核データニュース, No. 53 (1996)

解 説(II)

JENDL−3.2 の炉定数整備 (2)

連続モンテカルロコード用ライブラリー

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1) JENDL-3.2 に基づく MVP ライブラリー MVPLIB-J32

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整備状況

JENDL−3.2 に基づいて、Table 1 に示した核種及び温度の MVP 用中性子断面積ライブラリーが作成されている。処理温度は 300K、600K、900K、1500K、及び 1800K であり、それぞれ

300K: 98 核種、　600K: 34 核種、　900K: 24 核種
1500K: 7 核種、　1800K: 6 核種

のライブラリーが利用できる。ライブラリーの仕様は、JENDL−3.1 に基づくものと同様に以下のとおりである。

ポイントワイス断面積の内挿精度	0.1 %
非分離共鳴	断面積確率テーブル+バックグラウンド断面積
熱中性子散乱 (S(α,β))	ENDF/B−III より VIM モデルのデータ
散乱の角度分布	32 の等確率余弦ビン
エネルギー分布	JENDL−3.2 の表現に従う
γ線生成断面積	JENDL−3.2 に与えられている核種は処理

ライブラリーの容量と配布

JENDL−3.2 では、断面積を与えるエネルギー点数が大幅に増加した核種があるために、すべての核種のライブラリー(テキストファイル)は圧縮した状態で 約 200 Mbyte の容量がある (バイナリーファイルでもほぼ同量)。そのうち、100 Mbyte 強が 300 K のライブラリーである。

上記 MVP ライブラリーの必要な方、及びここでお知らせした核種・温度以外のライ

ブラリーの必要な方は、以下へご連絡下さい。

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2) 連続エネルギーモンテカルロコード MCNP 用ライブラリー FSXLIB-J3R2 の整備状況

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FSXLIB−J3R2 は、JENDL−3.2 の全 340 核種を収納している。ガンマ線生成データも JENDL−3.2 と同じ 66 核種である。そのエネルギー範囲は 10^{-11} ～ 20 MeV、処理温度は 300 K のみであり、断面積の pointwise 処理精度は 0.5 % である。熱中性子領域は free gas model で処理されており、S(α,β) 処理は MCNP 計算段階で必要に応じて行う。テキスト形式でのデータサイズは約 328 Mbyte である。Table 2 に収納した核種の ZAID などを示す。ZAID 中の核データファイル識別番号は、meta−stable 状態の核種に 36、基底状態または天然元素の核種に 37 を適用した。このライブラリーは MCNP−3A ～ 4A に適用可能である。

FSXLIB−J3R2 の入手を希望される方は、高度情報科学技術研究機構 (RIST) にお問い合わせ下さい。また、使用上の問題点等に関しましては以下にお知らせ下さい。

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Table 1 **List of nuclide ID. in MVP neutron cross section library based on JENDL-3.2**

(300K:98 nuclides, 600K:34 nuclides, 900K:24 nuclides

1500K:7 nuclides, 1800K:6 nuclides)

NOTICE: the nuclide IDs for each nuclide is the same as that based on JENDL-3.1

Nuclide	Nuclide ID	Data Source	MAT No.	Err (%)	Temp. (K)	GPD	Therm. scat.	No.of data(k)	Comment
Z=1 ******** Hydrogen **********									
H-1	H01003J3	JENDL3.2	125	0.1	300	Yes	FreeG	4	
H-1 in H_2O	H01H03J3	JENDL3.2	125	0.1	300	Yes	S(αβ)	32	with O06003J3
	H01H06J3	JENDL3.2	125	0.1	600	Yes	S(αβ)	32	with O06006J3
H-1 in CH_2	H01P03J3	JENDL3.2	125	0.1	300	Yes	S(αβ)	33	with C02003J3
H-1 in ZrH	H01Z03J3	JENDL3.2	125	0.1	300	Yes	S(αβ)	27	with ZRNZ03J3
H-2	D02003J3	JENDL3.2	128	0.1	300	No	FreeG	12	
H-2 in D_2O	D02D03J3	JENDL3.2	128	0.1	300	No	S(αβ)	35	with O06003J3
Z=2 ******** Helium **********									
He-3	HE3003J3	JENDL3.2	225	0.1	300	Yes	FreeG	5	
He-4	HE4003J3	JENDL3.2	228	0.1	300	No	FreeG	15	
Z=3 ******** Lithium **********									
Li-6	LI6003J3	JENDL3.2	325	0.1	300	Yes	FreeG	20	
Li-7	LI7003J3	JENDL3.2	328	0.1	300	Yes	FreeG	18	
Z=4 ******** Beryllium **********									
Be-9	BE9003J3	JENDL3.2	425	0.1	300	Yes	FreeG	24	
Be-9 in Metal	BE9B03J3	JENDL3.2	425	0.1	300	Yes	S(αβ)	50	
Z=5 ******** Boron **********									
B-10	B00003J3	JENDL3.2	525	0.1	300	Yes	FreeG	27	
B-11	B01003J3	JENDL3.2	528	0.1	300	Yes	FreeG	72	
Z=6 ******** Carbon **********									
C-12	C02003J3	JENDL3.2	625	0.1	300	Yes	FreeG	40	
Graphite	C02C03J3	JENDL3.2	625	0.1	300	Yes	S(αβ)	69	
	C02C06J3	JENDL3.2	625	0.1	600	Yes	S(αβ)	70	
	C02C09J3	JENDL3.2	625	0.1	900	Yes	S(αβ)	72	
	C02C15J3	JENDL3.2	625	0.1	1500	Yes	S(αβ)	74	
Z=7 ******** Nitrogen **********									
N-14	N04003J3	JENDL3.2	725	0.1	300	Yes	FreeG	90	
N-15	N05003J3	JENDL3.2	728	0.1	300	Yes	FreeG	59	
Z=8 ******** Oxygen **********									
O-16	O06003J3	JENDL3.2	825	0.1	300	Yes	FreeG	72	
	O06006J3	JENDL3.2	825	0.1	600	Yes	FreeG	73	
	O06009J3	JENDL3.2	825	0.1	900	Yes	FreeG	74	
O-16 in UO2	O06W03J3	JENDL3.2	825	0.1	300	Yes	S(αβ)	101	with U08W03J3
	O06W09J3	JENDL3.2	825	0.1	900	Yes	S(αβ)	106	with U08W09J3
Z=9 ******** Fluorine **********									
F-19	F09003J3	JENDL3.2	925	0.1	300	No	FreeG	21	
Z=11 ******** Sodium **********									
Na-23	NA3003J3	JENDL3.2	1125	0.1	300	Yes	FreeG	100	
	NA3006J3	JENDL3.2	1125	0.1	600	Yes	FreeG	100	
Z=12 ******** Magnesium **********									
Mg-nat	MGN003J3	JENDL3.2	1200	0.1	300	Yes	FreeG	58	
Z=13 ******** Aluminum **********									
Al-27	AL7003J3	JENDL3.2	1325	0.1	300	Yes	FreeG	77	
Z=14 ******** Silicon **********									
Si-nat	SIN003J3	JENDL3.2	1400	0.1	300	Yes	FreeG	162	

