

EXFOR News (June 2021)

New experimental data available from Nuclear Reaction Data Centres

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This News lists newly created EXFOR entries as well as revised EXFOR entries where new data subentries are added. Entries from articles published in past 10 years are flagged by asterisks (*). Please send an email to the NRDC Coordinator (n.otsuka@iaea.org) for inclusion in the EXFOR News distribution list as well as any question on EXFOR.

[1] N. Otuka, E. Dupont, V. Semkova, B. Pritychenko et al., [Nucl.Data.Sheets](#) **120**(2014)272.

Quantity codes

ALF	α -value ($\sigma_{\text{capt}}/\sigma_{\text{fis}}$)	KE	Kinetic energy
AMP	Scattering length	INT	Cross section integral over incident energy
CHG	Fragment charge	KER	Kerma factor
CS	Cross section	MAS	Fragment mass
CSP	Partial cross section	MFQ	Differential fission neutron multiplicity
CST	Temperature dependent cross section	MLT	Multiplicity
D3A	Triple differential $d\Omega_1/d\Omega_2/dE'$	NQ	Nuclear quantity
D3E	Triple differential $d\Omega/dE'_1/dE'_2$	NU	Fission neutron multiplicity $\bar{\nu}$
D4A	Quadruple diff. $d\Omega_1/d\Omega_2/dE'_1/dE'_2$	NUD	Delayed fission neutron multiplicity $\bar{\nu}_d$
DA	Differential $d/d\Omega$	POL	Polarization
DAA	Double differential $d\Omega_1/d\Omega_2$	POD	Differential polarization
DAE	Double differential $d\Omega/dE'$	PY	Product yield (other than fission)
DAP	Partial differential $d/d\Omega$	RI	Resonance integral
DAT	Temperature-dependent Legendre coefficient	RP	Resonance parameter
DE	Differential d/dE'	RR	Reaction rate
DEP	Energy spectrum for specific group	SIF	Self indication
DP	Diff. by linear momentum of outgoing part.	SPC	Gamma spectrum
DT	Diff. by 4-momentum transfer squared	TSL	Thermal scattering
ETA	η -value = $\bar{\nu}\sigma_{\text{fis}}/(\sigma_{\text{capt}} + \sigma_{\text{fis}})$	TT	Thick target yield
EVL	Evaluation	TTD	Differential thick target yield, $d/d\Omega$
FY	Fission product yield	TTP	Partial thick target yield

Special codes in outgoing particle field

abs	Absorption	fus	Fusion	sct	Scattering	tot	Total
el	Elastic	inel	Inelastic	tex	Total charge changing		
fis	Fission	non	Nonelastic	ths	Thermal scattering		

Special codes in incident energy field

Fast	Fast reactor spectrum average	Maxw	Maxwellian spectrum average
Fiss	Fission spectrum average	Spont	Spontaneous (for fission)

^a [NNDC](#) (USA), [NEADB](#) (France), [NDS](#) (Austria), [CJD](#) (Russia), [CNDC](#) (China), [ATOMKI](#) (Hungary), [NDPCI](#) (India), [JAEA](#) (Japan), [JCPRG](#) (Japan), [KAERI](#) (Korea), [CDFE](#) (Russia), [CNPD](#) (Russia), [UkrNDC](#) (Ukraine)

1 Hydrogen 1

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $^{23}\text{F,X}+2p$	^{21}O	?	2JPNIPC	6.4+09	6.4+09	Jour	PRL,124,212502	20	T.L.Tang+	E2671
* $^{23}\text{F,X}+2p$	^{22}O	?	2JPNIPC	6.4+09	6.4+09	Jour	PRL,124,212502	20	T.L.Tang+	E2671
* $^{25}\text{F,X}+2p$	^{22}O	?	2JPNIPC	6.9+09	6.9+09	Jour	PRL,124,212502	20	T.L.Tang+	E2671
* $^{25}\text{F,X}+2p$	^{23}O	?	2JPNIPC	6.9+09	6.9+09	Jour	PRL,124,212502	20	T.L.Tang+	E2671
* $^{25}\text{F,X}+2p$	^{24}O	?	2JPNIPC	6.9+09	6.9+09	Jour	PRL,124,212502	20	T.L.Tang+	E2671
* $^{17}\text{Ne,non}$?	2JPNIRS	1.2+09	7.3+09	Jour	NP/A,994,121663	20	T.Moriguchi+	E2669
* $^{20}\text{Ne,tcc}$?	2JPNIRS	3.3+09	1.2+10	Jour	NP/A,994,121663	20	T.Moriguchi+	E2669

1 Hydrogen 2

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
γ,n	^1H	CS	1USAMIT	2.2+06	2.4+06	Jour	PR,61,19	42	F.E.Myers+	L0265
γ,n	^1H	CS	1USABRK	3.0+06	3.0+06	Rept	CF-403	42	O.Chamberlain+	L0264
* $^{16}\text{C,p}$	^{17}C	DAP	2FR GAN	2.8+08	2.8+08	Jour	PL/B,811,135939	20	X.Pereira-Lopez+	D8032

1 Hydrogen 3

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$^3\text{He,n}$	^5Li	DAP	2ITYPAD	2.0+06	4.5+06	Jour	NC/A,29,187	75	U.Abbondanno+	A1055

2 Helium 3

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
d,p	^4He	DA	2JPNTSU	1.2+07	2.2+07	Prog	UTTAC-56,40	89	T.Sakai+	E2678
d,p	^4He	DA	2SWTETH	2.8+06	9.0+06	Jour	NP/A,176,631	71	W.Grubler+	A1061
d,p	^4He	POD	2JPNTSU	1.2+07	2.2+07	Prog	UTTAC-56,40	89	T.Sakai+	E2678

3 Lithium 7

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,n+t$	^4He	CS	3CRORBZ	1.4+07	1.4+07	Jour	NP/A,219,332	74	B.Antolkovic	30280
$n,n+t$	^4He	CSP	3CRORBZ	1.4+07	1.4+07	Jour	NP/A,219,332	74	B.Antolkovic	30280
e,inel	^7Li	DAP	2FR ENS	1.5+08	1.5+08	Jour	PL,8,48	64	G.R.Bishop+	M0231

3 Lithium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #	
				Min	Max						
*	$d,x+n$	inclusive	TTD	2JPNKYU	1.3+07	1.3+07	Jour	NIM/A,983,164582	20	H.Takeshita+	E2681

