EXFOR News (February 2018)

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 #
*	^{6}He,el	^{1}H	DA	3CPRAEP	4.3+06	4.3+06	Jour	CPH/C,36,716	12	Liuxin+	S0068

2 Helium 3

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,p	^{2}H	DA	2ITYFRA	1.8+08	5.7+08	Jour	NP/A,157,190	70	P.Picozza+	M0962
γ,p	^{2}H	DA	2FR SAC	2.5+08	2.5+08	Jour	PL/B,312,57	93	G.Audit+	M0958

2 Helium 4

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,p	^{3}H	DA	2ITYFRA	2.0+08	5.1+08	Jour	NP/A,157,190	70	P.Picozza+	M0962

3 Lithium 6

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,t	^{3}He	POD	4UKRKFT	2.3+07	7.0+07	Jour	PL/B,223,136	89	N.A.Burkova+	M0964

5 Boron

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,x	^{7}Be	CS	2ITYEFR		1.0+09	Jour	JIN,40,1619	78	V.Dinapoli+	M0965

6 Carbon

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,x+γ	inclusive	CSP	4UKRKGU	1.4+07	1.4+07	Jour	YFE,17,349	16	I.M.Kadenko+	32242
	α,x	^{11}C	CS	1USABRK	1.6+09	4.2+09	Jour	NP/A,386,589	82	J.V.Geaga+	C1122

6 Carbon 12

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,x+n	inclusive	CS	2FR ENS	1.0+08	1.5+08	Jour	NP/A,98,409	67	S.Ferroni+	M0960

6 Carbon 14

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
d,γ	^{16}N	CS	1USAWIS	1.0+06	2.9+06	Jour	CJP,34,(11),1097	56	R.A.Douglas+	C1692
d,γ	^{16}N	CS	1USATEX	2.0+06	2.0+06	Jour	BAP,7,112(A6)	62	J.B.Nelson+	C1125
d,p	^{15}C	CS	1USAWIS	1.4+06	3.0+06	Jour	CJP,34,(11),1097	56	R.A.Douglas+	C1692

7 Nitrogen 14

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,x	^{7}Be	CS	2ITYEFR		1.0+09	Jour	JIN,40,1619	78	V.Dinapoli+	M0965
γ,x	^{11}C	CS	2ITYEFR		1.0+09	Jour	JIN,40,1619	78	V.Dinapoli+	M0965

8 Oxygen 16

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,x	^{7}Be	CS	2ITYEFR		1.0+09	Jour	JIN,40,1619	78	V.Dinapoli+	M0965
γ,x	^{11}C	CS	2ITYEFR		1.0+09	Jour	JIN,40,1619	78	V.Dinapoli+	M0965
γ,x+n	inclusive	CS	2FR ENS	1.0+08	1.5+08	Jour	NP/A,98,409	67	S.Ferroni+	M0960
p,α	^{13}N	CSP	1USACAL	6.3+06	9.9+06	Jour	NP/A,210,60	73	A.V.Nero+	C1103
p,α	^{13}N	RR	1USACAL			Jour	NP/A,210,60	73	A.V.Nero+	C1103

9 Fluorine 19

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,x	^{7}Be	CS	2ITYEFR		1.0+09	Jour	JIN,40,1619	78	V.Dinapoli+	M0965
γ,x	^{11}C	CS	2ITYEFR		1.0+09	Jour	JIN,40,1619	78	V.Dinapoli+	M0965

12 Magnesium

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
p,el	^{nat}Mg	DA	3CPRLNZ	7.8+05	2.5+06	Jour	NIM/B,201,551	03	Xiaodongzhang+	S0195

12 Magnesium 26

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	p,n	^{26}Al	CS	1CANMCM	5.2+06	9.5+06	Jour	CJP,57,(2),286	79	J.D.King+	C1058

13 Aluminium 27

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	γ,x	^{7}Be	CS	2ITYEFR		1.0+09	Jour	JIN,40,1619	78	V.Dinapoli+	M0965
	γ,x	^{11}C	CS	2ITYEFR		1.0+09	Jour	JIN,40,1619	78	V.Dinapoli+	M0965

14 Silicon 28

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	γ,x	^{7}Be	CS	2ITYEFR		1.0+09	Jour	JIN,40,1619	78	V.Dinapoli+	M0965
	γ,x	^{11}C	CS	2ITYEFR		1.0+09	Jour	JIN,40,1619	78	V.Dinapoli+	M0965

16 Sulphur 32

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	γ,x	^{7}Be	CS	2ITYEFR		1.0+09	Jour	JIN,40,1619	78	V.Dinapoli+	M0965
	γ,x	^{11}C	CS	2ITYEFR		1.0+09	Jour	JIN,40,1619	78	V.Dinapoli+	M0965

