

# EXFOR News (June 2012)

## New experimental data available from Nuclear Reaction Data Centres

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### Quantity codes

ALF	$\alpha$ -value ( $\sigma_{\text{capt}}/\sigma_{\text{fis}}$ )	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	Fission neutron multiplicity $\bar{\nu}$
D3A	Triple differential $d\Omega_1/d\Omega_2/dE'$	NUD	Delayed fission neutron multiplicity $\bar{\nu}_d$
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	$\eta$ -value $\bar{\nu}\sigma_{\text{fis}}/(\sigma_{\text{capt}} + \sigma_{\text{fis}})$	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	sc	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)

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

1 Hydrogen 1

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$n,\text{el}$	$^1\text{H}$	CS	2JPNYOK	1.4+07	1.4+07	Jour	JPJ,36,331		74	S.Shirato+	20296
$n,\text{el}$	$^1\text{H}$	DA	2JPNYOK	1.4+07	1.4+07	Jour	JPJ,36,331		74	S.Shirato+	20296
$n,\text{el}$	$^1\text{H}$	DA	2JPNYOK	1.4+07	1.4+07	Jour	JPJ,36,331		74	S.Shirato+	20404
$d,\text{el}$	$^1\text{H}$	POD	2GERGSI	1.3+08	1.3+08	Jour	PR/C,85,017001		12	I.Ciepal+	O1974
$d,n+p$	$^1\text{H}$	POD	2GERGSI	1.3+08	1.3+08	Jour	PR/C,85,017001		12	I.Ciepal+	O1974
$^8\text{He},2n+p$	$^6\text{He}$	DA	2JPNIPC	6.6+08	6.6+08	Jour	PL/B,707,(1),46		Jan 12	Z.X.Cao+	E2370
$^8\text{He},2n+p$	$^6\text{He}$	DE	2JPNIPC	6.6+08	6.6+08	Jour	PL/B,707,(1),46		Jan 12	Z.X.Cao+	E2370
$^9\text{Be},\alpha$	$^6\text{Li}$	DAP	2ITYLNS	2.3+06	5.4+06	Jour	PR/C,84,054615		11	A.N.Kuchera+	O1961
$^{12}\text{Be},\text{el}$	$^1\text{H}$	?	2GERGSI	8.4+09	8.4+09	Jour	NP/A,875,8		12	S.Ilieva+	O1975
$^{14}\text{Be},\text{el}$	$^1\text{H}$	?	2GERGSI	9.8+09	9.8+09	Jour	NP/A,875,8		12	S.Ilieva+	O1975
$^{19}\text{C},x$	$^{18}\text{C}$	CS	2JPNIPC	7.6+08	7.6+08	Jour	PR/C,84,064315		Dec 11	A.Ozawa+	E2364
$^{19}\text{C},x$	$^{18}\text{C}$	DP	2JPNIPC	7.6+08	7.6+08	Jour	PR/C,84,064315		Dec 11	A.Ozawa+	E2364
$^{20}\text{C},x$	$^{18}\text{C}$	CS	2JPNIPC	8.0+08	8.0+08	Jour	PR/C,84,064315		Dec 11	A.Ozawa+	E2364
$^{20}\text{C},x$	$^{18}\text{C}$	DP	2JPNIPC	8.0+08	8.0+08	Jour	PR/C,84,064315		Dec 11	A.Ozawa+	E2364
$^{20}\text{C},x$	$^{19}\text{C}$	CS	2JPNIPC	8.0+08	8.0+08	Jour	PR/C,84,064315		Dec 11	A.Ozawa+	E2364
$^{20}\text{C},x$	$^{19}\text{C}$	DP	2JPNIPC	8.0+08	8.0+08	Jour	PR/C,84,064315		Dec 11	A.Ozawa+	E2364
$^{17}\text{F},0$		?	3CPRIMP			Jour	EPJ/A,47,(5),67		May 11	J.J.He+	S0063
$^{17}\text{F},\text{el}$	$^1\text{H}$	?	3CPRIMP	2.5+06	4.0+06	Jour	EPJ/A,47,(5),67		May 11	J.J.He+	S0063
$^{17}\text{F},\text{el}$	$^1\text{H}$	?	2ITYPAD	6.0+07	7.3+07	Jour	PR/C,85,024609		12	N.Patronis+	O1978
$^{17}\text{F},\text{non}$		CS	2ITYPAD	6.0+07	7.3+07	Jour	PR/C,85,024609		12	N.Patronis+	O1978
$^{18}\text{F},\alpha$	$^{15}\text{O}$	?	2FR GAN	5.6+05	1.9+06	Jour	PR/C,85,022801		12	D.J.Mountford+	O1979
$^{18}\text{F},\text{el}$	$^1\text{H}$	?	2FR GAN	5.8+05	1.9+06	Jour	PR/C,85,022801		12	D.J.Mountford+	O1979
$^{17}\text{Ne},\text{el}$	$^1\text{H}$	?	2FR GAN	5.7+05	3.7+06	Jour	EPJ/CS,17,06003		11	F.Deoliveirasantos	O1977
$^{25}\text{Al},0$		RP	2JPNTOK			Jour	PR/C,85,(1),015805		Jan 12	J.Chen+	E2369
$^{25}\text{Al},\text{el}$	$^1\text{H}$	DA	2JPNTOK	1.4+06	3.0+06	Jour	PR/C,85,(1),015805		Jan 12	J.Chen+	E2369
$^{55}\text{Co},n$	$^{55}\text{Ni}$	?	1USAMSU	5.8+09	5.8+09	Jour	PRL,107,202501		11	M.Sasano+	C1878
$^{56}\text{Ni},n$	$^{56}\text{Cu}$	?	1USAMSU	6.2+09	6.2+09	Jour	PRL,107,202501		11	M.Sasano+	C1878
$^{139}\text{La},x$	Many	CS	1USABRK	7.2+10	1.6+11	Jour	PR/C,42,2508		90	J.R.Cummings+	C1874
$^{165}\text{Ho},x$	Many	CS	1USABRK	8.1+10	1.6+11	Jour	PR/C,42,2508		90	J.R.Cummings+	C1874

1 Hydrogen 2

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$n,\text{el}$	$^2\text{H}$	DA	1USAROC	1.4+07	1.4+07	Jour	PRL,107,122502		11	J.A.Frenje+	14305
$p,\text{el}$	$^2\text{H}$	DA	2UK HAR	7.7+07	7.7+07	Jour	PL,3,358		63	M.Davison+	O1938
$d,\text{el}$	$^2\text{H}$	DA	2UK HAR	7.5+07	7.5+07	Jour	PL,3,359		63	L.Lyons+	O1937
$d,n$	$^3\text{He}$	CS	2UK HAR	2.0+07	5.0+07	Jour	PL,3,359		63	L.Lyons+	O1937
$d,n+p$	$^2\text{H}$	?	2UK HAR	2.0+07	5.0+07	Jour	PL,3,359		63	L.Lyons+	O1937
$d,p$	$^3\text{H}$	CS	2UK HAR	2.0+07	5.0+07	Jour	PL,3,359		63	L.Lyons+	O1937
$^6\text{He},p$	$^7\text{He}$	?	1USAANL	6.6+07	6.6+07	Jour	EPJ/ST,150,79		07	A.H.Wuosmaa+	C1886
$^8\text{Li},\text{el}$	$^2\text{H}$	DA	2ZZZCER	2.5+07	2.5+07	Jour	PR/C,84,064616		11	E.Tengborn+	O1971
$^8\text{Li},\text{inel}$	$^2\text{H}$	DAP	2ZZZCER	2.5+07	2.5+07	Jour	PR/C,84,064616		11	E.Tengborn+	O1971
$^8\text{Li},p$	$^9\text{Li}$	DAP	2ZZZCER	2.5+07	2.5+07	Jour	PR/C,84,064616		11	E.Tengborn+	O1971
$^8\text{Li},p$	$^9\text{Li}$	?	1USAANL	7.2+07	7.2+07	Jour	EPJ/ST,150,79		07	A.H.Wuosmaa+	C1886
$^8\text{Li},t$	$^7\text{Li}$	DAP	2ZZZCER	2.5+07	2.5+07	Jour	PR/C,84,064616		11	E.Tengborn+	O1971
$^{11}\text{Be},\text{el}$	$^2\text{H}$	DA	2ZZZCER	4.5+06	4.5+06	Rept	AIP-1377,368		11	J.Johansen+	O1972
$^{11}\text{Be},t$	$^{10}\text{Be}$	DAP	2ZZZCER	2.5+07	2.5+07	Rept	AIP-1377,368		11	J.Johansen+	O1972

$^{18}\text{F},n$	$^{19}\text{Ne}$	?	1USAORL	1.5+07	1.5+07	Jour	<a href="#">PR/C,84,054611</a>	11	A.S.Adekola+	<a href="#">C1881</a>
$^{18}\text{F},p$	$^{19}\text{F}$	?	1USAORL	1.5+07	1.5+07	Jour	<a href="#">PR/C,84,054611</a>	11	A.S.Adekola+	<a href="#">C1881</a>

**1 Hydrogen 3**

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

$n,\text{el}$	$^3\text{H}$	DA	1USAROC	1.4+07	1.4+07	Jour	<a href="#">PRL,107,122502</a>	11	J.A.Frenje+	<a href="#">14305</a>
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**1 Hydrogen**

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

$^{20}\text{Ne},\text{tcc}$		CS	2JPNIRS	9.3+08	6.5+09	Jour	<a href="#">RM,45,856</a>	10	A.N.Golovchenko+	<a href="#">E2353</a>
$^{20}\text{Ne},x$	Many	CS	2JPNIRS	5.3+09	5.3+09	Jour	<a href="#">RM,45,856</a>	10	A.N.Golovchenko+	<a href="#">E2353</a>
$^{139}\text{La},x$	Many	CS	1USABRK	7.2+10	1.6+11	Jour	<a href="#">PR/C,42,2508</a>	90	J.R.Cummings+	<a href="#">C1874</a>
$^{165}\text{Ho},x$	Many	CS	1USABRK	8.0+10	1.5+11	Jour	<a href="#">PR/C,42,2508</a>	90	J.R.Cummings+	<a href="#">C1874</a>
$^{197}\text{Au},x$	Many	CS	1USABRK	1.1+11	1.8+11	Jour	<a href="#">PR/C,42,2508</a>	90	J.R.Cummings+	<a href="#">C1874</a>
$^{20}\text{Ne},\text{tcc}$		CS	2JPNIRS	5.7+09	5.7+09	Jour	<a href="#">RM,45,856</a>	10	A.N.Golovchenko+	<a href="#">E2353</a>
$^{20}\text{Ne},x$	Many	CS	2JPNIRS	5.7+09	5.7+09	Jour	<a href="#">RM,45,856</a>	10	A.N.Golovchenko+	<a href="#">E2353</a>

