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## THE FOND-2.2 EVALUATED NEUTRON DATA LIBRARY

(Russian library of evaluated neutron data files for generating sets of constants in the ABBN constants system)

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**Abstract:** A short description is given of the Russian evaluated neutron data library FOND-2.2. The main purpose of FOND-2.2 is to provide sets of constants for the ABBN constants system. A history of its compilation and the sources of the neutron data are given. The contents of FOND-2.2 are presented with brief comments.

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**For Web access to data, please click on FOND-2.2 DATA**

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96/11

**Citation guidelines:**

a) *citing the entire library*

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b) *citing the format*

V. McLane, P.F. Rose, C.L. Dunford (ed.), "Data formats and procedures for the Evaluated Nuclear Data File ENDF-6", report BNL-NCS-44945 (ENDF-102) Rev 2/97 (Brookhaven National Laboratory 1997).

## **THE FOND-2.2 EVALUATED NEUTRON DATA LIBRARY**

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THE FOND-2.2 EVALUATED NEUTRON DATA LIBRARY. A short description is given of the Russian evaluated neutron data library FOND-2.2. The main purpose of FOND-2.2 is to provide sets of constants for the ABBN constants system. A history of its compilation and the sources of the neutron data are given. The contents of FOND-2.2 are presented with brief comments.

The FOND library contains evaluated neutron data files for a large number of nuclides. The library's main purpose is to provide the sets of neutron data needed to create libraries of group constants for the ABBN constants system [1]. The library was created in the ABBN constants laboratory of the A.I. Leipunsky Institute for Physics and Power Engineering. The new version of the ABBN-93 group constants system, which was created using the FOND library, is used widely in a number of applications:

- calculations for nuclear physics facilities with different spectral characteristics;
- radiation shielding calculations;
- nuclear safety problems, etc.

### **History**

**1970** - During the development of the SOKRATOR system [2], work began on the compilation of library evaluated neutron data in machine format for the main reactor material  $^{238}\text{U}$  and a number of other nuclides.

**1984** - The compilation of the first version of the FOND library, which formed part of the SOKRATOR system for providing group constants for nuclear reactor calculations, was completed. Initially, the library contained evaluated neutron data for the 67 nuclides of most importance for fast reactor calculations [3]. The library was the principal (but not the only) neutron data source used in creating the ABBN-78 group constants library [4].

**1988** - During the development of the new ABBN-90 constants system [5], the first fairly complete version of the evaluated neutron data library FOND-1 was compiled; it contained neutron data for 121 nuclides [6]. The library included neutron data for the main fuel materials, shielding materials, moderators, fission products and minor actinides.

**1993** - As part of the process of verifying the ABBN-90 constants system by comparing the results of calculations with the results obtained in critical assemblies and the BN-350 power reactor, a review was carried out of neutron data in the FOND library for a number of basic fuel nuclides and structural materials. In particular, the ENDF/B-VI (Rev.2) evaluation was adopted for  $^{235}\text{U}$  and the JENDL-3 library evaluation - modified in the low-energy region - for  $^{239}\text{Pu}$ , the neutron data for Ni, Na, Pb, O, N and C were reviewed and evaluations for new materials were added to the library which then contained evaluated neutron data for 268 nuclides [7]. This version was named FOND-2.

**1996** - Version FOND-2.1a was produced. It included evaluated neutron data for 52 minor actinides; these data were selected while the actinide library was being created in the ABBN-93 constants system [8] following analysis of a series of international tests [9] and taking into account available experimental data [10].

**1998** - Version FOND-2.1b was produced. It included evaluated neutron data for 172 fission product nuclides selected while the fission product library was being created in the ABBN-93.1 constants system and verified in the SWG-17 international test [11].

**1999** - Version FOND-2.2 was produced and finalized which forms the basis of the modern ABBN-93.2 group constants system and contains the earlier data for the main reactor materials and improved data for fission products and minor actinides. The FOND-2.2 library contains evaluated neutron data for 452 nuclides.

### **Neutron data sources**

Traditionally, the main source of neutron data for the FOND library has been the BROND national evaluated neutron data library [6, 7] compiled in the Russian Nuclear Data Centre with the participation of specialists from the ABBN constants laboratory. In the first phase, evaluated neutron data from the foreign ENDF/B, JENDL, JEF and EAF libraries, and later from the Russian ADL library, were used when gaps existed in the BROND library.

At that stage, nuclear data were selected from foreign libraries by means of a comparative analysis of their simplest integral characteristics, such as:

- reaction cross-sections at the thermal point ( $E = 0.0253$  eV);
- resonance integrals;
- cross-sections averaged over known standard spectra, etc.

In the second phase, when selecting neutron data for some of the main reactor nuclides, the results of calculation-based studies of experiments performed in a number of critical assemblies and operational reactors were taken into account. The calculations employed different sets of group constants obtained using several of the neutron data files being studied.

For later versions of the FOND library, emphasis was placed on the up-to-dateness and completeness of the experimental data used for the evaluation when selecting evaluated neutron data, and compliance with the requirement for congruence with the results of integral experiments.

### **Data presentation format**

As a component of the SOKRATOR system, the FOND library was at first produced in the specially developed SOKRATOR format [12], which is similar to the UKNDL format [13]. Subsequently, as the FOND library developed, the following ENDF formats were used to store the evaluated neutron data [14]:

- ENDF-IV format (for the first version FOND-1);
- ENDF-V format (for FOND-2);
- ENDF-VI format (for FOND-2.1 and FOND-2.2).

The only difference from the ENDF-IV format is the rule for generation of the material identifier MAT.

MAT is a four-digit identifier of the type ZZAA. As is the case in the ENDF format, the highest-order digits ZZ contain the atomic number **Z**. The two lowest-order digits AA, **as a rule**, contain the two lowest-order digits of the mass number of the nuclide **A**. For natural mixtures, the latter are zeros. For example: for  $^{235}\text{U}$ , MAT = 9235; for  $^3\text{He}$ , MAT = 0203; and for  $^{\text{nat}}\text{Pb}$ , MAT = 8200.

The exceptions are as follows:

- a) for  $^{100}\text{Mo}$ , MAT = 4210; for  $^{100}\text{Ru}$ , MAT = 4410; for  $^{200}\text{Hg}$ , MAT = 8020, etc.;
- b) when generating the last two digits of the MAT identifier for first isomers, the mass number is decreased by 30, and for second isomers it is decreased by 40. Thus: for  $^{242\text{m}}\text{Am}$ , MAT = 9512; and for  $^{178\text{n}}\text{Hf}$ , MAT = 7238, etc.

### **Use of computer programs**

The neutron data from the FOND library can be processed by any computer program which processes data in ENDF format.

The following programs are usually used:

- The Utility Codes program package [15] is traditionally used to verify the consistency of the data from the point of view of the format and the physics involved. Different versions of this program package have been used as the FOND library has developed;
- The GRUKON application package [16] and the NJOY94 neutron data processing system [17] have traditionally been used to process the evaluated neutron data into the required sets of group constants;
- The ENDF/B Pre-Processing Codes program package may also be used to process neutron data [18], but the authors have only limited practical experience of its use.

### **Structure of the library**

A diagram of the library's structure is shown in Fig. 1. The library consists of four sections: neutron data for light elements, structural materials and intermediate nuclei, and data for actinides.

The neutron data can be classified into data for main and secondary materials. For main materials, all the neutron data required for neutron field calculations are given. These are the general purpose (GP) files. For secondary materials, often only the data on neutron reactions which bring about a change in the material's composition are given. These are the activation and transmutation data (ACT, MA or FP). The latter type are used to calculate activation of reactor configurations, the nuclide composition of nuclear fuel after its removal from the reactor, cooling, chemical processing, recycling, disposal, etc.

### **Composition of the neutron data files**

The files contain different types of neutron data. The full range is not given for all nuclides. Generally, the files contain the following:

data on neutron transport	(MF = 2, 3, 4, 5);
energy-angle data	(MF = 6);
decay data	(MF = 8, 9, 10);
data on photon production	(MF = 12, 13, 14, 15);
data on errors and their covariances	(MF = 32, 33 etc.).

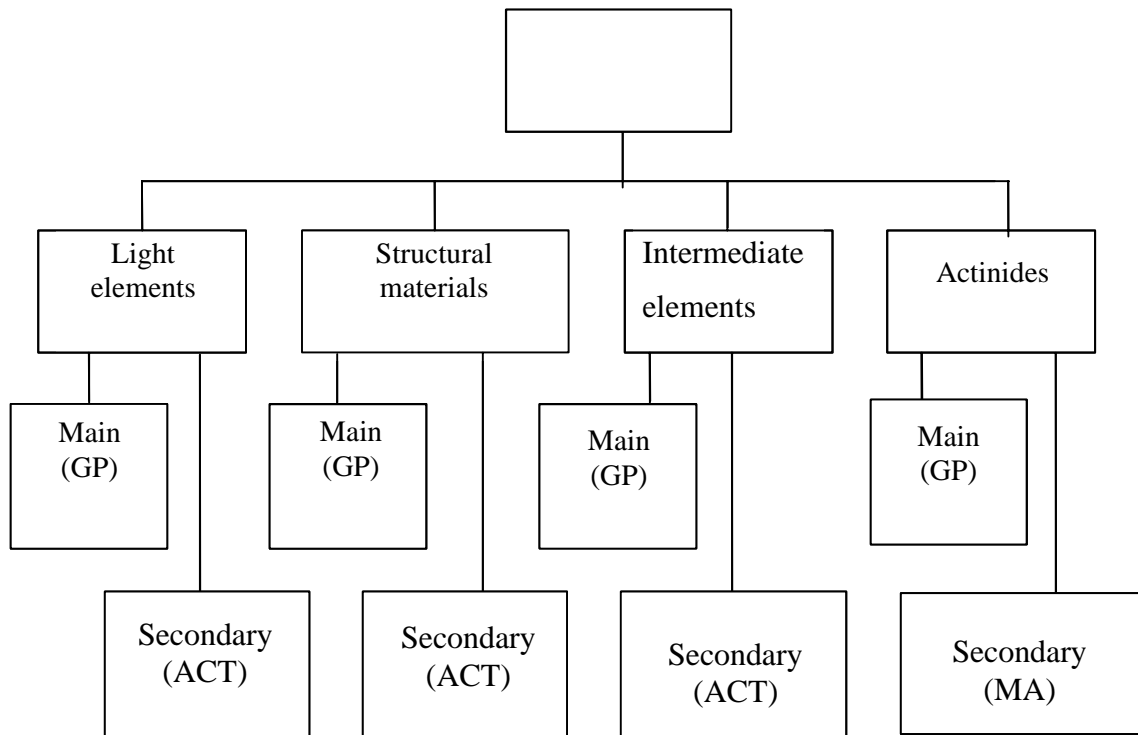


Fig. 1. Structure of the FOND-2.2 library

It should be noted that the decay data file (MF = 8) is always minimal in size, i.e. it gives the radionuclides which form as a result of neutron reactions but not the radiation characteristics of those radionuclides. MF = 8 files are given only for materials for which there are also MF = 9 or MF = 10 files.

