EXFOR News (January 2020)

New experimental data available from Nuclear Reaction Data Centres

EXFOR [1] is a world-wide data library for experimental neutron, charged-particle and photon induced reaction data compiled by the International Network of the Nuclear Reaction Data Centres (NRDC)[a] co-ordinated by the IAEA Nuclear Data Section. Regularly updated web retrieval databases are available at IAEA-NDS as well as NNDC, NEADB, JCPRG and CDFE.

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

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

Quantity codes

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

Special codes in outgoing particle field

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

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

1 Hydrogen 1

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #
					Min	Max		Ref Vol Page			
*	^{11}Be,el	^{1}H	?	2JPNOSA	3.0+08	3.0+08	Jour	PR/C,98,014616	18	J.Chen+	E2604
*	^{14}O,2p	^{13}N	?	2JPNIPC	3.5+09	3.5+09	Jour	PTEP,2018,021D01	18	S.Kawase+	E2588
*	^{22}O,2p	^{21}N	?	2JPNIPC	5.5+09	5.5+09	Jour	PTEP,2018,021D01	18	S.Kawase+	E2588
*	^{24}O,2p	^{23}N	?	2JPNIPC	6.0+09	6.0+09	Jour	PTEP,2018,021D01	18	S.Kawase+	E2588
*	^{79}Cu,2p	^{78}Ni	?	2JPNIPC	2.0+10	2.0+10	Jour	NAT,569,53	19	R.Taniuchi+	E2609
*	^{80}Zn,3p	^{78}Ni	?	2JPNIPC	2.0+10	2.0+10	Jour	NAT,569,53	19	R.Taniuchi+	E2609
*	^{136}Xe,x	Many	?	2JPNIPC	2.3+10	2.3+10	Rept	CERN-PROC-2019-001,153	19	X.Sun+	E2616

1 Hydrogen 2

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #
					Min	Max		Ref Vol Page			
*	p,n+p	^{1}H	D3A	2JPNOSA	3.0+08	3.0+08	Jour	PR/C,96,014604	17	T.Wakasa+	E2550
*	^{11}Be,el	^{2}H	?	2JPNOSA	3.0+08	3.0+08	Jour	PR/C,98,014616	18	J.Chen+	E2604
*	^{11}Be,p	^{12}Be	?	2JPNOSA	3.0+08	3.0+08	Jour	PR/C,98,014616	18	J.Chen+	E2604
*	^{136}Xe,x	Many	?	2JPNIPC	2.3+10	2.3+10	Rept	CERN-PROC-2019-001,153	19	X.Sun+	E2616

2 Helium 4

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #
					Min	Max		Ref Vol Page			
	α,2d	^{4}He	D3A	2JPNOSA	1.2+08	1.2+08	Jour	JPJ,48,1797	80	S.Kakigi+	E2569
	α,inel	^{4}He	DAE	2JPNOSA	1.2+08	1.2+08	Jour	JPJ,48,1797	80	S.Kakigi+	E2569

3 Lithium

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #
					Min	Max		Ref Vol Page			
	^{15}N,x	^{17}N	CS	4ZZZDUB	9.5+07	9.5+07	Jour	ZET,41,1365	61	G.N.Flerov+	F1397

3 Lithium 6

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #
					Min	Max		Ref Vol Page			
*	γ,x+n	inclusive	CS	2JPNHIT	4.9+06	5.4+07	Jour	PR/C,95,044307	17	T.Yamagata+	K2534
*	p,n+p	^{5}Li	D3A	2JPNOSA	3.0+08	3.0+08	Jour	PR/C,96,014604	17	T.Wakasa+	E2550

4 Beryllium 9

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	p,el	^{9}Be	POD	1USATNL	1.3+07	1.5+07	Jour	NP/A,204,529	73	H.J.Votava+	F0132
	p,inel	^{9}Be	POD	1USATNL	1.3+07	1.5+07	Jour	NP/A,204,529	73	H.J.Votava+	F0132
	^{17}Ne,x	^{15}O	CS	2JPNIPC	1.1+09	1.1+09	Jour	NP/A,734,337	04	R.Kanungo	E2619
*	^{33}Na,x	^{32}Ne	CS	2JPNIPC	2.2+08	2.2+08	Jour	PR/C,99,011302	19	I.Murray+	E2623
*	^{33}Na,x	^{32}Ne	CSP	2JPNIPC	2.2+08	2.2+08	Jour	PR/C,99,011302	19	I.Murray+	E2623
*	^{34}Mg,x	^{32}Ne	CS	2JPNIPC	2.4+08	2.4+08	Jour	PR/C,99,011302	19	I.Murray+	E2623
*	^{34}Mg,x	^{32}Ne	CSP	2JPNIPC	2.4+08	2.4+08	Jour	PR/C,99,011302	19	I.Murray+	E2623

5 Boron

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,tot		CS	1USACOL			Jour	NSE,8,453	60	F.T.Gould+	11198

5 Boron 11

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	d,t	^{10}B	DAP	4RUSKUR	2.0+07	2.0+07	Jour	ZET,39,1618	60	N.A.Vlasov+	F1400

6 Carbon

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	d,x+γ	inclusive	PY	2JPNKYU	5.0+06	9.0+06	Jour	RPR,42,16	17	S.Araki+	E2577
*	^{93}Zr,x	^{91}Zr	CS	2JPNIPC	1.9+10	1.9+10	Jour	PTEP,2019,013D02	19	S.Takeuchi+	E2595
*	^{93}Zr,x	^{92}Zr	CS	2JPNIPC	1.9+10	1.9+10	Jour	PTEP,2019,013D02	19	S.Takeuchi+	E2595
*	^{94}Zr,x	^{92}Zr	CS	2JPNIPC	1.9+10	1.9+10	Jour	PTEP,2019,013D02	19	S.Takeuchi+	E2595
*	^{94}Zr,x	^{93}Zr	CS	2JPNIPC	1.9+10	1.9+10	Jour	PTEP,2019,013D02	19	S.Takeuchi+	E2595