4 Beryllium

9

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #	
				Min	Max						
	γ,n	^8Be	CS	1USABRK	3.0+06	3.0+06	Rept	CF-403	42	O.Chamberlain+	L0264
	γ,n	^8Be	?	1USAMIT			Jour	PR,61,19	42	F.E.Myers+	L0265
	p,α	^6Li	DAP	4KASKAZ	3.0+07	3.0+07	Jour	JEL,19,280	74	A.D.Duisebaev+	D8034
*	$^{127}\text{In},x$	^{126}Cd	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{128}\text{In},x$	^{127}Cd	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{129}\text{In},x$	^{128}Cd	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{130}\text{In},x$	^{129}Cd	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{113}\text{Sn},x$	^{112}Sn	CS	2GERGSI	1.1+11	1.1+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{114}\text{Sn},x$	^{113}Sn	CS	2GERGSI	1.1+11	1.1+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{115}\text{Sn},x$	^{114}Sn	CS	2GERGSI	1.2+11	1.2+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{119}\text{Sn},x$	^{118}Sn	CS	2GERGSI	1.2+11	1.2+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{121}\text{Sn},x$	^{120}Sn	CS	2GERGSI	1.2+11	1.2+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{122}\text{Sn},x$	^{121}Sn	CS	2GERGSI	1.2+11	1.2+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{123}\text{Sn},x$	^{122}Sn	CS	2GERGSI	1.2+11	1.2+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{126}\text{Sn},x$	^{125}Sn	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{127}\text{Sn},x$	^{126}Sn	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{128}\text{Sn},x$	^{127}Sn	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{129}\text{Sn},x$	^{128}In	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{129}\text{Sn},x$	^{128}Sn	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{130}\text{Sn},x$	^{129}In	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{130}\text{Sn},x$	^{129}Sn	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{131}\text{Sn},x$	^{130}In	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{131}\text{Sn},x$	^{130}Sn	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{132}\text{Sn},x$	^{131}In	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{132}\text{Sn},x$	^{131}Sn	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{133}\text{Sn},x$	^{132}In	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{133}\text{Sn},x$	^{132}Sn	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{134}\text{Sn},x$	^{133}Sn	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{135}\text{Sn},x$	^{134}Sn	CS	2GERGSI	1.4+11	1.4+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{129}\text{Sb},x$	^{128}Sb	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{130}\text{Sb},x$	^{129}Sb	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{131}\text{Sb},x$	^{130}Sn	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{131}\text{Sb},x$	^{130}Sb	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{132}\text{Sb},x$	^{131}Sn	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{132}\text{Sb},x$	^{131}Sb	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{133}\text{Sb},x$	^{132}Sn	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{133}\text{Sb},x$	^{132}Sb	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{134}\text{Sb},x$	^{133}Sn	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{134}\text{Sb},x$	^{133}Sb	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{135}\text{Sb},x$	^{134}Sb	CS	2GERGSI	1.4+11	1.4+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{136}\text{Sb},x$	^{135}Sb	CS	2GERGSI	1.4+11	1.4+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{137}\text{Sb},x$	^{136}Sb	CS	2GERGSI	1.4+11	1.4+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{134}\text{Te},x$	^{133}Te	CS	2GERGSI	1.3+11	1.3+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{135}\text{Te},x$	^{134}Te	CS	2GERGSI	1.4+11	1.4+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{136}\text{Te},x$	^{135}Te	CS	2GERGSI	1.4+11	1.4+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031

*	$^{137}\text{Te},x$	^{136}Te	CS	2GERGSI	1.4+11	1.4+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031
*	$^{138}\text{Te},x$	^{137}Te	CS	2GERGSI	1.4+11	1.4+11	Jour	PL/B,811,135962	20	J.Diaz-Cortes+	D8031

5 Boron 10

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
					Min	Max					
*	n,α	^7Li	CS	3CPRBJG	4.0+06	5.0+06	Jour	PR/C,96,044621	17	Zhimin Wang+	32771
*	$n,t+\alpha$	^4He	CS	3CPRBJG	4.0+06	5.0+06	Jour	PR/C,96,044621	17	Zhimin Wang+	32771

5 Boron 11

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
					Min	Max					
*	α,t	^{12}C	DAP	4KASKAZ	4.0+07	4.0+07	Jour	EPJ/A,55,38	19	N.Burtebayev+	D8004

6 Carbon

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
					Min	Max					
*	$d,x+n$	inclusive	TTD	2JPNKYU	1.3+07	1.3+07	Jour	NIM/A,983,164582	20	H.Takeshita+	E2681
*	$^{19}\text{B},2n+X$	^{17}B	CS	2JPNIPC	4.2+09	4.2+09	Jour	PRL,124,212503	20	K.J.Cook+	E2670
*	$^{19}\text{B},2n+X$	^{17}B	DE	2JPNIPC	4.2+09	4.2+09	Jour	PRL,124,212503	20	K.J.Cook+	E2670
*	$^{19}\text{B},x$	^{15}B	CS	2JPNIPC	4.2+09	4.2+09	Jour	PRL,124,212503	20	K.J.Cook+	E2670
*	$^{19}\text{B},x$	^{17}B	CS	2JPNIPC	4.2+09	4.2+09	Jour	PRL,124,212503	20	K.J.Cook+	E2670
*	$^{27}\text{F},\text{non}$		CS	2JPNIPC	6.8+09	6.8+09	Jour	PRL,124,222504	20	S.Bagchi+	E2672
*	$^{29}\text{F},\text{non}$		CS	2JPNIPC	7.4+09	7.4+09	Jour	PRL,124,222504	20	S.Bagchi+	E2672

6 Carbon 12

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
					Min	Max					
*	$p,2p$	^{11}B	D3A	2JPNOSA	3.9+08	3.9+08	Jour	PTEP,2020,093D02	20	T.Noro+	E2675
*	$p,2p$	^{11}B	POD	2JPNOSA	3.9+08	3.9+08	Jour	PTEP,2020,093D02	20	T.Noro+	E2675
*	p,inel	^{12}C	DAE	2JPNOSA	3.9+08	3.9+08	Jour	PR/C,100,024615	19	M.S.Reen+	E2639
*	p,inel	^{12}C	DAP	2JPNOSA	3.9+08	3.9+08	Jour	PR/C,100,024615	19	M.S.Reen+	E2639
*	$^6\text{Li},\text{inel}$	^{12}C	DAP	2JPNOSA	6.0+08	6.0+08	Jour	PR/C,98,015804	18	C.Sullivan+	E2637
*	$^6\text{Li},\text{inel}$	^{12}C	DAP	2JPNOSA	6.0+08	6.0+08	Jour	PR/C,101,064609	20	J.C.Zamora+	E2673
*	$^6\text{Li},\text{inel}$	^{12}C	?	2JPNOSA	6.0+08	6.0+08	Jour	PR/C,98,015804	18	C.Sullivan+	E2637
*	$^6\text{Li},\text{inel}$	^{12}C	?	2JPNOSA	6.0+08	6.0+08	Jour	PR/C,101,064609	20	J.C.Zamora+	E2673
*	$^{18}\text{O},^{14}\text{C}$	^{16}O	CSP	2ITYLNS	2.8+08	2.8+08	Jour	EPJ/A,57,34	21	F.Cappuzzello+	D8033
*	$^{18}\text{O},^{14}\text{C}$	^{16}O	DAP	2ITYLNS	2.8+08	2.8+08	Jour	EPJ/A,57,34	21	F.Cappuzzello+	D8033

6 Carbon 13

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $^{18}\text{O},^{15}\text{C}$	^{16}O	CSP	2ITYLNS	2.8+08	2.8+08	Jour	EPJ/A,57,34	21	F.Cappuzzello+	D8033
* $^{18}\text{O},^{15}\text{C}$	^{16}O	DAP	2ITYLNS	2.8+08	2.8+08	Jour	EPJ/A,57,34	21	F.Cappuzzello+	D8033