Table 1 (continued)

Nuclide ID	Data Source	MAT No.	Err (%)	Temp. (K)	GPD	Therm. scat.	No.of data(k)	Comment
Z=19 ******* Potassium **********								
K-nat	KON003J3	JENDL3.2 1500	0.1	300	Yes	FreeG	193	
Z=20 ******* Calcium **********								
Ca-nat	CAN003J3	JENDL3.2 2000	0.1	300	Yes	FreeG	262	
Z=22 ******* Titanium **********								
Ti-nat	TIN003J3	JENDL3.2 2200	0.1	300	Yes	FreeG	169	
Z=24 ******* Chromium **********								
Cr-nat	CRN003J3	JENDL3.2 2400	0.1	300	Yes	FreeG	315	
	CRN006J3	JENDL3.2 2400	0.1	600	Yes	FreeG	312	
Z=25 ******* Manganese **********								
Mn-55	MN5003J3	JENDL3.2 2525	0.1	300	Yes	FreeG	604	
	MN5006J3	JENDL3.2 2525	0.1	600	Yes	FreeG	598	
Z=26 ******* Iron **********								
Fe-nat	FEN003J3	JENDL3.2 2600	0.1	300	Yes	FreeG	557	
	FEN006J3	JENDL3.2 2600	0.1	600	Yes	FreeG	573	
Z=27 ******* Cobalt **********								
Co-59	CO9003J3	JENDL3.2 2725	0.1	300	Yes	FreeG	277	
Z=28 ******* Nickel **********								
Ni-nat	NIN003J3	JENDL3.2 2800	0.1	300	Yes	FreeG	861	
	NIN006J3	JENDL3.2 2800	0.1	600	Yes	FreeG	848	
Z=29 ******* Copper **********								
Cu-nat	CUN003J3	JENDL3.2 2900	0.1	300	Yes	FreeG	380	
Z=31 ******* Gallium **********								
Ga-nat	GAN003J3	JENDL3.2 3100	0.1	300	No	FreeG	162	
Z=39 ******* Yttrium **********								
Y-89	Y09003J3	JENDL3.2 3925	0.1	300	No	FreeG	230	
Z=40 ******* Zirconium **********								
Zr-nat	ZRN003J3	JENDL3.2 4000	0.1	300	Yes	FreeG	531	
	ZRN006J3	JENDL3.2 4000	0.1	600	Yes	FreeG	510	
Zr-nat in ZrH	ZRNZ03J3	JENDL3.2 4000	0.1	300	Yes	S(αβ)	606	with H01Z03J3
Z=41 ******* Niobium **********								
Nb-93	NB3003J3	JENDL3.2 4125	0.1	300	No	FreeG	236	
	NB3006J3	JENDL3.2 4125	0.1	600	No	FreeG	216	
Z=42 ******* Molybdenum **********								
Mo-nat	MON003J3	JENDL3.2 4200	0.1	300	Yes	FreeG	585	
Mo-95	MO5003J3	JENDL3.2 4234	0.1	300	No	FreeG	181	
Z=43 ******* Technetium **********								
Tc-99	TC9003J3	JENDL3.2 4331	0.1	300	No	FreeG	518	
Z=44 ******* Ruthenium **********								
Ru-101	RU1003J3	JENDL3.2 4440	0.1	300	No	FreeG	284	
Z=45 ******* Rhodium **********								
Rh-103	RH3003J3	JENDL3.2 4525	0.1	300	No	FreeG	441	
Z=46 ******* Palladium **********								
Pd-105	PD5003J3	JENDL3.2 4634	0.1	300	No	FreeG	419	
Z=47 ******* Silver **********								
Ag-nat	AGN003J3	JENDL3.2 4700	0.1	300	Yes	FreeG	657	
	AGN006J3	JENDL3.2 4700	0.1	600	Yes	FreeG	646	
Ag-109	AG9003J3	JENDL3.2 4731	0.1	300	No	FreeG	560	
Z=48 ******* Cadmium **********								
Cd-nat	CDN003J3	JENDL3.2 4800	0.1	300	Yes	FreeG	541	
	CDN006J3	JENDL3.2 4800	0.1	600	Yes	FreeG	492	