### Contents of the library

A list of the nuclides for which the FOND-2.2 library contains data is given in the table. Some explanations of the table are given below.

NUCLIDE - The symbols of natural nuclides are shown in bold.

For radioactive isotopes, the half-life is given and the following symbols are used:

y - years; d - days; h - hours; m - minutes, in accordance with the nuclide chart in [19].

SOURCE - Original evaluation from which neutron data were taken for FOND-2.2;

EVAL/REV - Date of neutron data evaluation/date when data revised;

STATUS - Recommended area of application:

GP general-purpose neutron data;  
 ACT neutron data for use in calculating activation;  
 FP neutron data for fission products;  
 MA neutron data for minor actinides.

COMPOSITION OF DATA:

NT main data required for neutron transport calculations;  
 DDD energy-angle data;  
 DD decay data;  
 GAM data on photon production;  
 COV data on errors in cross-sections or the parameters describing them, and on the covariances of these errors.

COMMENTS

Reference is frequently made to the existence (availability) of a later evaluation of the data for a given nuclide. This does not mean that it is advisable to adopt that evaluation; it merely indicates the desirability of comparative study of existing evaluated data, and of taking decisions on the results of such a comparison.

### Contents of the FOND-2.2 library

#### LIGHT ELEMENTS

No.	Nuclide	Source	Eval/REV	Status	Composition of data and brief comments
1	<b>1-H-1</b>	ENDF/B-6 Rev. 1	Oct89/Jul91	GP	NT, GAM <b>Total cross-section below 20 MeV recommended as a standard. Rev. 3 (1999) available with slight corrections.</b>
2	<b>1-H-2</b>	ENDF/B-6 Rev. 2	Nov67/Nov96	GP	NT, DD, GAM Rev. 3 (1999) available with slight corrections.
3	<i>1-H-3</i> <i>12.323 y</i>	BROND-2	Dec 88/	GP	NT, DDD
4	<b>2-He-nat</b>	FOND-2	Jan76/Jan92	GP	NT
5	<b>2-He-3</b>	BROND-2	Dec 88/	GP	NT, DDD, DD <b>Cross-section for (n,p) reaction up to 50 keV recommended as a standard. Corresponds to the data in the ENDF/B-6 library (Rev. 1).</b>
6	<b>2-He-4</b>	BROND-2	Jan76/Jan92	GP	NT



No.	Nuclide	Source	EVAL/REV	Status	Composition of data and brief comments
7	<b>3-Li-6</b>	BROND-2	Jan76/Jan92	GP	NT, DDD, COV <b>Cross-section for (n, t) reaction up to 1 MeV recommended as a standard.</b> Corresponds to the data in the ENDF/B-6 library (Rev. 1).
8	<b>3-Li-7</b>	BROND-2	May84/Feb92	GP ACT	NT, DD, GAM
9	<b>4-Be-9</b>	ENDF/B-6	Jan86/	GP ACT	NT, DD, GAM
10	<i>4-Be-10</i> <i>1.6×10<sup>6</sup> y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
11	<b>5-B-10</b>	ENDF/B-6 Rev. 1	Oct89/Jul91	GP ACT	NT, GAM <b>Cross-sections for (n,α) and (n,α1) reactions up to 100 keV recommended as standards.</b>
12	<b>5-B-11</b>	ENDF/B-6	May89/	GP ACT	NT, DD, GAM
13	<b>6-C</b>	ENDF/B-6 Rev. 1	Aug89/Jul91	GP	NT, GAM, COV <b>Elastic scattering cross-section up to 2 MeV, recommended as a standard.</b> Rev. 2 (1999) available with slight corrections.
14	<b>6-C-12</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
15	<b>6-C-13</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
16	<i>6-C-14</i> <i>5.730 y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
17	<b>7-N-14</b>	ENDF/B-6	May90/	GP	NT, GAM Rev. 3 (1999) available with re-evaluation in the resonance region.
18	<b>7-N-15</b>	ENDF/B-6	Sep83/	GP	NT, GAM
19	<b>8-O-16</b>	ENDF/B-6	Jun90/	GP	NT, GAM Rev. 1 (1999) available with slight changes below 20 MeV
20	<b>8-O-17</b>	ENDF/B-6	Jan78/	GP	NT, DD, GAM, COV
21	<b>8-O-18</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
22	<b>9-F-19</b>	ENDF/B-6	Jun90/	GP	NT, DD, GAM, COV
23	<b>10-Ne-20</b>	EAF-3	Jul92/	GP	Only sets of cross-sections given.
24	<b>10-Ne-21</b>	EAF-3	Jul92/	GP	Only sets of cross-sections given.
25	<b>10-Ne-22</b>	EAF-3	Jul92/	GP	Only sets of cross-sections given.
26	<i>11-Na-22</i> <i>2.603 y</i>	EAF-3	Jul92/	GP	Only sets of cross-sections given.
27	<b>11-Na-23</b>	ENDF/B-6 Rev. 1	Dec77/Jul91	GP ACT	NT, DD, GAM
28	<b>12-Mg</b>	JENDL-3.2	Mar87/Nov93	GP	NT, GAM
29	<b>12-Mg-24</b>	JENDL-3.2	Mar87/Apr93	GP	NT
30	<b>12-Mg-25</b>	JENDL-3.2	Mar87/	GP	NT
31	<b>12-Mg-26</b>	JENDL-3.2	Mar87/	GP	NT
32	<i>13-Al-26</i> <i>7.16×2.603</i> <i>y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.

No.	Nuclide	Source	EVAL/REV	Status	Composition of data and brief comments
33	13-Al-27	ENDL-3	Mar88/	GP ACT	NT, GAM <b>Cross-section for (n,<math>\alpha</math>) reaction recommended as a standard.</b> Corresponds to the data in the ENDF/B-6 library. JENDL-3.2 evaluation (1993) available.
34	14-Si	BROND-2	May85/	GP	NT, GAM
35	14-Si-28	ENDF/B-6	May96/	GP	NT, DD, GAM
36	14-Si-29	ENDF/B-6	May96/	GP	NT, DD, GAM
37	14-Si-30	ENDF/B-6	May96/	GP	NT, DD, GAM
38	14-Si-31 2.62 h	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
39	14-Si-32 172 y	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
40	15-P-31	BROND-2	May89/Dec90	GP ACT	NT, GAM Modification of ENDL-84 evaluation
41	15-P-32 14.26 d	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
42	15-P-33 25.34 d	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
43	16-S	ENDF/B-6	Apr79	GP	NT, GAM
44	16-S-32	JENDL-3.2	May87/Feb94	GP	NT
45	16-S-33	JENDL-3.2	May87/Feb94	GP	NT
46	16-S-34	JENDL-3.2	May87/Feb94	GP	NT
47	16-S-35 87.5 d	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
48	16-S-36	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
49	17-Cl	BROND-2	Feb90/	GP	NT, GAM Modification of ENDF/B-4 evaluation
50	17-Cl-35	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
51	17-Cl-36 3.0 $\times 10^5$ y	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
52	17-Cl-37	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
53	18-Ar	ENDL-84	Oct83/	GP	NT, GAM
54	18-Ar-36	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
55	18-Ar-37 35.0 d	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
56	18-Ar-38	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
57	18-Ar-39 269 y	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
58	18-Ar-40	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
59	18-Ar-41 1.83 h	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
60	18-Ar-42 33 y	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
61	19-K	JENDL-3.0	May87/Jan93	GP	NT JENDL-3.2 (1994) evaluation available with major modification of cross sections.
62	19-K-39	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
63	19-K-40 1.28 $\times 10^9$ y	EAF-3	Jul92/	ACT	Only sets of cross-sections given.

No.	Nuclide	Source	EVAL/REV	Status	Composition of data and brief comments
64	<b>19-K-41</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
65	<i>19-K-42</i> <i>12.36 h</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
66	<i>19-K-43</i> <i>22.2 h</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
67	<b>20-Ca</b>	FOND-2	Jan78/Dec90	GP	NT, GAM Modification of ENDL-78 evaluation.
68	<b>20-Ca-40</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
69	<i>20-Ca-41</i> <i>1.03×10<sup>5</sup> y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
70	<b>20-Ca-42</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
71	<b>20-Ca-43</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
72	<b>20-Ca-44</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
73	<i>20-Ca-45</i> <i>163 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
74	<b>20-Ca-46</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
75	<i>20-Ca-47</i> <i>4.54 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
76	<b>20-Ca-48</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
77	<i>21-Sc-44m</i> <i>2.44 d</i>	ADL-3	Jan94/	ACT	Only sets of cross-sections given.
78	<b>21-Sc-45</b>	JENDL-3.0	Feb82/Nov83	GP ACT	NT JENDL-3.2 (1993) evaluation available with major modification of cross-sections.
79	<i>21-Sc-46</i> <i>83.82 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
80	<i>21-Sc-47</i> <i>3.35 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
81	<i>21-Sc-48</i> <i>43.67 h</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.

