5)=0.912
		fzk_ss316	4.42E-03	1.84E-04	0.121	C/E(5)=1.975
		fzk_ss316	4.33E-03	2.21E-04	0.124	C/E(5)=2.018
		rez_DF	2.52E-03	5.79E-05	0.172	C/E(5)=2.802
		rez_DF	2.54E-04	1.27E-05	1.704	
Cr-50(n,pα)	(5_3)	fzk_ss316	3.04E-03	2.49E-04	0.265†	
		rez_DF	1.56E-03	4.08E-05	0.401	
		rez_DF	1.47E-03	5.88E-05	0.426	
Cr-51(n,γ)	5_3	MACS_30keV	8.70E-02	1.60E-02	0.893	
Cr-52(n,2n)	6	fns_7hour	3.18E-01	1.59E-02	1.075	C/E(5)=1.000
		fzk_2	3.90E-02	5.85E-03	1.241	
		fng_Cr	3.38E-01	3.05E-02	1.044	
		fng_cucrzr	4.62E-01	3.69E-02	0.760	
		tud_ cucrzr	3.27E-01	3.53E-02	1.160	
		fng_vanad	2.76E-01	2.27E-02	1.042	
		fng_f82h	3.25E-01	4.12E-02	1.024	
		fng_eurofer	3.18E-01	2.26E-02	0.977	
		sneg_1	5.18E-01	1.26E-02	0.812	
		fzk_ss316	1.79E-01	4.00E-03	1.003	C/E(5)=0.996
		fzk_ss316	1.77E-01	3.76E-03	1.015	C/E(5)=1.008
		fzk_ss316	1.98E-01	6.02E-03	0.908	
		rez_DF	1.31E-01	9.71E-04	1.108	
		rez_DF	1.22E-01	2.44E-03	1.185	
		rez_DF	1.40E-01	2.81E-03	1.032	
Cr-52(n,γ)	6	MACS_30keV	8.80E-03	2.00E-03	0.840	
Cr-52(n,p)	6	fns_5min	6.95E-02	1.56E-03	0.968	
		sneg_1	9.97E-02	4.49E-03	0.740	
		fng_Cr	7.12E-02	9.92E-03	0.941	
		cf252_flux_1	1.07E-03	7.00E-05	1.218	
		rez_DF	1.80E-02	8.30E-04	1.317	
Cr-52(n,t)/*(n,xt)*	$5_3/5_3$	d-Be3	2.03E-04	6.09E-05	1.106	/1.132
		d-Be3	1.65E-04	3.35E-05	1.341	/1.372
Cr-52(n,t)/*(n,t+)*	$5_3/5_3$	d-Be	3.05E-02	3.50E-03	0.071†	/1.510
Cr-52(n,pα)	5_3	rez_DF	5.15E-05	1.03E-05	0.749	
		rez_DF	6.27E-05	6.27E-06	0.616	
Cr-52(n,dα)	5_3	fzk_ss316	4.54E-06	4.16E-07	0.858	

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
Cr-53(n,3n)	5_3	d-Be3	1.06E-02	1.6E-03	0.769	
Cr-53(n,γ)	5_2	MACS_30keV	5.80E-02	1.00E-02	0.489	
Cr-54(n,γ)	5_2	MACS_30keV	6.70E-03	1.60E-03	0.588	
Cr-53(n,p)	6	sneg_1 cf252_flux_1 rez_DF	5.95E-02 3.06E-04 3.84E-03	5.89E-03 2.70E-05 1.85E-03	0.811 1.880† 3.256†	
Cr-53(n,h)/*(n,h+)*	$5_0/5_0$	d-Be3	2.60E-04	8.00E-05	0.073	/0.077
Cr-54(n,α)	5_2	rez_DF	5.14E-04	1.54E-05	6.891	
Mn-52(n,γ)	6	Maxw_300K	6.00E+01	7.00E+00	0.806	
Mn-55(n,2n)	6	fns_7hour cf252_flux_1 cf252_flux_1	7.62E-01 5.80E-04 4.08E-04	3.81E-02 1.40E-04 9.00E-06	1.023 0.977 1.390†	 C/E(5)=1.273
Mn-55(n,γ)	6 5_2	fns_7hour fns_5min MACS_30keV	8.32E-04 3.97E-03 3.96E-02	4.16E-05 2.38E-04 3.00E-03	0.980 1.010 0.648	
Mn-55(n,p)	6	fns_5min	2.85E-02	1.42E-03	1.099	
Mn-55(n,t)/*(n,xt)*	6	d-Be d-Be3 d-Be3	4.90E-03 6.40E-04 1.40E-03	1.20E-03 2.00E-04 2.80E-04	0.912 1.532 0.700	/1.474 /1.671 C/E(5)=1.484 /0.764
Mn-55(n,h)/*(n,h+)*	$5_1/5_4$	d-Be2a d-Be2a	1.38E-03 1.79E-03	6.88E-04 3.59E-04	0.260 0.200	/0.474 /0.365
Mn-55(n,α)	6	fns_5min d-Be2a	1.92E-02 7.31E-03	9.62E-04 1.51E-03	1.099 1.123	C/E(5)=1.081 C/E(5)=1.105
Mn-55(n,2α)	5_3	d-Be2a	6.45E-05	4.30E-05	0.421	
Fe-54(n,2n)	(5_2)	sneg_1	9.23E-03	2.58E-03	2.039	C/E(5)=1.124 C/E(7)=2.039
Fe-54(n,3n)g	5_2	fzk_ss316 fzk_ss316 rez_DF	1.08E-04 1.17E-04 3.76E-05	5.38E-05 1.63E-05 1.09E-06	4.314 3.978 3.923	
Fe-54(n,γ)	5_2	MACS_30keV	2.94E-02	1.30E-03	0.659	
Fe-54(n,p)	6	fns_7hour sneg_1 sneg_2 fzk_2 fng_f82h cf252_flux_1 cf252_flux_1 cf252_flux_1 cf252_flux_1 cf252_flux_1 fzk_1 fzk_ss316 fzk_ss316 rez_DF fng_eurofer fng_vanad	3.39E-01 3.09E-01 3.43E-01 2.87E-01 2.69E-01 8.46E-02 9.25E-02 8.78E-02 8.76E-02 7.90E-02 2.82E-01 2.04E-01 1.96E-01 1.79E-01 2.46E-01 2.44E-01	2.04E-02 1.54E-02 1.71E-02 4.30E-02 1.90E-02 2.00E-03 5.00E-03 8.78E-04 4.35E-03 3.00E-03 2.82E-02 4.56E-03 4.58E-03 1.43E-03 1.70E-02 7.42E-02	0.967 0.950 1.044 0.972 1.083 1.030 0.942 0.993 0.995 1.103 0.981 1.115 1.164 1.278 1.057 1.021	C/E(5)=0.992
Fe-54(n,t)g/*(n,t+)g*	$5_2/5_2$	d-Be rez_DF fzk_ss316	1.70E-02 3.23E-04 2.83E-02	4.00E-03 2.90E-06 7.07E-03	0.075 0.714 0.010†	/1.970 C/E(5)=0.089 /7.527 C/E(5)=1.081 /0.200
Fe-54(n,t)m/*(n,t+)m*	$5_1/5_4$	d-Be	7.00E-03	1.00E-03	0.136	/2.281 C/E(5)=0.186
Fe-54(n,t)	(6)	fzk_2 fzk_ss316 fzk_ss316	9.00E-05 7.36E-04 6.55E-04	1.80E-05 2.00E-05 1.87E-05	0.110† 0.734 0.824	C/E(5)=0.781 C/E(5)=1.117 C/E(5)=1.255
Fe-54(n,α)	6	fng_SiC	8.22E-02	4.11E-03	0.923	
Fe-55(n,γ)	5_0	MACS_30keV	7.50E-02	1.50E-02	0.484	
Fe-56(n,γ)	6	MACS_30keV	1.17E-02	5.00E-04	0.863	
Fe-56(n,p)	6	fns_5min	9.05E-02	2.26E-03	1.049	C/E(5)=1.039
		fns_7hour fng_f82h fng_SiC	1.07E-01 9.31E-02 9.58E-02	5.36E-03 6.58E-03 4.79E-03	0.971 0.996 0.973	

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
		fng_vanad	9.16E-02	1.45E-02	0.848	
		sneg_1	1.07E-01	3.27E-03	0.959	
		sneg_2	1.10E-01	4.59E-03	1.014	
		cf252_flux_1	1.15E-03	8.00E-05	1.259	
		cf252_flux_1	1.45E-03	6.00E-05	0.998	
		cf252_flux_1	1.45E-03	3.50E-05	0.998	
		cf252_flux_1	1.18E-03	8.00E-05	1.227	
		cf252_flux_1	1.40E-03	1.68E-05	1.034	
		fzk_ss316	3.43E-02	9.91E-04	1.043	
		fzk_ss316	3.36E-02	9.90E-04	1.067	
		rez_DF	2.32E-02	4.13E-04	1.372	
Fe-56(n,t)/*(n,xt)*	6	d-Be3	3.90E-04	1.17E-04	1.287	/1.339 C/E(5)=1.196
		d-Be3	3.99E-04	7.99E-05	1.255	/1.307 C/E(5)=1.166
Fe-56(n,t)/*(n,t+)*	6	d-Be	4.10E-02	6.00E-03	0.093	/1.875
Fe-56(n,h)/*(n,h+)*	$5_0/5_3$	d-Be2a	5.41E-03	5.31E-04	0.138	/1.138
Fe-57(n,γ)	5_2	MACS_30keV	4.00E-02	4.00E-03	0.643	
Fe-57(n,p)	6	sneg_1	7.12E-02	9.26E-03	0.777	
Fe-58(n,γ)	6	fng_SiC	1.26E-03	6.30E-05	1.145	
		fng_eurofer	2.48E-02	4.27E-03	0.776	
		fng_f82h	5.98E-03	5.14E-04	0.920	
		rez_DF	1.78E-03	6.18E-05	1.027	
		MACS_30keV	1.35E-02	7.00E-03	1.292	
Fe-59(n,γ)	5_0	MACS_30keV	1.90E-02	5.00E-03	0.762	
Fe-60(n,γ)	5_0	MACS_30keV	5.15E-03	1.41E-03	2.63	
Co-59(n,2n)m	6	fns_7hour	3.37E-01	1.69E-02	1.370[†]	
		rez_DF	1.31E-01	2.62E-02	1.109	
Co-59(n,2n)	(5_2)	fns_7hour	7.37E-01	3.69E-02	0.917	C/E(5)=0.956
		cf252_flux_1	5.70E-04	3.00E-05	0.709	
		rez_DF	1.19E-01	2.38E-02	1.787	
Co-59(n,3n)	6	rez_DF	2.47E-02	9.89E-04	0.761	
		d-Be3	1.12E-02	1.80E-03	0.765	
Co-59(n,γ)	(6)	cf252_flux_1	6.97E-03	3.40E-04	0.685	
		fng_eurofer	7.25E-01	1.22E-01	0.863	
		MACS_30keV	3.96E-02	2.70E-03	0.648	
Co-59(n,p)	6	cf252_flux_1	1.96E-03	1.00E-05	0.869	
		rez_DF	1.53E-02	6.13E-04	1.196	
Co-59(n,t)/*(n,xt)*	6	d-Be3	6.40E-04	2.00E-04	1.175	/1.348
		d-Be3	4.90E-04	9.80E-05	1.534	/1.761
		d-Be	3.10E-03	7.00E-04	1.044	/2.040
Co-59(n,h)/*(n,h+)*	$5_1/5_4$	d-Be2a	1.44E-03	5.80E-04	0.316	/0.986 C/E(5)=2.916
		d-Be2a	1.47E-03	2.44E-04	0.309	/0.964 C/E(5)=2.853
Co-59(n,α)	6	fns_5min	2.53E-02	1.27E-03	1.099	
		cf252_flux_1	2.00E-04	1.00E-05	1.118	
		cf252_flux_1	2.17E-04	1.40E-05	1.031	
		cf252_flux_1	2.22E-04	4.00E-06	1.008	
		cf252_flux_1	2.00E-04	1.00E-05	1.118	
		rez_DF	6.74E-03	2.70E-04	1.132	C/E(5)=1.127
		d-Be2a	8.39E-03	1.72E-03	1.180	C/E(5)=1.162
Co-59(n,2α)	5_3	d-Be2a	1.08E-04	6.45E-05	0.633	
Ni-58(n,2n)	6	fns_7hour	3.26E-02	1.63E-03	1.010	
		fng_f82h	3.65E-02	1.01E-02	0.891	
		fzk_2	5.42E-03	5.42E-04	0.964	
		sneg_1	4.37E-02	3.06E-03	0.964	
		sneg_2	3.27E-02	2.29E-03	0.958	
		cf252_flux_1	8.95E-06	2.80E-07	1.076	C/E(5)=1.074
		fzk_ss316	1.94E-02	1.93E-03	1.255	C/E(5)=1.238
		fzk_ss316	2.57E-02	6.16E-03	0.947	
		rez_DF	1.54E-02	6.45E-04	1.267	C/E(5)=1.242
Ni-58(n,3n)	5_3	fzk_ss316	4.48E-04	2.50E-05	0.284	
		d-Be3	2.00E-05	1.00E-05	1.219	

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
Ni-58*(n,n'p)*/(n,d+)	6	fns_7hour	6.26E-01	3.13E-02	0.946	/0.974
		fng_vanad	5.29E-01	1.07E-01	0.886	/0.913
		fzk_2	1.07E-01	1.07E-02	0.812	/0.843
		sneg_1	7.20E-01	5.04E-02	0.915	/0.943
		sneg_2	6.43E-01	3.86E-02	0.945	/0.972
		fng_f82h	5.08E-01	4.79E-02	1.085	/1.117
		fng_eurofer	4.76E-01	1.38E-01	1.056	/1.089
		fzk_ss316	2.44E-01	5.63E-03	1.028	/1.080
		rez_DF	2.13E-01	4.02E-03	0.957	/1.005 C/E(5)=0.961
Ni-58(n,γ)	6	MACS_30keV	3.87E-02	1.50E-03	0.916	
Ni-58(n,p)	(6)	fns_7hour	3.04E-01	1.52E-02	1.025	C/E(5)=0.998
		fzk_2	4.37E-01	4.37E-02	0.777	
		fng_vanad	2.72E-01	4.09E-02	0.897	
		sneg_1	2.98E-01	2.09E-02	0.932	
		cf252_flux_1	9.50E-02	4.50E-03	1.254	
		cf252_flux_1	1.05E-01	5.00E-03	1.135	C/E(5)=1.119
		cf252_flux_1	1.13E-01	4.80E-03	1.051	C/E(5)=1.036
		cf252_flux_1	1.19E-01	6.00E-03	1.001	
		cf252_flux_1	1.21E-01	2.00E-03	0.985	
		fzk_ss316	2.43E-01	5.39E-03	1.081	
		fzk_ss316	2.22E-01	1.33E-02	1.183	
		rez_DF	2.10E-01	2.68E-03	1.282	
Ni-58(n,t)	6	fzk_2	4.40E-05	1.10E-05	0.407	C/E(5)=0.406
		fzk_ss316	2.94E-04	7.77E-06	1.290	C/E(5)=1.003
		fzk_ss316	4.97E-02	1.56E-03	0.008†	C/E(5)=0.006
/(n,xt)		d-Be3	2.43E-04	8.96E-05	0.882	/0.965
/(n,xt)		d-Be3	1.79E-04	3.58E-05	1.198	/1.310 C/E(5)=0.998
Ni-58(n,t)*/(n,t+)*	6	d-Be	3.50E-02	6.00E-03	0.041	/1.641
		rez_DF	3.39E-03	8.25E-05	0.091†	/1.604
Ni-59(n,γ)	5_3	MACS_30keV	8.74E-02	1.40E-02	0.992	
Ni-60(n,γ)	6	MACS_30keV	2.99E-02	7.00E-03	0.847	
Ni-60(n,p)m	6	fns_5min	6.90E-02	4.14E-03	0.917	
		fng_heat	6.45E-02	8.39E-03	1.214	
Ni-60(n,p)	(6)	fzk_2	5.52E-02	5.52E-03	0.771	
		sneg_1	1.51E-01	1.20E-02	0.857	
		sneg_2	1.62E-01	1.29E-02	0.902	
		fzk_ss316	5.56E-02	2.25E-03	0.865	
		fzk_ss316	1.90E+0	2.75E-01	0.025†	
		d-Be3	8.20E-02	1.60E-02	0.841	
Ni-60(n,t)*/(n,t+)*	(6)	d-Be	6.10E-02	8.00E-03	0.044	/1.560 C/E(5)=0.052
Ni-60(n,2p)	5_3	fzk_ss316	8.62E-04	1.55E-04	0.926	
Ni-61(n,γ)	5_3	MACS_30keV	8.28E-02	8.00E-03	0.847	
Ni-61(n,p)	5_2	fzk_2	1.88E-02	2.82E-03	1.722	
Ni-62*(n,n'p)*/(n,d+)	5_2	fzk_ss316	6.38E-03	2.17E-03	4.255	/4.887
Ni-62(n,γ)	5_3	MACS_30keV	2.23E-02	1.60E-03	0.778	
Ni-62(n,p)g	6	fns_5min	1.87E-02	1.12E-03	1.010	
		fng_heat	2.22E-02	2.99E-03	0.881	
Ni-62(n,p)m	6	fns_5min	1.69E-02	8.44E-04	0.963	
		fng_heat	1.85E-02	2.50E-03	0.915	
Ni-62(n,α)	6	fzk_2	4.60E-03	4.60E-04	0.974	
		sneg_1	3.40E-02	4.11E-03	0.646	C/E(5) = 0.606
Ni-63(n,γ)	5_3	MACS_30keV	3.10E-02	6.00E-03	0.756	
Ni-64(n,γ)	5_2	MACS_30keV	8.00E-03	7.00E-04	2.276	
Cu-63(n,2n)	6	fns_5min	4.59E-01	2.30E-02	1.075	
		tud_cucrzr	4.91E-01	5.55E-02	1.090	
		cf252_flux_1	3.00E-04	2.70E-05	0.718†	
		cf252_flux_1	1.83E-04	7.00E-06	1.177	
Cu-63(n,3n)	6	d-Be3	4.26E-03	1.21E-03	0.666	C/E(5)=0.818
Cu-63(n,γ)	5_2	cf252_flux_1	1.76E-02	1.40E-03	0.594	C/E(7)=0.591
		MACS-30keV	5.56E-02	2.20E-03	1.152	

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
Cu-63(n,t)/*(n,xt)*	5_3 6	d-Be3 d-Be	8.20E-04 5.31E-03	2.63E-04 1.43E-03	1.748 1.068	/1.923 /1.719
Cu-63(n,h)/*(n,h+)*	$5_1/5_4$	d-Be2a	3.91E-03	7.82E-04	0.490	/0.751
Cu-63(n,α)	(6)	fns_7hour fng_SiC fzk_2 fng_cucrzr tud_cucrzr cf252_flux_1 cf252_flux_1 fng_vanad	4.70E-02 1.99E-02 1.50E-02 3.51E-02 3.44E-02 6.71E-04 7.09E-04 2.24E-02	3.76E-03 9.94E-04 1.50E-03 3.16E-03 3.34E-03 1.80E-05 1.70E-05 8.93E-03	0.935 1.970† 0.843 1.143 1.299 0.890 0.843 1.456	C/E(5)=1.001
Cu-65(n,2n)	6	fns_7hour fng_SiC fzk_2 fng_cucrzr tud_cucrzr cf252_flux_1	8.83E-01 9.40E-01 1.57E-01 9.79E-01 8.16E-01 6.65E-04	4.42E-02 1.88E-02 1.57E-02 6.86E-02 2.84E-01 2.30E-05	1.010 0.900 0.856 0.876 1.151 1.088	 C/E(5)=1.053 C/E(5)=0.876 C/E(5)=1.151 C/E(5)=1.088
Cu-65(n,γ)	6	cf252_flux_1 MACS_30keV	8.00E-03 2.98E-02	1.20E-03 1.30E-03	0.863 1.176	
Cu-65(n,α)m	6	fng_cucrzr tud_cucrzr fzk_2	5.80E-03 4.83E-03 1.21E-03	8.71E-04 5.50E-04 1.94E-04	1.161 1.530† 0.996	
Cu-65(n,n′α)	6	fng_SiC fzk_2 fng_cucrzr tud_cucrzr d-Be3	1.25E-03 7.10E-04 2.27E-03 1.50E-03 5.10E-03	1.25E-04 1.42E-04 2.27E-04 1.36E-04 1.20E-03	1.439 1.092 0.783 1.090 1.038	 C/E(5)=1.017
Cu-65(n,p)	6	fng_SiC fzk_2 fng_cucrzr tud_cucrzr d-Be3	2.12E-02 7.40E-03 2.16E-02 1.85E-02 1.20E-03	1.06E-03 7.40E-04 1.30E-03 1.37E-03 3.00E-03	0.935 0.909 0.933 1.190 1.005	C/E(7)=0.935 C/E (7)=0.909 C/E (7)=0.933 C/E (7)=1.190 C/E (7)=1.005
Zn-64(n,2n)	6	fns_5min	1.51E-01	7.54E-03	1.000	
Zn-64(n,γ)	6	MACS_30keV	5.90E-02	5.00E-03	0.940	
Zn-64(n,p)	6	cf252_flux_1 cf252_flux_1 cf252_flux_1 cf252_flux_1 cf252_flux_1 cf252_flux_1	4.11E-02 3.82E-02 4.64E-02 3.94E-02 4.18E-02 4.13E-02	1.30E-03 1.50E-03 2.30E-03 1.00E-03 1.75E-03 2.82E-03	0.938 1.009 0.831 0.979 0.922 0.934	C/E(5)=1.074 C/E(5)=0.951 C/E(5)=1.055 C/E(5)=1.068
Zn-64(n,t)/*(n,t+)*	6	d-Be	6.70E-02	8.00E-03	0.098	/1.592
Zn-64(n,h)/*(n,h+)*	$5_0/5_3$	d-Be2a	1.94E-02	3.88E-03	0.131	/2.314
Zn-65(n,γ)	5_3	MACS_30keV	1.62E-01	2.70E-02	0.705	
Zn-66(n,γ)	6	MACS_30keV	3.50E-02	3.00E-03	0.830	
Zn-66(n,2α)	5_3	d-Be2a	6.45E-05	4.30E-05	1.032	
Zn-67(n,γ)	5_3	MACS_30keV	1.53E-01	1.50E-02	0.873	
Zn-67(n,h)/*(n,h+)*	$5_3/5_3$	d-Be2a	9.89E-04	2.80E-04	0.159	/0.769
Zn-68(n,γ)m	5_1 5_1	cf252_flux_1 MACS_30keV	1.85E-03 3.40E-03	1.20E-04 1.00E-03	0.246 0.388	
Zn-68(n,γ)	(6)	MACS_30keV	1.92E-02	2.40E-03	0.831	
Zn-68(n,h)/*(n,h+)*	$5_3/5_3$	d-Be2a	1.05E-03	3.66E-04	0.477	/0.547
Zn-68(n,α)	6	d-Be2a	4.08E-03	8.60E-04	1.373	
Zn-70(n,γ)	(5_0)	MACS_30keV	2.15E-02	2.00E-03	0.690	
Ga-69(n,2n)	6	fns_5min	7.82E-01	3.91E-02	1.099	
Ga-69(n,γ)	6	MACS_30keV	1.39E-01	6.00E-03	0.926	
Ga-69(n,t)/*(n,xt)*	$5_3/5_3$	d-Be	4.27E-03	8.13E-04	1.180	/2.022
Ga-71(n,2n)	6	fns_5min	8.99E-01	4.50E-02	1.088	
Ga-71(n,γ)	(6)	MACS_30keV	1.22E-01	8.00E-03	0.908	
Ge-70(n,γ)	(5_2)	MACS_30keV	8.80E-02	5.00E-03	0.493	

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
Ge-72(n,γ)	5_0	MACS_30keV	7.30E-02	7.00E-03	0.711	
Ge-73(n,γ)	5_3	MACS_30keV	2.43E-01	4.7E-02	1.032	
Ge-74(n,γ)	(5_2)	MACS_30keV	3.76E-02	3.90E-03	0.334	
Ge-74(n,p)	(5_1)	fns_5min	1.32E-02	7.93E-04	1.389	
Ge-74(n,t)/*(n,t+)*	$5_0/5_0$	d-Be	6.20E-02	1.30E-02	0.036	/0.278
Ge-76(n,2n)m	6	fns_5min	6.47E-01	4.53E-02	1.267	C/E(5)= 0.884
Ge-76(n,2n)	(6)	fns_5min	1.03E+0	7.18E-02	1.112	C/E(5)=1.100
Ge-76(n,γ)	(5_0)	MACS_30keV	2.15E-02	1.80E-03	0.710	
As-75(n,γ)	6	MACS_30keV	3.62E-01	1.90E-02	1.109	
As-75(n,p)m	6	fns_5min	1.05E-02	8.43E-04	0.990	
As-75(n,p)	(6)	fns_5min	1.86E-02	1.12E-03	1.177	C/E(5)=1.158
As-75(n,t)/*(n,xt)*	$(5_3/5_3)$	d-Be	3.80E-03	8.00E-04	1.038	/1.914
As-75(n,h)/*(n,h+)*	$5_1/5_1$	d-Be2a d-Be2a	1.03E-03 1.49E-03	4.30E-04 2.99E-04	0.473 0.326	/0.587 /0.405
As-75(n,α)	6	d-Be2a	4.73E-03	1.08E-03	1.147	C/E(7)= 1.104
Se-74 (n,γ)	5_0	MACS_30keV	2.71E-01	1.50E-02	0.723	
Se-76 (n,γ)	(5_3)	MACS_30keV	1.64E-01	8.00E-03	0.842	
Se-77 (n,γ)	(5_3)	MACS_30keV	4.18E-01	7.10E-02	1.080	
Se-78(n,2n)m	6	fns_5min	5.76E-01	5.76E-02	1.186	C/E(5)=1.087
Se-78 (n,γ)	(5_3)	MACS_30keV	6.01E-02	9.60E-03	0.999	
Se-79 (n,γ)	5_0	MACS_30keV	2.63E-01	4.60E-02	0.357	
Se-80 (n,γ)	(6)	MACS_30keV	4.20E-02	3.00E-03	0.866	
Se-80(n,t)/*(n,t+)*	$5_0/5_0$	d-Be	5.50E-02	1.20E-02	0.040	/0.246
Se-82(n,2n)	(5_2)	fns_5min	1.00E+0	7.02E-02	1.305	
Se-82(n,γ)	(5_0)	MACS_30keV	9.00E-03	8.00E-03	1.493	
Br-79(n,2n)	6	fns_5min	8.18E-01	9.00E-02	1.000	
Br-79(n,γ)	(6)	MACS_30keV	6.22E-01	3.40E-02	0.987	
Br-81(n,2n)g	6	fns_5min	3.37E-01	3.71E-02	1.177	C/E(5)=1.069
Br-81(n,γ)	(5_2)	MACS_30keV	2.39E-01	7.00E-03	1.508	
Kr-78(n,γ)	(5_2)	MACS_30keV	3.21E-01	2.60E-02	0.748	
Kr-79(n,γ)	5_0	MACS_30keV	9.59E-01	1.62E-01	0.308	
Kr-80(n,γ)	(5_2)	MACS_30keV	2.67E-01	1.40E-02	0.631	
Kr-81(n,γ)	5_0	MACS_30keV	6.07E-01	1.05E-01	0.320	
Kr-82(n,γ)	5_2	MACS_30keV	9.20E-02	6.00E-03	0.779	
Kr-83(n,γ)	6	MACS_30keV	2.43E-01	1.50E-02	1.009	
Kr-84(n,γ)	(6)	MACS_30keV	3.80E-02	4.00E-03	0.835	
Kr-85(n,γ)	5_0	MACS_30keV	5.50E-02	4.50E-02	0.722	
Kr-86(n,γ)	5_2	MACS_30keV	3.40E-03	3.00E-04	1.493	
Rb-85(n,2n)	(6)	fns_5min	9.19E-01	4.59E-02	1.095	C/E(7)=1.020
Rb-85(n,γ)	(6)	MACS_30keV	2.34E-01	7.00E-03	0.997	
Rb-86(n,γ)	5_3	MACS_30keV	2.02E-01	1.63E-01	0.869	
Rb-87(n,2n)m	6	fns_5min	4.19E-01	2.09E-02	1.150	C/E(5)=1.074
Rb-87(n,γ)	6	MACS_30keV	1.57E-02	8.00E-04	1.144	
Sr-84(n,2n)	(6)	fns_7hour	6.37E-01	3.19E-02	1.020	C/E(5)=1.010
Sr-84(n,γ)m	6 5_3	cf252_flux_1 cf252_flux_1 MACS_30keV	2.42E-01 3.54E-02 1.90E-01	2.70E-02 2.34E-03 1.00E-02	0.192[†] 1.312 0.821	
Sr-84(n,γ)	(5_0)	MACS_30keV	3.00E-01	1.70E-02	0.694	
Sr-86(n,2n)	(6)	fns_7hour	9.93E-01	1.49E-01	1.067	C/E(5)=1.020 C/E(7)=0.971
Sr-86(n,γ)m	5_2	cf252_flux_1	1.82E-01	2.20E-02	0.093	
Sr-86(n,γ)	(6)	MACS_30keV	6.40E-02	3.00E-03	0.951	
Sr-87(n,γ)	6	MACS_30keV	9.20E-02	4.00E-03	0.933	
Sr-88(n,2n)m	6	fns_7hour	2.53E-01	1.27E-02	0.881	
Sr-88(n,γ)		MACS_30keV	6.13E-03	1.10E-04	0.918	
Sr-88(n,p)	6	fns_5min	1.42E-02	7.09E-04	0.962	
Sr-89(n,γ)	5_0	MACS_30keV	1.90E-02	1.40E-02	1.371	

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
Y-89(n,n′)m	6	fns_5min	3.60E-01	1.80E-02	1.000	
		fng_Y	3.31E-01	1.99E-02	1.042	
Y-89(n,2n)	6	fns_7hour	1.06E+0	6.35E-02	0.885	
		fns_5min	8.15E-01	1.63E-01	1.124	C/E(5)=1.111
		fng_Y	8.91E-01	8.91E-03	1.021	
		tud_Y	8.00E-01	9.00E-02	1.138	C/E(5)=1.130
		rez_DF	1.94E-01	5.82E-03	1.482†	
Y-89(n,3n)	(5_2)	rez_DF	4.61E-02	1.38E-03	0.562	C/E(5)=0.584
Y-89(n,γ)m	6	tud_Y	3.82E-04	1.96E-04	1.137	C/E(5)=1.140
		fng_Y	3.57E-04	1.07E-05	1.239	C/E(5)=1.229
Y-89(n,γ)	(6)	MACS_30keV	1.90E-02	6.00E-04	1.024	
Y-89(n,t)/*(n,xt)*	(6)	d-Be	6.50E-03	2.00E-03	1.110	/1.370 C/E(5)=1.060
Y-89(n,α)m	6	fns_5min	1.83E-03	9.14E-05	1.010	
		fng_Y	2.03E-03	2.64E-04	0.903	
Y-89(n,α)	(5_2)	fng_Y	1.42E-02	1.84E-03	0.444	
Zr-90(n,2n)m	6	fns_5min	1.16E-01	5.81E-03	1.220	
		fng_heat	1.17E-01	3.52E-03	1.273	
Zr-90(n,2n)	(6)	fns_7hour	7.11E-01	4.27E-02	0.965	C/E(5)=0.971
		fng_cucrzr	9.24E-01	6.47E-02	0.750†	
		tud_cucrzr	6.71E-01	6.91E-02	1.120	
		cf252_flux_1	2.67E-04	1.50E-05	0.815	
		cf252_flux_1	2.21E-04	6.00E-06	0.985	
		rez_DF	1.86E-01	5.57E-03	1.504†	C/E(5)=1.493
		fng_Y	6.07E-01	7.28E-02	1.133	C/E(5)=1.131
Zr-90(n,γ)	6	MACS_30keV	1.93-02	9.00E-04	0.999	
Zr-90(n,p)m	6	fng_heat	9.83E-03	7.87E-04	1.189	C/E(5)=1.170
		cf252_flux_1	4.50E-05	6.00E-06	1.367†	C/E(5)=1.346
Zr-90(n,t)/*(n,t+)*	6	d-Be	5.10E-02	1.10E-02	0.105	/1.087
Zr-91(n,γ)	6	MACS_30keV	6.20E-02	3.40E-03	0.985	
Zr-92(n,γ)	6	MACS_30keV	3.01E-02	1.70E-03	1.225	
Zr-93(n,γ)	6	MACS_30keV	9.50E-02	1.00E-02	0.944	
Zr-94(n,γ)	6	cf252_flux_1	8.75E-03	6.50E-04	0.722	
		MACS_30keV	2.60E-02	1.00E-03	1.134	
Zr-94(n,p)	6	fns_5min	6.93E-03	3.47E-04	1.031	
Zr-95(n,γ)	5_0	MACS_30keV	7.90E-02	1.20E-02	0.579	
Zr-96(n,2n)	6	fns_7hour	1.57E+0	7.83E-02	0.926	C/E(5)=0.943
		fzk_1	5.47E-01	8.21E-02	0.605†	
Zr-96(n,γ)	5_2	cf252_flux_1	4.17E-03	2.10E-04	3.447	
		MACS_30keV	1.07E-02	5.00E-04	1.313	
Nb-93(n,2n)m	6	fns_7hour	4.67E-01	2.34E-02	0.962	
		fng_SiC	3.93E-01	1.18E-02	1.059	
		fzk_2	2.76E-01	4.14E-02	0.295†	
		fzk_ss316	1.58E-01	1.58E-02	0.892	C/E(5)=0.895
		fzk_ss316	1.07E-01	2.90E-02	1.316	
		rez_DF	1.23E-01	3.68E-03	0.951	C/E(5)=0.956
		fng_vanad	4.81E-01	6.59E-02	0.718	
		fzk_1	8.21E-02	7.80E-02	0.413†	
		d-Be3	1.78E-01	2.40E-02	1.176	
		d-Be3	2.02E-01	2.40E-02	1.036	
Nb-93(n,3n)m	5_4	rez_DF	1.84E-02	1.66E-03	0.803	
Nb-93(n,4n)	(5_3)	rez_DF	1.93E-05	2.51E-06	1.032	C/E(7)=2.319
Nb-93(n,n′α)m	6	fns_5min	2.89E-03	2.02E-04	0.962	C/E(5)=1.010
Nb-93(n,γ)m	6	fns_5min	4.65E-03	2.79E-04	1.042	
		fng_heat	1.24E-02	2.10E-03	0.199†	
Nb-93(n,γ)	(6)	MACS_30keV	2.66E-01	5.00E-03	0.893	
Nb-93(n,t)/***(n,xt)***	6	d-Be3	6.10E-04	2.00E-04	0.626	/0.926
		d-Be3	4.90E-04	9.80E-05	0.780	/1.153
		d-Be	4.10E-03	8.00E-04	0.332	/1.391
Nb-93(n,h)m/*(n,h+)m*	$5_4/5_4$	d-Be2a	2.15E-04	6.45E-05	1.712	/2.179
Nb-93(n,h)/*(n,h+)*	$(5_0/5_0)$	d-Be2a	1.61E-03	2.80E-04	0.337	/0.423 C/E(5)=1.062