8 Oxygen 16

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $p,2p$	^{15}N	D3A	2JPNOSA	3.9+08	3.9+08	Jour	PTEP,2020,093D02	20	T.Noro+	E2675
* $p,2p$	^{15}N	POD	2JPNOSA	3.9+08	3.9+08	Jour	PTEP,2020,093D02	20	T.Noro+	E2675
* p,inel	^{16}O	DAP	2JPNOSA	3.9+08	3.9+08	Jour	PR/C,100,024615	19	M.S.Reen+	E2639

13 Aluminium 27

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* n,α	^{24}Na	CS	3KORKRM	1.5+07	3.7+07	Jour	RCA,105,593	17	M.Zaman+	30848
* n,p	^{27}Mg	CS	3KORKRM	1.5+07	3.7+07	Jour	RCA,105,593	17	M.Zaman+	30848
* p,x	^7Be	CS	2JPNJAE	4.0+08	3.0+09	Jour	NST,55,955	18	H.Matsuda+	E2665
* p,x	^7Be	CS	2JPNJAE	4.0+08	3.0+09	Jour	NSTP,6,171	19	H.Matsuda+	E2667
* p,x	^{22}Na	CS	2JPNJAE	4.0+08	3.0+09	Jour	NST,55,955	18	H.Matsuda+	E2665
* p,x	^{22}Na	CS	2JPNJAE	4.0+08	3.0+10	Jour	NSTP,6,171	19	H.Matsuda+	E2667
* p,x	^{24}Na	CS	2JPNJAE	4.0+08	3.0+09	Jour	NST,55,955	18	H.Matsuda+	E2665
* p,x	^{24}Na	CS	2JPNJAE	4.0+08	3.0+09	Jour	NSTP,6,171	19	H.Matsuda+	E2667
* $^8\text{B},\text{el}$	^{27}Al	DA	1USANOT	2.2+07	2.2+07	Jour	PR/C,95,014615	17	V.Morcelle+	D0835

14 Silicon

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $d,x+n$	inclusive	TTD	2JPNKYU	1.3+07	1.3+07	Jour	NIM/A,983,164582	20	H.Takeshita+	E2681

20 Calcium 40

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $p,2p$	^{39}K	D3A	2JPNOSA	3.9+08	3.9+08	Jour	PTEP,2020,093D02	20	T.Noro+	E2675
* $p,2p$	^{39}K	POD	2JPNOSA	3.9+08	3.9+08	Jour	PTEP,2020,093D02	20	T.Noro+	E2675

23 Vanadium 51

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					

*	${}^6\text{Li},\text{el}$	${}^{51}\text{V}$	DA	3INDTRM	1.4+07	2.6+07	Jour	NP/A,1002,121973	20	H.Kumawat+	D6386
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24 Chromium 50

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #	
				Min	Max						
*	$n,2n$	${}^{49}\text{Cr}$	CS	3INDTRM	1.5+07	1.5+07	Jour	RCA,108,679	20	I.Pasha+	33151

24 Chromium 52

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #	
				Min	Max						
*	$n,2n$	${}^{51}\text{Cr}$	CS	3INDTRM	1.5+07	1.5+07	Jour	RCA,108,679	20	I.Pasha+	33151
*	n,p	${}^{52}\text{V}$	CS	3INDTRM	1.5+07	1.5+07	Jour	RCA,108,679	20	I.Pasha+	33151

25 Manganese 55

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #	
				Min	Max						
*	$n,2n$	${}^{54}\text{Mn}$	CS	3INDTRM	1.5+07	1.5+07	Jour	RCA,108,679	20	I.Pasha+	33151
*	n,α	${}^{52}\text{V}$	CS	3INDTRM	1.5+07	1.5+07	Jour	RCA,108,679	20	I.Pasha+	33151
*	n,γ	${}^{56}\text{Mn}$	CS	3INDTRM	1.5+07	1.5+07	Jour	RCA,108,679	20	I.Pasha+	33151

28 Nickel

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #	
				Min	Max						
*	p,x	${}^{55}\text{Co}$	CS	3HUNDEB	6.0+06	1.7+07	Jour	ARI,159,109094	20	D.Adel+	D4410
*	p,x	${}^{57}\text{Co}$	CS	3HUNDEB	2.6+06	1.7+07	Jour	ARI,159,109094	20	D.Adel+	D4410
*	p,x	${}^{58}\text{Co}$	CS	3HUNDEB	2.9+06	1.7+07	Jour	ARI,159,109094	20	D.Adel+	D4410
*	p,x	${}^{57}\text{Ni}$	CS	3HUNDEB	1.2+07	1.7+07	Jour	ARI,159,109094	20	D.Adel+	D4410
*	p,x	${}^{60}\text{Cu}$	CS	3HUNDEB	7.5+06	1.7+07	Jour	ARI,159,109094	20	D.Adel+	D4410
*	p,x	${}^{61}\text{Cu}$	CS	3HUNDEB	2.6+06	1.7+07	Jour	ARI,159,109094	20	D.Adel+	D4410
*	$d,x+n$	inclusive	TTD	2JPNKYU	1.3+07	1.3+07	Jour	NIM/A,983,164582	20	H.Takeshita+	E2681
*	α,x	${}^{56}\text{Ni}$	CS	2JPNIPC	3.0+07	4.4+07	Jour	NIM/B,479,125	20	S.Takacs+	D4408
*	α,x	${}^{57}\text{Ni}$	CS	2JPNIPC	1.5+07	5.0+07	Jour	NIM/B,479,125	20	S.Takacs+	D4408
*	α,x	${}^{60}\text{Cu}$	CS	2JPNIPC	1.6+07	5.0+07	Jour	NIM/B,479,125	20	S.Takacs+	D4408
*	α,x	${}^{61}\text{Cu}$	CS	2JPNIPC	5.1+06	5.0+07	Jour	NIM/B,479,125	20	S.Takacs+	D4408
*	α,x	${}^{64}\text{Cu}$	CS	2JPNIPC	1.5+07	5.0+07	Jour	NIM/B,479,125	20	S.Takacs+	D4408
*	α,x	${}^{62}\text{Zn}$	CS	2JPNIPC	5.1+06	5.0+07	Jour	NIM/B,479,125	20	S.Takacs+	D4408
*	α,x	${}^{63}\text{Zn}$	CS	2JPNIPC	6.9+06	5.0+07	Jour	NIM/B,479,125	20	S.Takacs+	D4408

28 Nickel 64

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* p,n	⁶⁴ Cu	CS	3HUNDEB	2.6+06	1.7+07	Jour	ARI,159,109094	20	D.Adel+	D4410
* α,x	⁶⁷ Cu	CS	2JPNIPC	5.1+06	5.0+07	Jour	NIM/B,479,125	20	S.Takacs+	D4408
* $^7\text{Li}_{\text{sct}}$	⁶⁴ Ni	DAP	3INDTRM	1.0+07	2.1+07	Jour	PR/C,102,024627	20	M.M.Shaikh+	D6390