6 Carbon 12

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	p,n+p	^{11}C	D3A	2JPNOSA	3.0+08	3.0+08	Jour	PR/C,96,014604	17	T.Wakasa+	E2550
	^{15}N,x	^{17}N	CS	4ZZZDUB	9.5+07	9.5+07	Jour	ZET,41,1365	61	G.N.Flerov+	F1397
	^{16}O,x	^{17}N	PY	4ZZZDUB	9.5+07	9.5+07	Jour	ZET,41,1365	61	G.N.Flerov+	F1397
	^{22}Ne,x	^{17}N	PY	4ZZZDUB	1.8+08	1.8+08	Jour	ZET,41,1365	61	G.N.Flerov+	F1397
*	^{30}Ne,x	^{29}F	CS	2JPNIPC	6.9+09	6.9+09	Jour	PTEP,2016,083D01	16	J.Lee+	E2587
*	^{136}Xe,x	Many	?	2JPNIPC	2.3+10	2.3+10	Rept	CERN-PROC-2019-001,153	19	X.Sun+	E2616

6 Carbon 13

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,0		RP	1USAORL			Prog	ORNL-2501,18	Jun 58	H.B.Willard+	11293

9 Fluorine 19

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	p,inel	^{19}F	CSP	4RUSMOS	6.6+06	6.6+06	Jour	ZET,41,1040	61	S.S.Vasil'Ev+	F1395
	p,inel	^{19}F	DAP	4RUSMOS	6.6+06	6.6+06	Jour	ZET,41,1040	61	S.S.Vasil'Ev+	F1395

10 Neon 22

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	^{6}Li,d	^{26}Mg	DAP	2JPNOSA	8.2+07	8.2+07	Jour	PR/C,93,055803	16	R.Talwar+	E2514

12 Magnesium 26

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	α,inel	^{26}Mg	DAP	2JPNOSA	2.1+08	2.1+08	Jour	PR/C,93,055803	16	R.Talwar+	E2514

13 Aluminium 27

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	d,x	^{24}Na	CS	2JPNIPC	3.4+06	2.3+07	Jour	EPJ/CS,146,11029	17	M.U.Khandaker+	E2540
	^{3}He,x+^{3}He	inclusive	DAE	4KASKAZ	3.4+07	3.4+07	Jour	YF,36,19	82	N.T.Burtebaev+	F0940
	^{15}N,x	^{17}N	CS	4ZZZDUB	9.5+07	9.5+07	Jour	ZET,41,1365	61	G.N.Flerov+	F1397
	^{16}O,x	^{17}N	PY	4ZZZDUB	9.5+07	9.5+07	Jour	ZET,41,1365	61	G.N.Flerov+	F1397

17 Chlorine 35

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,0		RP	4RUSLEB			Jour	ZET,40,1610	61	Yu.P.Popov+	40807
	n,p	^{35}S	CS	4RUSLEB	2.6+01	7.4+03	Jour	ZET,40,1610	61	Yu.P.Popov+	40807
	n,p	^{35}S	RI	4RUSLEB	5.0-01	2.0+04	Jour	ZET,40,1610	61	Yu.P.Popov+	40807

18 Argon 36

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,α	^{33}S	CS	4RUSLEB	2.5+06	2.5+06	Jour	AE/S,,(5),75	57	A.V.Elpidinskii+	40774

20 Calcium 40

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	p,inel	^{40}Ca	DAP	4RUSMOS	6.6+06	6.6+06	Jour	ZET,42,395	62	S.S.Vasil'Ev+	F1396

22 Titanium

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	p,x	^{44}Sc	CS	3INDTRM	1.3+07	2.2+07	Jour	NP/A,987,128	19	S.Parashari+	D6353
*	p,x	^{46}Sc	CS	3INDTRM	1.3+07	2.2+07	Jour	NP/A,987,128	19	S.Parashari+	D6353
*	p,x	^{47}Sc	CS	3INDTRM	1.3+07	2.2+07	Jour	NP/A,987,128	19	S.Parashari+	D6353
*	p,x	^{48}V	CS	3INDTRM	1.3+07	2.2+07	Jour	NP/A,987,128	19	S.Parashari+	D6353

23 Vanadium

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	^{12}C,x+n	inclusive	DA	4RUSKUR	8.0+07	8.0+07	Jour	ZET,40,1004	61	A.S.Karamyan+	F1398

23 Vanadium 51

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	^{16}O,2n	^{65}Ga	CS	3INDNSD	4.7+07	7.5+07	Jour	PR/C,100,034616	19	M.Kumar+	D6369
*	^{16}O,x	^{56}Co	CS	3INDNSD	7.5+07	9.8+07	Jour	PR/C,100,034616	19	M.Kumar+	D6369
*	^{16}O,x	^{57}Co	CS	3INDNSD	6.2+07	9.8+07	Jour	PR/C,100,034616	19	M.Kumar+	D6369
*	^{16}O,x	^{58}Co	CS	3INDNSD	4.7+07	9.8+07	Jour	PR/C,100,034616	19	M.Kumar+	D6369
*	^{16}O,x	^{61}Co	CS	3INDNSD	4.7+07	9.8+07	Jour	PR/C,100,034616	19	M.Kumar+	D6369
*	^{16}O,x	^{60}Cu	CS	3INDNSD	6.2+07	9.8+07	Jour	PR/C,100,034616	19	M.Kumar+	D6369
*	^{16}O,x	^{61}Cu	CS	3INDNSD	6.2+07	9.8+07	Jour	PR/C,100,034616	19	M.Kumar+	D6369
*	^{16}O,x	^{62}Zn	CS	3INDNSD	7.5+07	9.8+07	Jour	PR/C,100,034616	19	M.Kumar+	D6369
*	^{16}O,x	^{63}Zn	CS	3INDNSD	4.7+07	9.8+07	Jour	PR/C,100,034616	19	M.Kumar+	D6369

24 Chromium 52

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	γ,0		RP	2JPNHIT			Jour	PR/C,96,044316	17	T.Shizuma+	K2555

24 Chromium 54

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	p,n	^{54}Mn	CSP	2JPNTIT	2.0+06	3.9+06	Jour	NP/A,194,259	72	M.Ogawa+	E2572

25 Manganese 55

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	p,inel	^{55}Mn	DAP	4RUSMOS	6.6+06	6.6+06	Jour	ZET,42,395	62	S.S.Vasil'Ev+	F1396

27 Cobalt 59

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	^{3}He,x+^{3}He	inclusive	DAE	4KASKAZ	3.4+07	3.4+07	Jour	YF,36,19	82	N.T.Burtebaev+	F0940

28 Nickel

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	p,x	^{61}Cu	CS	3INDTRM	7.4+06	1.9+07	Jour	NP/A,977,112	18	S.Badwar+	D6334