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
		d-Be2a	1.54E-03	3.08E-04	0.353	/0.443 C/E(5)=1.112
Nb-93(n,α)g	5_2	fng_heat	4.46E-02	7.58E-03	0.151	C/E(5)=0.157
Nb-93(n,α)m	6	fns_5min fng_SiC d-Be2a d-Be3	5.16E-03 4.76E-03 1.93E-03 2.80E-03	2.58E-04 2.86E-04 4.30E-04 3.00E-04	1.000 1.070 1.231 0.918	
Nb-93(n,α)	(6)	d-Be2a d-Be3	4.09E-03 3.80E-03	4.30E-04 5.00E-04	1.279 1.575†	
Nb-93(n,2α)	(5_0)	d-Be2a	1.93E-04	1.08E-04	0.020	C/E(5)=0.046
Nb-94(n,γ)	(5_0)	MACS_30keV	4.82E-01	9.20E-02	0.559	
Nb-95(n,γ)	5_3	MACS_30keV	3.10E-01	6.50e-02	1.084	
Mo-92(n,2n)m	5_2	fns_5min	2.77E-02	1.38E-03	1.316	
Mo-92(n,2n)	(5_2)	fns_5min fng_heat fng_Mo	2.23E-01 2.14E-01 2.35E-01	1.12E-02 2.35E-02 2.83E-03	1.334 1.461 1.321	C/E(5)=1.003 C/E(5)=1.080 C/E(5)=0.977
Mo-92(n,3n)	5_3	fzk_ss316	2.92E-03	1.61E-03	1.677	
Mo-92(n,n'p)m/*(n,d+)m*	6	fns_7hour	1.99E-01	3.78E-02	0.710	/0.719 C/E(5)=0.951
Mo-92(n,n'α)	6	fzk_ss316	3.99E-03	2.39E-03	1.732	C/E(5)=0.430
Mo-92(n,γ)	(6)	MACS_30keV	7.20E-02	1.00E-02	0.844	
Mo-92(n,p)m	6	fns_7hour	6.37E-02	3.18E-03	0.943	C/E(5)=0.952
		fzk_ss316 fng_Mo	3.29E-02 5.49E-02	1.61E-03 2.09E-03	1.228 0.999	C/E(5)=1.211
Mo-92(n,p)	(5_1)	cf252_flux_1	1.68E-02	7.00E-04	0.761	
Mo-92(n,t) ***/(n,xt)***	(5_4/5_4)	fzk_ss316 d-Be	4.91E-04 4.05E-03	2.40E-05 4.87E-04	1.258 0.686	C/E(7)=1.025 /0.854 C/E(5)=0.703 C/E(7)=0.556
Mo-92(n,t)/*(n,t+)*	(5_1/5_1)	d-Be	3.70E-02	4.00E-03	0.061	/3.841 C/E(7)=0.061
Mo-92(n,α)	(6)	sneg_1 cf252_flux_1 fzk_ss316 fng_Mo	2.27E-02 4.20E-04 8.69E-03 2.68E-02	2.04E-03 2.00E-05 3.84E-04 2.33E-03	1.314 0.229† 1.432 1.000	
Mo-92(n,2α)m	5_0	d-Be2a	4.51E-04	2.80E-04	0.010	
Mo-92(n,pα)	5_3	fzk_ss316	1.51E-03	5.13E-04	0.553	
Mo-92(n,dα)m	5_0	fzk_ss316	1.48E-05	4.15E-06	0.119	
Mo-92(n,2nα)	(5_3)	fzk_ss316	1.30E-03	2.46E-04	0.409	
Mo-92(n,3nα)	5_0	fzk_ss316	1.17E-03	2.68E-04	0.026	
Mo-94(n,γ)	6	MACS_30keV	1.04E-01	2.00E-02	0.844	
Mo-95(n,3n)m	5_3	fzk_ss316	8.38E-03	1.39E-03	0.988	
Mo-95(n,γ)	6	MACS_30keV	2.90E-01	1.20E-02	1.116	
Mo-95(n,p)g	6	fns_7hour fng_vanad sneg_1 fng_Mo	2.71E-02 4.25E-02 3.73E-02 3.18E-02	2.44E-03 1.54E-02 3.32E-03 2.78E-03	1.232 0.619 0.977 1.052	C/E(5)=1.028 C/E(5)=1.055
Mo-95(n,p)m	6	cf252_flux_1 fng_Mo	1.44E-04 7.30E-03	1.44E-04 6.58E-04	0.517† 0.997	C/E(5)=0.569
		fzk_ss316	5.41E-03	7.03E-04	0.642†	
Mo-95(n,p)	(5_2)	cf252_flux_1	2.20E-02	2.00E-03	0.013	
Mo-96(n,n'p)/*(n,d+)*	(6)	fzk_ss316	9.30E-03	4.15E-04	1.541	/1.925
Mo-96(n,γ)	6	MACS_30keV	1.12E-01	8.00E-03	0.834	
Mo-96(n,p)	6	sneg_1 fng_Mo	2.08E-02 2.03E-02	2.08E-03 1.14E-03	1.159 1.075	
Mo-97(n,γ)	6	MACS_30keV	3.39E-01	1.40E-02	0.946	
Mo-98(n,γ)	6	cf252_flux_1 MACS_30keV	2.63E-02 9.90E-02	1.30E-03 7.00E-03	1.045 0.894	
Mo-98(n,p)m	5_2	fng_heat	6.18E-03	6.80E-04	0.610	C/E(5)=0.898
Mo-98(n,t)/*(n,xt)*	5_3	d-Be3	5.04E-04	1.63E-04	1.169	/1.262
Mo-98(n,α)	5_3	fns_7hour	8.36E-03	1.59E-03	0.741	C/E(5)=0.878
Mo-99(n,γ)	5_3	MACS_30keV	2.40E-01	4.00E-02	1.041	
Mo-100(n,2n)	6	fns_7hour	1.49E+0	4.04E-02	0.962	

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
		sneg_1 sneg_2 fng_vanad fzk_ss316 fzk_ss316 fng_Mo	1.53E+0 1.51E+0 1.12+E0 4.13E-01 3.28E-01 1.29E+0	1.22E-01 1.21E-01 3.63E-01 9.55E-03 1.31E-01 4.04E-02	0.990 0.989 0.988 1.063 1.337 1.086	C/E(5)=1.082
Mo-100(n,γ)	6	cf252_flux_1 MACS_30keV	1.48E-02 1.08E-01	1.11E-03 1.40E-02	0.956 0.655	
Mo-100(n,α)	5_2	fzk_ss316	8.16E-02	1.71E-02	0.018	
Tc-99(n,γ)	5_2	MACS_30keV	9.33E-01	4.70E-02	0.744	
Ru-96(n,2n)	6	fns_5min	5.45E-01	2.73E-02	0.940	C/E(5)=1.010 C/E(7)=0.980
Ru-96(n,γ)	6	MACS_30keV	2.07E-01	8.00E-03	1.107	
Ru-98(n,γ)	5_0	MACS_30keV	1.73E-01	3.60E-02	0.642	
Ru-99(n,γ)	5_3	MACS_30keV	6.31E-01	9.90E-02	0.923	
Ru-100(n,p)	6	fns_5min	3.05E-02	3.35E-03	0.821	
Ru-100(n,γ)	6	MACS_30keV	2.06E-01	1.30E-02	0.886	
Ru-101(n,γ)	6	MACS_30keV	9.90E-01	4.00E-02	0.813	
Ru-102(n,γ)	6	MACS_30keV	1.51E-01	7.00E-03	1.129	
Ru-102(n,p)m	6	fns_5min	6.75E-03	3.37E-04	1.020	
Ru-103(n,γ)	5_3	MACS_30keV	3.43E-01	5.20E-02	1.200	
Ru-104(n,γ)	6	MACS_30keV	1.54E-01	6.00E-03	0.963	
Rh-103(n,n′)m	5_2	fns_5min	7.55E-02	1.36E-02	3.846	C/E(5)=2.222
Rh-103(n,2n)g	5_2	rez_DF	7.05E-01	3.52E-02	0.272	
Rh-103(n,3n)m	5	rez_DF	5.51E-02	2.20E-03	1.450	
Rh-103(n,4n)	(5_3)	rez_DF	2.93E-04	1.17E-05	2.366	
Rh-103(n,γ)	(5_2)	fns_5min MACS_30keV	2.68E-02 8.11E-01	2.15E-03 1.40E-02	2.504 0.957	
Rh-103(n,p)	5_2	rez_DF	4.75E-03	1.90E-04	1.910	
Pd-102(n,γ)	5_0	MACS_30keV	3.69E-01	1.70E-02	0.408	
Pd-104(n,γ)	5_3	MACS_30keV	2.89E-01	2.90E-02	0.867	
Pd-105(n,γ)	6	MACS_30keV	1.20E+00	6.00E-02	0.891	
Pd-106(n,γ)	(6)	MACS_30keV	2.52E-01	2.50E-02	0.767	
Pd-106(n,t)/*(n,t+)*	$(5_0/5_3)$	d-Be	3.60E-02	6.00E-03	0.061	/0.630 C/E(5)=0.081
Pd-107(n,γ)	6	MACS_30keV	1.34E+00	6.00E-02	0.905	
Pd-108(n,2n)m	5_2	fns_5min	3.35E-01	1.68E-02	1.279	C/E(5)=1.251 C/E(7)=1.283
Pd-108(n,γ)	(6)	MACS_30keV	2.03E-01	2.00E-02	0.983	
Pd-108(n,p)m	6	fns_5min	6.17E-03	3.70E-04	1.316	
Pd-110(n,2n)m	6	fns_5min	3.66E-01	2.19E-02	1.268	C/E(5)=1.112
Pd-110(n,2n)	(6)	fns_5min	1.46E+0	8.73E-02	1.156	
Pd-110(n,γ)	(5_2)	MACS_30keV	1.46E-01	2.00E-02	0.679	
Ag-107(n,2n)g	6	fns_5min fng_heat	6.94E-01 7.45E-01	3.47E-02 8.19E-02	0.901 0.870	C/E(5)=0.909
Ag-107(n,γ)	(6)	MACS_30keV	7.92E-01	3.00E-02	1.020	
Ag-107(n,t)/*(n,xt)*	$5_2/5_2$	d-Be3 d-Be	4.99E-04 4.54E-03	1.59E-04 8.26E-04	2.782† 1.258	/3.058 /2.079
Ag-107(n,h)/*(n,h+)*	$(5_0/5_0)$	d-Be2a d-Be2a	3.30E-03 2.24E-03	6.61E-04 3.57E-04	0.180 0.265	/0.209 /0.308
Ag-109(n,2n)g	6	fns_5min fng_heat	5.95E-01 7.57E-01	3.57E-02 8.32E-02	1.117 0.909	C/E(5)=1.067
Ag-109(n,γ)	(6)	MACS_30keV	7.88E-01	3.00E-02	0.961	
Ag-110m(n,γ)	(5_0)	MACS_30keV	1.17E+00	1.88E-01	0.573	
Cd-106(n,γ)	5_2	MACS_30keV	3.02E-01	2.40E-02	1.470	
Cd-108(n,γ)	5_4	MACS_30keV	2.02E-01	9.00E-03	0.991	
Cd-110(n,γ)	(5_2)	cf252_flux_1 MACS_30keV	2.04E-01 2.37E-01	7.00E-03 2.00E-03	0.194 0.815	
Cd-111(n,γ)	5_2	MACS_30keV	7.54E-01	1.20E-02	0.733	

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
Cd-112(n,2n)m	6	fns_5min fng_heat	5.28E-01 6.89E-01	2.64E-02 2.07E-02	1.048 0.835	
Cd-112(n,γ)	(5_2)	MACS_30keV	1.88E-01	1.70E-02	0.719	
Cd-113(n,γ)	6	MACS_30keV	6.67E-01	1.10E-02	0.974	
Cd-113m(n,γ)	5_0	MACS_30keV	6.82E-01	3.41E-01	0.548	
Cd-114(n,p)	(6)	fns_5min	7.78E-03	3.89E-04	1.053	
Cd-114(n,γ)	(6)	MACS_30keV	1.29E-01	1.30E-03	1.112	
Cd-115(n,γ)	5_0	MACS_30keV	2.90E-01	6.20E-02	1.750	
Cd-115m(n,γ)	5_0	MACS_30keV	6.01E-01	2.00E-01	0.744	
Cd-116(n,γ)	(5_2)	cf252_flux_1 MACS_30keV	3.80E-02 7.48E-02	1.40E-02 9.00E-04	0.261 0.920	
In-113(n,2n)m	5_2	cf252_flux_1	3.75E-03	1.85E-03	0.307	
In-113(n,2n)	(5_2)	cf252_flux_1	9.50E-03	4.75E-03	0.150	
In-113(n,γ)	(6)	MACS_30keV	7.87E-01	7.00E-02	0.903	
In-114m(n,γ)	5_3	MACS_30keV	2.60E+00	1.30E+00	0.907	
In-115(n,2n)g	5_2	fns_5min	1.99E-01	9.93E-03	1.206	C/E(5)=1.192
In-115(n,n′α)	(5_2)	d-Be2a	3.66E-03	6.45E-04	3.179	C/E(7)=3.207
In-115(n,γ)m	5_1	cf252_flux_1 cf252_flux_1 MACS_30keV	1.24E-01 1.39E-01 6.89E-01	3.60E-03 6.00E-02 1.70E-02	0.612 0.546 0.633	
In-115(n,γ)	(5_2) (6)	fns_5min MACS_30keV	5.18E-02 7.06E-01	2.59E-03 7.00E-02	3.328 0.942	
In-115(n,t)/*(n,xt)*	(6)	d-Be	3.90E-03	7.99E-04	1.032	/1.860
In-115(n,h)g/*(n,h+)g*	5_4/5_4	d-Be2a	2.15E-04	6.45E-05	0.376	/0.874
In-115(n,h)/*(n,h+)*	(5_1/5_1)	d-Be2a	1.04E-03	2.14E-04	0.258	/0.280
In-115(n,α)	5_2	d-Be2a	2.58E-03	6.45E-04	1.615	
Sn-112(n,2n)	6	fng_heat fng_Sn	1.67E+0 1.17E+0	2.25E-01 1.05E-01	0.666† 0.947	
Sn-112(n,γ)	(6)	MACS_30keV	2.10E-01	1.20E-02	0.865	
Sn-114(n,2n)	(5_2)	fng_Sn	1.94E+0	9.37E-02	0.620	
Sn-114(n,n′p)m/*(n,d+)m*	5_3/5_3	fng_Sn	4.23E-03	9.91E-04	0.362	/0.514
Sn-114(n,γ)	6	MACS_30keV	1.34E-01	1.80E-03	0.937	
Sn-115(n,γ)	6	MACS_30keV	3.42E-01	8.70E-03	1.021	
Sn-116(n,γ)	(6)	MACS_30keV	9.16E-02	6.00E-04	0.915	
Sn-116(n,p)	(5_3)	fng_Sn	2.47E-02	7.41E-04	0.997	
Sn-116(n,n′p)m/*(n,d+)m*	5_0/5_0	fng_Sn	1.10E-03	1.05E-04	0.181	/0.487
Sn-117(n,γ)	(6)	MACS_30keV	3.19E-01	4.80E-03	0.981	
Sn-117(n,p)m	5_2	fng_Sn	5.16E-03	6.39E-04	0.595	
Sn-117(n,p)	(5_2)	fng_Sn	1.98E-02	6.55E-04	0.705	
Sn-118(n,2n)m	5_2	fns_7hour	9.55E-01	1.05E-01	0.795	
		fng_Sn	1.32E+00	3.27E-02	0.572	
Sn-118(n,γ)	(6)	MACS_30keV	6.21E-02	6.00E-04	0.958	
Sn-118(n,p)m	6	fns_5min	6.69E-03	4.02E-04	0.910	C/E(5)=0.940
Sn-118(n,α)g	5_2	fng_Sn	1.23E-03	2.37E-04	0.582	
Sn-119(n,γ)	6	MACS_30keV	1.80E-01	1.00E-02	1.128	
Sn-120(n,2n)m	6	fns_7hour	5.77E-01	1.15E-01	1.133	
Sn-120(n,γ)	(6)	MACS_30keV	3.60E-02	5.00E-04	0.900	
Sn-120(n,p)m	5_2	fns_5min	4.91E-03	4.42E-04	0.680	C/E(5)=0.952
Sn-120(n,α)g	5_1	fng_Sn	3.84E-04	5.32E-05	0.610	
Sn-120(n,α)m	5_2	fng_Sn	3.90E-04	6.11E-05	0.661	
Sn-121(n,γ)	5_3	MACS_30keV	1.67E-01	3.00E-02	0.935	
Sn-122(n,γ)	(5_1)	MACS_30keV	2.19E-02	1.50E-03	0.535	
Sn-124(n,2n)g	6	fns_7hour fng_Sn	1.25E+0 2.21E+0	1.25E-01 8.96E-01	0.952 0.529†	
Sn-124(n,2n)m	6	fns_5min fng_Sn	4.15E-01 5.60E-01	2.49E-02 1.71E-02	1.150 0.881	C/E(5)=1.112
Sn-124(n,γ)	(5_2)	MACS_30keV	1.20E-02	1.20E-03	1.389	
Sn-125(n,γ)	5_0	MACS_30keV	5.90E-02	9.00E-03	1.349	

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
Sn-126(n,γ)	5_0	MACS_30keV	1.00E-02	4.00E-03	0.769	
Sb-121(n,2n)g	6	fns_5min	7.79E-01	4.67E-02	1.205	
Sb-121(n,γ)	(6)	MACS_30keV	5.32E-01	1.60E-02	0.948	
Sb-121(n,t)/*(n,xt)*	(5_3/5_3)	d-Be	4.50E-03	1.36E-03	1.057	/1.944
Sb-122(n,γ)	5_3	MACS_30keV	9.94E-01	1.62E-01	0.789	
Sb-123(n,γ)	(6)	MACS_30keV	3.03E-01	9.00E-03	1.156	
Sb-125(n,γ)	(5_3)	MACS_30keV	2.60E-01	7.00E-02	0.844	
Te-120(n,γ)	(5_0)	MACS_30keV	5.38E-01	2.60E-02	0.676	
Te-122(n,γ)	(6)	MACS_30keV	2.95E-01	3.00E-02	0.958	
Te-123(n,γ)	(6)	MACS_30keV	8.32E-01	8.00E-02	0.756	
Te-124(n,γ)	(6)	MACS_30keV	1.55E-01	2.00E-03	0.885	
Te-125(n,γ)	6	MACS_30keV	4.31E-01	4.00E-03	0.861	
Te-126(n,γ)	(6)	MACS_30keV	8.13E-02	1.40E-03	1.014	
Te-128(n,γ)	(5_2)	MACS_30keV	4.44E-02	1.30E-03	0.654	
Te-128(n,t)/*(n,t+)*	(5_0/5_3)	d-Be	2.50E-02	6.00E-03	0.069	/0.528 C/E(5)=0.094
Te-130(n,2n)g	6	fns_5min	5.64E-01	4.51E-02	1.042	
Te-130(n,γ)	(6)	MACS_30keV	1.47E-02	2.80E-03	0.950	
I-127(n,2n)	6	cf252_flux_1	2.07E-03	7.00E-05	1.085	
I-127(n,γ)	5_2 6	fns_5min MACS_30keV	1.93E-02 6.35E-01	1.16E-03 3.00E-02	1.695 0.965	C/E(5)=1.666
I-127(n,h)/*(n,h+)*	5_3/5_3	d-Be2a	5.59E-04	1.08E-04	0.588	/0.627
I-127(n,α)/*(n,α+)*	(5_0/5_3)	d-Be2a	1.93E-03	3.23E-04	2.738	/2.924
I-129(n,γ)	(6)	MACS_30keV	4.41E-01	2.20E-02	0.823	
Xe-124(n,γ)	(5_0)	MACS_30keV	6.44E-01	8.30E-02	0.607	
Xe-126(n,γ)	(5_0)	MACS_30keV	3.59E-01	5.10E-02	0.760	
Xe-128(n,γ)	(5_2)	MACS_30keV	2.63E-01	3.70E-03	0.651	
Xe-129(n,γ)	5_2	MACS_30keV	6.17E-01	1.20E-02	0.724	
Xe-130(n,γ)	(6)	MACS_30keV	1.32E-01	2.10E-02	1.021	
Xe-131(n,γ)	5_3	MACS_30keV	3.40E-01	6.50E-02	0.773	
Xe-132(n,γ)	(5_0)	MACS_30keV	6.46E-02	5.30E-03	0.655	
Xe-133(n,γ)	(5_0)	MACS_30keV	1.27E-01	3.40E-02	0.719	
Xe-134(n,γ)	(5_3)	MACS_30keV	2.02E-02	1.70E-03	1.000	
Xe-136(n,γ)	5_0	MACS_30keV	9.10E-04	8.00E-05	0.846	
Cs-133(n,2n)	6	fns_5min	1.06E+0	8.46E-02	1.235	C/E(5)=1.190
Cs-133(n,γ)	(6)	MACS_30keV	5.09E-01	2.10E-02	0.915	
Cs-133(n,h)/*(n,h+)*	5_4/5_4	d-Be2a	4.78E-04	9.02E-05	0.611	/0.648
Cs-134(n,γ)	(6)	MACS_30keV	7.24E-01	6.50E-02	0.764	
Cs-135(n,γ)	(6)	MACS_30keV	1.60E-01	1.00E-02	1.127	
Ba-130(n,γ)	(5_2)	MACS_30keV	7.46E-01	3.40E-02	0.877	
Ba-132(n,2n)	(6)	fns_7hour	1.47E+00	7.51E-01	0.943	C/E(5)=1.042
Ba-132(n,γ)	(5_0)	MACS_30keV	3.97E-01	1.60E-01	0.591	
Ba-134(n,2n)m	6	fns_7hour	7.14E-01	9.99E-02	1.075	
Ba-134(n,γ)	(5_2) (6)	cf252_flux_1 MACS_30keV	2.55E-01 1.76E-01	2.80E-02 5.60E-03	0.197 1.139	
Ba-134(n,t)/*(n,t+)*	5_0/5_3	d-Be	1.50E-02	2.00E-03	0.228	/1.269
Ba-135(n,γ)	(6)	MACS_30keV	4.55E-01	1.50E-02	0.731	
Ba-136(n,2n)m	6	fns_7hour	8.90E-01	1.25E-01	1.095	C/E(5)=1.076
Ba-136(n,γ)	(5_2)	cf252_flux_1 MACS_30keV	2.93E-01 6.12E-02	2.90E-02 2.00E-03	0.049 0.812	C/E(5)=0.197
Ba-137(n,γ)	6	MACS_30keV	7.63E-02	2.40E-02	0.846	
Ba-138(n,2n)m	6	fns_5min	6.85E-01	5.48E-02	1.183	C/E(5)=1.099
Ba-138(n,γ)	6 6	cf252_flux_1 cf252_flux_1 MACS_30keV	3.80E-03 1.30E-03 4.00E-03	4.00E-04 2.60E-04 2.00E-04	0.416† 1.216 0.920	
Ba-138(n,p)	(6)	fns_5min	2.70E-03	2.70E-04	1.099	
La-138(n,γ)	5_0	MACS_30keV	4.19E-01	5.90E-02	0.669	
La-139(n,γ)	6	tud_Er	2.48E-03	1.56E-04	0.950	

Reaction	QS	**Spectrum**	**σ (b)**	**Δσ (b)**	**C/E**	**Comment**
		MACS_30keV	3.24E-02	3.10E-03	1.084	
La-139(n,p)	6	fns_5min tud_Er	3.66E-03 4.00E-03	1.46E-03 9.53E-04	1.163 0.970	
La-139(n,t)/*(n,xt)*	(6)	d-Be	7.00E-03	1.50E-03	0.453	/0.909 C/E(5)=0.469
La-139(n,h)/*(n,h+)*	$5_3/5_3$	d-Be2a d-Be2a	4.52E-04 4.65E-04	8.60E-05 6.15E-05	0.502 0.488	/0.525 /0.511
La-139(n,α)/*(n,α+)*	(6)	d-Be2a tud_Er	2.04E-03 2.05E-03	3.23E-04 2.05E-03	1.387 1.090	/1.520 C/E(5)=1.205
Ce-134(n,γ)	(5_3)	MACS_30keV	9.67E-01	3.51E-01	0.220	
Ce-135(n,γ)	5_0	MACS_30keV	1.32E+00	2.60E-01	0.708	
Ce-136(n,γ)	(5_3)	MACS_30keV	3.28E-01	2.10E-02	1.431	
Ce-137(n,γ)	5_3	MACS_30keV	9.73E-01	2.56E-01	0.795	
Ce-138(n,γ)	(5_3)	MACS_30keV	1.79E-01	5.00E-03	0.530	
Ce-139(n,γ)	5_0	MACS_30keV	2.14E-01	1.20E-01	0.524	
Ce-140(n,2n)m	6	fns_5min	6.86E-01	4.11E-02	1.099	
Ce-140(n,γ)	6	MACS_30keV	1.00E-02	4.00E-04	0.810	
Ce-140(n,α)m	6	fns_5min	2.85E-03	1.71E-04	1.042	
Ce-141(n,γ)	6	MACS_30keV	7.60E-02	3.30E-02	1.055	
Ce-142(n,γ)	5_1	MACS_30keV	2.80E-02	1.00E-03	0.623	
Ce-142(n,p)	6	fns_5min	4.81E-03	4.81E-04	1.053	
Pr-141(n,2n)	5_2	fns_5min	1.03E+0	8.21E-02	1.370	
Pr-141(n,γ)	(6)	MACS_30keV	1.11E-01	1.40E-03	0.946	
Pr-141(n,t)/*(n,xt)*	(6)	d-Be	9.40E-03	2.00E-03	0.794	/1.135 C/E(5)=0.805 C/E(7)=0.810
Pr-141(n,t)/*(n,t+)*	(6)	d-Be	2.30E-02	6.00E-03	0.325	/1.186 C/E(7)=0.331[†]
Pr-142(n,γ)	5_0	MACS_30keV	4.15E-01	1.78E-01	0.659	
Pr-143(n,γ)	5_3	MACS_30keV	3.50E-01	8.60E-02	0.937	
Nd-142(n,2n)m	6	fns_5min	4.22E-01	5.49E-02	1.333	
Nd-142(n,γ)	6	MACS_30keV	3.50E-02	7.00E-04	1.274	
Nd-143(n,γ)	6	MACS_30keV	2.45E-01	3.00E-03	0.996	
Nd-144(n,γ)	5_2	MACS_30keV	8.13E-02	6.50E-03	0.691	
Nd-145(n,γ)	6	MACS_30keV	4.25E-01	5.00E-03	0.910	
Nd-146(n,γ)	6	MACS_30keV	9.12E-02	1.00E-03	1.016	
Nd-146(n,h)/*(n,h+)*	$5_3/5_3$	d-Be2a	2.58E-04	8.60E-05	0.719	/0.747
Nd-146(n,α)/*(n,α+)*	6	d-Be2a	2.15E-03	3.23E-04	1.350	/1.448
Nd-147(n,γ)	5_3	MACS_30keV	5.44E-01	9.00E-02	0.828	
Nd-148(n,γ)	6	MACS_30keV	1.47E-01	2.00E-03	0.813	
Nd-150(n,γ)	6	MACS_30keV	1.59E-01	1.00E-02	0.873	
Nd-150(n,2n)	5_2	fns_5min	8.08E-01	1.13E-01	1.829	C/E(5)=1.812
Pm-147(n,γ)	(5_3)	MACS_30keV	7.09E-01	1.00E-01	1.355	
Pm-148(n,γ)	5_2	MACS_30keV	2.97E+00	5.00E-01	0.413	
Pm-148m(n,γ)	5_0	MACS_30keV	2.45E+00	1.20E+00	1.414	
Pm-149(n,γ)	5_2	MACS_30keV	2.15E+00	7.50E-01	0.420	
Sm-144(n,2n)m	6	fns_5min	4.61E-01	5.07E-02	1.263	C/E(5)=0.984 C/E(7)=1.136
Sm-144(n,2n)	(6)	fns_5min	1.08E+0	1.19E-01	1.165	C/E(5)=1.148 C/E(7)=1.111
Sm-144(n,γ)	6	MACS_30keV	9.20E-02	6.00E-03	0.951	
Sm-147(n,γ)	6	MACS_30keV	9.74E-01	1.00E-02	1.061	
Sm-148(n,γ)	6	MACS_30keV	2.41E-01	2.00E-03	0.902	
Sm-149(n,γ)	6	MACS_30keV	1.82E+00	1.70E-02	1.034	
Sm-150(n,γ)	6	MACS_30keV	4.22E-01	4.00E-03	0.989	
Sm-150(n,p)	6	fng_ScSmGd	6.05E-03	7.26E-04	1.245	
Sm-151(n,γ)	5_0	MACS_30keV	3.03E+00	6.80E-02	0.723	
Sm-152(n,γ)	6	MACS_30keV	4.73E-01	4.00E-03	0.929	
Sm-152(n,α)	6	fng_ScSmGd	2.55E-03	3.06E-04	0.803	
Sm-153(n,γ)	5_3	MACS_30keV	1.10E+00	1.75E-01	0.975	

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
Sm-154(n,2n)	6	fng_ScSmGd	1.84E+00	6.42E-02	0.939	
Sm-154(n,γ)	6	MACS_30keV	2.06E-01	1.20E-02	1.101	
Eu-151(n,γ)m	5_2	fns_5min MACS_30keV	1.01E-01 1.56E+00	1.51E-02 1.24E-01	3.452 0.852	C/E(5)=2.609
Eu-151(n,γ)	(6)	MACS_30keV	3.48E+00	7.70E-02	1.110	
Eu-152(n,γ)	5_0	MACS_30keV	7.60E+00	1.20E+00	0.622	
Eu-153(n,γ)	(6)	MACS_30keV	2.26E+00	4.60E-02	1.158	
Eu-154(n,γ)	5_0	MACS_30keV	4.42E+00	6.70E-01	0.617	
Eu-155(n,γ)	5_3	MACS_30keV	1.32E+00	8.40E-02	0.767	
Gd-152(n,γ)	6	MACS_30keV	1.05E+00	1.70E-02	0.845	
Gd-153(n,γ)	5_0	MACS_30keV	4.55E+00	7.00E-01	0.555	
Gd-154(n,γ)	5_2	MACS_30keV	1.03E+00	1.20E-01	0.677	
Gd-155(n,γ)	6	MACS_30keV	2.65E+00	3.00E-01	1.020	
Gd-156(n,γ)	6	MACS_30keV	6.15E-01	5.00E-03	0.834	
Gd-157(n,γ)	6	MACS_30keV	1.37E+00	1.50E-01	1.022	
Gd-158(n,γ)	6	MACS_30keV	3.24E-01	3.00E-03	0.808	
Gd-158(n,p)	6	fng_ScSmGd	3.17E-03	1.46E-04	1.170	
Gd-158(n,α)	5_2	fng_ScSmGd	1.11E-03	6.67E-05	2.005	
Gd-160(n,2n)	5_2	fns_5min fng_ScSmGd	1.20E+0 1.96E+0	2.27E-01 6.08E-02	1.209 0.779	
Gd-160(n,γ)	6 5_2	fns_5min MACS_30keV	3.28E-03 1.54E-01	6.23E-04 2.00E-02	4.106 1.326	C/E(5)=1.563 C/E(7)=1.818
Gd-160(n,p)	5_3	fns_5min	2.24E-03	5.61E-04	0.885	C/E(5)=0.942
Tb-159(n,2n)m	5_4	fns_5min	3.69E-01	6.43E-01	1.351	
Tb-159(n,γ)	6	MACS_30keV	1.58E+00	1.50E-01	1.010	
Tb-159(n,p)	6	fns_5min	4.68E-03	4.40E-02	1.042	
Tb-159(n,t)/*(n,xt)*	$5_3/5_3$	d-Be	7.90E-03	2.00E-03	0.628	/1.127
Tb-159(n,α)/*(n,α+)*	6	d-Be2a	1.55E-03	2.58E-04	2.827	/2.948
Tb-160(n,γ)	5_0	MACS_30keV	3.24E+00	5.10E-01	0.586	
Dy-156(n,2n)	6	fng_Dy	1.53E+0	8.09E-02	1.120	
Dy-156(n,γ)	6	MACS_30keV	1.61+E00	9.30E-02	0.854	
Dy-158(n,2n)	6	fng_Dy	1.92E+0	7.28E-02	0.969	
Dy-158(n,γ)	5_3	MACS_30keV	1.06E+00	4.00E-01	0.765	
Dy-160(n,γ)	6	MACS_30keV	8.90E-01	1.20E-02	0.918	
Dy-161(n,γ)	6	MACS_30keV	1.96E+00	1.90E-02	0.896	
Dy-162(n,γ)	6	MACS_30keV	4.96E-01	4.00E-03	0.827	
Dy-162(n,p)	6	fns_5min fng_Dy	2.14E-03 4.08E-03	2.79E-04 1.92E-04	1.811[†] 1.000	C/E(5)=1.482
Dy-162(n,t)/*(n,t+)*	$5_0/5_3$	d-Be	1.60E-02	3.30E-03	0.218	/1.039
Dy-163(n,γ)		MACS_30keV	1.11E+00	1.10E-02	0.666	
Dy-163(n,p)	6	fng_Dy	3.33E-03	1.37E-04	0.957	
Dy-164(n,γ)g	5_4	fng_Dy	2.97E-02	1.34E-03	0.752	
Dy-164(n,γ)m	6	fns_5min	8.89E-02	1.24E-02	1.351	C/E(5)=0.852
Dy-164(n,γ)	(5_2)	fns_5min MACS_30keV	6.89E-02 2.12E-01	1.52E-02 3.00E-03	86.629 0.852	C/E(5)=2.767 C/E(7)=2.783
Dy-164(n,p)	5_2	fns_5min	1.64E-03	1.81E-04	1.515	C/E(5)=1.432
Ho-163(n,γ)	(5_0)	MACS_30keV	2.13E+00	9.50E-02	0.643	
Ho-165(n,2n)	(6)	fns_5min	1.44E+0	2.01E-01	1.102	C/E(5)=0.529 C/E(7)=1.191
Ho-165(n,2n)m	6	fns_5min	5.64E-01	7.89E-02	1.654	C/E(5)=0.485 C/E(7)=1.136
Ho-165(n,γ)	(5_2)	MACS_30keV	1.18E+00	1.00E-01	1.315	
Ho-165(n,t)/***(n,xt)***	$5_0/5_3$	d-Be	9.80E-03	2.00E-03	0.484	/0.889
Ho-165(n,h)/*(n,h+)*	$5_3/5_3$	d-Be2a	1.72E-04	4.30E-05	0.694	/0.733
Ho-165(n,α)/*(n,α+)*	6	d-Be2a	1.85E-03	3.23E-04	1.026	/1.112
Er-162(n,2n)	6	tud_Er	1.42E+0	1.19E-01	1.080	
Er-162(n,γ)	5_3	MACS_30keV	6.63E+00	1.24E-01	0.785	