17 Chlorine

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	γ,x	^{11}C	CS	2ITYEFR		1.0+09	Jour	JIN,40,1619	78	V.Dinapoli+	M0965

20 Calcium 40

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	γ,x+n	inclusive	CS	2FR ENS	1.0+08	1.4+08	Jour	NP/A,98,409	67	S.Ferroni+	M0960
*	n,α	^{37}Ar	CS	3CPRBJG	4.0+06	6.5+06	Jour	EPJ/A,51,12	15	Jinhuahan+	32741
*	n,α	^{37}Ar	CSP	3CPRBJG	4.0+06	6.5+06	Jour	EPJ/A,51,12	15	Jinhuahan+	32741
*	n,α	^{37}Ar	DAP	3CPRBJG	4.0+06	6.5+06	Jour	EPJ/A,51,12	15	Jinhuahan+	32741

22 Titanium 46

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	p,γ	^{47}V	CS	1USACAL	9.3+05	3.6+06	Jour	NP/A,236,523	74	M.Rios+	C1111

24 Chromium 50

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	p,γ	^{51}Mn	CS	1USACAL	7.4+05	4.1+06	Jour	NP/A,236,523	74	M.Rios+	C1111

24 Chromium 52

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,tot		CS	4UKRIJD	3.8+04	5.2+04	Jour	YFE,17,411	16	O.O.Gritzay+	32243

26 Iron 54

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,γ	^{55}Fe	CS	4UKRIJD	2.5-02	2.5-02	Jour	YK,,(3-4),41	94	L.L.Litvinskij+	32234

26 Iron 56

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,γ	^{57}Fe	CS	4UKRIJD	2.5-02	2.5-02	Jour	YK,,(3-4),41	94	L.L.Litvinskij+	32234

26 Iron 57

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,α	^{54}Cr	CS	3CPRBJG	5.0+06	6.5+06	Jour	PR/C,89,064607	14	Yu.M.Gledenov+	32748
	n,γ	^{58}Fe	CS	4UKRIJD	2.5-02	2.5-02	Jour	YK,,(3-4),41	94	L.L.Litvinskij+	32234

27 Cobalt 59

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	p,x	^{59}Fe	CS	1USACOL	3.8+08	3.8+08	Jour	BAP,7,623(W6)	62	S.Kaufman+	C1126

28 Nickel

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,x+p	inclusive	CSP	3CPRHST	1.5+07	1.5+07	Jour	NP/A,612,213	97	Bangjiaoye+	32763
	n,x+p	inclusive	DAE	3CPRHST	1.5+07	1.5+07	Jour	NP/A,612,213	97	Bangjiaoye+	32763
	n,x+p	inclusive	DE	3CPRHST	1.5+07	1.5+07	Jour	NP/A,612,213	97	Bangjiaoye+	32763

28 Nickel 58

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	p,γ	^{59}Cu	CS	1CANALA	1.4+06	4.7+06	Jour	CJP,53,(5),445	75	T.H.Hall+	C1695
	p,γ	^{59}Cu	RR	1CANALA			Jour	CJP,53,(5),445	75	T.H.Hall+	C1695
	α,γ	^{62}Zn	CS	1USACAL	4.1+06	4.8+06	Jour	NP/A,236,523	74	M.Rios+	C1111
	α,p	^{61}Cu	CS	1USACAL	4.3+06	4.8+06	Jour	NP/A,236,523	74	M.Rios+	C1111

29 Copper 63

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,γ	^{64}Cu	CS	3ISLSOR	Maxwl	3.5+04	Jour	PR/C,96,015802	17	L.Weissman+	31779

40 Zirconium 90

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,2n	^{89}Zr	CS	3CPRLNZ	1.4+07	1.5+07	Jour	JLNZ,32,57	96	Qiujiuzi+	32754
	n,γ	^{91}Zr	CS	1USAORL	3.0+03	2.0+05	Jour	NP/A,246,1	75	J.W.Boldeman+	30329

40 Zirconium 96

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,2n	^{95}Zr	CS	3CPRLNZ	1.4+07	1.5+07	Jour	JLNZ,39,107	03	Puzhongsheng+	32757

42 Molybdenum

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,γ		CS	1USAORL	3.0+03	2.0+05	Jour	NP/A,270,108	Oct 76	A.R.Del.Musgrove+	30357

42 Molybdenum 92

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,γ	^{93}Mo	CS	1USAORL	3.0+03	2.0+05	Jour	NP/A,270,108	Oct 76	A.R.Del.Musgrove+	30357
e,el	^{92}Mo	DA	1USAMIT	1.0+08	3.8+08	Jour	PR/C,41,2586	90	T.E.Milliman+	L0223
e,inel	^{92}Mo	DAP	1USAMIT	8.0+07	3.9+08	Jour	PR/C,41,2586	90	T.E.Milliman+	L0223

