

Japan Charged-Particle Nuclear Reaction Data Group (JCPRG)

EXFOR : Recent Compilation List (Added in Jun 2005)

EXFOR is a world-wide database for experimental neutron induced, charged-particle induced and photonuclear reaction compiled by Nuclear Reaction Data Centres Network coordinated by IAEA Nuclear Data Section. This list gives newly compiled data to EXFOR. *List consists of tables titled by target nuclide.*

Retrieval service is available at:

<http://www.jcprg.org/exfor/>

Quantity code

ALF	Alpha	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	Nu
D3A	Triple differential $d\Omega_1/d\Omega_2/dE'$	NUD	Nu delayed
D3E	Triple differential $d\Omega/dE'_1/dE'_2$	NUF	Fragment neutrons
D4A	Quadruple diff. $d\Omega_1/d\Omega_2/dE'_1/dE'_2$	POL	Polarization
DA	Differential $d/d\Omega$	POD	Differential polarization
DAA	Double differential $d\Omega_1/d\Omega_2$	PY	Product yield (other than fission)
DAE	Double differential $d\Omega/dE'$	RI	Resonance integral
DAP	Partial differential $d/d\Omega$	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	Eta	TTD	Differential thick target yield, $d/d\Omega$
EVL	Evaluation	TT	Partial thick target yield

Special codes in outgoing particle field

abs	Absorption	fus	Fusion	non	Nonelastic	ths	Thermal scattering
el	Elastic	inel	Inelastic	sct	Scattering	tot	Total
f	Fission	incl	Inclusive	tcc	Total charge changing		

Special codes in incident energy field

Fast	Fast reactor spectrum average	Maxw	Maxwellian spectrum average
Fiss	Fission spectrum average	Spont	Spontaneous (for fission)

1 Hydrogen 1										
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,el</i>	¹ H	POD	1CANTMF	2.0+08	5.2+08	Jour	NP/A,322,308	79	L.G.Greeniaus+	T0404

1 Hydrogen 2										
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
γ,el	² H	DA	1CANSAS	8.4+07	1.0+08	Jour	PRL,84,2334	00	D.L.Hornidge+	L0060
<i>n,2n</i>	¹ H	D3A	1USADKE	1.3+07		Jour	PR/C,71,034006	05	H.R.Setze+	13988

2 Helium 3										
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,el</i>	³ He	POD	1USABRK	2.1+07	5.0+07	Jour	PR/C,29,2009	84	J.Birchall+	T0402

2 Helium 4										
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,2p</i>	³ H	D3A	1CANTMF	2.5+08	5.0+08	Jour	PR/C,25,390	82	W.T.H.Vanoers+	T0405
<i>p,2p</i>	³ H	POD	1CANTMF	2.5+08	5.0+08	Jour	PR/C,25,2873	Jun 82	D.J.Margaziotis+	T0407
<i>p,el</i>	⁴ He	POD	1CANTMF	2.2+08	5.2+08	Jour	NP/A,322,308	79	L.G.Greeniaus+	T0404

3 Lithium 6										
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,n</i>	⁶ Be	DAP	1USAINU	1.4+08		Jour	PR/C,21,2211	80	G.L.Moake+	T0401

4 Beryllium 9										
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,inel</i>	⁹ Be	CS	1USALBL	8.0+07		Jour	PR,95,1268	54	G.P.Millburn+	13989

γ, d	^{25}Mg	DAE	2SWDLND	5.9+07	6.5+07	Jour	PR/C,42,444	90	D.Ryckbosch+	L0062
γ, p	^{26}Mg	DAE	2SWDLND	5.9+07	6.5+07	Jour	PR/C,42,444	90	D.Ryckbosch+	L0062
n, γ	^{28}Al	CS	1USAORL	2.5-02	5.0+05	Jour	NST,2,346	02	K.H.Guber+	13961
n, inel	^{27}Al	CS	1USALBL	8.0+07		Jour	PR,95,1268	54	G.P.Millburn+	13989

14 Silicon 30

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n, γ	^{31}Si	CS	1USAORL	2.5-02	7.0+05	Jour	NST,2,346	02	K.H.Guber+	13961

17 Chlorine 35

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
p, α	^{32}S	DAP	1CANCRC	3.9+06		Jour	NP/A,305,151	78	A.B.Mcdonald+	T0409
p, el	^{35}Cl	DA	1CANCRC	3.9+06		Jour	NP/A,305,151	78	A.B.Mcdonald+	T0409

