

Japan Charged-Particle Nuclear Reaction Data Group (JCPRG)

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Quantity code

ALF	Alpha	FY	Fission product yield
AMP	Length or amplitude	INT	Cross section integral over incident energy
CHG	Fragment charge	KE	Kinetic energy
CS	Cross section	KER	Kerma factor
CSN	Differential with respect to number of particles	MLT	Multiplicity
CSP	Partial cross section	NQ	Nuclear quantity
CST	Temperature dependent cross section	NU	Nu
D3A	Triple differential $d\Omega_1/d\Omega_2/dE'$	NUD	Nu delayed
D3E	Triple differential $d\Omega/dE'_1/dE'_2$	NUF	Fragment neutrons
D4A	Quadruple diff. $d\Omega_1/d\Omega_2/dE'_1/dE'_2$	POL	Polarization
DA	Differential $d/d\Omega$	POD	Differential polarization
DAA	Double differential $d\Omega_1/d\Omega_2$	PY	Product yield (other than fission)
DAE	Double differential $d\Omega/dE'$	RI	Resonance integral
DAP	Partial differential $d/d\Omega$	RP	Resonance parameter
DAT	Temperature-dependent Legendre coefficient	RR	Reaction rate
DE	Differential d/dE'	SIF	Self indication
DEP	Energy spectrum for specific group	SPC	Gamma spectrum
DP	Diff. by linear momentum of outgoing part.	TSL	Thermal scattering
DT	Diff. by 4-momentum transfer squared	TT	Thick target yield
ETA	Eta	TTD	Differential thick target yield, $d/d\Omega$
EVL	Evaluation	TTP	Partial thick target yield

Special codes in outgoing particle field

abs	Absorption	fus	Fusion	sct	Scattering	tot	Total
el	Elastic	inel	Inelastic	tcx	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)

1 Hydrogen 1

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,el	^1H	POD	2SWTPSI	6.8+07	6.8+07	Jour	NP/A,541,137	92	C.Brogli-Gysin+	22714
$^6\text{He},el$	^1H	?	2JPNIPC	4.3+08	4.3+08	Jour	EPJ/AS,25,(1),255	Sep 05	M.Hatano+	E1987
$^{27}\text{F},inel$	^1H	CSP	2JPNIPC	1.1+09	1.1+09	Jour	PL/B,599,(1-2),17	Oct 04	Z.Elekes+	E1998
$^{30}\text{Na},inel$	^1H	CSP	2JPNIPC	5.0+07	5.0+07	Jour	PR/C,73,(4),044314	Apr 06	Z.Elekes+	E1982
$^{31}\text{Na},inel$	^1H	CSP	2JPNIPC	5.0+07	5.0+07	Jour	PR/C,73,(4),044314	Apr 06	Z.Elekes+	E1982
$^{33}\text{Mg},inel$	^1H	CSP	2JPNIPC	5.0+07	5.0+07	Jour	PR/C,73,(4),044314	Apr 06	Z.Elekes+	E1982
$^{34}\text{Mg},inel$	^1H	CSP	2JPNIPC	5.0+07	5.0+07	Jour	PR/C,73,(4),044314	Apr 06	Z.Elekes+	E1982

1 Hydrogen 2

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$^8\text{Li},n$	^9Be	CS	3CPRAEP	8.1+06	8.1+06	Jour	CPL,22,(9),2219	05	Zengsheng+	S0048
$^8\text{Li},n$	^9Be	DA	3CPRAEP	8.1+06	8.1+06	Jour	CPL,22,(9),2219	05	Zengsheng+	S0048

1 Hydrogen

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,tot		CST	3ARGCAB	1.6-03	8.9+01	Jour	NIM/B,248,340	06	L.Torres+	31588
n,tot		CST	3ARGCAB	1.6-03	8.9+01	Jour	NIM/B,248,340	06	L.Torres+	31588

2 Helium 4

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
p,el	^4He	DA	2JPNOSA	3.0+08	3.0+08	Jour	PR/C,74,(1),014309	Jul 06	T.Yamagata+	E1993
$p,inel$	^4He	DAE	2JPNOSA	3.0+08	3.0+08	Jour	PR/C,74,(1),014309	Jul 06	T.Yamagata+	E1993
$p,inel$	^4He	DAP	2JPNOSA	3.0+08	3.0+08	Jour	PR/C,74,(1),014309	Jul 06	T.Yamagata+	E1993
$^{22}\text{O},x$	^{23}F	DAP	2JPNIPC	7.7+08	7.7+08	Jour	PL/B,638,(2-3),146	Jul 06	S.Michimasa+	E1990