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
Er-164(n,2n)	5_2	tud_Er	1.84E+00	1.73E-01	0.770	
Er-164 (n,γ)	5_0	MACS_30keV	1.08E+00	5.10E-02	0.590	
Er-166(n,2n)	5_2	fns_5min	3.75E-01	1.39E-01	4.611	C/E(5)=1.267
Er-166(n,γ)	(6)	MACS_30keV	5.36E-01	5.60E-02	1.170	
Er-166(n,p)g	6	tud_Er	3.50E-03	2.20E-04	0.893	
Er-167(n,γ)	6	MACS_30keV	1.43E+00	1.43E-01	0.942	
Er-167(n,p)	6	tud_Er	2.87E-03	1.61E-04	0.942	
Er-168(n,γ)	6	MACS_30keV	3.38E-01	4.40E-02	0.927	
Er-168(n,p)	6	fns_5min tud_Er	2.47E-03 2.39E-03	2.47E-04 1.79E-04	1.020 0.970	C/E(5)=1.010
Er-169(n,γ)	5_0	MACS_30keV	6.53E-01	1.14E-01	0.493	
Er-170(n,γ)	6	MACS_30keV	1.70E-01	7.00E-03	1.133	
Er-170(n,p)g	5_4	tud_Er	1.52E-03	2.84E-04	0.640	
Er-170(n,d)/*(n,d+)*	6	tud_Er	1.69E-04	3.97E-05	0.703	/0.890
Tm-169(n,2n)	6	fns_5min	1.98E+0	4.75E-01	0.877	
Tm-170(n,γ)	5_3	MACS_30keV	1.13E+00	5.60E-02	0.898	
Tm-171(n,γ)	5_3	MACS_30keV	1.87E+00	3.30E-01	1.024	
Tm-169(n,γ)	5_0	MACS_30keV	4.86E-01	1.44E-01	1.481	
Yb-168(n,2n)	6	fns_5min	1.50E+0	1.08E+0	1.124	
Yb-168(n,γ)	(5_0)	MACS_30keV	1.21E+00	4.90E-02	0.689	
Yb-170(n,γ)	6	MACS_30keV	7.18E-01	7.00E-03	0.857	
Yb-171(n,γ)	6	MACS_30keV	1.21E+00	1.20E-02	1.005	
Yb-172(n,γ)	6	MACS_30keV	3.41E-01	3.00E-03	1.033	
Yb-173(n,γ)	6	MACS_30keV	7.57E-01	7.00E-03	1.011	
Yb-174(n,γ)	6	MACS_30keV	1.51E-01	2.00E-03	1.003	
Yb-174(n,p)	6	fns_5min	2.22E-03	4.43E-04	1.235	
Yb-174(n,h)/*(n,h+)*	5_0/5_3	d-Be2a	2.15E-04	5.38E-05	0.411	/0.430
Yb-174(n,α)/*(n,α+)*	6	d-Be2a	1.93E-03	3.23E-04	1.686	/1.744
Yb-175(n,γ)	(5_0)	MACS_30keV	5.58E-01	8.30E-02	1.140	
Yb-176(n,γ)	(6)	MACS_30keV	1.16E-01	2.00E-03	0.836	
Lu-175(n,2n)g	5_2	rez_DF	5.94E-01	1.78E-02	0.634	
Lu-175(n,3n)	5_2	rez_DF	1.68E-01	5.04E-03	1.465	
Lu-175(n,4n)	(5_3)	rez_DF	1.74E-02	5.23E-04	1.362	C/E(5)=1.184
Lu-175(n,γ)m	6	fns_5min MACS_30keV	5.01E-02 1.04E+00	1.00E-02 3.00E-02	1.220 0.753	C/E(5)=1.203
Lu-175(n,γ)	(6)	MACS_30keV	1.22E+00	3.00E-02	0.961	
Lu-176(n,γ)	(6)	MACS_30keV	1.64E+00	1.40E-02	0.837	
Hf-174(n,2n)	6	fng_hafnium	1.86E+0	3.73E-01	0.942	C/E(5)=1.000
Hf-174(n,γ)	6	MACS_30keV	9.84E-01	4.6E-02	0.807	
Hf-176(n,2n)	6	fng_hafnium	1.75E+0	1.96E-01	1.024	
Hf-176(n,γ)	(6)	MACS_30keV	6.26E-01	1.10E-02	0.712	
Hf-177(n,n′)n	5_3	fng_heat	4.42E-03	7.07E-04	1.270	C/E(5)=1.124
Hf-177(n,γ)	(6)	MACS_30keV	1.54E+00	1.20E-02	0.802	
Hf-178(n,γ)	(6)	MACS_30keV	3.19E-01	3.00E-03	0.845	
Hf-178(n,p)m	6	fng_hafnium	5.94E-04	1.08E-04	1.039	
Hf-178(n,p)	(6)	fng_hafnium	3.67E-03	1.18E-03	0.781	
Hf-179(n,γ)	(6)	MACS_30keV	9.22E-01	8.00E-03	0.962	
Hf-179(n,p)	5_2	fng_hafnium	1.08E-02	2.51E-03	0.599	
Hf-180(n,n′)m	6	fng_hafnium	1.14E-02	6.65E-04	1.948	C/E(5)=0.987
Hf-180(n,2n)m	6	fns_5min fng_heat	5.42E-01 6.29E-01	3.25E-02 1.01E-01	0.988 0.868	
Hf-180(n,γ)	5_2	fng_hafnium MACS_30keV	9.28E-03 1.57E-01	1.51E-03 2.00E-03	0.507 0.897	
Hf-180(n,p)	6	fns_5min fng_hafnium fng_heat	1.20E-03 3.87E-03 3.85E-03	7.18E-05 9.36E-04 6.16E-04	1.961† 0.614 0.640	
Hf-181(n,γ)	(5_3)	MACS_30keV	1.94E-01	3.10E-02	1.124	
Hf-182(n,γ)	5_3	MACS_30keV	1.41E-01	8.00E-03	0.908	

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
Ta-179(n,γ)	(5_3)	MACS_30keV	1.33E+00	4.22E-01	0.749	
Ta-181(n,γ)	(6)	MACS_30keV	2.36E+00	5.80E-01	0.849	
		MACS_30keV	1.47E+00	1.10E-01	1.444	
Ta-181(n,2n)g	6	fns_7hour	7.93E-01	7.93E-02	1.409	C/E(5)=1.376
		fns_5min	1.05E+0	1.37E-01	0.990	
		fng_Ta	1.01E+0	2.32E-02	1.036	C/E(5)=1.009
		tud_Ta	8.11E-01	2.08E-01	1.227	C/E(5)=1.190
		rez_DF	2.92E-01	8.07E-03	1.024	C/E(5)=1.008
		rez_DF	3.30E-01	3.99E-03	0.906	
Ta-181(n,n′α)m	5_3	rez_DF	3.00E-05	1.23E-06	3.138	C/E(5)=0.660
Ta-181(n,n′α)	(5_3)	rez_DF	4.91E-04	6.61E-06	2.615	C/E(5)=0.314
Ta-181(n,4n)m	5_0	rez_DF	1.25E-02	2.36E-04	0.255	
Ta-181(n,γ)n	6	fng_Ta	1.20E-04	4.13E-05	0.521	
Ta-181(n,γ)	(6)	fng_eurofer	1.19E+0	1.79E-01	1.118	
		cf252_flux_1	1.20E-01	6.50E-03	0.835	
		cf252_flux_1	8.92E-02	1.07E-03	1.122	
		fng_Ta	4.21E-02	2.90E-03	0.876	C/E(5)=0.882
		rez_DF	2.30E-01	3.27E-03	0.296†	
		rez_DF	3.38E-02	2.91E-04	2.018†	
		fns_7hour	1.36E-02	2.85E-03	0.803	C/E(7)=0.734
		MACS_30keV	7.66E-01	1.50E-02	0.921	
Ta-181(n,p)	6	fns_7hour	4.43E-03	9.31E-04	0.735	
		fng_Ta	3.40E-03	4.31E-04	0.978	
		tud_Ta	2.94E-03	3.85E-04	1.010	
		rez_DF	1.74E-03	1.65E-05	1.126	
Ta-181*(n,n'p)m*/(n,d+)m	$5_4/5_0$	fng_Ta	1.61E-04	3.06E-05	1.030	/4.758
		tud_Ta	1.37E-04	1.61E-05	0.948	/4.831
		rez_DF	2.50E-03	3.97E-04	0.447	/0.620
		rez_DF	2.00E-03	3.06E-05	0.559	/0.776 C/E(5)=0.719
Ta-181(n,t)n	5_3	rez_DF	2.83E-06	6.01E-08	0.846	
Ta-181(n,t)/*(n,xt)*	(6)	d-Be3	5.90E-04	2.40E-04	0.694	/0.859 C/E(5)=1.531
		d-Be	4.50E-03	1.30E-03	0.528	/1.156 C/E(5)=0.761
Ta-181(n,h)/*(n,h+)*	$5_4/5_4$	d-Be2a	9.20E-05	2.59E-05	1.049	/1.119
Ta-181(n,α)g	5_2	fng_Ta	1.01E-03	4.04E-04	0.440	
Ta-181(n,α)m	6	fng_Ta	2.31E-04	2.77E-05	1.017	C/E(5)=1.013
		tud_Ta	2.20E-04	2.30E-05	0.925	
Ta-182(n,γ)	5_3	MACS_30keV	1.12E+00	1.80E-01	0.935	
W-180(n,2n)m	6	fzk_2	8.70E-02	2.61E-02	1.117	
W-180(n,3n)	5_3	fzk_2	1.71E-02	2.56E-03	1.003	
W-180(n,γ)	6	MACS_30keV	6.60E-01	5.30E-02	0.903	
W-182(n,2n)	6	fns_7hour	1.58E+0	2.21E-01	1.221	
		fng_tung	1.37E+0	1.75E-01	1.153	
		fzk_2	5.39E-01	7.24E-02	0.750	
		fng_eurofer	1.44E+0	1.66E-01	1.106	
W-182(n,γ)	(6)	MACS_30keV	2.74E-01	8.00E-02	0.960	
W-182(n,p)	(6)	sneg_1	6.30E-03	2.02E-03	0.852	C/E(5)=0.928
		fng_tung	3.73E-03	6.19E-04	1.062	
		sneg_1	44.4E-03	3.02E-04	1.028	
		sneg_2	3.87E-03	8.12E-04	1.067	
		fzk_ss316	2.92E-02	3.80E-03	0.174†	C/E(5)=0.167
		fzk_2	7.10E-04	1.06E-04	1.201	
		rez_DF	2.75E-03	1.10E-04	1.318	
W-182(n,α)n/*(n,α+)n*	6	rez_DF	2.48E-05	1.81E-06	0.320	/0.320
W-183(n,γ)	6	MACS_30keV	5.15E-01	1.50E-02	0.931	
W-183(n,p)	5_2	sneg_1	4.42E-03	3.45E-04	1.465	
		sneg_2	4.75E-03	4.51E-04	1.119	
		fng_f82h	3.15E-03	2.71E-04	1.647	
W-183(n,α)m	6	fzk_2	1.80E-05	3.60E-06	0.778	
/(n,α+)m		rez_DF	2.23E-05	6.67E-07	2.500†	/2.502
W-184*(n,n'p)*/(n,d+)	$5_3/5_3$	fzk_ss316	9.80E-03	1.20E-03	0.473	/0.651 C/E(5)=0.658

Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
		rez_DF	2.68E-03	7.38E-05	1.226	/1.739
		rez_DF	2.65E-03	1.35E-04	1.239	/1.758
W-184(n,γ)	(6)	MACS_30keV	2.23E-01	5.00E-02	0.898	
W-184(n,p)	6	fns_7hour	2.25E-03	1.58E-04	1.136	C/E(5)=1.064
		fng_tung	2.63E-03	2.28E-04	0.911	
		fng_f82h	1.98E-03	2.94E-04	1.276	
		sneg_1	2.78E-03	1.80E-04	1.173	
		fzk_ss316	9.08E-04	3.13E-04	4.057†	
		fzk_2	6.29E-04	9.43E-05	0.902	
		rez_DF	1.26E-03	3.78E-05	2.361	
W-184(n,t)/*(n,t+)*	(5_0/5_3)	d-Be	1.20E-02	2.00E-03	0.098	/0.623 C/E(5)=0.141
W-184(n,α)	6	fng_tung	6.27E-04	5.39E-05	1.234	
		fzk_2	1.66E-04	2.49E-05	1.022	
		sneg_1	7.52E-04	5.64E-05	1.394	
		sneg_2	5.35E-04	9.64E-05	1.491	
		rez_DF	3.33E-04	1.51E-05	2.015†	C/E(5)=1.927
W-185(n,γ)	5_0	MACS_30keV	5.84E-01	5.30E-02	0.422	
W-186(n,2n)m	6	fns_5min	3.36E-01	4.37E-02	1.853†	
		fng_tung	5.71E-01	9.30E-02	0.943	
		sneg_1	7.83E-01	5.64E-02	0.880	
W-186(n,2n)	(6)	fns_7hour	1.38E+0	1.93E-01	1.221	
		fzk_2	4.86E-01	6.84E-02	0.872	
		fng_tung	1.34E+0	1.65E-01	0.984	
		rez_DF	5.41E-01	1.78E-02	0.802	
W-186(n,n′p)/*(n,d+)*	5_2/5_2	fng_tung	1.74E-04	2.50E-05	0.094	/0.427 C/E(5)=4.187
		fzk_2	3.38E-04	1.01E-04	0.164	/0.349 C/E(5)=0.785
		rez_DF	2.73E-03	6.53E-05	1.210	/1.615 C/E(5)=0.771
W-186(n,n′α)m	5_4	fzk_2	2.00E-06	8.00E-07	1.591	C/E(5) = 1.055
		rez_DF	4.55E-05	6.83E-06	4.198†	
W-186(n,γ)	6	fng_f82h	3.48E-01	2.46E-02	0.918	C/E(7)=0.926
		fng_tung	1.29E+0	8.29E-02	1.010	C/E(7)=1.011
		sneg_1	4.34E-03	3.90E-04	11.835†	C/E(7)=0.931
						PEQ changed
		rez_DF	1.32E-01	1.13E-03	0.167	C/E(7)=0.179†
		rez_DF	3.10E-02	9.30E-04	0.709	C/E(7)=0.762
		fzk_ss316	2.28E-02	1.48E-03	0.571	C/E(7)=0.668
		MACS_30keV	2.35E-01	9.00E-03	0.842	
W-186(n,p)	6	fns_5min	1.01E-03	1.31E-04	2.041†	C/E(5)=1.661
		fng_tung	1.84E-03	2.75E-04	1.005	
		fzk_2	5.44E-04	8.16E-05	1.001	
		sneg_1	2.29E-03	3.66E-04	1.119	
W-186(n,h)/*(n,h+)*	5_3/5_3	d-Be2a	1.18E-04	3.23E-05	0.497	/0.519 C/E(5)=0.195
W-186(n,α)	6	fng_tung	5.33E-04	8.43E-05	0.962	
		fzk_2	1.27E-04	1.90E-05	0.990	
		sneg_1	7.18E-04	1.08E-04	0.978	
/(n,α+)		d-Be2a	1.40E-03	2.15E-04	1.443	/1.488
/(n,α+)		rez_DF	4.62E-04	2.31E-05	1.436†	/1.436
Re-185(n,2n)g	5_2	fns_7hour	1.64E+0	8.22E-02	0.855	
		fng_heat	2.19E+0	3.28E-01	0.625	
		fng_Re	1.87E+0	2.82E-01	0.735	
Re-185(n,2n)m	6	fns_7hour	3.68E-01	2.21E-02	0.917	
		fng_Re	2.99E-01	6.46E-02	1.103	
Re-185(n,3n)	5_3	fng_Re	4.41E-02	1.37E-02	0.643	
Re-185(n,γ)	(5_2)	MACS_30keV	1.53E+00	6.20E-02	0.610	
Re-185(n,p)m	6	fns_5min	2.17E-03	2.38E-04	1.155	
		fng_heat	4.79E-03	7.81E-04	0.546	
Re-186(n,γ)	5_3	MACS_30keV	1.55E+00	2.50E-01	1.258	
Re-187(n,2n)g	6	fns_7hour	1.68E+0	1.51E-01	0.995	C/E(7)=1.112
		fns_5min	1.50E+0	1.20E-01	0.995	C/E(7)=1.258
		fng_heat	2.00E+0	2.59E-01	0.768	C/E(7)=0.767

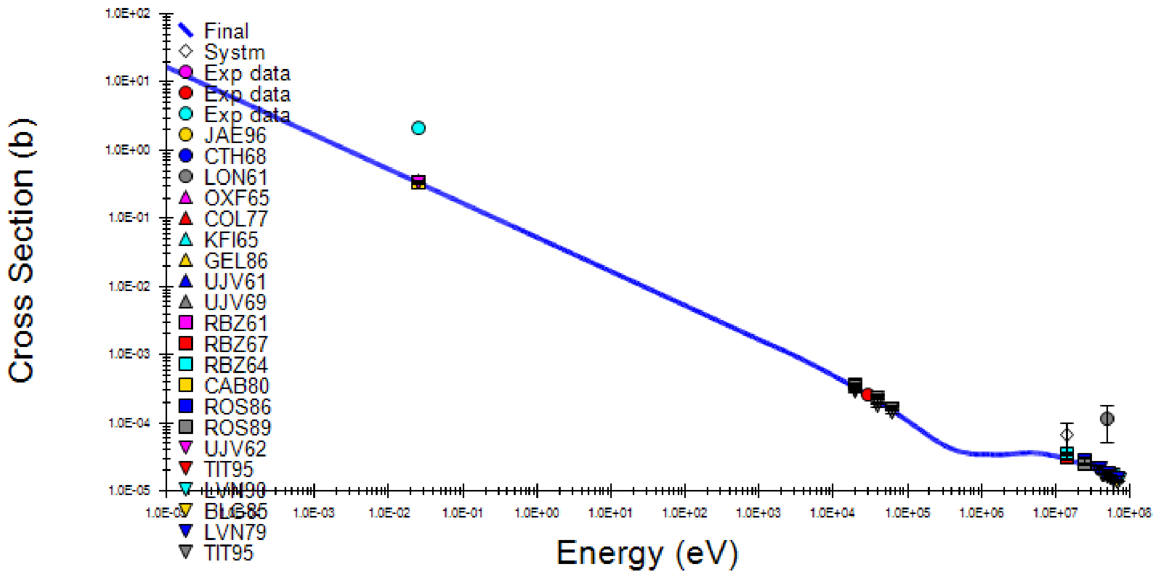
Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
		fng_Re	1.86E+0	2.64E-01	0.836	C/E(7)=0.885
Re-187(n,γ)m	6	fng_heat	3.64E-03	5.46E-04	0.500	
		fng_Re	7.02E-03	4.46E-03	0.948	
Re-187(n,γ)	(6)	fng_Re	3.19E-01	6.93E-02	0.635	
		MACS_30keV	1.16E+00	5.70E-02	0.788	
Re-187(n,p)	6	fng_Re	4.43E-03	6.55E-04	0.919	
Re-187(n,t)/*(n,xt)*	(5_3/5_3)	d-Be	3.30E-03	5.63E-04	0.904	/2.223
Re-187(n,α)	6	fng_Re	7.10E-04	1.59E-04	0.931	
Os-184(n,γ)	5_3	MACS_30keV	5.90E-01	3.90E-02	1.123	
Os-186n,γ)	6	MACS_30keV	4.10E-01	1.70E-02	0.961	
Os-187(n,γ)	6	MACS_30keV	9.66E-01	3.10E-02	0.866	
Os-188(n,γ)	5_2	MACS_30keV	2.93E-01	1.40E-02	1.304	
Os-189(n,γ)	(6)	MACS_30keV	1.17E+00	4.70E-02	0.843	
Os-190(n,n′)m	5_2	fns_5min	7.04E-03	3.52E-04	2.735	C/E(5)=2.272
Os-190(n,γ)	5_2	MACS_30keV	2.74e-01	1.20e-03	1.361	
Os-191(n,γ)	5_3	MACS_30keV	1.29E+00	2.80E-01	0.954	
Os-192(n,γ)	6	MACS_30keV	1.55E-01	7.00E-03	1.224	
Ir-191(n,γ)	(6)	MACS_30keV	1.35E+00	4.3E-02	0.888	
Ir-192(n,γ)	5_3	MACS_30keV	2.08E+00	4.50e-01	0.897	
Ir-193(n,2n)m	5_2	fns_5min	2.06E-01	3.50E-02	0.869	C/E(5)=3.428
						C/E(7)=2.498
Ir-193(n,γ)	(6)	MACS_30keV	9.94E-01	7.00E-02	0.796	
Pt-190(n,γ)	5_3	MACS_30keV	5.08E-01	4.40E-02	1.275	
Pt-192(n,γ)	5_3	MACS_30keV	5.90E-01	1.20E-01	1.142	
Pt-193(n,γ)	5_3	MACS_30keV	1.23E+00	2.40E-01	0.944	
Pt-194(n,γ)	(5_0)	MACS_30keV	3.65E-01	8.50E-02	0.637	
Pt-195(n,γ)	(5_2)	MACS_30keV	8.60E-01	2.00E-01	0.689	
Pt-196(n,γ)	(5_3)	MACS_30keV	1.83E-01	1.60E-02	1.198	
Pt-198(n,2n)m	6	fns_5min	7.97E-01	4.78E-02	1.307	C/E(5)=1.178
						C/E(7)=1.164
Pt-198(n,γ)	(5_2)	MACS_30keV	9.22E-02	4.60E-03	1.691	
Au-197(n,n′)m	5_2	fns_5min	1.94E-01	2.33E-02	1.667	C/E(5)=1.639
Au-197(n,2n)m	6	fns_5min	1.01E-01	1.12E-02	1.099	
Au-197(n,2n)n	6	fns_5min	9.50E-02	4.75E-03	1.370†	
		rez_DF	3.46E-02	1.73E-03	1.238	C/E(5)=1.262
Au-197(n,2n)	(6)	cf252_flux_1	4.30E-03	5.00E-04	1.334†	C/E(5)=1.335
		cf252_flux_1	5.27E-03	2.26E-04	1.089	
		cf252_flux_1	5.25E-03	3.10E-04	1.093	
		cf252_flux_1	5.80E-03	2.90E-04	0.989	
		cf252_flux_1	5.50E-03	1.40E-04	1.043	
		rez_DF	4.99E-01	2.00E-02	1.086	
Au-197(n,3n)m	5_3	fns_5min	1.18E-03	7.08E-05	1.266	
Au-197(n,3n)	(6)	rez_DF	2.75E-01	1.38E-02	0.913	
Au-197(n,4n)	(6)	rez_DF	2.88E-02	8.64E-04	0.526	C/E(5)=0.594
Au-197(n,γ)	(6)	cf252_flux_1	1.10E-01	5.00E-03	0.673	
		cf252_flux_1	7.70E-02	7.70E-05	0.962	
		cf252_flux_1	7.80E-02	3.00E-03	0.950	
		MACS_30keV	5.82E-01	9.00E-03	0.929	
Au-197(n,t)/*(n,xt)*	(5_3/5_3)	d-Be	3.90E-03	9.00E-04	0.726	/1.466 C/E(5)=1.072
Au-197(n,h)g/*(n,h+)g*	5_0/5_0	d-Be2a	1.07E-04	3.23E-05	0.195	/0.210
Au-197(n,h)/*(n,h+)*	(5_3/5_3)	d-Be2a	8.03E-05	1.95E-05	0.951	/1.010
Au-197(n,α)g/*(n,α+)g*	6	d-Be2a	1.44E-03	2.15E-04	1.631	/1.650
Au-197(n,α)m/*(n,α+)m*	6	d-Be2a	1.07E-04	2.15E-05	0.782	/1.433
Au-198(n,γ)	5_3	MACS_30keV	8.40E-01	1.47E-01	0.768	
Hg-196(n,γ)	(5_0)	MACS_30keV	2.04E-01	8.00E-03	3.018	
Hg-198(n,γ)	(5_2)	cf252_flux_1	1.68E-01	6.00E-03	0.143	
		MACS_30keV	1.73E-01	1.50E-02	0.947	
Hg-199(n,γ)	6	MACS_30keV	3.74E-01	2.30E-02	0.768	

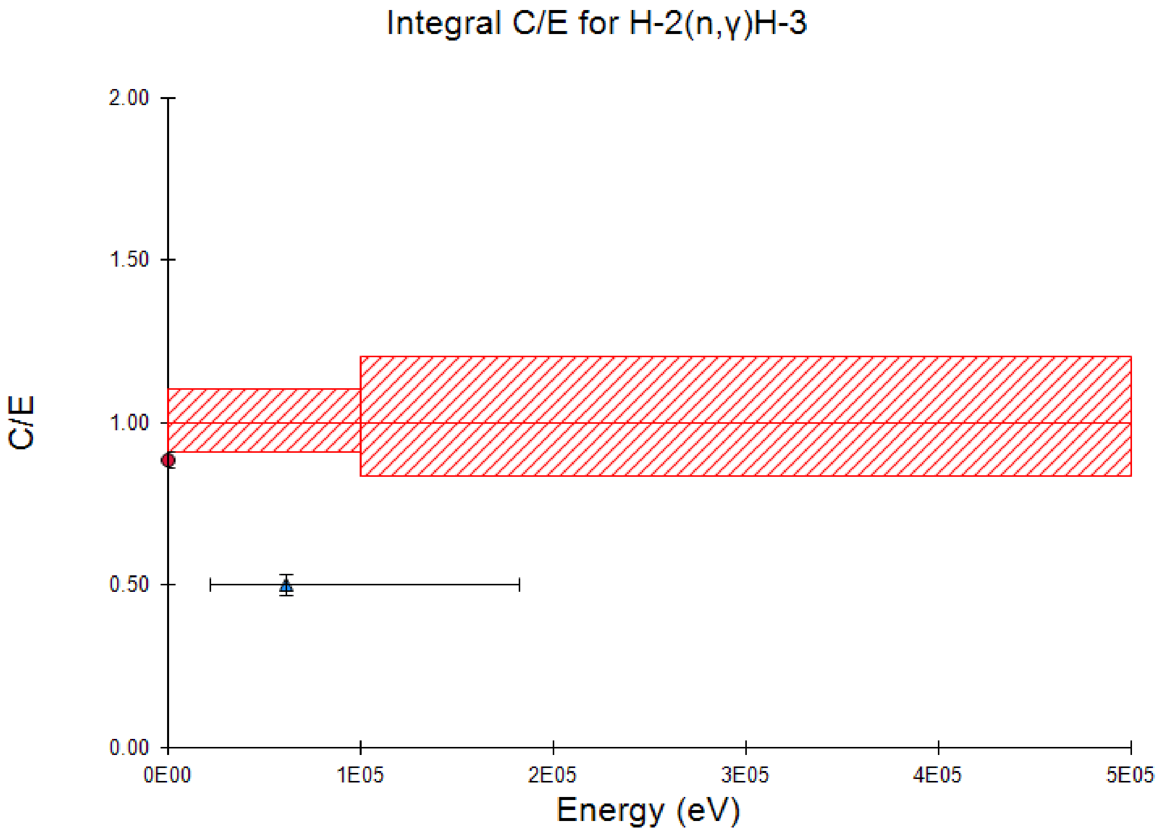
Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
Hg-200(n,2n)m	6	fns_5min	8.24E-01	6.59E-02	0.866	C/E(5)=0.870
Hg-200(n,γ)	6	MACS_30keV	1.15E-01	1.20E-02	0.899	
Hg-201(n,γ)	6	MACS_30keV	2.64E-01	1.400E-02	0.996	
Hg-202(n,γ)	6	MACS_30keV	6.33E-02	1.90E-03	1.075	
Hg-203(n,γ)		MACS_30keV	9.80E-02	1.70E-02	0.347	
Hg-204(n,γ)	6	MACS_30keV	4.20E-02	4.00E-03	0.840	
Tl-203(n,2n)	6	fns_5min	1.41E+0	1.84E-01	1.205	
Tl-203(n,γ)	5_2	MACS_30keV	1.24E-01	8.00E-03	1.455	
Tl-205(n,γ)	(6)	fns_5min MACS_30keV	2.53E-03 5.40E-02	1.27E-04 4.00E-03	11.739 0.644	C/E(5)=0.954 C/E(7)=0.793
Tl-205(n,p)	6	fns_5min	1.93E-03	9.63E-05	0.787	C/E(5)=1.010
Tl-205(n,t)/*(n,xt)*	6	d-Be3 d-Be	6.07E-04 4.60E-03	2.80E-04 1.35E-03	1.137 1.189	/1.183 /1.640
Tl-205(n,t)/*(n,t+)*	6	d-Be	2.00E-02	4.00E-03	0.251	/0.780
Pb-204(n,n′)m	6	fns_5min fng_heat tud_Pb	5.24E-02 5.62E-02 6.19E-02	1.36E-02 4.49E-03 5.63E-03	1.064 0.940 0.920	
Pb-204(n,2n)m	5_2	fns_5min	1.51E+0	7.57E-02	0.656	C/E(5)=0.679
Pb-204(n,2n)	(6)	fns_7hour fng_heat tud_Pb	2.20E+0 2.41E+0 1.94E+0	1.10E-01 1.69E-01 1.67E-01	0.943 0.839 0.966	 C/E(5)=0.970
Pb-204(n,γ)	(6)	MACS_30keV	8.10E-02	2.30E-03	0.788	
Pb-205(n,γ)	5_0	MACS_30keV	1.25E-01	2.20E-02	0.388	
Pb-206(n,γ)	(6)	MACS_30keV	1.45E-02	3.00E-04	0.771	
Pb-206(n,p)	(5_2)	fng_heat	1.11E-02	2.89E-03	0.256	
Pb-206(n,α)	6	tud_Pb fns_7hour	5.02E-04 1.29E-03	5.42E-05 8.11E-04	0.761 0.315†	
Pb-207(n,γ)	6	MACS_30keV	9.90E-03	5.00E-04	0.740	
Pb-208(n,γ)	5_2	MACS_30keV	3.6E-04	3.00E-05	1.472	
Pb-208(n,p)	5_2	fns_5min fng_heat tud_Pb	1.21E-03 2.56E-03 8.38E-04	6.03E-05 4.61E-04 8.88E-05	0.704 0.350 0.864	C/E(5)=0.771
Pb-208(n,t)/*(n,xt)*	(5_0/5_3)	d-Be3	5.81E-04	1.76E-04	0.360	/0.407 C/E(5)=0.879
Pb-208(n,t)/*(n,t+)*	(5_0/5_3)	d-Be	1.60E-02	3.00E-03	0.126	/0.697 C/E(5)=0.193
Bi-209(n,3n)	6	rez_DF	2.96E-01	2.09E-02	0.868	
Bi-209(n,4n)	6	rez_DF	3.01E-02	8.53E-04	0.775	
Bi-209(n,γ)	(6)	MACS_30keV	2.56E-03	3.00E-04	1.020	
Bi-209(n,p)	5_4	fns_5min	2.01E-03	1.81E-03	0.596	C/E(7)=1.190 RN - NPL90
Bi-209(n,t)/(n,xt)	(5_4/5_4)	d-Be3 d-Be	7.80E-04 3.70E-03	2.50E-04 7.00E-04	0.775 0.891	/0.988 C/E(5)=0.446 C/E(7)=1.258 /2.217 C/E(5)=0.374 C/E(7)=1.380
Bi-209(n,h)/*(n,h+)*	(5_4/5_4)	d-Be2a	6.14E-05	2.05E-05	1.727	/1.800 C/E(5)=0.688
Bi-209(n,α)	(6)	fns_5min	5.81E-04	7.56E-05	1.411	
Bi-210(n,γ)	5_0	MACS_30keV	6.00E-03	5.00E-03	1.263	
Th-232(n,f)	6	cf252_flux_1 cf252_flux_1	8.94E-02 8.47E-02	2.40E-03 4.90E-03	0.915 0.965	
Pa-231(n,f)	6	cf252_flux_1	9.70E-01	4.50E-02	0.891	
U-233(n,f)	6	cf252_flux_1 cf252_flux_1	1.95E+0 1.89E+0	3.12E-02 4.80E-02	0.942 0.969	
U-234(n,f)	6	cf252_flux_1	1.20E+0	1.40E-02	0.992	
U-235(n,f)	6	cf252_flux_1 cf252_flux_1 cf252_flux_1 cf252_flux_1 cf252_flux_1	1.27E+0 1.21E+0 1.22E+0 1.05E+0 1.23E+0	1.82E-02 2.20E-02 1.90E-02 3.10E-02 1.70E-02	0.962 1.003 1.002 1.158 0.987	
U-236(n,f)	6	cf252_flux_1	6.12E-01	8.00E-03	0.987	

