

## Nuclear Reaction Data Center (JCPRG)

### EXFOR : Recent Compilation (Added in September 2007)

EXFOR is a world-wide database for experimental neutron induced, charged-particle induced and photonuclear reaction compiled by Nuclear Reaction Data Centres Network coordinated by IAEA Nuclear Data Section. This list gives newly compiled data to EXFOR. *This list consists of tables titled by target nuclide.*

Retrieval service is available at:

<http://www.jcprg.org/exfor/>

#### 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		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$p,el$	$^1\text{H}$	?	2JPNKEK	3.5+09	3.5+09	Jour	PL/B,243,(1-2),29		Jun 90	C.Ohmori+	E1352
$p,\pi^++n$	$^1\text{H}$	?	2JPNLEP			Jour	PRL,67,(15),1982		Oct 91	J.Chiba+	E1460

1 Hydrogen 2											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$d,n+p$	$^2\text{H}$	?	4UKRIJD	1.4+07	1.4+07	Jour	UFZ,45,(7),795		00	V.I.Grantsev+	D5037
$d,p$	$^3\text{H}$	POD	2JPNTSU	3.0+04	9.0+04	Jour	PR/C,46,(4),1155		Oct 92	Y.Tagishi+	E1485
$d,tot$		CS	2JPNLEP			Jour	PR/C,45,(6),2926		Jun 92	T.Kishida+	E1567
$\alpha,n+p$	$^4\text{He}$	?	4UKRIJD	2.7+07	2.7+07	Jour	UFZ,45,(3),270		00	O.K.Gorpinich+	D5044

1 Hydrogen 3											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$d,2n$	$^3\text{He}$	?	4UKRIJD	1.4+07	1.4+07	Jour	UFZ,45,(10),1154		00	B.G.Struzhko	D5047
$d,el$	$^3\text{H}$	DA	4UKRIJD	1.4+07	1.4+07	Jour	UFZ,45,(10),1154		00	B.G.Struzhko	D5047
$d,n+p$	$^3\text{H}$	?	4UKRIJD	1.4+07	1.4+07	Jour	UFZ,45,(10),1154		00	B.G.Struzhko	D5047

2 Helium 3											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$\alpha,d+t$	$^2\text{He}$	?	4UKRIJD	6.7+07	6.7+07	Jour	UFZ,48,(10),1035		03	O.K.Gorpinich+	D5038
$\alpha,p+d$	$^4\text{He}$	?	2JPNOSA	1.2+08	1.2+08	Jour	NP/A,510,(3),417		Apr 90	T.Sekioka	E1308

3 Lithium 6											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$d,^2\text{He}$	$^6\text{He}$	DAP	2JPNIPC	2.6+08	2.6+08	Jour	PR/C,47,(2),648		Feb 93	H.Ohnuma+	E1475

3 Lithium 7											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$\alpha,t+\alpha$	$^4\text{He}$	?	2JPNOSA	7.7+07	1.2+08	Jour	PR/C,45,(5),2328		May 92	R.E.Warner+	E1375
$^{11}\text{B},el$	$^7\text{Li}$	DA	3POLWWA	4.4+07	4.4+07	Jour	PR/C,72,034608		05	A.A.Rudchik+	D0364



$^{15}\text{N},n,\alpha$	$^{22}\text{Na}$	CSP	2FR STR	3.0+07	7.0+07	Jour	PCN,12,23	03	G.A.Monchan+	D0404
$^{16}\text{O},\text{fus}$		CS	2JPNKYU	1.9+07	2.4+07	Jour	NP/A,464,(3),415	Mar 87	T.Sugimitsu+	E1625
$^{16}\text{O},x$	Many	CS	2JPNKYU	1.9+07	2.4+07	Jour	NP/A,464,(3),415	Mar 87	T.Sugimitsu+	E1625
$^{16}\text{O},x$	$^{20}\text{Ne}$	CS	2JPNKYU	1.9+07	2.4+07	Jour	NP/A,464,(3),415	Mar 87	T.Sugimitsu+	E1625
$^{16}\text{O},x$	$^{23}\text{Na}$	CS	2JPNKYU	1.9+07	2.4+07	Jour	NP/A,464,(3),415	Mar 87	T.Sugimitsu+	E1625
$^{16}\text{O},x$	$^{23}\text{Mg}$	CS	2JPNKYU	1.9+07	2.4+07	Jour	NP/A,464,(3),415	Mar 87	T.Sugimitsu+	E1625
$^{16}\text{O},x$	$^{24}\text{Mg}$	CS	2JPNKYU	1.9+07	2.4+07	Jour	NP/A,464,(3),415	Mar 87	T.Sugimitsu+	E1625
$^{16}\text{O},x$	$^{25}\text{Mg}$	CS	2JPNKYU	1.9+07	2.4+07	Jour	NP/A,464,(3),415	Mar 87	T.Sugimitsu+	E1625
$^{16}\text{O},x$	$^{26}\text{Mg}$	CS	2JPNKYU	1.9+07	2.4+07	Jour	NP/A,464,(3),415	Mar 87	T.Sugimitsu+	E1625
$^{16}\text{O},x$	$^{26}\text{Al}$	CS	2JPNKYU	1.9+07	2.4+07	Jour	NP/A,464,(3),415	Mar 87	T.Sugimitsu+	E1625
$^{16}\text{O},x$	$^{27}\text{Al}$	CS	2JPNKYU	1.9+07	2.4+07	Jour	NP/A,464,(3),415	Mar 87	T.Sugimitsu+	E1625

**6 Carbon 13**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$d,^2\text{He}$	$^{13}\text{B}$	DAP	2JPNIPC	2.6+08	2.6+08	Jour	PR/C,47,(2),648	Feb 93	H.Ohnuma+	E1475
$d,^2\text{He}$	$^{13}\text{B}$	DAP	2JPNOSA	7.0+07	7.0+07	Jour	PR/C,34,(6),2365	Dec 86	T.Motobayashi+	E1464
$d,^2\text{He}$	$^{13}\text{B}$	POD	2JPNOSA	7.0+07	7.0+07	Jour	PR/C,34,(6),2365	Dec 86	T.Motobayashi+	E1464

**6 Carbon 14**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,n$	$^{14}\text{N}$	DAP	2JPNTOH	3.5+07	3.5+07	Jour	PR/C,45,(3),1220	Mar 92	M.Kabasawa+	E1486

**7 Nitrogen 13**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,\gamma$		RP	2JPNIPC	5.2+06	5.2+06	Jour	PL/B,264,(3-4),259	Aug 91	T.Motobayashi+	E1498

**7 Nitrogen 14**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,d$	$^{13}\text{N}$	DAP	2JPNTSU	2.1+07	2.1+07	Jour	JPJ,47,(1),329	Jul 79	Y.Aoki+	E1422
$p,\text{el}$	$^{14}\text{N}$	DA	2JPNTSU	2.1+07	2.1+07	Jour	JPJ,47,(1),329	Jul 79	Y.Aoki+	E1422
$p,\text{el}$	$^{14}\text{N}$	POD	2JPNTSU	2.1+07	2.1+07	Jour	JPJ,47,(1),329	Jul 79	Y.Aoki+	E1422
$p,\text{inel}$	$^{14}\text{N}$	DAP	2JPNTSU	2.1+07	2.1+07	Jour	JPJ,47,(1),329	Jul 79	Y.Aoki+	E1422
$p,\text{inel}$	$^{14}\text{N}$	POD	2JPNTSU	2.1+07	2.1+07	Jour	JPJ,47,(1),329	Jul 79	Y.Aoki+	E1422
$p,n$	$^{14}\text{O}$	DAP	2JPNTOH	3.5+07	3.5+07	Jour	PR/C,45,(3),1220	Mar 92	M.Kabasawa+	E1486
$d,\alpha$	$^{12}\text{C}$	DAP	4RUSFEI	7.0+05	2.2+06	Priv	Gurbich	07	A.Gurbich+	D0448
$d,^2\text{He}$	$^{14}\text{C}$	DAP	2JPNOSA	7.0+07	7.0+07	Jour	PR/C,34,(6),2365	Dec 86	T.Motobayashi+	E1464
$d,^2\text{He}$	$^{14}\text{C}$	POD	2JPNOSA	7.0+07	7.0+07	Jour	PR/C,34,(6),2365	Dec 86	T.Motobayashi+	E1464
$d,p$	$^{15}\text{N}$	DAP	4RUSFEI	7.0+05	2.1+06	Priv	Gurbich	07	A.Gurbich+	D0448

**7 Nitrogen 15**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$p,el$	$^{15}\text{N}$	POD	2JPNOSA	6.5+07	6.5+07	Jour	PL/B,240,(3-4),301		Apr 90	T.Nakano+	E1309

