EXFOR News (August 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)

3 Lithium 6

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	α,n	^{9}B	DAP	1USALRL	1.4+07	1.4+07	Jour	NP,56,117	64	R.W.Bauer+	C1850
	α,x+n	inclusive	DAE	1USALRL	1.4+07	1.4+07	Jour	NP,56,117	64	R.W.Bauer+	C1850

4 Beryllium 7

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,α	^{4}He	CS	2JPNOSA	2.0+05	8.0+05	Jour	PRL,118,052701	17	T.Kawabata+	23366

4 Beryllium 9

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	p,n	^{9}B	DA	1USALRL	2.0+06	4.3+06	Jour	PR,122,862	61	R.D.Albert+	C1849
	p,n	^{9}B	DAP	1USALRL	6.3+06	7.4+06	Jour	NP,56,117	64	R.W.Bauer+	C1850
	p,x+n	inclusive	DAE	1USALRL	6.3+06	7.4+06	Jour	NP,56,117	64	R.W.Bauer+	C1850

5 Boron 11

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	p,n	^{11}C	DA	1USALRL	2.9+06	4.3+06	Jour	PR,122,862	61	R.D.Albert+	C1849

6 Carbon

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,el	^{nat}C	CS	2ZZZGEL	2.0+06	8.0+06	Rept	INDC(BLG)-2	17	E.Pirovano	23365
*	n,el	^{nat}C	DA	2ZZZGEL	2.0+06	8.0+06	Rept	INDC(BLG)-2	17	E.Pirovano	23365

6 Carbon 12

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,el	^{12}C	DA	2JPNJAE	2.8+07	2.8+07	Jour	NP/A,624,305	97	S.Chiba+	22160
	n,inel	^{12}C	DAP	2JPNJAE	2.8+07	2.8+07	Jour	NP/A,624,305	97	S.Chiba+	22160
	p,α	^{9}B	DAE	1USALRL	1.3+07	1.3+07	Jour	NP,56,117	64	R.W.Bauer+	C1850
	p,α	^{9}B	DAP	1USALRL	1.4+07	1.8+07	Jour	NP,56,117	64	R.W.Bauer+	C1850
	p,x+α	inclusive	DAE	1USALRL	1.3+07	1.8+07	Jour	NP,56,117	64	R.W.Bauer+	C1850

d,n	^{13}N	CS	1USABNL	5.9+06	2.0+07	Jour	PR,100,32	55	D.H.Wilkinson	C2293
d,t	^{11}C	CS	1USABNL	1.6+07	2.0+07	Jour	PR,100,32	55	D.H.Wilkinson	C2293

6 Carbon 13

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
p,n	^{13}N	DA	1USALRL	3.1+06	5.3+06	Jour	PR,122,862	61	R.D.Albert+	C1849

8 Oxygen 16

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
d,γ	^{18}F	CS	1USANRL	1.7+06	1.7+06	Jour	PR,99,643(PA2)	55	J.W.Butler	C2294
t,n	^{18}F	CS	1USALAS	6.8+05	2.1+06	Jour	PR,98,41	55	N.Jarmie	C1851

8 Oxygen 17

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
d,n	^{18}F	?	1USANRL	1.7+06	1.7+06	Jour	PR,99,643(PA2)	55	J.W.Butler	C2294

14 Silicon 28

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
γ,n	^{27}Si	CS	4RUSMOS	1.7+07	3.0+07	Rept	MSU-INP-1993-8/300	93	V.V.Varlamov+	M0969

24 Chromium 52

Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
n,el	^{52}Cr	DA	2JPNJAE	1.8+07	1.8+07	Conf	91JUELIC,,717	91	Y.Yamanouti+	23367
n,inel	^{52}Cr	DAP	2JPNJAE	1.8+07	1.8+07	Conf	91JUELIC,,717	91	Y.Yamanouti+	23367

26 Iron

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,el	^{nat}Fe	CS	2ZZZGEL	2.0+06	6.0+06	Rept	INDC(BLG)-2	17	E.Pirovano	23365
*	n,el	^{nat}Fe	CS	2GERZFK	2.0+06	6.0+06	Rept	INDC(BLG)-2	17	E.Pirovano	23365
*	n,el	^{nat}Fe	DA	2ZZZGEL	2.0+06	6.0+06	Rept	INDC(BLG)-2	17	E.Pirovano	23365
*	n,el	^{nat}Fe	DA	2GERZFK	2.0+06	6.0+06	Rept	INDC(BLG)-2	17	E.Pirovano	23365

28 Nickel 60

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,el	^{60}Ni	DA	2JPNJAE	1.8+07	1.8+07	Conf	91JUELIC,,717	91	Y.Yamanouti+	23367
	n,inel	^{60}Ni	DAP	2JPNJAE	1.8+07	1.8+07	Conf	91JUELIC,,717	91	Y.Yamanouti+	23367

