

EXFOR News (December 2020)

New experimental data available from Nuclear Reaction Data Centres

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This News lists newly created EXFOR entries as well as revised EXFOR entries where new data subentries are added. Entries from articles published 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 ($\sigma_{\text{capt}}/\sigma_{\text{fis}}$)	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 $d\Omega_1/d\Omega_2/dE'$	NQ	Nuclear quantity
D3E	Triple differential $d\Omega/dE'_1/dE'_2$	NU	Fission neutron multiplicity $\bar{\nu}$
D4A	Quadruple diff. $d\Omega_1/d\Omega_2/dE'_1/dE'_2$	NUD	Delayed fission neutron multiplicity $\bar{\nu}_d$
DA	Differential $d/d\Omega$	POL	Polarization
DAA	Double differential $d\Omega_1/d\Omega_2$	POD	Differential polarization
DAE	Double differential $d\Omega/dE'$	PY	Product yield (other than fission)
DAP	Partial differential $d/d\Omega$	RI	Resonance integral
DAT	Temperature-dependent Legendre coefficient	RP	Resonance parameter
DE	Differential d/dE'	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 = $\bar{\nu}\sigma_{\text{fis}}/(\sigma_{\text{capt}} + \sigma_{\text{fis}})$	TT	Thick target yield
EVL	Evaluation	TTD	Differential thick target yield, $d/d\Omega$
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	tex	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 2

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* γ, π^0	^2H	POD	4RUSSIB	2.6+08	4.0+08	Jour	IMP/E,29,2050011	20	V.V.Gauzshtein+	M1018

4 Beryllium 9

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* n, tot		CS	3CPRNRS	1.0-03	9.9-01	Jour	NIM/B,410,158	17	L.X.Liu+	32767

7 Nitrogen 14

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n, p	^{14}C	CS	4ZZZDUB	2.5-02	1.4+00	Jour	ZP/A,346,307	93	Y.M.Gledenov+	41704

12 Magnesium 24

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* n, p	^{24}Na	CS	3BANSAY	1.5+06	1.5+06	Jour	RCA,108,511	20	M.S.Uddin+	31823

13 Aluminium 27

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* n, α	^{24}Na	CS	3BANSAY	1.5+06	1.5+06	Jour	RCA,108,511	20	M.S.Uddin+	31823
* n, p	^{27}Mg	CS	3BANSAY	1.5+06	1.5+06	Jour	RCA,108,511	20	M.S.Uddin+	31823

17 Chlorine 35

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* n, γ	^{36}Cl	CS	2GERKFK			Jour	PR/C,99,015801	19	S.Pavetich+	31796
* n, γ	^{36}Cl	CS	3ISLSOR			Jour	PR/C,99,015801	19	S.Pavetich+	31796
* n, γ	^{36}Cl	CS	2AUSVIE	Maxwl		Jour	PR/C,99,015801	19	S.Pavetich+	31796

25 Manganese 55

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,2n$	^{54}Mn	CS	3CZRUV	Fiss		Jour	ARI,166,109313	20	M.Schulc+	31828
* n,γ	^{56}Mn	CS	3BANSAV	2.5-02	5.4-02	Jour	RPC,177,109136	20	M.A.Islam+	31827

28 Nickel 58

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,2n$	^{57}Ni	CS	3INDTRM	1.5+07	1.5+07	Jour	IPA,58,241	20	I.Pasha+	33143
* n,p	^{58}Co	CS	3INDTRM	1.5+07	1.5+07	Jour	IPA,58,241	20	I.Pasha+	33143
* n,p	^{58}Co	CS	3EGYCAI	5.0+06	5.0+06	Jour	ARI,165,109340	20	M.Tohamy+	31829
* n,x	^{57}Co	CS	3CZRUV	Fiss		Jour	ARI,166,109355	20	M.Schulc+	31825