3 Lithium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$d,x+n$	inclusive	DAE	2JPNTOH	4.0+07	4.0+07	Jour	FST,48,(3),1320	Nov 05	M.Hagiwara+	E1986
$d,x+n$	inclusive	TT	2JPNTOH	4.0+07	4.0+07	Jour	FST,48,(3),1320	Nov 05	M.Hagiwara+	E1986
$d,x+n$	inclusive	TTD	2JPNTOH	4.0+07	4.0+07	Jour	FST,48,(3),1320	Nov 05	M.Hagiwara+	E1986

3

Lithium

6

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,t	^4He	CS	3CPRBJG	1.0+06	2.2+06	Jour	NSE,153,41	06	Guohuizhang+	32651
n,t	^4He	DA	3CPRBJG	1.0+06	2.2+06	Jour	NSE,153,41	06	Guohuizhang+	32651
p,inel	^6Li	POD	2JPNOSA	5.0+07	8.0+07	Jour	NIM/A,257,(2),279	Jun 87	H.Sakai+	E1999

3

Lithium

8

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,γ	^9Li	RR	3CPRAEP			Jour	PR/C,71,052801	05	Z.H.Li+	S0047
d,p	^9Li	CSP	3CPRAEP	7.8+06	7.8+06	Jour	PR/C,71,052801	05	Z.H.Li+	S0047
d,p	^9Li	DAP	3CPRAEP	7.8+06	7.8+06	Jour	PR/C,71,052801	05	Z.H.Li+	S0047

6

Carbon

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,tot		CS	4UKRIJD	1.9+04	1.6+05	Jour	JAI,3,(8),(JAI13424)	06	O.Gritzay+	32215
$p,x+n$	inclusive	PY	2JPNOSA	3.5+08	3.5+08	Jour	NIM/A,562,(2),789	Jun 06	Y.Iwamoto+	E1989
d,x	^7Be	CS	2JPNTOH	2.3+07	4.0+07	Jour	JNM,329,218	Aug 04	M.Hagiwara+	E1985
$d,x+n$	inclusive	TTD	2JPNTOH	4.0+07	4.0+07	Jour	JNM,329,218	Aug 04	M.Hagiwara+	E1985
$^{14}\text{Be,abs}$		CS	3CPRIMP	6.3+08	6.3+08	Jour	NIM/B,247,(2),155	Jun 06	A.Ozawa+	E1984
$^{14}\text{B,abs}$		CS	3CPRIMP	7.1+08	7.1+08	Jour	NIM/B,247,(2),155	Jun 06	A.Ozawa+	E1984
$^{15}\text{B,abs}$		CS	3CPRIMP	7.8+08	7.8+08	Jour	NIM/B,247,(2),155	Jun 06	A.Ozawa+	E1984

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Carbon

12

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$^{16}\text{O,inel}$	^{12}C	CSP	2JPNKYU	1.7+07	2.3+07	Jour	NP/A,736,(1-2),3	May 04	T.Sugimitsu+	E1962

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Nitrogen

14

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,γ	^{15}N	CSP	3HUNII	Maxwl		Jour	PR/C,74,024603	06	T.Belgya	31586
$d,^2\text{He}$	^{14}C	DAP	2NEDKVI	1.7+08	1.7+08	Jour	PRL,97,(6),062502	Aug 06	A.Negret+	E1995
$^3\text{He},t$	^{14}O	DAP	2JPNOSA	4.2+08	4.2+08	Jour	PRL,97,(6),062502	Aug 06	A.Negret+	E1995

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Oxygen

18

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

n,γ	^{19}O	CS	2SWTWUR	Maxwl		Jour	JIN,33,1221	May 71	W.Blaser+	20439
n,γ	^{19}O	RI	2SWTWUR		5.0-01	Jour	JIN,33,1221	May 71	W.Blaser+	20439

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Fluorine

19

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,γ	^{20}F	CSP	3HUNII	5.0-04	5.0-04	Jour	NIM/A,564,655	06	L.Szentmiklosi+	31582

11

Sodium

23

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,γ	^{24}Na	CSP	3HUNII	5.0-04	5.0-04	Jour	NIM/A,564,655	06	L.Szentmiklosi+	31582