29 Copper

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $p,x+\alpha$	inclusive	CSP	4KASKAZ	3.0+07	3.0+07	Jour	EPJ/CS,239,01033	20	T.Zholdybayev+	D8030
* $p,x+\alpha$	inclusive	DAE	4KASKAZ	3.0+07	3.0+07	Jour	EPJ/CS,239,01033	20	T.Zholdybayev+	D8030
* $p,x+\alpha$	inclusive	DE	4KASKAZ	3.0+07	3.0+07	Jour	EPJ/CS,239,01033	20	T.Zholdybayev+	D8030
* $p,x+p$	inclusive	CSP	4KASKAZ	3.0+07	3.0+07	Jour	EPJ/CS,239,01033	20	T.Zholdybayev+	D8030
* $p,x+p$	inclusive	DAE	4KASKAZ	3.0+07	3.0+07	Jour	EPJ/CS,239,01033	20	T.Zholdybayev+	D8030
* $p,x+p$	inclusive	DE	4KASKAZ	3.0+07	3.0+07	Jour	EPJ/CS,239,01033	20	T.Zholdybayev+	D8030
* $^3\text{He},x$	⁶⁵ Zn	CS	2JPNIRS	6.2+06	5.3+07	Jour	EPJ/CS,239,20009	20	M.U.Khandaker+	E2674

34 Selenium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* d,x	⁷¹ As	CS	2BLGLVN	2.3+07	5.0+07	Jour	EPJ/A,57,117	21	F.Tarkanyi+	D4414
* d,x	⁷² As	CS	2BLGLVN	2.9+07	5.0+07	Jour	EPJ/A,57,117	21	F.Tarkanyi+	D4414
* d,x	⁷⁴ As	CS	2BLGLVN	7.5+06	5.0+07	Jour	EPJ/A,57,117	21	F.Tarkanyi+	D4414
* d,x	⁷⁶ As	CS	2BLGLVN	2.9+07	5.0+07	Jour	EPJ/A,57,117	21	F.Tarkanyi+	D4414
* d,x	⁷⁵ Se	CS	2BLGLVN	7.5+06	5.0+07	Jour	EPJ/A,57,117	21	F.Tarkanyi+	D4414
* d,x	⁷⁵ Br	CS	2BLGLVN	2.3+07	5.0+07	Jour	EPJ/A,57,117	21	F.Tarkanyi+	D4414
* d,x	⁷⁶ Br	CS	2BLGLVN	7.5+06	5.0+07	Jour	EPJ/A,57,117	21	F.Tarkanyi+	D4414
* d,x	⁷⁷ Br	CS	2BLGLVN	7.5+06	5.0+07	Jour	EPJ/A,57,117	21	F.Tarkanyi+	D4414
* d,x	⁸⁰ Br	CS	2BLGLVN	7.5+06	5.0+07	Jour	EPJ/A,57,117	21	F.Tarkanyi+	D4414
* d,x	⁸² Br	CS	2BLGLVN	7.5+06	5.0+07	Jour	EPJ/A,57,117	21	F.Tarkanyi+	D4414

34 Selenium 74

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,2n$	⁷³ Se	CS	3CPNPC			Jour	EPJ/A,56,125	20	Junhua Luo+	32805

37 Rubidium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* d,x	⁸⁵ Kr	CS	2BLGLVN	1.1+07	5.0+07	Jour	EPJ/A,57,21	21	F.Tarkanyi+	D4413
* d,x	⁸² Rb	CS	2BLGLVN	4.2+07	5.0+07	Jour	EPJ/A,57,21	21	F.Tarkanyi+	D4413
* d,x	⁸³ Rb	CS	2BLGLVN	3.2+07	5.0+07	Jour	EPJ/A,57,21	21	F.Tarkanyi+	D4413

*	<i>d,x</i>	⁸⁴ Rb	CS	2BLGLVN	1.9+07	5.0+07	Jour	EPJ/A,57,21	21	F.Tarkanyi+	D4413
*	<i>d,x</i>	⁸⁶ Rb	CS	2BLGLVN	1.1+07	5.0+07	Jour	EPJ/A,57,21	21	F.Tarkanyi+	D4413
*	<i>d,x</i>	⁸² Sr	CS	2BLGLVN	4.2+07	5.0+07	Jour	EPJ/A,57,21	21	F.Tarkanyi+	D4413
*	<i>d,x</i>	⁸³ Sr	CS	2BLGLVN	3.2+07	5.0+07	Jour	EPJ/A,57,21	21	F.Tarkanyi+	D4413
*	<i>d,x</i>	⁸⁵ Sr	CS	2BLGLVN	1.1+07	5.0+07	Jour	EPJ/A,57,21	21	F.Tarkanyi+	D4413
*	<i>d,x</i>	⁸⁷ Sr	CS	2BLGLVN	1.1+07	5.0+07	Jour	EPJ/A,57,21	21	F.Tarkanyi+	D4413

37 Rubidium 85

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
					Min	Max					
*	<i>n,2n</i>	⁸⁴ Rb	CS	3CPRAEP	1.2+07	2.0+07	Jour	CPH/C,44,034001	20	Chuanxin Zhu+	32801

37 Rubidium 87

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
					Min	Max					
*	γ ,sct	⁸⁷ Rb	CS	2GERZFK	4.0+06	1.1+07	Jour	PR/C,102,044327	20	J.Wilhelmy+	L0266
*	γ ,sct	⁸⁷ Rb	CS	1USATNL	6.0+06	9.6+06	Jour	PR/C,102,044327	20	J.Wilhelmy+	L0266

40 Zirconium 95

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
					Min	Max					
*	<i>n,γ</i>	⁹⁶ Zr	CS	2JPNJAE	5.0+05	7.5+06	Jour	AJ,848,98	17	S.Q.Yan+	32770

41 Niobium 93

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
					Min	Max					
*	⁶ Li,inel	⁹³ Nb	DAP	2JPNOSA	6.0+08	6.0+08	Jour	PR/C,101,064609	20	J.C.Zamora+	E2673
*	⁶ Li,inel	⁹³ Nb	?	2JPNOSA	6.0+08	6.0+08	Jour	PR/C,101,064609	20	J.C.Zamora+	E2673

42 Molybdenum

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
					Min	Max					
*	<i>d,x+n</i>	inclusive	TTD	2JPNKYU	1.3+07	1.3+07	Jour	NIM/A,983,164582	20	H.Takeshita+	E2681

44 Ruthenium

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
					Min	Max					
*	<i>d,x</i>	⁹³ Tc	CS	2BLGLVN	9.7+06	4.9+07	Jour	ARI,168,109401	21	F.Tarkanyi+	D4412