Table 1 (continued)

Nuclide	ID	Data Source	MAT No.	Err (%)	Temp. (K)	GPD	Therm. scat.	No.of data(k)	Comment
Z=49 ******* Indium **********									
In-113	IN3003J3	JENDL3.2	4925	0.1	300	No	FreeG	260	
	IN3006J3	JENDL3.2	4925	0.1	600	No	FreeG	254	
In-115	IN5003J3	JENDL3.2	2931	0.1	300	No	FreeG	424	
	IN5006J3	JENDL3.2	2931	0.1	600	No	FreeG	386	
Z=53 ******* Iodine **********									
I-129	I09003J3	JENDL3.2	5331	0.1	300	No	FreeG	358	
Z=54 ******* Xenon **********									
Xe-131	XE1003J3	JENDL3.2	5446	0.1	300	No	FreeG	210	
Xe-135	XE5003J3	JENDL3.2	5458	0.1	300	No	FreeG	143	
Z=55 ******* Cesium **********									
Cs-133	CS3003J3	JENDL3.2	5525	0.1	300	No	FreeG	574	
Z=60 ******* Neodymium **********									
Nd-143	ND3003J3	JENDL3.2	6028	0.1	300	No	FreeG	392	
Nd-145	ND5003J3	JENDL3.2	6034	0.1	300	No	FreeG	545	
Z=61 ******* Promethium **********									
Pm-147	PM7003J3	JENDL3.2	6149	0.1	300	No	FreeG	207	
Z=62 ******* Samarium **********									
Sm-147	SM7003J3	JENDL3.2	6234	0.1	300	No	FreeG	452	
Sm-149	SM9003J3	JENDL3.2	6240	0.1	300	No	FreeG	407	
Sm-150	SM0003J3	JENDL3.2	6243	0.1	300	No	FreeG	245	
Sm-151	SM1003J3	JENDL3.2	6246	0.1	300	No	FreeG	319	
Sm-152	SM2003J3	JENDL3.2	6249	0.1	300	No	FreeG	341	
Z=63 ******* Europium **********									
Eu-153	EU3003J3	JENDL3.2	6331	0.1	300	No	FreeG	144	
Z=64 ********* Gadolinium **********									
Gd-152	GD2003J3	JENDL3.2	6425	0.1	300	No	FreeG	499	
	GD2006J3	JENDL3.2	6425	0.1	600	No	FreeG	473	
	GD2009J3	JENDL3.2	6425	0.1	900	No	FreeG	457	
Gd-154	GD4003J3	JENDL3.2	6431	0.1	300	No	FreeG	455	
	GD4006J3	JENDL3.2	6431	0.1	600	No	FreeG	428	
	GD4009J3	JENDL3.2	6431	0.1	900	No	FreeG	411	
Gd-155	GD5003J3	JENDL3.2	6434	0.1	300	No	FreeG	301	
	GD5006J3	JENDL3.2	6434	0.1	600	No	FreeG	284	
	GD5009J3	JENDL3.2	6434	0.1	900	No	FreeG	273	
Gd-156	GD6003J3	JENDL3.2	6437	0.1	300	No	FreeG	330	
	GD6006J3	JENDL3.2	6437	0.1	600	No	FreeG	317	
	GD6009J3	JENDL3.2	6437	0.1	900	No	FreeG	309	
Gd-157	GD7003J3	JENDL3.2	6440	0.1	300	No	FreeG	302	
	GD7006J3	JENDL3.2	6440	0.1	600	No	FreeG	292	
	GD7009J3	JENDL3.2	6440	0.1	900	No	FreeG	286	
Gd-158	GD8003J3	JENDL3.2	6443	0.1	300	No	FreeG	330	
	GD8006J3	JENDL3.2	6443	0.1	600	No	FreeG	318	
	GD8009J3	JENDL3.2	6443	0.1	900	No	FreeG	312	
Gd-160	GD0003J3	JENDL3.2	6449	0.1	300	No	FreeG	229	
	GD0006J3	JENDL3.2	6449	0.1	600	No	FreeG	226	
	GD0009J3	JENDL3.2	6449	0.1	900	No	FreeG	224	
Z=72 ******* Hafnium **********									
Hf-nat	HFN003J3	JENDL3.2	7200	0.1	300	Yes	FreeG	270	
	HFN006J3	JENDL3.2	7200	0.1	600	Yes	FreeG	246	
	HFN009J3	JENDL3.2	7200	0.1	900	Yes	FreeG	229	
Z=74 ******* Tungsten **********									
W-nat	W0N003J3	JENDL3.2	7400	0.1	300	Yes	FreeG	592	
Z=82 ******* Lead **********									
Pb-nat	PBN003J3	JENDL3.2	8200	0.1	300	Yes	FreeG	480	
Z=83 ******* Bismuth **********									
Bi-209	BI9003J3	JENDL3.2	8325	0.1	300	Yes	FreeG	179	

Table 1 (continued)