**2 Helium 3**

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

$\gamma,p$	$^2\text{H}$	CS	1USADKE	7.0+06	1.6+07	Jour	<a href="#">PL/B,702,121</a>	11	W.Tornow+	<a href="#">L0168</a>
$n,\gamma$	$^4\text{He}$	CS	4ZZZDUB	1.0+03	6.9+04	Jour	ZEP,29,(1),100	Jan 79	V.P.Alfimenkov+	<a href="#">41583</a>
$n,\gamma$	$^4\text{He}$	CS	4ZZZDUB	2.8-02	3.7-01	Jour	YF,31,(1),21	Jan 80	V.P.Alfimenkov+	<a href="#">40656</a>
$n,\gamma$	$^4\text{He}$	DA	4ZZZDUB	1.0+03	6.9+04	Jour	ZEP,29,(1),100	Jan 79	V.P.Alfimenkov+	<a href="#">41583</a>

**2 Helium 4**

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

$\gamma,p$	$^3\text{H}$	CS	1USADKE	2.2+07	3.0+07	Jour	<a href="#">PRL,108,042502</a>	12	R.Raut+	<a href="#">L0167</a>
$^7\text{Li},0$		RP	2JPNIPC			Jour	<a href="#">PR/C,83,(3),034306</a>	Mar 11	H.Yamaguchi+	<a href="#">E2326</a>
$^7\text{Li},\text{el}$	$^4\text{He}$	DA	2JPNIPC	1.4+06	4.4+06	Jour	<a href="#">PR/C,83,(3),034306</a>	Mar 11	H.Yamaguchi+	<a href="#">E2326</a>
$^7\text{Li},\text{inel}$	$^4\text{He}$	DAP	2JPNIPC	1.4+06	4.3+06	Jour	<a href="#">PR/C,83,(3),034306</a>	Mar 11	H.Yamaguchi+	<a href="#">E2326</a>
$^7\text{Li},p$	$^{10}\text{Be}$	DA	2JPNIPC	3.0+06	4.3+06	Jour	<a href="#">PR/C,83,(3),034306</a>	Mar 11	H.Yamaguchi+	<a href="#">E2326</a>

**3 Lithium**

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

$d,x$	$^7\text{Be}$	CS	2JPNTOH	6.8+06	3.9+07	Jour	<a href="#">JNM,417,1267</a>	Oct 11	M.Hagiwara+	<a href="#">E2323</a>
$d,x$	$^7\text{Be}$	TT	2JPNTOH	4.0+07	4.0+07	Jour	<a href="#">JNM,417,1267</a>	Oct 11	M.Hagiwara+	<a href="#">E2323</a>

$d,x+n$	inclusive	DA	2JPNTOH	2.5+07	2.5+07	Jour	<a href="#">JNM,417,1284</a>	Oct 11	M.Hagiwara+	<a href="#">E2322</a>
$d,x+n$	inclusive	DAE	2JPNTOH	2.5+07	2.5+07	Jour	<a href="#">JNM,417,1284</a>	Oct 11	M.Hagiwara+	<a href="#">E2322</a>

**3 Lithium 6**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$d,\alpha$	$^4\text{He}$	DA	2GRCATH	8.9+05	2.0+06	Jour	<a href="#">NIM/B,269,2990</a>	11	V.Foteinou+	<a href="#">O1968</a>

**4 Beryllium 9**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,\text{non}$		CS	1USACLA	2.0+07	4.3+07	Jour	<a href="#">PR/C,12,1093</a>	75	I.Slaus+	<a href="#">C1862</a>
$^{14}\text{N},^6\text{Li}$	$^{17}\text{O}$	DAP	2GERMPH	2.5+07	2.5+07	Jour	<a href="#">NP,70,481</a>	65	R.Bock+	<a href="#">O1932</a>
$^{14}\text{N},^7\text{Li}$	$^{16}\text{O}$	DAP	2GERMPH	2.5+07	2.5+07	Jour	<a href="#">NP,70,481</a>	65	R.Bock+	<a href="#">O1932</a>
$^{14}\text{N},^{10}\text{B}$	$^{13}\text{C}$	DAP	2GERMPH	2.0+07	3.0+07	Jour	<a href="#">NP,70,481</a>	65	R.Bock+	<a href="#">O1932</a>
$^{14}\text{N},^{11}\text{B}$	$^{12}\text{C}$	DAP	2GERMPH	2.5+07	3.0+07	Jour	<a href="#">NP,70,481</a>	65	R.Bock+	<a href="#">O1932</a>
$^{14}\text{N},\text{el}$	$^9\text{Be}$	DA	2GERMPH	2.5+07	2.5+07	Jour	<a href="#">NP,70,481</a>	65	R.Bock+	<a href="#">O1932</a>
$^{43}\text{S},x$	$^{41}\text{Si}$	CS	2FR GAN	1.8+09	1.8+09	Jour	<a href="#">PL/B,703,417</a>	11	D.Sohler+	<a href="#">O1955</a>

**5 Boron 10**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$^3\text{He},^6\text{Li}$	$^7\text{Be}$	DAP	2GERMPH	3.0+07	3.0+07	Jour	<a href="#">NP/A,147,488</a>	70	C.Detraz+	<a href="#">O1926</a>

**5 Boron 11**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,\alpha$	$^8\text{Be}$	CS	2ITYLNS	1.0+04	6.3+05	Jour	<a href="#">JP/G,39,015106</a>	12	L.Lamia+	<a href="#">O1973</a>
$p,\alpha$	$^8\text{Be}$	DA	2ITYLNS	3.0+05	3.0+05	Jour	<a href="#">JP/G,39,015106</a>	12	L.Lamia+	<a href="#">O1973</a>
$^3\text{He},n$	$^{13}\text{N}$	DAP	3AULCBR	1.7+06	1.9+06	Jour	ANP,491,56	79	A.Osman+	<a href="#">F0208</a>

**6 Carbon**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$d,x$	$^7\text{Be}$	TT	2JPNTOH	4.0+07	4.0+07	Jour	<a href="#">JNM,417,1267</a>	Oct 11	M.Hagiwara+	<a href="#">E2323</a>