28 Nickel 58

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,2n	^{57}Ni	CS	3INDTRM	1.4+07	1.7+07	Jour	EPJ/A,55,51	19	S.Parashari+	33128
*	n,p	^{58}Co	CS	3INDTRM	3.0+06	1.7+07	Jour	EPJ/A,55,51	19	S.Parashari+	33128

28 Nickel 60

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	p,n	^{60}Cu	CS	3INDTRM	7.2+06	1.9+07	Jour	JRN,319,695	19	B.Lawriniang+	D6352
	d,x+d	inclusive	DAE	4KASKAZ	2.3+07	2.3+07	Jour	IZV,48,1006	84	N.T.Burtebaev+	F0570

29 Copper

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	^{15}N,x	^{17}N	CS	4ZZZDUB	9.5+07	9.5+07	Jour	ZET,41,1365	61	G.N.Flerov+	F1397
	^{16}O,x	^{17}N	PY	4ZZZDUB	9.5+07	9.5+07	Jour	ZET,41,1365	61	G.N.Flerov+	F1397

30 Zinc 68

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	α,el	^{68}Zn	DA	4KASKAZ	5.0+07	5.0+07	Jour	IZV,39,2152	75	K.B.Baktybaev+	F0865
	α,inel	^{68}Zn	DAP	4KASKAZ	5.0+07	5.0+07	Jour	IZV,39,2152	75	K.B.Baktybaev+	F0865

30 Zinc 70

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	α,el	^{70}Zn	DA	4KASKAZ	5.0+07	5.0+07	Jour	IZV,39,2152	75	K.B.Baktybaev+	F0865
	α,inel	^{70}Zn	DAP	4KASKAZ	5.0+07	5.0+07	Jour	IZV,39,2152	75	K.B.Baktybaev+	F0865

31 Gallium 69

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,2n	^{68}Ga	CS	3INDTRM	1.5+07	1.5+07	Jour	NP/A,992,121613	19	R.Pachuau+	33132
*	n,p	^{69}Zn	CS	3INDTRM	1.5+07	1.5+07	Jour	NP/A,992,121613	19	R.Pachuau+	33132

31 Gallium 71

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,2n	^{70}Ga	CS	3INDTRM	1.5+07	1.5+07	Jour	NP/A,992,121613	19	R.Pachuau+	33132
*	n,n+α	^{67}Cu	CS	3INDTRM	1.5+07	1.5+07	Jour	NP/A,992,121613	19	R.Pachuau+	33132
*	n,p	^{71}Zn	CS	3INDTRM	1.5+07	1.5+07	Jour	NP/A,992,121613	19	R.Pachuau+	33132

38 Strontium 86

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,2n	^{85}Sr	CS	3INDTRM	1.7+07	1.9+07	Jour	ARI,154,108866	19	N.Shetty+	33133

39 Yttrium 89

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	α,2n	^{91}Nb	CS	2JPNIPC	2.0+07	3.9+07	Jour	NIM/B,458,21	19	T.Murata+	E2617
*	α,3n	^{90}Nb	CS	2JPNIPC	2.9+07	5.0+07	Jour	NIM/B,458,21	19	T.Murata+	E2617
*	α,4n	^{89}Nb	CS	2JPNIPC	4.4+07	5.0+07	Jour	NIM/B,458,21	19	T.Murata+	E2617
*	α,n	^{92}Nb	CS	2JPNIPC	9.7+06	5.0+07	Jour	NIM/B,458,21	19	T.Murata+	E2617
*	α,x	^{87}Y	CS	2JPNIPC	3.3+07	5.0+07	Jour	NIM/B,458,21	19	T.Murata+	E2617
*	α,x	^{88}Y	CS	2JPNIPC	2.4+07	5.0+07	Jour	NIM/B,458,21	19	T.Murata+	E2617
*	α,x	^{90}Y	CS	2JPNIPC	4.2+07	5.0+07	Jour	NIM/B,458,21	19	T.Murata+	E2617
*	α,x	^{88}Zr	CS	2JPNIPC	4.6+07	5.0+07	Jour	NIM/B,458,21	19	T.Murata+	E2617
*	α,x	^{89}Zr	CS	2JPNIPC	3.1+07	5.0+07	Jour	NIM/B,458,21	19	T.Murata+	E2617
*	^{12}C,3n	^{98}Rh	CS	3INDTRM	4.1+07	7.4+07	Jour	PR/C,99,064609	19	A.Chauhan+	D6357
*	^{12}C,4n	^{97}Rh	CS	3INDTRM	4.8+07	7.4+07	Jour	PR/C,99,064609	19	A.Chauhan+	D6357
*	^{12}C,5n	^{96}Rh	CS	3INDTRM	6.7+07	7.4+07	Jour	PR/C,99,064609	19	A.Chauhan+	D6357
*	^{12}C,x	^{93}Mo	CS	3INDTRM	6.7+07	7.4+07	Jour	PR/C,99,064609	19	A.Chauhan+	D6357
*	^{12}C,x	^{93}Tc	CS	3INDTRM	6.7+07	7.4+07	Jour	PR/C,99,064609	19	A.Chauhan+	D6357
*	^{12}C,x	^{94}Tc	CS	3INDTRM	4.1+07	7.4+07	Jour	PR/C,99,064609	19	A.Chauhan+	D6357
*	^{12}C,x	^{95}Tc	CS	3INDTRM	4.1+07	7.4+07	Jour	PR/C,99,064609	19	A.Chauhan+	D6357
*	^{12}C,x	^{96}Tc	CS	3INDTRM	4.1+07	7.4+07	Jour	PR/C,99,064609	19	A.Chauhan+	D6357
*	^{12}C,x	^{97}Ru	CS	3INDTRM	4.1+07	7.4+07	Jour	PR/C,99,064609	19	A.Chauhan+	D6357

40 Zirconium 90

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	^{12}N,^{12}C	^{90}Nb	DA	2JPNIPC	2.1+09	2.1+09	Jour	PRL,120,172501	18	S.Noji+	E2585
*	^{12}N,^{12}C	^{90}Nb	DAE	2JPNIPC	2.1+09	2.1+09	Jour	PRL,120,172501	18	S.Noji+	E2585

40 Zirconium 91

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
d,t	^{90}Zr	DAP	4RUSKUR	2.0+07	2.0+07	Jour	ZET,39,1615	60	N.A.Vlasov+	F1399

40 Zirconium 92

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
d,t	^{91}Zr	DAP	4RUSKUR	2.0+07	2.0+07	Jour	ZET,39,1615	60	N.A.Vlasov+	F1399

