EXFOR News (May 2017)

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, JAEA, 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 N.Otsuka (NRDC Coordinator n.otsuka@iaea.org) for inclusion in the EXFOR News distribution list as well as any question on EXFOR.

[1] N.Otuka et al., Nucl.Data.Sheets **120**(2014)272.

Quantity codes

ALF	α-value ($\sigma_{\rm capt}/\sigma_{\rm fis}$)	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 dΩ_1/dΩ_2/dE'	NUD	Delayed fission neutron multiplicity $\bar{\nu}_d$
D3E	Triple differential dΩ/dE'_1/dE'_2	NUF	Fragment neutrons
D4A	Quadruple diff. dΩ_1/dΩ_2/dE'_1/dE'_2	POL	Polarization
DA	Differential d/dΩ	POD	Differential polarization
DAA	Double differential dΩ_1/dΩ_2	PY	Product yield (other than fission)
DAE	Double differential dΩ/dE'	RI	Resonance integral
DAP	Partial differential d/dΩ	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	η-value $\bar{\nu}\sigma_{\rm fis}/(\sigma_{\rm capt}+\sigma_{\rm fis})$	TTD	Differential thick target yield, d/dΩ
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)

[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) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	p,el	^{1}H	POD	4ZZZDUB			Jour	NIM/A,538,431	05	L.S.Azhgirey+	F1295
*	^{7}Be,x+p	inclusive	CS	4ZZZDUB			Jour	YF,78,(5),393	15	Yu.A.Alexandrov+	F1300

1 Hydrogen 2

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	α,γ	^{6}Li	CS	4RUSTPI	3.6+04	3.6+04	Jour	NIM/A,825,24	16	V.M.Bystritsky+	F1296

1 Hydrogen

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,tot		CS	1USAINU	4.6-05	3.2+00	Jour	NC/C,38,178	15	J.I.Marquez-Damian+	14435
	n,ths	1-H-WTR	DAE	1USARPI	1.5-01	6.3-01	Prog	RPI-PR-328-87,73	67	F.Bischoff+	13921
	n,tot		CS	1USAGGA	3.6-03	1.6+01	Jour	NSE,33,265	68	J.M.Neill+	14218

3 Lithium 6

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,inel	^{6}Li	DAP	1USALAS	4.8+06	7.5+06	Jour	NP/A,107,139	68	J.C.Hopkins+	11153
	p,p+X	^{1}H	DAA	4RUSLIN	1.0+09	1.0+09	Jour	NP/A,736,283	04	V.N.Baturin+	F1306

3 Lithium 7

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,inel	^{7}Li	CSP	1USALAS	5.7+06	7.5+06	Jour	NP/A,107,139	68	J.C.Hopkins+	11153
	n,n+t	^{4}He	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152
	d,x+n	inclusive	PY	4RUSFEI	7.5+05	2.2+06	Jour	NIM/A,564,525	06	V.N.Kononov+	F1279

4 Beryllium 9

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	γ,x+n	inclusive	CS	1USAORL	1.7+06	1.7+06	Jour	PR,114,1319	59	J.H.Gibbons+	M0441
	d,x+n	inclusive	PY	4RUSFEI	7.5+05	2.2+06	Jour	NIM/A,564,525	06	V.N.Kononov+	F1279
*	α,el	^{9}Be	DA	2SF JYV	4.0+07	9.0+07	Jour	ZEP,102,(7),467	15	A.S.Demyanova+	F1302

*	α,inel	^{9}Be	DAP	2SF JYV	4.0+07	9.0+07	Jour	ZEP,102,(7),467	15	A.S.Demyanova+	F1302
*	α,inel	^{9}Be	DAP	2SF JYV	9.0+07	9.0+07	Jour	ZEP,104,(5),299	16	A.S.Demyanova+	F1303
*	^{12}C,x	^{6}He	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x	^{8}He	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x	^{6}Li	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x	^{7}Li	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x	^{8}Li	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x	^{9}Li	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x	^{7}Be	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x	^{9}Be	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x	^{10}Be	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x	^{8}B	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x	^{10}B	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x	^{11}B	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x	^{9}C	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x	^{10}C	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x	^{11}C	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x+α	inclusive	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x+d	inclusive	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x+^{3}He	inclusive	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{12}C,x+t	inclusive	DAE	4RUSITE	7.2+09	7.2+09	Jour	YF,79,(5),475	16	B.M.Abramov+	F1311
*	^{78}Kr,x	Many	CS	2JPNIPC	2.7+10	2.7+10	Jour	PR/C,93,061301	16	B.Blank+	E2515
*	^{124}Xe,x	Many	CS	2JPNIPC	4.3+10	4.3+10	Jour	PRL,116,162501	16	I.Celikovic+	E2507