12

Magnesium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,p		DE	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535
n,p		?	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535

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Magnesium

26

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$t,^3\text{He}$	^{26}Na	DAP	1USAMSU	3.4+08	3.4+08	Jour	PR/C,74,(2),024309	Aug 06	R.G.T.Zegers+	E1997
$^3\text{He},t$	^{26}Al	DAP	2JPNOSA	4.2+08	4.2+08	Jour	PR/C,74,(2),024309	Aug 06	R.G.T.Zegers+	E1997

13

Aluminium

27

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,α	^{24}Na	CS	2JPNJAE	9.5+06	1.3+07	Conf	91JUELIC,,294	May 91	Y.Ikeda+	22209
n,γ	^{28}Al	CSP	3HUNII	5.0-04	5.0-04	Jour	NIM/A,564,655	06	L.Szentmiklosi+	31582
n,p	^{27}Mg	DE	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535
n,p	^{27}Mg	?	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535
$p,x+n$	inclusive	PY	2JPNOSA	3.5+08	3.5+08	Jour	NIM/A,562,(2),789	Jun 06	Y.Iwamoto+	E1989
d,x	^7Be	CS	2JPNTOH	2.1+07	3.9+07	Jour	JNM,329,218	Aug 04	M.Hagiwara+	E1985
d,x	^{22}Na	CS	2JPNTOH	2.1+07	3.9+07	Jour	JNM,329,218	Aug 04	M.Hagiwara+	E1985
d,x	^{22}Na	CS	2JPNJAE	3.1+07	4.0+07	Jour	NIM/A,562,(2),785	Jun 06	M.Nakao+	E1988
d,x	^{24}Na	CS	2JPNJAE	1.9+07	4.0+07	Jour	NIM/A,562,(2),785	Jun 06	M.Nakao+	E1988
d,x	^{24}Na	CS	2JPNTOH	4.4+06	3.9+07	Jour	JNM,329,218	Aug 04	M.Hagiwara+	E1985
$d,x+n$	inclusive	TTD	2JPNTOH	4.0+07	4.0+07	Jour	JNM,329,218	Aug 04	M.Hagiwara+	E1985

14 Silicon

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,p</i>		DE	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535
<i>n,p</i>		?	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535

16 Sulphur

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,p</i>		?	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535
<i>n,x+p</i>	inclusive	DE	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535

17 Chlorine

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,γ</i>	³⁸ Cl	CSP	3HUNII	5.0-04	5.0-04	Jour	NIM/A,564,655	06	L.Szentmiklosi+	31582

20 Calcium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,p</i>		DE	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535
<i>n,p</i>		?	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535

21 Scandium 45

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,γ</i>	⁴⁶ Sc	CSP	3HUNII	5.0-04	5.0-04	Jour	NIM/A,564,655	06	L.Szentmiklosi+	31582

22 Titanium 48

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,p</i>	⁴⁸ Sc	CS	2JPNJAE	9.5+06	1.2+07	Conf	91JUELIC,,294	May 91	Y.Ikeda+	22209

25 Manganese 55

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

n,γ	^{56}Mn	CSP	3HUNII	5.0-04	5.0-04	Jour	NIM/A,564,655	06	L.Szentmiklosi+	31582
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26 Iron

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,p		DE	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535
n,p		?	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535
$p,x+n$	inclusive	PY	2JPNOSA	3.5+08	3.5+08	Jour	NIM/A,562,(2),789	Jun 06	Y.Iwamoto+	E1989
d,x	^{55}Co	CS	2JPNJAE	1.6+07	4.0+07	Jour	NIM/A,562,(2),785	Jun 06	M.Nakao+	E1988
d,x	^{56}Co	CS	2JPNJAE	2.6+07	4.0+07	Jour	NIM/A,562,(2),785	Jun 06	M.Nakao+	E1988

27 Cobalt 59

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,2n$	^{58}Co	CS	4ZZZDUB	4.0+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004
$n,4n$	^{56}Co	CS	4ZZZDUB	4.0+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004
$n,5n$	^{55}Co	CS	4ZZZDUB	4.0+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004
n,α	^{56}Mn	CS	4ZZZDUB	4.0+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004

28 Nickel

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,p		DE	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535
n,p		?	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535