40 Zirconium 90

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	γ,2n	^{88}Zr	CS	4RUSMOS	2.2+07	2.6+07	Jour	EPJ/A,54,74	18	V.V.Varlamov+	M0967
*	γ,n	^{89}Zr	CS	4RUSMOS	1.2+07	2.6+07	Jour	EPJ/A,54,74	18	V.V.Varlamov+	M0967
*	γ,x+n	inclusive	CS	4RUSMOS	1.2+07	2.6+07	Jour	EPJ/A,54,74	18	V.V.Varlamov+	M0967

40 Zirconium 92

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	γ,2n	^{90}Zr	CS	4RUSMOS	2.2+07	2.6+07	Jour	EPJ/A,54,74	18	V.V.Varlamov+	M0967
*	γ,n	^{91}Zr	CS	4RUSMOS	1.2+07	2.6+07	Jour	EPJ/A,54,74	18	V.V.Varlamov+	M0967
*	γ,x+n	inclusive	CS	4RUSMOS	1.0+07	2.8+07	Jour	EPJ/A,54,74	18	V.V.Varlamov+	M0967
*	n,γ	^{93}Zr	CS	2ZZZCER	1.0+01	1.0+05	Jour	PR/C,81,055801	10	G.Tagliente+	23117

42 Molybdenum 98

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	γ,2n	^{96}Mo	CS	4RUSMOS	1.6+07	2.7+07	Jour	VMU,1,68	18	V.V.Varlamov+	M0968
*	γ,3n	^{95}Mo	CS	4RUSMOS	2.6+07	2.7+07	Jour	VMU,1,68	18	V.V.Varlamov+	M0968
*	γ,n	^{97}Mo	CS	4RUSMOS	9.0+06	2.6+07	Jour	VMU,1,68	18	V.V.Varlamov+	M0968
*	γ,x+n	inclusive	CS	4RUSMOS	9.0+06	2.7+07	Jour	VMU,1,68	18	V.V.Varlamov+	M0968

59 Praseodymium 141

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	γ,n	^{140}Pr	CS	4RUSMOS	9.2+06	1.8+07	Rept	MSU-INP-1993-8/300	93	V.V.Varlamov+	M0969

74 Tungsten

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,tot		CS	2ZZZGEL	2.0+00	4.0+02	Rept	EUR-29250	18	C.Paradela+	23323

82 Lead 204

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,γ	^{205}Pb	CS	2ZZZCER	4.0+02	4.7+05	Jour	PR/C,75,015806	07	C.Domingo-Pardo+	22945

82 Lead 206

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
	n,γ	^{207}Pb	CS	2ZZZCER	4.0+02	9.8+05	Jour	PR/C,76,045805	07	C.Domingo-Pardo+	22984

90 Thorium 232

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,fis	Many	FY	1USAMHG	1.4+07	1.4+07	Jour	NDS,139,171	17	B.D.Pierson+	14500

92 Uranium 235

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,fis	Many	FY	1USAMHG	1.4+07	1.4+07	Jour	NDS,139,171	17	B.D.Pierson+	14500

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	1USAMHG	1.4+07	1.4+07	Jour	NDS,139,171	17	B.D.Pierson+	14500
*	n,γ		RP	2ZZZCER	6.7+00	5.0+03	Jour	PR/C,96,064601	17	T.Wright+	23364
*	n,γ	^{239}U	CS	2ZZZCER	1.0+00	8.0+04	Jour	PR/C,96,064601	17	T.Wright+	23364

94 Plutonium 242

	Reaction	Product	Quant.	Lab.	Energy (eV) Min	Energy (eV) Max	Type	Documentation Ref Vol Page	Date	Author	Data #
*	n,0		RP	2ZZZCER			Jour	PR/C,97,024605	18	J.Lerendegui-Marco+	23368
*	n,el		RP	2ZZZCER		4.0+03	Jour	PR/C,97,024605	18	J.Lerendegui-Marco+	23368
*	n,γ		RP	2ZZZCER		4.0+03	Jour	PR/C,97,024605	18	J.Lerendegui-Marco+	23368

	Reaction	Product	Quant.	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #
					Min	Max		Ref Vol Page			
*	n,el		RP	2ZZZCER		1.0+04	Jour	PR/C,97,054616	18	E.Mendoza+	23369
*	n,γ	^{242}Am	CS	2ZZZCER	2.0-01	9.9+03	Jour	PR/C,97,054616	18	E.Mendoza+	23369
*	n,γ	^{242}Am	RI	2ZZZCER		1.1-01	Jour	PR/C,97,054616	18	E.Mendoza+	23369