6 Carbon

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,ths	^{nat}C	DAE	1USAGA	1.8-01	4.7-01	Jour	NSE,33,31	68	W.L.Whittemore	14216
*	^{19}C,abs		CS	2JPNIPC	5.8+09	5.8+09	Jour	PL/B,761,412	16	Y.Togano+	E2522
*	^{20}C,abs		CS	2JPNIPC	5.6+09	5.6+09	Jour	PL/B,761,412	16	Y.Togano+	E2522
*	^{22}C,abs		CS	2JPNIPC	5.2+09	5.2+09	Jour	PL/B,761,412	16	Y.Togano+	E2522
	n,ths	6-C-CMP	DA	1USAGA	2.3-01	2.3-01	Rept	GA-5554	64	S.Boehm+	13920
	n,ths	6-C-CMP	DAE	1USAGA	2.3-01	2.3-01	Rept	GA-5554	64	S.Boehm+	13920

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,el	^{12}C	DA	1USAKTY	1.5+06	3.8+06	Jour	EPJ/CS,93,02014	15	J.R.Vanhoy+	14452
	d,n	^{13}N	MLT	4RUSFEI	7.5+05	2.2+06	Jour	NIM/A,564,525	06	V.N.Kononov+	F1279

7 Nitrogen

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,el	^{nat}N	DA	1USAORL	4.2+05	1.2+06	Conf	91JUELIC,,729	May 91	J.A.Harvey+	13728

12 Magnesium 24

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	γ,x+n	inclusive	CS	1USAPEN	1.7+07	2.3+07	Jour	PR,98,1296	55	R.Nathans+	M0929
	γ,x+n	inclusive	INT	1USAPEN		2.4+07	Jour	PR,98,1296	55	R.Nathans+	M0929
*	p,inel	^{24}Mg	DAA	4RUSMOS	7.4+06	7.4+06	Jour	IZV,79,(4),556	15	L.I.Galanina+	F1310

12 Magnesium 25

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	γ,x+n	inclusive	CS	1USAPEN	7.5+06	2.3+07	Jour	PR,98,1296	55	R.Nathans+	M0929
	γ,x+n	inclusive	INT	1USAPEN		2.4+07	Jour	PR,98,1296	55	R.Nathans+	M0929

13 Aluminium 27

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,α	^{24}Na	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152
	n,p	^{27}Mg	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152
	d,p	^{28}Al	DAP	4RUSRI	2.5+06	2.5+06	Conf	75LENING,,360	75	L.M.Solin+	F1182
*	^{6}He,non		CS	4ZZZDUB	1.4+08	2.6+08	Jour	IZV,80,(3),250	16	B.Erdemchimeg+	F1308
*	^{8}He,non		CS	4ZZZDUB	1.6+08	1.9+08	Jour	IZV,80,(3),250	16	B.Erdemchimeg+	F1308
*	^{8}Li,non		CS	4ZZZDUB	2.4+08	2.8+08	Jour	IZV,80,(3),250	16	B.Erdemchimeg+	F1308
*	^{9}Li,non		CS	4ZZZDUB	2.3+08	2.8+08	Jour	IZV,80,(3),250	16	B.Erdemchimeg+	F1308

14 Silicon 28

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	α,non		CS	4ZZZDUB	1.3+07	2.3+08	Jour	IZV,69,(11),1603	05	Yu.G.Sobolev+	F1309
	^{6}He,non		CS	4ZZZDUB	2.6+07	1.9+08	Jour	IZV,69,(11),1603	05	Yu.G.Sobolev+	F1309
	^{7}Li,non		CS	4ZZZDUB	6.9+07	2.1+08	Jour	IZV,69,(11),1603	05	Yu.G.Sobolev+	F1309

22 Titanium

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,tot		CS	1USAORL	1.0+01	6.3+05	Jour	KPS,59,(2),1685	11	K.H.Guber+	14324
*	p,x	^{48}V	CS	4RUSRI	1.3+07	1.3+07	Jour	IZV,80,(8),975	16	V.I.Zherebchevsky+	F1298