**8 Oxygen 16**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$^{16}\text{O},^{15}\text{O}$	$^{17}\text{O}$	DAP	2GERBER	2.5+08	1.1+09	Jour	NP/A,703,573		02	H.G.Bohlen+	D0178

**9 Fluorine 19**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$p,\alpha$	$^{16}\text{O}$	CSP	3BZLUSP	1.4+06	1.4+06	Conf	2007NICE,,23(#769)		07	D.B.Tridapalli+	D0450
$^{16}\text{O},el$	$^{19}\text{F}$	DA	2JPN TOK	2.1+07	2.6+07	Jour	PL/B,59,(5),421		Dec 75	T.Motobayashi+	E1394

**11 Sodium 23**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$n,\gamma$	$^{24}\text{Na}$	?	2JPNKTO	Maxwl		Conf	2004SANTA,1,996		04	I.Miyazaki+	22744
$n,tot$		CS	2FR SAC	1.9+06	1.1+07	Jour	JPR,24,826		Nov 63	J.L.Leroy+	22554
$d,^2\text{He}$	$^{23}\text{Ne}$	DAP	2JPNIPC	2.6+08	2.6+08	Jour	PR/C,47,(2),648		Feb 93	H.Ohnuma+	E1475

**12 Magnesium 24**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$^3\text{He},^6\text{He}$	$^{21}\text{Mg}$	DAP	2JPN TOK	7.4+07	7.4+07	Jour	ZP/A,334,(4),511		Dec 89	S.Kubono+	E1326

**13 Aluminium 27**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$n,\alpha$	$^{24}\text{Na}$	CS	3NI NI	Fiss		Priv	JONAH		07	S.A.Jonah+	31601
$n,\gamma$	$^{28}\text{Al}$	?	2JPNKTO	Maxwl		Conf	2004SANTA,1,996		04	I.Miyazaki+	22744
$n,p$	$^{27}\text{Mg}$	CS	3NI NI	Fiss		Priv	JONAH		07	S.A.Jonah+	31601
$n,p$	$^{27}\text{Mg}$	?	2ITYCIS	1.4+07	1.4+07	Jour	NC,7,400		Feb 58	L.Colli+	21069
$n,tot$		CS	2JPNJAE	1.4+07	1.4+07	Conf	2004SANTA,1,769		04	I.Murata+	22743
$n,x+p$	inclusive	DA	2JPNJAE	1.4+07	1.4+07	Conf	2004SANTA,1,769		04	I.Murata+	22743
$p,el$	$^{27}\text{Al}$	DA	3CRORBZ	2.4+06	5.1+06	Jour	NIM/B,261,414		07	Zdravkosiketic+	D0447
$d,2p$	$^{27}\text{Mg}$	CS	3CZRUF	3.4+06	2.0+07	Conf	2007NICE,,191(#601)		07	P.Bem+	D0453

$d,p$	$^{28}\text{Al}$	CS	3CZRUFJ	3.4+06	2.0+07	Conf	2007NICE,,191(#601)	07	P.Bem+	D0453
$d,p+\alpha$	$^{24}\text{Na}$	CS	3CZRUFJ	3.4+06	2.0+07	Conf	2007NICE,,191(#601)	07	P.Bem+	D0453
$^7\text{Li},^6\text{Li}$	$^{28}\text{Al}$	DAP	3ARGCNE	1.1+07	1.8+07	Jour	NP/A,791,24	07	J.Lubian+	D0445
$^7\text{Li,inel}$	$^{27}\text{Al}$	DAP	3ARGCNE	1.1+07	1.8+07	Jour	NP/A,791,24	07	J.Lubian+	D0445
$^{11}\text{Be,non}$		CS	2JPNIPC	3.6+08	3.6+08	Jour	PL/B,268,(3-4),339	Oct 91	M.Fukuda+	E1468
$^{11}\text{Be,x}$	$^{10}\text{Be}$	CS	2JPNIPC	3.6+08	3.6+08	Jour	PL/B,268,(3-4),339	Oct 91	M.Fukuda+	E1468
$^{13}\text{C,non}$		CS	2JPNIPC	4.1+08	4.1+08	Jour	PL/B,268,(3-4),339	Oct 91	M.Fukuda+	E1468
$^{84}\text{Kr,x}$	Many	CS	2JPNIPC	8.9+08	8.9+08	Jour	PL/B,283,(3-4),185	Jun 92	K.Y.Nakagawa+	E1493

**14 Silicon 28**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\gamma,p$	$^{27}\text{Al}$	CSP	4RUSMOS	1.4+07	3.0+07	Jour	YF,4,(3),505	66	B.I.Goryachev+	M0717
$\gamma,p$	$^{27}\text{Al}$	DAE	4RUSMOS		2.7+07	Jour	YF,1,(6),1155	65	B.I.Goryachev+	M0715
$n,p$	$^{28}\text{Al}$	CS	3NI NI	Fiss		Priv	JONAH	07	S.A.Jonah+	31601

**14 Silicon 29**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,p$	$^{29}\text{Al}$	CS	3NI NI	Fiss		Priv	JONAH	07	S.A.Jonah+	31601

**14 Silicon 30**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\alpha$	$^{27}\text{Mg}$	CS	3NI NI	Fiss		Priv	JONAH	07	S.A.Jonah+	31601
$p,\gamma$	$^{31}\text{P}$	DAP	4UKRKFT	1.5+06	2.5+06	Jour	VAT/I,40,(2),33	02	A.S.Kachan+	D5039

**16 Sulphur 36**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,0$		RP	4UKRUFT	2.0+06	2.5+06	Jour	VAT/I,44,(5),39	04	A.S.Kachan+	D5042
$p,0$		RP	4UKRUFT	2.5+06	2.7+06	Jour	VAT/I,40,(2),30	02	A.N.Vodin+	D5041
$p,\gamma$	$^{37}\text{Cl}$	DAP	4UKRUFT	2.0+06	2.5+06	Jour	VAT/I,44,(5),39	04	A.S.Kachan+	D5042
$p,\gamma$	$^{37}\text{Cl}$	DAP	4UKRUFT	2.5+06	2.7+06	Jour	VAT/I,40,(2),30	02	A.N.Vodin+	D5041

**17 Chlorine**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,x$	$^{28}\text{Mg}$	CS	3SAFITH	5.0+07	2.0+08	Conf	2007NICE,,142(#186)	07	G.F.Steyn+	D0451

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## Argon

## 36

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
${}^6\text{Li},d$	${}^{40}\text{Ca}$	DAP	2JPNOSA	5.0+07	5.0+07	Jour	PL/B,306,(1-2),1	May 93	T.Yamaya+	E1474

## 20

## Calcium

## 40

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\gamma,n$	${}^{39}\text{Ca}$	?	4RUSMOS	1.6+07	2.9+07	Jour	YF,5,1138	67	B.I.Goryachev+	M0714
$\gamma,p$	${}^{39}\text{K}$	CSP	4RUSMOS	1.2+07	3.0+07	Jour	YF,7,(5),944	68	B.I.Goryachev+	M0718
$\gamma,p$	${}^{39}\text{K}$	INT	4RUSMOS		3.0+07	Jour	YF,7,(5),944	68	B.I.Goryachev+	M0718

## 20

## Calcium

## 48

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,\text{inel}$	${}^{48}\text{Ca}$	DAE	2JPNOSA	6.5+07	6.5+07	Jour	PR/C,37,(1),45	Jan 88	Y.Fujita+	E1446
$p,\text{inel}$	${}^{48}\text{Ca}$	DAP	2JPNOSA	6.5+07	6.5+07	Jour	PR/C,37,(1),45	Jan 88	Y.Fujita+	E1446

## 21

## Scandium

## 45

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\gamma,n$	${}^{44}\text{Sc}$	CS	3KORPUE		6.5+07	Jour	KPS,50,(2),417	07	Vandonguyen+	M0716
$\gamma,n$	${}^{44}\text{Sc}$	?	4RUSMOS		3.2+07	Jour	YF,56,(12),263	93	B.S.Ishkhanov+	M0712
$\gamma,p$	${}^{44}\text{Ca}$	?	4RUSMOS		3.2+07	Jour	YF,56,(12),263	93	B.S.Ishkhanov+	M0712