42 Molybdenum 94

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,γ	^{95}Mo	CS	1USAORL	3.0+03	2.0+05	Jour	NP/A,270,108	Oct 76	A.R.Del.Musgrove+	30357

42 Molybdenum 95

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,γ	^{96}Mo	CS	1USAORL	3.0+03	2.0+05	Jour	NP/A,270,108	Oct 76	A.R.Del.Musgrove+	30357

42 Molybdenum 96

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,γ	^{97}Mo	CS	1USAORL	3.0+03	2.0+05	Jour	NP/A,270,108	Oct 76	A.R.Del.Musgrove+	30357

42 Molybdenum 97

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,γ	^{98}Mo	CS	1USAORL	3.0+03	2.0+05	Jour	NP/A,270,108	Oct 76	A.R.Del.Musgrove+	30357

42 Molybdenum 98

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,γ	^{99}Mo	CS	1USAORL	3.0+03	2.0+05	Jour	NP/A,270,108	Oct 76	A.R.Del.Musgrove+	30357

42 Molybdenum 100

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,γ	^{101}Mo	CS	1USAORL	3.0+03	2.0+05	Jour	NP/A,270,108	Oct 76	A.R.Del.Musgrove+	30357

50 Tin

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,x+γ	inclusive	DE	4UKRKGU	1.4+07	1.4+07	Jour	YFE,17,349	16	I.M.Kadenko+	32242

50 Tin 117

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,n	^{116}Sn	DAP	2UK HAR	7.6+06	8.8+06	Jour	PL/B,32,607	70	E.J.Winhold+	M0956

50 Tin 119

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,n	^{118}Sn	DAP	2UK HAR	7.1+06	8.9+06	Jour	PL/B,32,607	70	E.J.Winhold+	M0956

56 Barium 134

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
α,n	^{137}Ce	CS	1USAANL	1.5+07	2.8+07	Jour	NP/A,144,344	70	D.G.Swanson+	C1095
α,n	^{137}Ce	DA	1USAANL	1.9+07	2.4+07	Jour	NP/A,144,355	70	D.G.Swanson+	C1123

56 Barium 135

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
α,2n	^{137}Ce	CS	1USAANL	1.9+07	2.7+07	Jour	NP/A,144,344	70	D.G.Swanson+	C1095
α,2n	^{137}Ce	DA	1USAANL	2.1+07	2.4+07	Jour	NP/A,144,355	70	D.G.Swanson+	C1123

58 Cerium 136

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,2n	^{135}Ce	CS	3CPRNPC	1.4+07	1.5+07	Jour	JRN,305,691	15	Junhualuo+	32752

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	3CPRNPC			Jour	JRN,305,691	15	Junhualuo+	32752
*	n,α	^{137}Ba	CS	3CPRNPC	1.4+07	1.5+07	Jour	JRN,305,691	15	Junhualuo+	32752
*	n,p	^{140}La	CS	3CPRNPC	1.4+07	1.5+07	Jour	JRN,305,691	15	Junhualuo+	32752

58 Cerium 142

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,2n	^{141}Ce	CS	3CPRNPC	1.4+07	1.5+07	Jour	JRN,305,691	15	Junhualuo+	32752
*	n,p	^{142}La	CS	3CPRNPC	1.4+07	1.5+07	Jour	JRN,305,691	15	Junhualuo+	32752

62 Samarium 144

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,α	^{141}Nd	CS	3CPRBJG	4.0+06	6.0+06	Rept	ISINN-23,338	16	Yu.M.Gledenov+	32755

63 Europium 151

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,α	^{148}Pm	CS	3CPRNPC			Jour	JRN,311,349	17	Junhualuo+	32753

69 Thulium 169

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,2n	^{168}Tm	CS	3CPRNPC	1.4+07	1.5+07	Jour	NSE,178,261	14	Junhualuo+	32746

71 Lutetium 175

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	^{40}Ca,3n	^{212}Pa	CS	3CPRIMP	1.9+08	1.9+08	Jour	JP/G,41,105104	14	Huabinyang+	S0199
*	^{40}Ca,x	^{208}Ac	CS	3CPRIMP	1.9+08	1.9+08	Jour	JP/G,41,105104	14	Huabinyang+	S0199
*	^{40}Ca,x	^{209}Ac	CS	3CPRIMP	1.9+08	1.9+08	Jour	JP/G,41,105104	14	Huabinyang+	S0199
*	^{40}Ca,x	^{210}Ac	?	3CPRIMP	1.9+08	1.9+08	Jour	JP/G,41,105104	14	Huabinyang+	S0199
*	^{40}Ca,x	^{212}Ac	CS	3CPRIMP	1.9+08	1.9+08	Jour	JP/G,41,105104	14	Huabinyang+	S0199