*	<i>d,x</i>	⁹⁴ Tc	CS	2BLGLVN	2.6+07	4.9+07	Jour	ARI,168,109401	21	F.Tarkanyi+	D4412
*	<i>d,x</i>	⁹⁵ Tc	CS	2BLGLVN	1.3+07	4.9+07	Jour	ARI,168,109401	21	F.Tarkanyi+	D4412
*	<i>d,x</i>	⁹⁶ Tc	CS	2BLGLVN	9.7+06	4.9+07	Jour	ARI,168,109401	21	F.Tarkanyi+	D4412
*	<i>d,x</i>	⁹⁹ Tc	CS	2BLGLVN	1.9+07	4.9+07	Jour	ARI,168,109401	21	F.Tarkanyi+	D4412
*	<i>d,x</i>	⁹⁵ Ru	CS	2BLGLVN	2.3+07	4.9+07	Jour	ARI,168,109401	21	F.Tarkanyi+	D4412
*	<i>d,x</i>	⁹⁷ Ru	CS	2BLGLVN	9.7+06	4.9+07	Jour	ARI,168,109401	21	F.Tarkanyi+	D4412
*	<i>d,x</i>	¹⁰³ Ru	CS	2BLGLVN	9.7+06	4.9+07	Jour	ARI,168,109401	21	F.Tarkanyi+	D4412
*	<i>d,x</i>	¹⁰⁵ Ru	CS	2BLGLVN	9.7+06	4.9+07	Jour	ARI,168,109401	21	F.Tarkanyi+	D4412
*	<i>d,x</i>	⁹⁹ Rh	CS	2BLGLVN	9.7+06	4.9+07	Jour	ARI,168,109401	21	F.Tarkanyi+	D4412
*	<i>d,x</i>	¹⁰⁰ Rh	CS	2BLGLVN	9.7+06	4.9+07	Jour	ARI,168,109401	21	F.Tarkanyi+	D4412
*	<i>d,x</i>	¹⁰¹ Rh	CS	2BLGLVN	9.7+06	4.9+07	Jour	ARI,168,109401	21	F.Tarkanyi+	D4412
*	<i>d,x</i>	¹⁰² Rh	CS	2BLGLVN	9.7+06	4.9+07	Jour	ARI,168,109401	21	F.Tarkanyi+	D4412
*	<i>d,x</i>	¹⁰⁵ Rh	CS	2BLGLVN	9.7+06	4.9+07	Jour	ARI,168,109401	21	F.Tarkanyi+	D4412

45 Rhodium 103

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,γ</i>	¹⁰⁴ Rh	CS	1USANYU	1.3+00	1.3+00	Jour	PR,58,18	40	J.Hornbostel+	14672
<i>n,γ</i>	¹⁰⁴ Rh	CS	1USACOL	2.0+00	2.0+00	Jour	PR,55,39	39	J.H.Manley+	14671

49 Indium 115

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,γ</i>	¹¹⁶ In	CS	1USANYU	1.5+00	1.5+00	Jour	PR,58,18	40	J.Hornbostel+	14672

50 Tin 124

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #	
				Min	Max						
*	¹⁴ N, _{5n}	¹³³ La	CS	3INDNSD	6.6+07	8.5+07	Jour	EPJ/A,56,131	20	A.Mahato+	D6384
*	¹⁴ N, _{6n}	¹³² La	CS	3INDNSD	6.6+07	8.5+07	Jour	EPJ/A,56,131	20	A.Mahato+	D6384
*	¹⁴ N, _{7n}	¹³¹ La	CS	3INDNSD	7.8+07	8.5+07	Jour	EPJ/A,56,131	20	A.Mahato+	D6384
*	¹⁴ N, _x	¹³¹ Xe	CS	3INDNSD	6.6+07	8.5+07	Jour	EPJ/A,56,131	20	A.Mahato+	D6384
*	¹⁴ N, _x	¹²⁹ Cs	CS	3INDNSD	7.0+07	8.5+07	Jour	EPJ/A,56,131	20	A.Mahato+	D6384
*	¹⁴ N, _x	¹³⁰ Cs	CS	3INDNSD	6.6+07	8.5+07	Jour	EPJ/A,56,131	20	A.Mahato+	D6384
*	¹⁴ N, _x	¹³² Cs	CS	3INDNSD	6.6+07	8.5+07	Jour	EPJ/A,56,131	20	A.Mahato+	D6384
*	¹⁴ N, _x	¹³⁴ Cs	CS	3INDNSD	7.0+07	8.5+07	Jour	EPJ/A,56,131	20	A.Mahato+	D6384
*	¹⁴ N, _x	¹³³ Ba	CS	3INDNSD	6.6+07	8.5+07	Jour	EPJ/A,56,131	20	A.Mahato+	D6384

52 Tellurium 130

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
*	³⁵ Cl,fus	CS	3INDNSD	9.4+07	1.2+08	Jour	PR/C,102,024615	20	R.N.Sahoo+	D6389

58 Cerium 136

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,2n$	¹³⁵ Ce	CS	2JPNOSA	1.4+07	1.5+07	Jour	ARI,147,144	19	Qiangwang+	32768

58 Cerium 138

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,2n$	¹³⁷ Ce	CS	2JPNOSA	1.4+07	1.5+07	Jour	ARI,147,144	19	Qiangwang+	32768

58 Cerium 140

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,2n$	¹³⁹ Ce	CS	3INDTRM	1.4+07	1.4+07	Jour	JRN,325,885	20	H.B.Sachhidananda+	33149
* $n,2n$	¹³⁹ Ce	CS	2JPNOSA	1.4+07	1.5+07	Jour	ARI,147,144	19	Qiangwang+	32768
* n,α	¹³⁷ Ba	CS	2JPNOSA	1.4+07	1.5+07	Jour	ARI,147,144	19	Qiangwang+	32768
* n,p	¹⁴⁰ La	CS	2JPNOSA	1.4+07	1.5+07	Jour	ARI,147,144	19	Qiangwang+	32768

58 Cerium 142

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,2n$	¹⁴¹ Ce	CS	3INDTRM	1.4+07	1.4+07	Jour	JRN,325,885	20	H.B.Sachhidananda+	33149
* $n,2n$	¹⁴¹ Ce	CS	2JPNOSA	1.4+07	1.5+07	Jour	ARI,147,144	19	Qiangwang+	32768
* n,α	¹³⁹ Ba	CS	2JPNOSA	1.4+07	1.5+07	Jour	ARI,147,144	19	Qiangwang+	32768
* n,γ	¹⁴³ Ce	CS	2JPNOSA	1.4+07	1.5+07	Jour	ARI,147,144	19	Qiangwang+	32768
* n,p	¹⁴² La	CS	2JPNOSA	1.4+07	1.5+07	Jour	ARI,147,144	19	Qiangwang+	32768

71 Lutetium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* d,x	¹⁶⁹ Yb	CS	2BLGLVN	3.6+07	4.9+07	Jour	JRN,324,1405	20	F.Tarkanyi+	D4411
* d,x	¹⁷¹ Lu	CS	2BLGLVN	3.6+07	4.9+07	Jour	JRN,324,1405	20	F.Tarkanyi+	D4411
* d,x	¹⁷² Lu	CS	2BLGLVN	2.1+07	4.9+07	Jour	JRN,324,1405	20	F.Tarkanyi+	D4411
* d,x	¹⁷³ Lu	CS	2BLGLVN	1.9+07	4.9+07	Jour	JRN,324,1405	20	F.Tarkanyi+	D4411
* d,x	¹⁷⁴ Lu	CS	2BLGLVN	2.1+07	4.9+07	Jour	JRN,324,1405	20	F.Tarkanyi+	D4411
* d,x	¹⁷⁶ Lu	CS	2BLGLVN	5.7+06	4.9+07	Jour	JRN,324,1405	20	F.Tarkanyi+	D4411
* d,x	¹⁷⁷ Lu	CS	2BLGLVN	5.7+06	4.9+07	Jour	JRN,324,1405	20	F.Tarkanyi+	D4411
* d,x	¹⁷¹ Hf	CS	2BLGLVN	4.0+07	4.9+07	Jour	JRN,324,1405	20	F.Tarkanyi+	D4411
* d,x	¹⁷² Hf	CS	2BLGLVN	3.1+07	4.9+07	Jour	JRN,324,1405	20	F.Tarkanyi+	D4411
* d,x	¹⁷³ Hf	CS	2BLGLVN	1.9+07	4.9+07	Jour	JRN,324,1405	20	F.Tarkanyi+	D4411
* d,x	¹⁷⁵ Hf	CS	2BLGLVN	5.7+06	4.9+07	Jour	JRN,324,1405	20	F.Tarkanyi+	D4411
* $d,x+n$	inclusive	DAE	2JPNOSA	2.0+08	2.0+08	Jour	EPJ/CS,239,20012	20	Y.Watanabe+	E2684