Nuclide ID	Data Source	MAT No.	Err (%)	Temp. (K)	GPD	Therm. scat.	No.of data(k)	Comment
Z=90 ******* Thorium **********								
Th-232	TH2003J3	JENDL3.2	9040	0.1	300	No	FreeG	475	
Z=92 ******* Uranium **********								
U-233	U03003J3	JENDL3.2	9222	0.1	300	No	FreeG	168	
U-234	U04003J3	JENDL3.2	9225	0.1	300	No	FreeG	399	
U-235	U05003J3	JENDL3.2	9228	0.1	300	Yes	FreeG	513	
	U05006J3	JENDL3.2	9228	0.1	600	Yes	FreeG	418	
	U05009J3	JENDL3.2	9228	0.1	900	Yes	FreeG	369	
	U05015J3	JENDL3.2	9228	0.1	1500	Yes	FreeG	315	
	U05018J3	JENDL3.2	9228	0.1	1800	Yes	FreeG	298	
U-236	U06003J3	JENDL3.2	9231	0.1	300	No	FreeG	323	
U-238	U08003J3	JENDL3.2	9237	0.1	300	Yes	FreeG	1368	
	U08006J3	JENDL3.2	9237	0.1	600	Yes	FreeG	1094	
	U08009J3	JENDL3.2	9237	0.1	900	Yes	FreeG	938	
	U08015J3	JENDL3.2	9237	0.1	1500	Yes	FreeG	763	
	U08018J3	JENDL3.2	9237	0.1	1800	Yes	FreeG	707	
U-238 in UO2	U08W03J3	JENDL3.2	9237	0.1	300	Yes	S(αβ)	1368	with O06W03J3
	U08W09J3	JENDL3.2	9237	0.1	900	Yes	S(αβ)	938	with O06W09J3
Z-93 ******* Neptinium **********								
Np-237	NP7003J3	JENDL3.2	9346	0.1	300	No	FreeG	198	
Np-239	NP9003J3	JENDL3.2	9352	0.1	300	No	FreeG	14	
Z=94 ******* Plutonium **********								
Pu-238	PU8003J3	JENDL3.2	9434	0.1	300	No	FreeG	155	
Pu-239	PU9003J3	JENDL3.2	9437	0.1	300	Yes	FreeG	772	
	PU9006J3	JENDL3.2	9437	0.1	600	Yes	FreeG	619	
	PU9009J3	JENDL3.2	9437	0.1	900	Yes	FreeG	540	
	PU9015J3	JENDL3.2	9437	0.1	1500	Yes	FreeG	458	
	PU9018J3	JENDL3.2	9437	0.1	1800	Yes	FreeG	431	
Pu-240	PU0003J3	JENDL3.2	9440	0.1	300	No	FreeG	542	
	PU0006J3	JENDL3.2	9440	0.1	600	No	FreeG	509	
	PU0009J3	JENDL3.2	9440	0.1	900	No	FreeG	483	
	PU0015J3	JENDL3.2	9440	0.1	1500	No	FreeG	451	
	PU0018J3	JENDL3.2	9440	0.1	1800	No	FreeG	437	
Pu-241	PU1003J3	JENDL3.2	9443	0.1	300	No	FreeG	173	
	PU1006J3	JENDL3.2	9443	0.1	600	No	FreeG	148	
	PU1009J3	JENDL3.2	9443	0.1	900	No	FreeG	134	
	PU1015J3	JENDL3.2	9443	0.1	1500	No	FreeG	116	
	PU1018J3	JENDL3.2	9443	0.1	1800	No	FreeG	109	
Pu-242	PU2003J3	JENDL3.2	9446	0.1	300	No	FreeG	259	
	PU2006J3	JENDL3.2	9446	0.1	600	No	FreeG	248	
	PU2009J3	JENDL3.2	9446	0.1	900	No	FreeG	239	
	PU2015J3	JENDL3.2	9446	0.1	1500	No	FreeG	228	
	PU2018J3	JENDL3.2	9446	0.1	1800	No	FreeG	223	
Z=95 ******* Americium **********								
Am-241	AM1003J3	JENDL3.2	9543	0.1	300	No	FreeG	200	
	AM1006J3	JENDL3.2	9543	0.1	600	No	FreeG	165	
	AM1009J3	JENDL3.2	9543	0.1	900	No	FreeG	143	
Am-242	AM2003J3	JENDL3.2	9546	0.1	300	No	FreeG	23	
	AM2006J3	JENDL3.2	9546	0.1	600	No	FreeG	23	
	AM2009J3	JENDL3.2	9546	0.1	900	No	FreeG	23	
Am-242m	AM2M03J3	JENDL3.2	9547	0.1	300	No	FreeG	41	
	AM2M06J3	JENDL3.2	9547	0.1	600	No	FreeG	40	
	AM2M09J3	JENDL3.2	9547	0.1	900	No	FreeG	40	
Am-243	AM3003J3	JENDL3.2	9549	0.1	300	No	FreeG	228	
	AM3006J3	JENDL3.2	9549	0.1	600	No	FreeG	187	
	AM3009J3	JENDL3.2	9549	0.1	900	No	FreeG	161	
Am-244	AM4003J3	JENDL3.2	9552	0.1	300	No	FreeG	28	
	AM4006J3	JENDL3.2	9552	0.1	600	No	FreeG	28	
	AM4009J3	JENDL3.2	9552	0.1	900	No	FreeG	28	
Am-244m	AM4M03J3	JENDL3.2	9553	0.1	300	No	FreeG	28	
	AM4M06J3	JENDL3.2	9553	0.1	600	No	FreeG	28	
	AM4M09J3	JENDL3.2	9553	0.1	900	No	FreeG	28	