28 Nickel 58

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
α,el	^{58}Ni	DA	2JPNOSA	3.9+08	3.9+08	Jour	PL/B,637,(1-2),43	Jun 06	B.K.Nayak+	E1983
α,inel	^{58}Ni	DAE	2JPNOSA	3.9+08	3.9+08	Jour	PL/B,637,(1-2),43	Jun 06	B.K.Nayak+	E1983
α,inel	^{58}Ni	DAP	2JPNOSA	3.9+08	3.9+08	Jour	PL/B,637,(1-2),43	Jun 06	B.K.Nayak+	E1983

28 Nickel 61

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,0$		RP	2ZZZGEL		1.5+05	Jour	NP/A,773,173	06	S.Kopecky+	22922
n,el		RP	2ZZZGEL		1.5+05	Jour	NP/A,773,173	06	S.Kopecky+	22922

29 Copper

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,p</i>		DE	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535
<i>d,x</i>	⁶¹ Cu	CS	2JPNJAE	2.3+07	4.0+07	Jour	NIM/A,562,(2),785	Jun 06	M.Nakao+	E1988
<i>d,x</i>	⁶² Zn	CS	2JPNJAE	2.0+07	4.0+07	Jour	NIM/A,562,(2),785	Jun 06	M.Nakao+	E1988
α,x	⁶¹ Cu	CS	2JPNIRS	3.4+07	5.8+07	Jour	NIM/B,184,(4),589	Dec 01	F.Szelecsenyi+	E1996
α,x	⁶⁶ Ga	CS	2JPNIRS	1.6+07	5.8+07	Jour	NIM/B,184,(4),589	Dec 01	F.Szelecsenyi+	E1996
α,x	⁶⁷ Ga	CS	2JPNIRS	1.6+07	5.8+07	Jour	NIM/B,184,(4),589	Dec 01	F.Szelecsenyi+	E1996

30 Zinc

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,p</i>		DE	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535
<i>n,p</i>		?	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535

30 Zinc 64

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,α</i>	⁶¹ Ni	CS	3CPRBJG	5.0+06	6.5+06	Jour	NSE,144,108	03	Jingyuan+	32657
<i>n,α</i>	⁶¹ Ni	DA	3CPRBJG	5.0+06	6.5+06	Jour	NSE,144,108	03	Jingyuan+	32657
<i>n,α</i>	⁶¹ Ni	DAP	3CPRBJG	5.0+06	6.5+06	Jour	NSE,144,108	03	Jingyuan+	32657
<i>n,p</i>	⁶⁴ Cu	CS	2JPNJAE	9.5+06	1.1+07	Conf	91JUELIC,,294	May 91	Y.Ikeda+	22209

31 Gallium 71

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,2n</i>	⁷⁰ Ga	CS	3CPRLNZ	1.4+07	1.5+07	Jour	PR/C,72,037604	05	Jishanwang+	32655

33 Arsenic 75

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,2n</i>	⁷⁴ As	CS	3ARGCAB	Fiss		Jour	JRN,270,603	06	E.L.Dorval+	31591
<i>n,p</i>	⁷⁵ Ge	CS	3ARGCAB	Fiss		Jour	JRN,270,603	06	E.L.Dorval+	31591

34 Selenium 74

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,p</i>	⁷⁴ As	CS	3CPRLNZ	1.5+07	1.5+07	Jour	IPA,43,729	Oct 05	Guozhuhe+	32656

34 Selenium 76

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,2n$	^{75}Se	CS	3CPRLNZ	1.4+07	1.4+07	Jour	IPA,43,729	Oct 05	Guozhuhe+	32656
n,p	^{76}As	CS	3CPRLNZ	1.5+07	1.5+07	Jour	IPA,43,729	Oct 05	Guozhuhe+	32656

34 Selenium 78

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,p	^{78}As	CS	3CPRLNZ	1.4+07	1.5+07	Jour	IPA,43,729	Oct 05	Guozhuhe+	32656

34 Selenium 80

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,α	^{77}Ge	CS	3CPRLNZ	1.4+07	1.4+07	Jour	IPA,43,729	Oct 05	Guozhuhe+	32656

34 Selenium 82

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,2n$	^{81}Se	CS	3CPRLNZ	1.4+07	1.5+07	Jour	IPA,43,729	Oct 05	Guozhuhe+	32656

35 Bromine

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,γ	^{80}Br	CSP	3HUNII	5.0-04	5.0-04	Jour	NIM/A,564,655	06	L.Szentmiklosi+	31582
n,γ	^{82}Br	CSP	3HUNII	5.0-04	5.0-04	Jour	NIM/A,564,655	06	L.Szentmiklosi+	31582