17 Chlorine 37

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n, γ	^{38}Cl	CS	1USAORL	2.5-02	5.0+05	Jour	NST,2,346	02	K.H.Guber+	13961

20 Calcium 40

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
γ, d	^{38}K	DAE	2SWDLND	5.9+07	6.5+07	Jour	PR/C,42,444	90	D.Ryckbosch+	L0062
γ, p	^{39}K	DAE	2SWDLND	5.9+07	6.5+07	Jour	PR/C,42,444	90	D.Ryckbosch+	L0062
α, el	^{40}Ca	DA	1USAMIT	3.1+07		Jour	PL/B,30,20	69	A.M.Bernstein+	T0274

20 Calcium 48

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
α, el	^{48}Ca	DA	1USAMIT	3.1+07		Jour	PL/B,30,20	69	A.M.Bernstein+	T0274

21 Scandium 45

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n, p	^{45}Ca	DAE	1CANTMF	2.0+08		Jour	NP/A,531,97	91	W.P.Alford+	14006

22 Titanium 48

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,2n$	^{47}Ti	CSP	1USALAS	1.0+07	2.0+07	Rept	UCRL-TR-209474,	05	D.Dashdorj+	13997
n,inel	^{48}Ti	CSP	1USALAS	1.0+06	1.6+07	Rept	UCRL-TR-209474,	05	D.Dashdorj+	13997
n,p	^{48}Sc	CSP	1USALAS	1.0+06	2.0+07	Rept	UCRL-TR-209474,	05	D.Dashdorj+	13997
n,p	^{48}Sc	DAE	1CANTMF	2.0+08		Jour	NP/A,514,49	90	W.P.Alford+	14007
n,x	^{45}Ca	CSP	1USALAS	1.0+06	2.0+07	Rept	UCRL-TR-209474,	05	D.Dashdorj+	13997

29 Copper

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,inel	^{nat}Cu	CS	1USALBL	8.0+07		Jour	PR,95,1268	54	G.P.Millburn+	13989
$^{12}\text{C},x$	Many	CS	1USAMSU	1.1+09		Jour	PR/C,47,1636	93	J.P.Whitfield+	T0201
$^{12}\text{C},x$	Many	CS	1USAANL	1.5+08		Jour	PR/C,39,2227	89	S.Y.Cho+	T0200
$^{12}\text{C},x$	Many	CS	1USAMSU	2.8+08	5.3+08	Jour	PR/C,39,2227	89	S.Y.Cho+	T0200

42 Molybdenum 95

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,0$		RP	1USAORL	0.0+00		Jour	PR/C,68,015802	03	W.Rapp+	13998

50 Tin

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
γ,abs		CS	2FR SAC	2.5+07	1.3+08	Jour	NP/A,367,237	81	A.Lepretre+	L0061

52 Tellurium 122

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,inel	^{122}Te	CSP	1USAQTY	1.9+06	3.3+06	Jour	PR/C,71,034307	05	S.F.Hicks+	13987

58 Cerium

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
γ,abs		CS	2FR SAC	2.7+07	1.3+08	Jour	NP/A,367,237	81	A.Lepretre+	L0061

				90		Thorium		232			
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #	
				Min	Max						Ref
γ ,f		NU	1USALAS	6.4+06	8.1+06	Jour	NSE,56,179	75	J.T.Caldwell+	L0065	
γ ,f		NU	1USALAS	8.0+06	1.2+07	Conf	73PACIFI,1,651	73	J.T.Caldwell+	L0068	
n ,f	Many	FY	1USANMS	9.0+06	3.8+07	Jour	PR/C,16,2296	77	J.C.Hogan+	L0067	
n ,inel	^{232}Th	CSP	1USALTI	2.3+06	2.8+06	Conf	88MITO.,63	88	J.J.Egan+	14003	
n ,inel	^{232}Th	CSP	1USALTI	7.6+05	1.8+06	Jour	PR/C,26,841	82	D.W.S.Chan+	13991	
n ,inel	^{232}Th	DAP	1USALTI	2.4+06		Conf	88MITO.,63	88	J.J.Egan+	14003	