72 Hafnium 180

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* n,γ	^{181}Hf	CS	3CPNPC	1.4+07	1.5+07	Jour	NIM/B,451,24	19	Fengqun Zhou+	32795

73 Tantalum

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $d,x+n$	inclusive	TTD	2JPNKYU	1.3+07	1.3+07	Jour	NIM/A,983,164582	20	H.Takeshita+	E2681

73 Tantalum 181

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $d,2n$	^{181}W	CS	2BLGLVN	1.4+07	3.1+07	Jour	NIM/B,481,82	20	A.Hermanne+	D4409
* $d,2p$	^{181}Hf	CS	2BLGLVN	3.0+07	4.9+07	Jour	NIM/B,481,82	20	A.Hermanne+	D4409
* $d,5n$	^{178}W	CS	2BLGLVN	2.4+07	4.9+07	Jour	NIM/B,481,82	20	A.Hermanne+	D4409
* $d,6n$	^{177}W	CS	2BLGLVN	3.9+07	4.9+07	Jour	NIM/B,481,82	20	A.Hermanne+	D4409
* d,p	^{182}Ta	CS	2BLGLVN	1.4+07	4.9+07	Jour	NIM/B,481,82	20	A.Hermanne+	D4409
* d,x	^{175}Hf	CS	2BLGLVN	3.6+07	4.9+07	Jour	NIM/B,481,82	20	A.Hermanne+	D4409
* d,x	^{179}Hf	CS	2BLGLVN	1.7+07	4.9+07	Jour	NIM/B,481,82	20	A.Hermanne+	D4409
* d,x	^{180}Hf	CS	2BLGLVN	3.1+07	4.9+07	Jour	NIM/B,481,82	20	A.Hermanne+	D4409
* d,x	^{177}Ta	CS	2BLGLVN	3.3+07	4.9+07	Jour	NIM/B,481,82	20	A.Hermanne+	D4409
* d,x	^{178}Ta	CS	2BLGLVN	1.4+07	4.9+07	Jour	NIM/B,481,82	20	A.Hermanne+	D4409
* d,x	^{180}Ta	CS	2BLGLVN	1.4+07	4.9+07	Jour	NIM/B,481,82	20	A.Hermanne+	D4409

74 Tungsten

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $p,x+n$	inclusive	TTD	2JPNOSA	5.3+07	5.3+07	Jour	ARI,152,11	19	H.W.Koay+	E2668

74 Tungsten 180

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,2n$	^{179}W	CS	3CPNPC	1.4+07	1.4+07	Jour	CPL,36,112501	19	Xiao-Jun Sun+	32797

74 Tungsten 186

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,2n$	^{185}W	CS	3CPNPC	1.4+07	1.4+07	Jour	CPL,36,112501	19	Xiao-Jun Sun+	32797

77 Iridium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* p,x	^{190}Ir	CS	2JPNIRS	1.6+07	3.0+07	Jour	ARI,137,250	18	H.Obata+	E2664
* p,x	^{192}Ir	CS	2JPNIRS	1.6+07	3.0+07	Jour	ARI,137,250	18	H.Obata+	E2664
* p,x	^{189}Pt	CS	2JPNIRS	1.9+07	3.0+07	Jour	ARI,137,250	18	H.Obata+	E2664
* p,x	^{191}Pt	CS	2JPNIRS	1.6+07	3.0+07	Jour	ARI,137,250	18	H.Obata+	E2664
* d,x	^{189}Ir	CS	2JPNIRS	2.4+07	5.1+07	Jour	ARI,137,250	18	H.Obata+	E2664
* d,x	^{190}Ir	CS	2JPNIRS	1.4+07	5.1+07	Jour	ARI,137,250	18	H.Obata+	E2664
* d,x	^{192}Ir	CS	2JPNIRS	1.4+07	5.1+07	Jour	ARI,137,250	18	H.Obata+	E2664
* d,x	^{194}Ir	CS	2JPNIRS	1.4+07	5.1+07	Jour	ARI,137,250	18	H.Obata+	E2664
* d,x	^{189}Pt	CS	2JPNIRS	2.1+07	5.1+07	Jour	ARI,137,250	18	H.Obata+	E2664
* d,x	^{191}Pt	CS	2JPNIRS	1.4+07	5.1+07	Jour	ARI,137,250	18	H.Obata+	E2664

78 Platinum 194

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$^{19}\text{F,fus}$		CS	3INDTRM	9.1+07	1.0+08	Jour	PR/C,65,034613	02	K.Mahata+	A0524

78 Platinum 198

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$^{19}\text{F,fus}$		CS	3INDTRM	9.0+07	1.0+08	Jour	PR/C,65,034613	02	K.Mahata+	A0524

80 Mercury

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $p,x+n$	inclusive	TTD	2JPNJAE	3.0+09	3.0+09	Jour	NIM/B,483,33	20	H.Matsuda+	E2679

82 Lead

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $^{19}\text{B},2n+X$	^{17}B	CS	2JPNIPC	4.2+09	4.2+09	Jour	PRL,124,212503	20	K.J.Cook+	E2670
* $^{19}\text{B},2n+X$	^{17}B	DE	2JPNIPC	4.2+09	4.2+09	Jour	PRL,124,212503	20	K.J.Cook+	E2670
* $^{19}\text{B},x$	^{15}B	CS	2JPNIPC	4.2+09	4.2+09	Jour	PRL,124,212503	20	K.J.Cook+	E2670

* ¹⁹B,x ¹⁷B CS 2JPNIPC 4.2+09 4.2+09 Jour [PRL,124,212503](#) 20 K.J.Cook+ [E2670](#)

82 Lead 208

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* <i>p,2p</i>	²⁰⁷ Tl	D3A	2JPNOSA	3.9+08	3.9+08	Jour	PTEP,2020,093D02	20	T.Noro+	E2675
* <i>p,2p</i>	²⁰⁷ Tl	POD	2JPNOSA	3.9+08	3.9+08	Jour	PTEP,2020,093D02	20	T.Noro+	E2675
* ⁷ Be,el	²⁰⁸ Pb	DA	2ITYPAD	3.7+07	4.2+07	Jour	PR/C,100,024602	19	M.Mazzocco+	E2638
* ⁸ B,el	²⁰⁸ Pb	DA	2JPNIPC	5.0+07	5.0+07	Jour	PR/C,100,024602	19	M.Mazzocco+	E2638