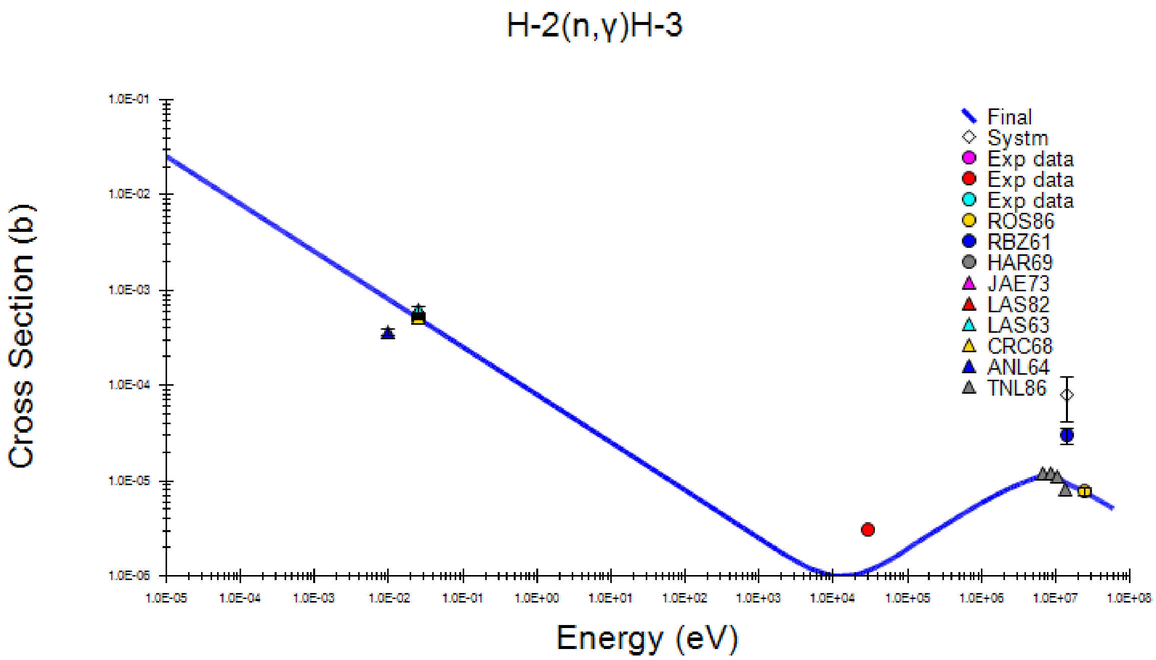
Reaction	QS	Spectrum	σ (b)	Δσ (b)	C/E	Comment
U-238(n,2n)	5_2	cf252_flux_1 cf252_flux_1	1.92E-01 1.22E-02	1.90E-03 1.50E-03	0.106 1.670	C/E(7)= 0.106 C/E(7)= 1.670
U-238(n,f)	6	cf252_flux_1 cf252_flux_1 cf252_flux_1 cf252_flux_1 cf252_flux_1 cf252_flux_1	3.29E-01 3.24E-01 2.88E-01 3.08E-01 3.32E-01 3.11E-01	1.00E-02 1.40E-02 7.00E-03 1.70E-02 5.00E-03 1.40E-02	0.960 0.975 1.096 1.025 0.951 1.016	
Np-237(n,2n)m	5_2	cf252_flux_1	4.66E-03	4.66E-04	0.621	
Np-237(n,f)	6	cf252_flux_1 cf252_flux_1 cf252_flux_1 cf252_flux_1	1.26E+0 1.38E+0 1.37E+0 1.44E+0	6.00E-02 1.00E-01 2.00E-02 2.29E-02	1.044 0.953 0.963 0.912	
Pu-239(n,f)	6	cf252_flux_1 cf252_flux_1 cf252_flux_1 cf252_flux_1	1.80E+0 1.84E+0 1.86E+0 1.79E+0	6.00E-02 2.40E-02 3.01E-02 4.10E-02	0.999 0.975 0.966 1.004	
Pu-240(n,f)	6	cf252_flux_1 cf252_flux_1	1.34E+0 1.31E+0	3.20E-02 3.00E-02	1.025 1.046	
Pu-241(n,f)	6	cf252_flux_1 cf252_flux_1	1.62E+0 1.74E+0	8.00E-02 5.40E-02	1.004 0.930	
Am-243(n,f)	6	cf252_flux_1	1.14E+0	2.30E-02	1.001	

1/ ENDF/B-VII.1 C/E = 7.59 JENDL-4 C/E = 7.28

H-1(n,γ)H-2




Integral C/E for H-2(n,γ)H-3
C/E
2.00
1.50
1.00
0.50
0.00
0E00
1E05
2E05
3E05
4E05
5E05
Energy (eV)


H-2(n,γ)H-3
Cross Section (b)
Energy (eV)
Final
Systm
Exp data
Exp data
Exp data
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RBZ61
HAR69
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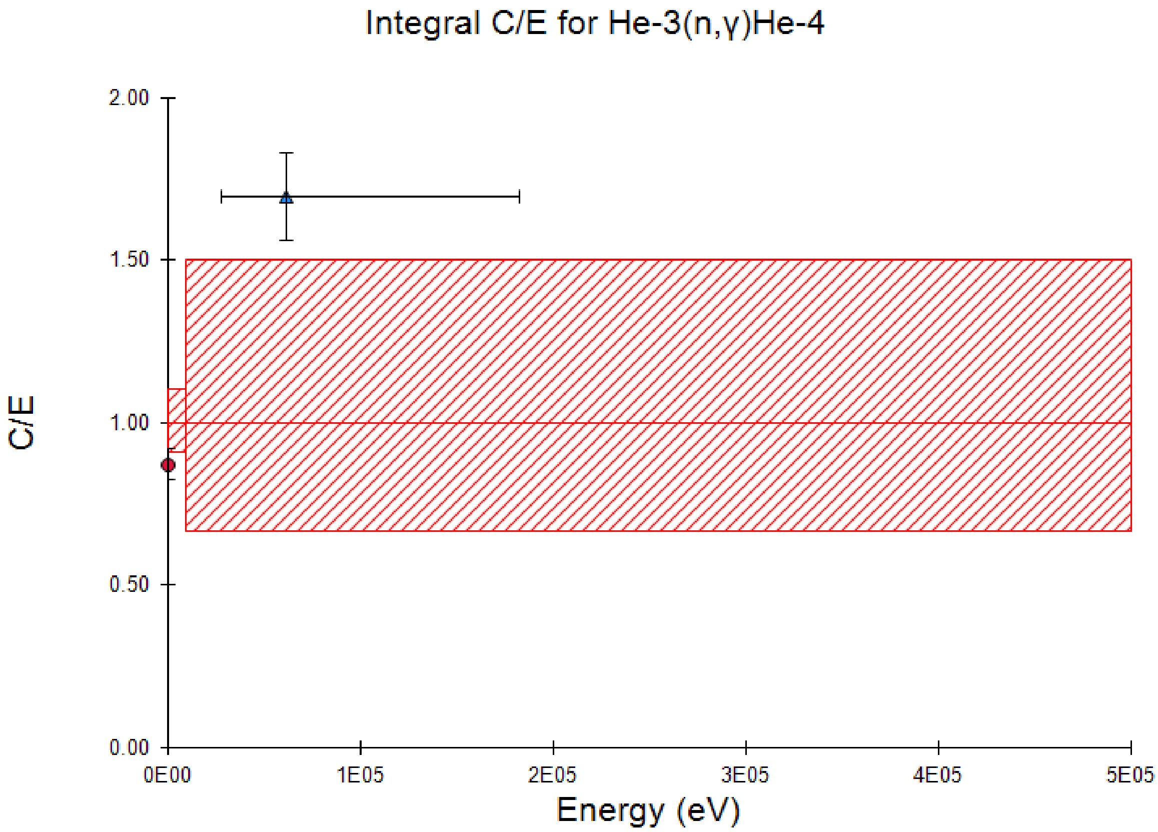
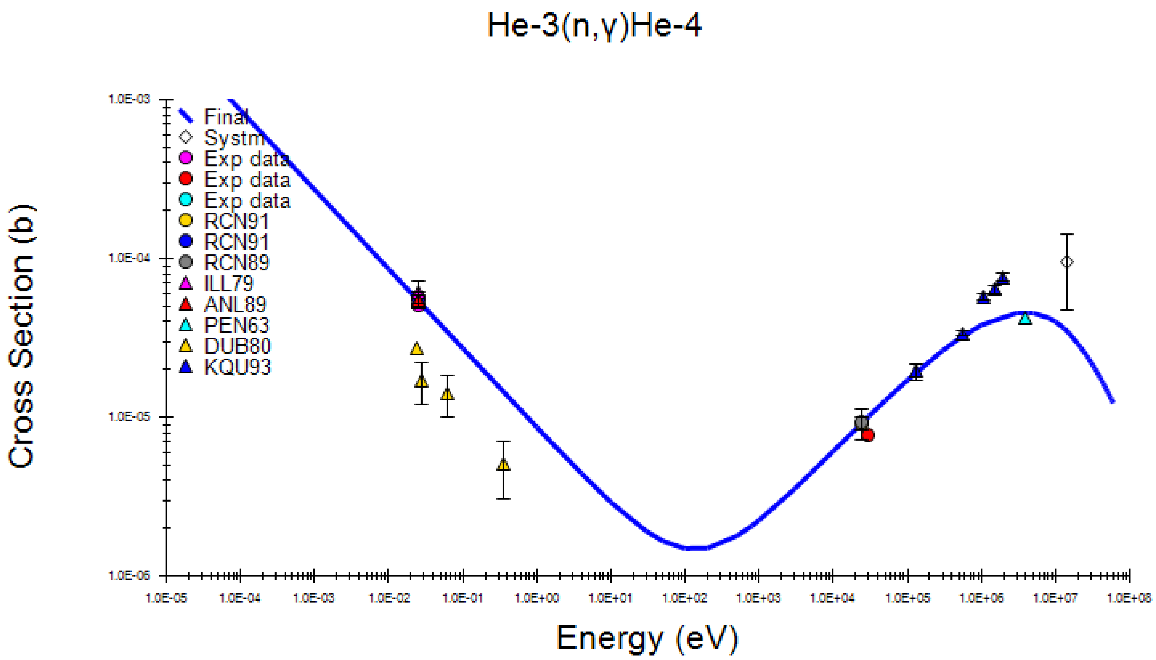
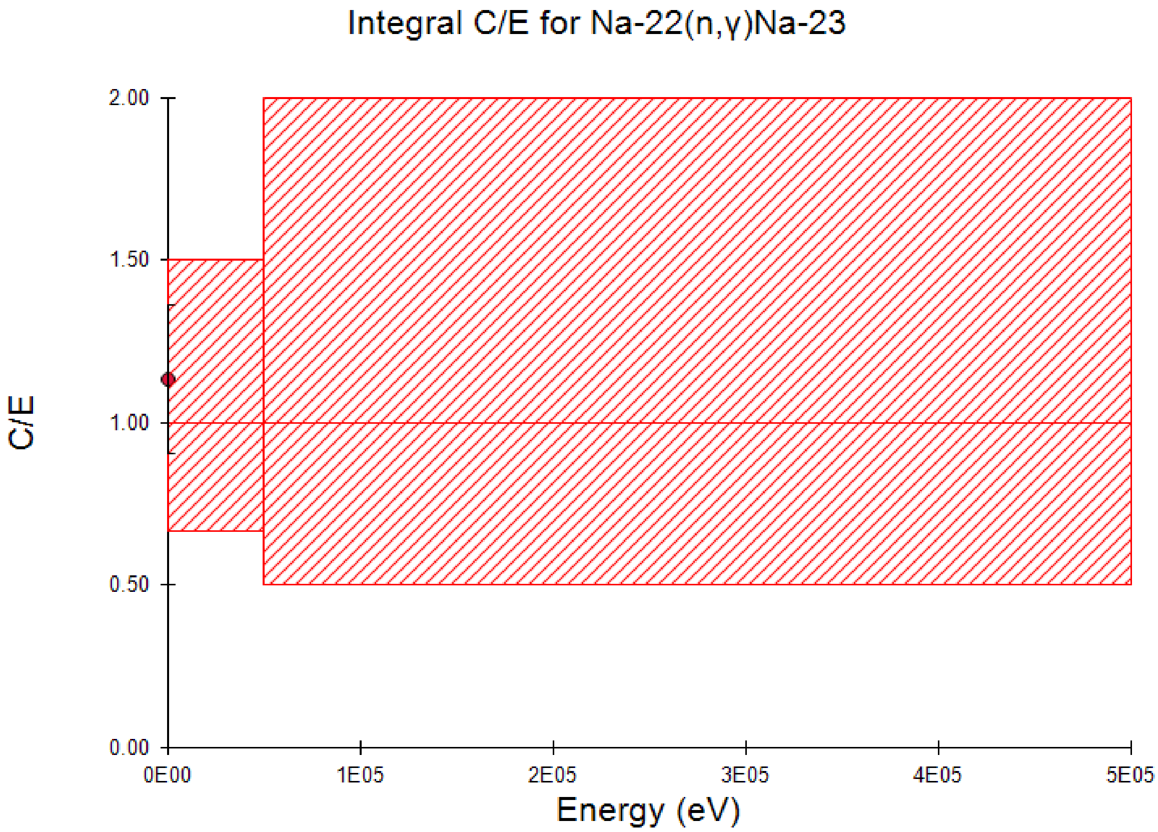
CRC68
ANL64
TNL86



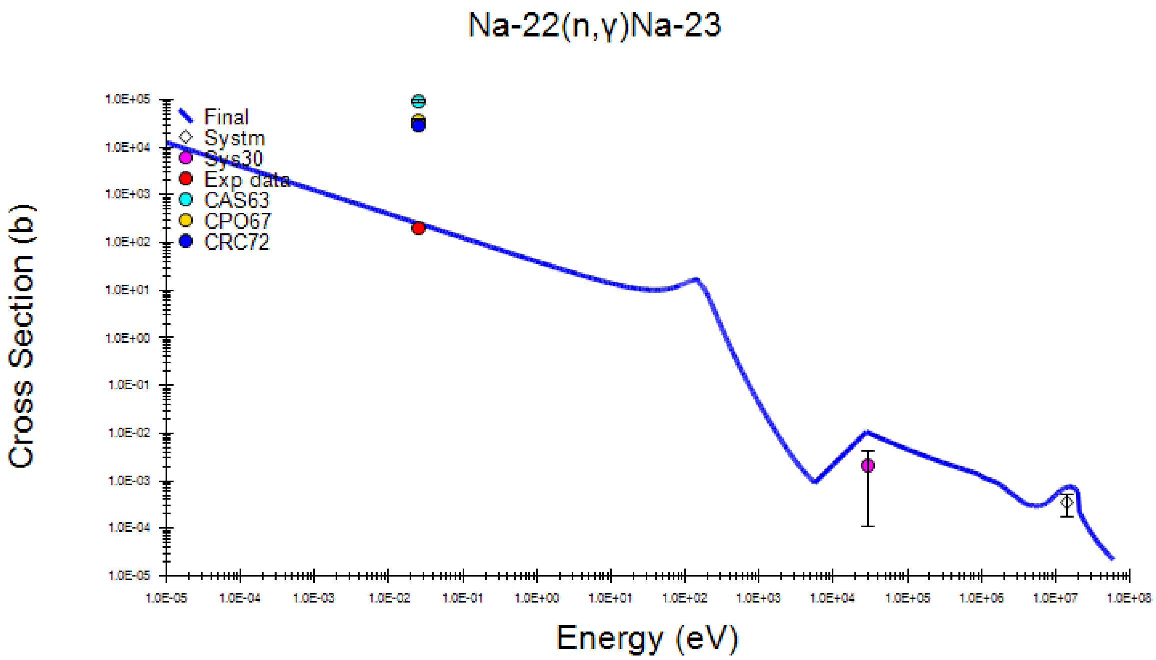
Integral C/E for He-3(n,γ)He-4
C/E
2.00
1.50
1.00
0.50
0.00
0E00
1E05
2E05
3E05
4E05
5E05
Energy (eV)



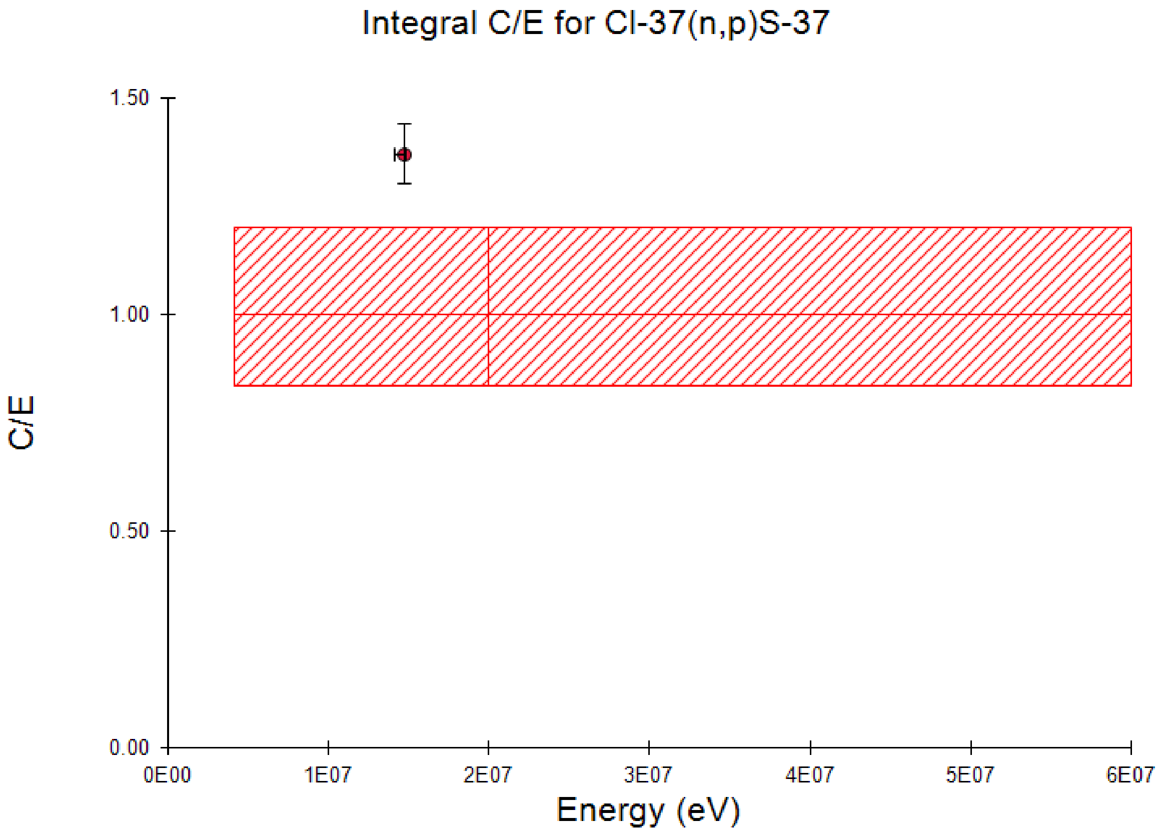
He-3(n,γ)He-4
Cross Section (b)
Final
Systm
Exp data
Exp data
Exp data
RCN91
RCN91
RCN89
ILL79
ANL89
PEN63
DUB80
KQU93
Energy (eV)

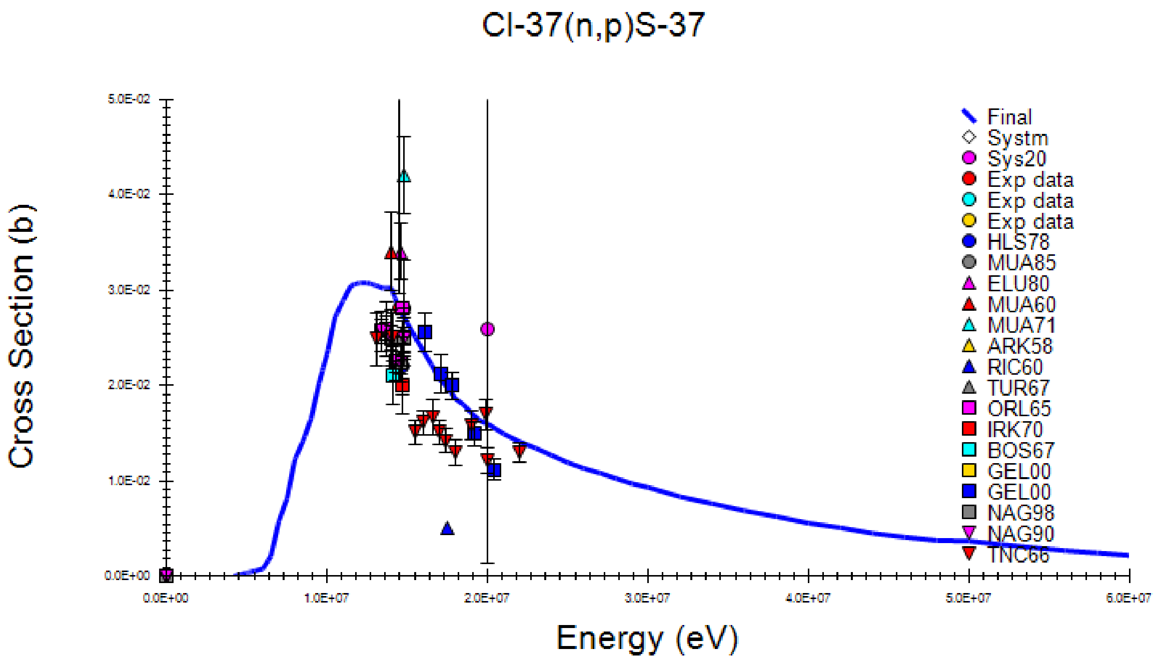


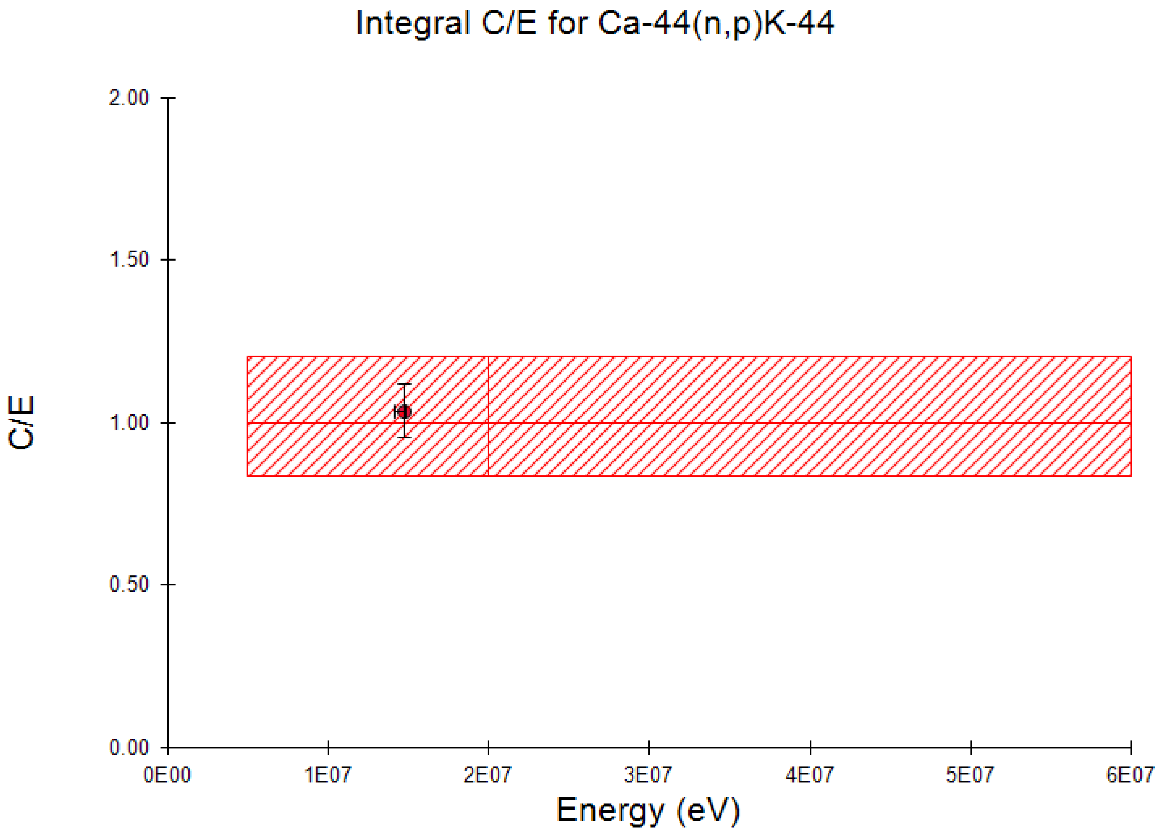
Integral C/E for Na-22(n,γ)Na-23
2.00
1.50
1.00
0.50
0.00
C/E
0E00
1E05
2E05
3E05
4E05
5E05
Energy (eV)

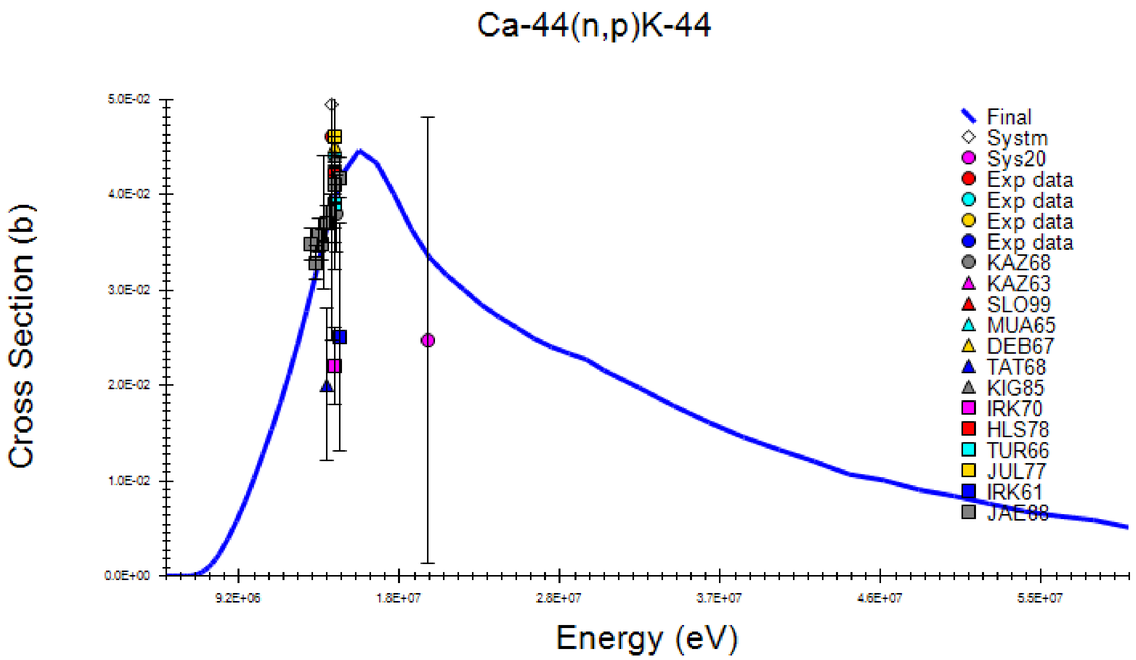


Na-22(n,γ)Na-23
Final
Systm
Sys30
Exp data
CAS63
CPO67
CRC72
Cross Section (b)
Energy (eV)

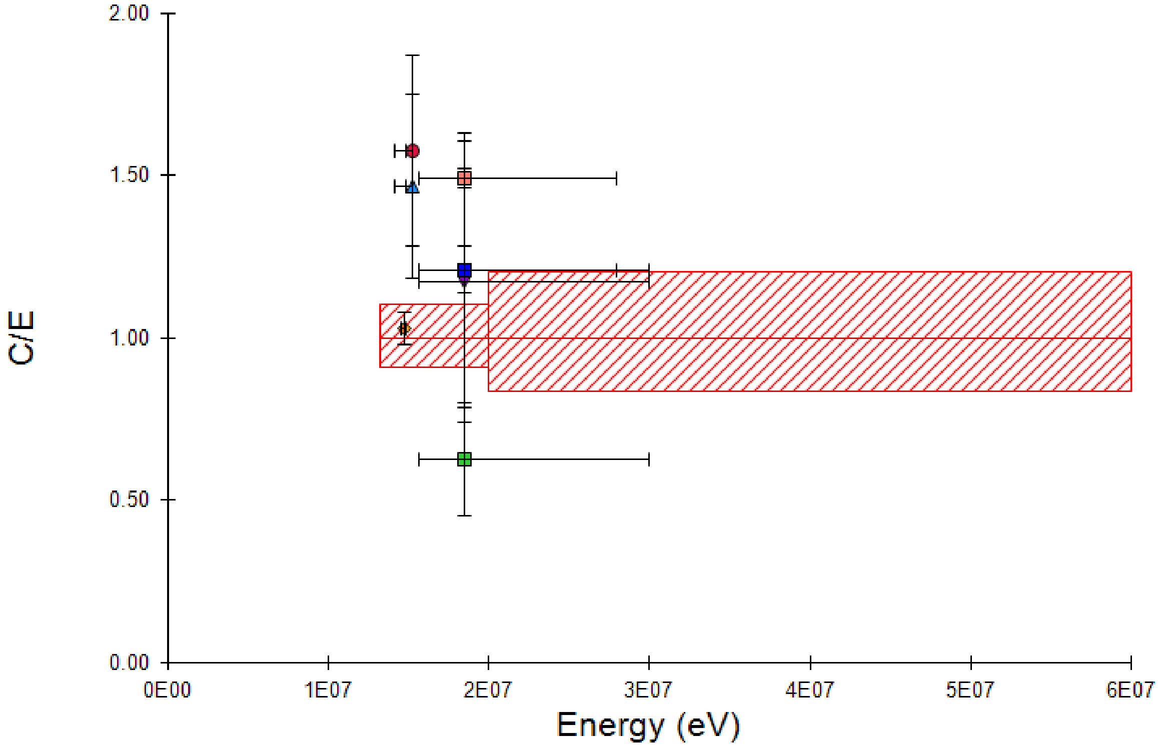

Integral C/E for Cl-37(n,p)S-37
C/E
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)


Cl-37(n,p)S-37
Cross Section (b)
Energy (eV)
Final
Systm
Sys20
Exp data
Exp data
Exp data
HLS78
MUA85
ELU80
MUA60
MUA71
ARK58
RIC60
TUR67
ORL65
IRK70
BOS67
GEL00
GEL00
NAG98
NAG90
TNC66

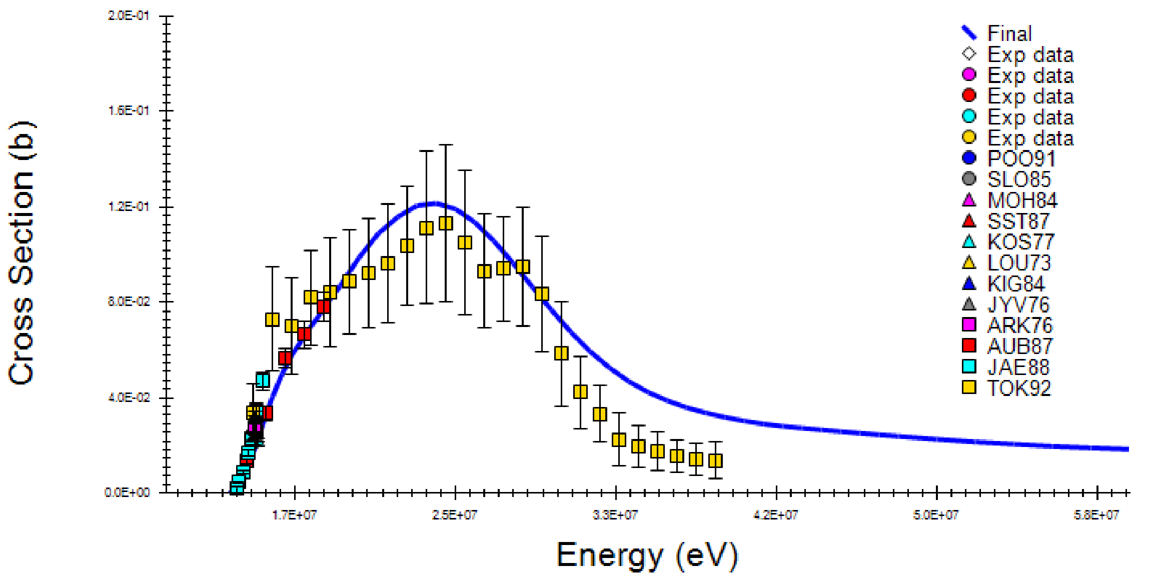

Integral C/E for Ca-44(n,p)K-44
C/E
2.00
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)

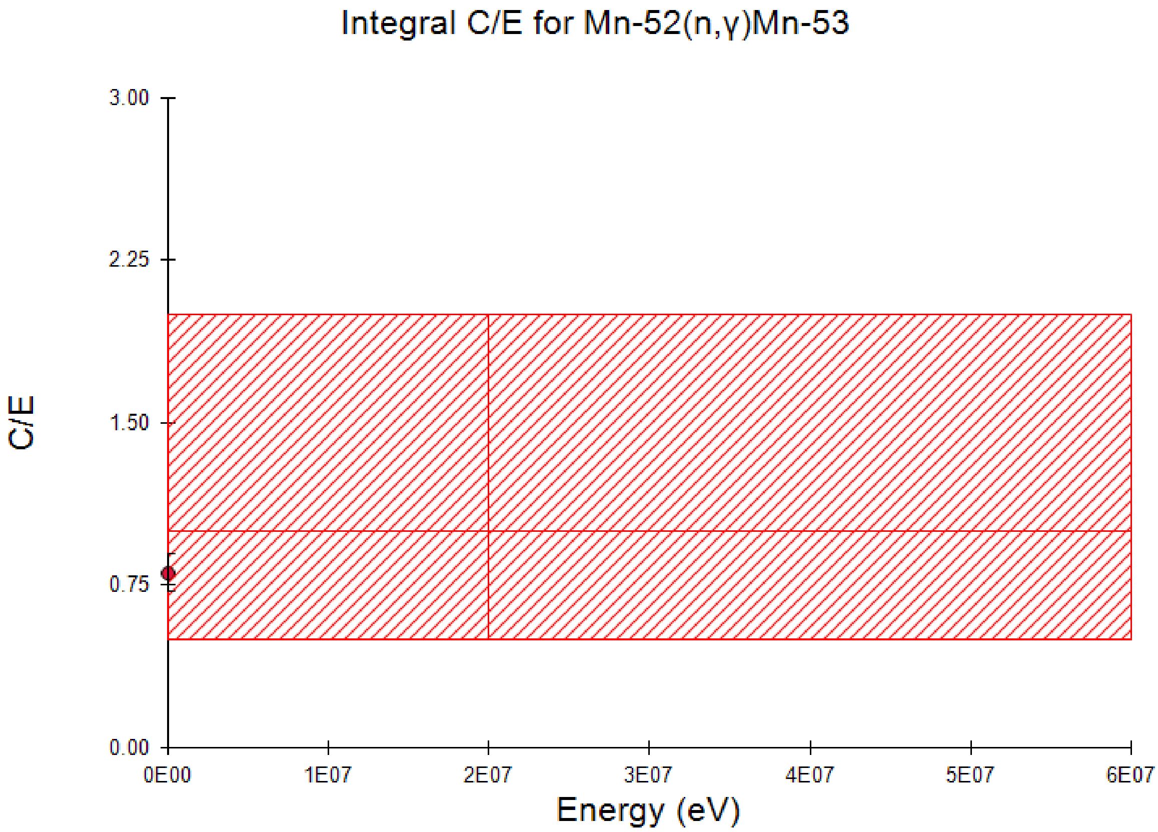

Ca-44(n,p)K-44
Cross Section (b)
5.0E-02
4.0E-02
3.0E-02
2.0E-02
1.0E-02
0.0E+00
9.2E+06
1.8E+07
2.8E+07
3.7E+07
4.6E+07
5.5E+07
Energy (eV)
Final
Systm
Sys20
Exp data
Exp data
Exp data
Exp data
KAZ68
KAZ63
SLO99
MUA65
DEB67
TAT68
KIG85
IRK70
HLS78
TUR66
JUL77
IRK61