## STRUCTURAL MATERIALS

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
<b>1</b>	<b>22-Ti</b>	FOND-2	Jun77/Dec90	GP	NT, GAM Modification of ENDL-78 evaluation.
2	<i>22-Ti-44</i> <i>47.3 y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
3	<i>22-Ti-45</i> <i>3.08 h</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
4	<i>23-V-48</i> <i>15.97 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
5	<i>23-V-49</i> <i>330 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>6</b>	<b>23-V-50</b> <b><math>1.4 \times 10^{17}</math> y</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>7</b>	<b>23-V-51</b>	FOND-2	May77/Dec90	GP	NT, GAM Modification of ENDL-78 evaluation.
<b>8</b>	<b>24-Cr</b>	BROND-2	Apr84/Oct89	GP	NG, GAM
<b>9</b>	<b>24-Cr-50</b>	BROND-2	Apr85/Mar92	GP	NT, DD
10	<i>24-Cr-51</i> <i>27.70 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>11</b>	<b>24-Cr-52</b>	BROND-2	Apr85/Mar92	GP	NT, DD
<b>12</b>	<b>24-Cr-53</b>	BROND-2	May88/Mar92	GP	NT, DD
<b>13</b>	<b>24-Cr-54</b>	BROND-2	May85/Mar92	GP	NT, DD
14	<i>25-Mn-52</i> <i>5.6 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
15	<i>25-Mn-53</i> <i><math>3.7 \times 10^6</math> y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
16	<i>25-Mn-54</i> <i>312.2 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>17</b>	<b>25-Mn-55</b>	JENDL-3	Mar87/Mar88	GP ACT	NT, GAM, COV JENDL-3.2 (1993) evaluation available with modification of cross-sections.
<b>18</b>	<b>26-Fe</b>	BROND-2	Nov85/Mar90	GP	NT, DDD, GAM
<b>19</b>	<b>26-Fe-54</b>	BROND-2	Nov85/Nov90	GP	NT
20	<i>26-Fe-55</i> <i>2.73 y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>21</b>	<b>26-Fe-56</b>	BROND-2	Nov85/Nov90	GP	NT
<b>22</b>	<b>26-Fe-57</b>	BROND-2	Nov85/Oct89	GP	NT
<b>23</b>	<b>26-Fe-58</b>	BROND-2	Nov85/Nov90	GP	NT

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
24	<i>26-Fe-59</i> <i>44.503 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
25	<i>26-Fe-60</i> <i>1.5×10<sup>6</sup> y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
26	<i>27-Co-56</i> <i>77.26 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
27	<i>27-Co-57</i> <i>271.79 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
28	<i>27-Co-58</i> <i>70.86 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>29</b>	<b>27-Co-59</b>	FOND-2	Nov82/Jan84	GP	NT, modification of JENDL-2 evaluation. JENDL-3.2 evaluation (1994 mod.) available. <b>Cross-section for (n, 2n) reaction recommended as a standard.</b> Corresponds to the data in the ENDF/B-6 library.
30	<i>27-Co-60</i> <i>5.272 y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
31	<i>28-Ni-56</i> <i>6.075 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
32	<i>28-Ni-57</i> <i>36.0 h</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>33</b>	<b>28-Ni-58</b>	ENDF/B-6 Rev. 1	Oct89/Jul91	GP, ACT	NT, DDD, GAM, COV Rev. 2 (1999) available.
34	<i>28-Ni-59</i> <i>7.5×10<sup>4</sup> y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>35</b>	<b>28-Ni-60</b>	ENDF/B-6 Rev. 1	Oct89/Jul91	GP, ACT	NT, DDD, GAM, COV Rev. 2 (1999) available.
<b>36</b>	<b>28-Ni-61</b>	ENDF/B-6	Feb89/	GP, ACT	NT, DDD, GAM, COV Rev. 3 (1999) available with slight changes below 20 MeV.
<b>37</b>	<b>28-Ni-62</b>	ENDF/B-6 Rev. 1	Oct89/Jul91	GP, ACT	NT, DDD, GAM, COV Rev. 4 (1999) available with slight changes below 20 MeV.
38	<i>28-Ni-63</i> <i>100 y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>39</b>	<b>28-Ni-64</b>	ENDF/B-6 Rev. 1	Oct89/Jul91	GP, ACT	NT, DDD, GAM, COV Rev. 2 (1999) available.
40	<i>28-Ni-65</i> <i>2.52 h</i>	ADL-3	Jan94/	ACT	Only sets of cross-sections given.
41	<i>28-Ni-66</i> <i>54.6 h</i>	ADL-3	Jan94/	ACT	Only sets of cross-sections given.
<b>42</b>	<b>29-Cu-63</b>	ENDF/B-6	Nov89/	GP, ACT	NT, DDD, GAM, COV Rev. 3 (1999) available with slight changes below 20 MeV.
<b>43</b>	<b>29-Cu-65</b>	ENDF/B-6	Nov89/	GP, ACT	NT, DDD, GAM, COV Rev. 4 (1999) available with slight changes below 20 MeV.
44	<i>29-Cu-66</i> <i>5.1 m</i>	ADL-3	Jun94/	ACT	Only sets of cross-sections given.
45	<i>29-Cu-67</i> <i>61.9 h</i>	ADL-3	Jun94/	ACT	Only sets of cross-sections given.

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
46	<b>30-Zn</b>	BROND-2	Dec89/Oct91	GP	NT, GAM
47	<b>30-Zn-64</b>	BROND-2	Dec89/Mar92	GP	NT, DD
48	<i>30-Zn-65</i> <i>244.3 d</i>	ADL-3	Jan94/	ACT	Only sets of cross-sections given.
49	<b>30-Zn-66</b>	BROND-2	Dec89/	GP	NT, DD
50	<b>30-Zn-67</b>	BROND-2	Dec89/Feb92	GP	NT, DD
51	<b>30-Zn-68</b>	BROND-2	Dec89/Feb92	GP	NT, DD
52	<b>30-Zn-70</b>	BROND-2	Dec89/Feb92	GP	NT, DD
53	<i>30-Zn-71m</i> <i>3.9 h</i>	ADL-3	Jan94/	ACT	Only sets of cross-sections given.
54	<i>30-Zn-72</i> <i>46.5 h</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.

### ELEMENTS IN INTERMEDIATE GROUP 1

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
1	<b>31-Ga</b>	FOND-2	Sep72/Dec90	GP	NT, GAM Modification of ENDL-72 evaluation.
2	<b>31-Ga-69</b>	JENDL-3.2	Mar94/	GP	NT
3	<b>31-Ga-71</b>	JENDL-3.2	Mar94/	GP	NT
4	<b>32-Ge</b>	JENDL-3.2	Mar94/	GP	NT
5	<i>32-Ge-68</i> <i>270.82 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
6	<i>32-Ge-69</i> <i>39.0 h</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
7	<b>32-Ge-70</b>	JENDL-3.2	Mar94/	FP	NT
8	<i>32-Ge-71</i> <i>11.43 d</i>	EAF-3	Jul92/Nov96	FP	MF=10 data added for MT=106.
9	<b>32-Ge-72</b>	JENDL-3.2	Mar94/	FP	NT
10	<b>32-Ge-73</b>	JENDL-3.2	Mar94/	FP	NT
11	<b>32-Ge-74</b>	JENDL-3.2	Mar94/	FP	NT
12	<b>32-Ge-76</b> <b><math>1.53 \times 10^{21}</math> y</b>	JENDL-3.2	Mar94/Jul99	FP	NT Threshold reaction cross-sections reviewed.
13	<i>33-As-71</i> <i>65.28 h</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
14	<i>33-As-72</i> <i>26.0 h</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
15	<i>33-As-73</i> <i>80.3 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
16	<i>33-As-74</i> <i>17.77 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
17	<b>33-As-75</b>	JENDL-3.2	Mar90/Feb94/ Jul99	GP	NT Threshold reaction cross-sections reviewed.
18	<i>33-As-76</i> <i>26.4 h</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
19	<i>33-As-77</i> <i>38.8 h</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
20	<i>34-Se-72</i> <i>8.5 d</i>	EAF-3	Jul92/Nov96	FP	MF=10 data added for MT=106.
21	<i>34-Se-73</i> <i>7.1 h</i>	EAF-3	Jul92/Nov96	FP	MF=10 data added for MT=104.

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
22	<b>34-Se-74</b>	JENDL-3.2	Mar90/Nov96	FP	NT MF=9 data added for MT=16.
23	<i>34-Se-75</i> <i>119.64d</i>	EAF-3	Jul92/Nov96	FP	Neutron data represented only by reaction cross-sections. MF=10 data added for MT=106.
24	<b>34-Se-76</b>	JENDL-3.2	Mar90/	FP	NT
25	<b>34-Se-77</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
26	<b>34-Se-78</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
27	<i>34-Se-79</i> <i>6.×10<sup>4</sup> y</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
28	<b>34-Se-80</b>	JENDL-3.2	Mar93/Jul99	FP	NT Threshold reaction cross-sections reviewed.
29	<b>34-Se-82</b> <b>1.08×10<sup>20</sup> y</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
30	<i>35-Br-77</i> <i>57.0 h</i>	ADL-3	Jan94/	FP	Only sets of cross-sections given.
31	<b>35-Br-79</b>	JENDL-3.2	Mar90/Mar93	FP	NT
32	<b>35-Br-81</b>	JENDL-3.2	Mar93/Jul99	FP	NT Threshold reaction cross-sections reviewed.
33	<i>35-Br-82</i> <i>35.34 h</i>	ADL-3	Jan94/Jul99	FP	Only sets of cross-sections given. Threshold reaction cross-sections reviewed.
34	<b>36-Kr-78</b>	JENDL-3.2	Mar90/	FP	NT
35	<i>36-Kr-79</i> <i>34.9 h</i>	ADL-3	Jan94/	FP	Only sets of cross-sections given.
36	<b>36-Kr-80</b>	JENDL-3.2	Mar90/Nov96	FP	NT Cross-sections modified. DD data added.
37	<i>36-Kr-81</i> <i>2.3×10<sup>5</sup> y</i>	EAF-3	Jul92/Nov96	FP	Only sets of cross-sections given. DD data added.
38	<b>36-Kr-82</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
39	<b>36-Kr-83</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
40	<b>36-Kr-84</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
41	<i>36-Kr-85</i> <i>10.76 y</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
42	<b>36-Kr-86</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
43	<i>37-Rb-83</i> <i>86.2 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
44	<i>37-Rb-84</i> <i>32.8 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
45	<b>37-Rb-85</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
46	<i>37-Rb-86</i> <i>18.7 d</i>	JEF-2	Jul82/Jul99	FP	NT Modification of ENDF/B-5FP evaluation. Threshold reaction cross-sections reviewed.
47	<b>37-Rb-87</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
48	<i>38-Sr-82</i> <i>25.34 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
49	<i>38-Sr-83</i> <i>32.4 h</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
<b>50</b>	<b>38-Sr-84</b>	ENDF/B-5	Feb80/	FP	NT
51	<i>38-Sr-85</i> <i>64.9 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added. Threshold reaction cross-sections reviewed.
<b>52</b>	<b>38-Sr-86</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
<b>53</b>	<b>38-Sr-87</b>	JENDL-3.2	Mar90/	FP	NT
<b>54</b>	<b>38-Sr-88</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
55	<i>38-Sr-89</i> <i>50.5 d</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
56	<i>38-Sr-90</i> <i>28.64 y</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
57	<i>39-Y-87</i> <i>80.3 h</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
58	<i>39-Y-88</i> <i>106.6 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
<b>59</b>	<b>39-Y-89</b>	JENDL-3.2	Nov93/Jul99	GP	NT, GAM Threshold reaction cross-sections reviewed.
60	<i>39-Y-90</i> <i>64.1 h</i>	JEF-2	Jul82/Jul99	FP	NT Modification of ENDF/B-5FP evaluation. Threshold reaction cross-sections reviewed.
61	<i>39-Y-91</i> <i>58.5 d</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
<b>62</b>	<b>40-Zr</b>	BROND-2	Dec88/Sep98	GP	NT, GAM Upper limit of unresolved resonance region changed for Zr-90 to 200 keV.
63	<i>40-Zr-88</i> <i>83.4 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
64	<i>40-Zr-89</i> <i>78.4 h</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
<b>65</b>	<b>40-Zr-90</b>	JENDL-3.2	Aug89/Jul99	FP	NT Threshold reaction cross-sections reviewed.
<b>66</b>	<b>40-Zr-91</b>	BROND-2	Dec88/Jul99	FP	NT Threshold reaction cross-sections reviewed.
<b>67</b>	<b>40-Zr-92</b>	JENDL-3.2	Aug89/Jul99	FP	NT Threshold reaction cross-sections reviewed.
68	<i>40-Zr-93</i> <i>1.5×10<sup>6</sup> y</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
<b>69</b>	<b>40-Zr-94</b>	JENDL-3.2	Aug89/Jul99	FP	NT Threshold reaction cross-sections reviewed.
70	<i>40-Zr-95</i> <i>64.0 d</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
<b>71</b>	<b>40-Zr-96</b> <b>3.9×10<sup>18</sup> y</b>	JENDL-3.2	Aug89/Jul99	FP	NT Threshold reaction cross-sections reviewed.