## 22

## Titanium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\gamma,x$	${}^{44}\text{Sc}$	CS	3KORPUE		6.5+07	Jour	KPS,50,(2),417	07	Vandonguyen+	M0716
$n,\text{sct}$	${}^{nat}\text{Ti}$	CS	2GERPTB	7.9+06	1.5+07	Rept	PTB-N-50	06	D.Schmidt+	22961
$n,\text{sct}$	${}^{nat}\text{Ti}$	DA	2GERPTB	7.9+06	1.5+07	Rept	PTB-N-50	06	D.Schmidt+	22961
$n,x+n$	inclusive	DA	2GERPTB	7.9+06	1.5+07	Rept	PTB-N-50	06	D.Schmidt+	22961
$n,x+n$	inclusive	DAE	2GERPTB	7.9+06	1.5+07	Rept	PTB-N-50	06	D.Schmidt+	22961
$n,x+n$	inclusive	DE	2GERPTB	7.9+06	1.5+07	Rept	PTB-N-50	06	D.Schmidt+	22961
$d,x$	${}^{44}\text{Sc}$	CS	3HUNDEB	5.4+06	1.0+07	Jour	NIM/B,262,7	07	S.Takacs+	D4168
$d,x$	${}^{46}\text{Sc}$	CS	3HUNDEB	3.5+06	1.0+07	Jour	NIM/B,262,7	07	S.Takacs+	D4168
$d,x$	${}^{47}\text{Sc}$	CS	3HUNDEB	3.5+06	1.0+07	Jour	NIM/B,262,7	07	S.Takacs+	D4168
$d,x$	${}^{48}\text{Sc}$	CS	3HUNDEB	7.0+06	1.0+07	Jour	NIM/B,262,7	07	S.Takacs+	D4168
$d,x$	${}^{48}\text{V}$	CS	3HUNDEB	2.7+06	5.0+07	Jour	NIM/B,262,7	07	S.Takacs+	D4168

22 Titanium 46											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
<i>n,inel</i>	<sup>46</sup> Ti	?	2GERPTB	7.9+06	1.5+07	Rept	PTB-N-50		06	D.Schmidt+	22961
<i>n,p</i>	<sup>46</sup> Sc	CS	3NI NI	Fiss		Priv	JONAH		07	S.A.Jonah+	31601
22 Titanium 47											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
<i>n,p</i>	<sup>47</sup> Sc	CS	3NI NI	Fiss		Priv	JONAH		07	S.A.Jonah+	31601
23 Vanadium 51											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
<i>n,γ</i>	<sup>52</sup> V	?	2JPNKTO	Maxwl		Conf	2004SANTA,1,996		04	I.Miyazaki+	22744
24 Chromium 54											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
<i>p,γ</i>	<sup>55</sup> Mn	CSP	4UKRKFT	1.5+06	2.3+06	Jour	VAT/F,45,(6),40		05	S.N.Utenkov+	D5040
25 Manganese 55											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
<i>n,γ</i>	<sup>56</sup> Mn	?	2JPNKTO	Maxwl		Conf	2004SANTA,1,996		04	I.Miyazaki+	22744
26 Iron 54											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
<i>n,p</i>	<sup>54</sup> Mn	CS	3NI NI	Fiss		Priv	JONAH		07	S.A.Jonah+	31601
26 Iron 56											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
<i>γ,x</i>	<sup>52</sup> Mn	CS	3KORPUE		6.5+07	Jour	KPS,50,(2),417		07	Vandonguyen+	M0716
<i>p,inel</i>	<sup>56</sup> Fe	DAP	2JPNOSA	6.5+07	6.5+07	Jour	JPR/C,51,(C6),423		Nov 90	J.Takamatsu+	E1351
<i>p,inel</i>	<sup>56</sup> Fe	POD	2JPNOSA	6.5+07	6.5+07	Jour	JPR/C,51,(C6),423		Nov 90	J.Takamatsu+	E1351



*d,inel* <sup>56</sup>Fe DAP 2JPNOSA 5.6+07 5.6+07 Jour JPR/C,51,(C6),423 Nov 90 J.Takamatsu+ E1351

**27 Cobalt 59**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,p</i>	<sup>59</sup> Fe	CS	2ZZZGEL	1.5+07	2.1+07	Conf	2004SANTA,1,1019	Sep 04	V.Semkova+	22745
<sup>3</sup> He,2 <i>n</i>	<sup>60</sup> Cu	CS	2JPNIPC	1.1+07	3.8+07	Jour	NP/A,486,(1),77	Sep 88	Y.Nagame+	E1370
<sup>3</sup> He,2 <i>n</i> +2 <i>p</i>	<sup>58</sup> Co	CS	2JPNIPC	8.1+06	3.8+07	Jour	NP/A,486,(1),77	Sep 88	Y.Nagame+	E1370
<sup>3</sup> He,2 <i>n</i> + $\alpha$	<sup>56</sup> Co	CS	2JPNIPC	1.8+07	3.9+07	Jour	NP/A,486,(1),77	Sep 88	Y.Nagame+	E1370
<sup>3</sup> He,2 <i>p</i>	<sup>60</sup> Co	CS	2JPNIPC	1.0+07	3.8+07	Jour	NP/A,486,(1),77	Sep 88	Y.Nagame+	E1370
<sup>3</sup> He, <i>n</i>	<sup>61</sup> Cu	CS	2JPNOK	7.5+06	6.0+07	Jour	NP/A,486,(1),77	Sep 88	Y.Nagame+	E1370
<sup>3</sup> He, <i>n</i> + $\alpha$	<sup>57</sup> Co	CS	2JPNIPC	1.0+07	3.9+07	Jour	NP/A,486,(1),77	Sep 88	Y.Nagame+	E1370

**28 Nickel**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,x+p</i>	inclusive	?	2ITYCIS	1.4+07	1.4+07	Jour	NC,7,400	Feb 58	L.Colli+	21069
<i>d,x</i>	<sup>51</sup> Cr	CS	2BLGVUB	3.2+07	4.8+07	Jour	NIM/B,260,495	07	S.Takacs+	D4178
<i>d,x</i>	<sup>52</sup> Mn	CS	2BLGVUB	1.8+07	4.8+07	Jour	NIM/B,260,495	07	S.Takacs+	D4178
<i>d,x</i>	<sup>54</sup> Mn	CS	2BLGVUB	2.5+07	4.8+07	Jour	NIM/B,260,495	07	S.Takacs+	D4178
<i>d,x</i>	<sup>56</sup> Mn	CS	2BLGVUB	2.5+07	4.8+07	Jour	NIM/B,260,495	07	S.Takacs+	D4178
<i>d,x</i>	<sup>55</sup> Co	CS	2BLGVUB	9.6+06	4.8+07	Jour	NIM/B,260,495	07	S.Takacs+	D4178
<i>d,x</i>	<sup>56</sup> Co	CS	2BLGVUB	9.6+06	4.8+07	Jour	NIM/B,260,495	07	S.Takacs+	D4178
<i>d,x</i>	<sup>57</sup> Co	CS	2BLGVUB	9.6+06	4.8+07	Jour	NIM/B,260,495	07	S.Takacs+	D4178
<i>d,x</i>	<sup>58</sup> Co	CS	2BLGVUB	9.6+06	4.8+07	Jour	NIM/B,260,495	07	S.Takacs+	D4178
<i>d,x</i>	<sup>60</sup> Co	CS	2BLGVUB	2.5+07	4.8+07	Jour	NIM/B,260,495	07	S.Takacs+	D4178
<i>d,x</i>	<sup>61</sup> Co	CS	2BLGVUB	1.1+07	4.8+07	Jour	NIM/B,260,495	07	S.Takacs+	D4178
<i>d,x</i>	<sup>56</sup> Ni	CS	2BLGVUB	3.0+07	4.8+07	Jour	NIM/B,260,495	07	S.Takacs+	D4178
<i>d,x</i>	<sup>57</sup> Ni	CS	2BLGVUB	9.6+06	4.8+07	Jour	NIM/B,260,495	07	S.Takacs+	D4178
<i>d,x</i>	<sup>61</sup> Cu	CS	2BLGVUB	4.2+06	4.8+07	Jour	NIM/B,260,495	07	S.Takacs+	D4178
<i>d,x</i>	<sup>64</sup> Cu	CS	2BLGVUB	9.6+06	2.0+07	Jour	NIM/B,260,495	07	S.Takacs+	D4178

