

Japan Charged-Particle Nuclear Reaction Data Group (JCPRG)

EXFOR : Recent Compilation List (Added in Nov 2005)

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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)

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
,		?	2ZZZGEL	3.4+03	1.6+05	Conf	2004EURAD,	Mar 04	G.Noguere+	22876

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Beryllium

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Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,α</i>	incl	DA	2JPNOSA	1.4+07		Jour	NIM/A,401,93	97	A.Takahashi+	22729
<i>n,α</i>	incl	DAE	2JPNOSA	1.4+07		Jour	NIM/A,401,93	97	A.Takahashi+	22729

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Carbon

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,t</i>		CS	1USALAS	3.1+05	1.3+08	Jour	NSE,104,339	90	M.M.Meier+	14031

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Carbon

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Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,α</i>	⁹ Be	DAE	1USALAS	9.5+06	1.0+07	Prog	DOE-NDC-24,140	81	R.W.Finlay+	14039
<i>n,inel</i>	¹² C	CSP	2GERPTB	1.4+07	1.6+07	Jour	NIM/A,342,534	94	D.Schmidt+	22728
<i>n,inel</i>	¹² C	DAP	2GERPTB	1.4+07	1.6+07	Jour	NIM/A,342,534	94	D.Schmidt+	22728

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Oxygen

16

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,α</i>	¹³ C	CS	1USAORL	3.2+06	5.8+06	Prog	ORNL-4743,37	72	C.H.Johnson+	14043

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Scandium

45

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,γ</i>	⁴⁶ Sc	DAE	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006
<i>n,γ</i>	⁴⁶ Sc	MLT	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006

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Titanium

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,γ		DAE	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006
n,γ		MLT	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006

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Iron

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,p	incl	DAE	2JPNOSA	1.4+07		Jour	NIM/A,401,93	97	A.Takahashi+	22729
n,p	incl	DE	2JPNOSA	1.4+07		Jour	NIM/A,401,93	97	A.Takahashi+	22729

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Cobalt

59

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,2\gamma$	^{60}Co	SPC	4ZZZDUB	2.5-02		Jour	IZV,67,(5),722	May 03	A.M.Sukhovoy+	41454

32

Germanium

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,tot		TSL	2JPNJPN	1.6-03	3.4-01	Jour	NST,22,(9),765	Sep 85	E.Suetomi+	22036

32

Germanium

74

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,inel	^{74}Ge	?	4KASKAZ	1.0+06		Jour	IZV,67,(1),140	03	Yu.G.Kosyak+	41451

37

Rubidium

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,γ		DAE	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006
n,γ		MLT	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006

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Molybdenum

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,γ		DAE	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006

n,γ MLT 2FR BRC 5.0+05 Jour NSE,112,87 92 J.Voignier+ 22006

43 Technetium 99

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,γ</i>	¹⁰⁰ Tc	CS	1USALAS	2.5-02		Conf	2004SANTA,2,1454	04	K.Furutaka+	14037

50 Tin 118

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>γ,p</i>	¹¹⁷ In	CS	4UKRIEP	0.0+00	1.6+07	Jour	IZV,69,(5),663	05	O.A.Bezshejko+	M0678

51 Antimony 121

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>γ,n</i>	¹²⁰ Sb	CS	4UKRIEP	0.0+00		Jour	IZV,69,(5),663	05	O.A.Bezshejko+	M0678

51 Antimony 123

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>γ,n</i>	¹²² Sb	CS	4UKRIEP	0.0+00		Jour	IZV,69,(5),663	05	O.A.Bezshejko+	M0678

53 Iodine 127

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,γ</i>	¹²⁸ I	DAE	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006
<i>n,γ</i>	¹²⁸ I	MLT	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006
<i>n,tot</i>		CS	2ZZZGEL	1.1-01	2.0+06	Conf	2004EURAD,	Mar 04	G.Noguere+	22876

53 Iodine 129

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,tot</i>		CS	2FR CAD	3.0-01	1.9+06	Conf	2004SANTA,,1462	Oct 04	G.Noguere+	22873

55

Cesium

133

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
n,γ	^{134}Cs	DAE	2FR BRC	5.0+05		Jour	NSE,112,87		92	J.Voignier+	22006
n,γ	^{134}Cs	MLT	2FR BRC	5.0+05		Jour	NSE,112,87		92	J.Voignier+	22006

58

Cerium

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
n,γ		DAE	2FR BRC	5.0+05		Jour	NSE,112,87		92	J.Voignier+	22006
n,γ		MLT	2FR BRC	5.0+05		Jour	NSE,112,87		92	J.Voignier+	22006