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\gamma, 2\alpha$	$^4\text{He}$	CS	1USATNL	9.4+06	1.1+07	Jour	<a href="#">JP/CS,267,012046</a>	11	M.Gai	<a href="#">L0165</a>
$n, \alpha$	$^9\text{Be}$	CSP	2ZZZGEL	7.3+06	2.0+07	Rept	AIP-1412,121	11	M.Pillon+	<a href="#">23142</a>
$n, d$	$^{11}\text{B}$	CSP	2ZZZGEL	1.6+07	2.0+07	Rept	AIP-1412,121	11	M.Pillon+	<a href="#">23142</a>
$n, p$	$^{12}\text{B}$	CSP	2ZZZGEL	1.7+07	2.0+07	Rept	AIP-1412,121	11	M.Pillon+	<a href="#">23142</a>
$p, \text{non}$		CS	1USACLA	2.2+07	3.5+07	Jour	<a href="#">PR/C,12,1093</a>	75	I.Slaus+	<a href="#">C1862</a>
$p, x+d$	inclusive	DAE	2JPNOSA	3.0+08	3.9+08	Jour	<a href="#">PR/C,84,064617</a>	Dec 11	Y.Uozumi+	<a href="#">E2365</a>
$d, \text{el}$	$^{12}\text{C}$	DA	2FR SAC	9.4+05	5.0+06	Jour	<a href="#">NP,43,417</a>	63	J.M.F.Jeronymo+	<a href="#">F1044</a>
$d, p$	$^{13}\text{C}$	DAP	3HUNDEB	1.4+06	1.9+06	Jour	<a href="#">NIM/B,190,291</a>	02	Z.Elekes+	<a href="#">D0685</a>
$^3\text{He}, ^7\text{Be}$	$^8\text{Be}$	DAP	2GERMPH	2.8+07	2.8+07	Jour	<a href="#">NP/A,147,488</a>	70	C.Detraz+	<a href="#">O1926</a>
$^6\text{Li}, \text{el}$	$^{12}\text{C}$	DA	2GERMPH	3.4+07	3.6+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
$^6\text{Li}, \text{inel}$	$^{12}\text{C}$	DAP	2GERMPH	3.4+07	3.6+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
$^7\text{Li}, ^6\text{He}$	$^{13}\text{N}$	DAP	2GERMPH	3.6+07	3.6+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
$^7\text{Li}, ^6\text{Li}$	$^{13}\text{C}$	DAP	2GERMPH	3.6+07	3.6+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
$^7\text{Li}, \text{el}$	$^{12}\text{C}$	DA	2GERMPH	3.6+07	3.6+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
$^7\text{Li}, \text{inel}$	$^{12}\text{C}$	DAP	2GERMPH	3.6+07	3.6+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
$^{16}\text{C}, \text{el}$	$^{12}\text{C}$	DA	3CPRIMP	7.6+08	7.6+08	Jour	<a href="#">CPL,26,(8),082501</a>	09	Fanfeng-Ying+	<a href="#">S0059</a>
$^{20}\text{Ne}, \text{abs}$		CS	2JPNIPC	4.8+09	5.2+09	Jour	<a href="#">PL/B,707,(3-4),357</a>	Feb 12	M.Takechi+	<a href="#">E2368</a>
$^{21}\text{Ne}, \text{abs}$		CS	2JPNIPC	5.0+09	5.0+09	Jour	<a href="#">PL/B,707,(3-4),357</a>	Feb 12	M.Takechi+	<a href="#">E2368</a>
$^{22}\text{Ne}, \text{abs}$		CS	2JPNIPC	4.7+09	5.3+09	Jour	<a href="#">PL/B,707,(3-4),357</a>	Feb 12	M.Takechi+	<a href="#">E2368</a>
$^{23}\text{Ne}, \text{abs}$		CS	2JPNIPC	4.5+09	5.5+09	Jour	<a href="#">PL/B,707,(3-4),357</a>	Feb 12	M.Takechi+	<a href="#">E2368</a>
$^{24}\text{Ne}, \text{abs}$		CS	2JPNIPC	4.3+09	5.8+09	Jour	<a href="#">PL/B,707,(3-4),357</a>	Feb 12	M.Takechi+	<a href="#">E2368</a>
$^{25}\text{Ne}, \text{abs}$		CS	2JPNIPC	6.0+09	6.6+09	Jour	<a href="#">PL/B,707,(3-4),357</a>	Feb 12	M.Takechi+	<a href="#">E2368</a>
$^{26}\text{Ne}, \text{abs}$		CS	2JPNIPC	6.2+09	6.3+09	Jour	<a href="#">PL/B,707,(3-4),357</a>	Feb 12	M.Takechi+	<a href="#">E2368</a>
$^{27}\text{Ne}, \text{abs}$		CS	2JPNIPC	6.1+09	7.2+09	Jour	<a href="#">PL/B,707,(3-4),357</a>	Feb 12	M.Takechi+	<a href="#">E2368</a>
$^{28}\text{Ne}, \text{abs}$		CS	2JPNIPC	6.7+09	7.3+09	Jour	<a href="#">PL/B,707,(3-4),357</a>	Feb 12	M.Takechi+	<a href="#">E2368</a>
$^{29}\text{Ne}, \text{abs}$		CS	2JPNIPC	7.0+09	7.1+09	Jour	<a href="#">PL/B,707,(3-4),357</a>	Feb 12	M.Takechi+	<a href="#">E2368</a>
$^{30}\text{Ne}, \text{abs}$		CS	2JPNIPC	6.7+09	7.2+09	Jour	<a href="#">PL/B,707,(3-4),357</a>	Feb 12	M.Takechi+	<a href="#">E2368</a>
$^{31}\text{Ne}, \text{abs}$		CS	2JPNIPC	6.9+09	7.4+09	Jour	<a href="#">PL/B,707,(3-4),357</a>	Feb 12	M.Takechi+	<a href="#">E2368</a>
$^{32}\text{Ne}, \text{abs}$		CS	2JPNIPC	7.3+09	7.7+09	Jour	<a href="#">PL/B,707,(3-4),357</a>	Feb 12	M.Takechi+	<a href="#">E2368</a>
$^{56}\text{Fe}, x$	Many	CS	1USABRK	8.8+10	8.8+10	Jour	<a href="#">PR/C,42,2508</a>	90	J.R.Cummings+	<a href="#">C1874</a>
$^{139}\text{La}, x$	Many	CS	1USABRK	7.2+10	1.6+11	Jour	<a href="#">PR/C,42,2508</a>	90	J.R.Cummings+	<a href="#">C1874</a>
$^{165}\text{Ho}, x$	Many	CS	1USABRK	8.1+10	1.5+11	Jour	<a href="#">PR/C,42,2508</a>	90	J.R.Cummings+	<a href="#">C1874</a>
$^{197}\text{Au}, x$	Many	CS	1USABRK	1.1+11	1.8+11	Jour	<a href="#">PR/C,42,2508</a>	90	J.R.Cummings+	<a href="#">C1874</a>

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n, \alpha$	$^{10}\text{Be}$	CSP	2ITYEFR	7.3+06	1.4+07	Rept	AIP-1412,121	11	M.Pillon+	<a href="#">23142</a>
$^6\text{Li}, ^7\text{Li}$	$^{12}\text{C}$	DAP	2GERMPH	3.4+07	3.4+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
$^6\text{Li}, \text{el}$	$^{13}\text{C}$	DA	2GERMPH	3.4+07	3.4+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
$^6\text{Li}, \text{inel}$	$^{13}\text{C}$	DAP	2GERMPH	3.4+07	3.4+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
$^7\text{Li}, ^6\text{He}$	$^{14}\text{N}$	DAP	2GERMPH	3.4+07	3.4+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
$^7\text{Li}, ^6\text{Li}$	$^{14}\text{C}$	DAP	2GERMPH	3.4+07	3.4+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
$^7\text{Li}, ^8\text{Li}$	$^{12}\text{C}$	DAP	2GERMPH	3.4+07	3.4+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
$^7\text{Li}, \text{el}$	$^{13}\text{C}$	DA	2GERMPH	3.4+07	3.4+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>

**6 Carbon 14**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,0</i>		RP	1USAWIS			Jour	<a href="#">PR,104,1434</a>	56	R.M.Sanders	<a href="#">C1880</a>
<i>p,el</i>	<sup>14</sup> C	DA	3MEXINI	3.7+06	1.1+07	Jour	<a href="#">RMF,57,55</a>	11	G.Murillo+	<a href="#">C1876</a>
<i>p,el</i>	<sup>14</sup> C	DA	1USANOT	3.8+06	6.7+06	Jour	<a href="#">RMF,57,55</a>	11	G.Murillo+	<a href="#">C1876</a>
<i>p,n</i>	<sup>14</sup> N	DA	1USAWIS	6.6+05	3.0+06	Jour	<a href="#">PR,104,1434</a>	56	R.M.Sanders	<a href="#">C1880</a>
<i>p,n</i>	<sup>14</sup> N	?	1USAWIS	1.2+06	2.9+06	Jour	<a href="#">PR,104,1434</a>	56	R.M.Sanders	<a href="#">C1880</a>
<i>α,n</i>	<sup>17</sup> O	DA	1USAWIS	2.3+06	3.0+06	Jour	<a href="#">PR,104,1434</a>	56	R.M.Sanders	<a href="#">C1880</a>
<i>α,n</i>	<sup>17</sup> O	?	1USAWIS	2.6+06	2.6+06	Jour	<a href="#">PR,104,1434</a>	56	R.M.Sanders	<a href="#">C1880</a>

**7 Nitrogen 14**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,α</i>	<sup>11</sup> B	CSP	4RUSFEI	4.0+06	7.0+06	Jour	<a href="#">EPJ/CS,21,03005</a>	12	V.A.Khryachkov+	<a href="#">41575</a>

**7 Nitrogen 15**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,el</i>	<sup>15</sup> N	DA	2UK HAR	1.2+06	1.1+07	Jour	<a href="#">PL,1,269</a>	62	G.Dearnaley+	<a href="#">O1939</a>

**8 Oxygen 14**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>α,p</i>	<sup>17</sup> F	RR	3CPRIMP	Maxwl		Jour	<a href="#">EPJ/A,47,(5),67</a>	May 11	J.J.He+	<a href="#">S0063</a>

**8 Oxygen 16**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,non</i>		CS	1USACLA	2.1+07	4.3+07	Jour	<a href="#">PR/C,12,1093</a>	75	I.Slaus+	<a href="#">C1862</a>
<sup>3</sup> He, <sup>7</sup> Be	<sup>12</sup> C	DAP	2GERMPH	3.0+07	3.0+07	Jour	<a href="#">NP/A,147,488</a>	70	C.Detraz+	<a href="#">O1926</a>
<sup>6</sup> Li, <sup>7</sup> Li	<sup>15</sup> O	DAP	2GERMPH	3.6+07	3.6+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
<sup>6</sup> Li,el	<sup>16</sup> O	DA	2GERMPH	3.6+07	3.6+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
<sup>7</sup> Li, <sup>6</sup> He	<sup>17</sup> F	DAP	2GERMPH	3.6+07	3.6+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
<sup>7</sup> Li, <sup>6</sup> Li	<sup>17</sup> O	DAP	2GERMPH	3.6+07	3.6+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
<sup>7</sup> Li,el	<sup>16</sup> O	DA	2GERMPH	3.6+07	3.6+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>

**9 Fluorine 19**

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

$n,\alpha$	$^{16}\text{N}$	DAP	2JPNJAE	1.4+07	1.4+07	Jour	<a href="#">NST,48,(8),1146</a>	11	K.Kondo+	<a href="#">23147</a>
$n,d$	$^{18}\text{O}$	DAP	2JPNJAE	1.4+07	1.4+07	Jour	<a href="#">NST,48,(8),1146</a>	11	K.Kondo+	<a href="#">23147</a>
$n,p$	$^{19}\text{O}$	DAP	2JPNJAE	1.4+07	1.4+07	Jour	<a href="#">NST,48,(8),1146</a>	11	K.Kondo+	<a href="#">23147</a>
$n,t$	$^{17}\text{O}$	DAP	2JPNJAE	1.4+07	1.4+07	Jour	<a href="#">NST,48,(8),1146</a>	11	K.Kondo+	<a href="#">23147</a>
$n,x+\alpha$	inclusive	CSP	2JPNJAE	1.4+07	1.4+07	Jour	<a href="#">NST,48,(8),1146</a>	11	K.Kondo+	<a href="#">23147</a>
$n,x+\alpha$	inclusive	DAE	2JPNJAE	1.4+07	1.4+07	Jour	<a href="#">NST,48,(8),1146</a>	11	K.Kondo+	<a href="#">23147</a>
$n,x+\alpha$	inclusive	DAP	2JPNJAE	1.4+07	1.4+07	Jour	<a href="#">NST,48,(8),1146</a>	11	K.Kondo+	<a href="#">23147</a>
$n,x+d$	inclusive	CSP	2JPNJAE	1.4+07	1.4+07	Jour	<a href="#">NST,48,(8),1146</a>	11	K.Kondo+	<a href="#">23147</a>
$n,x+d$	inclusive	DAE	2JPNJAE	1.4+07	1.4+07	Jour	<a href="#">NST,48,(8),1146</a>	11	K.Kondo+	<a href="#">23147</a>
$n,x+p$	inclusive	CSP	2JPNJAE	1.4+07	1.4+07	Jour	<a href="#">NST,48,(8),1146</a>	11	K.Kondo+	<a href="#">23147</a>
$n,x+p$	inclusive	DAE	2JPNJAE	1.4+07	1.4+07	Jour	<a href="#">NST,48,(8),1146</a>	11	K.Kondo+	<a href="#">23147</a>
$n,x+p$	inclusive	DAP	2JPNJAE	1.4+07	1.4+07	Jour	<a href="#">NST,48,(8),1146</a>	11	K.Kondo+	<a href="#">23147</a>
$n,x+t$	inclusive	CSP	2JPNJAE	1.4+07	1.4+07	Jour	<a href="#">NST,48,(8),1146</a>	11	K.Kondo+	<a href="#">23147</a>
$n,x+t$	inclusive	DAE	2JPNJAE	1.4+07	1.4+07	Jour	<a href="#">NST,48,(8),1146</a>	11	K.Kondo+	<a href="#">23147</a>
$^3\text{He}, ^6\text{Li}$	$^{16}\text{O}$	DAP	2GERMPH	2.8+07	2.8+07	Jour	<a href="#">NP/A,156,65</a>	70	W.J.Klages+	<a href="#">O1927</a>
$^3\text{He}, ^7\text{Be}$	$^{15}\text{N}$	DAP	2GERMPH	3.0+07	3.0+07	Jour	<a href="#">NP/A,147,488</a>	70	C.Detraz+	<a href="#">O1926</a>

