EXFOR News (March 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)

4 Beryllium 9

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,x+α	inclusive	DAP	2JPNJAE	1.4+07	1.4+07	Conf	2007NICE,1,407	Apr 07	K.Kondo+	23091
*	n,x+t	inclusive	CS	2JPNJAE	1.4+07	1.4+07	Conf	2007NICE,1,407	Apr 07	K.Kondo+	23091
*	n,x+t	inclusive	DA	2JPNJAE	1.4+07	1.4+07	Conf	2007NICE,1,407	Apr 07	K.Kondo+	23091

6 Carbon 13

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,α	^{10}Be	CSP	2ZZZGEL	1.4+07	1.7+07	Jour	EPJ/A,52,179	16	P.Kavrigin+	23308
*	n,α	^{10}Be	?	2ZZZGEL	1.4+07	1.7+07	Jour	EPJ/A,52,179	16	P.Kavrigin+	23308

8 Oxygen

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,x+α	inclusive	DAE	2SWDUPP	1.8+08	1.8+08	Jour	NSTP,4,569	14	Y.Watanabe+	23130
*	n,x+d	inclusive	DAE	2SWDUPP	1.8+08	1.8+08	Jour	NSTP,4,569	14	Y.Watanabe+	23130
*	n,x+t	inclusive	DAE	2SWDUPP	1.8+08	1.8+08	Jour	NSTP,4,569	14	Y.Watanabe+	23130

10 Neon 20

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,0		RP	2GERKFK			Jour	AJ,265,417	83	J.Almeida+	21808

10 Neon 21

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,0		RP	2GERKFK			Jour	AJ,265,417	83	J.Almeida+	21808

14 Silicon 28

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,x+^{3}He	inclusive	DAE	2SWDUPP	1.8+08	1.8+08	Jour	NSTP,4,569	14	Y.Watanabe+	23180

16 Sulphur 34

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,γ	^{35}S	CS	2GERKFK	Maxwl	9.5+04	Jour	AJ,528,573	00	R.Reifarth+	22424
	n,γ	^{35}S	?	2GERKFK	Maxwl		Jour	AJ,528,573	00	R.Reifarth+	22424

19 Potassium 41

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,γ	^{42}K	CS	2GERKFK			Jour	PR/C,93,055807	16	M.Heil+	23306

21 Scandium 45

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,γ	^{46}Sc	CS	2GERKFK			Jour	PR/C,93,055807	16	M.Heil+	23306

24 Chromium 50

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,el		RP	2GERKFK		6.0+04	Jour	NP/A,240,29	75	H.Beer+	20374
	n,γ	^{51}Cr	CS	2GERKFK	Maxwl		Jour	NP/A,240,29	75	H.Beer+	20374

24 Chromium 52

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,el		RP	2GERKFK		1.5+05	Jour	NP/A,240,29	75	H.Beer+	20374
	n,γ	^{53}Cr	CS	2GERKFK	Maxwl		Jour	NP/A,240,29	75	H.Beer+	20374

24 Chromium 53

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,el		RP	2GERKFK	6.0+03	9.4+04	Jour	NP/A,240,29	75	H.Beer+	20374
	n,γ	^{54}Cr	CS	2GERKFK	Maxwl		Jour	NP/A,240,29	75	H.Beer+	20374

26 Iron 54

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

n,el		RP	2GERKFK		1.3+05	Jour	NP/A,240,29	75	H.Beer+	20374
n,γ	^{55}Fe	CS	2GERKFK	Maxwl		Jour	NP/A,240,29	75	H.Beer+	20374

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	2GERKFK	Maxwl		Jour	NP/A,240,29	75	H.Beer+	20374
n,inel	^{56}Fe	CS	2ZZZGEL	5.3+05	3.0+06	Thes	DUPONT	98	E.Dupont+	23313

26 Iron 57

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,el		RP	2GERKFK	6.0+03	1.0+05	Jour	NP/A,240,29	75	H.Beer+	20374
n,γ	^{58}Fe	CS	2GERKFK	Maxwl		Jour	NP/A,240,29	75	H.Beer+	20374

27 Cobalt 59

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,2n	^{57}Co	INT	3RUMBUC		2.2+07	Jour	NP/A,167,177	71	G.Baciu+	M0926
γ,x+n	inclusive	CS	3RUMBUC	1.1+07	2.2+07	Jour	NP/A,167,177	71	G.Baciu+	M0926
γ,x+n	inclusive	INT	3RUMBUC		2.2+07	Jour	NP/A,167,177	71	G.Baciu+	M0926
n,γ		RP	2GERKFK	8.6+00	4.0+01	Jour	NSE,60,390	76	R.R.Spencer+	20555
n,γ	^{60}Co	CS	2GERKFK	Maxwl		Jour	NP/A,240,29	75	H.Beer+	20374

28 Nickel 58

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,γ	^{59}Ni	CS	2GERKFK	Maxwl		Jour	NP/A,240,29	75	H.Beer+	20374

28 Nickel 60

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,γ	^{61}Ni	CS	2GERKFK	Maxwl		Jour	NP/A,240,29	75	H.Beer+	20374

28 Nickel 61

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,γ	^{62}Ni	CS	2GERKFK	Maxwl		Jour	NP/A,240,29	75	H.Beer+	20374

28 Nickel 62

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,el		RP	2GERKFK		1.6+05	Jour	NP/A,240,29	75	H.Beer+	20374
	n,γ	^{63}Ni	CS	2GERKFK	Maxwl		Jour	NP/A,240,29	75	H.Beer+	20374