22 Titanium 46

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

	n,p	^{46}Sc	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152

22 Titanium 47

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,p	^{47}Sc	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152

22 Titanium 48

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,p	^{48}Sc	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152
*	n,tot		CS	1USAORL	1.0+01	6.3+05	Jour	KPS,59,(2),1685	11	K.H.Guber+	14324

24 Chromium

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,tot		CS	1USAORL	1.0+01	6.0+05	Jour	KPS,59,(2),1685	11	K.H.Guber+	14324

24 Chromium 52

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	p,x	^{52}Mn	CS	4RUSRI	1.3+07	1.3+07	Jour	IZV,80,(8),975	16	V.I.Zherebchevsky+	F1298

24 Chromium 53

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,tot		CS	1USAORL	1.0+01	6.3+05	Jour	KPS,59,(2),1685	11	K.H.Guber+	14324

26 Iron

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,el	^{nat}Fe	DA	1USAKTY	1.8+06	1.8+06	Jour	EPJ/CS,93,02002	15	S.F.Hicks+	14451

26 Iron 54

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,α	^{51}Cr	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152
*	n,inel	^{54}Fe	CSP	1USAKTY	2.7+06	4.7+06	Jour	EPJ/CS,93,02002	15	S.F.Hicks+	14451
	n,p	^{54}Mn	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152

26 Iron 56

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	$n,2n$	^{55}Fe	CS	1USALRL	1.5+07	1.5+07	Conf	90STRASB,,437	92	L.R.Greenwood+	13166
*	n,inel	^{56}Fe	CSP	1USAKTY	1.5+06	4.7+06	Jour	EPJ/CS,93,02002	15	S.F.Hicks+	14451
*	n,inel	^{56}Fe	DA	1USAKTY	1.8+06	1.8+06	Jour	EPJ/CS,93,02002	15	S.F.Hicks+	14451
	n,p	^{56}Mn	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152
*	p,x	^{56}Co	CS	4RUSRI	1.3+07	1.3+07	Jour	IZV,80,(8),975	16	V.I.Zherebchevsky+	F1298

27 Cobalt 59

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	$n,2n$	^{58}Co	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152
	n,α	^{56}Mn	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152
	n,p	^{59}Fe	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152

28 Nickel 58

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,p	^{58}Co	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152

28 Nickel 60

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	$n,2n$	^{59}Ni	CS	1USALRL	1.5+07	1.5+07	Conf	90STRASB,,437	92	L.R.Greenwood+	13166
	n,p	^{60}Co	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152

28 Nickel 64

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	$n,2n$	^{63}Ni	CS	1USALRL	1.5+07	1.5+07	Conf	90STRASB,,437	92	L.R.Greenwood+	13166

29 Copper

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	α,x	^{57}Co	CS	2JPNIPC	4.5+07	4.8+07	Jour	ARI,114,104	16	A.R.Usman+	E2511
*	α,x	^{58}Co	CS	2JPNIPC	3.6+07	4.8+07	Jour	ARI,114,104	16	A.R.Usman+	E2511
*	α,x	^{60}Co	CS	2JPNIPC	4.1+07	4.8+07	Jour	ARI,114,104	16	A.R.Usman+	E2511
*	α,x	^{65}Zn	CS	2JPNIPC	1.6+07	4.8+07	Jour	ARI,114,104	16	A.R.Usman+	E2511
*	α,x	^{66}Ga	CS	2JPNIPC	1.6+07	4.8+07	Jour	ARI,114,104	16	A.R.Usman+	E2511
*	α,x	^{67}Ga	CS	2JPNIPC	1.6+07	4.8+07	Jour	ARI,114,104	16	A.R.Usman+	E2511

29 Copper 63

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,α	^{60}Co	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152
n,p	^{63}Ni	CS	1USALRL	1.5+07	1.5+07	Conf	90STRASB,,437	92	L.R.Greenwood+	13166

29 Copper 65

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,p	^{65}Ni	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152

30 Zinc 64

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,p	^{64}Cu	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152

37 Rubidium

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	α,x	^{87}Y	TT	4ZZZDUB	3.5+07	3.5+07	Jour	JRN,279,341	09	N.V.Aksenov+	F1304

37 Rubidium 102

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	0,B-	^{102}Sr	NUD	1CANTMF	Spont		Jour	PR/C,93,054301	16	Z.M.Wang+	14436