28 Nickel 60

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* n,p	^{60}Co	CS	3BANSAV	1.5+06	1.5+06	Jour	RCA,108,511	20	M.S.Uddin+	31823
* n,x	^{57}Co	CS	3BANSAV	1.5+06	1.5+06	Jour	RCA,108,511	20	M.S.Uddin+	31823

42 Molybdenum 92

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* n,α	^{89}Zr	CS	3INDTRM	1.4+07	1.4+07	Jour	IPA,58,218	20	A.M.Sunitha+	33141

42 Molybdenum 96

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* n,p	^{96}Nb	CS	3INDTRM	1.5+07	1.5+07	Jour	JRN,325,831	20	S.P.Ram+	33147

42 Molybdenum 97

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* n,p	^{97}Nb	CS	3INDTRM	1.4+07	1.4+07	Jour	IPA,58,218	20	A.M.Sunitha+	33141

42 Molybdenum 100

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,2n$	^{99}Mo	CS	3INDTRM	1.5+07	1.5+07	Jour	JRN,325,831	20	S.P.Ram+	33147

49 Indium 113

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* n,inel	^{113}In	CS	3INDTRM	1.1+07	2.0+07	Jour	EPJ/P,135,300	20	B.Soni+	33140

49 Indium 115

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,2n$	^{114}In	CS	3INDTRM	1.4+07	2.0+07	Jour	EPJ/P,135,300	20	B.Soni+	33140
* n,inel	^{115}In	CS	3INDTRM	1.1+07	2.0+07	Jour	EPJ/P,135,300	20	B.Soni+	33140

52 Tellurium 122

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,2n$	^{121}Te	CS	3CPNPC			Jour	JRN,324,913	20	Junhua Luo+	32803

53 Iodine 127

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $\gamma,2n$	^{125}I	INT	4RUSMOS		3.1+07	Jour	AJPA,8,64	20	V.V.Varlamov+	M1016
* $\gamma,3n$	^{124}I	INT	4RUSMOS		3.1+07	Jour	AJPA,8,64	20	V.V.Varlamov+	M1016
* γ,n	^{126}I	INT	4RUSMOS		3.1+07	Jour	AJPA,8,64	20	V.V.Varlamov+	M1016
* $\gamma,x+n$	inclusive	INT	4RUSMOS		3.1+07	Jour	AJPA,8,64	20	V.V.Varlamov+	M1016

57 Lanthanum 139

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* n,γ	^{140}La	CS	3HUNKFI	2.5-02	2.5-02	Jour	PR/C,99,024310	19	A.M.Hurst+	31795
* n,γ	^{140}La	CSP	3HUNKFI	2.5-02	2.5-02	Jour	PR/C,99,024310	19	A.M.Hurst+	31795

69 Thulium 169

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,3n$	^{167}Tm	CS	3CZRUVJ	Fiss		Jour	ARI,166,109355	20	M.Schulc+	31825

69 Thulium 171

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* n,γ	^{172}Tm	CS	3ISLSOR			Jour	PRL,125,142701	20	C.Guerrero+	31826

72 Hafnium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* γ,x	^{177}Lu	CS	4UKRKFT	3.7+07		Jour	IZV,84,116	20	V.A.Zheltonozhsky+	M1020
* γ,x	^{177}Lu	CS	4RUSMOS	5.5+07		Jour	IZV,84,116	20	V.A.Zheltonozhsky+	M1020

72 Hafnium 178

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* γ,p	^{177}Lu	CS	4RUSRUS	2.0+07		Jour	IZV,84,116	20	V.A.Zheltonozhsky+	M1020

72 Hafnium 179

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* γ,inel	^{179}Hf	CS	4UKRIEP	1.8+07		Jour	YF,83,303	20	V.A.Zheltonozhsky+	M1019
* γ,inel	^{179}Hf	CS	4RUSRUS	2.0+07		Jour	YF,83,303	20	V.A.Zheltonozhsky+	M1019
* γ,inel	^{179}Hf	CS	4UKRKFT	3.7+07		Jour	YF,83,303	20	V.A.Zheltonozhsky+	M1019
* γ,inel	^{179}Hf	CS	4RUSMOS	5.5+07		Jour	YF,83,303	20	V.A.Zheltonozhsky+	M1019
* γ,x	^{177}Lu	CS	4RUSMOS	5.5+07		Jour	IZV,84,116	20	V.A.Zheltonozhsky+	M1020