90 Thorium 229

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,fis</i>	Many	FY	2FR ILL	2.5-02	2.5-02	Jour	NP/A,502,261	89	N.Boucheneb+	23585
<i>n,fis</i>	Many	FY	2FR ILL	2.5-02	2.5-02	Jour	RE,92,333	86	F.Caitucoli+	23588
<i>n,fis</i>	Many	KE	2FR ILL	2.5-02	2.5-02	Jour	NP/A,502,261	89	N.Boucheneb+	23585

90 Thorium 232

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,fis</i>	Many	FY	2GERTUE	1.4+07	1.4+07	Jour	NP/A,171,631	71	W.Holubarsch+	23716
<i>n,fis</i>	Many	FY	4RUSKUR	1.4+07	1.4+07	Book	NEJTRONFIZ,,235	61	V.A.Vlasov+	41736
<i>n,fis</i>	Many	FY	2GERTUE	4.8+06	1.4+07	Jour	NP/A,171,631	71	W.Holubarsch+	23716
<i>n,fis</i>		KE	2GERTUE	4.8+06	1.4+07	Jour	NP/A,171,631	71	W.Holubarsch+	23716
<i>n,fis</i>	Many	KE	2GERTUE	4.8+06	1.4+07	Jour	NP/A,171,631	71	W.Holubarsch+	23716
<i>n,fis</i>		MAS	2GERTUE	4.8+06	1.4+07	Jour	NP/A,171,631	71	W.Holubarsch+	23716
<i>n,fis</i>		NUD	2GERMNZ	1.5+07	1.5+07	Jour	RCA,17,61	72	G.Benedict+	22571
<i>n,fis</i>		NUD	2UK KEN	1.5+07	1.5+07	Jour	RCA,15,109	71	M.G.Brown+	23592
<i>n,fis</i>	Many	?	4RUSKUR	1.4+07	1.4+07	Book	NEJTRONFIZ,,235	61	V.A.Vlasov+	41736
<i>n,fis</i>	Many	?	2GERTUE	4.8+06	4.8+06	Jour	NP/A,171,631	71	W.Holubarsch+	23716
* <i>n,fis</i>	¹³¹ Sb	CS	3CPRNPC	1.4+07	1.5+07	Jour	EPJ/A,53,131	17	Chang-Lin Lan+	32765
* <i>n,fis</i>	¹³¹ Te	CS	3CPRNPC	1.4+07	1.5+07	Jour	EPJ/A,53,131	17	Chang-Lin Lan+	32765
* <i>n,fis</i>	¹³⁴ Te	CS	3CPRNPC	1.4+07	1.5+07	Jour	RPC,141,138	17	Zhang Zhengwei+	32778
* <i>n,fis</i>	¹³¹ I	CS	3CPRNPC	1.4+07	1.5+07	Jour	EPJ/A,53,131	17	Chang-Lin Lan+	32765
* <i>n,γ</i>	²³³ Th	CS	3CPRSIU	2.1+06	4.4+06	Jour	NIM/B,476,59	20	Su Shen+	32806
* <i>α,fis</i>	Many	FY	3INDVEC	3.6+07	3.6+07	Jour	EPJ/A,56,201	20	D.Banerjee+	D6385

91 Protactinium 231

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,fis</i>		NUD	2UK KEN	1.5+07	1.5+07	Jour	RCA,15,109	71	M.G.Brown+	23592
<i>n,fis</i>		?	2GRCATH	5.0-01		Jour	RCA,20,118	73	J.N.Anoussis+	23590

92 Uranium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis	Many	CS	2FR LYO	Fast	2.5-02	Jour	PR,60,534	41	A.Moussa+	23599

92 Uranium 233

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis	Many	FY	2FR ILL	2.5-02	2.5-02	Jour	RE,92,333	86	F.Caitucoli+	23588
<i>n</i> ,fis	Many	FY	2SWDSWR	2.5-02	2.5-02	Conf	97TRIEST,1,652	97	P.I.Johansson+	23794
<i>n</i> ,fis	Many	FY	2JPNKTO	Maxwl		Jour	JRN,239,117	99	K.Takamiya+	23595
<i>n</i> ,fis	Many	KE	2JPNKTO	Maxwl		Jour	JRN,239,117	99	K.Takamiya+	23595
<i>n</i> ,fis	Many	NU	2JPNKTO	Maxwl		Jour	JRN,239,117	99	K.Takamiya+	23595

92 Uranium 235

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis		DA	2ZZZGEL	5.0+05	6.0+06	Jour	NP/A,462,85	87	Ch.Straede+	23591
<i>n</i> ,fis	Many	FY	4RUSKUR	1.4+07	1.4+07	Book	NEJTRONFIZ,,224	61	E.K.Bonyushkin+	41735
<i>n</i> ,fis	Many	FY	2ZZZGEL	2.5-02	2.5-02	Jour	NP/A,462,85	87	Ch.Straede+	23591
<i>n</i> ,fis		FY	2FR SAC	2.5-02	2.5-02	Jour	NP/A,145,657	70	M.Asghar+	23593
<i>n</i> ,fis	Many	FY	2FR SAC	2.5-02	2.5-02	Jour	NP/A,145,657	70	M.Asghar+	23593
<i>n</i> ,fis	Many	FY	2FR ILL	2.5-02	2.5-02	Jour	RCA,62,177	93	H.O.Denschlag+	23596
<i>n</i> ,fis	Many	FY	2GERMUN	2.5-02	2.5-02	Jour	ZP,170,62	62	F.H.Froehner	23792
<i>n</i> ,fis	Many	FY	2ZZZGEL	5.0+05	6.0+06	Jour	NP/A,462,85	87	Ch.Straede+	23591
<i>n</i> ,fis	Many	FY	4RUSRI	Fiss		Book	NEJTRONFIZ,,217	61	K.A.Petrzhak+	41734
<i>n</i> ,fis	Many	FY	4RUSKUR	Fiss		Book	NEJTRONFIZ,,224	61	E.K.Bonyushkin+	41735
<i>n</i> ,fis	Many	FY	2FR ILL	Maxwl		Jour	EUL,4,793	87	P.Armbruster+	23586
<i>n</i> ,fis	Many	FY	2JPNYOK	Maxwl		Jour	NIM,66,130	68	F.Shiraishi+	23594
<i>n</i> ,fis	Many	KE	2FR SAC	2.5-02	2.5-02	Jour	RE,92,327	86	J.Trochon+	23589
<i>n</i> ,fis		KE	2FR SAC	2.5-02	2.5-02	Jour	NP/A,145,657	70	M.Asghar+	23593
<i>n</i> ,fis	Many	KE	2FR SAC	2.5-02	2.5-02	Jour	NP/A,145,657	70	M.Asghar+	23593
<i>n</i> ,fis		?	2FR SAC	2.5-02	2.5-02	Jour	NP/A,145,657	70	M.Asghar+	23593
<i>n</i> ,fis	⁴ He	KE	2FR SAC	2.5-02	2.5-02	Jour	NP/A,145,657	70	M.Asghar+	23593
<i>n</i> ,fis	⁴ He	?	2FR SAC	2.5-02	2.5-02	Jour	NP/A,145,657	70	M.Asghar+	23593
<i>n</i> ,fis	¹¹⁵ Ag	FY	1USALAS	Maxwl		Jour	PR,85,570	52	A.C.Wahl+	13368
<i>n</i> ,fis	¹⁴⁰ Ba	FY	2GERKFK	Maxwl	5.0+05	Jour	NT,12,226	71	W.Krappel+	23597