40 Zirconium 94

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
d,t	^{93}Zr	DAP	4RUSKUR	2.0+07	2.0+07	Jour	ZET,39,1615	60	N.A.Vlasov+	F1399

40 Zirconium 96

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,γ	^{97}Zr	CS	3INDTRM	6.1+05	1.0+06	Jour	EPJ/A,54,168	18	S.Badwar+	33114

41 Niobium 93

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	$n,2n$	^{92}Nb	CS	3INDTRM	1.5+07	1.5+07	Jour	JRN,320,561	19	I.Pasha+	33129
*	n,α	^{90}Y	CS	3INDTRM	1.5+07	1.5+07	Jour	JRN,320,561	19	I.Pasha+	33129
*	p,n	^{93}Mo	CS	3INDTRM	1.2+07	2.2+07	Jour	NP/A,978,160	18	S.Parashari+	D6335
*	p,n	^{93}Mo	CS	3INDTRM	8.6+06	1.9+07	Jour	NP/A,973,79	18	B.Lawriniang+	D6333
*	$p,n+\alpha$	^{89}Zr	CS	3INDTRM	1.4+07	2.2+07	Jour	NP/A,978,160	18	S.Parashari+	D6335
*	p,x	^{92}Nb	CS	3INDTRM	1.2+07	2.2+07	Jour	NP/A,978,160	18	S.Parashari+	D6335
*	p,x	^{92}Nb	CS	3INDTRM	1.3+07	1.9+07	Jour	NP/A,973,79	18	B.Lawriniang+	D6333
	^{12}C,x+n	inclusive	DA	4RUSKUR	8.0+07	8.0+07	Jour	ZET,40,1004	61	A.S.Karamyan+	F1398
*	^{28}Si,x	Many	CS	3INDTRM	1.0+08	1.6+08	Jour	IMP/E,27,1850010	18	R.Tripathi+	D6330
*	^{28}Si,x	^{113}Sn	CS	3INDTRM	1.6+08	1.6+08	Jour	IMP/E,27,1850010	18	R.Tripathi+	D6330

42 Molybdenum 92

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,p	^{92}Nb	CS	3INDTRM	1.5+07	1.5+07	Jour	JRN,320,561	19	I.Pasha+	33129

42 Molybdenum 100

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	$n,2n$	^{99}Mo	CS	3INDTRM	1.1+07	2.0+07	Jour	PR/C,99,044602	19	S.Parashari+	33131

43 Technetium 99

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,0		RP	1USAORL	7.0-01	4.5+02	Jour	BAP,3,364(G2)	58	G.G.Slaughter+	12485

46 Palladium

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	α,x	^{103}Ag	CS	2JPNIPC	3.3+07	5.0+07	Jour	NIM/B,449,99	19	M.Aikawa+	E2608

*	α,x	^{105}Ag	CS	2JPNIPC	1.1+07	5.0+07	Jour	NIM/B,449,99	19	M.Aikawa+	E2608
*	α,x	^{106}Ag	CS	2JPNIPC	2.2+07	5.0+07	Jour	NIM/B,449,99	19	M.Aikawa+	E2608
*	α,x	^{110}Ag	CS	2JPNIPC	2.2+07	5.0+07	Jour	NIM/B,449,99	19	M.Aikawa+	E2608
*	α,x	^{111}Ag	CS	2JPNIPC	1.1+07	5.0+07	Jour	NIM/B,449,99	19	M.Aikawa+	E2608
*	α,x	^{104}Cd	CS	2JPNIPC	2.6+07	5.0+07	Jour	NIM/B,449,99	19	M.Aikawa+	E2608
*	α,x	^{105}Cd	CS	2JPNIPC	3.3+07	5.0+07	Jour	NIM/B,449,99	19	M.Aikawa+	E2608
*	α,x	^{107}Cd	CS	2JPNIPC	1.1+07	5.0+07	Jour	NIM/B,449,99	19	M.Aikawa+	E2608
*	α,x	^{109}Cd	CS	2JPNIPC	1.7+07	5.0+07	Jour	NIM/B,449,99	19	M.Aikawa+	E2608
*	α,x	^{111}Cd	CS	2JPNIPC	1.7+07	5.0+07	Jour	NIM/B,449,99	19	M.Aikawa+	E2608

47 Silver

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #
					Min	Max		Ref Vol Page			
	n,el	^{nat}Ag	DA	4UKRIJD	1.4+07	1.4+07	Jour	ZET,40,725	61	V.I.Strizhak+	41242
*	p,x	^{107}Cd	CS	3INDTRM	1.1+07	2.2+07	Jour	NP/A,979,102	18	S.Parashari+	D6336

47 Silver 107

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #
					Min	Max		Ref Vol Page			
*	p,x	^{106}Ag	CS	3INDTRM	1.4+07	2.2+07	Jour	NP/A,979,102	18	S.Parashari+	D6336

50 Tin 112

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #
					Min	Max		Ref Vol Page			
	^{3}He,x+^{3}He	inclusive	DAE	4KASKAZ	3.4+07	3.4+07	Jour	YF,36,19	82	N.T.Burtebaev+	F0940

50 Tin 124

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #
					Min	Max		Ref Vol Page			
*	^{7}Li,x	^{123}Sn	CS	3INDTAT	1.8+07	3.6+07	Jour	PR/C,97,014607	18	V.V.Parkar+	D6337
*	^{7}Li,x	^{123}Sn	CS	3INDTRM	2.0+07	3.4+07	Jour	PR/C,98,014601	18	V.V.Parkar+	D6342
*	^{7}Li,x	^{125}Sn	CS	3INDTAT	1.8+07	3.6+07	Jour	PR/C,97,014607	18	V.V.Parkar+	D6337
*	^{7}Li,x	^{125}Sn	CS	3INDTRM	2.0+07	3.4+07	Jour	PR/C,98,014601	18	V.V.Parkar+	D6342
*	^{7}Li,x	^{124}Sb	CS	3INDTAT	1.8+07	3.6+07	Jour	PR/C,97,014607	18	V.V.Parkar+	D6337
*	^{7}Li,x	^{124}Sb	CS	3INDTRM	2.0+07	3.4+07	Jour	PR/C,98,014601	18	V.V.Parkar+	D6342
*	^{7}Li,x	^{125}Sb	CS	3INDTAT	1.8+07	3.6+07	Jour	PR/C,97,014607	18	V.V.Parkar+	D6337
*	^{7}Li,x	^{125}Sb	CS	3INDTRM	2.0+07	3.4+07	Jour	PR/C,98,014601	18	V.V.Parkar+	D6342
*	^{7}Li,x	^{126}Sb	CS	3INDTAT	1.8+07	3.6+07	Jour	PR/C,97,014607	18	V.V.Parkar+	D6337
*	^{7}Li,x	^{126}Te	CS	3INDTRM	1.8+07	3.6+07	Jour	PR/C,98,014601	18	V.V.Parkar+	D6342
*	^{7}Li,x	^{126}Te	CS	3INDTAT	2.6+07	3.9+07	Jour	PR/C,97,014607	18	V.V.Parkar+	D6337
*	^{7}Li,x	^{127}Te	CS	3INDTRM	2.0+07	3.6+07	Jour	PR/C,98,014601	18	V.V.Parkar+	D6342
*	^{7}Li,x	^{127}Te	CS	3INDTAT	2.2+07	3.9+07	Jour	PR/C,97,014607	18	V.V.Parkar+	D6337
	^{16}O,3n	^{137}Ce	CS	3INDNSD	6.2+07	8.3+07				D.Singh+	D6341
	^{16}O,5n	^{135}Ce	CS	3INDNSD	6.2+07	1.0+08				D.Singh+	D6341