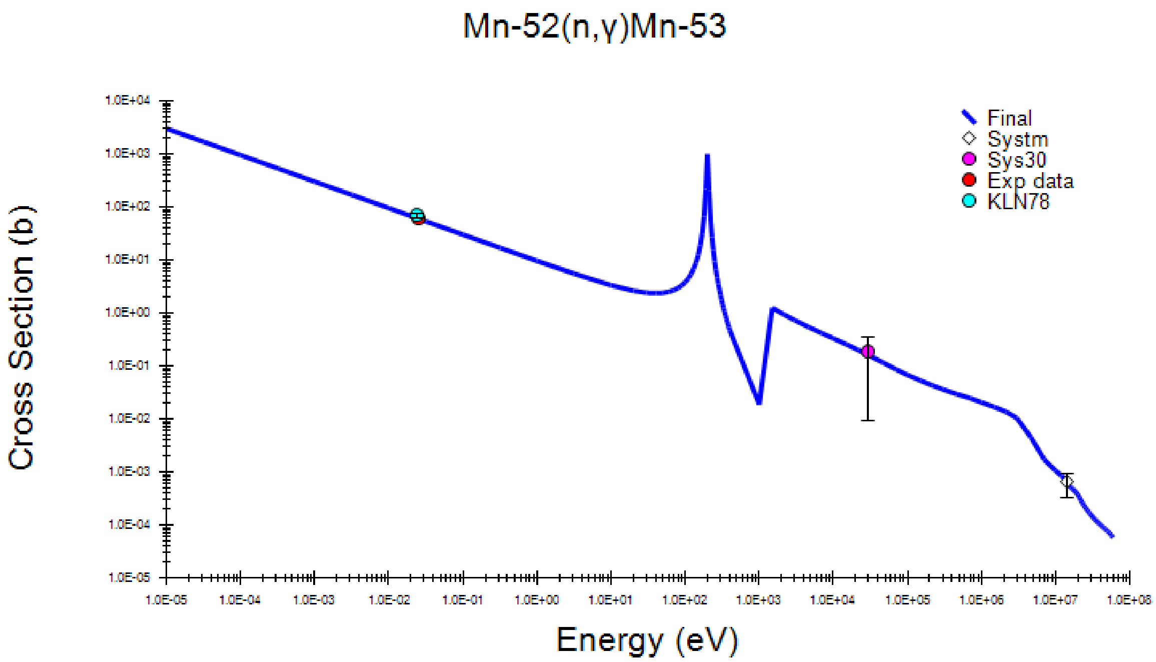
Integral C/E for Cr-50(n,2n)Cr-49

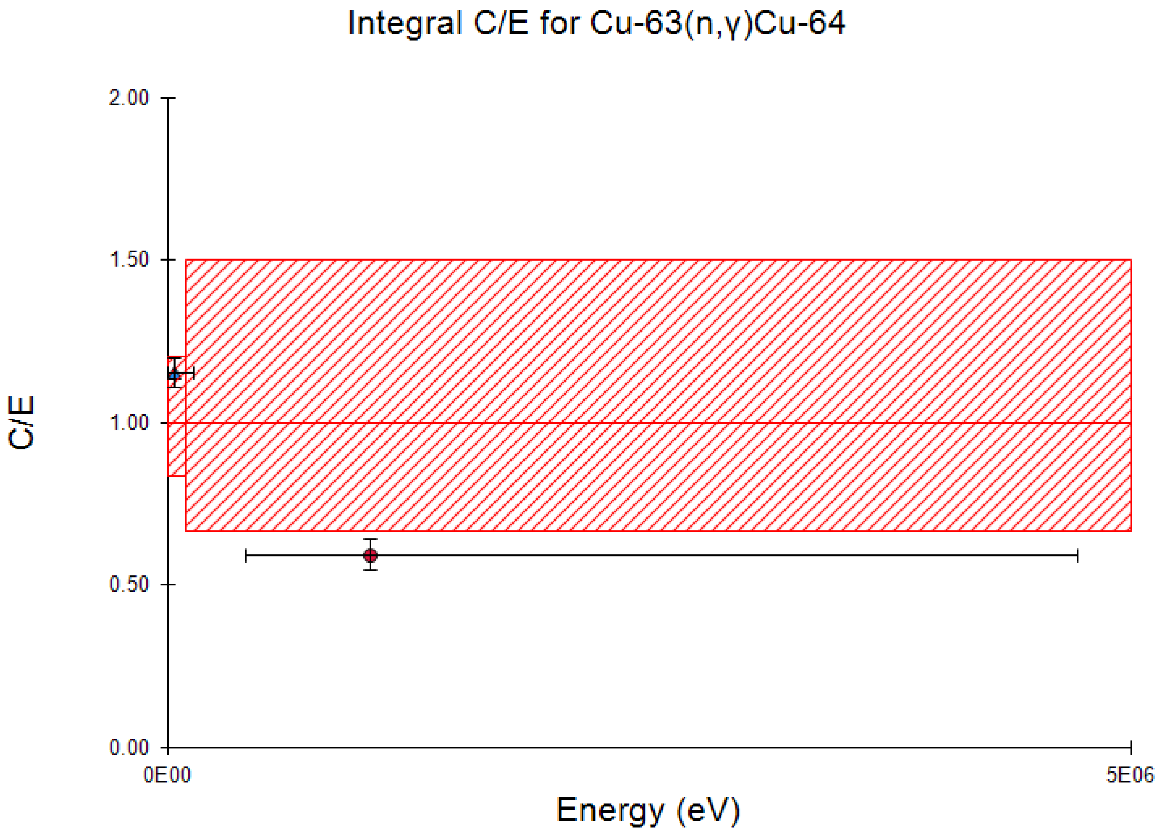


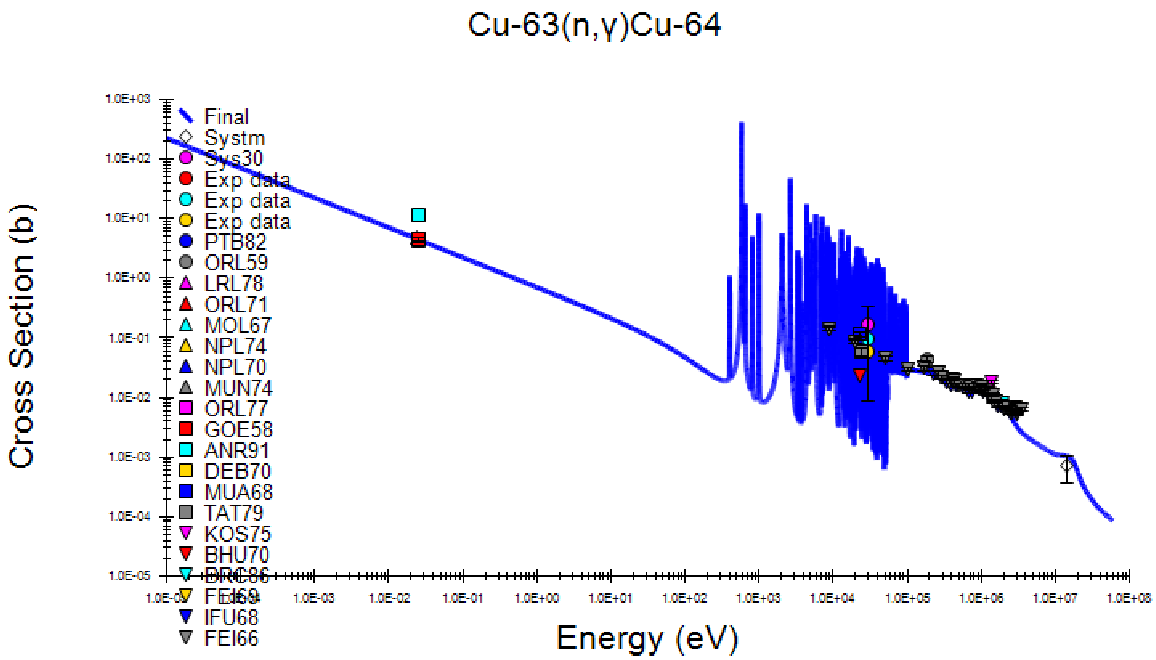
Cr-50(n,2n)Cr-49

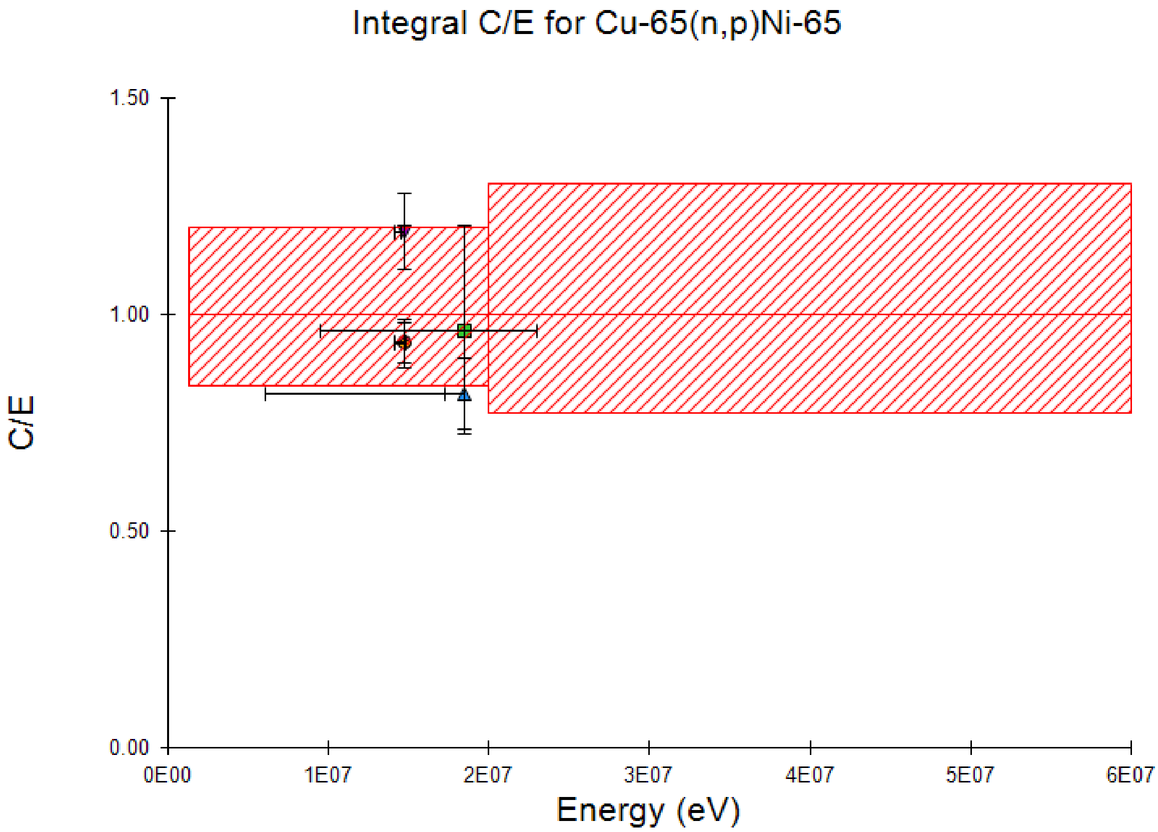


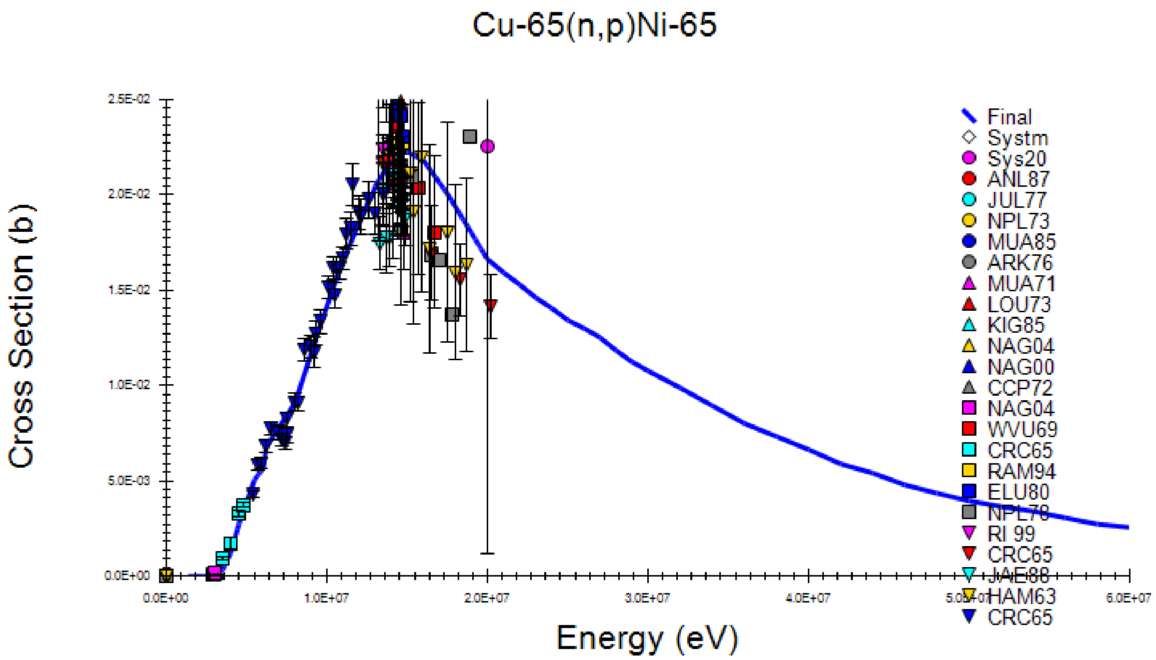

Integral C/E for Mn-52(n,γ)Mn-53
3.00
2.25
1.50
0.75
0.00
C/E
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)

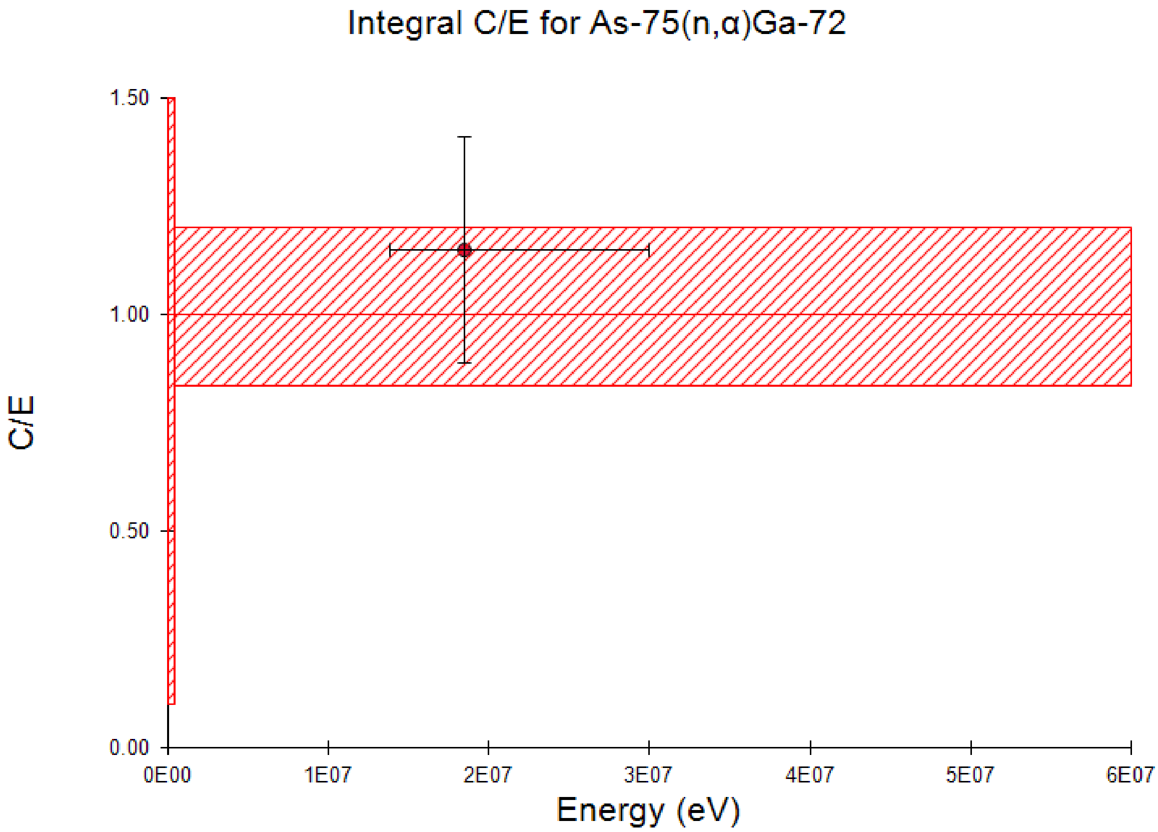

Mn-52(n,γ)Mn-53
Final
Systm
Sys30
Exp data
KLN78
Cross Section (b)
Energy (eV)


Integral C/E for Cu-63(n,γ)Cu-64
C/E
2.00
1.50
1.00
0.50
0.00
0E00
5E06
Energy (eV)

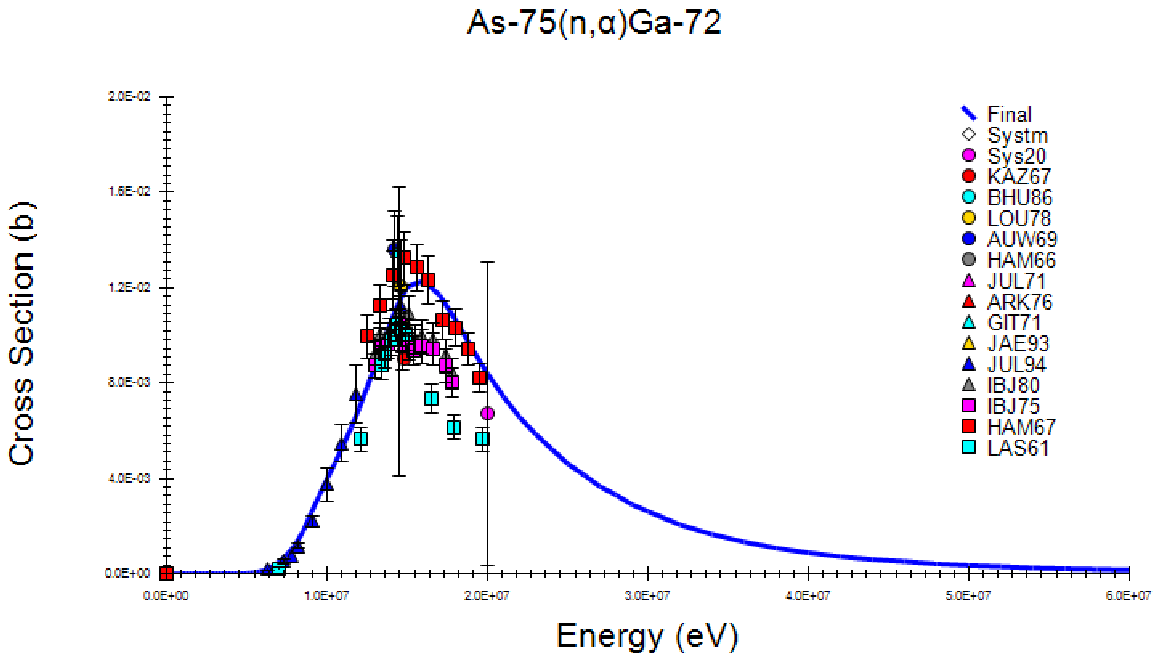

Cu-63(n,γ)Cu-64
Cross Section (b)
Energy (eV)
Final
Systm
Sys30
Exp data
Exp data
Exp data
PTB82
ORL59
LRL78
ORL71
MOL67
NPL74
NPL70
MUN74
ORL77
GOE58
ANR91
DEB70
MUA68
TAT79
KOS75
BHU70
BRC86
FEI69
IFU68
FEI66


Integral C/E for Cu-65(n,p)Ni-65
C/E
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)

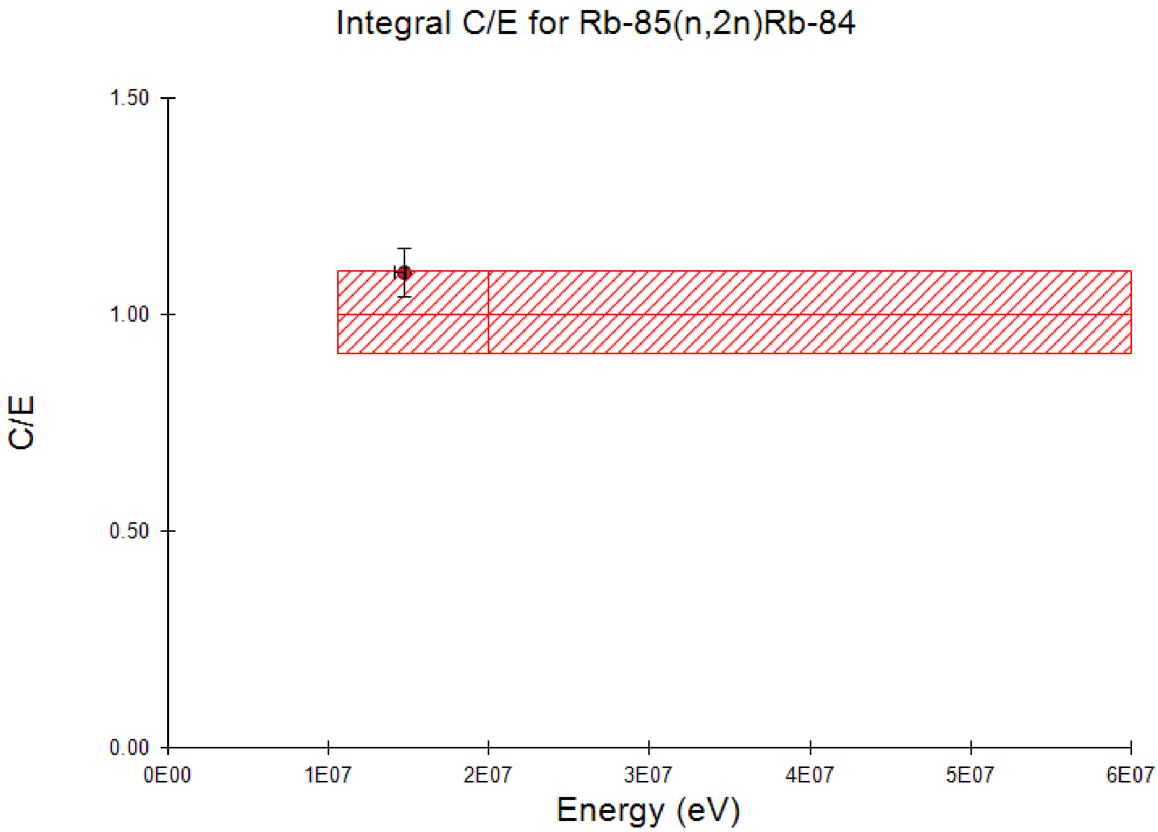

Cu-65(n,p)Ni-65
Cross Section (b)
2.5E-02
2.0E-02
1.5E-02
1.0E-02
5.0E-03
0.0E+00
0.0E+00
1.0E+07
2.0E+07
3.0E+07
4.0E+07
6.0E+07
Energy (eV)
Final
Systm
Sys20
ANL87
JUL77
NPL73
MUA85
ARK76
MUA71
LOU73
KIG85
NAG04
NAG00
CCP72
NAG04
WVU69
CRC65
RAM94
ELU80
RI 99
CRC65
HAM63
CRC65

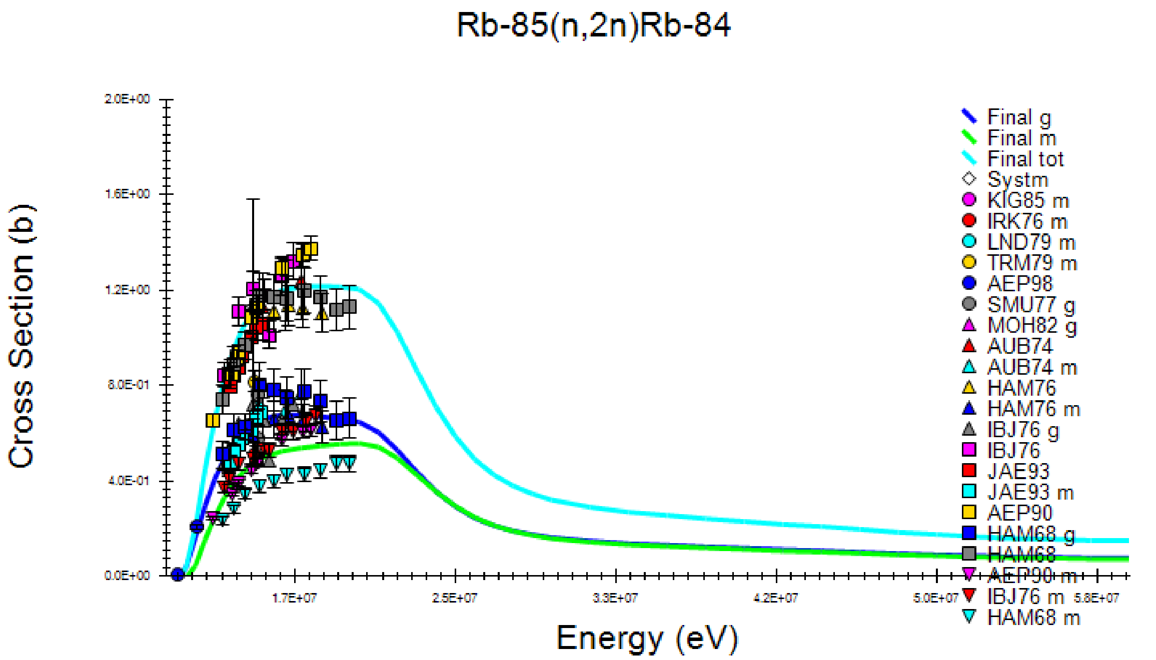


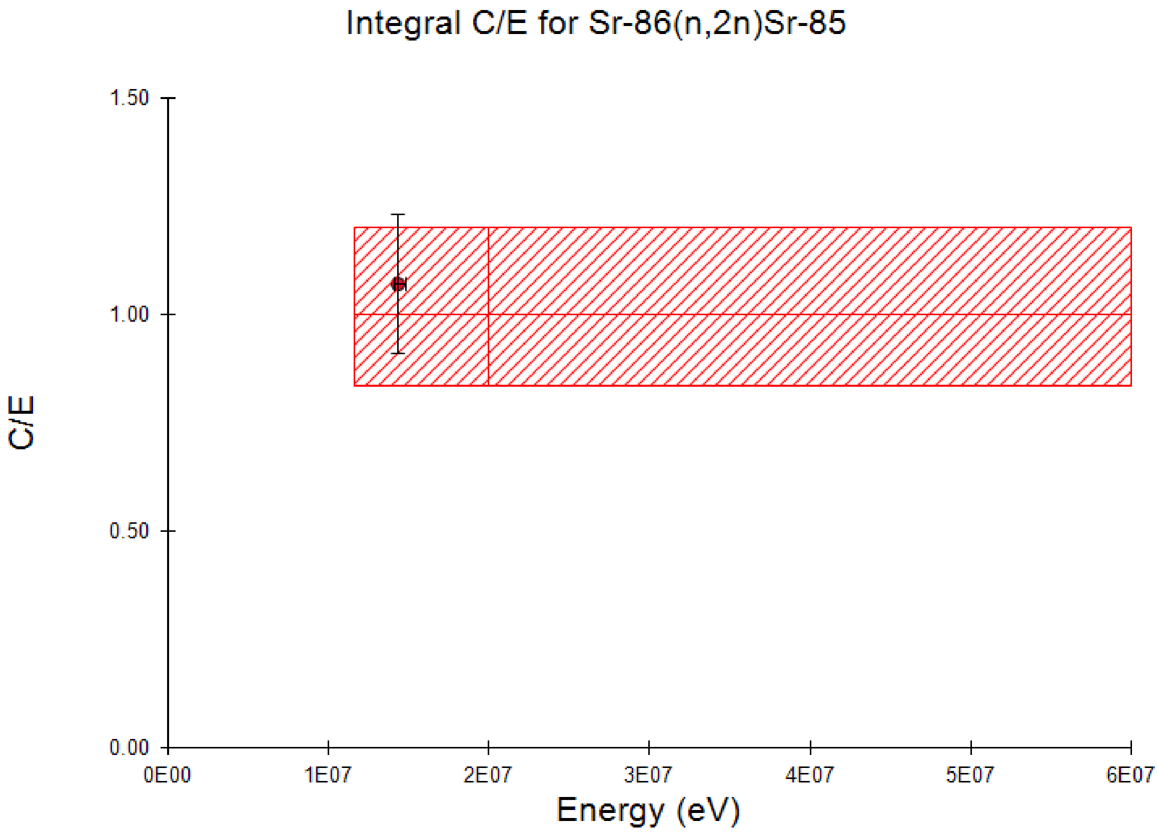
Integral C/E for As-75(n,α)Ga-72
C/E
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)



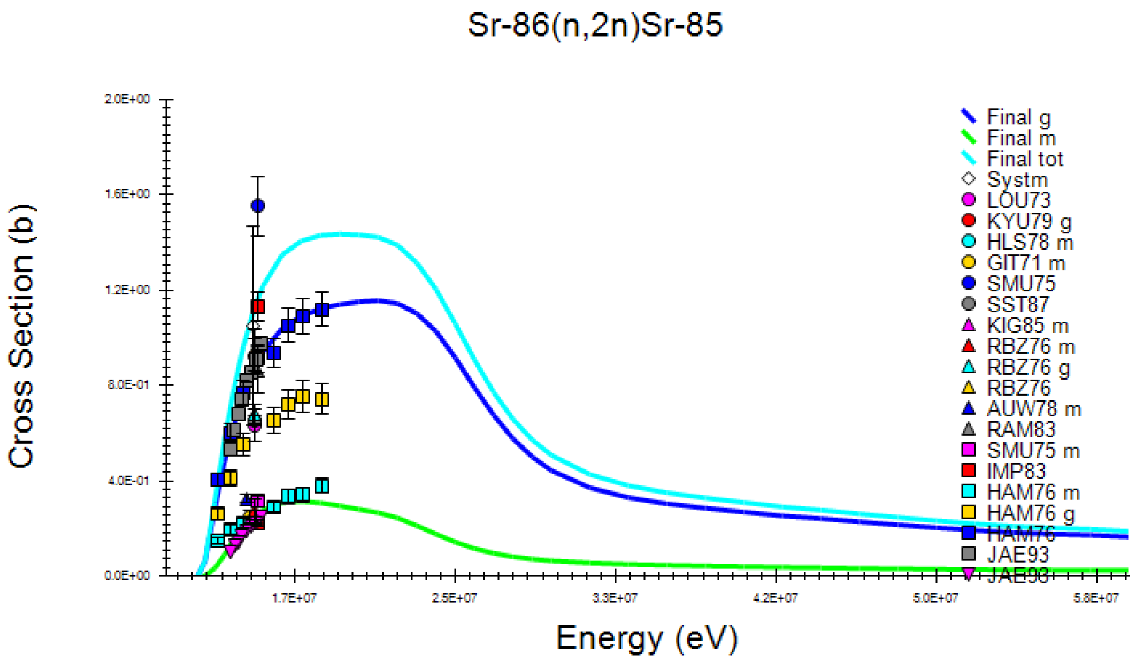
As-75(n,α)Ga-72
Cross Section (b)
Energy (eV)
Final
Systm
Sys20
KAZ67
BHU86
LOU78
AUW69
HAM66
JUL71
ARK76
GIT71
JAE93
JUL94
IBJ80
IBJ75
HAM67
LAS61


Integral C/E for Rb-85(n,2n)Rb-84
C/E
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)

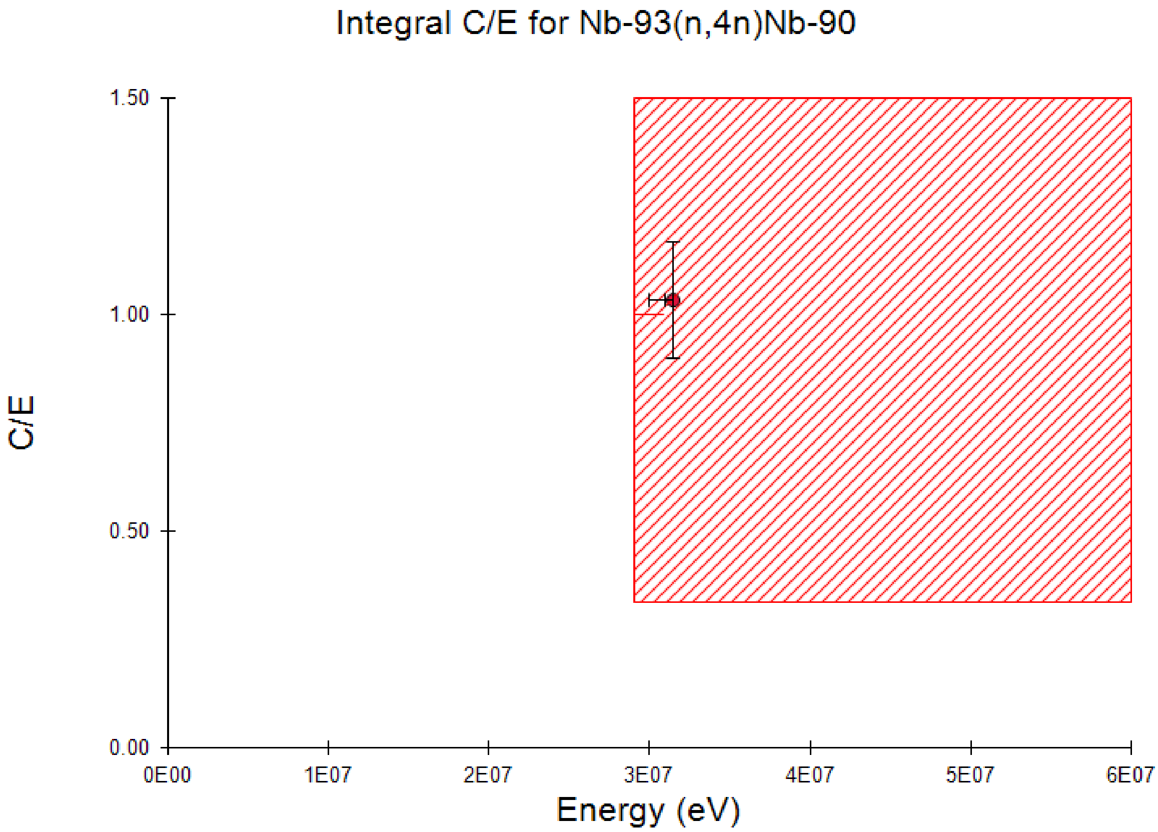

Rb-85(n,2n)Rb-84
Cross Section (b)
Energy (eV)
Final g
Final m
Final tot
Systm
KIG85 m
IRK76 m
LND79 m
TRM79 m
AEP98
SMU77 g
MOH82 g
AUB74
AUB74 m
HAM76
HAM76 m
IBJ76 g
IBJ76
JAE93
JAE93 m
AEP90
HAM68 g
HAM68
AEP90 m
IBJ76 m
HAM68 m