37 Rubidium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,γ	^{86}Rb	CSP	3HUNII	5.0-04	5.0-04	Jour	NIM/A,564,655	06	L.Szentmiklosi+	31582
n,γ	^{88}Rb	CSP	3HUNII	5.0-04	5.0-04	Jour	NIM/A,564,655	06	L.Szentmiklosi+	31582

38 Strontium 84

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,2n$	⁸³ Sr	CS	3CPRLNZ	1.4+07	1.5+07	Jour	ANE,33,37	06	Guozhuhe+	32654
n,p	⁸⁴ Rb	CS	3CPRLNZ	1.5+07	1.5+07	Jour	ANE,33,37	06	Guozhuhe+	32654

38 Strontium 86

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,2n$	⁸⁵ Sr	CS	3CPRLNZ	1.4+07	1.5+07	Jour	ANE,33,37	06	Guozhuhe+	32654
n,p	⁸⁶ Rb	CS	3CPRLNZ	1.4+07	1.4+07	Jour	ANE,33,37	06	Guozhuhe+	32654

38 Strontium 88

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,2n$	⁸⁷ Sr	CS	3CPRLNZ	1.4+07	1.5+07	Jour	ANE,33,37	06	Guozhuhe+	32654
n,α	⁸⁵ Kr	CS	3CPRLNZ	1.4+07	1.5+07	Jour	ANE,33,37	06	Guozhuhe+	32654
n,p	⁸⁸ Rb	CS	3CPRLNZ	1.5+07	1.5+07	Jour	ANE,33,37	06	Guozhuhe+	32654

39 Yttrium 89

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
γ,n	⁸⁸ Y	CS	4UKRUZH	1.3+07	2.4+07	Jour	YF,54,(3),609	91	I.Z.Beseda+	G4007

40 Zirconium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,p		DE	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535
n,p		?	2ITYCIS	1.4+07	1.4+07	Jour	NC,5,(1),309	Jan 57	C.Badoni+	22535

40 Zirconium 90

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,2n$	⁸⁹ Zr	CS	2JPNJAE	1.3+07	1.3+07	Conf	91JUELIC,,294	May 91	Y.Ikeda+	22209

41

Niobium

93

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,2n$	^{92}Nb	CS	2JPNJAE	9.5+06	1.3+07	Conf	91JUELIC,,294	May 91	Y.Ikeda+	22209

43

Technetium

99

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,γ	^{100}Tc	CS	2JPNYOK	2.5-02	2.5-02	Jour	JNRS,6,(3),283	05	K.Furutaka+	22933

47

Silver

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,γ	^{108}Ag	CSP	3HUNII	5.0-04	5.0-04	Jour	NIM/A,564,655	06	L.Szentmiklosi+	31582
n,γ	^{110}Ag	CSP	3HUNII	5.0-04	5.0-04	Jour	NIM/A,564,655	06	L.Szentmiklosi+	31582

49

Indium

113

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,2n$	^{112}In	CS	3CPRLNZ	1.4+07	1.5+07	Jour	ARI,64,910	06	Feituo+	32653
n,inel	^{113}In	CS	3CPRLNZ	1.4+07	1.5+07	Jour	ARI,64,910	06	Feituo+	32653

49

Indium

115

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,2n$	^{114}In	CS	3CPRLNZ	1.4+07	1.5+07	Jour	ARI,64,910	06	Feituo+	32653
n,α	^{112}Ag	CS	3CPRLNZ	1.4+07	1.5+07	Jour	ARI,64,910	06	Feituo+	32653
n,inel	^{115}In	CS	3CPRLNZ	1.4+07	1.5+07	Jour	ARI,64,910	06	Feituo+	32653
n,inel	^{115}In	CS	2JPNJAE	9.5+06	1.3+07	Conf	91JUELIC,,294	May 91	Y.Ikeda+	22209
n,p	^{115}Cd	CS	3CPRLNZ	1.4+07	1.5+07	Jour	ARI,64,910	06	Feituo+	32653

52

Tellurium

123

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,γ	^{124}Te	CS	3CZRUV	2.5-02	2.5-02	Jour	PR/C,74,034319	06	T.Vonegidy+	31589
n,γ	^{124}Te	SPC	3CZRUV	Maxwl		Jour	PR/C,74,034319	06	T.Vonegidy+	31589