10

Neon

20

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\gamma,n$	$^{19}\text{Ne}$	DAP	1CANOTC	1.8+07	3.1+07	Jour	<a href="#">CJP,53,(8),795</a>	75	J.G.Woodworth+	<a href="#">L0169</a>
$n,\gamma$	$^{21}\text{Ne}$	CS	1USAORL	Maxwl	1.5+05	Jour	<a href="#">AJ,329,943</a>	Jun 88	R.R.Winters+	<a href="#">13139</a>
$^3\text{He}, ^7\text{Be}$	$^{16}\text{O}$	DAP	2GERMPH	3.0+07	3.0+07	Jour	<a href="#">NP/A,147,488</a>	70	C.Detraz+	<a href="#">O1926</a>

10

Neon

22

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\gamma$	$^{23}\text{Ne}$	CS	1USAORL	Maxwl	1.7+05	Jour	<a href="#">AJ,329,943</a>	Jun 88	R.R.Winters+	<a href="#">13139</a>

11

Sodium

23

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\text{inel}$	$^{23}\text{Na}$	?	2ZZZGEL	4.6+05	3.7+06	Jour	<a href="#">NIM/A,672,82</a>	12	C.Rouki+	<a href="#">23137</a>

12

Magnesium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$^7\text{Li},x$	Many	CS	3INDTRM	4.7+07	4.7+07	Jour	<a href="#">PR/C,52,(2),798</a>	95	C.Bhattacharya+	<a href="#">D6149</a>
$^7\text{Li},x$	Many	DAE	3INDTRM	4.7+07	4.7+07	Jour	<a href="#">PR/C,52,(2),798</a>	95	C.Bhattacharya+	<a href="#">D6149</a>

12                                      Magnesium                                      25

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #
				Min	Max					
	$p,\gamma$	RP	2ITYLGS	9.2+04	1.9+05	Jour	<a href="#">PL/B,707,60</a>	12	F.Strieder+	<a href="#">O1976</a>
	$p,\gamma$	?	2ITYLGS	1.9+05	1.9+05	Jour	<a href="#">PL/B,707,60</a>	12	F.Strieder+	<a href="#">O1976</a>

12                                      Magnesium                                      26

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #
				Min	Max					
	${}^6\text{Li}, {}^6\text{He}$	DAP	2GERMPH	3.2+07	3.2+07	Jour	<a href="#">PL/B,48,1</a>	74	H.H.Duhm+	<a href="#">O1943</a>
	${}^6\text{Li}, {}^6\text{He}$	DAP	2GERMPH	3.6+07	3.6+07	Jour	<a href="#">PL/B,38,306</a>	72	H.H.Duhm+	<a href="#">O1941</a>
	${}^6\text{Li}, {}^7\text{Li}$	DAP	2GERMPH	3.6+07	3.6+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
	${}^6\text{Li}, \text{el}$	DA	2GERMPH	3.6+07	3.6+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
	${}^6\text{Li}, \text{inel}$	DAP	2GERMPH	3.6+07	3.6+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>

13                                      Aluminium                                      27

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #	
				Min	Max						
	$p,x+d$	inclusive	DAE	2JPNOSA	3.0+08	3.9+08	Jour	<a href="#">PR/C,84,064617</a>	Dec 11	Y.Uozumi+	<a href="#">E2365</a>
	$d,\alpha$	${}^{25}\text{Mg}$	CSP	2FR SAC	2.0+06	5.0+06	Jour	<a href="#">PL,2,93</a>	62	Y.Cassagnou+	<a href="#">O1934</a>
	$d,\alpha$	${}^{25}\text{Mg}$	CSP	2GERMPH	9.9+06	1.1+07	Jour	<a href="#">PL,6,209</a>	63	Y.Cassagnou+	<a href="#">O1933</a>
	$d,\alpha$	${}^{25}\text{Mg}$	DAP	2GERMPH	1.0+07	1.0+07	Jour	<a href="#">PL,6,209</a>	63	Y.Cassagnou+	<a href="#">O1933</a>
	$d,\alpha$	${}^{25}\text{Mg}$	DAP	2FR SAC	5.0+06	5.0+06	Jour	<a href="#">PL,2,93</a>	62	Y.Cassagnou+	<a href="#">O1934</a>
	$d,x$	${}^7\text{Be}$	TT	2JPNTOH	4.0+07	4.0+07	Jour	<a href="#">JNM,417,1267</a>	Oct 11	M.Hagiwara+	<a href="#">E2323</a>
	$d,x$	${}^{22}\text{Na}$	TT	2JPNTOH	4.0+07	4.0+07	Jour	<a href="#">JNM,417,1267</a>	Oct 11	M.Hagiwara+	<a href="#">E2323</a>
	$d,x$	${}^{24}\text{Na}$	TT	2JPNTOH	4.0+07	4.0+07	Jour	<a href="#">JNM,417,1267</a>	Oct 11	M.Hagiwara+	<a href="#">E2323</a>
	${}^{56}\text{Fe}, x$	Many	CS	1USABRK	8.8+10	8.8+10	Jour	<a href="#">PR/C,42,2508</a>	90	J.R.Cummings+	<a href="#">C1874</a>
	${}^{139}\text{La}, x$	Many	CS	1USABRK	7.2+10	1.6+11	Jour	<a href="#">PR/C,42,2508</a>	90	J.R.Cummings+	<a href="#">C1874</a>
	${}^{165}\text{Ho}, x$	Many	CS	1USABRK	8.1+10	1.3+11	Jour	<a href="#">PR/C,42,2508</a>	90	J.R.Cummings+	<a href="#">C1874</a>
	${}^{197}\text{Au}, x$	Many	CS	1USABRK	1.1+11	1.8+11	Jour	<a href="#">PR/C,42,2508</a>	90	J.R.Cummings+	<a href="#">C1874</a>

14                                      Silicon                                      28

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #	
				Min	Max						
	$p,\text{non}$		CS	1USACLA	2.1+07	3.8+07	Jour	<a href="#">PR/C,12,1093</a>	75	I.Slaus+	<a href="#">C1862</a>

14                                      Silicon                                      28

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #	
				Min	Max						
	${}^3\text{He}, {}^7\text{Be}$	${}^{24}\text{Mg}$	DAP	2GERMPH	3.0+07	3.0+07	Jour	<a href="#">NP/A,147,488</a>	70	C.Detraz+	<a href="#">O1926</a>
	${}^3\text{He}, \alpha$	${}^{27}\text{Si}$	DAP	2GERMUU	2.5+07	2.5+07	Jour	<a href="#">PR/C,84,065808</a>	11	A.Parikh+	<a href="#">O1967</a>
	${}^3\text{He}, p$	${}^{30}\text{P}$	DAP	2GERMPH	1.6+07	2.8+07	Jour	<a href="#">NP/A,227,450</a>	74	H.Hafner+	<a href="#">O1930</a>
	${}^7\text{Li}, {}^6\text{He}$	${}^{29}\text{P}$	DAP	2GERMPH	3.6+07	3.6+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>



<sup>7</sup> Li, <sup>6</sup> Li	<sup>29</sup> Si	DAP	2GERMPH	3.6+07	3.6+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>
<sup>7</sup> Li,eI	<sup>28</sup> Si	DA	2GERMPH	3.6+07	3.6+07	Jour	<a href="#">NP/A,212,573</a>	73	P.Schumacher+	<a href="#">O1929</a>

**18 Argon 36**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>d,α</i>	<sup>34</sup> Cl	CS	1USAWIS	3.0+06	7.9+06	Jour	<a href="#">ARI,70,355</a>	12	J.W.Engle+	<a href="#">C1885</a>

**18 Argon 40**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,γ</i>	<sup>41</sup> Ar	CS	1USAORL	Maxwl	1.8+04	Jour	AAA,216,109	89	R.L.Macklin+	<a href="#">13140</a>
<i>d,α</i>	<sup>38</sup> Cl	CS	1USAWIS	3.2+06	7.9+06	Jour	<a href="#">ARI,70,355</a>	12	J.W.Engle+	<a href="#">C1885</a>
<i>d,p</i>	<sup>41</sup> Ar	CS	1USAWIS	3.2+06	7.9+06	Jour	<a href="#">ARI,70,355</a>	12	J.W.Engle+	<a href="#">C1885</a>