38 Strontium 86

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,x+n	inclusive	CS	1USAPEN	1.2+07	2.3+07	Jour	PR,104,1334	56	P.F.Yergin+	M0930
γ,x+n	inclusive	INT	1USAPEN		2.4+07	Jour	PR,104,1334	56	P.F.Yergin+	M0930

38 Strontium 87

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,x+n	inclusive	CS	1USAPEN	1.0+07	2.3+07	Jour	PR,104,1334	56	P.F.Yergin+	M0930
γ,x+n	inclusive	INT	1USAPEN		2.4+07	Jour	PR,104,1334	56	P.F.Yergin+	M0930

38 Strontium 88

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,x+n	inclusive	CS	1USAPEN	1.2+07	2.3+07	Jour	PR,104,1334	56	P.F.Yergin+	M0930
γ,x+n	inclusive	INT	1USAPEN		2.4+07	Jour	PR,104,1334	56	P.F.Yergin+	M0930

39 Yttrium 89

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,x+n	inclusive	CS	1USAPEN	1.3+07	2.2+07	Jour	PR,104,1334	56	P.F.Yergin+	M0930
γ,x+n	inclusive	INT	1USAPEN		2.4+07	Jour	PR,104,1334	56	P.F.Yergin+	M0930

40 Zirconium

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,inel	40-ZR-HYD	DAP	1USAGA	2.4-01	3.8-01	Rept	GA-5554	64	S.Boehm+	13920
n,ths	40-ZR-HYD	CS	1USAGA	2.4-01	4.0-01	Rept	GA-5554	64	S.Boehm+	13920
n,ths	40-ZR-HYD	DA	1USAGA	1.6-02	8.3-01	Rept	GA-8345	67	G.W.Carriveau	13919
n,ths	40-ZR-HYD	DA	1USAGA	2.4-01	2.4-01	Rept	GA-5554	64	S.Boehm+	13920
n,ths	40-ZR-HYD	DA	1USAGA	7.7-03	9.4-01	Rept	GA-8345	67	G.W.Carriveau	13919
n,ths	40-ZR-HYD	DAE	1USAGA	2.4-01	2.4-01	Rept	GA-5554	64	S.Boehm+	13920
n,ths	40-ZR-HYD	?	1USAGA	7.7-03	9.6-01	Rept	GA-8345	67	G.W.Carriveau	13919

40 Zirconium 90

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,x+n	inclusive	CS	1USAPEN	1.2+07	2.2+07	Jour	PR,98,1296	55	R.Nathans+	M0929
γ,x+n	inclusive	CS	1USAPEN	1.3+07	2.3+07	Jour	PR,104,1334	56	P.F.Yergin+	M0930

γ,x+n	inclusive	INT	1USAPEN		2.4+07	Jour	PR,98,1296	55	R.Nathans+	M0929
γ,x+n	inclusive	INT	1USAPEN		2.4+07	Jour	PR,104,1334	56	P.F.Yergin+	M0930

40 Zirconium 91

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,x+n	inclusive	CS	1USAPEN	7.7+06	2.4+07	Jour	PR,98,1296	55	R.Nathans+	M0929
γ,x+n	inclusive	CS	1USAPEN	8.0+06	2.4+07	Jour	PR,104,1334	56	P.F.Yergin+	M0930
γ,x+n	inclusive	INT	1USAPEN		2.4+07	Jour	PR,98,1296	55	R.Nathans+	M0929
γ,x+n	inclusive	INT	1USAPEN		2.4+07	Jour	PR,104,1334	56	P.F.Yergin+	M0930

40 Zirconium 92

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,x+n	inclusive	CS	1USAPEN	9.0+06	2.3+07	Jour	PR,104,1334	56	P.F.Yergin+	M0930
γ,x+n	inclusive	INT	1USAPEN		2.4+07	Jour	PR,104,1334	56	P.F.Yergin+	M0930

41 Niobium

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,ths	41-NB-CMP	DAE	1USARPI	2.4-01	2.4-01	Prog	RPI-PR-328-87,73	67	F.Bischoff+	13921