	^{16}O,7n	^{133}Ce	CS	3INDNSD	8.8+07	1.0+08			D.Singh+	D6341
	^{16}O,x	^{131}I	CS	3INDNSD	8.0+07	1.0+08			D.Singh+	D6341
	^{16}O,x	^{131}Xe	CS	3INDNSD	7.4+07	1.0+08			D.Singh+	D6341
	^{16}O,x	^{132}Cs	CS	3INDNSD	7.4+07	1.0+08			D.Singh+	D6341
	^{16}O,x	^{135}Cs	CS	3INDNSD	6.2+07	1.0+08			D.Singh+	D6341
	^{16}O,x	^{129}Ba	CS	3INDNSD	6.8+07	1.0+08			D.Singh+	D6341
	^{16}O,x	^{131}Ba	CS	3INDNSD	8.3+07	1.0+08			D.Singh+	D6341
	^{16}O,x	^{133}Ba	CS	3INDNSD	6.2+07	1.0+08			D.Singh+	D6341
	^{16}O,x	^{133}La	CS	3INDNSD	9.4+07	1.0+08			D.Singh+	D6341

52 Tellurium 130

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	^{37}Cl,fus		CS	3INDNSD	9.4+07	1.2+08	Jour	PR/C,99,024607	19	R.N.Sahoo+	D6360

58 Cerium 140

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,2n	^{139}Ce	CS	3INDPOO	1.4+07	1.5+07	Jour	ARI,146,10	19	V.D.Bharud+	33127

59 Praseodymium 141

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	α,n	^{144}Pm	CS	3INDVEC	1.4+07	4.0+07	Jour	PR/C,98,054607	18	M.K.Sharma+	D6348

60 Neodymium 148

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	^{16}O,3n	^{161}Er	CS	3INDNSD	6.7+07	8.4+07	Jour	PR/C,100,024621	19	P.K.Giri+	D6368
*	^{16}O,5n	^{159}Er	CS	3INDNSD	7.7+07	1.0+08	Jour	PR/C,100,024621	19	P.K.Giri+	D6368
*	^{16}O,6n	^{158}Er	CS	3INDNSD	8.4+07	1.0+08	Jour	PR/C,100,024621	19	P.K.Giri+	D6368
*	^{16}O,x	^{155}Tb	CS	3INDNSD	8.4+07	1.0+08	Jour	PR/C,100,024621	19	P.K.Giri+	D6368
*	^{16}O,x	^{155}Dy	CS	3INDNSD	8.4+07	1.0+08	Jour	PR/C,100,024621	19	P.K.Giri+	D6368
*	^{16}O,x	^{157}Dy	CS	3INDNSD	6.7+07	1.0+08	Jour	PR/C,100,024621	19	P.K.Giri+	D6368
*	^{16}O,x	^{159}Ho	CS	3INDNSD	7.2+07	1.0+08	Jour	PR/C,100,024621	19	P.K.Giri+	D6368
*	^{16}O,x	^{160}Ho	CS	3INDNSD	6.3+07	1.0+08	Jour	PR/C,100,024621	19	P.K.Giri+	D6368
*	^{16}O,x	^{161}Ho	CS	3INDNSD	6.7+07	7.7+07	Jour	PR/C,100,024621	19	P.K.Giri+	D6368

63 Europium 152

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

	n,tot		CS	4UKRIJD	2.5-02	2.5-02	Rept	INDC(CCP)-197,13	82	V.A.Pshenichnyj+	40606

64 Gadolinium 153

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #
					Min	Max		Ref Vol Page			
	n,α	^{150}Sm	CSP	2FR ILL	Maxwl		Rept	LYCEN-7991,91	80	A.Emsallem+	21714

65 Terbium 159

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #
					Min	Max		Ref Vol Page			
*	d,2n	^{159}Dy	CS	2JPNIPC	7.5+06	2.4+07	Jour	NIM/B,461,102	19	D.Ichinkhorloo+	E2629
*	d,4n	^{157}Dy	CS	2JPNIPC	2.1+07	2.4+07	Jour	NIM/B,461,102	19	D.Ichinkhorloo+	E2629
*	d,p	^{160}Tb	CS	2JPNIPC	2.6+06	2.4+07	Jour	NIM/B,461,102	19	D.Ichinkhorloo+	E2629
*	^{6}Li,x	^{160}Ho	CS	3INDTRM	3.4+07	3.4+07	Jour	PR/C,98,014601	18	V.V.Parkar+	D6342
*	^{6}Li,x	^{162}Ho	CS	3INDTRM	2.4+07	3.4+07	Jour	PR/C,98,014601	18	V.V.Parkar+	D6342