**20 Calcium 40**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<sup>3</sup> He, <sup>7</sup> Be	<sup>36</sup> Ar	DAP	2GERMPH	3.0+07	3.0+07	Jour	<a href="#">NP/A,147,488</a>	70	C.Detraz+	<a href="#">O1926</a>
<sup>3</sup> He,α	<sup>39</sup> Ca	DAP	2GERMPH	1.8+07	1.8+07	Jour	<a href="#">PL,18,61</a>	65	R.Bock+	<a href="#">O1942</a>
<sup>3</sup> He,d	<sup>41</sup> Sc	DAP	2GERMPH	1.8+07	1.8+07	Jour	<a href="#">PL,18,61</a>	65	R.Bock+	<a href="#">O1942</a>

**20 Calcium 41**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,0</i>		RP	2ZZZGEL			Jour	<a href="#">PR/C,85,015803</a>	12	S.Vermote+	<a href="#">23124</a>

**21 Scandium 45**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,eI</i>	<sup>45</sup> Sc	DA	2GRCATH	3.4+06	5.5+06	Jour	<a href="#">NIM/B,269,2994</a>	11	G.Provatas+	<a href="#">O1969</a>
<i>d,2n</i>	<sup>45</sup> Ti	CS	2BLGVUB	4.7+06	2.0+07	Jour	<a href="#">NIM/B,270,106</a>	12	A.Hermanne+	<a href="#">D4257</a>
<i>d,3n</i>	<sup>44</sup> Ti	CS	2BLGVUB	2.1+07	5.0+07	Jour	<a href="#">NIM/B,270,106</a>	12	A.Hermanne+	<a href="#">D4257</a>
<i>d,p</i>	<sup>46</sup> Sc	CS	2BLGVUB	1.3+06	5.0+07	Jour	<a href="#">NIM/B,270,106</a>	12	A.Hermanne+	<a href="#">D4257</a>
<i>d,x</i>	<sup>43</sup> Sc	CS	2BLGVUB	3.1+07	5.0+07	Jour	<a href="#">NIM/B,270,106</a>	12	A.Hermanne+	<a href="#">D4257</a>
<i>d,x</i>	<sup>44</sup> Sc	CS	2BLGVUB	9.9+06	5.0+07	Jour	<a href="#">NIM/B,270,106</a>	12	A.Hermanne+	<a href="#">D4257</a>

22 Titanium 48

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$^3\text{He},d$	$^{49}\text{V}$	DAP	2GERMPH	1.8+07	1.8+07	Jour	<a href="#">NP/A,106,577</a>		68	D.Bachner+	<a href="#">O1944</a>

23 Vanadium 51

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$p,x+d$	inclusive	DAE	2JPNOSA	3.9+08	3.9+08	Jour	<a href="#">PR/C,84,064617</a>		Dec 11	Y.Uozumi+	<a href="#">E2365</a>

24 Chromium 50

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$t,\alpha$	$^{49}\text{V}$	DAP	2UK ALD	1.3+07	1.3+07	Jour	<a href="#">NP/A,106,577</a>		68	D.Bachner+	<a href="#">O1944</a>

24 Chromium 52

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$d,p$	$^{53}\text{Cr}$	DAP	2GERMPH	1.0+07	1.0+07	Jour	<a href="#">NP,72,273</a>		65	R.Bock+	<a href="#">O1931</a>
$d,p$	$^{53}\text{Cr}$	DAP	2GERMPH	1.0+07	1.0+07	Jour	<a href="#">PL,13,151</a>		64	R.Bock+	<a href="#">O1936</a>

24 Chromium 54

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$d,p$	$^{55}\text{Cr}$	DAP	2GERMPH	1.0+07	1.0+07	Jour	<a href="#">NP,72,273</a>		65	R.Bock+	<a href="#">O1931</a>

26 Iron

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
0,0		NQ	4RUSFEI	Spont		Rept	YFI-6,16		68	O.A.Sal'Nikov+	<a href="#">40744</a>
$n,x+\alpha$	inclusive	DAE	2SWDUPP	1.8+08	1.8+08	Thes	BEVILACQUA		May 11	R.Bevilacqua+	<a href="#">23129</a>
$n,x+d$	inclusive	DAE	2SWDUPP	1.8+08	1.8+08	Thes	BEVILACQUA		May 11	R.Bevilacqua+	<a href="#">23129</a>
$n,x+^3\text{He}$	inclusive	DAE	2SWDUPP	1.8+08	1.8+08	Thes	BEVILACQUA		May 11	R.Bevilacqua+	<a href="#">23129</a>
$n,x+p$	inclusive	DAE	2SWDUPP	1.8+08	1.8+08	Thes	BEVILACQUA		May 11	R.Bevilacqua+	<a href="#">23129</a>
$n,x+t$	inclusive	DAE	2SWDUPP	1.8+08	1.8+08	Thes	BEVILACQUA		May 11	R.Bevilacqua+	<a href="#">23129</a>

28

Nickel

58

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$^8\text{B, fus}$		CS	1USANOT	1.5+07	2.6+07	Jour	<a href="#">PRL,107,092701</a>	11	E.F.Aguilera+	<a href="#">C1884</a>
$^{132}\text{Sn, fis}$		CS	1USAORL	1.6+08	2.0+08	Jour	<a href="#">PRL,107,202701</a>	11	Z.Kohley+	<a href="#">C1879</a>
$^{132}\text{Sn, fus}$		CS	1USAORL	1.5+08	2.0+08	Jour	<a href="#">PRL,107,202701</a>	11	Z.Kohley+	<a href="#">C1879</a>

29

Copper

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
0,0		NQ	4RUSFEI	Spont		Rept	<a href="#">YFI-6,16</a>	68	O.A.Sal'Nikov+	<a href="#">40744</a>
$p, x$	Many	CS	1USABRK	2.8+10	2.8+10	Jour	<a href="#">PR/C,14,1554</a>	76	J.B.Cumming+	<a href="#">C1875</a>
$^{12}\text{C, x}$	Many	CS	1USABRK	2.5+10	2.5+10	Jour	<a href="#">PR/C,14,1554</a>	76	J.B.Cumming+	<a href="#">C1875</a>
$^{56}\text{Fe, x}$	Many	CS	1USABRK	8.8+10	8.8+10	Jour	<a href="#">PR/C,42,2508</a>	90	J.R.Cummings+	<a href="#">C1874</a>
$^{139}\text{La, x}$	Many	CS	1USABRK	7.2+10	1.6+11	Jour	<a href="#">PR/C,42,2508</a>	90	J.R.Cummings+	<a href="#">C1874</a>
$^{165}\text{Ho, x}$	Many	CS	1USABRK	1.3+11	1.3+11	Jour	<a href="#">PR/C,42,2508</a>	90	J.R.Cummings+	<a href="#">C1874</a>
$^{197}\text{Au, x}$	Many	CS	1USABRK	1.1+11	1.8+11	Jour	<a href="#">PR/C,42,2508</a>	90	J.R.Cummings+	<a href="#">C1874</a>

30

Zinc

64

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$^3\text{He, } \alpha$	$^{63}\text{Zn}$	DAP	2GERMPH	1.8+07	1.8+07	Jour	<a href="#">NP/A,100,416</a>	67	M.G.Betigeri+	<a href="#">O1925</a>
$^3\text{He, } d$	$^{65}\text{Ga}$	DAP	2GERMPH	1.8+07	1.8+07	Jour	<a href="#">NP/A,100,416</a>	67	M.G.Betigeri+	<a href="#">O1925</a>
$^3\text{He, el}$	$^{64}\text{Zn}$	DA	2GERMPH	2.0+07	2.0+07	Jour	<a href="#">NP/A,100,416</a>	67	M.G.Betigeri+	<a href="#">O1925</a>
$\alpha, \text{fus}$		CS	3CROBZ	7.4+06	1.6+07	Jour	<a href="#">PR/C,84,064604</a>	11	V.Scuderi+	<a href="#">O1970</a>
$^6\text{He, fus}$		CS	2BLGLVN	1.3+07	1.6+07	Jour	<a href="#">PR/C,84,064604</a>	11	V.Scuderi+	<a href="#">O1970</a>
$^6\text{He, x}$	$^{64}\text{Cu}$	CS	2BLGLVN	1.6+07	1.6+07	Jour	<a href="#">PR/C,84,064604</a>	11	V.Scuderi+	<a href="#">O1970</a>
$^6\text{He, x}$	$^{65}\text{Zn}$	CS	2BLGLVN	7.5+06	1.6+07	Jour	<a href="#">PR/C,84,064604</a>	11	V.Scuderi+	<a href="#">O1970</a>
$^6\text{He, x}$	$^{67}\text{Ga}$	CS	2BLGLVN	9.1+06	1.6+07	Jour	<a href="#">PR/C,84,064604</a>	11	V.Scuderi+	<a href="#">O1970</a>
$^6\text{He, x}$	$^{68}\text{Ga}$	CS	2BLGLVN	1.1+07	1.6+07	Jour	<a href="#">PR/C,84,064604</a>	11	V.Scuderi+	<a href="#">O1970</a>
$^6\text{He, x}$	$^{68}\text{Ge}$	CS	2BLGLVN	7.5+06	1.6+07	Jour	<a href="#">PR/C,84,064604</a>	11	V.Scuderi+	<a href="#">O1970</a>
$^6\text{He, x} + \alpha$	inclusive	CS	2ITYCAT	1.3+07	1.8+07	Jour	<a href="#">PR/C,84,064604</a>	11	V.Scuderi+	<a href="#">O1970</a>
$^6\text{He, x} + \alpha$	inclusive	DA	2BLGLVN	1.5+07	1.8+07	Jour	<a href="#">PR/C,84,064604</a>	11	V.Scuderi+	<a href="#">O1970</a>
$^6\text{He, x} + p$	inclusive	DA	2BLGLVN	1.0+07	1.3+07	Jour	<a href="#">PR/C,84,064604</a>	11	V.Scuderi+	<a href="#">O1970</a>