73 Tantalum

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>d,x</i>	¹⁷⁸ Ta	CS	2JPNJAE	2.9+07	4.0+07	Jour	NIM/A,562,(2),785	Jun 06	M.Nakao+	E1988
<i>d,x</i>	¹⁸⁰ Ta	CS	2JPNJAE	2.5+07	4.0+07	Jour	NIM/A,562,(2),785	Jun 06	M.Nakao+	E1988

73 Tantalum 181

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,2n</i>	¹⁸⁰ Ta	CS	4ZZZDUB	3.0+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004
<i>n,4n</i>	¹⁷⁸ Ta	CS	4ZZZDUB	3.0+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004
<i>n,5n</i>	¹⁷⁷ Ta	CS	4ZZZDUB	3.0+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004
<i>n,γ</i>	¹⁸² Ta	CS	4ZZZDUB	3.0+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004
<i>n,n+p</i>	¹⁸⁰ Hf	CS	4ZZZDUB	3.0+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004
<i>p,4n</i>	¹⁷⁸ W	CS	2JPNTOH	2.9+07	6.9+07	Jour	NSTS,4,160	Mar 04	M.S.Uddin+	E1981
<i>p,x</i>	¹⁷⁹ Lu	CS	2JPNTOH	5.2+07	6.9+07	Jour	NSTS,4,160	Mar 04	M.S.Uddin+	E1981
<i>p,x</i>	¹⁷³ Hf	CS	2JPNTOH	5.4+07	6.9+07	Jour	NSTS,4,160	Mar 04	M.S.Uddin+	E1981
<i>p,x</i>	¹⁷⁵ Hf	CS	2JPNTOH	3.6+07	6.9+07	Jour	NSTS,4,160	Mar 04	M.S.Uddin+	E1981
<i>p,x</i>	¹⁷⁵ Ta	CS	2JPNTOH	5.7+07	6.9+07	Jour	NSTS,4,160	Mar 04	M.S.Uddin+	E1981
<i>p,x</i>	¹⁷⁶ Ta	CS	2JPNTOH	4.7+07	6.9+07	Jour	NSTS,4,160	Mar 04	M.S.Uddin+	E1981
<i>p,x</i>	¹⁷⁷ Ta	CS	2JPNTOH	3.6+07	6.9+07	Jour	NSTS,4,160	Mar 04	M.S.Uddin+	E1981
<i>p,x</i>	¹⁸⁰ Ta	CS	2JPNTOH	2.9+07	6.9+07	Jour	NSTS,4,160	Mar 04	M.S.Uddin+	E1981

74 Tungsten

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,fis</i>		CS	2SWDUPP	7.5+07	1.7+08	Rept	ISINN-13,309	06	V.P.Eismont+	22937
<i>n,γ</i>	¹⁸⁷ W	CSP	3HUNII	5.0-04	5.0-04	Jour	NIM/A,564,655	06	L.Szentmiklosi+	31582
<i>d,x</i>	¹⁸¹ Re	CS	2JPNJAE	2.0+07	4.0+07	Jour	NIM/A,562,(2),785	Jun 06	M.Nakao+	E1988
<i>d,x</i>	¹⁸³ Re	CS	2JPNJAE	1.8+07	4.0+07	Jour	NIM/A,562,(2),785	Jun 06	M.Nakao+	E1988

74 Tungsten 182

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,fis</i>		CS	2SWDUPP	7.5+07	1.7+08	Rept	ISINN-13,309	06	V.P.Eismont+	22937

74 Tungsten 183

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,fis</i>		CS	2SWDUPP	7.5+07	1.7+08	Rept	ISINN-13,309	06	V.P.Eismont+	22937

74

Tungsten

184

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n, fis		CS	2SWDUPP	7.5+07	1.7+08	Rept	ISINN-13,309	06	V.P.Eismont+	22937

75

Rhenium

185

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
γ, n	^{184}Re	CS	4UKRIEP	1.0+07	1.8+07	Jour	YF,62,(5),941	99	I.N.Vishnevsky+	G4006