**28 Nickel 58**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\gamma$ , <i>p</i>	<sup>57</sup> Co	DAE	4RUSMOS		2.2+07	Jour	YF,21,(3),457	75	V.V.Varlamov+	M0713
<i>n,2n</i>	<sup>57</sup> Ni	CS	3BANSAB	1.5+07	1.5+07	Jour	IJP,80,737	06	A.K.Mharun-Ar-Rashid+	31600
<i>n,p</i>	<sup>58</sup> Co	CS	3BANSAB	1.5+07	1.5+07	Jour	IJP,80,737	06	A.K.Mharun-Ar-Rashid+	31600
<i>n,p</i>	<sup>58</sup> Co	CS	3NI NI	Fiss		Priv	JONAH	07	S.A.Jonah+	31601
<i>n,t</i>	<sup>56</sup> Co	CS	2ZZZGEL	1.8+07	2.0+07	Conf	2004SANTA,1,1019	Sep 04	V.Semkova+	22745
<i>p,el</i>	?		2JPNITIT	3.0+06	4.0+06	Jour	NP/A,256,(1),127	Jan 76	E.Arai+	E1494
<i>p,el</i>	<sup>58</sup> Ni	DA	2JPNITIT	3.1+06	4.0+06	Jour	NP/A,256,(1),127	Jan 76	E.Arai+	E1494
<i>p,inel</i>		RP	2JPNITIT	3.5+06	3.5+06	Jour	NP/A,256,(1),127	Jan 76	E.Arai+	E1494
<i>p,tot</i>		RP	2JPNITIT	3.0+06	4.0+06	Jour	NP/A,256,(1),127	Jan 76	E.Arai+	E1494
<i>d,p</i>	<sup>59</sup> Ni	DAE	2JPNOSA	5.6+07	5.6+07	Jour	PL/B,155,(4),227	May 85	H.Sakamoto+	E1462
<i>d,p</i>	<sup>59</sup> Ni	POD	2JPNOSA	5.6+07	5.6+07	Jour	PL/B,155,(4),227	May 85	H.Sakamoto+	E1462
<sup>3</sup> He, <i>el</i>	<sup>58</sup> Ni	DA	2JPNIPC	3.4+07	3.4+07	Jour	PL/B,28,(6),408	Jan 69	H.Kamitsubo+	E1495

${}^7\text{Li,el}$	${}^{58}\text{Ni}$	DA	3INDTRM	4.2+07	4.2+07	Jour	NP/A,646,161	99	D.Gupta+	D0441
${}^7\text{Li,x}$	${}^3\text{He}$	DAE	3INDTRM	4.2+07	4.2+07	Jour	NP/A,646,161	99	D.Gupta+	D0441
${}^7\text{Li,x}+\alpha$	inclusive	DA	3INDTRM	4.2+07	4.2+07	Jour	NP/A,646,161	99	D.Gupta+	D0441
${}^7\text{Li,x}+\alpha$	inclusive	DAE	3INDTRM	4.2+07	4.2+07	Jour	NP/A,646,161	99	D.Gupta+	D0441
${}^7\text{Li,x}+d$	inclusive	DAE	3INDTRM	4.2+07	4.2+07	Jour	NP/A,646,161	99	D.Gupta+	D0441
${}^7\text{Li,x}+p$	inclusive	DAE	3INDTRM	4.2+07	4.2+07	Jour	NP/A,646,161	99	D.Gupta+	D0441
${}^7\text{Li,x}+t$	inclusive	DA	3INDTRM	4.2+07	4.2+07	Jour	NP/A,646,161	99	D.Gupta+	D0441
${}^7\text{Li,x}+t$	inclusive	DAE	3INDTRM	4.2+07	4.2+07	Jour	NP/A,646,161	99	D.Gupta+	D0441

## 28

## Nickel

## 60

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,\text{el}$	${}^{60}\text{Ni}$	DA	2JPNITT	2.9+06	4.0+06	Jour	NP/A,256,(1),127	Jan 76	E.Arai+	E1494
$p,\text{tot}$		RP	2JPNITT	3.1+06	4.0+06	Jour	NP/A,256,(1),127	Jan 76	E.Arai+	E1494

## 28

## Nickel

## 62

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\gamma$	${}^{63}\text{Ni}$	CS	2GERKFK	Maxwl		Jour	PRL,94,092504	05	H.Nassar+	22959
$p,\text{el}$	${}^{62}\text{Ni}$	DA	2JPNITT	3.0+06	3.9+06	Jour	NP/A,256,(1),127	Jan 76	E.Arai+	E1494
$p,\text{tot}$		RP	2JPNITT	3.0+06	3.9+06	Jour	NP/A,256,(1),127	Jan 76	E.Arai+	E1494

## 28

## Nickel

## 64

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\gamma$	${}^{65}\text{Ni}$	?	2JPNKTO	Maxwl		Conf	2004SANTA,1,996	04	I.Miyazaki+	22744

## 29

## Copper

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,p+X$	${}^1\text{H}$	?	2JPNKEK	3.5+09	3.5+09	Jour	PL/B,243,(1-2),29	Jun 90	C.Ohmori+	E1352
$p,x$	${}^{62}\text{Zn}$	CS	3KORKRM	1.6+07	4.0+07	Jour	NIM/B,262,171	07	M.U.Khandaker+	D0446

## 29

## Copper

## 63

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,2n$	${}^{62}\text{Cu}$	CS	2JPNJAE	1.3+07	1.5+07	Conf	94GATLIN,2,944	94	Y.Ikeda+	22547
$n,\alpha$	${}^{60}\text{Co}$	CS	2ZZZGEL	1.3+07	2.0+07	Conf	2004SANTA,1,1019	Sep 04	V.Semkova+	22745
$d,2n$	${}^{63}\text{Zn}$	CS	3CZRUFJ	3.6+06	2.0+07	Conf	2007NICE,,191(#601)	07	P.Bem+	D0453
$d,3n$	${}^{62}\text{Zn}$	CS	3CZRUFJ	1.7+07	2.0+07	Conf	2007NICE,,191(#601)	07	P.Bem+	D0453
$d,p$	${}^{64}\text{Cu}$	CS	3CZRUFJ	3.6+06	2.0+07	Conf	2007NICE,,191(#601)	07	P.Bem+	D0453

## 29

## Copper

## 65

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,2n$	$^{64}\text{Cu}$	CS	2JPNJAE	1.3+07	1.5+07	Conf	94GATLIN,2,944	94	Y.Ikeda+	22547
$n,2n$	$^{64}\text{Cu}$	CS	3BANSAV	1.5+07	1.5+07	Jour	IJP,80,737	06	A.K.Mharun-Ar-Rashid+	31600
$n,\alpha$	$^{62}\text{Co}$	CS	3BANSAV	1.5+07	1.5+07	Jour	IJP,80,737	06	A.K.Mharun-Ar-Rashid+	31600
$n,\gamma$	$^{66}\text{Cu}$	?	2JPNKTO	Maxwl		Conf	2004SANTA,1,996	04	I.Miyazaki+	22744
$n,p$	$^{65}\text{Ni}$	CS	3BANSAV	1.5+07	1.5+07	Jour	IJP,80,737	06	A.K.Mharun-Ar-Rashid+	31600
$d,2n$	$^{65}\text{Zn}$	CS	3CZRUFJ	5.0+06	2.0+07	Conf	2007NICE,,191(#601)	07	P.Bem+	D0453
$d,2p$	$^{65}\text{Ni}$	CS	3CZRUFJ	1.2+07	2.0+07	Conf	2007NICE,,191(#601)	07	P.Bem+	D0453

## 30

## Zinc

## 64

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,p$	$^{64}\text{Cu}$	CS	3NI NI	Fiss		Priv	JONAH	07	S.A.Jonah+	31601
$^{16}\text{O,el}$	$^{64}\text{Zn}$	DA	3BZLUSP	3.0+07	4.6+07	Jour	PR/C,50,927	94	S.Salem-Vasconcelos+	D0444
$^{16}\text{O,inel}$	$^{64}\text{Zn}$	DAP	3BZLUSP	3.0+07	4.6+07	Jour	PR/C,50,927	94	S.Salem-Vasconcelos+	D0444
$^{18}\text{O,el}$	$^{64}\text{Zn}$	DA	3BZLUSP	2.9+07	4.9+07	Jour	PR/C,50,927	94	S.Salem-Vasconcelos+	D0444
$^{18}\text{O,inel}$	$^{64}\text{Zn}$	DAP	3BZLUSP	2.9+07	4.9+07	Jour	PR/C,50,927	94	S.Salem-Vasconcelos+	D0444

## 32

## Germanium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,x$	$^{71}\text{As}$	CS	3SAFITH	8.6+06	9.8+07	Jour	ARI,65,1057	07	I.Spahn+	D0454
$p,x$	$^{72}\text{As}$	CS	3SAFITH	4.9+06	9.8+07	Jour	ARI,65,1057	07	I.Spahn+	D0454
$p,x$	$^{73}\text{As}$	CS	3SAFITH	4.9+06	9.8+07	Jour	ARI,65,1057	07	I.Spahn+	D0454
$p,x$	$^{74}\text{As}$	CS	3SAFITH	4.9+06	9.8+07	Jour	ARI,65,1057	07	I.Spahn+	D0454

## 40

## Zirconium

## 92

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,t$	$^{90}\text{Zr}$	DAP	2JPNTSU	1.8+07	2.2+07	Jour	PR/C,25,(2),1050	Feb 82	Y.Aoki+	E1426
$p,t$	$^{90}\text{Zr}$	POD	2JPNTSU	1.8+07	2.2+07	Jour	PR/C,25,(2),1050	Feb 82	Y.Aoki+	E1426