40

Zirconium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p, x$	$^{88}\text{Y}$	CS	3HUNDEB	1.1+07	1.7+07	Jour	<a href="#">ARI,70,257</a>	12	M.Al-Abyad+	<a href="#">D4258</a>
$p, x$	$^{90}\text{Nb}$	CS	3HUNDEB	7.5+06	1.7+07	Jour	<a href="#">ARI,70,257</a>	12	M.Al-Abyad+	<a href="#">D4258</a>
$p, x$	$^{92}\text{Nb}$	CS	3HUNDEB	4.5+06	1.7+07	Jour	<a href="#">ARI,70,257</a>	12	M.Al-Abyad+	<a href="#">D4258</a>
$p, x$	$^{95}\text{Nb}$	CS	3HUNDEB	8.7+06	1.7+07	Jour	<a href="#">ARI,70,257</a>	12	M.Al-Abyad+	<a href="#">D4258</a>
$p, x$	$^{96}\text{Nb}$	CS	3HUNDEB	4.5+06	1.7+07	Jour	<a href="#">ARI,70,257</a>	12	M.Al-Abyad+	<a href="#">D4258</a>

40 Zirconium 94

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\gamma$		RP	2ZZZCER			Jour	<a href="#">PR/C,77,035802</a>	Mar 08	G.Tagliente+	<a href="#">22978</a>
$n,\gamma$	$^{95}\text{Zr}$	CS	2ZZZCER	Maxwl		Jour	<a href="#">PR/C,77,035802</a>	Mar 08	G.Tagliente+	<a href="#">22978</a>

40 Zirconium 96

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,0$		RP	2ZZZCER			Jour	<a href="#">PR/C,77,035802</a>	Mar 08	G.Tagliente+	<a href="#">22978</a>
$n,\gamma$	$^{97}\text{Zr}$	CS	2ZZZCER	Maxwl		Jour	<a href="#">PR/C,77,035802</a>	Mar 08	G.Tagliente+	<a href="#">22978</a>

41 Niobium 93

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$0,0$		NQ	4RUSFEI	Spont		Rept	YFI-6,16	68	O.A.Sal'Nikov+	<a href="#">40744</a>
$n,2n+\alpha$	$^{88}\text{Y}$	CS	3CZRUJF	2.5+07	3.6+07	Jour	<a href="#">KPS,59,1374</a>	11	M.Honusek+	<a href="#">31691</a>
$n,4n$	$^{90}\text{Nb}$	CS	3CZRUJF	3.0+07	3.6+07	Jour	<a href="#">KPS,59,1374</a>	11	M.Honusek+	<a href="#">31691</a>
$n,^3\text{He}$	$^{91}\text{Y}$	CS	3CZRUJF	2.5+07	3.6+07	Jour	<a href="#">KPS,59,1374</a>	11	M.Honusek+	<a href="#">31691</a>
$p,x+d$	inclusive	DAE	2JPNOSA	3.0+08	3.9+08	Jour	<a href="#">PR/C,84,064617</a>	Dec 11	Y.Uozumi+	<a href="#">E2365</a>

42 Molybdenum 95

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\gamma$	$^{96}\text{Mo}$	CS	1USAORL	Maxwl		Jour	<a href="#">NP/A,270,108</a>	Oct 76	A.R.Del.Musgrove+	<a href="#">30357</a>

42 Molybdenum 96

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\gamma$	$^{97}\text{Mo}$	CS	1USAORL	Maxwl		Jour	<a href="#">NP/A,270,108</a>	Oct 76	A.R.Del.Musgrove+	<a href="#">30357</a>

42 Molybdenum 97

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\gamma$	$^{98}\text{Mo}$	CS	1USAORL	Maxwl		Jour	<a href="#">NP/A,270,108</a>	Oct 76	A.R.Del.Musgrove+	<a href="#">30357</a>

42 Molybdenum 98

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$n,\gamma$	<sup>99</sup> Mo	CS	1USAORL	Maxwl		Jour	<a href="#">NP/A,270,108</a>		Oct 76	A.R.Del.Musgrove+	<a href="#">30357</a>

42 Molybdenum 100

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
<sup>60</sup> Ni,fus		CS	1USAANL	1.2+08	1.6+08	Jour	<a href="#">EPJ/CS,17,05002</a>		11	F.Scarlassara+	<a href="#">C1883</a>

43 Technetium 99

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$n,\gamma$	<sup>100</sup> Tc	CS	1USAORL	Maxwl		Jour	NSE,81,520		Aug 82	R.L.Macklin+	<a href="#">12753</a>
$n,\gamma$	<sup>100</sup> Tc	?	1USAORL	Maxwl		Jour	<a href="#">NP/A,270,108</a>		Oct 76	A.R.Del.Musgrove+	<a href="#">30357</a>

46 Palladium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$d,x$	<sup>99</sup> Rh	CS	2BLGVUB	5.8+06	3.8+07	Jour	<a href="#">NIM/B,270,61</a>		12	F.Ditroi+	<a href="#">D4256</a>
$d,x$	<sup>100</sup> Rh	CS	2BLGVUB	6.4+06	3.8+07	Jour	<a href="#">NIM/B,270,61</a>		12	F.Ditroi+	<a href="#">D4256</a>
$d,x$	<sup>101</sup> Rh	CS	2BLGVUB	3.3+06	3.8+07	Jour	<a href="#">NIM/B,270,61</a>		12	F.Ditroi+	<a href="#">D4256</a>
$d,x$	<sup>102</sup> Rh	CS	2BLGVUB	3.3+06	3.8+07	Jour	<a href="#">NIM/B,270,61</a>		12	F.Ditroi+	<a href="#">D4256</a>
$d,x$	<sup>105</sup> Rh	CS	2BLGVUB	5.8+06	3.8+07	Jour	<a href="#">NIM/B,270,61</a>		12	F.Ditroi+	<a href="#">D4256</a>
$d,x$	<sup>100</sup> Pd	CS	2BLGVUB	3.3+06	3.8+07	Jour	<a href="#">NIM/B,270,61</a>		12	F.Ditroi+	<a href="#">D4256</a>
$d,x$	<sup>101</sup> Pd	CS	2BLGVUB	1.3+07	3.8+07	Jour	<a href="#">NIM/B,270,61</a>		12	F.Ditroi+	<a href="#">D4256</a>
$d,x$	<sup>109</sup> Pd	CS	2BLGVUB	3.3+06	3.8+07	Jour	<a href="#">NIM/B,270,61</a>		12	F.Ditroi+	<a href="#">D4256</a>
$d,x$	<sup>111</sup> Pd	CS	2BLGVUB	3.3+06	3.8+07	Jour	<a href="#">NIM/B,270,61</a>		12	F.Ditroi+	<a href="#">D4256</a>
$d,x$	<sup>105</sup> Ag	CS	2BLGVUB	3.3+06	3.8+07	Jour	<a href="#">NIM/B,270,61</a>		12	F.Ditroi+	<a href="#">D4256</a>
$d,x$	<sup>106</sup> Ag	CS	2BLGVUB	3.3+06	3.8+07	Jour	<a href="#">NIM/B,270,61</a>		12	F.Ditroi+	<a href="#">D4256</a>
$d,x$	<sup>110</sup> Ag	CS	2BLGVUB	6.4+06	3.8+07	Jour	<a href="#">NIM/B,270,61</a>		12	F.Ditroi+	<a href="#">D4256</a>
$d,x$	<sup>111</sup> Ag	CS	2BLGVUB	6.4+06	3.8+07	Jour	<a href="#">NIM/B,270,61</a>		12	F.Ditroi+	<a href="#">D4256</a>

68 Erbium 166

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$\alpha,n$	<sup>169</sup> Yb	CS	1USANOT	1.1+07	1.5+07	Jour	<a href="#">JP/CS,312,042007</a>		11	K.Sonnabend+	<a href="#">C1887</a>

**68 Erbium 171**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\gamma$	$^{172}\text{Er}$	CS	2JPNJAE	2.5-02	2.5-02	Jour	<a href="#">JPJ,31,1304</a>	71	K.Miyano	<a href="#">20345</a>

**69 Thulium 169**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,3n$	$^{167}\text{Yb}$	CS	2GERJUL	2.4+07	3.6+07	Jour	<a href="#">ARI,70,309</a>	12	F.Tarkanyi+	<a href="#">D4259</a>
$p,4n$	$^{166}\text{Yb}$	CS	2GERJUL	2.8+07	3.6+07	Jour	<a href="#">ARI,70,309</a>	12	F.Tarkanyi+	<a href="#">D4259</a>
$p,n$	$^{169}\text{Yb}$	CS	2GERJUL	2.4+07	3.6+07	Jour	<a href="#">ARI,70,309</a>	12	F.Tarkanyi+	<a href="#">D4259</a>
$p,n$	$^{169}\text{Yb}$	CS	1USANOT	3.3+06	7.0+06	Jour	<a href="#">JP/CS,312,042007</a>	11	K.Sonnabend+	<a href="#">C1887</a>
$p,x$	$^{166}\text{Tm}$	CS	2GERJUL	3.0+07	3.6+07	Jour	<a href="#">ARI,70,309</a>	12	F.Tarkanyi+	<a href="#">D4259</a>
$p,x$	$^{167}\text{Tm}$	CS	2GERJUL	2.2+07	4.5+07	Jour	<a href="#">ARI,70,309</a>	12	F.Tarkanyi+	<a href="#">D4259</a>
$p,x$	$^{168}\text{Tm}$	CS	2GERJUL	2.4+07	3.6+07	Jour	<a href="#">ARI,70,309</a>	12	F.Tarkanyi+	<a href="#">D4259</a>

**69 Thulium 171**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\gamma$	$^{172}\text{Tm}$	CS	2JPNJAE	2.5-02	2.5-02	Jour	<a href="#">JPJ,31,1304</a>	71	K.Miyano	<a href="#">20345</a>

**70 Ytterbium 170**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,el$	$^{170}\text{Yb}$	DA	2FR SAC	1.0+07	1.2+07	Jour	<a href="#">NP/A,178,640</a>	72	P.Foissel+	<a href="#">O1928</a>
$p,inel$	$^{170}\text{Yb}$	DAP	2FR SAC	1.1+07	1.5+07	Jour	<a href="#">NP/A,178,640</a>	72	P.Foissel+	<a href="#">O1928</a>

**70 Ytterbium 172**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,inel$	$^{172}\text{Yb}$	DAP	2FR SAC	1.1+07	1.5+07	Jour	<a href="#">NP/A,178,640</a>	72	P.Foissel+	<a href="#">O1928</a>