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	1USANIS	Fiss		Conf	90STRASB,,371	90	T.G.Williamson+	13888
n,2n	^{92}Nb	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152
n,inel	^{93}Nb	CS	1USANBS	Fiss		Rept	ASTM-STP-1001,229	89	T.G.Williamson+	14153
n,inel	^{93}Nb	CS	1USAUI	Fiss		Rept	ASTM-STP-1001,235	89	J.G.Williams+	14158
n,inel	^{93}Nb	CS	1USANBS	Fiss		Rept	ASTM-STP-1001,235	89	J.G.Williams+	14158

42 Molybdenum

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,x	^{94}Nb	CS	1USALRL	1.5+07	1.5+07	Conf	90STRASB,,437	92	L.R.Greenwood+	13166

42 Molybdenum 92

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,x	^{91}Nb	CS	1USALRL	1.5+07	1.5+07	Conf	90STRASB,,437	92	L.R.Greenwood+	13166

42 Molybdenum 94

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,p	^{94}Nb	CS	1USALRL	1.5+07	1.5+07	Conf	90STRASB,,437	92	L.R.Greenwood+	13166

47 Silver 107

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	α,x	^{105}Ag	CS	3INDVEC	3.4+07	5.5+07	Jour	PRM,30,193	88	M.Ismail+	A0442

49 Indium 113

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	γ,n	^{112}In	?	4UKRKFT		1.3+07	Jour	JP/CS,665,012040	16	Ye.Skakun+	G4056
	n,inel	^{113}In	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152

49 Indium 115

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	γ,n	^{114}In	?	4UKRKFT		1.4+07	Jour	JP/CS,665,012040	16	Ye.Skakun+	G4056
	n,inel	^{115}In	?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152

50 Tin

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	p,x	^{122}Sb	CS	4RUSRI	1.2+07	1.2+07	Jour	IZV,80,(8),975	16	V.I.Zherebchevsky+	F1298
*	p,x	^{124}Sb	CS	4RUSRI	1.2+07	1.2+07	Jour	IZV,80,(8),975	16	V.I.Zherebchevsky+	F1298

56 Barium 136

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,inel	^{136}Ba	CSP	1USAKTY	2.7+06	3.9+06	Jour	PR/C,78,034317	08	S.Mukhopadhyay+	14437

57 Lanthanum 139

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	γ,x+n	inclusive	CS	1USAVIR	8.5+06	3.0+07	Jour	PR,134,B557	64	L.B.Rice+	M0928
	γ,x+n	inclusive	INT	1USAVIR		3.0+07	Jour	PR,134,B557	64	L.B.Rice+	M0928

59 Praseodymium 141

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	γ,x+n	inclusive	CS	1USAVIR	9.0+06	3.0+07	Jour	PR,134,B557	64	L.B.Rice+	M0928
	γ,x+n	inclusive	INT	1USAVIR		3.0+07	Jour	PR,134,B557	64	L.B.Rice+	M0928

62 Samarium

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	γ,x	^{143}Sm	CS	3KORPUE		6.0+07	Jour	NDS,119,314	14	S.C.Yang+	G3123

73 Tantalum 181

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	^{11}B,x	Many	CS	4ZZZDUB	1.3+08	2.5+08	Jour	PR/C,94,024618	16	G.S.Karapetyan+	F1305

75 Rhenium 187

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,2n	^{186}Re	CSP	1USALAS	1.0+06	2.4+07	Jour	PR/C,92,054304	15	D.A.Matters+	14438

78 Platinum

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,fis		?	1USABRK	8.4+07	8.4+07	Jour	PR,73,1135	48	E.L.Kelly+	13926

79 Gold 197

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,fis		?	1USABRK	8.4+07	8.4+07	Jour	PR,73,1135	48	E.L.Kelly+	13926
*	d,x	Many	CS	4ZZZDUB	4.4+09	4.4+09	Jour	PR/C,93,054614	16	A.R.Balabekyan+	F1299
*	d,x	^{44}Sc	CS	4ZZZDUB	4.4+09	4.4+09	Jour	PR/C,93,054614	16	A.R.Balabekyan+	F1299
*	d,x	^{95}Nb	CS	4ZZZDUB	4.4+09	4.4+09	Jour	PR/C,93,054614	16	A.R.Balabekyan+	F1299
*	d,x	^{95}Tc	CS	4ZZZDUB	4.4+09	4.4+09	Jour	PR/C,93,054614	16	A.R.Balabekyan+	F1299
*	d,x	^{102}Rh	CS	4ZZZDUB	4.4+09	4.4+09	Jour	PR/C,93,054614	16	A.R.Balabekyan+	F1299
*	d,x	^{184}Re	CS	4ZZZDUB	4.4+09	4.4+09	Jour	PR/C,93,054614	16	A.R.Balabekyan+	F1299
*	d,x	^{196}Au	CS	4ZZZDUB	4.4+09	4.4+09	Jour	PR/C,93,054614	16	A.R.Balabekyan+	F1299
*	d,x	^{193}Hg	CS	4ZZZDUB	4.4+09	4.4+09	Jour	PR/C,93,054614	16	A.R.Balabekyan+	F1299
*	d,x	^{197}Hg	CS	4ZZZDUB	4.4+09	4.4+09	Jour	PR/C,93,054614	16	A.R.Balabekyan+	F1299