## 42

## Molybdenum

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,x$	$^{89}\text{Zr}$	CS	3KORKRM	1.8+07	3.9+07	Jour	NIM/B,262,171	07	M.U.Khandaker+	D0446
$p,x$	$^{90}\text{Nb}$	CS	3KORKRM	1.8+07	3.9+07	Jour	NIM/B,262,171	07	M.U.Khandaker+	D0446
$p,x$	$^{96}\text{Nb}$	CS	3KORKRM	1.4+07	3.9+07	Jour	NIM/B,262,171	07	M.U.Khandaker+	D0446

<i>p,x</i>	<sup>93</sup> Mo	CS	3KORKRM	1.4+07	3.9+07	Jour	NIM/B,262,171	07	M.U.Khandaker+	D0446
<i>p,x</i>	<sup>99</sup> Mo	CS	3KORKRM	9.8+06	3.9+07	Jour	NIM/B,262,171	07	M.U.Khandaker+	D0446
<i>p,x</i>	<sup>93</sup> Tc	CS	3KORKRM	6.7+06	3.9+07	Jour	NIM/B,262,171	07	M.U.Khandaker+	D0446
<i>p,x</i>	<sup>94</sup> Tc	CS	3KORKRM	6.7+06	3.9+07	Jour	NIM/B,262,171	07	M.U.Khandaker+	D0446
<i>p,x</i>	<sup>95</sup> Tc	CS	3KORKRM	2.5+06	3.9+07	Jour	NIM/B,262,171	07	M.U.Khandaker+	D0446
<i>p,x</i>	<sup>96</sup> Tc	CS	3KORKRM	2.5+06	3.9+07	Jour	NIM/B,262,171	07	M.U.Khandaker+	D0446
<i>p,x</i>	<sup>99</sup> Tc	CS	3KORKRM	9.8+06	3.9+07	Jour	NIM/B,262,171	07	M.U.Khandaker+	D0446

**42 Molybdenum 92**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\gamma,n$	<sup>91</sup> Mo	?	4RUSMOS	1.2+07	2.7+07	Jour	YF,11,(3),702	70	B.S.Ishkhanov+	M0719
$\gamma,x+n$	inclusive	CS	4RUSMOS	1.2+07	3.0+07	Jour	YF,11,(3),702	70	B.S.Ishkhanov+	M0719

**42 Molybdenum 94**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,t</i>	<sup>92</sup> Mo	DAP	2JPNTSU	2.2+07	2.2+07	Jour	PR/C,25,(2),1050	Feb 82	Y.Aoki+	E1426
<i>p,t</i>	<sup>92</sup> Mo	POD	2JPNTSU	2.2+07	2.2+07	Jour	PR/C,25,(2),1050	Feb 82	Y.Aoki+	E1426

**42 Molybdenum 96**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,t</i>	<sup>94</sup> Mo	POD	2JPNTSU	2.2+07	2.2+07	Jour	PR/C,25,(2),1050	Feb 82	Y.Aoki+	E1426

**42 Molybdenum 98**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\gamma,n$	<sup>97</sup> Mo	?	4RUSMOS	8.5+06	2.0+07	Jour	YF,11,(3),702	70	B.S.Ishkhanov+	M0719
$\gamma,x+n$	inclusive	CS	4RUSMOS	8.5+06	2.9+07	Jour	YF,11,(3),702	70	B.S.Ishkhanov+	M0719
<i>p,t</i>	<sup>96</sup> Mo	DAP	2JPNTSU	2.2+07	2.2+07	Jour	PR/C,25,(2),1050	Feb 82	Y.Aoki+	E1426
<i>p,t</i>	<sup>96</sup> Mo	POD	2JPNTSU	2.2+07	2.2+07	Jour	PR/C,25,(2),1050	Feb 82	Y.Aoki+	E1426

**44 Ruthenium 100**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,t</i>	<sup>98</sup> Ru	POD	2JPNTSU	2.2+07	2.2+07	Jour	PR/C,25,(2),1050	Feb 82	Y.Aoki+	E1426

**44 Ruthenium 101**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$^3\text{He},x$	$^{101}\text{Rh}$	CS	2GERJUL	1.2+07	3.4+07	Conf	2007NICE,(#279)	07	Ye.Skakun+	D5048
$^3\text{He},x$	$^{102}\text{Rh}$	CS	2GERJUL	1.2+07	3.4+07	Conf	2007NICE,(#279)	07	Ye.Skakun+	D5048

**44 Ruthenium 102**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,t$	$^{100}\text{Ru}$	POD	2JPNTSU	2.2+07	2.2+07	Jour	PR/C,25,(2),1050	Feb 82	Y.Aoki+	E1426
$^3\text{He},x$	$^{101}\text{Rh}$	CS	2GERJUL	1.9+07	3.4+07	Conf	2007NICE,(#279)	07	Ye.Skakun+	D5048
$^3\text{He},x$	$^{102}\text{Rh}$	CS	2GERJUL	1.8+07	3.4+07	Conf	2007NICE,(#279)	07	Ye.Skakun+	D5048

**44 Ruthenium 104**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,t$	$^{102}\text{Ru}$	POD	2JPNTSU	2.2+07	2.2+07	Jour	PR/C,25,(2),1050	Feb 82	Y.Aoki+	E1426

**45 Rhodium 103**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\gamma,4n$	$^{99}\text{Rh}$	CS	3KORPUE		6.5+07	Jour	KPS,50,(2),417	07	Vandonguyen+	M0716
$n,p$	$^{103}\text{Ru}$	?	2ITYCIS	1.4+07	1.4+07	Jour	NC,7,400	Feb 58	L.Colli+	21069

**46 Palladium 104**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,t$	$^{102}\text{Pd}$	POD	2JPNTSU	2.2+07	2.2+07	Jour	PR/C,25,(2),1050	Feb 82	Y.Aoki+	E1426

**46 Palladium 106**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,t$	$^{104}\text{Pd}$	POD	2JPNTSU	2.2+07	2.2+07	Jour	PR/C,25,(2),1050	Feb 82	Y.Aoki+	E1426

**46 Palladium 108**

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

<i>p,t</i>	<sup>106</sup> Pd	POD	2JPNTSU	2.2+07	2.2+07	Jour	PR/C,25,(2),1050	Feb 82	Y.Aoki+	E1426
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**46 Palladium 110**

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

<i>p,t</i>	<sup>108</sup> Pd	POD	2JPNTSU	1.9+07	2.2+07	Jour	PR/C,25,(2),1050	Feb 82	Y.Aoki+	E1426
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**47 Silver 107**

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

$\gamma,3n$	<sup>104</sup> Ag	CS	4RUSMOS		5.0+07	Conf	2007NICE,,124(#317)	07	A.Ermakov+	M0721
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**47 Silver 109**

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

<sup>3</sup> He,2n	<sup>110</sup> In	CS	2JPNIPC	1.1+07	3.7+07	Jour	NP/A,486,(1),77	Sep 88	Y.Nagame+	E1370
<sup>3</sup> He,2n+p	<sup>109</sup> Cd	CS	2JPNIPC	1.7+07	3.8+07	Jour	NP/A,486,(1),77	Sep 88	Y.Nagame+	E1370
<sup>3</sup> He,3n	<sup>109</sup> In	CS	2JPNIPC	1.1+07	3.7+07	Jour	NP/A,486,(1),77	Sep 88	Y.Nagame+	E1370
<sup>3</sup> He,n	<sup>111</sup> In	CS	2JPNTOK	1.1+07	3.7+07	Jour	NP/A,486,(1),77	Sep 88	Y.Nagame+	E1370