79 Gold 197

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	p,x	^{149}Tb	CS	1USACHI	2.2+08	4.3+08	Jour	NP/A,196,156	72	H.R.Heydegger+	C1102

82 Lead 206

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	α,3n	^{207}Po	CS	1USAANL	3.2+07	4.4+07	Jour	NP/A,151,549	70	P.Wong+	C1101

82 Lead 207

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	^{3}He,3n	^{207}Po	CS	1USAANL	2.1+07	3.3+07	Jour	NP/A,151,549	70	P.Wong+	C1101

82 Lead 208

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,γ	^{209}Pb	CS	3ISLSOR	Maxwl	3.5+04	Jour	PR/C,96,015802	17	L.Weissman+	31779

83 Bismuth 209

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,γ	^{210}Bi	CS	3ISLSOR	Maxwl	3.5+04	Jour	PR/C,96,055805	17	A.Shor+	31780

90 Thorium 232

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,fis	^{141}Ba	CS	3CPRNPC	1.4+07	1.5+07	Jour	EPJ/A,52,345	16	Chang-Linlan+	32751
	α,2p	^{234}Th	CS	1USAMRY	1.4+08	1.4+08	Jour	NP/A,329,73	79	M.D.Glascock+	C1116
	α,7n	^{229}U	CS	1USAMRY	1.4+08	1.4+08	Jour	NP/A,329,73	79	M.D.Glascock+	C1116
	α,8n	^{228}U	CS	1USAMRY	1.4+08	1.4+08	Jour	NP/A,329,73	79	M.D.Glascock+	C1116
	α,9n	^{227}U	CS	1USAMRY	1.4+08	1.4+08	Jour	NP/A,329,73	79	M.D.Glascock+	C1116
	α,fis	Many	CS	1USAMRY	1.4+08	1.4+08	Jour	NP/A,329,73	79	M.D.Glascock+	C1116
	α,x	Many	CS	1USAMRY	1.4+08	1.4+08	Jour	NP/A,329,73	79	M.D.Glascock+	C1116
	α,x	^{218}Ac	CS	1USAMRY	1.4+08	1.4+08	Jour	NP/A,329,73	79	M.D.Glascock+	C1116
	α,x	^{222}Pa	CS	1USAMRY	1.4+08	1.4+08	Jour	NP/A,329,73	79	M.D.Glascock+	C1116

92 Uranium 235

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	γ,fis		NUF	1USALAS	1.2+07	1.2+07	Jour	PR/C,95,064612	17	S.D.Clarke+	L0224

*	γ,fis		?	1USATNL	9.0+06	1.7+07	Jour	NIM/A,854,40	17	Krishichayan+	L0222
	n,fis		DE	3INDTRM	2.5-02	2.5-02	Jour	PR,131,283	63	S.S.Kapoor+	33102
	n,fis		NU	3INDTRM	2.5-02	2.5-02	Jour	PR,131,283	63	S.S.Kapoor+	33102
	n,fis		NUD	3INDTRM	2.5-02	2.5-02	Jour	PR,131,283	63	S.S.Kapoor+	33102
	n,fis	Many	NUD	3INDTRM	2.5-02	2.5-02	Jour	PR/C,51,3127	95	M.S.Samant+	33103
	n,fis		NUF	3INDTRM	2.5-02	2.5-02	Jour	PR,131,283	63	S.S.Kapoor+	33102
	n,fis	Many	NUF	3INDTRM	2.5-02	2.5-02	Jour	PR/C,51,3127	95	M.S.Samant+	33103
	n,fis		NUF	3INDTRM	2.5-02	2.5-02	Jour	PR/C,51,3127	95	M.S.Samant+	33103
	n,fis		?	3INDTRM	2.5-02	2.5-02	Jour	PR,131,283	63	S.S.Kapoor+	33102

92 Uranium 238

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,fis		CS	4RUSSIB	7.0+07	2.4+08	Jour	NP/A,539,263	92	A.S.Iljinov+	M0940

93 Neptunium 237

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,fis		CS	4RUSSIB	7.0+07	2.4+08	Jour	NP/A,539,263	92	A.S.Iljinov+	M0940

94 Plutonium 240

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
0,fis		NU	3CPRAEP	Spont		Jour	ASI,23,38	74	Wangyu-Sheng+	32758
0,fis		NU	3CPRAEP	Spont		Jour	ASI,23,46	74	Hwangsheng-Nian+	32759