28 Nickel 64

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,el		RP	2GERKFK			Jour	NP/A,240,29	75	H.Beer+	20374
	n,γ		RP	2GERKFK	1.4+04	3.4+04	Jour	NSE,87,48	84	K.Wisshak+	21890
	n,γ	^{65}Ni	CS	2GERKFK	Maxwl		Jour	NP/A,240,29	75	H.Beer+	20374
	n,γ	^{65}Ni	CS	2GERKFK	Maxwl		Jour	NSE,87,48	84	K.Wisshak+	21890

29 Copper 77

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	0,B-	^{77}Zn	KE	2ZZZCER	Spont		Jour	PR/C,80,034307	09	N.Patronis+	23304
*	0,B-	^{77}Zn	NUD	2ZZZCER	Spont		Jour	PR/C,80,034307	09	N.Patronis+	23304

32 Germanium 85

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	0,B-	^{86}As	NUD	2SF JYV	Spont		Jour	NDS,120,74	14	J.Agramunt+	23315

33 Arsenic 85

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	0,B-	^{85}Se	NUD	2SF JYV	Spont		Jour	NDS,120,74	14	J.Agramunt+	23315

33 Arsenic 86

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	0,B-	^{86}Se	NUD	2SF JYV	Spont		Jour	NDS,120,74	14	J.Agramunt+	23315

35 Bromine 91

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	0,B-	^{91}Kr	NUD	2SF JYV	Spont		Jour	NDS,120,74	14	J.Agramunt+	23315

36 Krypton

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,γ		CS	2GERKFK	Maxwl		Rept	KFK-3652,1	Feb 84	G.Walter+	21913

50 Tin 132

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	0,0		NQ	2FR ILL	Spont		Jour	EPJ/CS,111,08003	16	A.Chebboubi+	23314

57 Lanthanum 139

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,γ	^{140}La	CS	2GERKFK	Maxwl		Jour	AAA,162,330	86	H.Beer	22009
n,γ	^{140}La	CS	2GERKFK	Maxwl		Jour	NP/A,758,529C	05	M.Heil+	23303

62 Samarium 148

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,γ	^{149}Sm	CS	2GERKFK	1.0+04	1.0+05	Jour	AJ,300,41	86	R.R.Winters+	21899
n,γ	^{149}Sm	?	2GERKFK	Maxwl		Jour	AJ,300,41	86	R.R.Winters+	21899

62 Samarium 149

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,γ	^{150}Sm	CS	2GERKFK	1.0+04	1.0+05	Jour	AJ,300,41	86	R.R.Winters+	21899

62 Samarium 150

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,γ	^{151}Sm	CS	2GERKFK	1.0+04	1.0+05	Jour	AJ,300,41	86	R.R.Winters+	21899

62 Samarium 154

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,p	^{154}Pm	CS	2TUKSTU	1.4+07	1.5+07	Jour	ARI,113,79	16	I.A.Reyhancan	23300

63 Europium 155

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,γ	^{156}Eu	CS	2GERKFK	Maxwl		Jour	PR/C,51,3465	95	S.Jaag+	22459
	n,γ	^{156}Eu	?	2GERKFK	Maxwl		Jour	PR/C,51,3465	95	S.Jaag+	22459

75 Rhenium 185

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	$n,2n$	^{184}Re	CS	2ZZZGEL	1.5+07	1.8+07	Jour	EPJ/A,52,148	16	N.Jovancevic+	23301

75 Rhenium 187

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	$n,2n$	^{186}Re	CS	2ZZZGEL	1.5+07	1.8+07	Jour	EPJ/A,52,148	16	N.Jovancevic+	23301
*	n,α	^{184}Ta	CS	2ZZZGEL	1.5+07	1.8+07	Jour	EPJ/A,52,148	16	N.Jovancevic+	23301

82 Lead

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	γ,x	^{206}Tl	?	4RUSMOS		3.3+07	Jour	ZET,43,1600	62	Yu.I.Sorokin+	M0925

92 Uranium 234

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,fis		FY	2ZZZGEL	2.0+05	5.0+06	Jour	PR/C,93,034603	16	A.Al-Adili+	23164

92 Uranium 238

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

*	n,0		RP	2ZZZGEL			Jour	EPJ/A,52,170	16	H.I.Kim+	23302
	n,0		RP	2ZZZGEL			Rept	INDC(NDS)-0129,151	81	M.S.Moore+	23333
*	n,γ	^{239}U	CS	2ZZZGEL		9.0+04	Jour	EPJ/A,52,170	16	H.I.Kim+	23302

94 Plutonium 240

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	0,fis	γ	FY	2ZZZGEL	Spont		Jour	PR/C,93,054603	16	S.Oberstedt+	23305
*	0,fis	γ	KE	2ZZZGEL	Spont		Jour	PR/C,93,054603	16	S.Oberstedt+	23305

94 Plutonium 241

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,fis	^{132}Sn	CS	2FR ILL	2.5-02	2.5-02	Jour	EPJ/CS,111,08003	16	A.Chebboubi+	23314

94 Plutonium 242

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	0,fis	γ	FY	2ZZZGEL	Spont		Jour	PR/C,93,054603	16	S.Oberstedt+	23305
*	0,fis	γ	KE	2ZZZGEL	Spont		Jour	PR/C,93,054603	16	S.Oberstedt+	23305

95 Americium 243

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,γ	^{244}Am	CS	2FR ILL	2.5-02	2.5-02	Conf	2009BUDA,,81	09	A.Letourneau+	22941