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Praesodymium

141

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
n,γ	^{142}Pr	DAE	2FR BRC	5.0+05		Jour	NSE,112,87		92	J.Voignier+	22006
n,γ	^{142}Pr	MLT	2FR BRC	5.0+05		Jour	NSE,112,87		92	J.Voignier+	22006

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Neodymium

144

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
n,inel	^{144}Nd	DAP	1USAKTY	2.3+06	3.3+06	Jour	PR/C,57,2264		98	S.F.Hicks+	14034

67

Holmium

165

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
n,γ	^{166}Ho	DAE	2FR BRC	5.0+05		Jour	NSE,112,87		92	J.Voignier+	22006
n,γ	^{166}Ho	MLT	2FR BRC	5.0+05		Jour	NSE,112,87		92	J.Voignier+	22006

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Lutetium

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
n,γ		DAE	2FR BRC	5.0+05		Jour	NSE,112,87		92	J.Voignier+	22006
n,γ		MLT	2FR BRC	5.0+05		Jour	NSE,112,87		92	J.Voignier+	22006

72 Hafnium

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,γ</i>		RI	1USARPI	5.0-03	2.0+02	Conf	2004SANTA,1,949	04	M.J.Trbovich+	14038

72 Hafnium 174

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,γ</i>	¹⁷⁵ Hf	RI	1USARPI	5.0-03	2.0+02	Conf	2004SANTA,1,949	04	M.J.Trbovich+	14038

72 Hafnium 176

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,0</i>		RP	1USARPI	0.0+00		Conf	2004SANTA,1,949	04	M.J.Trbovich+	14038
<i>n,γ</i>	¹⁷⁷ Hf	RI	1USARPI	5.0-03	2.0+02	Conf	2004SANTA,1,949	04	M.J.Trbovich+	14038

72 Hafnium 177

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,γ</i>	¹⁷⁸ Hf	RI	1USARPI	5.0-03	2.0+02	Conf	2004SANTA,1,949	04	M.J.Trbovich+	14038

72 Hafnium 178

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,0</i>		RP	1USARPI	0.0+00		Conf	2004SANTA,1,949	04	M.J.Trbovich+	14038
<i>n,γ</i>	¹⁷⁹ Hf	RI	1USARPI	5.0-03	2.0+02	Conf	2004SANTA,1,949	04	M.J.Trbovich+	14038

72 Hafnium 179

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,γ</i>	¹⁸⁰ Hf	RI	1USARPI	5.0-03	2.0+02	Conf	2004SANTA,1,949	04	M.J.Trbovich+	14038

72 Hafnium 180

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,γ</i>	¹⁸¹ Hf	RI	1USARPI	5.0-03	2.0+02	Conf	2004SANTA,1,949	04	M.J.Trbovich+	14038

73 Tantalum 181											
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
γ, f		CS	4UKRUFT	0.0+00	5.0+09	Jour	YF,14,65		71	G.A.Vartapetyan+	M0677

74 Tungsten 182											
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
n, γ	^{183}W	SPC	4RUSLIN	2.5-02		Jour	IZV,68,(8),1145		04	Yu.E.Loginov+	41449

74 Tungsten 183											
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
n, γ	^{184}W	SPC	4RUSLIN	2.5-02		Jour	IZV,68,(8),1145		04	Yu.E.Loginov+	41449
n, γ	^{184}W	?	4RUSLIN	2.5-02		Jour	IZV,68,(8),1145		04	Yu.E.Loginov+	41449

74 Tungsten 186											
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
γ, n	^{185}W	CS	2JPN AIS	7.3+06	1.1+07	Jour	PR/C,72,025808		05	T.Shizuma+	M0676
n, γ	^{187}W	SPC	4RUSLIN	2.5-02		Jour	IZV,68,(8),1145		04	Yu.E.Loginov+	41449

75 Rhenium 185											
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
γ, n	^{184}Re	CS	4ZZZDUB	0.0+00	2.2+07	Jour	YF,67,1257		04	Yu.P.Gangrsky+	M0679
$n, 2n$	^{184}Re	CS	4ZZZDUB	Maxwl		Jour	IZV,68,(2),167		04	Yu.P.Gangrskiy+	41453

75 Rhenium 186											
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
$\gamma, 2n$	^{184}Re	CS	4ZZZDUB	0.0+00	2.2+07	Jour	YF,67,1257		04	Yu.P.Gangrsky+	M0679

75 Rhenium 187										
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
γ, n	¹⁸⁶ Re	CS	2JPNAIS	7.4+06	1.1+07	Jour	PR/C,72,025808	05	T.Shizuma+	M0676