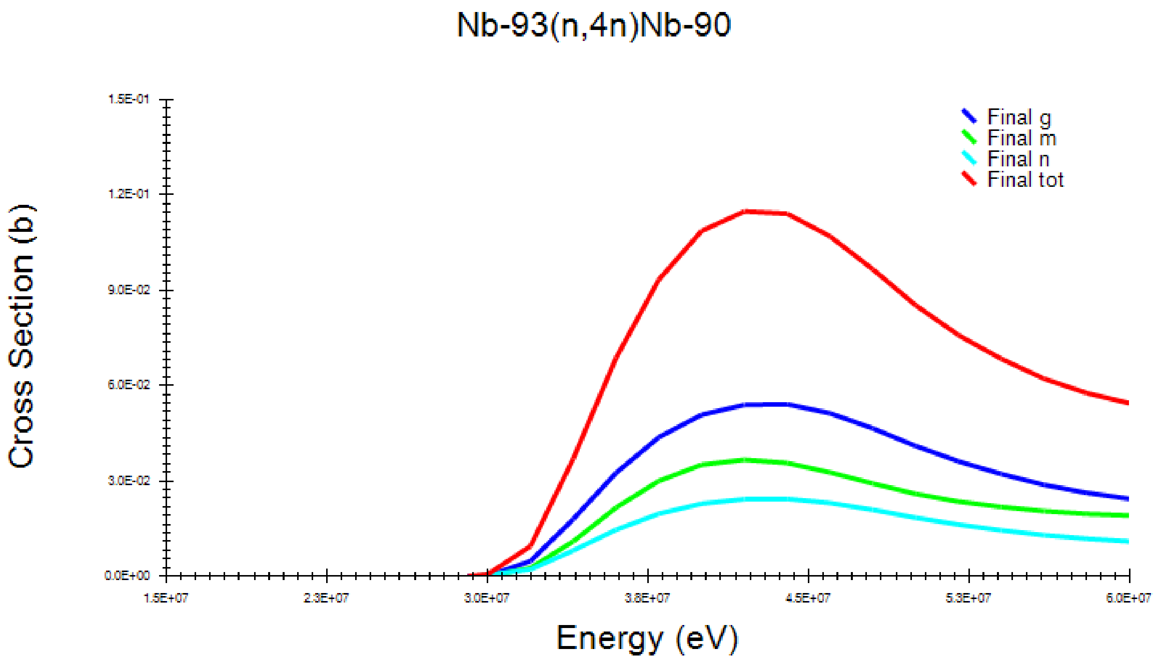


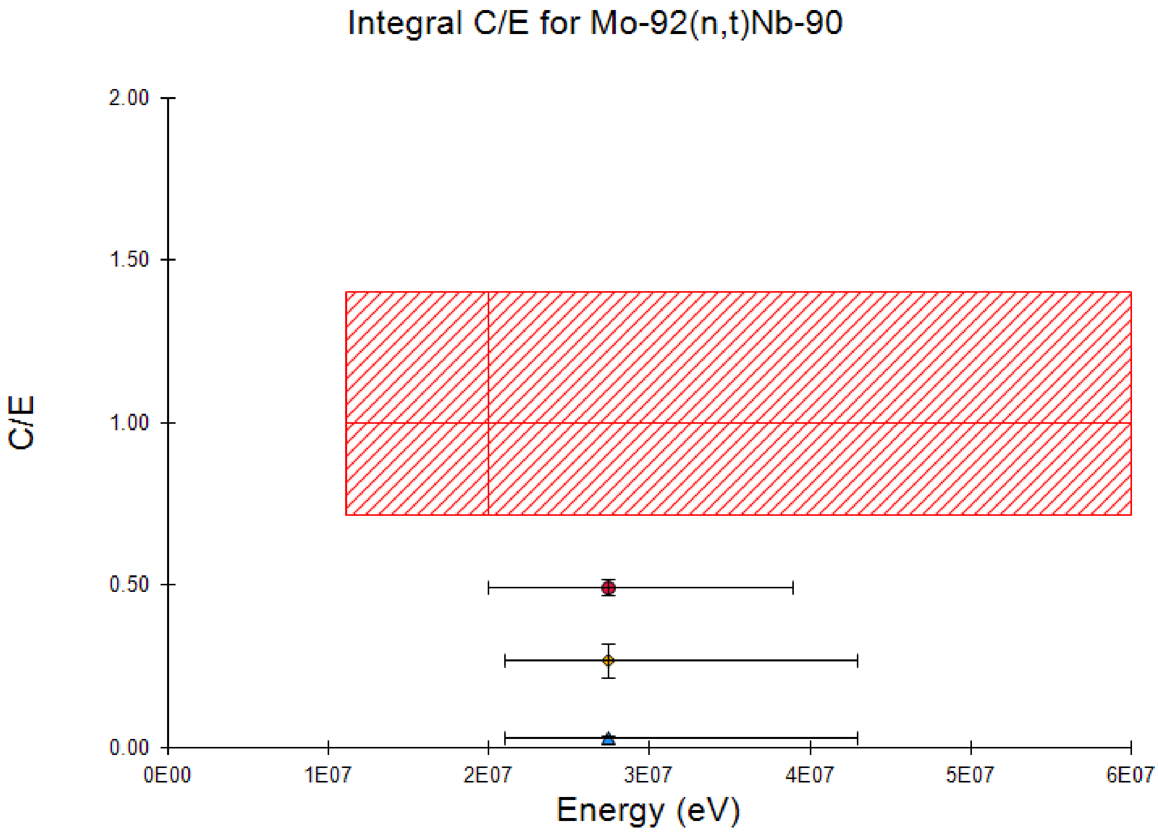
Integral C/E for Sr-86(n,2n)Sr-85
C/E
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)



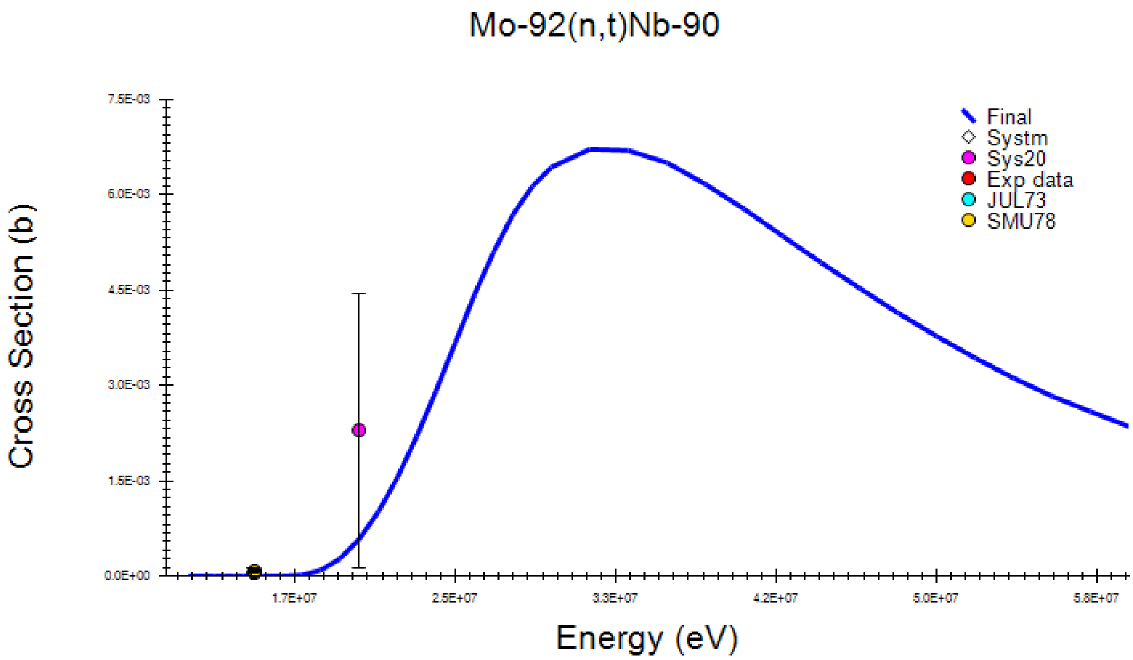
Sr-86(n,2n)Sr-85
Cross Section (b)
Energy (eV)
Final g
Final m
Final tot
Systm
LOU73
KYU79 g
HLS78 m
GIT71 m
SMU75
SST87
KIG85 m
RBZ76 m
RBZ76 g
RBZ76
AUW78 m
RAM83
SMU75 m
IMP83
HAM76 m
HAM76 g
HAM76
JAE93
JAE98


Integral C/E for Nb-93(n,4n)Nb-90
1.50
1.00
0.50
0.00
C/E
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)

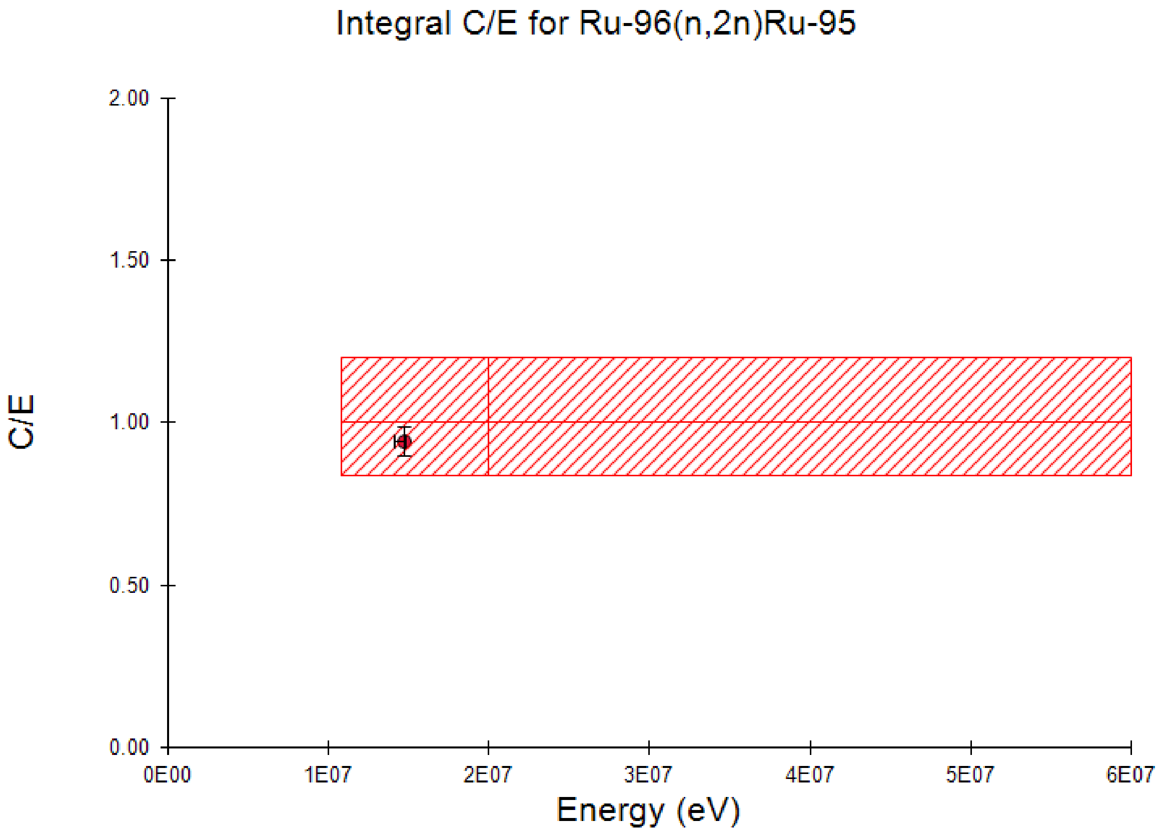

Nb-93(n,4n)Nb-90
Final g
Final m
Final n
Final tot
Cross Section (b)
Energy (eV)



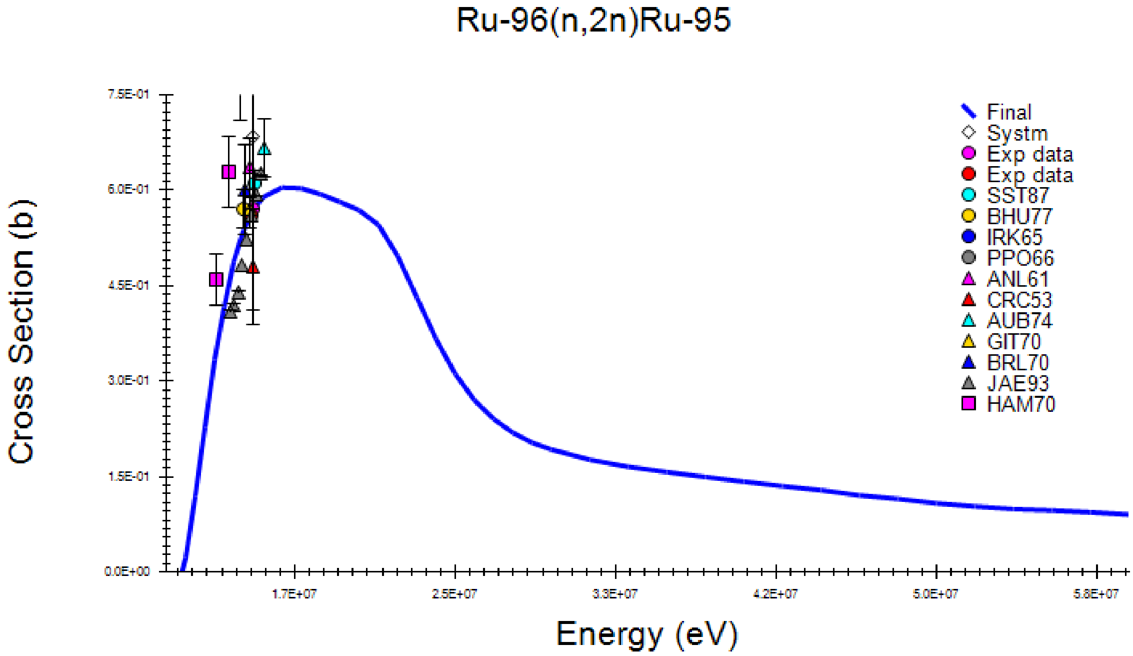
Integral C/E for Mo-92(n,t)Nb-90
C/E
2.00
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)



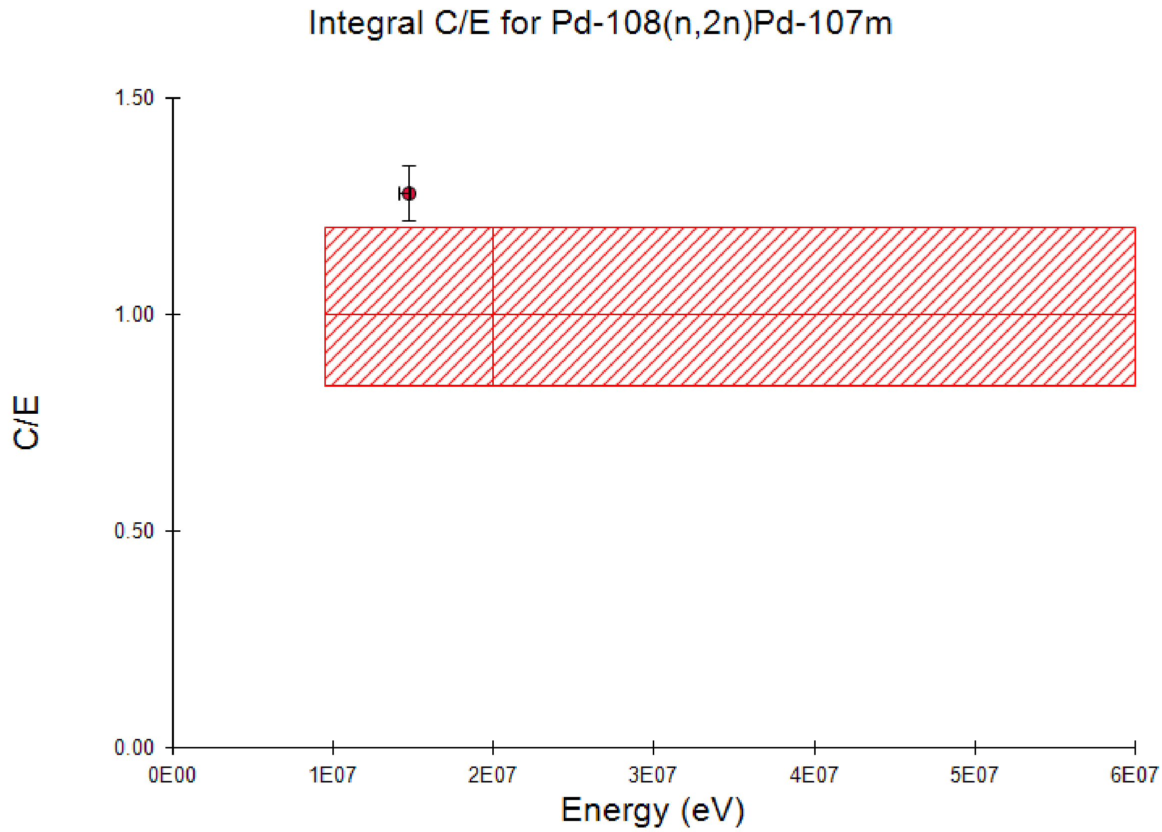
Mo-92(n,t)Nb-90
Cross Section (b)
Final
Systm
Sys20
Exp data
JUL73
SMU78
Energy (eV)

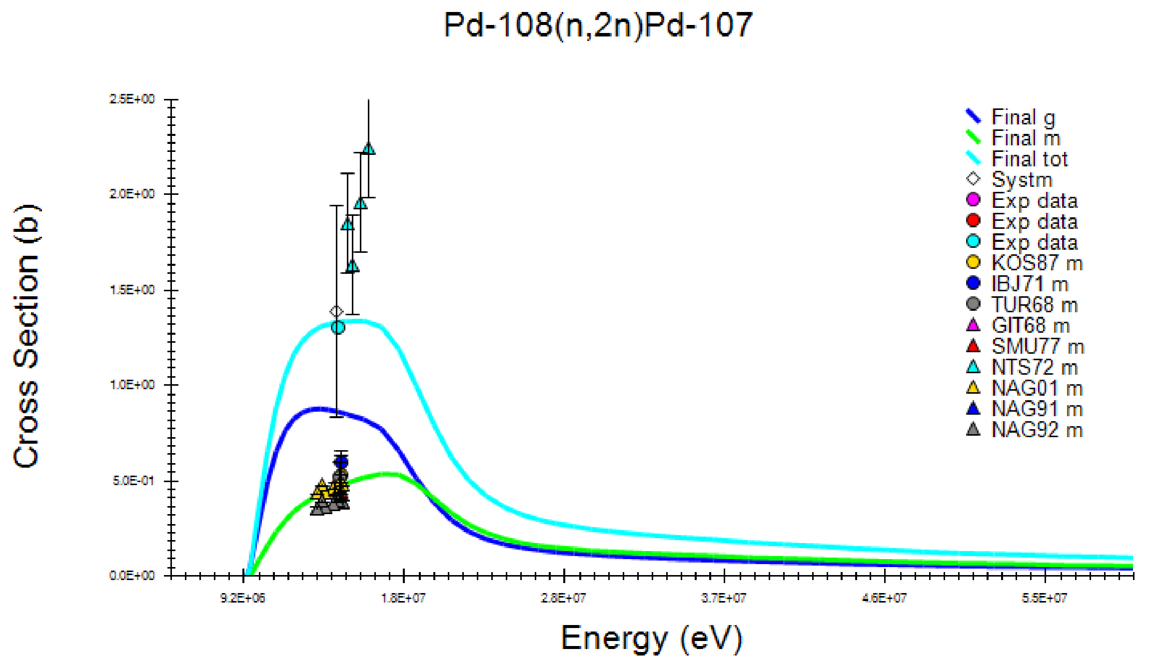


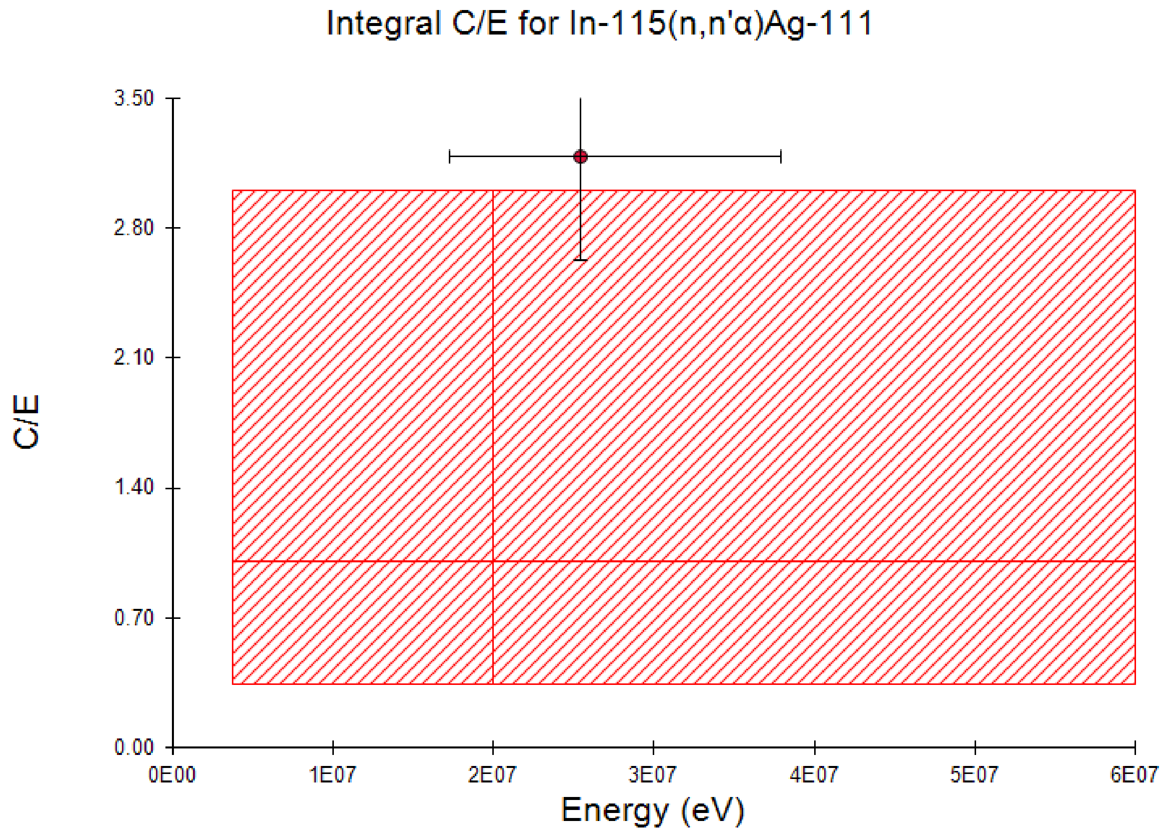
Integral C/E for Ru-96(n,2n)Ru-95
C/E
2.00
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)

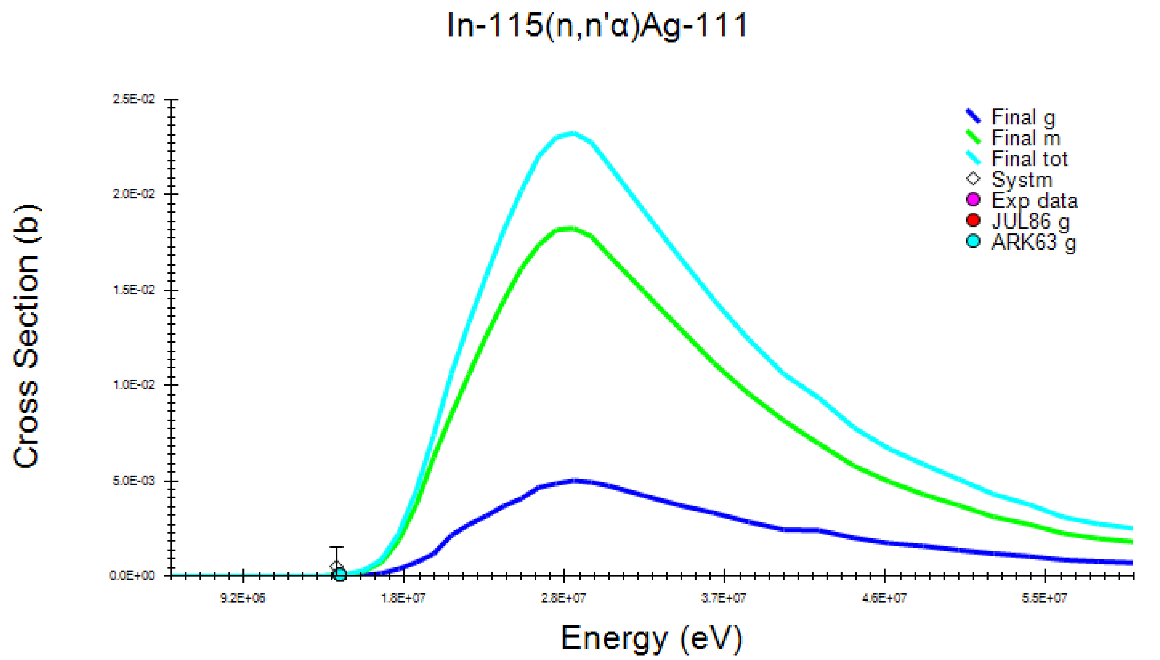


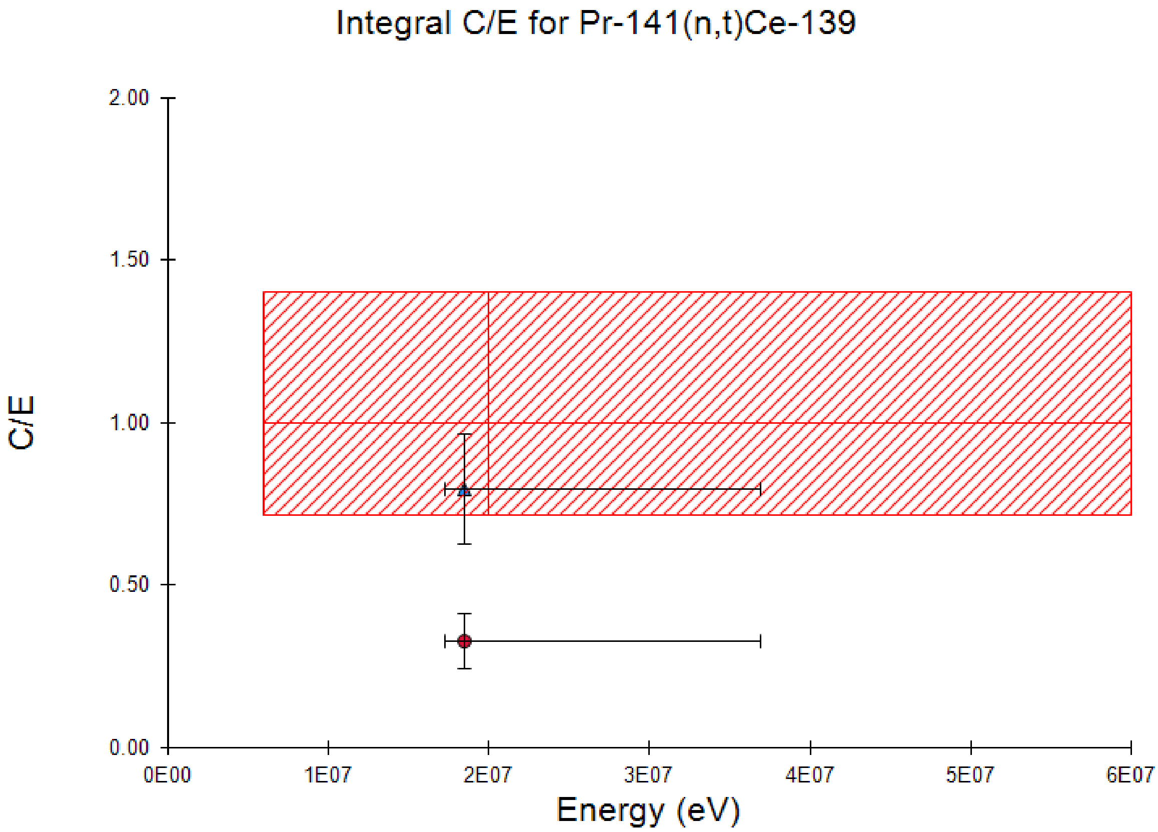
Ru-96(n,2n)Ru-95
Cross Section (b)
Energy (eV)
Final
Systm
Exp data
Exp data
SST87
BHU77
IRK65
PPO66
ANL61
CRC53
AUB74
GIT70
BRL70
JAE93
HAM70


Integral C/E for Pd-108(n,2n)Pd-107m
C/E
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)

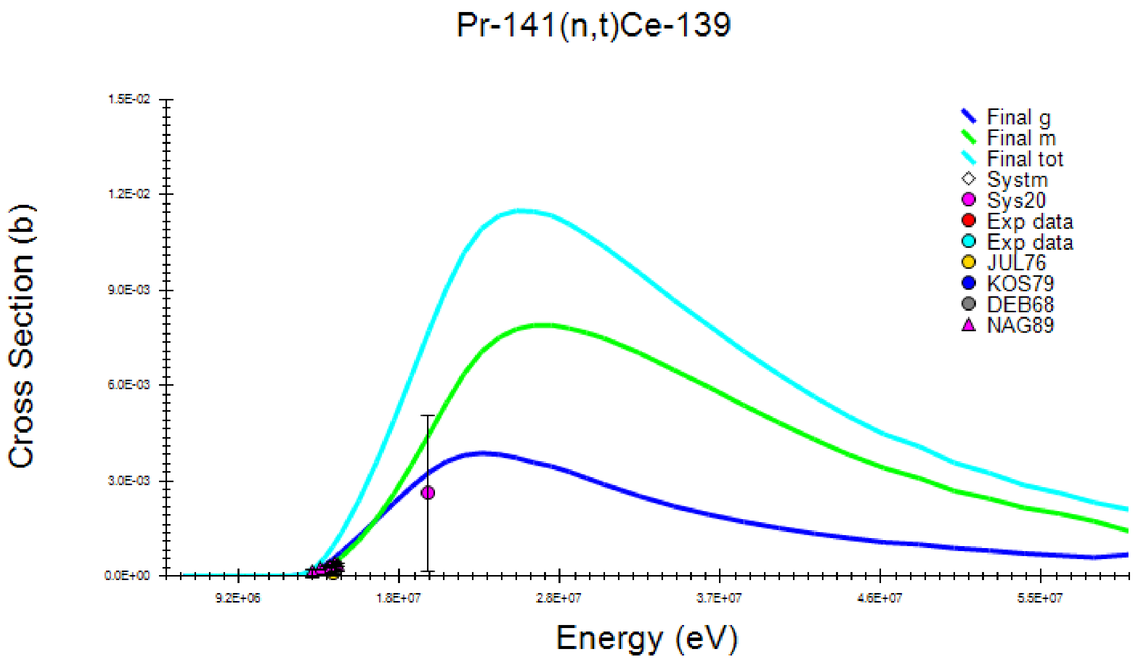

Pd-108(n,2n)Pd-107
Cross Section (b)
Energy (eV)
Final g
Final m
Final tot
Systm
Exp data
Exp data
Exp data
KOS87 m
IBJ71 m
TUR68 m
GIT68 m
SMU77 m
NTS72 m
NAG01 m
NAG91 m
NAG92 m


Integral C/E for In-115(n,n'α)Ag-111
C/E
3.50
2.80
2.10
1.40
0.70
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)

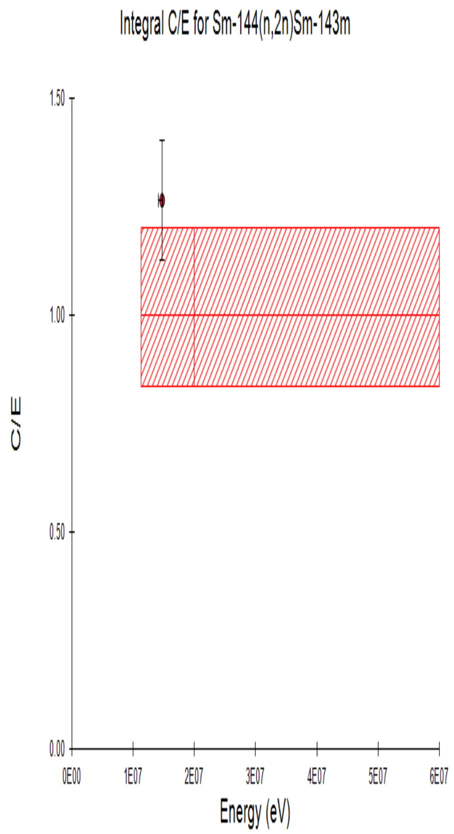

In-115(n,n'α)Ag-111
Cross Section (b)
2.5E-02
2.0E-02
1.5E-02
1.0E-02
5.0E-03
0.0E+00
9.2E+06
1.8E+07
2.8E+07
3.7E+07
4.6E+07
5.5E+07
Energy (eV)
Final g
Final m
Final tot
Systm
Exp data
JUL86 g
ARK63 g