**48 Cadmium**

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

<i>d,x</i>	<sup>105</sup> Ag	CS	2JPNTOH	1.4+07	4.0+07	Jour	NIM/B,259,817	07	F.Tarkanyi+	D4179
<i>d,x</i>	<sup>106</sup> Ag	CS	2JPNTOH	1.5+07	4.0+07	Jour	NIM/B,259,817	07	F.Tarkanyi+	D4179
<i>d,x</i>	<sup>110</sup> Ag	CS	2JPNTOH	1.2+07	4.0+07	Jour	NIM/B,259,817	07	F.Tarkanyi+	D4179
<i>d,x</i>	<sup>111</sup> Ag	CS	2JPNTOH	1.2+07	2.1+07	Jour	NIM/B,259,817	07	F.Tarkanyi+	D4179
<i>d,x</i>	<sup>111</sup> Cd	CS	2JPNTOH	4.9+06	2.1+07	Jour	NIM/B,259,817	07	F.Tarkanyi+	D4179
<i>d,x</i>	<sup>115</sup> Cd	CS	2JPNTOH	4.9+06	4.0+07	Jour	NIM/B,259,817	07	F.Tarkanyi+	D4179
<i>d,x</i>	<sup>117</sup> Cd	CS	2JPNTOH	4.9+06	2.1+07	Jour	NIM/B,259,817	07	F.Tarkanyi+	D4179
<i>d,x</i>	<sup>107</sup> In	CS	2JPNTOH	6.5+06	1.4+07	Jour	NIM/B,259,817	07	F.Tarkanyi+	D4179
<i>d,x</i>	<sup>108</sup> In	CS	2JPNTOH	1.2+07	2.1+07	Jour	NIM/B,259,817	07	F.Tarkanyi+	D4179
<i>d,x</i>	<sup>109</sup> In	CS	2JPNTOH	4.9+06	4.0+07	Jour	NIM/B,259,817	07	F.Tarkanyi+	D4179
<i>d,x</i>	<sup>110</sup> In	CS	2JPNTOH	9.0+06	4.0+07	Jour	NIM/B,259,817	07	F.Tarkanyi+	D4179
<i>d,x</i>	<sup>111</sup> In	CS	2JPNTOH	4.9+06	4.0+07	Jour	NIM/B,259,817	07	F.Tarkanyi+	D4179
<i>d,x</i>	<sup>112</sup> In	CS	2JPNTOH	8.0+06	2.1+07	Jour	NIM/B,259,817	07	F.Tarkanyi+	D4179
<i>d,x</i>	<sup>113</sup> In	CS	2JPNTOH	4.9+06	2.1+07	Jour	NIM/B,259,817	07	F.Tarkanyi+	D4179
<i>d,x</i>	<sup>114</sup> In	CS	2JPNTOH	6.5+06	4.0+07	Jour	NIM/B,259,817	07	F.Tarkanyi+	D4179
<i>d,x</i>	<sup>115</sup> In	CS	2JPNTOH	6.5+06	2.1+07	Jour	NIM/B,259,817	07	F.Tarkanyi+	D4179
<i>d,x</i>	<sup>116</sup> In	CS	2JPNTOH	8.0+06	2.1+07	Jour	NIM/B,259,817	07	F.Tarkanyi+	D4179

				49		Indium		115			
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max						
				Ref Vol Page							
$\gamma,inel$	$^{115}\text{In}$	CS	4UKRUZH	7.0+06	2.5+07	Jour	UFZ,51,(7),657		06	V.S.Bokhinyuk+	G4010

				50		Tin					
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max						
				Ref Vol Page							
$\alpha,x$	$^{117}\text{Sn}$	CS	2BLGVUB	1.2+07	3.8+07	Jour	NIM/B,260,672		07	R.A.Rebeles+	D4189
$\alpha,x$	$^{117}\text{Sb}$	CS	2BLGVUB	1.5+07	3.8+07	Jour	NIM/B,260,672		07	R.A.Rebeles+	D4189
$\alpha,x$	$^{120}\text{Sb}$	CS	2BLGVUB	1.2+07	3.8+07	Jour	NIM/B,260,672		07	R.A.Rebeles+	D4189
$\alpha,x$	$^{124}\text{Sb}$	CS	2BLGVUB	1.5+07	3.8+07	Jour	NIM/B,260,672		07	R.A.Rebeles+	D4189
$\alpha,x$	$^{116}\text{Te}$	CS	2BLGVUB	1.5+07	3.8+07	Jour	NIM/B,260,672		07	R.A.Rebeles+	D4189
$\alpha,x$	$^{118}\text{Te}$	CS	2BLGVUB	1.2+07	3.8+07	Jour	NIM/B,260,672		07	R.A.Rebeles+	D4189
$\alpha,x$	$^{119}\text{Te}$	CS	2BLGVUB	1.2+07	3.8+07	Jour	NIM/B,260,672		07	R.A.Rebeles+	D4189
$\alpha,x$	$^{121}\text{Te}$	CS	2BLGVUB	1.5+07	3.8+07	Jour	NIM/B,260,672		07	R.A.Rebeles+	D4189

				50		Tin		116			
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max						
				Ref Vol Page							
$d,^2\text{He}$	$^{116}\text{In}$	DAP	2NEDKVI	1.8+08	1.8+08	Jour	PR/C,71,054313		05	S.Rakers+	D0438

				56		Barium		130			
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max						
				Ref Vol Page							
$\gamma,n$	$^{129}\text{Ba}$	CS	4UKRIEP	1.2+07	1.8+07	Jour	UFZ,46,(5-6),529		01	V.M.Mazur+	G4008

				56		Barium		132			
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max						
				Ref Vol Page							
$\gamma,n$	$^{131}\text{Ba}$	CS	4UKRIEP	1.2+07	1.8+07	Jour	UFZ,46,(5-6),529		01	V.M.Mazur+	G4008

				56		Barium		136			
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max						
				Ref Vol Page							
$\gamma,n$	$^{135}\text{Ba}$	CS	4UKRIEP	1.2+07	1.8+07	Jour	UFZ,46,(5-6),529		01	V.M.Mazur+	G4008

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## Barium

138

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,t$	$^{136}\text{Ba}$	POD	2JPNTSU	1.8+07	2.1+07	Jour	PR/C,25,(2),1050	Feb 82	Y.Aoki+	E1426

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## Lanthanum

139

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,0$		RP	2ZZZCER			Jour	PR/C,75,035807	07	R.Terlizzi+	22930
$n,\gamma$		RP	2ZZZCER	6.0-01	9.0+03	Jour	PR/C,75,035807	07	R.Terlizzi+	22930
$n,\gamma$	$^{140}\text{La}$	CS	3VN DAL	5.5+04	1.4+05	Conf	2007TOKAI,,(V02)	07	Vuonghuutan+	31599
$n,\gamma$	$^{140}\text{La}$	CS	2ZZZCER	Maxwl		Jour	PR/C,75,035807	07	R.Terlizzi+	22930
$n,\gamma$	$^{140}\text{La}$	RI	2ZZZCER		5.0-01	Jour	PR/C,75,035807	07	R.Terlizzi+	22930

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## Praesodymium

141

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\gamma$	$^{142}\text{Pr}$	?	2JPNKTO	Maxwl		Conf	2004SANTA,1,996	04	I.Miyazaki+	22744

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## Samarium

152

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\gamma$	$^{153}\text{Sm}$	CS	2TUKANR	2.5-02	2.5-02	Jour	ANE,34,188	07	M.Karadag+	22964
$n,\gamma$	$^{153}\text{Sm}$	CS	3VN DAL	5.5+04	1.4+05	Conf	2007TOKAI,,(V02)	07	Vuonghuutan+	31599
$n,\gamma$	$^{153}\text{Sm}$	RI	2TUKANR		5.5-01	Jour	ANE,34,188	07	M.Karadag+	22964

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## Gadolinium

155

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\gamma$	$^{156}\text{Gd}$	CS	2JPNTIT	1.5+04	5.5+05	Jour	KPS,50,(2),409	Feb 07	W.C.Chung+	22932

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## Gadolinium

157

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\gamma$	$^{158}\text{Gd}$	CS	2JPNTIT	1.5+04	5.5+05	Jour	KPS,50,(2),409	Feb 07	W.C.Chung+	22932



73 Tantalum 181											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
$^3\text{He},n$	$^{183}\text{Re}$	CS	2JPNTOK	1.8+07	6.4+07	Jour	NP/A,486,(1),77		Sep 88	Y.Nagame+	E1370

  

74 Tungsten 186											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
$n,\text{inel}$	$^{nat}\text{W}$	CSP	2GERPTB	7.2+06	1.4+07	Rept	PTB-N-51		06	D.Schmidt+	22962
$n,\text{inel}$	$^{nat}\text{W}$	DAP	2GERPTB	7.2+06	1.4+07	Rept	PTB-N-51		06	D.Schmidt+	22962
$n,\text{sct}$	$^{nat}\text{W}$	CS	2GERPTB	7.2+06	1.4+07	Rept	PTB-N-51		06	D.Schmidt+	22962
$n,\text{sct}$	$^{nat}\text{W}$	DA	2GERPTB	7.2+06	1.4+07	Rept	PTB-N-51		06	D.Schmidt+	22962
$n,x+n$	inclusive	DA	2GERPTB	7.2+06	1.4+07	Rept	PTB-N-51		06	D.Schmidt+	22962
$n,x+n$	inclusive	DAE	2GERPTB	7.2+06	1.4+07	Rept	PTB-N-51		06	D.Schmidt+	22962
$n,x+n$	inclusive	DE	2GERPTB	7.2+06	1.4+07	Rept	PTB-N-51		06	D.Schmidt+	22962

  

74 Tungsten 186											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
$n,\gamma$	$^{187}\text{W}$	?	2JPNKTO	Maxwl		Conf	2004SANTA,1,996		04	I.Miyazaki+	22744