76 Osmium 188										
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
γ, n	¹⁸⁷ Os	CS	2JPNAIS	8.0+06	1.1+07	Jour	NP/A,758,561	05	T.Shizuma+	M0675
γ, n	¹⁸⁷ Os	CS	2JPNAIS	8.0+06	1.1+07	Jour	PR/C,72,025808	05	T.Shizuma+	M0676

76 Osmium 190										
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n, γ	¹⁹¹ Os	DAE	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006
n, γ	¹⁹¹ Os	MLT	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006

76 Osmium 192										
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n, γ	¹⁹³ Os	DAE	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006
n, γ	¹⁹³ Os	MLT	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006

77 Iridium 191										
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
γ, n	¹⁹⁰ Ir	CS	4ZZZDUB	0.0+00	2.2+07	Jour	YF,67,1257	04	Yu.P.Gangrskiy+	M0679
$n, 2n$	¹⁹⁰ Ir	CS	4ZZZDUB	Maxwl		Jour	IZV,68,(2),167	04	Yu.P.Gangrskiy+	41453
$n, 2n$	¹⁹⁰ Ir	CSP	1USALAS	7.3+06	2.7+07	Conf	2004SANTA,1,898	04	N.Fotiades+	14041
$n, 3n$	¹⁸⁹ Ir	CSP	1USALAS	7.3+06	2.5+08	Conf	2004SANTA,1,898	04	N.Fotiades+	14041
$n, 4n$	¹⁸⁸ Ir	CSP	1USALAS	2.0+07	2.5+08	Conf	2004SANTA,1,898	04	N.Fotiades+	14041
$n, 5n$	¹⁸⁷ Ir	CSP	1USALAS	2.0+07	2.5+08	Conf	2004SANTA,1,898	04	N.Fotiades+	14041
$n, 6n$	¹⁸⁶ Ir	CSP	1USALAS	3.0+07	2.5+08	Conf	2004SANTA,1,898	04	N.Fotiades+	14041
$n, 7n$	¹⁸⁵ Ir	CSP	1USALAS	3.0+07	2.5+08	Conf	2004SANTA,1,898	04	N.Fotiades+	14041
$n, 8n$	¹⁸⁴ Ir	CSP	1USALAS	5.0+07	2.5+08	Conf	2004SANTA,1,898	04	N.Fotiades+	14041
$n, 9n$	¹⁸³ Ir	CSP	1USALAS	5.0+07	2.5+08	Conf	2004SANTA,1,898	04	N.Fotiades+	14041
n, γ	¹⁹² Ir	CS	4ZZZDUB	Maxwl		Jour	IZV,67,(11),1605	03	Yu.P.Gangrskiy+	41452
$n, inel$	¹⁹¹ Ir	CSP	1USALAS	4.1+05	2.5+08	Conf	2004SANTA,1,898	04	N.Fotiades+	14041

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Iridium

192

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\gamma,2n$	^{190}Ir	CS	4ZZZDUB	0.0+00	2.2+07	Jour	YF,67,1257	04	Yu.P.Gangrsky+	M0679

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Iridium

193

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,3n$	^{191}Ir	CSP	1USALAS	8.7+06	6.9+07	Conf	2004SANTA,1,898	04	N.Fotiades+	14041
n,γ	^{194}Ir	CS	4ZZZDUB	Maxwl		Jour	IZV,67,(11),1605	03	Yu.P.Gangrsky+	41452
n,γ	^{194}Ir	SPC	2SWTPSI	2.5-02		Jour	FIZ/B,7,15	98	M.Balodis+	22730
n,γ	^{194}Ir	SPC	2FR ILL	2.5-02		Jour	FIZ/B,7,15	98	M.Balodis+	22730
n,γ	^{194}Ir	SPC	2SWTPSI	2.5-02		Jour	FIZ/B,7,15	98	M.Balodis+	22730
n,inel	^{193}Ir	CSP	1USALAS	5.0+05	6.9+07	Conf	2004SANTA,1,898	04	N.Fotiades+	14041

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Platinum

194

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
n,γ	^{195}Pt	DAE	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006
n,γ	^{195}Pt	MLT	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006

