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The JENDL-3 Sub-library for Dosimetry

by M. Nakazawa et al.

Summary of contents

by

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Abstract: This document summarizes the contents of the JENDL-3 Sub-library for Dosimetry. This nuclear data library contains neutron activation cross-sections for selected materials that are used for reactor neutron dosimetry by foil activation. The library or retrievals of selected materials are available on Cd-Rom or magnetic tape from the IAEA Nuclear Data Section upon request.

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Citation guidelines:

The JENDL-3 Sub-library for Dosimetry

by

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Contents

This data library, which was released in 1992, contains neutron activation cross-section data for selected nuclides that are used for reactor neutron dosimetry by foil activation. The data are mostly taken from JENDL-3. For some reactions data were adopted from other evaluated files. The library consists of two files, one with "point data" (about 175.700 records), the other with "group data" (SAND-2 type, 640 energy intervals, about 17.260 records). Both files include co-variances taken from IRDF-85. (Note that IRDF-85 has been replaced by IRDF-90; see document IAEA-NDS-141).

A description of the JENDL-3 Dosimetry File, including graphs of the data, has been published as report JAERI-1325, March 1992.

The format of the data is close to ENDF-6, with some exceptions. See the footnotes in the following table.

Table of Contents

MAT	Nuclide	MT	Reaction	Product	Half-life	Source **	
						sig	cov
331	3-Li-6	105	(n,t)α				
		207	α-production				
332	3-Li-7	205	t-production				
531	5-B-10	107	(n,t)				
		207	α-production				
931	9-F-19	16	(n,2n)	F-18	109.77 min		
1131	11-Na-23	16	(n,2n)	Na-22	2.602 y		
		102	(n,γ)	Na-24	15.02 h		
1231	12-Mg-24	103	(n,p)	Na-24	15.02 h		
1331	13-Al-27	103	(n,p)	Mg-27	9.462 min		
		107	(n,t)	Na-24	15.02 h		
1531	15-P-31	103	(n,p)	Si-31	2.62 h		
1631	16-S-32	103	(n,p)	P-32	14.26 h		
2131	21-Sc-45	102	(n,γ)	Sc-46	83.83 d		
2230	22-Ti-0	210*	(n,x)	Sc-46	83.83 d		-
		211*	(n,x)	Sc-47	3.345 d		-
		212*	(n,x)	Sc-48	43.7 h		-
2231	22-Ti-46	103	(n,p)	Sc-46	83.83 d		
2232	22-Ti-47	28	(n,np)	Sc-46	83.83 d		
		103	(n,p)	Sc-47	3.345 d		
2233	22-Ti-48	28	(n,np)	Sc-47	3.345 d		
		103	(n,p)	Sc-48	43.7 h		
2234	22-Ti-49	28	(n,np)	Sc-48	43.7 h		A

* These MT numbers do not correspond with ENDF/B-6 format

MAT	Nuclide	MT	Reaction	Product	Half-life	Source **	
						sig	cov
2531	25-Mn-55	16	(n,2n)	Mn-54	312.5 d		J3
		102	(n,γ)	Mn-56	2.5785 h		J3
2631	26-Fe-54	103	(n,p)	Mn-54	312.5 d		
2632	26-Fe-56	103	(n,p)	Mn-56	2.5785 h		
2633	26-Fe-57	28	(n,np)	Mn-56	2.5785 h		B6
2634	26-Fe-58	102	(n,γ)	Fe-59	44.496 h		
2731	27-Co-59	102	(n,γ)	Co-60	5.271 y		
		16	(n,2n)	Co-58	70.916 d		
		107	(n,α)	Mn-56	2.5785 h		
2831	28-Ni-58	16	(n,2n)	Ni-57	36.08 h		
		103	(n,p)	Co-58	70.916 d		
2832	28-Ni-60	103	(n,p)	Co-60	5.271 y		
2931	29-Cu-63	102	(n,γ)	Cu-64	12.701 h		
		16	(n,2n)	Cu-62	9.74 min		
		107	(n,α)	Co-60	5.271 y		
2932	29-Cu-65	16	(n,2n)	Cu-64	12.701 h		
3031	30-Zn-64	103	(n,p)	Cu-64	12.701 h	Y	
4031	40-Zr-90	16	(n,2n)	Zr-89	78.43 h		
4131	41-Nb-93	16	(n,2n)	Nb-92m	10.15 d	Y	A
		51	(n,n')	Nb-93m	13.6 y	S	S
4531	45-Rh-103	51	(n,n')	Rh-103m	56.12 m	I	
4931	49-In-115	51	(n,n')	In-115m	4.486 h	C	C
		102	(n,γ)	In-116m	54.1 m		
5331	53-I-127	16	(n,2n)	I-126	13.02 d		
6331	63-Eu-151	102	(n,γ)	Eu-152	13.33 y		A
7331	73-Ta-181	102	(n,γ)	Ta-181	114.5 d		A
7431	74-W-186	102	(n,γ)	W-187	23.9 h		A
7931	79-Au-197	16	(n,2n)	Au-196	6.183 d	Y	I90
		102	(n,γ)	Au-198	2.696 d	Y	
8031	80-Hg-199	51*	(n,n')	Hg-199m	42.6 m	S	S
9031	90-Th-232	18	(n,f)				
		102	(n,γ)	Th-233	22.3 m		
9231	92-U-235	18	(n,f)				
9232	92-U-238	18	(n,f)				
		102	(n,γ)	U-239	23.5 m		
9331	93-Np-237	18	(n,f)				
9431	94-Pu-239	18	(n,f)				
9531	95-Am-241	18	(n,f)			-	B6

* Note misprint in the text where it says MT=57

** Source: In most cases cross-section data are from JENDL-3 or JENDL-3 FP, and covariance data from IRDF-85. Special cases are:

sig	
Y	evaluated by N. Yamamuro
S	cross-sections and covariances evaluated by K. Sakurai
I	cross-sections and covariances from IRDF-85
C	evaluated by A.B. Smith et al.

cov	
-	no covariance data given
A	estimated for the present work
J3	covarinace data from JENDL-3
B6	from ENDF/B-6
S	K. Sakurai
C	A.B. Smith et al.
I90	from IRDF-90