Table 1 (continued)

Nuclide ID	Data Source	MAT No.	Err (%)	Temp. (K)	GPD	Therm. scat.	No.of data(k)	Comment
Z=96 ******* Curium **********								
Cm-242	CM2003J3	JENDL3.2	9631	0.1	300	No	FreeG	57
Cm-243	CM3003J3	JENDL3.2	9634	0.1	300	No	FreeG	61
Cm-244	CM4003J3	JENDL3.2	9637	0.1	300	No	FreeG	214
Cm-245	CM5003J3	JENDL3.2	9640	0.1	300	No	FreeG	61

Temp: The temperature(in K) at which the data are processed.
GPD= Yes/No= gamma-production data exist / none of such data exist.
Therm. scat. = FreeG / S($\alpha\beta$) means that thermal scattering is treated based on the Free gas model / thermal scattering law data (S(α,β)).
S(α,β) :Thermal scattering data S(α,β) are taken from ENDF/B-III.
No. of data: the size of data in k-single-precision-word (4bytes).

Table 2 List of nuclides contained in the FSXLIB-J3R2 library.

nuclide	ZAID	MAT	GPD	length	NUBAR	status
1-H - 1	1001.37C	125	yes	2422		revised
1-H - 2	1002.37C	128		6376		revised
2-He- 3	2003.37C	225	yes	3176		revised
2-He- 4	2004.37C	228		3319		
3-Li- 6	3006.37C	325	yes	14049		revised
3-Li- 7	3007.37C	328	yes	19526		revised
4-Be- 9	4009.37C	425	yes	18522		
5-B - 10	5010.37C	525	yes	29424		
5-B - 11	5011.37C	528	yes	42876		
6-C - 12	6012.37C	625	yes	24085		revised
7-N - 14	7014.37C	725	yes	53444		revised
7-N - 15	7015.37C	728	yes	25625		revised
8-O - 16	8016.37C	825	yes	43085		revised
9-F - 19	9019.37C	925	yes	34979		revised
11-Na- 23	11023.37C	1125	yes	49630		revised
12-Mg- 0	12000.37C	1200	yes	46291		revised
12-Mg- 24	12024.37C	1225		11976		revised
12-Mg- 25	12025.37C	1228		16019		
12-Mg- 26	12026.37C	1231		12135		
13-Al- 27	13027.37C	1325	yes	47340		revised
14-Si- 0	14000.37C	1400	yes	75373		revised
14-Si- 28	14028.37C	1425	yes	43048		revised
14-Si- 29	14029.37C	1428	yes	38103		revised
14-Si- 30	14030.37C	1431	yes	33007		revised
15-P - 31	15031.37C	1525	yes	31224		revised
16-S - 0	16000.37C	1600	yes	79771		revised
16-S - 32	16032.37C	1625		45010		revised
16-S - 33	16033.37C	1628		17858		revised
16-S - 34	16034.37C	1631		13634		revised
16-S - 36	16036.37C	1637		7934		revised
17-Cl- 0	17000.37C	1700		83467		new
17-Cl- 35	17035.37C	1725		52970		new
17-Cl- 37	17037.37C	1731		35357		new
18-Ar- 40	18040.37C	1837		99238		new
19-K - 0	19000.37C	1900	yes	64640		revised
19-K - 39	19039.37C	1925		28841		revised
19-K - 40	19040.37C	1928		9460		revised
19-K - 41	19041.37C	1931		23643		revised
20-Ca- 0	20000.37C	2000	yes	117187		revised
20-Ca- 40	20040.37C	2025	yes	51987		revised
20-Ca- 42	20042.37C	2031		32236		revised
20-Ca- 43	20043.37C	2034		25933		revised
20-Ca- 44	20044.37C	2037		26742		revised
20-Ca- 46	20046.37C	2043		9982		revised
20-Ca- 48	20048.37C	2049		11282		revised
21-Sc- 45	21045.37C	2125		79770		revised
22-Ti- 0	22000.37C	2200	yes	77625		revised
22-Ti- 46	22046.37C	2225		28667		revised
22-Ti- 47	22047.37C	2228		37002		revised
22-Ti- 48	22048.37C	2231		19525		revised

Table 2 (continued)