ELEMENTS IN INTERMEDIATE GROUP 2

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
1	<i>41-Nb-91</i> <i>680 y</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
2	<i>41-Nb-91m</i> <i>60.9 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
3	<i>41-Nb-92</i> <i>3.6 × 10<sup>7</sup> y</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
4	<i>41-Nb-92m</i> <i>10.15 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
5	<b>41-Nb-93</b>	BROND-2	Dec88/Feb93	GP	NT, GAM <b>Cross section for (n, 2n) reaction recommended as a standard.</b> Corresponds to the ENDF/B-6 data.
6	<i>41-Nb-93m</i> <i>16.13 y</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
7	<i>41-Nb-94</i> <i>2. × 10<sup>4</sup> y</i>	JENDL-3.2	Mar90/Nov96	FP	NT Cross-sections modified. DD data added.
8	<i>41-Nb-95</i> <i>34.97 d</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
9	<i>41-Nb-95m</i> <i>86.6 h</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
10	<i>41-Nb-96</i> <i>23.4 h</i>	ADL-3	Jan94/	FP	Only sets of cross-sections given.
11	<b>42-Mo</b>	JENDL-3.2	Mar89/Feb94	GP	NT, GAM
12	<b>42-Mo-92</b>	JENDL-3.2	Aug89/Oct93	FP	NT

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
13	<i>42-Mo-93</i> $3.5 \times 10^3$ y	EAF-3	Jul92/	FP	Only sets of cross-sections given.
14	<b>42-Mo-94</b>	JENDL-3.2	Aug89/Oct93	FP	NT
15	<b>42-Mo-95</b>	JENDL-3.2	Aug89/Oct93/Ju 199	FP	NT Threshold reaction cross-sections reviewed.
16	<b>42-Mo-96</b>	JENDL-3.2	Aug89/Oct93/Ju 199	FP	NT Threshold reaction cross-sections reviewed.
17	<b>42-Mo-97</b>	JENDL-3.2	Aug89/Oct93/Ju 199	FP	NT Threshold reaction cross-sections reviewed.
18	<b>42-Mo-98</b>	JENDL-3.2	Aug89/Oct93/Ju 199	FP	NT Threshold reaction cross-sections reviewed.
19	<i>42-Mo-99</i> 66 h	JENDL-3.2	Aug89/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
20	<b>42-Mo-100</b> $1.15 \times 10^{19}$ y	JENDL-3.2	Aug89/Oct93/Ju 199	FP	NT Threshold reaction cross-sections reviewed.
21	<i>43-Tc-95</i> 20 h	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
22	<i>43-Tc-95m</i> 60 d	EAF-3	Jul92/	FP	Only sets of cross-sections given.
23	<i>43-Tc-96</i> 4.3 d	EAF-3	Jul92/	FP	Only sets of cross-sections given.
24	<i>43-Tc-97</i> $4 \times 10^6$ y	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
25	<i>43-Tc-97m</i> 92.2 d	EAF-3	Jul92/	FP	Only sets of cross-sections given.
26	<i>43-Tc-98</i> $4.2 \times 10^6$ y	EAF-3	Jul92/	FP	Only sets of cross-sections given.
27	<i>43-Tc-99</i> $2.1 \times 10^5$ y	JENDL-3.2	Mar90/Nov93/J ul99	GP	NT Threshold reaction cross-sections reviewed.
28	<b>44-Ru-96</b>	JENDL-3.2	Mar90/	FP	NT
29	<i>44-Ru-97</i> 2.9 d	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
30	<b>44-Ru-98</b>	JENDL-3.2	Mar90/	FP	NT
31	<b>44-Ru-99</b>	JENDL-3.2	Mar90/Oct93	FP	NT
32	<b>44-Ru-100</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
33	<b>44-Ru-101</b>	JENDL-3.2	Mar90/Oct93/Ju 199	FP	NT Threshold reaction cross-sections reviewed.
34	<b>44-Ru-102</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
35	<i>44-Ru-103</i> 39.35 d	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
36	<b>44-Ru-104</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
37	<i>44-Ru-105</i> 4.44 h	EAF-3	Jul92/Nov96	FP	Neutron data represented only by reaction cross-sections. Cross-sections modified. DD data added.
38	<i>44-Ru-106</i> 373.6 d	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
39	<i>45-Rh-101</i> 3.3 y	EAF-3	Jul92/Nov96	FP	Neutron data represented only by reaction cross-sections. Threshold reaction cross-sections reviewed.

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
40	<i>45-Rh-102m</i> <i>2.9 y</i>	EAF-3	Jul92/Nov96	FP	Neutron data represented only by reaction cross-sections. Threshold reaction cross-sections reviewed.
41	<i>45-Rh-102</i> <i>207. d</i>	EAF-3	Jul92/Nov96	FP	Neutron data represented only by reaction cross-sections. Threshold reaction cross-sections reviewed.
<b>42</b>	<b>45-Rh-103</b>	JENDL-3.2	Mar90/Feb94/Ju 199	GP	NT Threshold reaction cross-sections reviewed.
43	<i>45-Rh-105</i> <i>35.4 h</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
<b>44</b>	<b>46-Pd-102</b>	JENDL-3.2	Mar90/	FP	NT ENDF/B-6 evaluation (1998) available.
45	<i>46-Pd-103</i> <i>16.96 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
<b>46</b>	<b>46-Pd-104</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed. ENDF/B-6 evaluation (1998) available.
<b>47</b>	<b>46-Pd-105</b>	JENDL-3.2	Mar90/Aug91/J ul99	FP	NT Threshold reaction cross-sections reviewed. ENDF/B-6 evaluation (1998) available.
<b>48</b>	<b>46-Pd-106</b>	JENDL-3.2	Mar90/Jul99	FP	FP Threshold reaction cross-sections reviewed. ENDF/B-6 evaluation (1998) available.
49	<i>46-Pd-107</i> <i>6.5×10<sup>6</sup> y</i>	JENDL-3.2	Mar90/Mar93/J ul99	FP	NT Threshold reaction cross-sections reviewed.
<b>50</b>	<b>46-Pd-108</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed. ENDF/B-6 evaluation (1998) available.
<b>51</b>	<b>46-Pd-110</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed. ENDF/B-6 evaluation (1998) available.
<b>52</b>	<b>47-Ag</b>	JENDL-3.2	Mar87/Feb94	GP	NT, GAM
53	<i>47-Ag-105g</i> <i>41.29 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
54	<i>47-Ag-106m</i> <i>8.3 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
<b>55</b>	<b>47-Ag-107</b>	JENDL-3.2	Mar87/Feb94	ACT	NT, GAM
56	<i>47-Ag-108m</i> <i>418 y</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
<b>57</b>	<b>47-Ag-109</b>	JENDL-3.2	Mar87/Feb94/Ju 199	FP	NT, GAM Threshold reaction cross-sections reviewed.
58	<i>47-Ag-110m</i> <i>249.9 d</i>	JENDL-3.2	Mar90/	FP	NT
59	<i>47-Ag-111</i> <i>7.45 d</i>	JEF-2	Jul82/Jul99	FP	NT Modification of ENDF/B-5FP evaluation. Threshold reaction cross-sections reviewed.
<b>60</b>	<b>48-Cd</b>	JENDL-3.2	Mar89/Dec93	GP	NT, GAM
<b>61</b>	<b>48-Cd-106</b>	JENDL-3.2	Mar90/Nov96	FP	NT Cross-sections modified. DD data added.