80 Mercury

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,fis		?	1USABRK	8.4+07	8.4+07	Jour	PR,73,1135	48	E.L.Kelly+	13926

81 Thallium

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,fis		?	1USABRK	8.4+07	8.4+07	Jour	PR,73,1135	48	E.L.Kelly+	13926

82 Lead

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,fis		?	1USABRK	8.4+07	8.4+07	Jour	PR,73,1135	48	E.L.Kelly+	13926
	d,x+n	inclusive	DAE	4ZZZDUB	2.0+09	2.0+09	Jour	YF,69,(9),1531	06	V.I.Yurevich+	F1307
	α,x+n	inclusive	DAE	4ZZZDUB	4.0+09	4.0+09	Jour	YF,69,(9),1531	06	V.I.Yurevich+	F1307
*	^{6}He,non		CS	4ZZZDUB	1.4+08	1.9+08	Jour	IZV,80,(3),250	16	B.Erdemchimeg+	F1308
*	^{8}He,non		CS	4ZZZDUB	1.9+08	1.9+08	Jour	IZV,80,(3),250	16	B.Erdemchimeg+	F1308
*	^{8}Li,non		CS	4ZZZDUB	2.6+08	3.1+08	Jour	IZV,80,(3),250	16	B.Erdemchimeg+	F1308
*	^{9}Li,non		CS	4ZZZDUB	2.1+08	2.6+08	Jour	IZV,80,(3),250	16	B.Erdemchimeg+	F1308
	^{12}C,x+n	inclusive	DAE	4ZZZDUB	2.4+10	2.4+10	Jour	YF,69,(9),1531	06	V.I.Yurevich+	F1307

82 Lead 206

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,fis		?	1USABRK	8.4+07	8.4+07	Jour	PR,73,1135	48	E.L.Kelly+	13926

82 Lead 208

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,fis		?	1USABRK	8.4+07	8.4+07	Jour	PR,73,1135	48	E.L.Kelly+	13926
*	^{48}Ca,fus		CS	4ZZZDUB	2.1+08	2.4+08	Jour	NP/A,802,45	08	E.V.Prokhorova+	F1297

83 Bismuth 209

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,fis		?	1USABRK	8.4+07	8.4+07	Jour	PR,73,1135	48	E.L.Kelly+	13926
*	^{11}B,x	Many	CS	4ZZZDUB	1.5+08	1.5+08	Jour	PR/C,94,024618	16	G.S.Karapetyan+	F1305
*	^{11}B,x	^{46}Sc	CS	4ZZZDUB	1.5+08	1.5+08	Jour	PR/C,94,024618	16	G.S.Karapetyan+	F1305

90 Thorium 232

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,fis		?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152

92 Uranium

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,ths	92-U-OXI	DAE	1USARPI	1.3-01	3.3-01	Prog	RPI-PR-328-87,73	67	F.Bischoff+	13921

92 Uranium 233

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,abs		ALF	1USABET		5.0-01	Jour	NSE,29,1	Jul 67	D.E.Conway+	12313
	n,abs		ALF	1USAMTR	2.5-02	2.5-02	Rept	IDO-14678	67	W.J.Maeck+	13848
	n,abs		ALF	1USAANL	Maxwl		Conf	55GENEVA,4,105	56	M.G.Inghram+	13906
	n,abs		ETA	1USAMTR	2.5-02	6.0-02	Rept	EPRI-NP-3436,(2)	84	J.R.Smith+	13805
	n,fis		CS	1USAANL	Maxwl		Conf	55GENEVA,4,105	56	M.G.Inghram+	13906
	n,fis		RI	1USAORL		5.4-01	Jour	NSE,16,245	63	J.Halperin+	12335
	n,fis		?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152
	n,γ	^{234}U	CS	1USAANL	Maxwl		Conf	55GENEVA,4,105	56	M.G.Inghram+	13906
	n,γ	^{234}U	?	1USAORL		5.4-01	Jour	NSE,16,245	63	J.Halperin+	12335