nuclide	ZAID	MAT	GPD	length	NUBAR	status
22-Ti- 49	22049.37C	2234		24470		revised
22-Ti- 50	22050.37C	2237		17788		revised
23-V - 51	23051.37C	2328	yes	47006		revised
24-Cr- 0	24000.37C	2400	yes	122736		revised
24-Cr- 50	24050.37C	2425		47558		revised
24-Cr- 52	24052.37C	2431		37854		revised
24-Cr- 53	24053.37C	2434		32074		revised
24-Cr- 54	24054.37C	2437		24727		revised
25-Mn- 55	25055.37C	2525	yes	194580		revised
26-Fe- 0	26000.37C	2600	yes	229660		revised
26-Fe- 54	26054.37C	2625	yes	63040		revised
26-Fe- 56	26056.37C	2631	yes	73619		revised
26-Fe- 57	26057.37C	2634	yes	61520		revised
26-Fe- 58	26058.37C	2637	yes	66638		revised
27-Co- 59	27059.37C	2725	yes	104347		revised
28-Ni- 0	28000.37C	2800	yes	329664		revised
28-Ni- 58	28058.37C	2825	yes	84502		revised
28-Ni- 60	28060.37C	2831	yes	105048		revised
28-Ni- 61	28061.37C	2834	yes	47155		revised
28-Ni- 62	28062.37C	2837	yes	45262		revised
28-Ni- 64	28064.37C	2843	yes	44279		revised
29-Cu- 0	29000.37C	2900	yes	137439		revised
29-Cu- 63	29063.37C	2925	yes	100587		revised
29-Cu- 65	29065.37C	2931	yes	78326		revised
31-Ga- 0	31000.37C	3100		57691		new
31-Ga- 69	31069.37C	3125		41693		new
31-Ga- 71	31071.37C	3131		42315		new
32-Ge- 0	32000.37C	3200		83252		new
32-Ge- 70	32070.37C	3225		34305		new
32-Ge- 72	32072.37C	3231		35896		new
32-Ge- 73	32073.37C	3234		58132		new
32-Ge- 74	32074.37C	3237		30954		new
32-Ge- 76	32076.37C	3243		29597		new
33-As- 75	33075.37C	3325		77786		revised
34-Se- 74	34074.37C	3425		19708		
34-Se- 76	34076.37C	3431		35946		
34-Se- 77	34077.37C	3434		41079		
34-Se- 78	34078.37C	3437		26314		
34-Se- 79	34079.37C	3440		20862		
34-Se- 80	34080.37C	3443		24794		revised
34-Se- 82	34082.37C	3449		16796		
35-Br- 79	35079.37C	3525		83756		revised
35-Br- 81	35081.37C	3531		85693		revised
36-Kr- 78	36078.37C	3625		24815		
36-Kr- 80	36080.37C	3631		24452		
36-Kr- 82	36082.37C	3637		14543		
36-Kr- 83	36083.37C	3640		14792		
36-Kr- 84	36084.37C	3643		16026		
36-Kr- 85	36085.37C	3646		12561		
36-Kr- 86	36086.37C	3649		49024		

Table 2 (continued)

nuclide	ZAID	MAT	GPD	length	NUBAR	status
37-Rb- 85	37085.37C	3725		50322		
37-Rb- 87	37087.37C	3731		18507		
38-Sr- 86	38086.37C	3831		52678		
38-Sr- 87	38087.37C	3834		58783		
38-Sr- 88	38088.37C	3837		40801		revised
38-Sr- 89	38089.37C	3840		12408		
38-Sr- 90	38090.37C	3843		9919		revised
39-Y - 89	39089.37C	3925		39216		revised
39-Y - 91	39091.37C	3931		24611		
40-Zr- 0	40000.37C	4000	yes	154919		revised
40-Zr- 90	40090.37C	4025		54471		revised
40-Zr- 91	40091.37C	4028		69794		revised
40-Zr- 92	40092.37C	4031		57721		revised
40-Zr- 93	40093.37C	4034		20857		
40-Zr- 94	40094.37C	4037		51131		revised
40-Zr- 95	40095.37C	4040		17236		
40-Zr- 96	40096.37C	4043		34683		revised
41-Nb- 93	41093.37C	4125	yes	114171		revised
41-Nb- 94	41094.37C	4128		24425		
41-Nb- 95	41095.37C	4131		18651		
42-Mo- 0	42000.37C	4200	yes	162073		revised
42-Mo- 92	42092.37C	4225		55938		revised
42-Mo- 94	42094.37C	4231		49991		revised
42-Mo- 95	42095.37C	4234		44679		revised
42-Mo- 96	42096.37C	4237		53801		revised
42-Mo- 97	42097.37C	4240		47623		revised
42-Mo- 98	42098.37C	4243		71206		revised
42-Mo- 99	42099.37C	4246		16443		
42-Mo-100	42100.37C	4249		70116		revised
43-Tc- 99	43099.37C	4331		88716		revised
44-Ru- 96	44096.37C	4425		16141		
44-Ru- 98	44098.37C	4431		16719		
44-Ru- 99	44099.37C	4434		36465		revised
44-Ru-100	44100.37C	4437		56532		
44-Ru-101	44101.37C	4440		47242		revised
44-Ru-102	44102.37C	4443		61357		
44-Ru-103	44103.37C	4446		13756		
44-Ru-104	44104.37C	4449		51240		
44-Ru-106	44106.37C	4455		9280		
45-Rh-103	45103.37C	4525		77112		revised
45-Rh-105	45105.37C	4531		15893		
46-Pd-102	46102.37C	4625		18920		
46-Pd-104	46104.37C	4631		15065		
46-Pd-105	46105.37C	4634		76148		
46-Pd-106	46106.37C	4637		19654		
46-Pd-107	46107.37C	4640		46660		revised
46-Pd-108	46108.37C	4643		63986		
46-Pd-110	46110.37C	4649		50108		
47-Ag- 0	47000.37C	4700	yes	189009		revised
47-Ag-107	47107.37C	4725	yes	152187		revised