67 Holmium 165

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #
					Min	Max		Ref Vol Page			
*	^{12}C,3n	^{174}Ta	CS	3INDNSD	5.7+07	8.3+07	Jour	PR/C,100,024622	19	S.A.Tali+	D6359
*	^{12}C,4n	^{173}Ta	CS	3INDNSD	5.7+07	8.7+07	Jour	PR/C,100,024622	19	S.A.Tali+	D6359
*	^{12}C,5n	^{172}Ta	CS	3INDNSD	6.6+07	8.7+07	Jour	PR/C,100,024622	19	S.A.Tali+	D6359
*	^{12}C,6n	^{171}Ta	CS	3INDNSD	7.9+07	8.7+07	Jour	PR/C,100,024622	19	S.A.Tali+	D6359
*	^{12}C,x	^{166}Tm	CS	3INDNSD	6.6+07	8.7+07	Jour	PR/C,100,024622	19	S.A.Tali+	D6359
*	^{12}C,x	^{167}Tm	CS	3INDNSD	6.2+07	8.7+07	Jour	PR/C,100,024622	19	S.A.Tali+	D6359
*	^{12}C,x	^{169}Yb	CS	3INDNSD	6.2+07	8.7+07	Jour	PR/C,100,024622	19	S.A.Tali+	D6359
*	^{12}C,x	^{169}Lu	CS	3INDNSD	6.2+07	8.7+07	Jour	PR/C,100,024622	19	S.A.Tali+	D6359
*	^{12}C,x	^{170}Lu	CS	3INDNSD	5.7+07	8.7+07	Jour	PR/C,100,024622	19	S.A.Tali+	D6359
*	^{12}C,x	^{171}Lu	CS	3INDNSD	5.7+07	8.7+07	Jour	PR/C,100,024622	19	S.A.Tali+	D6359
*	^{12}C,x	^{172}Lu	CS	3INDNSD	7.0+07	8.7+07	Jour	PR/C,100,024622	19	S.A.Tali+	D6359
*	^{12}C,x	^{171}Hf	CS	3INDNSD	7.9+07	8.7+07	Jour	PR/C,100,024622	19	S.A.Tali+	D6359
*	^{12}C,x	^{173}Hf	CS	3INDNSD	5.7+07	8.7+07	Jour	PR/C,100,024622	19	S.A.Tali+	D6359

68 Erbium

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #
					Min	Max		Ref Vol Page			
*	α,x	^{165}Tm	CS	2JPNIPC	1.6+07	4.9+07	Jour	ARI,154,108874	19	M.Saito+	E2618
*	α,x	^{166}Tm	CS	2JPNIPC	4.0+07	4.9+07	Jour	ARI,154,108874	19	M.Saito+	E2618
*	α,x	^{167}Tm	CS	2JPNIPC	1.6+07	4.9+07	Jour	ARI,154,108874	19	M.Saito+	E2618
*	α,x	^{168}Tm	CS	2JPNIPC	2.3+07	4.9+07	Jour	ARI,154,108874	19	M.Saito+	E2618
*	α,x	^{170}Tm	CS	2JPNIPC	2.6+07	4.9+07	Jour	ARI,154,108874	19	M.Saito+	E2618
*	α,x	^{173}Tm	CS	2JPNIPC	2.0+07	4.1+07	Jour	ARI,154,108874	19	M.Saito+	E2618
*	α,x	^{166}Yb	CS	2JPNIPC	4.0+07	4.9+07	Jour	ARI,154,108874	19	M.Saito+	E2618
*	α,x	^{169}Yb	CS	2JPNIPC	1.6+07	4.9+07	Jour	ARI,154,108874	19	M.Saito+	E2618

69 Thulium 169

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	^{12}C,4n	^{177}Re	CS	3INDNSD	5.6+07	8.9+07	Jour	APP/B,49,585	18	R.N.Sahoo+	D6326
*	^{19}F,x	Many	CS	3INDNSD	9.2+07	1.1+08	Jour	PR/C,99,024617	19	M.Shuaib+	D6361

70 Ytterbium

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	α,x	^{169}Yb	CS	2JPNIPC	3.5+07	4.9+07	Jour	NIM/B,453,15	19	M.Saito+	E2610
*	α,x	^{171}Lu	CS	2JPNIPC	1.9+07	4.9+07	Jour	NIM/B,453,15	19	M.Saito+	E2610
*	α,x	^{172}Lu	CS	2JPNIPC	2.8+07	4.9+07	Jour	NIM/B,453,15	19	M.Saito+	E2610
*	α,x	^{173}Lu	CS	2JPNIPC	1.9+07	4.9+07	Jour	NIM/B,453,15	19	M.Saito+	E2610
*	α,x	^{177}Lu	CS	2JPNIPC	2.3+07	4.9+07	Jour	NIM/B,453,15	19	M.Saito+	E2610
*	α,x	^{170}Hf	CS	2JPNIPC	3.9+07	4.9+07	Jour	NIM/B,453,15	19	M.Saito+	E2610
*	α,x	^{171}Hf	CS	2JPNIPC	3.1+07	4.9+07	Jour	NIM/B,453,15	19	M.Saito+	E2610
*	α,x	^{172}Hf	CS	2JPNIPC	2.3+07	4.9+07	Jour	NIM/B,453,15	19	M.Saito+	E2610
*	α,x	^{173}Hf	CS	2JPNIPC	1.9+07	4.9+07	Jour	NIM/B,453,15	19	M.Saito+	E2610
*	α,x	^{175}Hf	CS	2JPNIPC	1.9+07	4.9+07	Jour	NIM/B,453,15	19	M.Saito+	E2610

71 Lutetium 175

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,0		RP	1USAORL		4.3+01	Prog	ORNL-2718,26	59	R.C.Block+	11349
*	^{19}F,4n	^{190}Hg	CS	3INDNSD	8.3+07	1.1+08	Jour	PR/C,98,014605	18	M.Shuaib+	D6343
*	^{19}F,5n	^{189}Hg	CS	3INDNSD	8.3+07	1.1+08	Jour	PR/C,98,014605	18	M.Shuaib+	D6343
*	^{19}F,6n	^{188}Hg	CS	3INDNSD	9.5+07	1.1+08	Jour	PR/C,98,014605	18	M.Shuaib+	D6343
*	^{19}F,x	^{181}Re	CS	3INDNSD	8.6+07	1.1+08	Jour	PR/C,98,014605	18	M.Shuaib+	D6343
*	^{19}F,x	^{182}Os	CS	3INDNSD	8.3+07	1.1+08	Jour	PR/C,98,014605	18	M.Shuaib+	D6343
*	^{19}F,x	^{183}Os	CS	3INDNSD	8.3+07	1.1+08	Jour	PR/C,98,014605	18	M.Shuaib+	D6343
*	^{19}F,x	^{185}Ir	CS	3INDNSD	9.5+07	1.1+08	Jour	PR/C,98,014605	18	M.Shuaib+	D6343
*	^{19}F,x	^{186}Ir	CS	3INDNSD	9.2+07	1.1+08	Jour	PR/C,98,014605	18	M.Shuaib+	D6343
*	^{19}F,x	^{187}Ir	CS	3INDNSD	8.6+07	1.1+08	Jour	PR/C,98,014605	18	M.Shuaib+	D6343
*	^{19}F,x	^{186}Pt	CS	3INDNSD	8.3+07	1.1+08	Jour	PR/C,98,014605	18	M.Shuaib+	D6343
*	^{19}F,x	^{187}Pt	CS	3INDNSD	8.3+07	1.1+08	Jour	PR/C,98,014605	18	M.Shuaib+	D6343
*	^{19}F,x	^{188}Pt	CS	3INDNSD	8.3+07	1.1+08	Jour	PR/C,98,014605	18	M.Shuaib+	D6343
*	^{19}F,x	^{189}Pt	CS	3INDNSD	8.3+07	1.1+08	Jour	PR/C,98,014605	18	M.Shuaib+	D6343
*	^{19}F,x	^{188}Au	CS	3INDNSD	9.5+07	1.1+08	Jour	PR/C,98,014605	18	M.Shuaib+	D6343
*	^{19}F,x	^{189}Au	CS	3INDNSD	8.3+07	1.1+08	Jour	PR/C,98,014605	18	M.Shuaib+	D6343
*	^{19}F,x	^{190}Au	CS	3INDNSD	8.3+07	1.1+08	Jour	PR/C,98,014605	18	M.Shuaib+	D6343