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Gold

197

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
γ,f		CS	4UKRUFT	0.0+00	5.0+09	Jour	YF,14,65	71	G.A.Vartapetyan+	M0677
γ,n	^{196}Au	CS	4ZZZDUB	0.0+00	2.2+07	Jour	YF,67,1257	04	Yu.P.Gangrsky+	M0679
$n,2n$	^{196}Au	CS	4ZZZDUB	Maxwl		Jour	IZV,68,(2),167	04	Yu.P.Gangrsky+	41453
n,el	^{197}Au	DA	1USAANL	4.5+06	1.0+07	Rept	ANL-NDM-161	05	A.B.Smith	14033
n,γ	^{198}Au	CS	1USAUSA	2.3+04	9.7+05	Prog	DOE-NDC-57,113	90	S.Sakamoto+	14040
n,γ	^{198}Au	CS	4ZZZDUB	Maxwl		Jour	IZV,67,(11),1605	03	Yu.P.Gangrsky+	41452
n,γ	^{198}Au	DAE	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006
n,γ	^{198}Au	MLT	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006

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Gold

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Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\gamma,2n$	^{196}Au	CS	4ZZZDUB	0.0+00	2.2+07	Jour	YF,67,1257	04	Yu.P.Gangrsky+	M0679

				83		Bismuth		209			
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
γ ,f		CS	4UKRUFT	0.0+00	5.0+09	Jour	YF,14,65		71	G.A.Vartapetyan+	M0677

				88		Radium		214			
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
0,f		DE	1USALBL	Spont		Jour	PR/C,41,631		90	D.C.Hoffman+	14055

				90		Thorium		232			
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
γ ,f		CS	4UKRUFT	0.0+00	5.0+09	Jour	YF,14,65		71	G.A.Vartapetyan+	M0677
n ,f		CS	1USAANL	2.5-02		Jour	NSE,2,33		57	G.L.Pyle+	14050
n ,f		?	1USAANL	1.0+05	1.1+07	Jour	ANE,14,563		87	Y.Watanabe+	14049
n ,f		?	1USANBS	2.5-02		Prog	INDC(USA)-83,1241		80	D.M.Gilliam+	14052
n ,f	Many	?	1USALRL	1.5+07		Priv	Nethaway		73	D.R.Nethaway	14046
n , γ	²³³ Th	CS	2ZZZGEL	4.0+03	1.4+05	Conf	2004SANTA,		Sep 04	P.Schillebeeckx+	22875
n , γ	²³³ Th	CS	2JPNKTO	Maxwl		Conf	2004SANTA,,664		Oct 04	Hiroshichatani	22874

				90		Thorium		233			
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
n ,0		RP	2JPNKTO	0.0+00		Conf	2004SANTA,,664		Oct 04	Hiroshichatani	22874
n , γ	²³⁴ Th	CS	2JPNKTO	Maxwl 2.5-02		Conf	2004SANTA,,664		Oct 04	Hiroshichatani	22874
n , γ	²³⁴ Th	RI	2JPNKTO	5.0+00		Conf	2004SANTA,,664		Oct 04	Hiroshichatani	22874

				92		Uranium		232			
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
n ,f		CS	1USALRL	2.5-02		Prog	WASH-1033,28		61	E.K.Hulet+	14047

				92		Uranium		233			
Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max	Ref Vol Page					
n ,f		?	1USAANL	1.0+05	1.1+07	Jour	ANE,14,563		87	Y.Watanabe+	14049
n ,f		?	1USANBS	2.5-02		Prog	INDC(USA)-83,1241		80	D.M.Gilliam+	14052

92 Uranium 234

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,f</i>		?	1USAANL	1.0+05	1.1+07	Jour	ANE,14,563	87	Y.Watanabe+	14049

92 Uranium 235

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
γ ,f		CS	4UKRUFT	0.0+00	5.0+09	Jour	YF,14,65	71	G.A.Vartapetyan+	M0677
<i>n,f</i>		CS	1USAMHG	1.4+05	9.6+05	Conf	77NBS,304	77	G.F.Knoll	14053
<i>n,f</i>		CS	1USAANL	2.5-02		Jour	NSE,2,33	57	G.L.Pyle+	14050
<i>n,f</i>		CS	1USANBS	5.1+05	2.0+06	Prog	INDC(NDS)-146,61	83	A.D.Carlson	14048
<i>n,f</i>		CS	1USALAS	5.4+05	9.5+08	Prog	LA-11078-MS,1	87	J.Rapaport+	14036
<i>n,f</i>		NU	1USALRL	8.9+04	2.3+07	Rept	BNL-NCS-21501,66	76	R.E.Howe+	14051
<i>n,f</i>		?	1USAFLA	Maxwl		Jour	PR/C,11,1287	75	L.Muga+	14044
<i>n,f</i>	Many	FY	1USABRK	1.0+06	1.4+07	Prog	UCRL-53929	89	G.B.Hudson	14045
<i>n,f</i>	Many	FY	1CANCRC	2.5-02		Prog	EANDC(CAN)-44,1	71	B.W.Weller+	14042
<i>n,f</i>	Many	DE	1USAFLA	Maxwl		Jour	PR/C,11,1287	75	L.Muga+	14044