Table 2 (continued)

nuclide	ZAID	MAT	GPD	length	NUBAR	status
47-Ag-109	47109.37C	4731	yes	155982		revised
47-Ag-110m	47110.36C	4735		31162		
48-Cd- 0	48000.37C	4800	yes	132651		revised
48-Cd-106	48106.37C	4825		19118		
48-Cd-108	48108.37C	4831		25699		
48-Cd-110	48110.37C	4837		52320		revised
48-Cd-111	48111.37C	4840		51566		revised
48-Cd-112	48112.37C	4843		49181		
48-Cd-113	48113.37C	4846		30549		revised
48-Cd-114	48114.37C	4849		46115		
48-Cd-116	48116.37C	4855		32904		
49-In-113	49113.37C	4925		41552		
49-In-115	49115.37C	4931		71368		revised
50-Sn-112	50112.37C	5025		31090		
50-Sn-114	50114.37C	5031		30430		
50-Sn-115	50115.37C	5034		21160		
50-Sn-116	50116.37C	5037		20160		
50-Sn-117	50117.37C	5040		39999		revised
50-Sn-118	50118.37C	5043		25189		
50-Sn-119	50119.37C	5046		28217		
50-Sn-120	50120.37C	5049		84753		
50-Sn-122	50122.37C	5055		28742		
50-Sn-123	50123.37c	5058		12975		
50-Sn-124	50124.37C	5061		22509		revised
50-Sn-126	50126.37C	5067		9498		
51-Sb- 0	51000.37C	5100		79971		revised
51-Sb-121	51121.37C	5125		62805		revised
51-Sb-123	51123.37C	5131		54632		revised
51-Sb-124	51124.37C	5134		11059		
51-Sb-125	51125.37C	5137		21070		
52-Te-120	52120.37C	5225		15342		
52-Te-122	52122.37C	5231		73000		revised
52-Te-123	52123.37C	5234		40252		revised
52-Te-124	52124.37C	5237		112471		revised
52-Te-125	52125.37C	5240		84614		revised
52-Te-126	52126.37C	5243		72049		revised
52-Te-127m	52127.36C	5247		17887		
52-Te-128	52128.37C	5249		21518		
52-Te-129m	52129.37C	5253		19245		
52-Te-130	52130.37C	5255		23540		
53-I -127	53127.37C	5325		66811		revised
53-I -129	53129.37C	5331		61456		
53-I -131	53131.37C	5337		15714		
54-Xe-124	54124.37C	5425		22726		
54-Xe-126	54126.37C	5431		17458		
54-Xe-128	54128.37C	5437		26795		
54-Xe-129	54129.37C	5440		51090		
54-Xe-130	54130.37C	5443		23590		
54-Xe-131	54131.37C	5446		37622		
54-Xe-132	54132.37C	5449		19661		

Table 2 (continued)

nuclide	ZAID	MAT	GPD	length	NUBAR	status
54-Xe-133	54133.37C	5452		15815		
54-Xe-134	54134.37C	5455		17967		
54-Xe-135	54135.37C	5458		16749		
54-Xe-136	54136.37C	5461		36261		
55-Cs-133	55133.37C	5525		102624		
55-Cs-134	55134.37C	5528		29109		
55-Cs-135	55135.37C	5531		13953		
55-Cs-136	55136.37C	5534		10385		
55-Cs-137	55137.37C	5537		13735		revised
56-Ba-130	56130.37C	5625		44033		
56-Ba-132	56132.37C	5631		15155		
56-Ba-134	56134.37C	5637		45785		
56-Ba-135	56135.37C	5640		90266		revised
56-Ba-136	56136.37C	5643		44592		
56-Ba-137	56137.37C	5646		47431		revised
56-Ba-138	56138.37C	5649		36429		revised
56-Ba-140	56140.37C	5655		14432		
57-La-138	57138.37C	5725		24629		
57-La-139	57139.37C	5728		59281		revised
58-Ce-140	58140.37C	5837		72384		revised
58-Ce-141	58141.37C	5840		28429		
58-Ce-142	58142.37C	5843		39561		revised
58-Ce-144	58144.37C	5849		11865		
59-Pr-141	59141.37C	5925		85153		revised
59-Pr-143	59143.37C	5931		16083		
60-Nd-142	60142.37C	6025		46611		revised
60-Nd-143	60143.37C	6028		83338		revised
60-Nd-144	60144.37C	6031		38345		revised
60-Nd-145	60145.37C	6034		116452		revised
60-Nd-146	60146.37C	6037		46441		
60-Nd-147	60147.37C	6040		21072		
60-Nd-148	60148.37C	6043		58845		
60-Nd-150	60150.37C	6049		62918		revised
61-Pm-147	61147.37C	6149		24995		
61-Pm-148	61148.37C	6152		13413		
61-Pm-148m	61148.36C	6153		13355		
61-Pm-149	61149.37C	6155		18637		
62-Sm-144	62144.37C	6225		43716		revised
62-Sm-147	62147.37C	6234		86852		revised
62-Sm-148	62148.37C	6237		55003		revised
62-Sm-149	62149.37C	6240		73574		
62-Sm-150	62150.37C	6243		40898		revised
62-Sm-151	62151.37C	6246		52384		
62-Sm-152	62152.37C	6249		72862		revised
62-Sm-153	62153.37C	6252		26643		
62-Sm-154	62154.37C	6255		44317		revised
63-Eu- 0	63000.37C	6300	yes	56629		revised
63-Eu-151	63151.37C	6325		42862		
63-Eu-152	63152.37C	6328		18988		
63-Eu-153	63153.37C	6331		39189		revised