**70 Ytterbium 174**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,el$	$^{174}\text{Yb}$	DA	2FR SAC	1.1+07	1.5+07	Jour	<a href="#">NP/A,178,640</a>	72	P.Foissel+	<a href="#">O1928</a>
$p,inel$	$^{174}\text{Yb}$	DAP	2FR SAC	1.1+07	1.5+07	Jour	<a href="#">NP/A,178,640</a>	72	P.Foissel+	<a href="#">O1928</a>

70 Ytterbium 176

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
<i>p</i> ,el	<sup>176</sup> Yb	DA	2GERMPH	1.1+07	1.6+07	Jour	<a href="#">NP/A,178,640</a>		72	P.Foissel+	<a href="#">O1928</a>
<i>p</i> ,inel	<sup>176</sup> Yb	DAP	2GERMPH	1.1+07	1.6+07	Jour	<a href="#">NP/A,178,640</a>		72	P.Foissel+	<a href="#">O1928</a>

71 Lutetium 177

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
<i>n</i> ,0		RP	2FR SAC			Jour	<a href="#">PR/C,83,064617</a>		11	O.Roig+	<a href="#">23146</a>
<i>n</i> ,inel	<sup>177</sup> Lu	CS	2FR SAC	Maxwl	4.5-03	Jour	<a href="#">PR/C,83,064617</a>		11	O.Roig+	<a href="#">23146</a>

75 Rhenium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
<i>n</i> ,tot		CS	1USABNL	1.0+00	1.3+01	Jour	<a href="#">PR,100,(5),1338</a>		55	G.Igo	<a href="#">13679</a>

75 Rhenium 185

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
<i>n</i> ,0		RP	1USABNL			Jour	<a href="#">PR,100,(5),1338</a>		55	G.Igo	<a href="#">13679</a>
<i>n</i> ,tot		CS	1USABNL	1.8+00	2.5+00	Jour	<a href="#">PR,100,(5),1338</a>		55	G.Igo	<a href="#">13679</a>

75 Rhenium 187

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
<i>n</i> ,0		RP	1USABNL			Jour	<a href="#">PR,100,(5),1338</a>		55	G.Igo	<a href="#">13679</a>

78 Platinum 192

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
<i>n</i> , $\gamma$	<sup>193</sup> Pt	CS	1USAORL	2.7+03	3.8+05	Rept	AIP-1005,119		08	P.E.Koehler+	<a href="#">14321</a>

78 Platinum 194

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
<i>n</i> , $\gamma$	<sup>195</sup> Pt	CS	1USAORL	2.7+03	3.8+05	Rept	AIP-1005,119		08	P.E.Koehler+	<a href="#">14321</a>

78

Platinum

195

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$n,\gamma$	<sup>196</sup> Pt	CS	1USAORL	2.7+03	3.8+05	Rept	AIP-1005,119		08	P.E.Koehler+	<a href="#">14321</a>

78

Platinum

196

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$n,\gamma$	<sup>197</sup> Pt	CS	1USAORL	2.7+03	3.8+05	Rept	AIP-1005,119		08	P.E.Koehler+	<a href="#">14321</a>

79

Gold

197

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$n,0$		RP	2ZZZGEL			Jour	NC/B,125,517		10	C.Massimi+	<a href="#">23132</a>
$p,x+d$	inclusive	DAE	2JPNOSA	3.0+08	3.9+08	Jour	<a href="#">PR/C,84,064617</a>		Dec 11	Y.Uozumi+	<a href="#">E2365</a>
<sup>16</sup> O,fis		?	3INDNSD	9.0+07	9.0+07	Jour	<a href="#">PR/C,83,024605</a>		11	K.Banerjee+	<a href="#">D6136</a>
<sup>17</sup> F,el	<sup>197</sup> Au	DA	2ITYPAD	7.2+07	7.2+07	Jour	<a href="#">PR/C,85,024609</a>		12	N.Patronis+	<a href="#">O1978</a>
<sup>26</sup> Ne,inel	<sup>197</sup> Au	CSP	1USAMSU	1.1+09	1.1+09	Thes	PRITYCHENKO		00	B.V.Pritychenko+	<a href="#">C1894</a>
<sup>28</sup> Ne,inel	<sup>197</sup> Au	CSP	1USAMSU	1.5+09	1.5+09	Thes	PRITYCHENKO		00	B.V.Pritychenko+	<a href="#">C1894</a>
<sup>28</sup> Na,inel	<sup>197</sup> Au	CSP	1USAMSU	1.2+09	1.2+09	Thes	PRITYCHENKO		00	B.V.Pritychenko+	<a href="#">C1894</a>
<sup>29</sup> Na,inel	<sup>197</sup> Au	CSP	1USAMSU	1.7+09	1.7+09	Thes	PRITYCHENKO		00	B.V.Pritychenko+	<a href="#">C1894</a>
<sup>30</sup> Na,inel	<sup>197</sup> Au	CSP	1USAMSU	1.7+09	1.7+09	Thes	PRITYCHENKO		00	B.V.Pritychenko+	<a href="#">C1894</a>
<sup>31</sup> Na,inel	<sup>197</sup> Au	CSP	1USAMSU	1.6+09	1.6+09	Thes	PRITYCHENKO		00	B.V.Pritychenko+	<a href="#">C1894</a>
<sup>30</sup> Mg,inel	<sup>197</sup> Au	CSP	1USAMSU	1.1+09	1.1+09	Thes	PRITYCHENKO		00	B.V.Pritychenko+	<a href="#">C1894</a>
<sup>31</sup> Mg,inel	<sup>197</sup> Au	CSP	1USAMSU	1.9+09	1.9+09	Thes	PRITYCHENKO		00	B.V.Pritychenko+	<a href="#">C1894</a>
<sup>32</sup> Mg,inel	<sup>197</sup> Au	CSP	1USAMSU	1.8+09	1.8+09	Thes	PRITYCHENKO		00	B.V.Pritychenko+	<a href="#">C1894</a>
<sup>33</sup> Mg,inel	<sup>197</sup> Au	CSP	1USAMSU	1.8+09	1.8+09	Thes	PRITYCHENKO		00	B.V.Pritychenko+	<a href="#">C1894</a>
<sup>34</sup> Mg,inel	<sup>197</sup> Au	CSP	1USAMSU	1.7+09	1.7+09	Thes	PRITYCHENKO		00	B.V.Pritychenko+	<a href="#">C1894</a>
<sup>34</sup> Al,inel	<sup>197</sup> Au	CSP	1USAMSU	2.0+09	2.0+09	Thes	PRITYCHENKO		00	B.V.Pritychenko+	<a href="#">C1894</a>
<sup>35</sup> Al,inel	<sup>197</sup> Au	CSP	1USAMSU	2.0+09	2.0+09	Thes	PRITYCHENKO		00	B.V.Pritychenko+	<a href="#">C1894</a>
<sup>33</sup> Si,inel	<sup>197</sup> Au	CSP	1USAMSU	1.3+09	1.3+09	Thes	PRITYCHENKO		00	B.V.Pritychenko+	<a href="#">C1894</a>
<sup>34</sup> P,inel	<sup>197</sup> Au	CSP	1USAMSU	1.5+09	1.5+09	Thes	PRITYCHENKO		00	B.V.Pritychenko+	<a href="#">C1894</a>
<sup>38</sup> S,inel	<sup>197</sup> Au	CSP	1USAMSU	1.5+09	1.5+09	Jour	<a href="#">PRL,77,3967</a>		96	H.Scheit+	<a href="#">C1895</a>
<sup>40</sup> S,inel	<sup>197</sup> Au	CSP	1USAMSU	1.6+09	1.6+09	Jour	<a href="#">PRL,77,3967</a>		96	H.Scheit+	<a href="#">C1895</a>
<sup>42</sup> S,inel	<sup>197</sup> Au	CSP	1USAMSU	1.7+09	1.7+09	Jour	<a href="#">PRL,77,3967</a>		96	H.Scheit+	<a href="#">C1895</a>
<sup>44</sup> Ar,inel	<sup>197</sup> Au	CSP	1USAMSU	1.5+09	1.5+09	Jour	<a href="#">PRL,77,3967</a>		96	H.Scheit+	<a href="#">C1895</a>
<sup>46</sup> Ar,inel	<sup>197</sup> Au	CSP	1USAMSU	1.6+09	1.6+09	Jour	<a href="#">PRL,77,3967</a>		96	H.Scheit+	<a href="#">C1895</a>

82

Lead

207

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
<sup>58</sup> Fe,n	<sup>264</sup> Hs	CS	2JPNIPC	2.9+08	2.9+08	Jour	<a href="#">JPI,80,094201</a>		Sep 11	N.Sato+	<a href="#">E2360</a>



**82                                  Lead                                  208**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,γ</i>	<sup>209</sup> Pb	CS	1USAORL	Maxwl	4.8+04	Jour	<a href="#">AJ,217,222</a>	Oct 77	R.L.Macklin+	10693
<i>p,inel</i>	<sup>208</sup> Pb	POD	2JPNOSA	3.0+08	3.0+08	Jour	<a href="#">PRL,107,062502</a>	Aug 11	A.Tamii+	E2355
<i>t,α</i>	<sup>207</sup> Tl	DAP	2UK ALD	1.2+07	1.4+07	Jour	<a href="#">PL,17,302</a>	65	S.Hinds+	O1935
<sup>9</sup> Be, <i>el</i>	<sup>208</sup> Pb	DA	3CPRAEP	3.7+07	5.0+07	Jour	<a href="#">JP/G,37,(7),075108</a>	10	Ningyu+	S0066
<sup>56</sup> Fe, <i>x</i>	Many	CS	1USABRK	8.8+10	8.8+10	Jour	<a href="#">PR/C,42,2508</a>	90	J.R.Cummings+	C1874
<sup>58</sup> Fe, <i>2n</i>	<sup>264</sup> Hs	CS	2JPNIPC	2.9+08	2.9+08	Jour	<a href="#">JPJ,80,094201</a>	Sep 11	N.Sato+	E2360
<sup>58</sup> Fe, <i>n</i>	<sup>265</sup> Hs	CS	2JPNIPC	2.8+08	2.9+08	Jour	<a href="#">JPJ,80,094201</a>	Sep 11	N.Sato+	E2360