92 Uranium 236

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,f</i>		?	1USAANL	1.0+05	1.1+07	Jour	ANE,14,563	87	Y.Watanabe+	14049

92 Uranium 238

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
γ ,f		CS	4UKRUFT	0.0+00	5.0+09	Jour	YF,14,65	71	G.A.Vartapetyan+	M0677
<i>n,f</i>		KE	4RUSFEI	5.0+06	1.3+07	Jour	YF,64,(1),3	Jan 01	A.M.Trufanov+	41450
<i>n,f</i>		?	1USAANL	1.0+05	1.1+07	Jour	ANE,14,563	87	Y.Watanabe+	14049
<i>n,f</i>	Many	FY	1USABRK	1.0+06	1.4+07	Prog	UCRL-53929	89	G.B.Hudson	14045
<i>n,f</i>	Many	?	1USALRL	Fiss	1.5+07	Priv	Nethaway	73	D.R.Nethaway	14046
<i>n,γ</i>	²³⁹ U	DAE	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006
<i>n,γ</i>	²³⁹ U	MLT	2FR BRC	5.0+05		Jour	NSE,112,87	92	J.Voignier+	22006

93 Neptunium 237

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,2n</i>	²³⁶ Np	CS	4RUSRI	1.5+07		Jour	AE,54,(2),108	Feb 83	E.A.Gromova+	40576
<i>n,f</i>		CS	1USALAS	5.0+00	4.8+03	Conf	94GATLIN,1,40	94	A.D.Carlson+	14035
<i>n,f</i>		?	1USAANL	1.0+05	1.1+07	Jour	ANE,14,563	87	Y.Watanabe+	14049
<i>n,γ</i>	²³⁸ Np	CS	1USALAS	2.1-02	4.0+05	Rept	LA-UR-05-6885	05	E.I.Esch+	14032

94 Plutonium 237

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
<i>n,f</i>		CS	1USALRL	2.5-02		Prog	WASH-1033,28		61	E.K.Hulet+	14047

94 Plutonium 239

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
<i>n,f</i>		CS	1USAMHG	1.4+05	9.6+05	Conf	77NBS,304		77	G.F.Knoll	14053
<i>n,f</i>		?	1USAANL	1.0+05	1.1+07	Jour	ANE,14,563		87	Y.Watanabe+	14049
<i>n,f</i>	Many	FY	1USABRK	1.0+06	1.4+07	Prog	UCRL-53929		89	G.B.Hudson	14045
<i>n,f</i>	Many	?	1USALRL	Fiss		Priv	Nethaway		73	D.R.Nethaway	14046

94 Plutonium 240

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
<i>n,f</i>		?	1USANBS	2.5-02		Prog	INDC(USA)-83,1241		80	D.M.Gilliam+	14052

95 Americium 241

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
<i>n,f</i>		NU	4RUSEPA	8.0+05	1.1+07	Conf	94GATLIN,1,272		94	Yu.A.Khokhlov+	41378

95 Americium 244

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
<i>n,f</i>		CS	1USALRL	2.5-02		Prog	WASH-1033,28		61	E.K.Hulet+	14047

102 Nobelium 252

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
0,f		FY	1USALRL	Spont		Jour	JALC,213,86		94	J.F.Wild+	14054
0,f	Many	FY	1USALRL	Spont		Jour	JALC,213,86		94	J.F.Wild+	14054

102**Nobelium****254**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
0,f		FY	1USALRL	Spont		Jour	JALC,213,86		94	J.F.Wild+	14054
0,f	Many	FY	1USALRL	Spont		Jour	JALC,213,86		94	J.F.Wild+	14054

102**Nobelium****256**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
0,f		DE	1USALBL	Spont		Jour	PR/C,41,631		90	D.C.Hoffman+	14055
0,f	Many	DE	1USALBL	Spont		Jour	PR/C,41,631		90	D.C.Hoffman+	14055

104**Rutherfordium****256**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
0,f		FY	1USALRL	Spont		Jour	JALC,213,86		94	J.F.Wild+	14054
0,f	Many	FY	1USALRL	Spont		Jour	JALC,213,86		94	J.F.Wild+	14054

104**Rutherfordium****258**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation		Date	Author	Data #
				Min	Max		Ref	Vol Page			
0,f		FY	1USALRL	Spont		Jour	JALC,213,86		94	J.F.Wild+	14054
0,f	Many	FY	1USALRL	Spont		Jour	JALC,213,86		94	J.F.Wild+	14054