  

77 Iridium 191											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
$n,\gamma$	$^{192}\text{Ir}$	CS	3VN DAL	5.5+04	1.4+05	Conf	2007TOKAI,,(V02)		07	Vuonghuutan+	31599

  

77 Iridium 193											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
$n,\gamma$	$^{194}\text{Ir}$	CS	3VN DAL	5.5+04	1.4+05	Conf	2007TOKAI,,(V02)		07	Vuonghuutan+	31599

  

79 Gold 197											
Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
$n,\gamma$	$^{198}\text{Au}$	?	2JPNKTO	Maxwl		Conf	2004SANTA,1,996		04	I.Miyazaki+	22744
$p,3n$	$^{195}\text{Hg}$	CS	2JPNTOK	1.8+07	5.1+07	Jour	PR/C,41,(3),889		Mar 90	Y.Nagame+	E1306
$p,n+p$	$^{196}\text{Au}$	CS	2JPNTOK	1.4+07	4.9+07	Jour	PR/C,41,(3),889		Mar 90	Y.Nagame+	E1306
$^3\text{He},2p$	$^{198}\text{Au}$	CS	2JPNIPC	1.9+07	3.9+07	Jour	PR/C,41,(3),889		Mar 90	Y.Nagame+	E1306
$^3\text{He},4n$	$^{196}\text{Tl}$	CS	2JPNIPC	2.3+07	3.9+07	Jour	PR/C,41,(3),889		Mar 90	Y.Nagame+	E1306
$^3\text{He},\alpha$	$^{196}\text{Au}$	CS	2JPNIPC	1.6+07	3.9+07	Jour	PR/C,41,(3),889		Mar 90	Y.Nagame+	E1306

$\alpha,3n$	$^{198}\text{Tl}$	CS	2JPNIPC	2.9+07	3.9+07	Jour	PR/C,41,(3),889	Mar 90	Y.Nagame+	E1306
$\alpha,n+\alpha$	$^{196}\text{Au}$	CS	2JPNIPC	2.4+07	3.9+07	Jour	PR/C,41,(3),889	Mar 90	Y.Nagame+	E1306
$^{12}\text{C},3n$	$^{206}\text{At}$	CS	2JPNJAE	5.9+07	6.9+07	Jour	ZP/A,331,(1),53	Mar 88	S.Baba+	E1358
$^{12}\text{C},4n$	$^{205}\text{At}$	CS	2JPNJAE	5.8+07	8.4+07	Jour	ZP/A,331,(1),53	Mar 88	S.Baba+	E1358
$^{12}\text{C},5n$	$^{204}\text{At}$	CS	2JPNJAE	6.6+07	9.1+07	Jour	ZP/A,331,(1),53	Mar 88	S.Baba+	E1358
$^{12}\text{C},6n$	$^{203}\text{At}$	CS	2JPNJAE	7.5+07	8.6+07	Jour	ZP/A,331,(1),53	Mar 88	S.Baba+	E1358
$^{16}\text{O},3n$	$^{210}\text{Fr}$	CS	2JPNJAE	7.6+07	8.0+07	Jour	ZP/A,331,(1),53	Mar 88	S.Baba+	E1358
$^{16}\text{O},3n$	$^{210}\text{Fr}$	?	2JPNJAE	8.1+07	8.4+07	Jour	ZP/A,331,(1),53	Mar 88	S.Baba+	E1358
$^{16}\text{O},4n$	$^{209}\text{Fr}$	CS	2JPNJAE	7.6+07	9.3+07	Jour	ZP/A,331,(1),53	Mar 88	S.Baba+	E1358
$^{16}\text{O},5n$	$^{208}\text{Fr}$	CS	2JPNJAE	8.1+07	1.1+08	Jour	ZP/A,331,(1),53	Mar 88	S.Baba+	E1358
$^{16}\text{O},5n$	$^{208}\text{Fr}$	?	2JPNJAE	8.5+07	1.0+08	Jour	ZP/A,331,(1),53	Mar 88	S.Baba+	E1358
$^{16}\text{O},6n$	$^{207}\text{Fr}$	CS	2JPNJAE	9.1+07	1.1+08	Jour	ZP/A,331,(1),53	Mar 88	S.Baba+	E1358
$^{16}\text{O},6n$	$^{207}\text{Fr}$	?	2JPNJAE	9.7+07	1.2+08	Jour	ZP/A,331,(1),53	Mar 88	S.Baba+	E1358
$^{16}\text{O},7n$	$^{206}\text{Fr}$	CS	2JPNJAE	1.1+08	1.2+08	Jour	ZP/A,331,(1),53	Mar 88	S.Baba+	E1358
$^{16}\text{O},7n$	$^{206}\text{Fr}$	?	2JPNJAE	1.2+08	1.2+08	Jour	ZP/A,331,(1),53	Mar 88	S.Baba+	E1358

**80                      Mercury                      200**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\gamma,n$	$^{199}\text{Hg}$	CS	4UKRIEP	1.1+07	1.7+07	Jour	UFZ,50,(7),649	05	V.M.Hoshovsky+	G4009

**81                      Thallium                      203**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\gamma,n$	Many	CS	4RUSMOS		5.0+07	Jour	IZV,71,346	07	Zh.A.Asanov+	M0711

**82                      Lead                      204**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\alpha,^8\text{He}$	$^{200}\text{Pb}$	DAP	2JPN TOK	6.5+07	6.5+07	Jour	PR/C,41,(5),2004	May 90	S.Kato+	E1353

**82                      Lead                      208**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$^{13}\text{N},\text{inel}$	$^{208}\text{Pb}$	DAP	2JPNIPC	1.0+09	1.0+09	Jour	PL/B,264,(3-4),259	Aug 91	T.Motobayashi+	E1498
$^{14}\text{O},\text{inel}$	$^{208}\text{Pb}$	DAE	2JPNIPC	1.2+09	1.2+09	Jour	PL/B,264,(3-4),259	Aug 91	T.Motobayashi+	E1498
$^{14}\text{O},\text{inel}$	$^{208}\text{Pb}$	DAP	2JPNIPC	1.2+09	1.2+09	Jour	PL/B,264,(3-4),259	Aug 91	T.Motobayashi+	E1498

**83                      Bismuth                      209**

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

<i>n</i> ,inel	<sup>209</sup> Bi	CS	2ZZZGEL	9.1+05	1.9+07	Conf	2004SANTA,,973	Sep 04	L.C.Mihailescu+	22741
<i>n</i> ,inel	<sup>209</sup> Bi	CSP	2ZZZGEL	9.0+05	1.8+07	Conf	2004SANTA,,973	Sep 04	L.C.Mihailescu+	22741
<i>d</i> , <i>p</i>	<sup>210</sup> Bi	DAE	2JPNOSA	5.6+07	5.6+07	Jour	PL/B,155,(4),227	May 85	H.Sakamoto+	E1462
<i>d</i> , <i>p</i>	<sup>210</sup> Bi	POD	2JPNOSA	5.6+07	5.6+07	Jour	PL/B,155,(4),227	May 85	H.Sakamoto+	E1462
<sup>3</sup> He, <i>2n</i>	<sup>210</sup> At	CS	2JPNIPC	2.1+07	3.5+07	Jour	NP/A,486,(1),77	Sep 88	Y.Nagame+	E1370
<sup>3</sup> He, <i>2n</i> + $\alpha$	<sup>206</sup> Bi	CS	2JPNIPC	2.8+07	3.6+07	Jour	NP/A,486,(1),77	Sep 88	Y.Nagame+	E1370
<sup>3</sup> He, <i>3n</i>	<sup>209</sup> At	CS	2JPNIPC	2.1+07	3.8+07	Jour	NP/A,486,(1),77	Sep 88	Y.Nagame+	E1370
<sup>3</sup> He, <i>4n</i>	<sup>208</sup> At	CS	2JPNIPC	2.5+07	3.8+07	Jour	NP/A,486,(1),77	Sep 88	Y.Nagame+	E1370
<sup>3</sup> He, <i>n</i>	<sup>211</sup> At	CS	2JPNIPIC	1.9+07	6.4+07	Jour	NP/A,486,(1),77	Sep 88	Y.Nagame+	E1370
<sup>12</sup> C, <i>fis</i>		CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>82</sup> Br	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>84</sup> Br	CS	3INDTAT	7.3+07	7.3+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>85</sup> Kr	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>87</sup> Kr	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>89</sup> Rb	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>91</sup> Sr	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>92</sup> Sr	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>90</sup> Y	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>93</sup> Y	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>94</sup> Y	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>97</sup> Zr	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>96</sup> Nb	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>98</sup> Nb	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>99</sup> Mo	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>101</sup> Mo	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>104</sup> Tc	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>103</sup> Ru	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>105</sup> Ru	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>106</sup> Rh	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>107</sup> Rh	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>112</sup> Pd	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>111</sup> Ag	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>115</sup> Cd	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>117</sup> Cd	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>118</sup> Cd	CS	3INDTAT	8.4+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>116</sup> In	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>122</sup> Sb	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>124</sup> Sb	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>126</sup> Sb	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>12</sup> C, <i>fis</i>	<sup>127</sup> Sb	CS	3INDTAT	7.3+07	8.4+07	Jour	JRN,242,(2),551	99	S.S.Rattan+	D6006
<sup>14</sup> N, $\alpha$ + <i>fis</i>	?		2JPNIPC	1.2+08	1.2+08	Jour	PL/B,105,(2-3),135	Oct 81	H.Utsunomiya+	E1396
<sup>14</sup> N, <i>fis</i>		CS	2JPNIPC	8.5+07	9.5+07	Jour	PRL,40,(11),694	Mar 78	T.Nomura+	E1389
<sup>14</sup> N, <i>x</i>	Many	CS	2JPNIPC	8.5+07	9.5+07	Jour	PRL,40,(11),694	Mar 78	T.Nomura+	E1389
<sup>14</sup> N, <i>x</i> + $\alpha$	inclusive	CS	2JPNIPC	8.5+07	9.5+07	Jour	PRL,40,(11),694	Mar 78	T.Nomura+	E1389
<sup>14</sup> N, <i>x</i> + $\alpha$	inclusive	DAE	2JPNIPC	1.2+08	1.2+08	Jour	PL/B,105,(2-3),135	Oct 81	H.Utsunomiya+	E1396