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
62	<b>48-Cd-108</b>	JENDL-3.2	Mar90/	FP	NT Cross-sections modified. DD data added.
63	<i>48-Cd-109</i> <i>462 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
64	<b>48-Cd-110</b>	JENDL-3.2	Mar90/Nov93/J ul99	FP	NT Threshold reaction cross-sections reviewed. ENDF/B-6 evaluation, Rev. 3 (1993) available.
65	<b>48-Cd-111</b>	JENDL-3.2	Mar90/Nov93/J ul99	FP	NT Threshold reaction cross-sections reviewed.
66	<b>48-Cd-112</b>	JENDL-3.2	Mar90/Jul99	FP	FP Threshold reaction cross-sections reviewed. ENDF/B-6 evaluation, Rev. 3 (1993) available.
67	<b>48-Cd-113</b> $9 \times 10^{15}$ y	JENDL-3.2	Mar90/Aug93/J ul99	FP	FP Threshold reaction cross-sections reviewed.
68	<i>48-Cd-113m</i> <i>14.6 y</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
69	<b>48-Cd-114</b>	JENDL-3.2	Mar90/Nov96/J ul99	FP	FP DD data added. Threshold reaction cross-sections reviewed. ENDF/B-6 evaluation, Rev. 3 (1993) available.
70	<i>48-Cd-115</i> <i>53.38 h</i>	EAF-3	Jul92/Nov96	FP	Only sets of cross-sections given.
71	<i>48-Cd-115m</i> <i>44.8 d</i>	JEF-2	Jul82/	FP	FP Modification of ENDF/B-5FP evaluation.
72	<b>48-Cd-116</b> $2.6 \times 10^{19}$ y	JENDL-3.2	Mar90/Nov96/J ul99	FP	NT DD data added. Threshold reaction cross-sections reviewed. ENDF/B-6 evaluation, Rev. 3 (1993) available.
73	<b>49-In-113</b>	JENDL-3.2	Mar90/	FP	NT
74	<i>49-In-114m</i> <i>49.5 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
75	<b>49-In-115</b> $4.4 \times 10^{14}$ y	JENDL-3.2	Mar90/Mar97/J ul99	FP	NT, DD, COV Threshold reaction cross-sections reviewed.
76	<b>50-Sn-112</b>	JENDL-3.2	Mar90/	FP	NT
77	<i>50-Sn-113</i> <i>115.1 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
78	<b>50-Sn-114</b>	JENDL-3.2	Mar90/	FP	NT
79	<b>50-Sn-115</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
80	<b>50-Sn-116</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
81	<b>50-Sn-117</b>	JENDL-3.2	Mar90/Nov96/J ul99	FP	NT DD data added. Threshold reaction cross-sections reviewed.
82	<i>50-Sn-117m</i> <i>13.6 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
83	<b>50-Sn-118</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
84	<b>50-Sn-119</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
85	<i>50-Sn-119m</i> <i>293 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
86	<b>50-Sn-120</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
87	<i>50-Sn-121</i> <i>27.0 h</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
88	<i>50-Sn-121m</i> <i>50 y</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
89	<b>50-Sn-122</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
90	<i>50-Sn-123</i> <i>129.3 d</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
91	<b>50-Sn-124</b>	JENDL-3.2	Mar90/Mar93/Jul99	FP	NT Threshold reaction cross-sections reviewed.
92	<i>50-Sn-125</i> <i>9.64 d</i>	JEF-2	Jul82/Jul99	FP	NT Modification of ENDF/B-5FP evaluation. Threshold reaction cross-sections reviewed.
93	<i>50-Sn-126</i> <i>10<sup>5</sup> y</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.

ELEMENTS IN INTERMEDIATE GROUP 3

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
1	<b>51-Sb</b>	JENDL-3.2	Mar89/Feb94	GP	NT
2	<i>51-Sb-119</i> <i>38.5 h</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
3	<i>51-Sb-120m</i> <i>5.76 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
4	<b>51-Sb-121</b>	JENDL-3.2	Mar89/Feb94/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
5	<i>51-Sb-122</i> <i>2.70 d</i>	EAF-3	Jul92/Nov96	FP	Threshold reaction cross-sections reviewed.
6	<b>51-Sb-123</b>	JENDL-3.2	Aug89/Feb94/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
7	<i>51-Sb-124</i> <i>60.3 d</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
8	<i>51-Sb-125</i> <i>2.77 y</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
9	<i>51-Sb-126</i> <i>12.4 d</i>	JEF-2	Jul82/Jul99	FP	NT Modification of ENDF/B-5FP evaluation. Threshold reaction cross-sections reviewed.
10	<i>51-Sb-127</i> <i>3.85 d</i>	EAF-3	Jul92/Jul99	FP	NT, DD Threshold reaction cross-sections reviewed.
11	<i>52-Te-118</i> <i>6.0 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
12	<i>52-Te-119m</i> <i>4.7 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
13	<b>52-Te-120</b>	JENDL-3.2	Mar90/	FP	NT
14	<i>52-Te-121</i> <i>16.8 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
15	<i>52-Te-121m</i> <i>154 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
16	<b>52-Te-122</b>	JENDL-3.2	Mar90/Nov93/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
17	<b>52-Te-123</b> <b><math>1.24 \times 10^{13}</math> y</b>	JENDL-3.2	Mar90/Sep93/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
18	<i>52-Te-123m</i> <i>119.7 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
19	<b>52-Te-124</b>	JENDL-3.2	Mar90/Nov93/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
20	<b>52-Te-125</b>	JENDL-3.2	Mar90/Nov93/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
21	<i>52-Te-125m</i> <i>57.4 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
22	<b>52-Te-126</b>	JENDL-3.2	Mar90/Nov93/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
23	<i>52-Te-127m</i> <i>109 d</i>	JENDL-3.2	Mar90/	FP	NT
24	<b>52-Te-128</b> <b><math>7.2 \times 10^{24}</math> y</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
25	<i>52-Te-129m</i> <i>33.6 d</i>	JENDL-3.2	Mar90/	FP	NT
26	<b>52-Te-130</b> <b><math>2.7 \times 10^{21}</math> y</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
27	<i>52-Te-131m</i> 30 h	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
28	<i>52-Te-132</i> 76.3 h	JEF-2	Jul82/Jul99	FP	NT Modification of ENDF/B-5FP evaluation. Threshold reaction cross-sections reviewed.
29	<i>53-I-124</i> 4.15 d	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
30	<i>53-I-125</i> 59.41 d	EAF-3	Jul92/	FP	Only sets of cross-sections given.
31	<i>53-I-126</i> 13.11 d	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
32	<b>53-I-127</b>	JENDL-3.2	Mar90/Apr93/ Jul99	GP	NT Threshold reaction cross-sections reviewed. ENDF/B-6 evaluation (1993) available.
33	<i>53-I-128</i> 25 m	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
34	<i>53-I-129</i> $1.57 \times 10^7$ y	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
35	<i>53-I-130</i> 12.36 h	JEF-2	Jul82/Jul99	FP	NT Modification of ENDF/B-5FP evaluation. Threshold reaction cross-sections reviewed.
36	<i>53-I-131</i> 8.02 d	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
37	<i>53-I-135</i> 6.61 h	ADL-3	Jan94/	FP	Only sets of cross-sections given.
38	<b>54-Xe-124</b>	JENDL-3.2	Mar90/	FP	NT
39	<b>54-Xe-126</b>	JENDL-3.2	Mar90/	FP	NT
40	<i>54-Xe-127</i> 36.4 d	EAF-3	Jul92/	FP	Only sets of cross-sections given.
41	<b>54-Xe-128</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
42	<b>54-Xe-129</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
43	<i>54-Xe-129m</i> 8.89 d	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
44	<b>54-Xe-130</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
45	<b>54-Xe-131</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
46	<i>54-Xe-131m</i> 11.9 d	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
47	<b>54-Xe-132</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
48	<i>54-Xe-133</i> 5.25 d	ENDF/B-6	Apr74/Jul99	FP	NT Threshold reaction cross-sections reviewed.
49	<i>54-Xe-133m</i> 2.19 d	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
50	<b>54-Xe-134</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
51	<i>54-Xe-135</i> 9.10 h	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
52	<b>54-Xe-136</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
53	<i>55-Cs-131</i> <i>9.69 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
54	<i>55-Cs-132</i> <i>6.47 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
<b>55</b>	<b>55-Cs-133</b>	JENDL-3.2	Mar90/Jul99	GP	NT Threshold reaction cross-sections reviewed.
56	<i>55-Cs-134</i> <i>2.06 y</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
57	<i>55-Cs-135</i> <i>2×10<sup>6</sup> y</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
58	<i>55-Cs-136</i> <i>13.16 d</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
59	<i>55-Cs-137</i> <i>30.17 y</i>	JENDL-3.2	Mar90/Mar93/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
<b>60</b>	<b>56-Ba-130</b>	JENDL-3.2	Mar90/	FP	NT
61	<i>56-Ba-131</i> <i>11.5 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
<b>62</b>	<b>56-Ba-132</b>	JENDL-3.2	Mar90/	FP	NT
63	<i>56-Ba-133</i> <i>10.5 y</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
64	<i>56-Ba-133m</i> <i>38.9 h</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
<b>65</b>	<b>56-Ba-134</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
<b>66</b>	<b>56-Ba-135</b>	JENDL-3.2	Mar90/Nov93/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
67	<i>56-Ba-135m</i> <i>28.7 h</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
<b>68</b>	<b>56-Ba-136</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
<b>69</b>	<b>56-Ba-137</b>	JENDL-3.2	Mar90/Oct93/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
<b>70</b>	<b>56-Ba-138</b>	JENDL-3.2	Mar90/Oct93/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
71	<i>56-Ba-139</i> <i>83.06 m</i>	EAF-3	Jul92/Nov96/ Jul99	FP	Cross-sections modified. DD data added.
72	<i>56-Ba-140</i> <i>12.75 d</i>	JEF-2	Jul82/Jul99	FP	NT Modification of ENEA/CEA evaluation. Threshold reaction cross-sections reviewed.
73	<i>57-La-137</i> <i>6.×10<sup>4</sup> y</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
<b>74</b>	<b>57-La-138</b> <b>1.05×10<sup>11</sup> y</b>	JENDL-3.2	Mar90/Nov93	GP	NT
<b>75</b>	<b>57-La-139</b>	JENDL-3.2	Mar90/Nov93/ Jul99	GP	NT Threshold reaction cross-sections reviewed.
76	<i>57-La-140</i> <i>40.272 h</i>	EAF-3	Jul92/Nov96/ Jul99	FP	DD data added. Threshold reaction cross-sections reviewed.
<b>77</b>	<b>58-Ce-136</b>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
78	<i>58-Ce-137m</i> <i>34.4 h</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
<b>79</b>	<b>58-Ce-138</b>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
80	<i>58-Ce-139</i> <i>137.6 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.