72 Hafnium 180

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* γ,inel	^{180}Hf	CS	4RUSRUS	2.0+07		Jour	YF,83,303	20	V.A.Zheltonozhsky+	M1019
* γ,inel	^{180}Hf	CS	4RUSMOS	5.5+07		Jour	YF,83,303	20	V.A.Zheltonozhsky+	M1019
* γ,x	^{177}Lu	CS	4RUSMOS	5.5+07		Jour	IZV,84,116	20	V.A.Zheltonozhsky+	M1020

73 Tantalum 181

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,2n$	¹⁸⁰ Ta	CS	3INDTRM	1.5+07	1.5+07	Jour	IPA,58,228	20	B.K.Soni+	33142

78 Platinum 195

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,inel$	¹⁹⁵ Pt	CS	3EGYCAI	5.0+06	5.0+06	Jour	ARI,165,109340	20	M.Tohamy+	31829

79 Gold 197

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,2n$	¹⁹⁶ Au	CS	3CZRUVJ	Fiss		Jour	ARI,166,109313	20	M.Schulc+	31828
* $n,3n$	¹⁹⁵ Au	CS	3CZRUVJ	Fiss		Jour	ARI,166,109355	20	M.Schulc+	31825
* $n,3n$	¹⁹⁵ Au	CS	3CZRUVJ	Fiss		Jour	ARI,166,109313	20	M.Schulc+	31828

80 Mercury 199

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,inel$	¹⁹⁹ Hg	CS	3EGYCAI	5.0+06	5.0+06	Jour	ARI,165,109340	20	M.Tohamy+	31829

83 Bismuth 209

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* $n,3n$	²⁰⁷ Bi	CS	3CZRUVJ	Fiss		Jour	ARI,166,109355	20	M.Schulc+	31825
* $n,3n$	²⁰⁷ Bi	CS	3CZRUVJ	Fiss		Jour	ARI,166,109313	20	M.Schulc+	31828
* $n,4n$	²⁰⁶ Bi	CS	3CZRUVJ	Fiss		Jour	ARI,166,109355	20	M.Schulc+	31825
* $n,4n$	²⁰⁶ Bi	CS	3CZRUVJ	Fiss		Jour	ARI,166,109313	20	M.Schulc+	31828

90 Thorium 232

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
* n,fis	γ	FY	3INDTRM	2.6+06	2.6+06	Jour	EPJ/A,56,116	20	S.De+	33135
* n,fis	γ	KE	3INDTRM	2.6+06	2.6+06	Jour	EPJ/A,56,116	20	S.De+	33135
* n,fis		MFQ	3INDTRM	2.6+06	2.6+06	Jour	EPJ/A,56,116	20	S.De+	33135
* n,fis		NU	3INDTRM	2.6+06	2.6+06	Jour	EPJ/A,56,116	20	S.De+	33135
* n,fis	n	KE	3INDTRM	2.6+06	2.6+06	Jour	EPJ/A,56,116	20	S.De+	33135

92 Uranium

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis		FY	4RUSRI	2.5+06	2.5+06	Jour	SJA,8,124	61	Z.I.Solov'Eva	41710
<i>n</i> ,fis	⁴ He	KE	4RUSRI	2.5+06	2.5+06	Jour	SJA,8,124	61	Z.I.Solov'Eva	41710

92 Uranium 232

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
γ ,fis	Many	CS	4ARMJER		3.5+09	Jour	YF,71,28	08	N.A.Demekhina+	M1017