79

Gold

197

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n, 2n$	^{196}Au	CS	4ZZZDUB	4.0+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004
$n, 4n$	^{194}Au	CS	4ZZZDUB	4.0+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004
$n, 6n$	^{192}Au	CS	4ZZZDUB	4.0+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004
$n, 6n+p$	^{191}Pt	CS	4ZZZDUB	4.0+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004
$n, 7n$	^{191}Au	CS	4ZZZDUB	4.0+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004
$n, 8n$	^{190}Au	CS	4ZZZDUB	4.0+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004
n, α	^{194}Ir	CS	4ZZZDUB	4.0+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004
n, γ	^{198}Au	CS	4ZZZDUB	4.0+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004

82

Lead

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p, x+n$	inclusive	PY	2JPNOSA	3.5+08	3.5+08	Jour	NIM/A,562,(2),789	Jun 06	Y.Iwamoto+	E1989
$^{11}\text{Li}, inel$	^{nat}Pb	CSP	2JPNIPC	7.7+08	7.7+08	Jour	PRL,96,(25),252502	Jun 06	T.Nakamura+	E1991
$^{11}\text{Li}, inel$	^{nat}Pb	DAE	2JPNIPC	7.7+08	7.7+08	Jour	PRL,96,(25),252502	Jun 06	T.Nakamura+	E1991
$^{11}\text{Li}, inel$	^{nat}Pb	DAP	2JPNIPC	7.7+08	7.7+08	Jour	PRL,96,(25),252502	Jun 06	T.Nakamura+	E1991

82

Lead

208

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$^6\text{Li}, fus$		CS	2ITYPAD	3.0+07	3.8+07	Jour	EPJ/A,26,73	05	Z.H.Liu+	S0049

83

Bismuth

209

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n, 0$		RP	2ZZZCER			Jour	PR/C,74,025807	06	C.Domingo-Pardo+	22944

$n,6n$	^{204}Bi	CS	4ZZZDUB	4.0+06	9.8+08	Jour	KT,70,127	Mar 05	J.Adam+	33005
$n,7n$	^{203}Bi	CS	4ZZZDUB	4.0+06	9.8+08	Jour	KT,70,127	Mar 05	J.Adam+	33005
$n,8n$	^{202}Bi	CS	4ZZZDUB	4.0+06	9.8+08	Jour	KT,70,127	Mar 05	J.Adam+	33005
$n,9n$	^{201}Bi	CS	4ZZZDUB	4.0+06	9.8+08	Jour	KT,70,127	Mar 05	J.Adam+	33005
n,γ	^{210}Bi	CS	2ZZZCER	Maxwl	2.5-02	Jour	PR/C,74,025807	06	C.Domingo-Pardo+	22944
$^9\text{Be, fus}$		CS	2GERLMU	3.6+07	4.8+07	Jour	EPJ/A,26,73	05	Z.H.Liu+	S0049
$^{11}\text{Be, sct}$	^{209}Bi	DAP	2JPNIPC	4.0+07	4.0+07	Jour	EPJ/A,28,(3),295	Jun 06	M.Mazzocco+	E1992

90 Thorium 232

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
γ, fis	^{117}In	CS	4UKRKGU		2.3+07	Jour	ZNJD,8,(2),46	02	O.A.Bezsheyko+	G4005
γ, fis	^{130}Sb	CS	4UKRKGU		2.3+07	Jour	ZNJD,8,(2),46	02	O.A.Bezsheyko+	G4005
γ, fis	^{133}Te	CS	4UKRKGU		2.3+07	Jour	ZNJD,8,(2),46	02	O.A.Bezsheyko+	G4005
γ, fis	^{134}I	CS	4UKRKGU		2.3+07	Jour	ZNJD,8,(2),46	02	O.A.Bezsheyko+	G4005
γ, fis	^{135}Xe	CS	4UKRKGU		2.3+07	Jour	ZNJD,8,(2),46	02	O.A.Bezsheyko+	G4005
$n,2n$	^{231}Th	CS	4ZZZDUB	2.2+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004
n, fis	Many	FY	3CHFTHU	Fast		Jour	RCA,38,173	85	C.Chung+	32666
n,γ	^{233}Th	CS	4ZZZDUB	2.2+06	9.8+08	Conf	2006JAIPUR,	Jan 06	Manishsharma+	33004

92 Uranium 232

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n, fis	Many	FY	3CHFTHU	Maxwl		Jour	RCA,49,113	90	Chienchung+	32659
n, fis	Many	FY	3CHFTHU	Maxwl		Jour	ANS,49,209	85	Abdulhamida.Hasan+	32667