No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
81	<b>58-Ce-140</b>	JENDL-3.2	Mar90/Nov93/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
82	<i>58-Ce-141</i> <i>32.50 d</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
83	<b>58-Ce-142</b>	JENDL-3.2	Mar90/Sep93/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
84	<i>58-Ce-143</i> <i>33.0 h</i>	EAF-3	Jul92/Nov96/ Jul99	FP	DD data added. Threshold reaction cross-sections reviewed.
85	<i>58-Ce-144</i> <i>284.8 d</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
86	<b>59-Pr-141</b>	JENDL-3.2	Mar90/Sep93/ Jul99	GP	NT Threshold reaction cross-sections reviewed.
87	<i>59-Pr-142</i> <i>19.13 h</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
88	<i>59-Pr-143</i> <i>13.75 d</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
89	<i>60-Nd-140</i> <i>3.37 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
90	<i>60-Nd-141</i> <i>2.5 h</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
91	<b>60-Nd-142</b>	JENDL-3.2	Mar90/Nov93/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
92	<b>60-Nd-143</b>	JENDL-3.2	Mar90/Nov93/ Jul99	FP	NT Threshold reaction cross-sections reviewed. ENDF/B-6 evaluation, 1993 Revision, available for thermal and resonance energy region.
93	<b>60-Nd-144</b> $2.29 \times 10^{15}$ y	JENDL-3.2	Mar90/Oct93/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
94	<b>60-Nd-145</b>	JENDL-3.2	Mar90/Oct93/ Jul99	FP	NT Threshold reaction cross-sections reviewed. ENDF/B-6 evaluation, 1993 Revision, available for thermal and resonance energy region.
95	<b>60-Nd-146</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
96	<i>60-Nd-147</i> <i>10.98 d</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed. ENDF/B-6 evaluation, 1993 Revision, available for thermal and resonance energy region.
97	<b>60-Nd-148</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
98	<b>60-Nd-150</b> $1.4 \times 10^{19}$ y	JENDL-3.2	Mar90/Oct93/ Jul99	FP	NT Threshold reaction cross-sections reviewed.

## ELEMENTS IN INTERMEDIATE GROUP 4

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
1	<i>61-Pm-143</i> <i>265 d</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
2	<i>61-Pm-144</i> <i>1.0 y</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
3	<i>61-Pm-145</i> <i>17.7 y</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
4	<i>61-Pm-146</i> <i>5.53 y</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
5	<i>61-Pm-147</i> <i>2.62 y</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
6	<i>61-Pm-148</i> <i>5.37 d</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
7	<i>61-Pm-148m</i> <i>41.3 d</i>	JENDL-3.2	Mar90/Dec97	FP	NT
8	<i>61-Pm-149</i> <i>53.1 h</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
9	<i>61-Pm-150</i> <i>2.7 h</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
10	<i>61-Pm-151</i> <i>28.4 h</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
11	<b>62-Sm-144</b>	ENDF/B-6	Feb80/Jan92	FP	NT
12	<i>62-Sm-145</i> <i>340 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
13	<i>62-Sm-146</i> <i>1.03×10<sup>8</sup> y</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
14	<b>62-Sm-147</b> <b>1.06×10<sup>11</sup> y</b>	FOND-2.2	Mar90/Aug93/ Jul99	FP	NT Modification of JENDL-3.2 evaluation. Threshold reaction cross-sections reviewed.
15	<b>62-Sm-148</b> <b>7×10<sup>15</sup> y</b>	FOND-2.2	Sep87/Apr97/ Jul99	FP	NT Modification of JENDL-3.2 evaluation. Threshold reaction cross-sections reviewed.
16	<b>62-Sm-149</b>	FOND-2.2	Mar90/Jul99/ Aug99	FP	NT Modification of JENDL-3.2 evaluation. Resonance parameters taken from BROND- 2 for unresolved resonance region. Threshold reaction cross-sections reviewed.
17	<b>62-Sm-150</b>	JENDL-3.2	Mar90/Jun94/ Jul99	FP	NT Threshold reaction cross-sections reviewed. ENDF/B-6 evaluation, 1993 Revision, available for thermal and resonance energy region.

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
18	<i>62-Sm-151</i> <i>93 y</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
19	<b>62-Sm-152</b>	JENDL-3.2	Mar90/Jun94/ Jul99	FP	NT Threshold reaction cross-sections reviewed. ENDF/B-6 evaluation, 1993 Revision, available for thermal and resonance energy region.
20	<i>62-Sm-153</i> <i>47.26 h</i>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
21	<b>62-Sm-154</b>	JENDL-3.2	Mar90/Jun94/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
22	<b>63-Eu</b>	JENDL-3.2	Mar89/Nov93	GP	NT, GAM
23	<i>63-Eu-145</i> <i>5.93 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
24	<i>63-Eu-146</i> <i>4.51 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
25	<i>63-Eu-147</i> <i>24.6 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
26	<i>63-Eu-148</i> <i>55.6 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
27	<i>63-Eu-149</i> <i>93.1 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
28	<i>63-Eu-150</i> <i>36.9 y</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
29	<b>63-Eu-151</b>	JENDL-3.2	Mar89/	FP	NT
30	<i>63-Eu-152</i> <i>13.33 y</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
31	<b>63-Eu-153</b>	JENDL-3.2	Mar89/Jan94/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
32	<i>63-Eu-154</i> <i>8.8 y</i>	JENDL-3.2	Dec90/Nov93/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
33	<i>63-Eu-155</i> <i>4.761 y</i>	JENDL-3.2	Mar90/Nov93/ Jul99	FP	NT Threshold reaction cross-sections reviewed.
34	<i>63-Eu-156</i> <i>15.2 d</i>	JEF-2	Jul82/Apr89/ Jul99	FP	NT Modification of ENDF/B-5FP evaluation. Threshold reaction cross-sections reviewed.
35	<i>63-Eu-157</i> <i>15.18 h</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
36	<i>64-Gd-148</i> <i>74.6 y</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
37	<i>64-Gd-149</i> <i>9.28 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
38	<i>64-Gd-150</i> <i>1.8×10<sup>6</sup> y</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
39	<i>64-Gd-151</i> <i>120 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
40	<b>64-Gd-152</b> <b>1.1×10<sup>14</sup> y</b>	JENDL-3.2	Mar90/	FP	NT ENDF/B-6 evaluation (1997) available.
41	<i>64-Gd-153</i> <i>239.47 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
42	<b>64-Gd-154</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed. ENDF/B-6 evaluation (1997) available.
43	<b>64-Gd-155</b>	ENDF/B-6	Jun77/Jul99	FP	NT Threshold reaction cross-sections reviewed.
44	<b>64-Gd-156</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
45	<b>64-Gd-157</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
46	<b>64-Gd-158</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
47	<b>64-Gd-160</b>	JENDL-3.2	Mar90/Jul99	FP	NT Threshold reaction cross-sections reviewed.
48	<i>65-Tb-157</i> <i>99 y</i>	AF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
49	<i>65-Tb-158</i> <i>180 y</i>	EAF-3	Jul92/Nov96	FP	Cross-sections modified. DD data added.
50	<b>65-Tb-159</b>	JENDL-3.2	Mar90/Jul99	GP	NT Threshold reaction cross-sections reviewed.
51	<i>65-Tb-160</i> <i>73.3 d</i>	JEF-2	Jun82/Jul99	FP	NT Modification of ENDF/B-5FP evaluation. Threshold reaction cross-sections reviewed.
52	<i>65-Tb-161</i> <i>6.90 d</i>	EAF-3	Jul92/Jul99	FP	Only sets of cross-sections given. Threshold reaction cross-sections reviewed.
53	<b>66-Dy</b>	FOND-2	Nov89/	GP	Only set of resonance parameters given.
54	<i>66-Dy-154</i> <i>3.0×10<sup>6</sup> y</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
55	<i>66-Dy-155</i> <i>10.0 h</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
56	<b>66-Dy-156</b>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
57	<b>66-Dy-158</b>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
58	<i>66-Dy-159</i> <i>144.4 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
59	<b>66-Dy-160</b>	JEF-2	Jun82/Jul99	FP	NT Modification of ENDF/B-5FP evaluation. Threshold reaction cross-sections reviewed.
60	<b>66-Dy-161</b>	JEF-2	Jun82/Jul99	FP	NT Modification of ENDF/B-5FP evaluation. Threshold reaction cross-sections reviewed.
61	<b>66-Dy-162</b>	JEF-2	Jun82/Jul99	FP	NT Modification of ENDF/B-5FP evaluation. Threshold reaction cross-sections reviewed.
62	<b>66-Dy-163</b>	JEF-2	Jun82/Jul99	FP	NT Modification of ENDF/B-5FP evaluation. Threshold reaction cross-sections reviewed.
63	<b>66-Dy-164</b>	JEF-2	Jun82/Jul99	FP	NT Modification of ENDF/B-5FP evaluation. Threshold reaction cross-sections reviewed.
64	<i>66-Dy-165</i> <i>2.35 h</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
65	<i>66-Dy-166</i> <i>81.5 h</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
66	<i>67-Ho-163</i> <i>4750 y</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
<b>67</b>	<b>67-Ho-165</b>	ENDF/B-5	Apr74/Jul80	GP	NT ENDF/B-6 evaluation (1998) available.
68	<i>67-Ho-166</i> <i>26.8 h</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
69	<i>67-Ho-166m</i> <i>1 200 y</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
<b>70</b>	<b>68-Er</b>	FOND-2	Dec76/Nov89	GP	Only set of resonance parameters for stable isotopes given.
<b>71</b>	<b>68-Er-162</b>	BROND-2	Dec76/Nov89	FP	NT, DD
<b>72</b>	<b>68-Er-164</b>	BROND-2	Dec76/Nov89	FP	NT, DD
73	<i>68-Er-165</i> <i>10.3 h</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
<b>74</b>	<b>68-Er-166</b>	BROND-2	Dec76/Nov89	FP	NT, DD
<b>75</b>	<b>68-Er-167</b>	BROND-2	Dec76/Nov89	FP	NT, DD
<b>76</b>	<b>68-Er-168</b>	BROND-2	Dec76/Nov89	FP	NT, DD
77	<i>68-Er-169</i> <i>9.40 d</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
<b>78</b>	<b>68-Er-170</b>	BROND-2	Dec76/Nov89	FP	NT, DD
79	<i>68-Er-171</i> <i>7.52 h</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
80	<i>68-Er-172</i> <i>49 h</i>	EAF-3	Jul92/	FP	Only sets of cross-sections given.
81	<i>69-Tm-167</i> <i>9.25 d</i>	EAF-3	Jul92/	FP	Neutron data represented only by reaction cross-sections.
82	<i>69-Tm-168</i> <i>93.1 d</i>	EAF-3	Jul92/	FP	Neutron data represented only by reaction cross-sections.
<b>83</b>	<b>69-Tm-169</b>	EAF-3	Jul92/	FP	Neutron data represented only by reaction cross-sections.
84	<i>69-Tm-170</i> <i>128.6 d</i>	EAF-3	Jul92/	FP	Neutron data represented only by reaction cross-sections.
85	<i>69-Tm-171</i> <i>1.92 y</i>	EAF-3	Jul92/	FP	Neutron data represented only by reaction cross-sections.
86	<i>69-Tm-172</i> <i>63.6 h</i>	EAF-3	Jul92/	FP	Neutron data represented only by reaction cross-sections.
<b>87</b>	<b>70-Yb-168</b>	EAF-3	Jul92/	FP	Neutron data represented only by reaction cross-sections.
88	<i>70-Yb-169</i> <i>32.0 d</i>	EAF-3	Jul92/	FP	Neutron data represented only by reaction cross-sections.
<b>89</b>	<b>70-Yb-170</b>	EAF-3	Jul92/	FP	Neutron data represented only by reaction cross-sections.
<b>90</b>	<b>70-Yb-171</b>	EAF-3	Jul92/	FP	Neutron data represented only by reaction cross-sections.
<b>91</b>	<b>70-Yb-172</b>	EAF-3	Jul92/	FP	Neutron data represented only by reaction cross-sections.
<b>92</b>	<b>70-Yb-173</b>	EAF-3	Jul92/	FP	Neutron data represented only by reaction cross-sections.
<b>93</b>	<b>70-Yb-174</b>	EAF-3	Jul92/	FP	Neutron data represented only by reaction cross-sections.
94	<i>70-Yb-175</i> <i>4.2 d</i>	EAF-3	Jul92/	FP	Neutron data represented only by reaction cross-sections.