**83                                  Bismuth                                  209**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,x+α</i>	inclusive	DAE	2SWDUPP	1.8+08	1.8+08	Thes	BEVILACQUA	May 11	R.Bevillacqua+	23129
<i>n,x+d</i>	inclusive	DAE	2SWDUPP	1.8+08	1.8+08	Thes	BEVILACQUA	May 11	R.Bevillacqua+	23129
<i>n,x+<sup>3</sup>He</i>	inclusive	DAE	2SWDUPP	1.8+08	1.8+08	Thes	BEVILACQUA	May 11	R.Bevillacqua+	23129
<i>n,x+p</i>	inclusive	DAE	2SWDUPP	1.8+08	1.8+08	Thes	BEVILACQUA	May 11	R.Bevillacqua+	23129
<i>n,x+t</i>	inclusive	DAE	2SWDUPP	1.8+08	1.8+08	Thes	BEVILACQUA	May 11	R.Bevillacqua+	23129
<sup>9</sup> Be, <i>el</i>	<sup>209</sup> Bi	DA	3CPRAEP	3.7+07	4.4+07	Jour	<a href="#">JP/G,37,(7),075108</a>	10	Ningyu+	S0066

**90                                  Thorium                                  229**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,fis</i>	<i>n</i>	?	4RUSNIR	2.5-02	2.5-02	Jour	AE,29,(2),95	Aug 70	N.I.Kroshkin+	40064

**90                                  Thorium                                  232**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
0,0		NQ	4RUSFEI	Spont		Rept	YFI-6,16	68	O.A.Sal'Nikov+	40744
<i>γ,fis</i>	<i>n</i>	?	1USADKE	5.8+06	7.3+06	Jour	<a href="#">PR/C,85,014605</a>	12	J.M.Mueller+	L0166
<i>n,2n</i>	<sup>231</sup> Th	CSP	2ZZZGEL	5.2+06	2.0+07	Thes	THIRY	Sep 10	J.C.Thiry+	23138
<i>n,3n</i>	<sup>230</sup> Th	CSP	2ZZZGEL	1.1+07	2.0+07	Thes	THIRY	Sep 10	J.C.Thiry+	23138
<i>n,inel</i>	<sup>232</sup> Th	CSP	2ZZZGEL	3.5+05	1.1+07	Thes	THIRY	Sep 10	J.C.Thiry+	23138

**91                                  Protactinium                                  234**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,fis</i>		CS	3INDTRM	2.5-02	2.5-02	Jour	<a href="#">EPJ/A,47,100</a>	11	H.Naik+	33036

**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 ITL	1.5+07	1.5+07	Jour	NDS,111,2965	10	J.Laurec+	<a href="#">21708</a>
<i>n</i> ,fis	Many	FY	2FR BRC	Fiss		Jour	NDS,111,2965	10	J.Laurec+	<a href="#">21707</a>

**92 Uranium 234**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis		CS	2ZZZCER	1.0+04	9.5+08	Jour	<a href="#">PR/C,82,034601</a>	10	C.Paradela+	<a href="#">23126</a>

**92 Uranium 235**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\gamma$ ,fis	<i>n</i>	?	1USADKE	5.8+06	7.0+06	Jour	<a href="#">PR/C,85,014605</a>	12	J.M.Mueller+	<a href="#">L0166</a>
<i>n</i> ,2 <i>n</i>	<sup>234</sup> U	CSP	2ZZZGEL	5.2+06	2.3+07	Thes	THIRY	Sep 10	J.C.Thiry+	<a href="#">23138</a>
<i>n</i> ,fis	Many	FY	2FR ITL	1.5+07	1.5+07	Jour	NDS,111,2965	10	J.Laurec+	<a href="#">21708</a>
<i>n</i> ,fis	Many	FY	2FR BRC	Fiss		Jour	NDS,111,2965	10	J.Laurec+	<a href="#">21707</a>
<i>n</i> ,fis	Many	FY	2FR SAC	Maxwl		Jour	NDS,111,2965	10	J.Laurec+	<a href="#">23150</a>
<i>n</i> ,inel	<sup>235</sup> U	CSP	2ZZZGEL	3.1+05	9.4+06	Thes	THIRY	Sep 10	J.C.Thiry+	<a href="#">23138</a>

**92 Uranium 236**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,0		RP	2ZZZCER			Jour	<a href="#">PR/C,84,044618</a>	11	R.Sarmiento+	<a href="#">23131</a>
<i>n</i> ,fis		CS	2ZZZCER	1.0+04	2.1+06	Jour	<a href="#">PR/C,84,044618</a>	11	R.Sarmiento+	<a href="#">23131</a>

**92 Uranium 238**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
0,0		NQ	4RUSFEI	Spont		Rept	YFI-6,16	68	O.A.Sal'Nikov+	<a href="#">40744</a>
$\gamma$ ,fis	<i>n</i>	?	1USADKE	5.8+06	7.0+06	Jour	<a href="#">PR/C,85,014605</a>	12	J.M.Mueller+	<a href="#">L0166</a>
<i>n</i> ,fis	Many	FY	2FR ITL	1.5+07	1.5+07	Jour	NDS,111,2965	10	J.Laurec+	<a href="#">21708</a>
<i>n</i> ,sct	<sup>238</sup> U	CS	4ZZZDUB	6.2+00	3.6+01	Rept	JINR-E3-2000-192,371	00	T.L.Enik+	<a href="#">41549</a>
<sup>16</sup> O,fis		NU	3INDNSD	8.5+07	1.0+08	Jour	<a href="#">PR/C,83,024605</a>	11	K.Banerjee+	<a href="#">D6136</a>
<sup>16</sup> O,fis		?	3INDNSD	8.5+07	1.0+08	Jour	<a href="#">PR/C,83,024605</a>	11	K.Banerjee+	<a href="#">D6136</a>

**94 Plutonium 238**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis	<i>n</i>	?	4RUSNIR	2.5-02	2.5-02	Jour	AE,29,(2),95	Aug 70	N.I.Kroshkin+	<a href="#">40064</a>

**94 Plutonium 239**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\gamma$ ,fis	<i>n</i>	?	1USADKE	5.6+06	7.0+06	Jour	<a href="#">PR/C,85,014605</a>	12	J.M.Mueller+	<a href="#">L0166</a>
<i>n</i> ,fis	Many	FY	2FR ITL	1.5+07	1.5+07	Jour	NDS,111,2965	10	J.Laurec+	<a href="#">21708</a>
<i>n</i> ,fis	Many	FY	2FR BRC	Fiss		Jour	NDS,111,2965	10	J.Laurec+	<a href="#">21707</a>
<i>n</i> ,fis	Many	FY	2FR ILL	Maxwl		Thes	BAIL	May 09	A.Bail+	<a href="#">22985</a>
<i>n</i> ,fis	Many	FY	2FR SAC	Maxwl		Jour	NDS,111,2965	10	J.Laurec+	<a href="#">23150</a>
<i>n</i> ,fis		KE	2ZZZGEL	1.0-02	1.0+00	Jour	NSTS,2,(1),307	Aug 02	F.-J.Hamsch+	<a href="#">22690</a>
<i>n</i> ,fis	Many	?	2FR ILL	Maxwl		Thes	BAIL	May 09	A.Bail+	<a href="#">22985</a>
<i>n</i> ,fis	<sup>99</sup> Mo	?	2ZZZGEL			Jour	NSTS,2,(1),307	Aug 02	F.-J.Hamsch+	<a href="#">22690</a>

**95 Americium 241**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,0		RP	2ZZZGEL			Jour	<a href="#">KPS,59,1785</a>	11	C.Lampoudis+	<a href="#">23139</a>

**95 Americium 242**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis	<i>n</i>	?	4RUSNIR	2.5-02	2.5-02	Jour	AE,29,(2),95	Aug 70	N.I.Kroshkin+	<a href="#">40064</a>

**96 Curium 244**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
0,fis	<i>n</i>	?	4RUSNIR	Spont		Jour	AE,29,(2),95	Aug 70	N.I.Kroshkin+	<a href="#">40064</a>
<i>n</i> ,fis		CS	4RUSNIR	2.5-02	2.5-02	Jour	AE,29,(2),95	Aug 70	N.I.Kroshkin+	<a href="#">40064</a>
<i>n</i> , $\gamma$	<sup>245</sup> Cm	?	2JPNJAE			Jour	<a href="#">NST,47,(12),1097</a>	10	S.Goko+	<a href="#">23141</a>

**96 Curium 245**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis		RI	2ZZZGEL	5.0-01	1.0+03	Rept	AIP-1175,207	11	O.Serot+	<a href="#">23120</a>
<i>n</i> ,fis	<i>n</i>	?	4RUSNIR	1.5-02	1.5-02	Jour	AE,29,(2),95	Aug 70	N.I.Kroshkin+	<a href="#">40064</a>

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## Curium

248

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$^{22}\text{Ne},5n$	$^{265}\text{Sg}$	CS	2JPNIPC	1.2+08	1.2+08	Jour	<a href="#">PR/C,85,(2),024611</a>	Feb 12	H.Haba+	<a href="#">E2371</a>

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## Californium

252

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
0,fis	Many	KE	2ZZZGEL	Spont		Jour	<a href="#">KPS,59,1396</a>	11	Sh.Zeynalov+	<a href="#">23118</a>
0,fis	$^{\text{nat}}\text{G}$	?	1USAANL	Spont		Jour	<a href="#">PR,104,(3),699</a>	56	A.B.Smith+	<a href="#">14320</a>
0,fis	Many	?	2GERMPH	Spont		Jour	ZP/A,356,299	96	A.Hotzel+	<a href="#">22757</a>
0,fis	Many	?	2ZZZGEL	Spont		Jour	<a href="#">KPS,59,1396</a>	11	Sh.Zeynalov+	<a href="#">23118</a>
0,fis	$n$	?	4RUSNIR	Spont		Jour	AE,29,(2),95	Aug 70	N.I.Kroshkin+	<a href="#">40064</a>