				92		Uranium					
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #	
				Min	Max						Ref
γ ,abs		CS	2FR SAC	1.9+07	1.3+08	Jour	NP/A,367,237	81	A.Lepretre+	L0061	
γ ,f		?	3BZLUSP	8.3+06	5.2+07	Conf	73PACIFI,1,653	73	J.C.Nascimento+	L0069	
n ,inel	^{nat}U	CS	1USALBL	8.0+07		Jour	PR,95,1268	54	G.P.Millburn+	13989	
E,f		CS	3BZLUSP	8.4+06	5.2+07	Conf	73PACIFI,1,653	73	J.C.Nascimento+	L0069	

				92		Uranium		235			
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #	
				Min	Max						Ref
γ ,f		NU	1USALAS	6.7+06	1.0+07	Jour	NSE,56,179	75	J.T.Caldwell+	L0065	
γ ,f		NU	1USALAS	8.0+06	1.2+07	Conf	73PACIFI,1,651	73	J.T.Caldwell+	L0068	
γ ,f	Many	FY	2ZZZGEL	0.0+00	2.5+07	Jour	PR/C,14,1058	76	H.Thierens+	L0066	
n ,f		CS	1USANIS	1.0-02	1.4+01	Conf	88MITO.,1037	88	R.G.Johnson+	13995	
n ,f		CS	1USALTI	1.9+05	3.8+05	Conf	97TRIEST,1,589	97	G.H.R.Kegel+	13999	

				92		Uranium		238			
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #	
				Min	Max						Ref
γ ,f		NU	1USALAS	6.5+06	8.9+06	Jour	NSE,56,179	75	J.T.Caldwell+	L0065	
γ ,f		NU	1USALAS	8.0+06	1.2+07	Conf	73PACIFI,1,651	73	J.T.Caldwell+	L0068	
γ ,f	Many	FY	2SWDLND	5.0+06	6.6+06	Jour	NP/A,215,461	73	A.Alm+	L0070	
γ ,f	Many	FY	2ZZZGEL	0.0+00	2.5+07	Jour	PR/C,14,1058	76	H.Thierens+	L0066	
γ ,n	incl	CS	1CANCRC	5.5+06	8.0+06	Conf	73PACIFI,1,647	73	J.W.Knowles+	L0071	
n ,inel	^{238}U	CSP	1USALTI	7.0+05	2.0+06	Jour	PR/C,26,841	82	D.W.S.Chan+	13991	

				93		Neptunium		237			
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation	Date	Author	Data #	
				Min	Max						Ref
γ ,f		NU	1USALAS	7.7+06	9.9+06	Jour	NSE,56,179	75	J.T.Caldwell+	L0065	
n ,f		NUD	1USATAM	2.5-02		Jour	ANS,72,379	95	H.Saleh+	13992	

94 Plutonium 239

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
γ ,f		NU	1USALAS	1.0+07	1.2+07	Conf	73PACIFI,1,651	73	J.T.Caldwell+	L0068
γ ,f		NU	1USALAS	7.7+06	9.6+06	Jour	NSE,56,179	75	J.T.Caldwell+	L0065
n ,inel	²³⁹ Pu	CSP	1USALTI	7.0+05		Conf	94GATLIN,1,248	94	G.Yue+	14000
n ,inel	²³⁹ Pu	DAP	1USALTI	5.7+05		Conf	91JUELIC,,59	91	J.J.Egan+	14001
n ,inel	²³⁹ Pu	DAP	1USALTI	7.0+05		Conf	94GATLIN,1,248	94	G.Yue+	14000

95 Americium 243

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n ,f		NUD	1USATAM	2.5-02		Jour	ANS,72,379	95	H.Saleh+	13992

96 Curium 245

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n ,f		CS	1USALRL	1.0+01	6.3+01	Conf	79KNOX,,496	79	R.M.White+	13993
n ,f		CS	1USALRL	1.1+04	9.8+06	Conf	82ANTWER,,218	82	R.M.White+	13994
n ,f		CS	1USALRL	2.1-02	1.0+01	Conf	79KNOX,,496	79	R.M.White+	13993

98 Californium 252

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
0,f	¹⁰⁹ Tc	SPC	1USAANL	Spont		Jour	PR/C,70,044310	Nov 04	Y.X.Luo+	13944

103 Lawrencium 259

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
0,f		DE	1USABRK	Spont		Jour	PR/C,46,1873	92	T.M.Hamilton+	14008
0,f	Many	FY	1USABRK	Spont		Jour	PR/C,46,1873	92	T.M.Hamilton+	14008