71 Lutetium 176

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,0		RP	1USAORL		4.3+01	Prog	ORNL-2718,26	59	R.C.Block+	11349

73 Tantalum

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	^{12}C,x+n	inclusive	DA	4RUSKUR	8.0+07	8.0+07	Jour	ZET,40,1004	61	A.S.Karamyan+	F1398

73 Tantalum 181

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,0		RP	1USACOL			Jour	PR,120,2214	60	J.S.Desjardins+	11948
	n,el		RP	1USACOL			Jour	PR,120,2214	60	J.S.Desjardins+	11948
*	p,x+n	inclusive	PY	3INDTRM	6.0+06	2.0+07	Jour	NIM/A,880,75	18	S.Paul+	D6331
*	p,x+n	inclusive	?	3INDTRM	6.0+06	2.0+07	Jour	NIM/A,880,75	18	S.Paul+	D6331
*	^{7}Li,5n	^{183}Os	CS	3INDTRM	3.5+07	4.5+07	Jour	PR/C,99,034608	19	A.Chauhan+	D6355
*	^{7}Li,x	^{180}Hf	CS	3INDTRM	2.8+07	3.8+07	Jour	PR/C,99,034608	19	A.Chauhan+	D6355
*	^{7}Li,x	^{183}Ta	CS	3INDTRM	2.8+07	3.8+07	Jour	PR/C,99,034608	19	A.Chauhan+	D6355
*	^{14}N,fis	Many	CS	3INDNSD	7.3+07	8.2+07	Jour	PR/C,99,034617	19	V.R.Sharma+	D6364

74 Tungsten

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	p,x	^{181}Re	CS	3INDTRM	1.2+07	2.1+07	Jour	RCA,106,743	18	D.Choudhury+	D6349
*	p,x	^{182}Re	CS	3INDTRM	8.8+06	2.1+07	Jour	RCA,106,743	18	D.Choudhury+	D6349
*	p,x	^{183}Re	CS	3INDTRM	8.8+06	2.1+07	Jour	RCA,106,743	18	D.Choudhury+	D6349
*	p,x	^{184}Re	CS	3INDTRM	8.8+06	2.1+07	Jour	RCA,106,743	18	D.Choudhury+	D6349

74 Tungsten 186

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	^{16}O,fis		MFQ	3INDNSD	1.1+08	1.1+08	Jour	PR/C,100,014614	19	N.K.Rai+	D6366

75 Rhenium 185

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,3n	^{183}Re	CS	2ZZZGEL	1.8+07	1.8+07	Jour	EPJ/A,52,148	16	N.Jovancevic+	23301

75 Rhenium 187

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,p	^{187}W	CS	2ZZZGEL	1.8+07	1.8+07	Jour	EPJ/A,52,148	16	N.Jovancevic+	23301

79 Gold 197

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	γ,fis	Many	FY	2JPNKEK		1.0+09	Jour	JNRS,1,53	00	H.Haba+	K2021
	n,0		RP	1USACOL			Jour	PR,120,2214	60	J.S.Desjardins+	11948
	n,el		RP	1USACOL			Jour	PR,120,2214	60	J.S.Desjardins+	11948

80 Mercury

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,el	^{nat}Hg	DA	4UKRIJD	1.4+07	1.4+07	Jour	ZET,40,725	61	V.I.Strizhak+	41242

81 Thallium 203

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	^{16}O,fus		CS	3INDNSD	7.6+07	1.0+08	Jour	PR/C,99,034615	19	J.Gehlot+	D6363

81 Thallium 205

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	^{16}O,fus		CS	3INDNSD	7.6+07	1.0+08	Jour	PR/C,99,034615	19	J.Gehlot+	D6363

82 Lead

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	^{93}Zr,x	^{91}Zr	CS	2JPNIPC	1.9+10	1.9+10	Jour	PTEP,2019,013D02	19	S.Takeuchi+	E2595
*	^{93}Zr,x	^{91}Zr	CSP	2JPNIPC	1.9+10	1.9+10	Jour	PTEP,2019,013D02	19	S.Takeuchi+	E2595
*	^{93}Zr,x	^{92}Zr	CS	2JPNIPC	1.9+10	1.9+10	Jour	PTEP,2019,013D02	19	S.Takeuchi+	E2595
*	^{93}Zr,x	^{92}Zr	CSP	2JPNIPC	1.9+10	1.9+10	Jour	PTEP,2019,013D02	19	S.Takeuchi+	E2595
*	^{94}Zr,x	^{92}Zr	CS	2JPNIPC	1.9+10	1.9+10	Jour	PTEP,2019,013D02	19	S.Takeuchi+	E2595
*	^{94}Zr,x	^{92}Zr	CSP	2JPNIPC	1.9+10	1.9+10	Jour	PTEP,2019,013D02	19	S.Takeuchi+	E2595
*	^{94}Zr,x	^{93}Zr	CS	2JPNIPC	1.9+10	1.9+10	Jour	PTEP,2019,013D02	19	S.Takeuchi+	E2595
*	^{94}Zr,x	^{93}Zr	CSP	2JPNIPC	1.9+10	1.9+10	Jour	PTEP,2019,013D02	19	S.Takeuchi+	E2595