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## Thorium

## 232

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #
				Min	Max					
<i>p</i> , <i>fis</i>	<sup>88</sup> Kr	DA	2JPNIPC	1.5+07	1.5+07	Jour	PR/C,25,(2),909	Feb 82	H.Kudo+	E1390
<i>p</i> , <i>fis</i>	<sup>91</sup> Sr	DA	2JPNIPC	1.5+07	1.5+07	Jour	PR/C,25,(2),909	Feb 82	H.Kudo+	E1390
<i>p</i> , <i>fis</i>	<sup>92</sup> Sr	DA	2JPNIPC	1.5+07	1.5+07	Jour	PR/C,25,(2),909	Feb 82	H.Kudo+	E1390
<i>p</i> , <i>fis</i>	<sup>97</sup> Zr	DA	2JPNIPC	1.5+07	1.5+07	Jour	PR/C,25,(2),909	Feb 82	H.Kudo+	E1390

<i>p</i> ,fis	<sup>99</sup> Mo	DA	2JPNIPC	1.5+07	1.5+07	Jour	PR/C,25,(2),909	Feb 82	H.Kudo+	E1390
<i>p</i> ,fis	<sup>105</sup> Ru	DA	2JPNIPC	1.5+07	1.5+07	Jour	PR/C,25,(2),909	Feb 82	H.Kudo+	E1390
<i>p</i> ,fis	<sup>112</sup> Pd	DA	2JPNIPC	1.5+07	1.5+07	Jour	PR/C,25,(2),909	Feb 82	H.Kudo+	E1390
<i>p</i> ,fis	<sup>115</sup> Cd	DA	2JPNIPC	1.5+07	1.5+07	Jour	PR/C,25,(2),909	Feb 82	H.Kudo+	E1390
<i>p</i> ,fis	<sup>127</sup> Sb	DA	2JPNIPC	1.5+07	1.5+07	Jour	PR/C,25,(2),909	Feb 82	H.Kudo+	E1390
<i>p</i> ,fis	<sup>132</sup> Te	DA	2JPNIPC	1.5+07	1.5+07	Jour	PR/C,25,(2),909	Feb 82	H.Kudo+	E1390
<i>p</i> ,fis	<sup>135</sup> I	DA	2JPNIPC	1.5+07	1.5+07	Jour	PR/C,25,(2),909	Feb 82	H.Kudo+	E1390
<i>p</i> ,fis	<sup>136</sup> Cs	DA	2JPNIPC	1.5+07	1.5+07	Jour	PR/C,25,(2),909	Feb 82	H.Kudo+	E1390
<i>p</i> ,fis	<sup>141</sup> Ce	DA	2JPNIPC	1.5+07	1.5+07	Jour	PR/C,25,(2),909	Feb 82	H.Kudo+	E1390
<i>p</i> ,fis	<sup>143</sup> Ce	DA	2JPNIPC	1.5+07	1.5+07	Jour	PR/C,25,(2),909	Feb 82	H.Kudo+	E1390
<i>p</i> ,fis	<sup>147</sup> Nd	DA	2JPNIPC	1.5+07	1.5+07	Jour	PR/C,25,(2),909	Feb 82	H.Kudo+	E1390

**92 Uranium**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,tot		CS	2FR SAC	1.6+06	1.1+07	Jour	JPR,24,826	Nov 63	J.L.Leroy+	22554

**92 Uranium 238**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<sup>16</sup> O, <i>4n</i>	<sup>250</sup> Fm	CS	2JPNJAE	8.5+07	1.0+08	Jour	PR/C,34,(3),909	Sep 86	N.Shinohara+	E1377
<sup>16</sup> O, <i>x</i>	<sup>242</sup> Cm	CS	2JPNJAE	8.5+07	1.2+08	Jour	PR/C,34,(3),909	Sep 86	N.Shinohara+	E1377
<sup>16</sup> O, <i>x</i>	<sup>244</sup> Cf	CS	2JPNJAE	1.0+08	1.0+08	Jour	PR/C,34,(3),909	Sep 86	N.Shinohara+	E1377
<sup>16</sup> O, <i>x</i>	<sup>245</sup> Cf	CS	2JPNJAE	9.5+07	1.1+08	Jour	PR/C,34,(3),909	Sep 86	N.Shinohara+	E1377
<sup>16</sup> O, <i>x</i>	<sup>246</sup> Cf	CS	2JPNJAE	8.5+07	1.2+08	Jour	PR/C,34,(3),909	Sep 86	N.Shinohara+	E1377

**93 Neptunium 237**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\gamma$ ,fis	Many	FY	4UKRIEP		9.5+06	Jour	UZHV,19,90	06	O.O.Parlag	G4011
<i>n</i> ,fis		CS	2ZZZCER	3.8+01	4.2+01	Conf	2004SANTA,,1039	Oct 04	W.Furman+	22742
<i>n</i> ,fis		INT	2ZZZCER	3.8+01	4.2+01	Conf	2004SANTA,,1039	Oct 04	W.Furman+	22742
<i>n</i> ,fis		?	2ZZZCER	2.4-01	6.6-01	Conf	2004SANTA,,1039	Oct 04	W.Furman+	22742

**94 Plutonium 239**

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis	<sup>98</sup> Zr	SPC	2FR ILL	Maxwl		Jour	PR/C,74,064308	06	G.S.Simpson+	22958

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## Plutonium

242

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$^{12}\text{C},4n$	$^{250}\text{Fm}$	CS	2JPNJAE	6.5+07	8.4+07	Jour	PR/C,34,(3),909	Sep 86	N.Shinohara+	E1377
$^{12}\text{C},x$	$^{242}\text{Cm}$	CS	2JPNJAE	6.5+07	9.3+07	Jour	PR/C,34,(3),909	Sep 86	N.Shinohara+	E1377
$^{12}\text{C},x$	$^{243}\text{Cm}$	?	2JPNJAE	6.7+07	9.3+07	Jour	PR/C,34,(3),909	Sep 86	N.Shinohara+	E1377
$^{12}\text{C},x$	$^{244}\text{Cf}$	CS	2JPNJAE	8.4+07	8.8+07	Jour	PR/C,34,(3),909	Sep 86	N.Shinohara+	E1377
$^{12}\text{C},x$	$^{245}\text{Cf}$	CS	2JPNJAE	7.6+07	9.3+07	Jour	PR/C,34,(3),909	Sep 86	N.Shinohara+	E1377
$^{12}\text{C},x$	$^{246}\text{Cf}$	CS	2JPNJAE	6.5+07	9.3+07	Jour	PR/C,34,(3),909	Sep 86	N.Shinohara+	E1377

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## Americium

241

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,x$	Many	PY	2BLGMOL	2.5-02	2.5-02	Jour	JIN,34,2427	72	H.Ihle+	20881

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## Americium

243

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\gamma$	$^{244}\text{Am}$	CS	2JPNKTO	2.5+00	2.5+00	Jour	NST,43,(12),1441	Dec 06	Masayukiohta+	22967

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## Curium

248

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
0,fis	$^{105}\text{Mo}$	SPC	2FR GRE	Spont		Jour	PR/C,74,064304	06	J.A.Pinston+	22957