92 Uranium 234

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,abs		CS	1USAANL	Maxwl		Conf	55GENEVA,4,105	56	M.G.Inghram+	13906

	n,fis		?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152

92 Uranium 235

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	γ,fis	^{84}Br	CS	4UKRIEP		1.8+07	Jour	YFE,16,(1),5	15	I.M.Vyshnevskyi+	G4054
	n,abs		ALF	1USABET		5.0-01	Jour	NSE,29,1	Jul 67	D.E.Conway+	12313
	n,abs		ALF	1USAMTR	2.5-02	2.5-02	Rept	IDO-14678	67	W.J.Maeck+	13848
	n,abs		ETA	1USAMTR	2.5-02	6.0-02	Rept	EPRI-NP-3436,(2)	84	J.R.Smith+	13805
	n,fis		?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152

92 Uranium 236

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,fis		?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152

92 Uranium 238

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,fis	Many	FY	1USALRL	1.4+07	1.4+07	Jour	JRN,309,899	16	W.S.Cassata+	14434

93 Neptunium 237

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	γ,fis	^{84}Br	CS	4UKRIEP		1.8+07	Jour	YFE,16,(1),5	15	I.M.Vyshnevskyi+	G4054
*	γ,fis	^{90}Rb	CS	4UKRIEP		1.8+07	Jour	YFE,16,(1),5	15	I.M.Vyshnevskyi+	G4054
	n,fis		?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152

94 Plutonium 239

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	γ,fis	^{84}Br	CS	4UKRIEP		1.8+07	Jour	YFE,16,(1),5	15	I.M.Vyshnevskyi+	G4054
*	γ,fis	^{90}Rb	CS	4UKRIEP		1.8+07	Jour	YFE,16,(1),5	15	I.M.Vyshnevskyi+	G4054
	n,abs		CS	1USAANL	Maxwl		Conf	55GENEVA,4,105	56	M.G.Inghram+	13906
	n,abs		ETA	1USAMTR	2.5-02	6.0-02	Rept	EPRI-NP-3436,(2)	84	J.R.Smith+	13805
	n,fis		?	1USAANL	2.2+05	1.2+07	Conf	90STRASB,,445	92	D.L.Smith+	14152
	n,γ	^{240}Pu	CS	1USAANL	Maxwl		Conf	55GENEVA,4,105	56	M.G.Inghram+	13906

94 Plutonium 240

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,abs		CS	1USAANL	Maxwl		Conf	55GENEVA,4,105	56	M.G.Inghram+	13906

94 Plutonium 241

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,abs		ETA	1USAMTR	2.5-02	6.0-02	Rept	EPRI-NP-3436,(2)	84	J.R.Smith+	13805
	n,fis		CS	1USAANL	Maxwl		Conf	55GENEVA,4,105	56	M.G.Inghram+	13906
	n,γ	^{242}Pu	CS	1USAANL	Maxwl		Conf	55GENEVA,4,105	56	M.G.Inghram+	13906
	n,tot		CS	1USAMTR	2.5-02	2.5-02	Rept	EPRI-NP-3436,(4)	84	J.R.Smith+	13805

94 Plutonium 242

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	γ,fis		CS	2BLGGHT	1.0+07	2.9+07	Jour	PR/C,29,498	84	H.Thierens+	G0054
	γ,fis		FY	2BLGGHT		3.0+07	Jour	PR/C,29,498	84	H.Thierens+	G0054
	γ,fis	Many	KE	2BLGGHT		2.0+07	Jour	PR/C,29,498	84	H.Thierens+	G0054
	γ,fis		KE	2BLGGHT		3.0+07	Jour	PR/C,29,498	84	H.Thierens+	G0054
	γ,fis	Many	?	2BLGGHT		2.0+07	Jour	PR/C,29,498	84	H.Thierens+	G0054
*	n,0		RP	1USALAS			Jour	PR/C,93,044613	16	M.Q.Buckner+	14456
*	n,γ	^{243}Pu	CS	1USALAS	2.8-02	3.6+04	Jour	PR/C,93,044613	16	M.Q.Buckner+	14456