Table 2 (continued)

nuclide	ZAID	MAT	GPD	length	NUBAR	status
63-Eu-154	63154.37C	6334		20590		revised
63-Eu-155	63155.37C	6337		19069		revised
63-Eu-156	63156.37C	6340		13682		
64-Gd-152	64152.37C	6425		99776		
64-Gd-154	64154.37C	6431		91186		
64-Gd-155	64155.37C	6434		52934		
64-Gd-156	64156.37C	6437		61627		
64-Gd-157	64157.37C	6440		50265		
64-Gd-158	64158.37C	6443		67903		
64-Gd-160	64160.37C	6449		41213		
65-Tb-159	65159.37C	6525		89596		
72-Hf- 0	72000.37C	7200	yes	85791		revised
72-Hf-174	72174.37C	7225	yes	35550		revised
72-Hf-176	72176.37C	7231	yes	47559		revised
72-Hf-177	72177.37C	7234	yes	62591		revised
72-Hf-178	72178.37C	7237	yes	51609		revised
72-Hf-179	72179.37C	7240	yes	49847		revised
72-Hf-180	72180.37C	7243	yes	39864		revised
73-Ta-181	73181.37C	7328	yes	166522		revised
74-W - 0	74000.37C	7400	yes	190490		revised
74-W -182	74182.37C	7431		107723		revised
74-W -183	74183.37C	7434		65592		revised
74-W -184	74184.37C	7437		93576		revised
74-W -186	74186.37C	7443		85206		revised
82-Pb- 0	82000.37C	8200	yes	165801		revised
82-Pb-204	82204.37C	8225	yes	73192		revised
82-Pb-206	82206.37C	8231	yes	120923		revised
82-Pb-207	82207.37C	8234	yes	81634		revised
82-Pb-208	82208.37C	8237	yes	63463		revised
83-Bi-209	83209.37C	8325	yes	68682		revised
88-Ra-223	88223.37C	8825		7233	total	
88-Ra-224	88224.37C	8828		6174		
88-Ra-225	88225.37C	8831		4557		
88-Ra-226	88226.37C	8834		35911	total	revised
89-Ac-225	89225.37C	8925		3165		
89-Ac-226	89226.37C	8928		3174		
89-Ac-227	89227.37C	8931		5779	total	
90-Th-227	90227.37C	9025		3405	both	revised
90-Th-228	90228.37C	9028		11242	both	revised
90-Th-229	90229.37C	9031		9148	both	revised
90-Th-230	90230.37C	9034		32422	both	revised
90-Th-232	90232.37C	9040		96180	both	revised
90-Th-233	90233.37C	9043		10780	both	revised
90-Th-234	90234.37C	9046		11577	both	revised
91-Pa-231	91231.37C	9131		45480	both	
91-Pa-232	91232.37C	9134		3512	both	revised
91-Pa-233	91233.37C	9137		13592	both	
92-U -232	92232.37C	9219		26151	both	revised
92-U -233	92233.37C	9222		48646	both	revised
92-U -234	92234.37C	9225		82289	both	revised

Table 2 (continued)

nuclide	ZAID	MAT	GPD	length	NUBAR	status
92-U -235	92235.37C	9228	yes	124804	both	revised
92-U -236	92236.37C	9231		77541	both	revised
92-U -237	92237.37C	9234		40028	both	new
92-U -238	92238.37C	9237	yes	289606	both	revised
93-Np-236	93236.37C	9343		4454	both	new
93-Np-237	93237.37C	9346		47092	both	revised
93-Np-238	93238.37C	9349		11825	both	new
93-Np-239	93239.37C	9352		4401	both	revised
94-Pu-236	94236.37C	9428		7521	both	revised
94-Pu-238	94238.37C	9434		45558	both	revised
94-Pu-239	94239.37C	9437	yes	203872	both	revised
94-Pu-240	94240.37C	9440		153542	both	revised
94-Pu-241	94241.37C	9443		52050	both	revised
94-Pu-242	94242.37C	9446		58701	both	revised
95-Am-241	95241.37C	9543		50430	both	
95-Am-242	95242.37C	9546		6372	both	
95-Am-242m	95242.36C	9547		13996	both	
95-Am-243	95243.37C	9549		57829	both	
95-Am-244	95244.37C	9552		10741	both	
95-Am-244m	95244.36C	9553		11757	both	
96-Cm-241	96241.37C	9628		4815	both	
96-Cm-242	96242.37C	9631		16868	both	
96-Cm-243	96243.37C	9634		20046	both	
96-Cm-244	96244.37C	9637		52874	both	
96-Cm-245	96245.37C	9640		20935	both	revised
96-Cm-246	96246.37C	9643		24120	both	
96-Cm-247	96247.37C	9646		20028	both	
96-Cm-248	96248.37C	9649		39134	both	
96-Cm-249	96249.37C	9652		6092	both	revised
96-Cm-250	96250.37C	9655		4346	both	revised
97-Bk-249	97249.37C	9752		26704	both	
97-Bk-250	97250.37C	9755		32256	both	
98-Cf-249	98249.37C	9852		21639	both	
98-Cf-250	98250.37C	9855		22274	both	
98-Cf-251	98251.37C	9858		29128	both	
98-Cf-252	98252.37C	9861		32666	both	
98-Cf-254	98254.37C	9867		4110	both	revised
99-Es-254	99254.37C	9914		4198	both	revised
99-Es-255	99255.37C	9915		4656	both	revised
100-Fm-255	100255.37C	9936		3971	both	revised

Notes:

[GPD]	yes	: Gamma-ray production data are given.
	(blank)	: Gamma-ray production data are not given.
[NUBAR]	both	: Number of both prompt fission and total fission neutrons are given.
	totoal	: Only number of total fission neutrons is given.
	(blank)	: No data is given for number of fission neutrons.
[Status]	revised	: Cross section data are revised in the evaluation of JENDL-3.2.
	new	: Cross section data are newly evaluated for JENDL-3.2.
	(blank)	: Cross section data in JENDL-3.2 are just the same as those in JENDL-3.1.