92 Uranium 233

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis	⁴ He	?	4RUSRI	1.0+00	1.0+00	Jour	JET,11,718	60	V.N.Dmitriev+	41701
<i>n</i> ,fis	⁴ He	?	4RUSKUR	2.5-02	2.5-02	Jour	SJA,10,359	62	T.A.Mostovaya	41708

92 Uranium 235

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis		FY	4RUSRI	1.4+07	1.4+07	Jour	SJA,14,601	64	N.A.Perfilov+	41703
<i>n</i> ,fis	Many	FY	4RUSITE	2.5-02	2.5-02	Jour	SNP,8,22	69	V.N.Andreev+	41705
<i>n</i> ,fis	Many	?	4RUSRI	1.5+07	1.5+07	Jour	JNE/A,10,80	59	A.N.Protopopov+	41702
<i>n</i> ,fis	⁴ He	FY	4RUSRI	1.0+00	1.0+00	Jour	SJA,16,164	64	L.V.Drapchinskii+	41709
<i>n</i> ,fis	⁴ He	FY	4RUSRI	1.4+07	1.4+07	Jour	SJA,14,601	64	N.A.Perfilov+	41703
<i>n</i> ,fis	⁴ He	FY	4RUSRI	2.5+06	1.4+07	Jour	SJA,16,164	64	L.V.Drapchinskii+	41709
<i>n</i> ,fis	⁴ He	?	4RUSRI			Jour	SJA,16,164	64	L.V.Drapchinskii+	41709

92 Uranium 238

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis		FY	4RUSRI	1.4+07	1.4+07	Jour	SJA,14,601	64	N.A.Perfilov+	41703
<i>n</i> ,fis	Many	?	4RUSRI	1.5+07	1.5+07	Jour	JNE/A,10,80	59	A.N.Protopopov+	41702
<i>n</i> ,fis	⁴ He	FY	4RUSRI	1.4+07	1.4+07	Jour	SJA,14,601	64	N.A.Perfilov+	41703
<i>n</i> ,fis	⁴ He	FY	4RUSRI	2.5+06	1.4+07	Jour	SJA,16,164	64	L.V.Drapchinskii+	41709
<i>n</i> ,fis	⁴ He	?	4RUSRI			Jour	SJA,16,164	64	L.V.Drapchinskii+	41709

94 Plutonium 239

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis	Many	FY	4RUSITE	1.0-03	1.5+07	Jour	JNE/A,10,163	59	L.M.Krizhansky+	41707
<i>n</i> ,fis	Many	?	4RUSITE	1.0-03	1.5+07	Jour	SJA,2,334	57	L.M.Krizhansky+	41706
<i>n</i> ,fis	Many	?	4RUSITE	1.0-03	1.5+07	Jour	JNE/A,10,163	59	L.M.Krizhansky+	41707
<i>n</i> ,fis	Many	?	4RUSRI	1.5+07	1.5+07	Jour	JNE/A,10,80	59	A.N.Protopopov+	41702
<i>n</i> ,fis	⁴ He	?	4RUSRI	1.0+00	1.0+00	Jour	JET,11,718	60	V.N.Dmitriev+	41701
<i>n</i> ,fis	⁴ He	?	4RUSKUR	2.5-02	2.5-02	Jour	SJA,10,359	62	T.A.Mostovaya	41708

94 Plutonium 241

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,fis	⁴ He	?	4RUSKUR	2.5-02	2.5-02	Jour	SJA,10,359	62	T.A.Mostovaya	41708

94 Plutonium 242

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #	
				Min	Max						
*	<i>n</i> , γ	²⁴³ Pu	CS	3HUNKFI	2.5-02	2.5-02	Jour	EPJ/A,55,63	19	J.Lerendegui-Marco+	31801
*	<i>n</i> , γ	²⁴³ Pu	CSP	3HUNKFI	2.5-02	2.5-02	Jour	EPJ/A,55,63	19	J.Lerendegui-Marco+	31801

98 Californium 252

Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #	
				Min	Max						
*	0,fis	γ	FY	3INDTRM	Spont		Jour	EPJ/A,56,116	20	S.De+	33135