92 Uranium 238

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
*	γ ,el	RP	1USADKE	2.4+06	2.5+06	Jour	NST,52,811	15	H.Negm+	L0267
*	γ ,fis	DAP	1USAISU	1.0+07	1.0+07	Jour	PR/C,102,014612	20	J.Burggraf+	L0263
<i>n</i> ,fis	Many	FY	4RUSKUR	1.4+07	1.4+07	Book	NEJTRONFIZ,,224	61	E.K.Bonyushkin+	41735
<i>n</i> ,fis	Many	FY	4RUSRI	Fiss		Book	NEJTRONFIZ,,217	61	K.A.Petrzhak+	41734

	<i>n</i> ,fis	Many	FY	4RUSKUR	Fiss		Book	NEJTRONFIZ,,224	61	E.K.Bonyushkin+	41735
	<i>n</i> ,fis		NUD	2GERMNZ	1.5+07	1.5+07	Jour	RCA,17,61	72	G.Benedict+	22571
	<i>n</i> ,fis		NUD	2UK KEN	1.5+07	1.5+07	Jour	RCA,15,109	71	M.G.Brown+	23592
*	<i>n</i> ,fis	⁸⁹ Rb	CS	3CPRNPC	1.4+07	1.5+07	Jour	NIM/B,469,28	20	Qiang Wang+	32799
	<i>n</i> ,fis	¹⁴⁰ Ba	FY	2GERKFK	5.0+05	5.0+05	Jour	NT,12,226	71	W.Krappel+	23597
*	<i>n</i> , γ	²³⁹ U	CS	3CPRSIU	2.0+06	4.4+06	Jour	JRN,324,277	20	Zhiling Yuan+	32802
*	¹⁸ O, ¹² C+fis	Many	FY	2JPNJAE	1.6+08	1.6+08	Jour	PRL,119,222501	17	K.Hirose+	E2661
*	¹⁸ O, ¹³ C+fis	Many	FY	2JPNJAE	1.6+08	1.6+08	Jour	PRL,119,222501	17	K.Hirose+	E2661
*	¹⁸ O, ¹⁴ C+fis	Many	FY	2JPNJAE	1.6+08	1.6+08	Jour	PRL,119,222501	17	K.Hirose+	E2661
*	¹⁸ O, ¹⁵ C+fis	Many	FY	2JPNJAE	1.6+08	1.6+08	Jour	PRL,119,222501	17	K.Hirose+	E2661
*	¹⁸ O, ¹⁴ N+fis	Many	FY	2JPNJAE	1.6+08	1.6+08	Jour	PRL,119,222501	17	K.Hirose+	E2661
*	¹⁸ O, ¹⁵ N+fis	Many	FY	2JPNJAE	1.6+08	1.6+08	Jour	PRL,119,222501	17	K.Hirose+	E2661
*	¹⁸ O, ¹⁶ N+fis	Many	FY	2JPNJAE	1.6+08	1.6+08	Jour	PRL,119,222501	17	K.Hirose+	E2661
*	¹⁸ O, ¹⁷ N+fis	Many	FY	2JPNJAE	1.6+08	1.6+08	Jour	PRL,119,222501	17	K.Hirose+	E2661
*	¹⁸ O, ¹⁶ O+fis	Many	FY	2JPNJAE	1.6+08	1.6+08	Jour	PRL,119,222501	17	K.Hirose+	E2661
*	¹⁸ O, ¹⁷ O+fis	Many	FY	2JPNJAE	1.6+08	1.6+08	Jour	PRL,119,222501	17	K.Hirose+	E2661
*	¹⁸ O, ¹⁸ O+fis	Many	FY	2JPNJAE	1.6+08	1.6+08	Jour	PRL,119,222501	17	K.Hirose+	E2661
*	¹⁸ O, ¹⁹ O+fis	Many	FY	2JPNJAE	1.6+08	1.6+08	Jour	PRL,119,222501	17	K.Hirose+	E2661

93 Neptunium 237

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis	Many	FY	2FR ILL	2.5-02	2.5-02	Jour	RE,92,333	86	F.Caitucoli+	23588
* ¹⁸ O, ¹⁰ Be+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹¹ Be+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ⁹ Be+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹⁰ B+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹¹ B+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹² B+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹³ B+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹² C+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹³ C+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹⁴ C+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹⁵ C+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹⁴ N+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹⁵ N+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹⁶ N+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹⁷ N+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹⁶ O+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹⁷ O+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹⁸ O+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹⁹ O+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹⁸ F+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ¹⁹ F+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ²⁰ F+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680
* ¹⁸ O, ²¹ F+fis	Many	FY	2JPNJAE	1.5+08	1.5+08	Jour	PR/C,102,054610	20	M.J.Vermeulen+	E2680

94 Plutonium 239

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis	Many	FY	4RUSRI	Fiss		Book	NEJTRONFIZ,,217	61	K.A.Petrzhak+	41734

n,fis ? IUSALAS Maxwl Jour PR,71,560(1) 47 R.R.Wilson [14673](#)

94 Plutonium 240

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* <i>n</i> ,fis		DA	4RUSLIN	1.8+05	3.0+08	Jour	JEL,112,323	20	A.S.Vorobyev+	41737

94 Plutonium 241

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis	Many	FY	2UK HAR	2.5-02	2.5-02	Rept	AERE-R-6154	69	I.F.Croall+	23793
<i>n</i> ,fis	⁹⁶ Nb	FY	2UK HAR	2.5-02	2.5-02	Rept	AERE-R-6154	69	I.F.Croall+	23793

96 Curium 245

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis	Many	FY	2FR ILL	2.5-02	2.5-02	Jour	RE,93,49	86	P.Koczon+	23587
<i>n</i> ,fis		KE	2FR ILL	2.5-02	2.5-02	Jour	RE,93,49	86	P.Koczon+	23587
<i>n</i> ,fis	⁴ He	KE	2FR ILL	2.5-02	2.5-02	Jour	RE,93,49	86	P.Koczon+	23587

96 Curium 248

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* ²³ Na, _{4n}	²⁶⁷ Bh	CS	2JPNIPC	1.2+08	1.2+08	Jour	PR/C,102,024625	20	H.Haba+	E2676
* ²³ Na, _{5n}	²⁶⁶ Bh	CS	2JPNIPC	1.2+08	1.4+08	Jour	PR/C,102,024625	20	H.Haba+	E2676

98 Californium 252

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
0,fis	Many	FY	2ITYUPV	Spont		Jour	EPJ/A,7,189	00	D.C.Biswas+	23598
0,fis	Many	NU	2ITYUPV	Spont		Jour	EPJ/A,7,189	00	D.C.Biswas+	23598