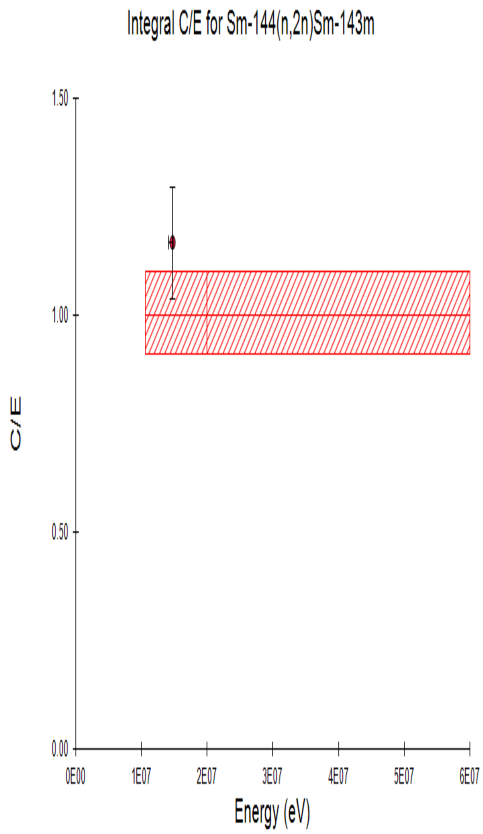


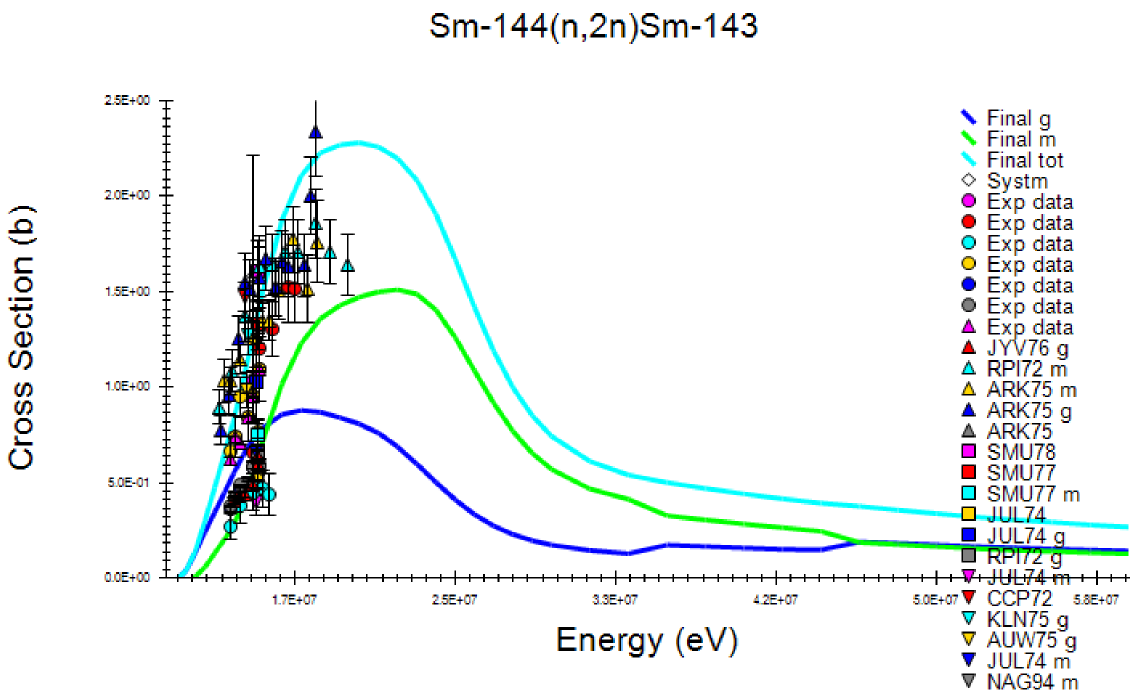
Integral C/E for Pr-141(n,t)Ce-139
C/E
2.00
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)

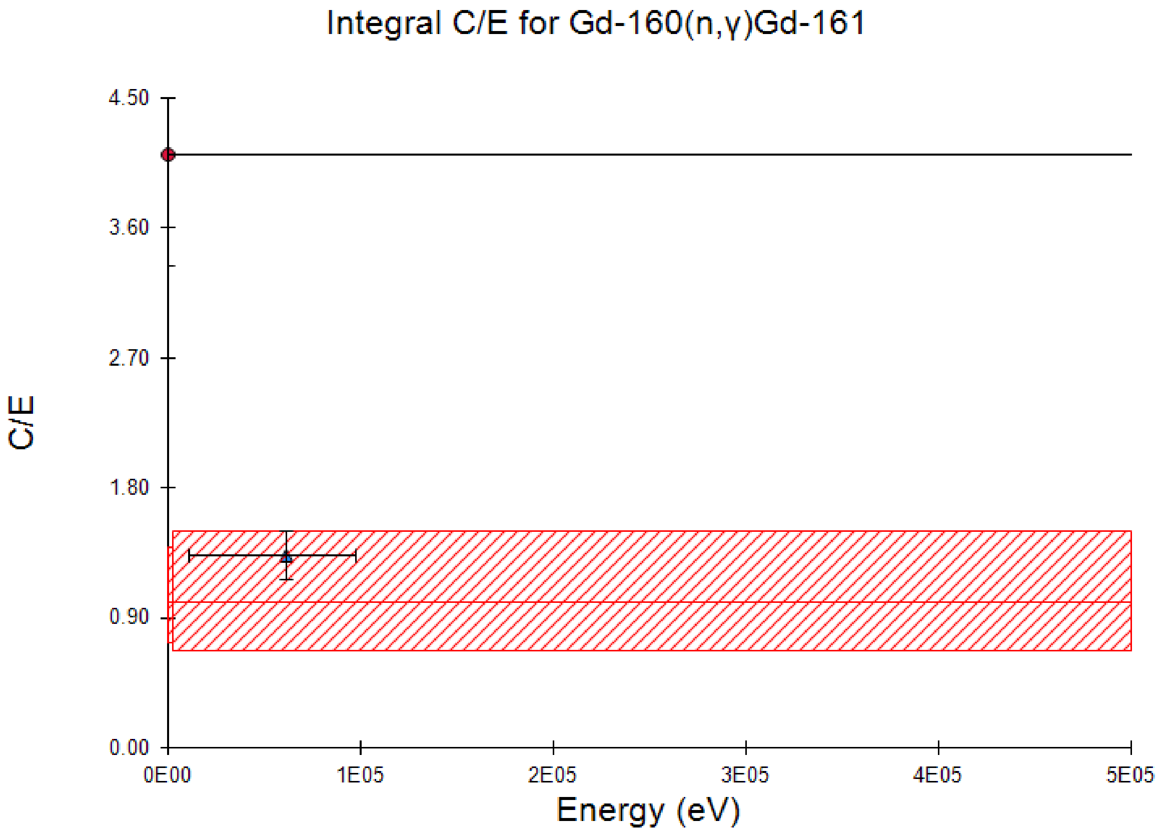


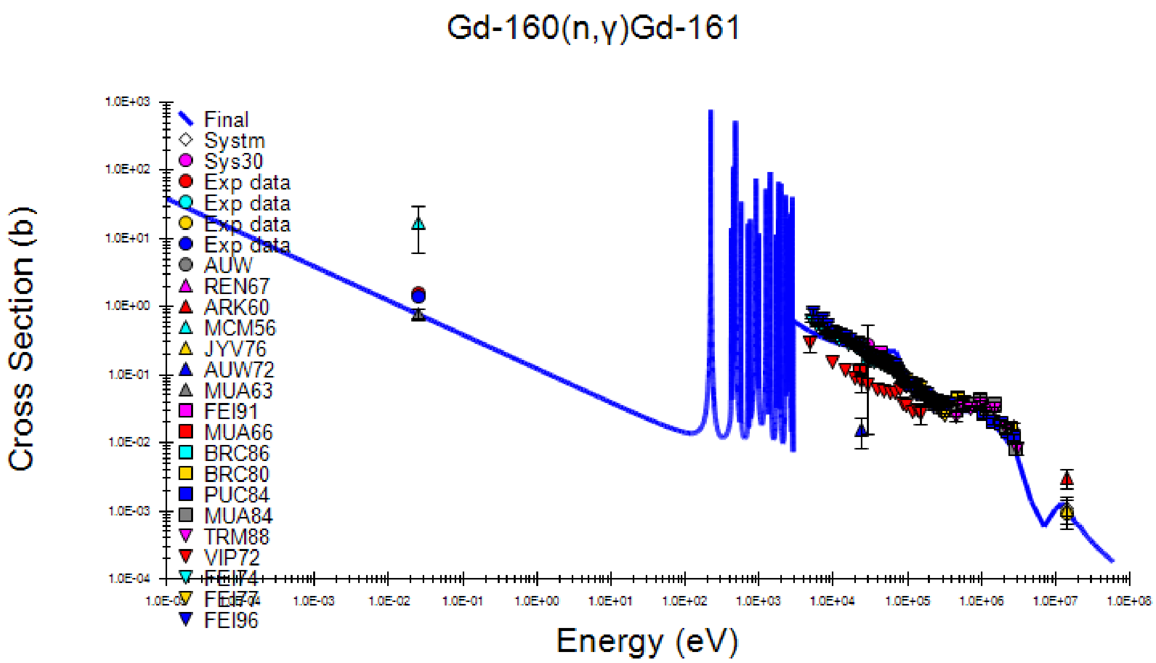
Pr-141(n,t)Ce-139
Cross Section (b)
Final g
Final m
Final tot
Systm
Sys20
Exp data
Exp data
JUL76
KOS79
DEB68
NAG89
Energy (eV)

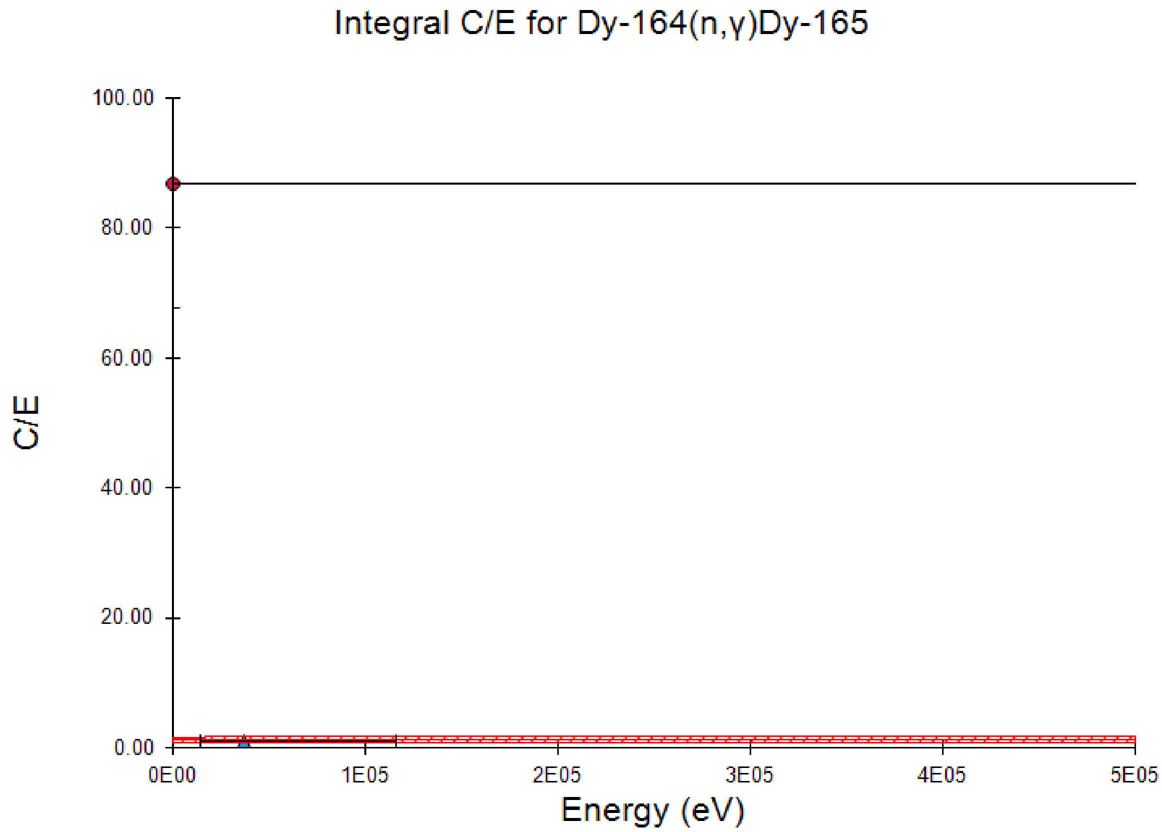

Integral C/E for Sm-144(n,2n)Sm-143m
C/E
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)


Integral C/E for Sm-144(n,2n)Sm-143m
C/E
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)

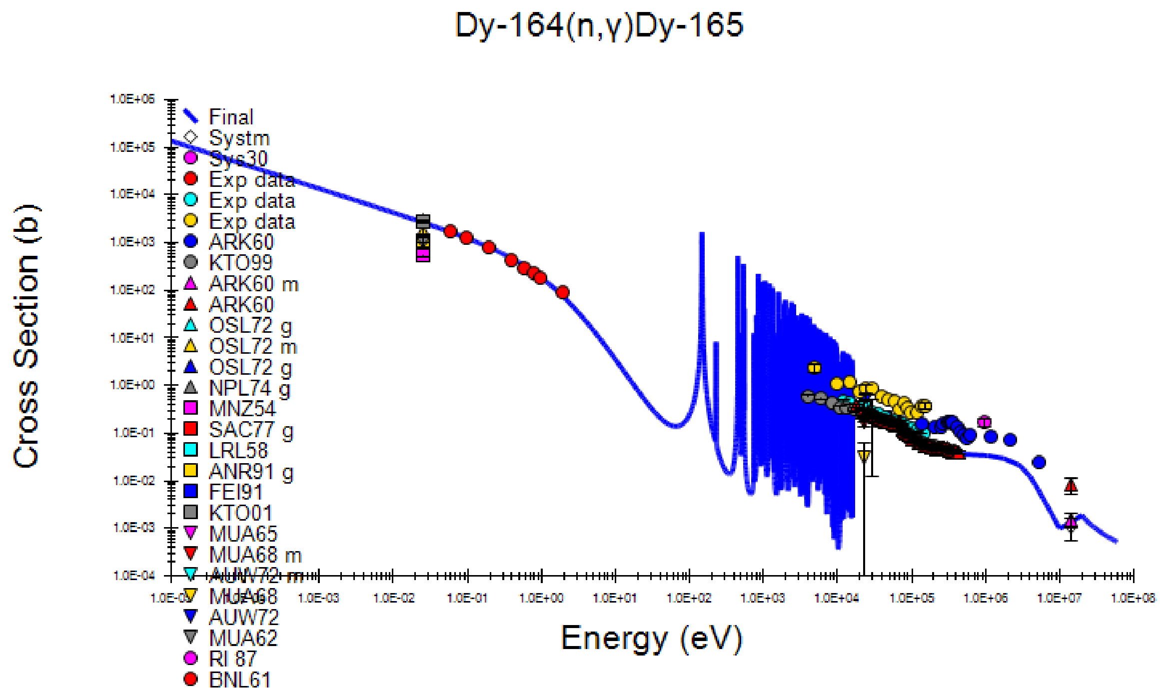

Sm-144(n,2n)Sm-143
Cross Section (b)
2.5E+00
2.0E+00
1.5E+00
1.0E+00
5.0E-01
0.0E+00
1.7E+07
2.5E+07
3.3E+07
4.2E+07
5.0E+07
5.8E+07
Energy (eV)
Final g
Final m
Final tot
Systm
Exp data
Exp data
Exp data
Exp data
Exp data
Exp data
Exp data
JYV76 g
RPI72 m
ARK75 m
ARK75 g
ARK75
SMU78
SMU77
SMU77 m
JUL74
JUL74 g
RPI72 g
JUL74 m
CCP72
KLN75 g
AUW75 g
JUL74 m
NAG94 m


Integral C/E for Gd-160(n,γ)Gd-161
4.50
3.60
2.70
1.80
0.90
0.00
C/E
0E00
1E05
2E05
3E05
4E05
5E05
Energy (eV)

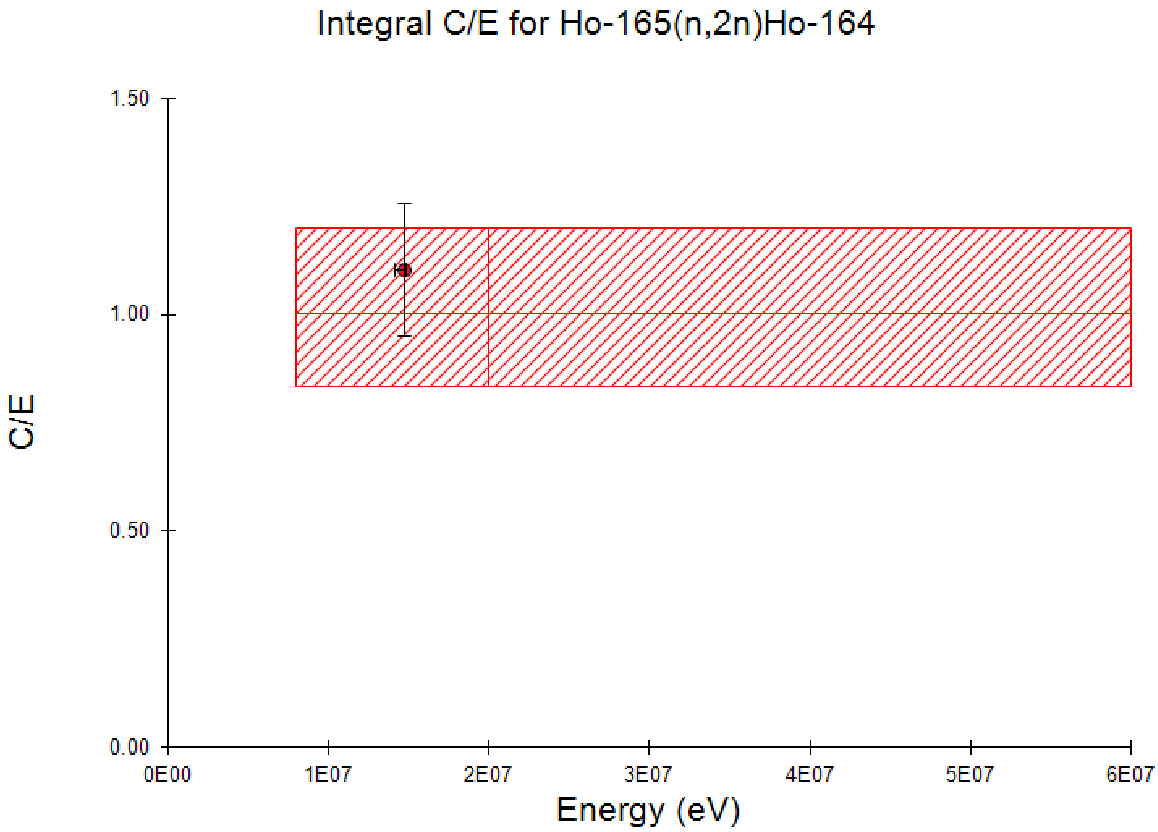

Gd-160(n,γ)Gd-161
Cross Section (b)
Final
Systm
Sys30
Exp data
Exp data
Exp data
Exp data
AUW
REN67
ARK60
MCM56
JYV76
AUW72
MUA63
FEI91
MUA66
BRC86
BRC80
PUC84
MUA84
TRM88
VIP72
FEI74
FEI77
FEI96
Energy (eV)

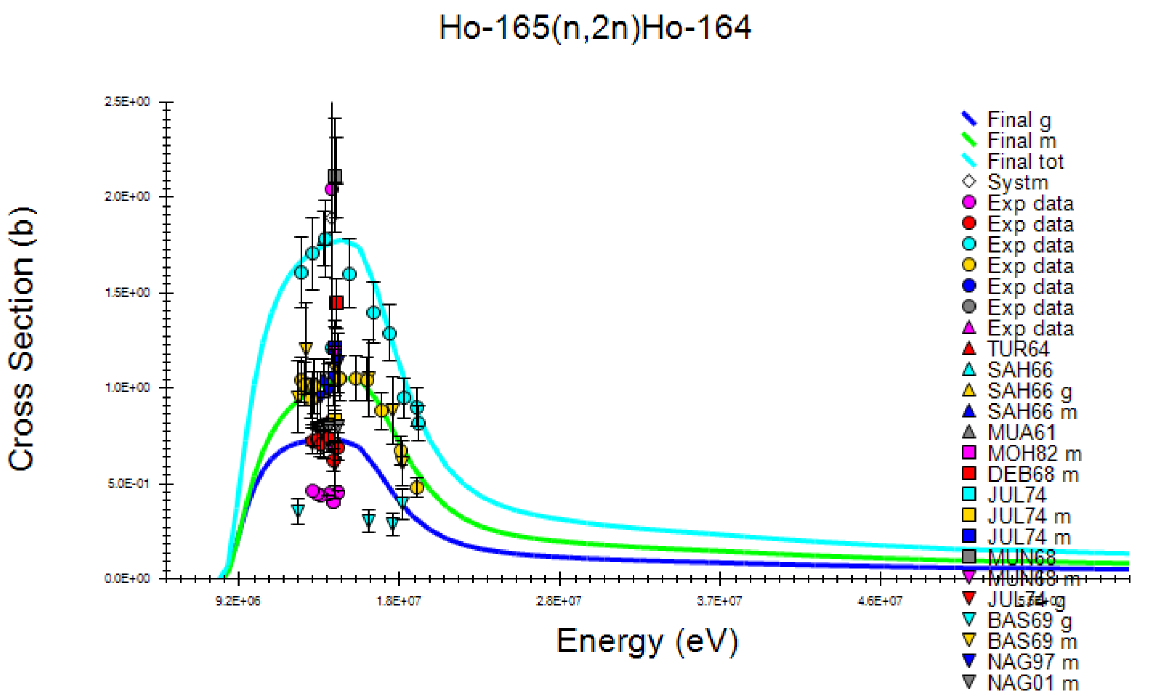


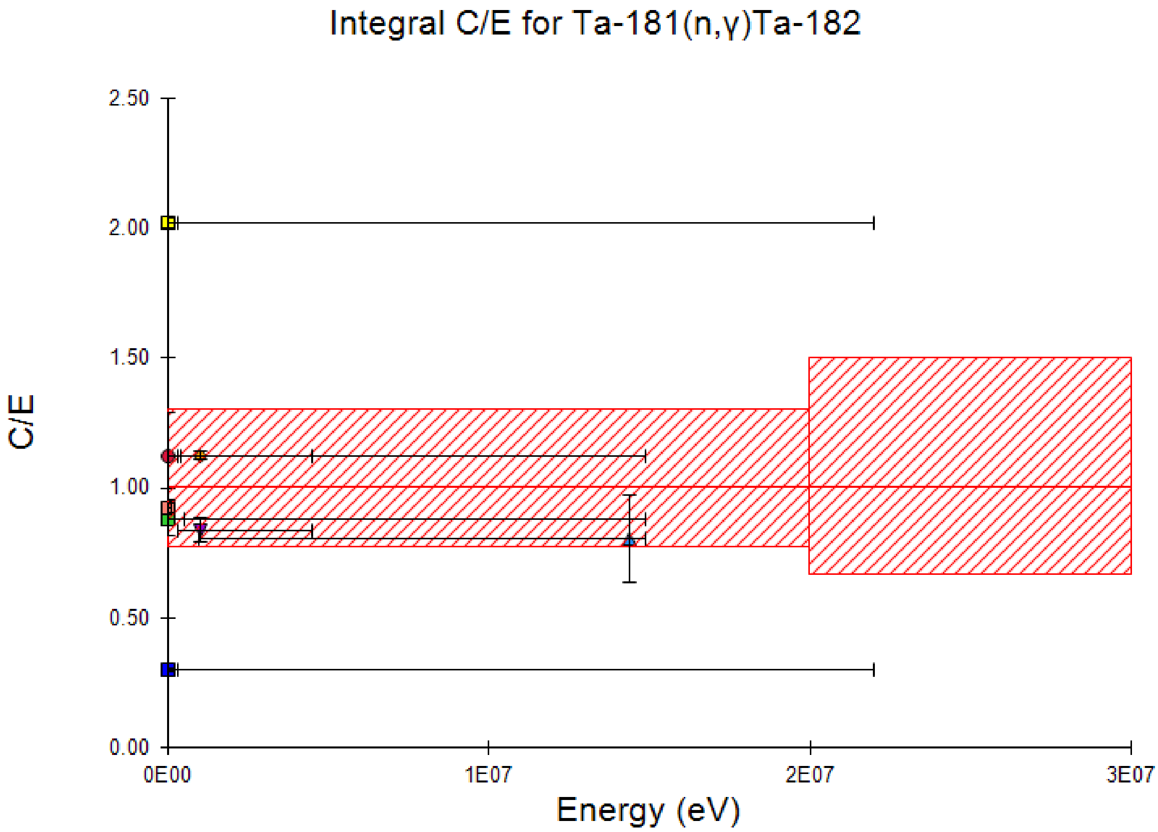
Integral C/E for Dy-164(n,γ)Dy-165
C/E
100.00
80.00
60.00
40.00
20.00
0.00
0E00
1E05
2E05
3E05
4E05
5E05
Energy (eV)

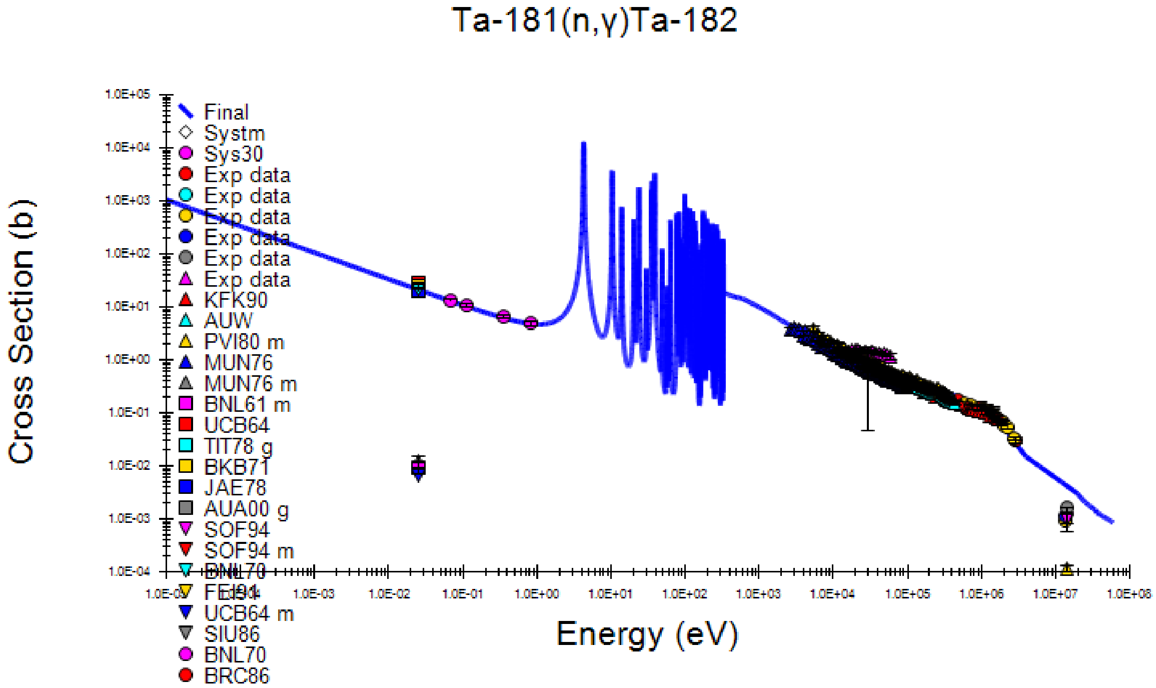


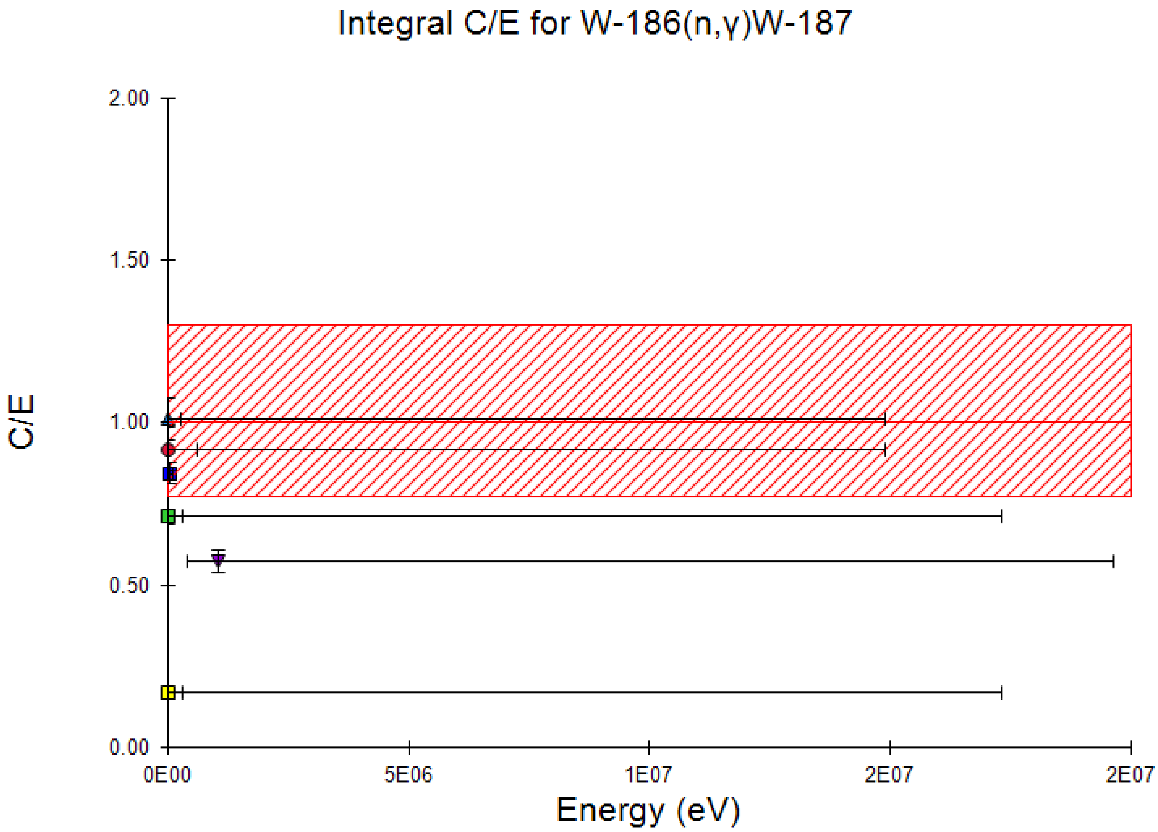
Dy-164(n,γ)Dy-165
Cross Section (b)
Final
Systm
Sys30
Exp data
Exp data
Exp data
ARK60
KTO99
ARK60 m
ARK60
OSL72 g
OSL72 m
OSL72 g
NPL74 g
MNZ54
SAC77 g
LRL58
ANR91 g
FEI91
KTO01
MUA65
MUA68 m
AUW72 m
MUA68
AUW72
MUA62
RI 87
BNL61
Energy (eV)

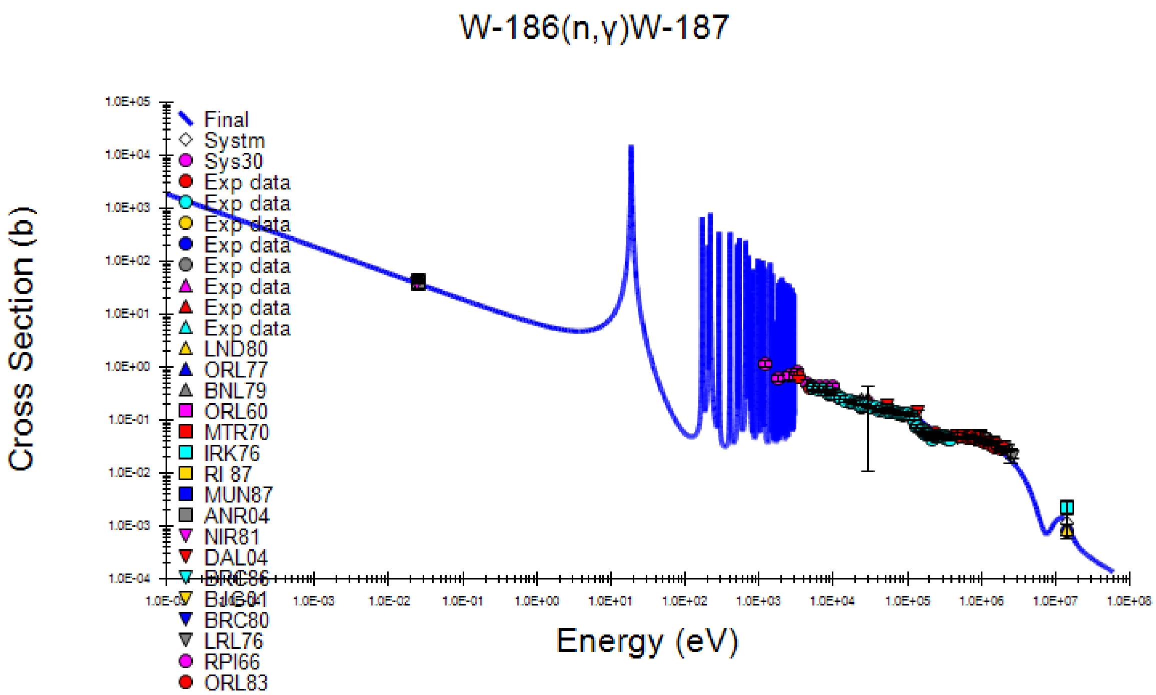

Integral C/E for Ho-165(n,2n)Ho-164
C/E
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)

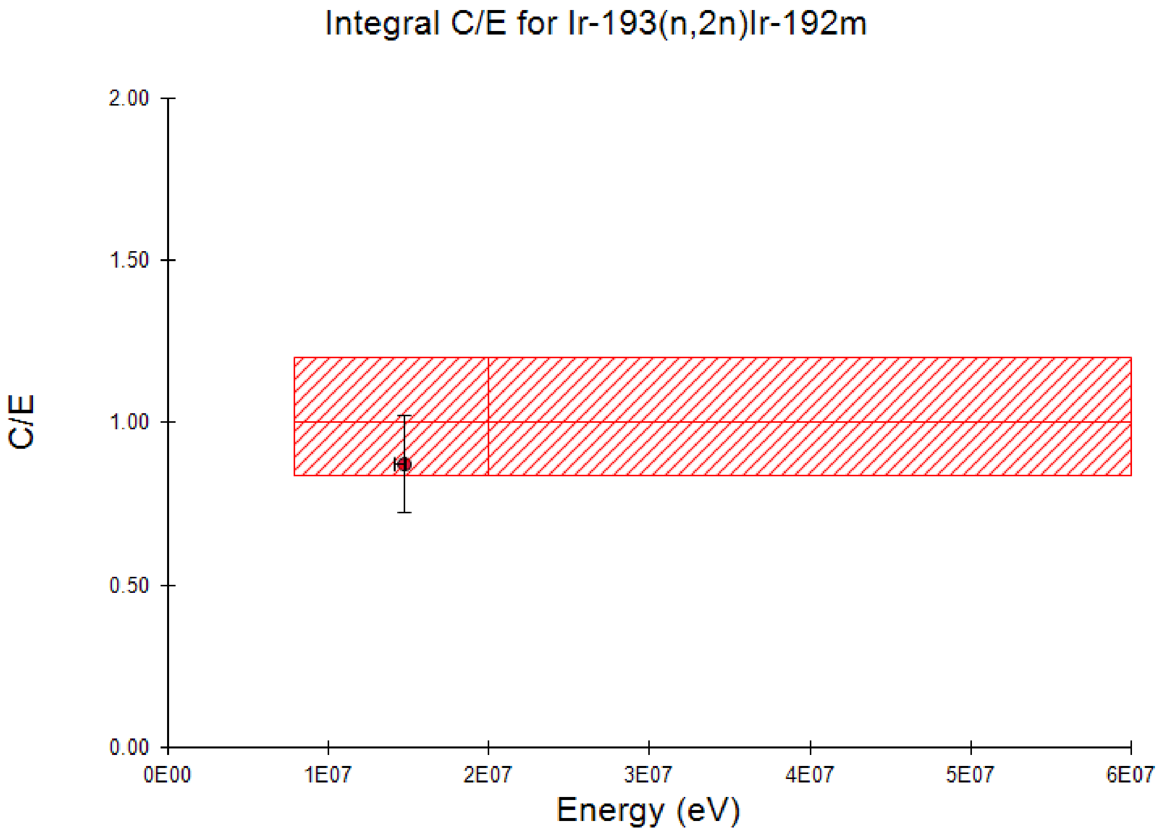

Ho-165(n,2n)Ho-164
Cross Section (b)
Energy (eV)
Final g
Final m
Final tot
Systm
Exp data
Exp data
Exp data
Exp data
Exp data
Exp data
Exp data
TUR64
SAH66
SAH66 g
SAH66 m
MUA61
MOH82 m
DEB68 m
JUL74
JUL74 m
JUL74 m
MUN68
MUN68 m
JUL74 g
BAS69 g
BAS69 m
NAG97 m
NAG01 m