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
95	<b>70-Yb-176</b>	EAF-3	Jul92/	FP	Neutron data represented only by reaction cross-sections.

### ELEMENTS IN INTERMEDIATE GROUP 5

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
1	<i>71-Lu-173</i> <i>1.37 y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
2	<i>71-Lu-174</i> <i>3.31 y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
3	<i>71-Lu-174m</i> <i>142 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
4	<b>71-Lu-175</b>	ENDF/B-5	Jul67/	GP	NT
5	<b>71-Lu-176</b> <b><math>3.8 \times 10^{10}</math> y</b>	ENDF/B-5	Jul67/	GP	NT
6	<i>71-Lu-177</i> <i>6.71 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
7	<i>71-Lu-177m</i> <i>160.1 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
8	<b>72-Hf</b>	ENDL-82	Oct82/Dec92	GP	NT, GP
9	<i>72-Hf-172</i> <i>1.87 y</i>	ADL-3	Jan94/	ACT	Only sets of cross-sections given.
10	<i>72-Hf-173</i> <i>23.6 h</i>	ADL-3	Jan94/	ACT	Only sets of cross-sections given.
11	<b>72-Hf-174</b> <b><math>2.0 \times 10^{15}</math> y</b>	JENDL-3	Dec82/Dec83	GP	NT ENDF/B-6 evaluation (1993) available.
12	<i>72-Hf-175</i> <i>70.0 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
13	<b>72-Hf-176</b>	JENDL-3	Dec82/Dec83	GP	NT ENDF/B-6 evaluation (1993) available.
14	<b>72-Hf-177</b>	JENDL-3	Dec82/Dec83	GP	NT ENDF/B-6 evaluation (1993) available.
15	<b>72-Hf-178</b>	JENDL-3	Dec82/Jan84	GP	NT ENDF/B-6 evaluation (1993) available.
16	<i>72-Hf-178n</i> <i>31 y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
17	<b>72-Hf-179</b>	JENDL-3	Dec82/Dec83	GP	NT ENDF/B-6 evaluation (1993) available.

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
18	<i>72-Hf-179n</i> <i>25 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>19</b>	<b>72-Hf-180</b>	JENDL-3	Dec82/Dec83	GP	NT ENDF/B-6 evaluation (1993) available.
20	<i>72-Hf-181</i> <i>42.39 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
21	<i>72-Hf-182</i> <i>9×10<sup>6</sup> y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
22	<i>73-Ta-179</i> <i>665 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>23</b>	<b>73-Ta-180</b> <b>8.15 h</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>24</b>	<b>73-Ta-180m</b> <b>&gt;10<sup>15</sup> y</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>25</b>	<b>73-Ta-181</b>	ENDL-72	Jan72/Dec92	GP	NT, GAM
26	<i>73-Ta-182</i> <i>114.43 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
27	<i>73-Ta-183</i> <i>5.0 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
28	<i>74-W-178</i> <i>22 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>29</b>	<b>74-W-180</b>	BROND-2	May83/May90	ACT	Only set of resonance parameters given.
30	<i>74-W-181</i> <i>121.2 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>31</b>	<b>74-W-182</b>	BROND-2	May83/May90	ACT	NT, GAM
<b>32</b>	<b>74-W-183</b>	BROND-2	May83/May90	ACT	NT, GAM
<b>33</b>	<b>74-W-184</b>	BROND-2	May83/May90	ACT	NT, GAM
34	<i>74-W-185</i> <i>75.1 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>35</b>	<b>74-W-186</b>	BROND-2	May83/May90	ACT	NT, GAM
36	<i>74-W-187</i> <i>23.72 h</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
37	<i>74-W-188</i> <i>69 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>38</b>	<b>75-Re</b>	FOND-2	Jan88/Sep91	GP	NT
39	<i>75-Re-183</i> <i>71 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
40	<i>75-Re-184</i> <i>38.0 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
41	<i>75-Re-184m</i> <i>169 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>42</b>	<b>75-Re-185</b>	FOND-2	Jan68/Dec92	ACT	NT Modification of ENDF/B-5 evaluation.
43	<i>75-Re-186</i> <i>89.25 h</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
44	<i>75-Re-186m</i> <i>2×10<sup>9</sup> y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>45</b>	<b>75-Re-187</b> <b>5×10<sup>10</sup> y</b>	FOND-2	Jan68/Dec92	ACT	NT Modification of ENDF/B-5 evaluation.
46	<i>75-Re-188</i> <i>16.96 h</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
47	<i>75-Re-189</i> <i>24.3 h</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>48</b>	<b>76-Os</b>	BROND-2	Jan90/	GP	NT, GP
<b>47</b>	<b>76-Os-184</b>	FOND-2	Jul92/	ACT	NT, DD
50	<i>76-Os-185</i> <i>94 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>51</b>	<b>76-Os-186</b> $2 \times 10^{15}$ y	FOND-2	Jul92/	ACT	NT, DD
<b>52</b>	<b>76-Os-187</b>	FOND-2	Jul92/	ACT	NT, DD
<b>53</b>	<b>76-Os-188</b>	FOND-2	Jul92/	ACT	NT, DD
<b>54</b>	<b>76-Os-189</b>	FOND-2	Jul92/	ACT	NT, DD
<b>55</b>	<b>76-Os-190</b>	FOND-2	Jul92/	ACT	NT, DD
56	<i>76-Os-191</i> <i>15.4 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>57</b>	<b>76-Os-192</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
58	<i>76-Os-193</i> <i>30.11 h</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
59	<i>76-Os-194</i> <i>6.0 y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>60</b>	<b>77-Ir</b>	BROND-2	Jan90/	GP	NT, GAM
61	<i>77-Ir-189</i> <i>13.3 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
62	<i>77-Ir-190</i> <i>11.8 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>63</b>	<b>77-Ir-191</b>	FOND-2	Jan90/Nov93	ACT	NT, DD
64	<i>77-Ir-192</i> <i>73.83 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
65	<i>77-Ir-192n</i> <i>241 y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>66</b>	<b>77-Ir-193</b>	FOND-2	Jan90/Jan93	ACT	NT, DD
67	<i>77-Ir-193m</i> <i>10.53 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
68	<i>77-Ir-194m</i> <i>171 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>69</b>	<b>78-Pt</b>	ENDL-78	Oct82/Apr91	GP	NT, GP
<b>70</b>	<b>78-Pt-190</b> $6.5 \times 10^{11}$ y	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
71	<i>78-Pt-191</i> <i>2.8 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>72</b>	<b>78-Pt-192</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
73	<i>78-Pt-193</i> <i>50 y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
74	<i>78-Pt-193m</i> <i>4.33 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>75</b>	<b>78-Pt-194</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>76</b>	<b>78-Pt-195</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
77	<i>78-Pt-195m</i> <i>4.02 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>78</b>	<b>78-Pt-196</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
79	<i>78-Pt-197</i> <i>18.3 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.



No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
<b>80</b>	<b>78-Pt-198</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
81	<i>79-Au-195</i> <i>196.1 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
82	<i>79-Au-196</i> <i>6.2 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>83</b>	<b>79-Au-197</b>	ENDF/B-6 Rev. 1	Jan84/Jul91	GP ACT	NT, DD, GAM, COV <b>Cross section for the (n,<math>\gamma</math>) reaction in the 0.2-2.5 MeV region recommended as a standard.</b>
84	<i>79-Au-198</i> <i>2.6943 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
85	<i>79-Au-198m</i> <i>2.30 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
86	<i>79-Au-199</i> <i>3.139 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
87	<i>80-Hg-194</i> <i>520 y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
88	<i>80-Hg-195</i> <i>9.5 h</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
89	<i>80-Hg-195m</i> <i>40 h</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>90</b>	<b>80-Hg-196</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
91	<i>80-Hg-197</i> <i>64.1 h</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
92	<i>80-Hg-197m</i> <i>23.8 h</i>	ADL-3	Jan94/	ACT	Only sets of cross-sections given.
<b>93</b>	<b>80-Hg-198</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>94</b>	<b>80-Hg-199</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>95</b>	<b>80-Hg-200</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>96</b>	<b>80-Hg-201</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>97</b>	<b>80-Hg-202</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
98	<i>80-Hg-203</i> <i>46.59 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>99</b>	<b>80-Hg-204</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.