92 Uranium 233

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n, fis	Many	?	2FR ILL	Maxwl		Jour	EPJ/A,24,379	05	P.Jesinger+	22925
n, fis	^4He	?	2FR ILL	Maxwl		Jour	EPJ/A,24,379	05	P.Jesinger+	22925
n, fis	^{134}I	FY	3CHFTHU	Maxwl		Jour	NSF,24,(2),63	Apr 87	Chih-Haolee+	32665
n, fis	^{136}I	FY	3CHFTHU	Maxwl		Jour	NSF,24,(2),63	Apr 87	Chih-Haolee+	32665

92 Uranium 235

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n, fis		DE	4UKRIJD	2.5-02	2.5-02	Conf	2004SANTA,1,(1),762	04	S.A.Kravchenko+	32211
n, fis	Many	FY	3CPRAEP	2.4+04	2.4+04	Jour	HFH,13,(4),237	Nov 91	Wangdongmei+	32663
n, fis	Many	FY	3CHFTHU	Fiss		Jour	NSF,24,(2),63	Apr 87	Chih-Haolee+	32665
n, fis	Many	?	2FR ILL	Maxwl		Jour	EPJ/A,24,379	05	P.Jesinger+	22925
n, fis	^4He	?	2FR ILL	Maxwl		Jour	EPJ/A,24,379	05	P.Jesinger+	22925
n, fis	^{148}Pr	FY	1USABNL	Maxwl		Jour	ZP/A,319,295	84	C.Chung+	32664

92 Uranium 238

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis		CS	3SY DAM	8.2+05	6.1+06	Jour	ARI,65,46	07	K.Khattab	31590
<i>n</i> ,fis	Many	FY	3CPRAEP	1.1+07	1.1+07	Jour	RCA,64,95	94	Zeli+	32658
<i>n</i> ,fis	Many	FY	3CPRAEP	8.0+06	8.0+06	Jour	HFH,17,65	May 95	Zeli+	32660
<i>n</i> ,fis	Many	FY	3SY DAM	Fast		Jour	ARI,65,46	07	K.Khattab	31590
<i>n</i> ,fis	Many	FY	3CHFTHU	Fast		Jour	JRN,109,117	87	Chien.Chung+	32668
<i>n</i> ,fis	Many	FY	3CPRAEP	Fiss		Jour	HFH,13,(3),129	Aug 91	Sushuxin+	32662
<i>n</i> ,fis		FY	3CPRAEP	Fiss		Jour	HFH,13,(3),129	Aug 91	Sushuxin+	32662
<i>n</i> ,fis	Many	FY	3CPRAEP	Fiss		Jour	HFH,13,(3),129	Aug 91	Sushuxin+	32662
<i>n</i> ,fis	Many	FY	3CPRAEP	Maxwl		Jour	HFH,17,65	May 95	Zeli+	32660
<i>n</i> ,fis		NU	3CPRAEP	Fiss		Jour	HFH,13,(3),129	Aug 91	Sushuxin+	32662

93 Neptunium 237

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> , γ	²³⁸ Np	?	2JPNKTO	Maxwl	9.4+01	Jour	NSE,136,321	00	T.Iwasaki+	22739

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	3INDTRM	2.5-02	2.5-02	Rept	IAEA-SM-122	69	S.P.Dange+	33008

95 Americium 241

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,2 <i>n</i>	²⁴⁰ Am	CS	2GRCATH	8.8+06	1.1+07	Jour	PR/C,73,067601	06	G.Perdikakis+	22936

96 Curium 244

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
0,fis	Many	FY	3INDTRM	Spont		Jour	RCA,87,1	Aug 99	A.K.Pandy+	33006

96 Curium 248

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
¹⁸ O,5 <i>n</i>	²⁶¹ Rf	CS	2JPNJAE	9.1+07	9.9+07	Jour	JNRS,3,(1),85	Jun 02	Y.Nagame+	E1994

$^{19}\text{F}, 5n$ ^{262}Db CS 2JPNJAE 1.1+08 1.1+08 Jour JNRS,3,(1),85 Jun 02 Y.Nagame+ E1994

98 Californium 252

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
0,fis	Many	FY	3CPRAEP	Spont		Jour	JRN,170,(1),99	93	Zhaoxin+	32661
0,fis	Many	?	2GERTUE	Spont		Jour	EPJ/A,24,379	05	P.Jesinger+	22925
0,fis	^4He	?	2GERTUE	Spont		Jour	EPJ/A,24,379	05	P.Jesinger+	22925