82 Lead 207

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	^{12}C,fis		CS	4ZZZDUB	5.8+07	7.9+07	Jour	ZET,42,973	62	V.A.Karnaukhov	F1393

82 Lead 208

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	p,x	^{207}At	?	4ZZZDUB	1.2+08	6.6+08	Jour	ZET,39,527	60	Wangyung-Yu+	F1391
	p,x	^{210}At	?	4ZZZDUB	8.0+07	6.6+08	Jour	ZET,39,527	60	Wangyung-Yu+	F1391
	p,x	^{211}At	CS	4ZZZDUB		8.0+07	Jour	ZET,39,527	60	Wangyung-Yu+	F1391
	d,x	^{211}At	CS	4ZZZDUB	8.1+07	3.7+08	Jour	ZET,39,527	60	Wangyung-Yu+	F1391
	α,x	^{211}At	CS	4ZZZDUB	2.2+08	8.2+08	Jour	ZET,39,527	60	Wangyung-Yu+	F1391
	^{12}C,fis		CS	4ZZZDUB	5.6+07	7.9+07	Jour	ZET,42,973	62	V.A.Karnaukhov	F1393
	^{13}C,fis		CS	4RUSKUR	6.5+07	7.8+07	Jour	ZET,37,1266	59	V.A.Karnaukhov+	F1388

83 Bismuth 209

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	γ,fis	Many	FY	2JPNKEK		1.0+09	Jour	RCA,90,371	02	H.Haba+	K2022
*	γ,x+n	inclusive	CS	2JPNJSR	7.7+06	4.2+07	Jour	PR/C,96,044604	17	I.Gheorghe+	K2556
*	γ,x+n	inclusive	KE	2JPNJSR	7.9+06	1.5+07	Jour	PR/C,96,044604	17	I.Gheorghe+	K2556
	p,x	Many	CS	4ZZZDUB	6.6+08	6.6+08	Jour	ZET,35,1103	58	T.V.Malysheva+	F1394
	p,x	^{191}Au	?	4ZZZDUB	6.6+08	6.6+08	Jour	ZET,35,1103	58	T.V.Malysheva+	F1394
	p,x	^{190}Hg	?	4ZZZDUB	6.6+08	6.6+08	Jour	ZET,35,1103	58	T.V.Malysheva+	F1394
	p,x	^{193}Hg	CS	4ZZZDUB	6.6+08	6.6+08	Jour	ZET,35,1103	58	T.V.Malysheva+	F1394
	p,x	^{195}Hg	CS	4ZZZDUB	6.6+08	6.6+08	Jour	ZET,35,1103	58	T.V.Malysheva+	F1394
	p,x	^{205}At	?	4ZZZDUB	1.8+08	4.8+08	Jour	ZET,35,56	58	B.V.Kurchatov+	F1392
	p,x	^{210}At	?	4ZZZDUB	1.3+08	6.6+08	Jour	ZET,39,230	60	Wangyung-Yu+	F1390
	p,x	^{210}At	?	4ZZZDUB	1.8+08	4.8+08	Jour	ZET,35,56	58	B.V.Kurchatov+	F1392
	p,x	^{211}At	CS	4ZZZDUB	1.3+08	6.6+08	Jour	ZET,39,230	60	Wangyung-Yu+	F1390
	p,x	^{211}At	CS	4ZZZDUB	1.8+08	4.8+08	Jour	ZET,35,56	58	B.V.Kurchatov+	F1392

90 Thorium 232

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,2n	^{231}Th	CS	3INDTRM	9.0+06	1.7+07	Jour	JRN,318,1893	18	M.Karkera+	33115
*	n,γ	^{233}Th	CS	3INDTRM	1.1+07	1.9+07	Jour	PR/C,98,014625	18	S.Parashari+	33116
*	n,γ	^{233}Th	CS	3INDTRM	5.1+06	1.7+07	Jour	ARI,143,72	19	S.Mukherjee+	33126
	α,fis	Many	FY	3INDVEC	2.8+07	2.8+07	Jour	RCA,48,7	89	R.Guin+	D6350
	α,fis	Many	FY	3INDVEC	3.8+07	3.8+07	Jour	RCA,51,97	90	R.Guin+	D6351

92 Uranium 235

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,tot		CS	2FR SAC	7.2+02	1.0+04	Jour	NP,69,545	65	A.Michaudon+	20727

92 Uranium 238

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,γ	^{239}U	CS	3INDTRM	5.1+06	1.7+07	Jour	ARI,143,72	19	S.Mukherjee+	33126
*	^{6}Li,α+fis	Many	FY	3INDNSD	3.0+07	4.0+07	Jour	PR/C,98,031601	18	A.Pal+	D6345
*	^{6}Li,d+fis	Many	FY	3INDNSD	3.0+07	4.0+07	Jour	PR/C,98,031601	18	A.Pal+	D6345
*	^{6}Li,fis	Many	FY	3INDNSD	3.0+07	4.0+07	Jour	PR/C,98,031601	18	A.Pal+	D6345
*	^{6}Li,p+fis	Many	FY	3INDNSD	3.0+07	4.0+07	Jour	PR/C,98,031601	18	A.Pal+	D6345
*	^{7}Li,α+fis	Many	FY	3INDNSD	3.1+07	4.1+07	Jour	PR/C,98,031601	18	A.Pal+	D6345
*	^{7}Li,d+fis	Many	FY	3INDNSD	3.1+07	4.1+07	Jour	PR/C,98,031601	18	A.Pal+	D6345
*	^{7}Li,fis	Many	FY	3INDNSD	3.1+07	4.1+07	Jour	PR/C,98,031601	18	A.Pal+	D6345
*	^{7}Li,p+fis	Many	FY	3INDNSD	3.1+07	4.1+07	Jour	PR/C,98,031601	18	A.Pal+	D6345
*	^{7}Li,t+fis	Many	FY	3INDNSD	3.1+07	4.1+07	Jour	PR/C,98,031601	18	A.Pal+	D6345
	^{16}O,x	^{250}Fm	CS	4RUSJIA	7.7+07	9.4+07	Jour	ZET,37,1207	59	V.V.Volkov+	F1389

94 Plutonium 241

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	^{13}C,x	^{250}Fm	CS	4RUSJIA	6.3+07	7.2+07	Jour	ZET,37,1207	59	V.V.Volkov+	F1389