ELEMENTS IN INTERMEDIATE GROUP 6

No.	NUCLIDE	SOURCE	Eval/REV	STATUS	Composition of data and brief comments
1	<i>81-Tl-201</i> <i>73.1 h</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
2	<i>81-Tl-202</i> <i>12.23 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>3</b>	<b>81-Tl-203</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
4	<i>81-Tl-204</i> <i>3.78 y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>5</b>	<b>81-Tl-205</b>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>6</b>	<b>82-Pb</b>	JENDL-3.0	Jul87/	GP	NT, GAM
7	<i>82-Pb-202</i> <i>5.25×10<sup>4</sup> y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
8	<i>82-Pb-203</i> <i>51.9 h</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>9</b>	<b>82-Pb-204</b>	JENDL-3.0	Jul87/	ACT	NT, GAM
10	<i>82-Pb-205</i> <i>1.5×10<sup>7</sup> y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>11</b>	<b>82-Pb-206</b>	JENDL-3.0	Jul87/	ACT	NT, GAM
<b>12</b>	<b>82-Pb-207</b>	JENDL-3.0	Jul87/	ACT	NT, GAM
<b>13</b>	<b>82-Pb-208</b>	JENDL-3.0	Jul87/	ACT	NT, GAM

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
14	<i>82-Pb-209</i> <i>3.253 h</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
15	<i>82-Pb-210</i> <i>22.3 y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given. Leads to the formation of Bi-210.
16	<i>83-Bi-207</i> <i>31.55 y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
17	<i>83-Bi-208</i> <i>3.68×10<sup>5</sup> y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
<b>18</b>	<b>83-Bi-209</b>	BROND-2	Nov90/	GP	NT, GAM
19	<i>83-Bi-210</i> <i>5.013 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
20	<i>83-Bi-210m</i> <i>3.0×10<sup>6</sup> y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
21	<i>84-Po-208</i> <i>2.898 y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
22	<i>84-Po-209</i> <i>102 y</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
23	<i>84-Po-210</i> <i>138.38 d</i>	EAF-3	Jul92/	ACT	Only sets of cross-sections given.
24	<i>88-Ra-223</i> <i>11.43 d</i>	JENDL-3.2	Aug88/	ACT	NT
25	<i>88-Ra-224</i> <i>3.66 d</i>	JENDL-3.2	Aug88/	ACT	NT
26	<i>88-Ra-225</i> <i>14.8 d</i>	JENDL-3.2	Aug88/	ACT	NT
27	<i>88-Ra-226</i> <i>1600 y</i>	JENDL-3.2	Aug88/Nov93	ACT	NT

## ACTINIDES

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
1	<i>89-Ac-225</i> <i>10.0 d</i>	JENDL-3.2	Aug88/	MA	NT
2	<i>89-Ac-226</i> <i>29 h</i>	JENDL-3.2	Aug88/	MA	NT
3	<i>89-Ac-227</i> <i>21.773 y</i>	JENDL-3.2	Aug88/	MA	NT
4	<i>90-Th-227</i> <i>18.72 d</i>	JENDL-3.2	Aug88/Jun94	MA	NT
5	<i>90-Th-228</i> <i>1.913 y</i>	JENDL-3.2	Jun87/Jun94	MA	NT
6	<i>90-Th-229</i> <i>7 880 y</i>	JENDL-3.2	Aug88/Jun94	MA	NT

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
7	<i>90-Th-230</i> $7.54 \times 10^4$ y	JENDL-3.2	Jul87/Jun94	MA	NT
8	<b>90-Th-232</b> $1.405 \times 10^{10}$ y	ENDF/B-6	Dec77/	GP	NT, GAM, COV
9	<i>90-Th-233</i> 22.3 m	JENDL-3.2	Jul87/Jun94	MA	NT
10	<i>90-Th-234</i> 24.10 d	JENDL-3.2	Jul87/Jun94	MA	NT
11	<i>91-Pa-231</i> $3.276 \times 10^4$ y	FOND-2.2	Mar87/Aug96	GP	NT Modification of capture cross-section for JENDL-3.2 evaluation.
12	<i>91-Pa-232</i> 1.31 d	JENDL-3.2	Aug88/Jun94	MA	NT
13	<i>91-Pa-233</i> 27.0 d	FOND-2	May78/	GP	NT, Modification of ENDF/B-5 evaluation.
14	<i>92-U-232</i> 68.9 y	JENDL-3.2	Mar87/Mar94	GP	NT
15	<i>92-U-233</i> $1.592 \times 10^5$ y	BROND-2	Mar90/Jun90	GP	NT
16	<b>92-U-234</b> $2.455 \times 10^5$ y	FOND-2	Jul78/	GP	NT, DD Modification of ENDF/B-5 evaluation.
17	<b>92-U-235</b> $7.038 \times 10^8$ y	ENDF/B-6 Rev. 2	Nov89/Feb93	GP	NT, GAM, COV <b>Cross-section for the (n, fis) reaction in the 100 keV-20 MeV energy region recommended as a standard.</b> ENDF/B-6 (Rev. 5 1998) reviews the parameters in the resonance energy region.
18	<i>92-U-236</i> $2.342 \times 10^7$ y	ENDF/B-6	Oct89/	GP	NT, DD
19	<i>92-U-237</i> 6.72 d	JENDL-3.2	Mar93/	MA	NT
20	<b>92-U-238</b> $4.468 \times 10^9$ y	BROND-2	Jan80/Feb93	GP	NT, DD <b>Cross-section for the (n, fis) reaction in the energy region up to 20 MeV recommended as a standard.</b>
21	<i>93-Np-236</i> $1.54 \times 10^5$ y	JENDL-3.2	Mar93/	MA	NT
22	<i>93-Np-237</i> $2.144 \times 10^6$ y	JENDL-3.2	Nov87/Apr00	GP	NT, DD Modification of the data for the (n,3n) reaction. New BROND-3 (1996) evaluation available.
23	<i>93-Np-238</i> 2.117 d	JENDL-3.2	Mar93/	MA	NT
24	<i>93-Np-239</i> 2.355 d	ENDF/B-6	Dec88/	GP	NT
25	<i>94-Pu-236</i> 2.858 y	ENDF/B-6	Apr78/	MA	NT, DD
26	<i>94-Pu-237</i> 45.2 d	ENDF/B-6	Apr78/	MA	NT, DD ENDF/B-6 (Revision 1) adopts JENDL-3.2 evaluation modified in 1995.
27	<i>94-Pu-238</i> 87.74 y	BROND-2	Feb87/Feb93	MA	NT

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
28	<i>94-Pu-239</i> $2.411 \times 10^4$ y	FOND-2	Mar87/Nov98	GP	NT, GAM Modification of JENDL-3 evaluation: data from the LIPAR-5 library adopted in the energy region below 200 eV.
29	<i>94-Pu-240</i> 6 563 y	FOND-2	Dec80/Jan93	GP	NT, GAM Modification of BROND-2 evaluation.
30	<i>94-Pu-241</i> 14.35 y	FOND-2	Feb79/Jan93	GP	NT, GAM Modification of BROND-2 evaluation.
31	<i>94-Pu-242</i> $3.750 \times 10^5$ y	BROND-2	Dec80/Apr91	GP	NT, GAM
32	<i>94-Pu-243</i> 4.956 h	ENDF/B-6	Jul76/	MA	NT, DD, GAM
33	<i>94-Pu-244</i> $8.00 \times 10^7$ y	ENDF/B-6	Apr78/	MA	NT, DD
34	<i>95-Am-241</i> 432.2 y	BROND-3	Feb97/Apr00	GP	NT, DD, GAM, COV Correction made to isomeric ratio for capture cross-section.
35	<i>95-Am-242</i> 16 h	JENDL-3.2	Mar80/	GP	NT
36	<i>95-Am-242m</i> 141 y	BROND-2	Oct90/Dec98	GP	NT Modification of BROND-2 evaluation.
37	<i>95-Am-243</i> 7 370 y	JENDL-3.2	Mar88/	GP	NT BROND-3 evaluation (1997) and ENDF/B-6 evaluation (1998) available.
38	<i>95-Am-244</i> 10.1 h	JENDL-3.2	Mar88/	MA	NT
39	<i>95-Am-244m</i> 26 m	JENDL-3.2	Mar88/	MA	NT
40	<i>96-Cm-241</i> 32.8 d	JENDL-3.2	Mar89/	MA	NT
41	<i>96-Cm-242</i> 162.94 d	JENDL-3.2	Mar89/	MA	NT BROND-3 (1997) evaluation available.
42	<i>96-Cm-243</i> 29.1 y	JENDL-3.2	Mar89/	MA	NT BROND-3 (1997) evaluation available.
43	<i>96-Cm-244</i> 18.10 y	JENDL-3.2	Mar89/	MA	NT BROND-3 (1997) evaluation available.
44	<i>96-Cm-245</i> 8 500 y	JENDL-3.2	Mar89/Sep92	MA	NT
45	<i>96-Cm-246</i> 4 730 y	JENDL-3.2	Mar87/	MA	NT
46	<i>96-Cm-247</i> $1.56 \times 10^7$ y	JENDL-3.2	Mar89/	MA	NT
47	<i>96-Cm-248</i> $3.40 \times 10^5$ y	JENDL-3.2	Mar84/	MA	NT
48	<i>96-Cm-249</i> 64.15 m	JENDL-3.2	Mar84/Sep92	MA	NT
49	<i>96-Cm-250</i> ~9700 y	JENDL-3.2	Aug87/Jul94	MA	NT
50	<i>97-Bk-249</i> 320 d	ENDF/B-6	Jun86/	MA	NT
51	<i>97-Bk-250</i> 3.217 h	JENDL-3.2	Mar87/	MA	NT
52	<i>98-Cf-249</i> 350.6 y	ENDF/B-6	Apr89/	MA	NT

No.	NUCLIDE	SOURCE	EVAL/REV	STATUS	Composition of data and brief comments
53	<i>98-Cf-250</i> <i>13.08 y</i>	ENDF/B-6	Jul76/	MA	NT, DD, GAM
54	<i>98-Cf-251</i> <i>898 y</i>	ENDF/B-6	Jul76/	MA	NT, DD, GAM
55	<i>98-Cf-252</i> <i>2.645 y</i>	ENDF/B-6	Jul76/Aug91	MA	NT, DD, GAM
56	<i>98-Cf-253</i> <i>17.81 d</i>	ENDF/B-6	Dec75	MA	NT
57	<i>98-Cf-254</i> <i>60.5 d</i>	JENDL-3.2	Aug87/Jun94	MA	NT
58	<i>99-Es-253</i> <i>20.47 d</i>	ENDF/B-6	Jul76/	MA	NT
59	<i>99-Es-254</i> <i>275.7 d</i>	JENDL-3.2	Aug87/Jun94	MA	NT
60	<i>99-Es-255</i> <i>39.8 d</i>	JENDL-3.2	Aug87/Jun94	MA	NT
61	<i>100-Fm-255</i> <i>20.1 h</i>	JENDL-3.2	Aug87/Jun94	MA	NT

### **Availability of data**

The latest release of the Library is available from the Sectoral Fund for Algorithms and Programs at the following address:

Institute for Physics and Power Engineering, Sectoral Fund for Algorithms and Programs,  
Bondarenko Square 1, Kaluga Region, 249033, Russia

(Web: <http://ultra.ippe.obninsk.ru:8097>;

E-mail: [ofap@ippe.rssi.ru](mailto:ofap@ippe.rssi.ru), with copy of the request to [abbn@ippe.rssi.ru](mailto:abbn@ippe.rssi.ru)).

The 1999 release of FOND-2.2 Library is available online from IAEA Nuclear Data Section Web server (<http://www-nds.iaea.org/reports/nds-199.pdf>) through hyperlink to data in this report or on CD-ROM on the request.

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