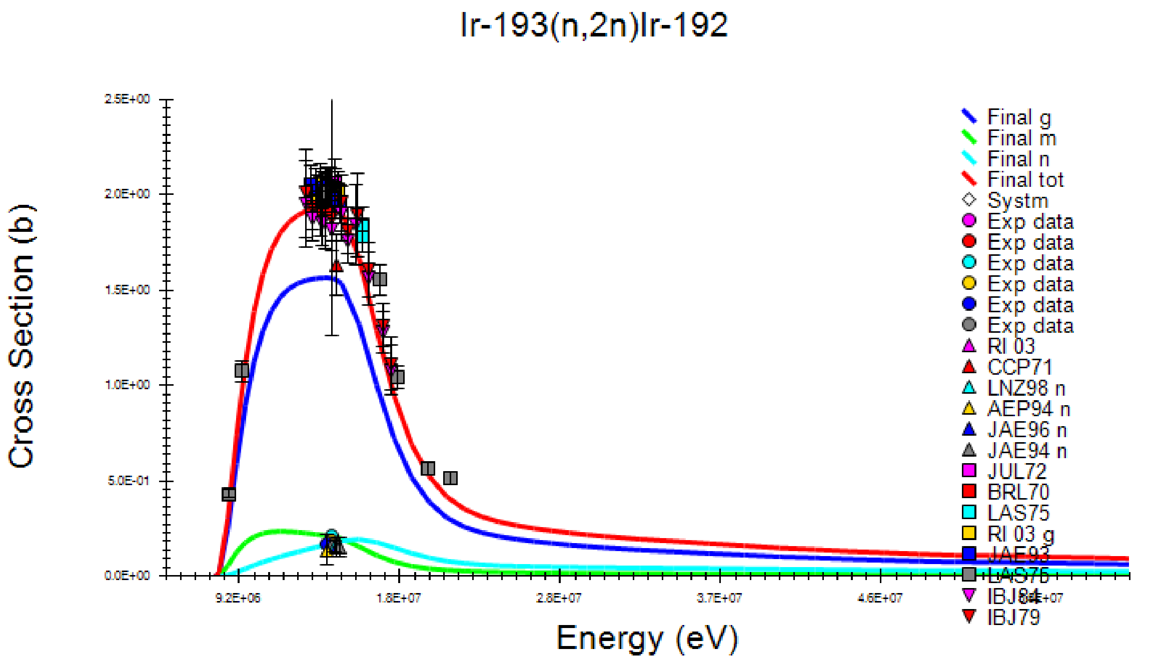

Integral C/E for Ta-181(n,γ)Ta-182
C/E
0.00
0.50
1.00
1.50
2.00
2.50
0E00
1E07
2E07
3E07
Energy (eV)

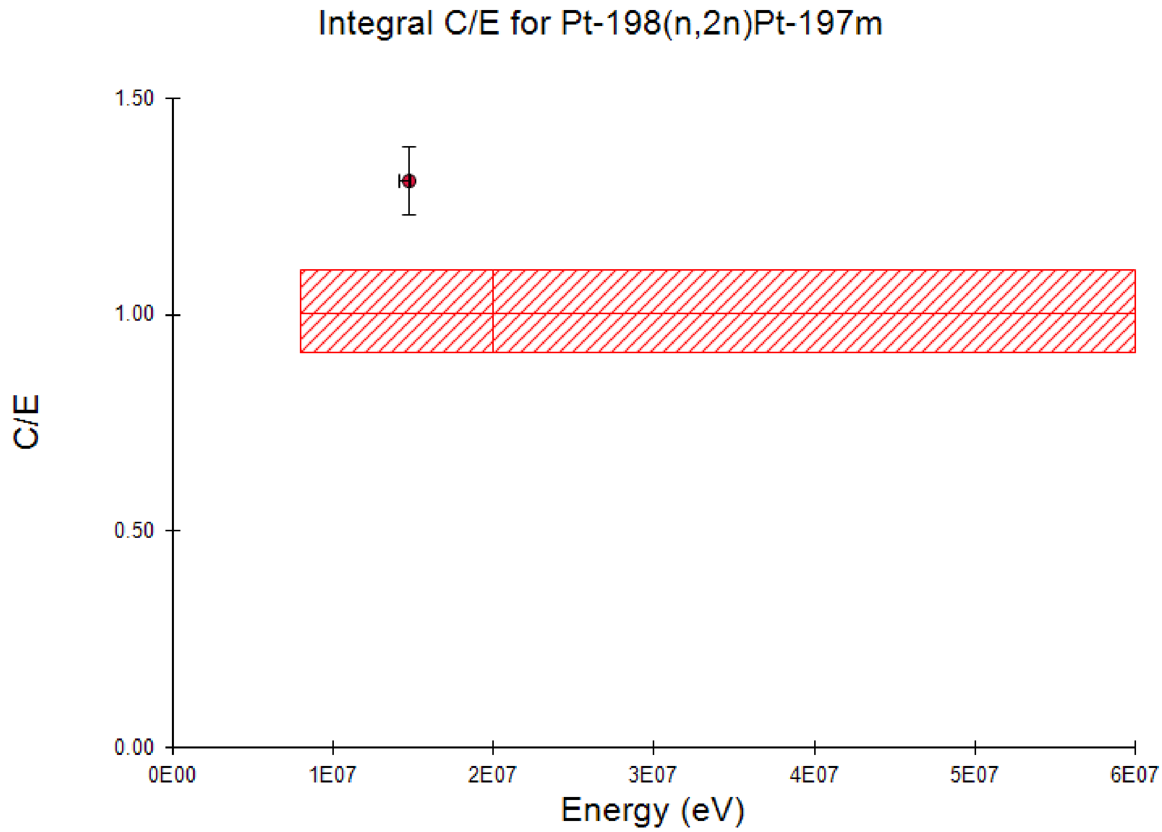

Ta-181(n,γ)Ta-182
Cross Section (b)
Energy (eV)
Final
Systm
Sys30
Exp data
Exp data
Exp data
Exp data
Exp data
Exp data
KFK90
AUW
PVI80 m
MUN76
MUN76 m
BNL61 m
UCB64
TIT78 g
BKB71
JAE78
AUA00 g
SOF94
SOF94 m
BNL70
FEI94
UCB64 m
SIU86
BNL70
BRC86

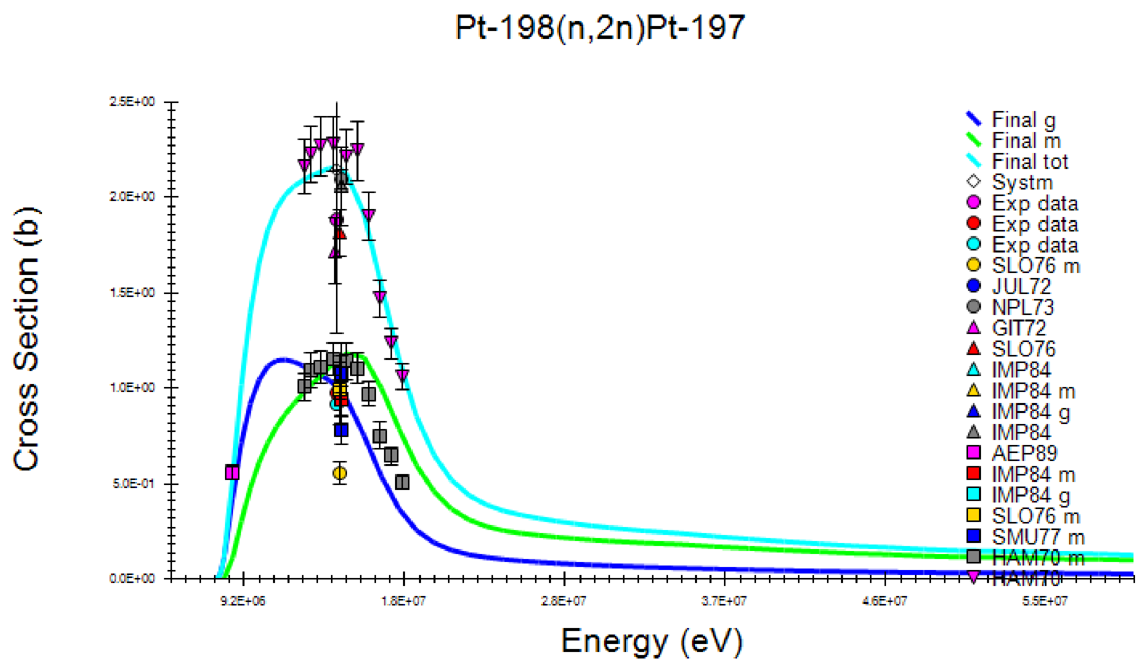

Integral C/E for W-186(n,γ)W-187
C/E
2.00
1.50
1.00
0.50
0.00
0E00
5E06
1E07
2E07
2E07
Energy (eV)

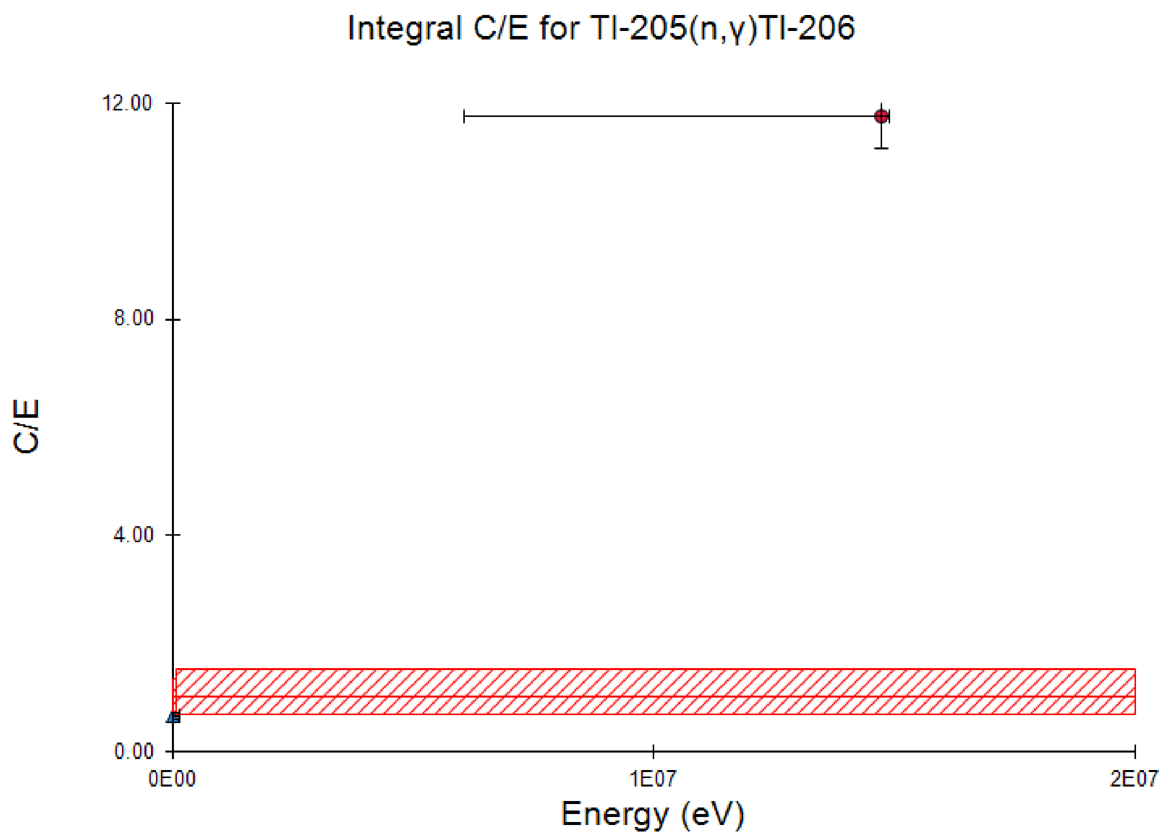

W-186(n,γ)W-187
Cross Section (b)
Final
Systm
Sys30
Exp data
Exp data
Exp data
Exp data
Exp data
Exp data
Exp data
Exp data
LND80
ORL77
BNL79
ORL60
MTR70
IRK76
RI 87
MUN87
ANR04
NIR81
DAL04
BRC86
BJG81
BRC80
LRL76
RPI66
ORL83
Energy (eV)

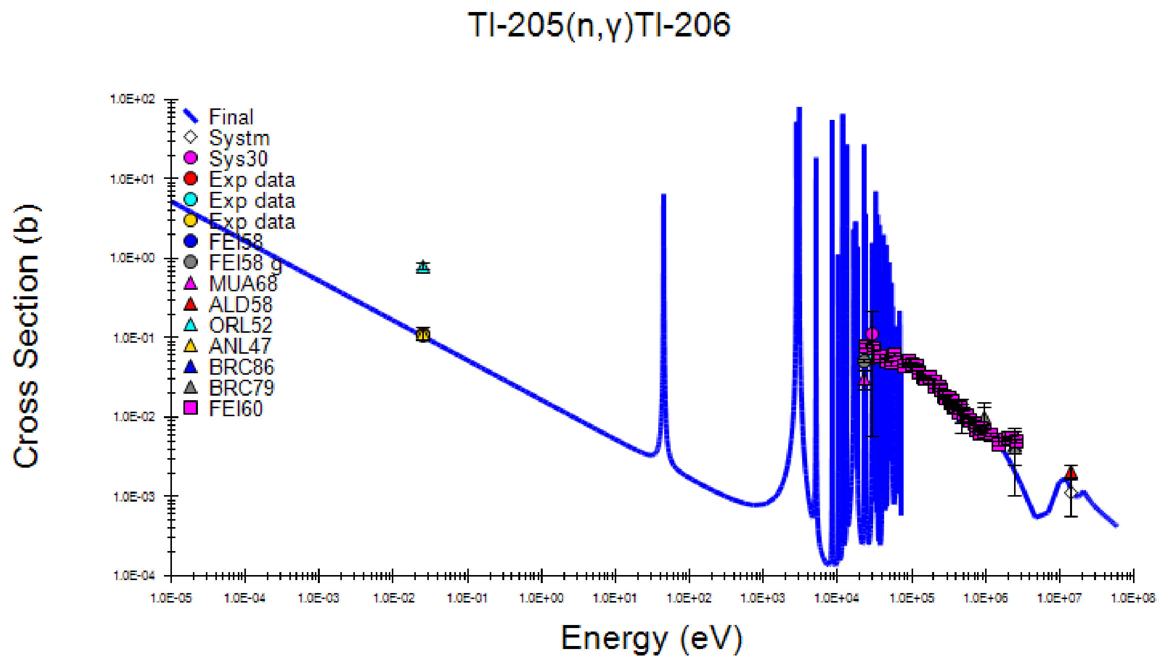

Integral C/E for Ir-193(n,2n)Ir-192m
C/E
2.00
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)

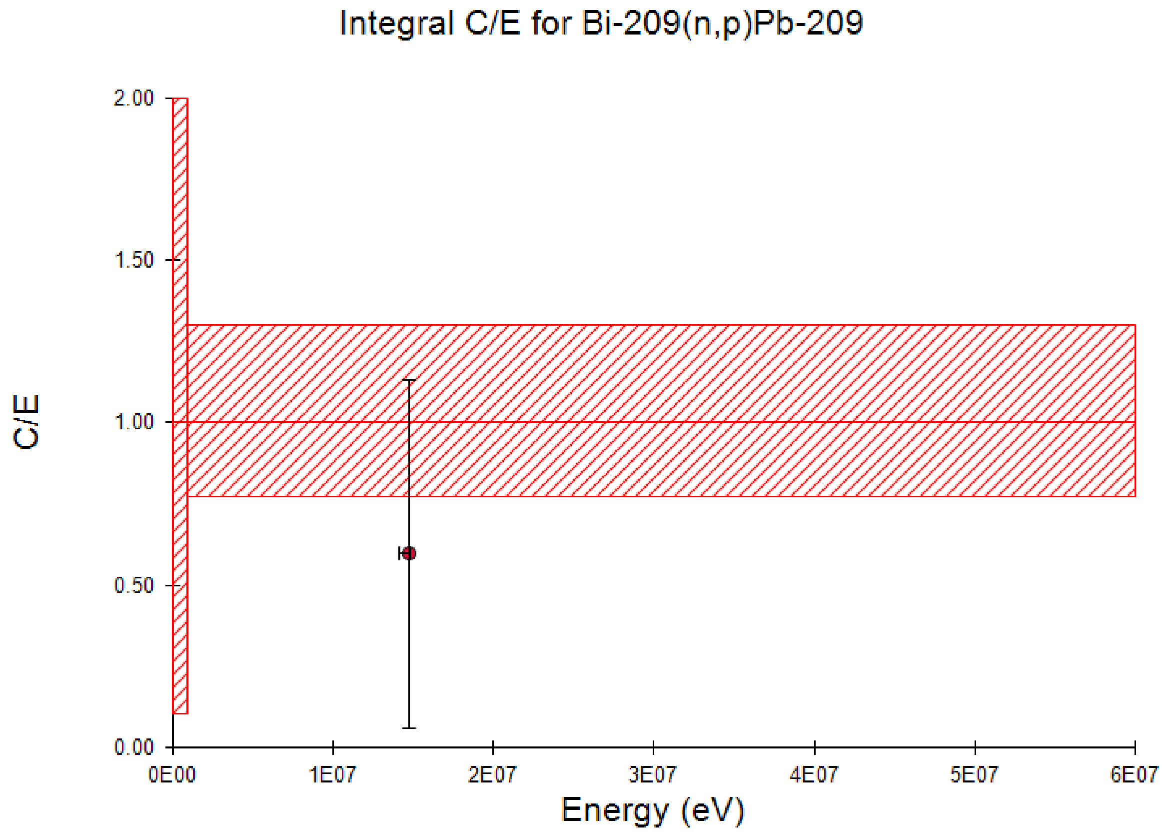

Ir-193(n,2n)Ir-192
Cross Section (b)
Energy (eV)
Final g
Final m
Final n
Final tot
Systm
Exp data
Exp data
Exp data
Exp data
Exp data
Exp data
RI 03
CCP71
LNZ98 n
AEP94 n
JAE96 n
JAE94 n
JUL72
BRL70
LAS75
RI 03 g
JAE93
LAS75
IBJ84
IBJ79

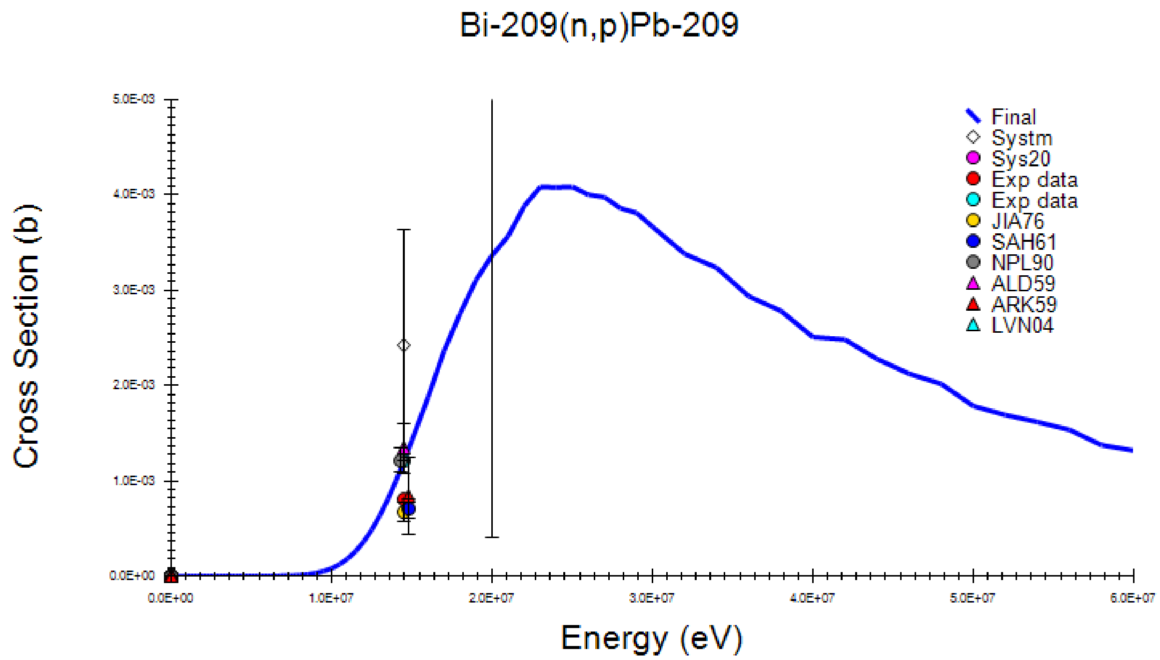

Integral C/E for Pt-198(n,2n)Pt-197m
C/E
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)

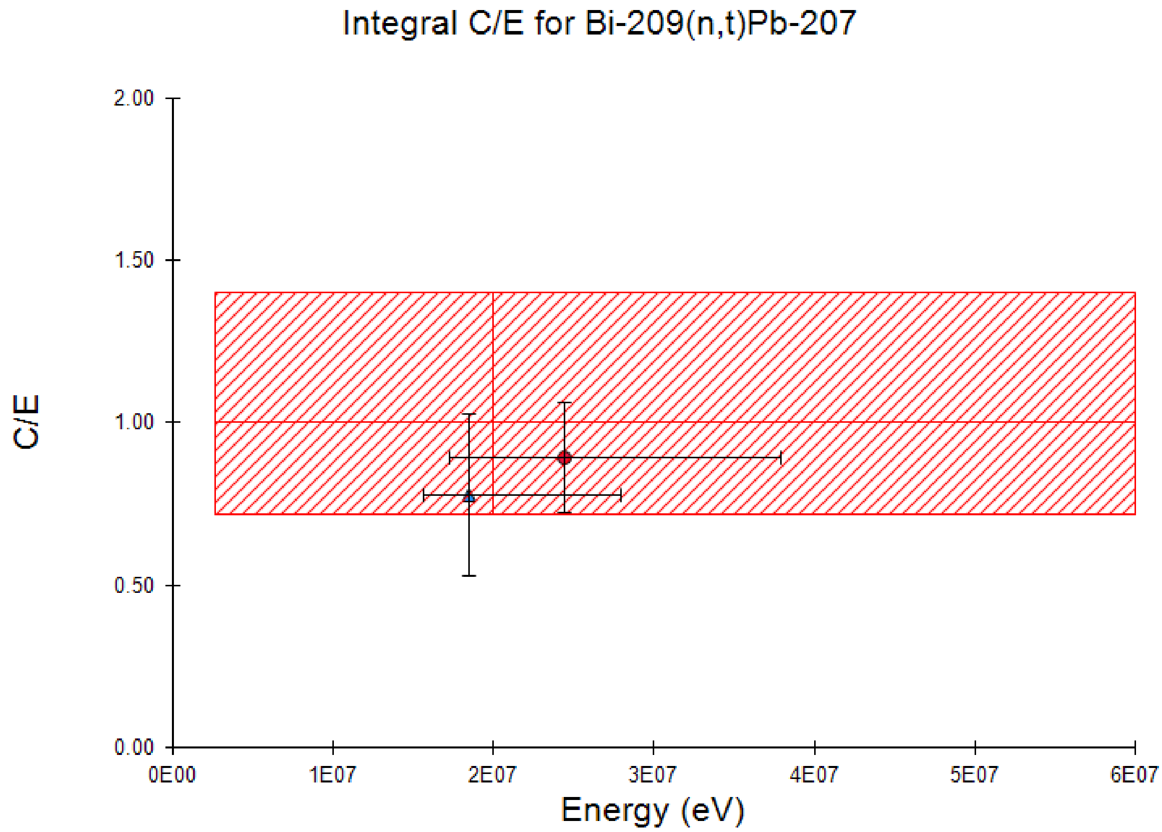

Pt-198(n,2n)Pt-197
Cross Section (b)
2.5E+00
2.0E+00
1.5E+00
1.0E+00
5.0E-01
0.0E+00
9.2E+06
1.8E+07
2.8E+07
3.7E+07
4.6E+07
5.5E+07
Energy (eV)
Final g
Final m
Final tot
Systm
Exp data
Exp data
Exp data
SLO76 m
JUL72
NPL73
GIT72
SLO76
IMP84
IMP84 m
IMP84 g
IMP84
AEP89
IMP84 m
IMP84 g
SLO76 m
SMU77 m
HAM70 m
HAM70

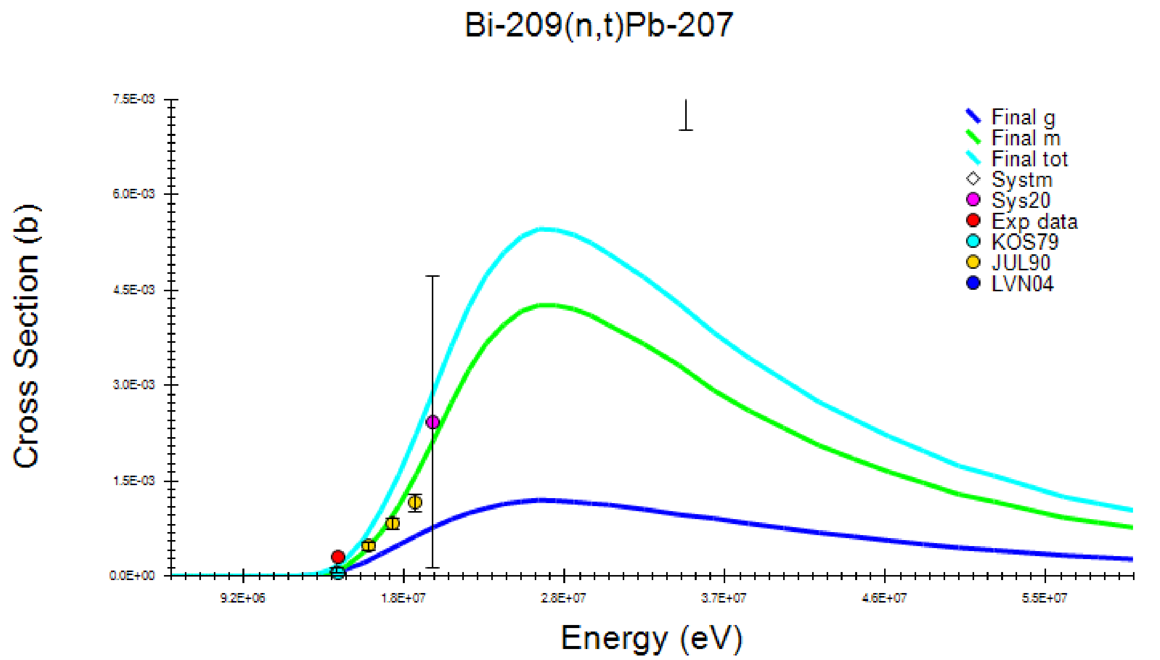

Integral C/E for Tl-205(n,γ)Tl-206
12.00
8.00
4.00
0.00
C/E
0E00
1E07
2E07
Energy (eV)

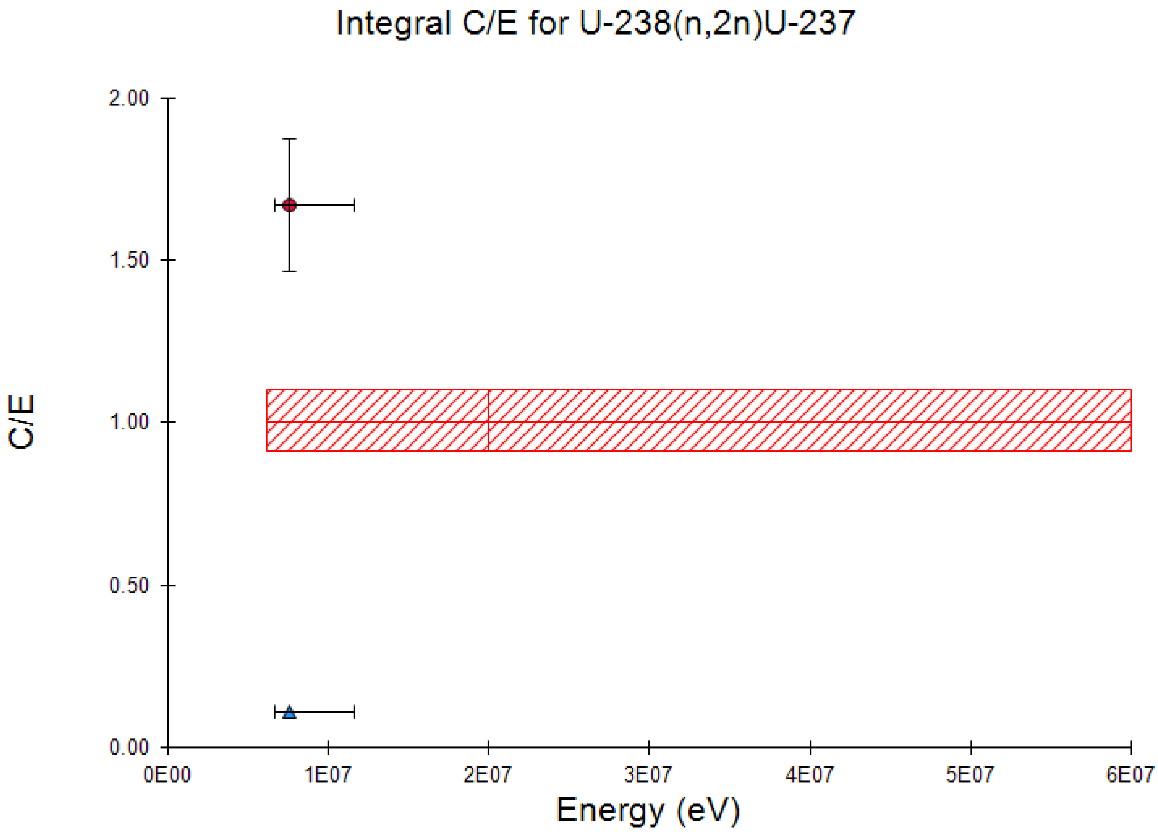

Tl-205(n,γ)Tl-206
1.0E+02
1.0E+01
1.0E+00
1.0E-01
1.0E-02
1.0E-03
1.0E-04
Cross Section (b)
Final
Systm
Sys30
Exp data
Exp data
Exp data
FEI58
FEI58 g
MUA68
ALD58
ORL52
ANL47
BRC86
BRC79
FEI60
1.0E-05
1.0E-04
1.0E-03
1.0E-02
1.0E-01
1.0E+00
1.0E+01
1.0E+02
1.0E+03
1.0E+04
1.0E+05
1.0E+06
1.0E+07
1.0E+08
Energy (eV)

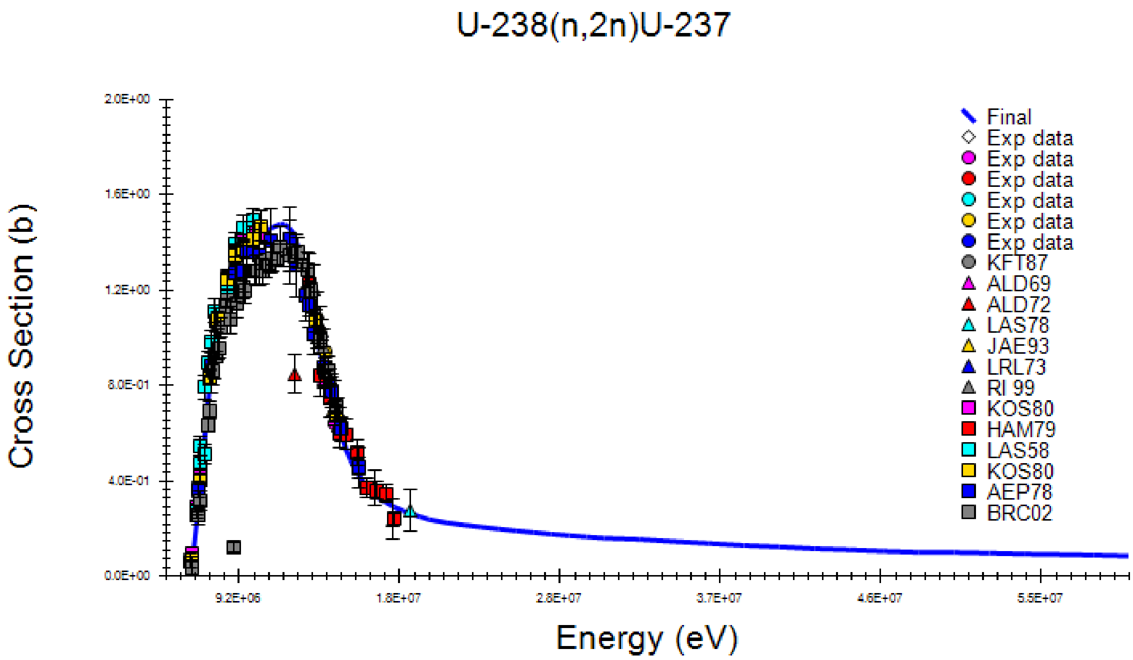

Integral C/E for Bi-209(n,p)Pb-209
C/E
2.00
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)


Bi-209(n,p)Pb-209
Cross Section (b)
Energy (eV)
Final
Systm
Sys20
Exp data
Exp data
JIA76
SAH61
NPL90
ALD59
ARK59
LVN04


Integral C/E for Bi-209(n,t)Pb-207
C/E
2.00
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)


Bi-209(n,t)Pb-207
Cross Section (b)
Final g
Final m
Final tot
Systm
Sys20
Exp data
KOS79
JUL90
LVN04
Energy (eV)


Integral C/E for U-238(n,2n)U-237
C/E
2.00
1.50
1.00
0.50
0.00
0E00
1E07
2E07
3E07
4E07
5E07
6E07
Energy (eV)


U-238(n,2n)U-237
Cross Section (b)
2.0E+00
1.6E+00
1.2E+00
8.0E-01
4.0E-01
0.0E+00
9.2E+06
1.8E+07
2.8E+07
3.7E+07
4.6E+07
5.5E+07
Energy (eV)
Final
Exp data
Exp data
Exp data
Exp data
Exp data
Exp data
KFT87
ALD69
ALD72
LAS78
JAE93
LRL73
RI 99
KOS80
HAM79
LAS58
KOS80
AEP78
BRC02

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