

## Japan Charged-Particle Nuclear Reaction Data Group (JCPRG)

### EXFOR : Recent Compilation List (Added in Jan 2004)

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>	<sup>1</sup> H	DA	1USAWIS	1.9+06	4.0+06	Jour	PR,90,899	Jun 53	H.R.Worthington+	C0935

**2 Helium 4**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>d,n+p</i>	<sup>4</sup> He	D3A	1USANOT	7.0+06		Jour	PR/C,38,1119	Sep 88	N.O.Gaiser+	C0896
<i>d,n+p</i>	<sup>4</sup> He	POD	1USANOT	7.0+06		Jour	PR/C,38,1119	Sep 88	N.O.Gaiser+	C0896

**6 Carbon 12**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<sup>3</sup> He, <i>el</i>	<sup>12</sup> C	DA	1USABRK	2.0+07		Rept	UCRL-17732	Aug 67	N.F.Mangelson	C0934
<sup>3</sup> He, <i>inel</i>	<sup>12</sup> C	DAP	1USABRK	2.0+07		Rept	UCRL-17732	Aug 67	N.F.Mangelson	C0934

**7 Nitrogen 14**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,α</i>	<sup>11</sup> C	CS	3HUNDEB	4.0+06	3.0+07	Priv	TAKACS	Apr 03	S.Takacs+	D4111
<i>d,n</i>	<sup>15</sup> O	CS	3HUNDEB	6.0+05	1.4+07	Priv	TAKACS	Apr 03	S.Takacs+	D4111

**7 Nitrogen 15**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,n</i>	<sup>15</sup> O	CS	3HUNDEB	3.7+06	2.8+07	Priv	TAKACS	Apr 03	S.Takacs+	D4111

**8 Oxygen 16**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,α</i>	<sup>13</sup> N	CS	3HUNDEB	5.8+06	3.0+07	Priv	TAKACS	Apr 03	S.Takacs+	D4111



<i>n,tot</i>	CS	4ZZZDUB	5.2+00	3.0+04	Conf	2001DUBNA,,70	May 01	T.I.Enik+	41422
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Argon

36

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\alpha,0$		RP	1USAPEN	0.0+00		Jour	NP/A,103,503	67	C.W.Nahm+	C0930
$\alpha,p$	$^{39}\text{K}$	CS	1USAYAL	7.4+06		Jour	PR,101,1370	Feb 56	R.B.Schwartz+	C0936

18

Argon

38

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\alpha,0$		RP	1USAPEN	0.0+00		Jour	NP/A,103,503	67	C.W.Nahm+	C0930

18

Argon

40

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\alpha,n$	$^{43}\text{Ca}$	CS	1USAYAL	7.4+06		Jour	PR,101,1370	Feb 56	R.B.Schwartz+	C0936
$\alpha,p$	$^{43}\text{K}$	CS	1USAYAL	7.4+06		Jour	PR,101,1370	Feb 56	R.B.Schwartz+	C0936

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Scandium

45

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\alpha,n$	$^{48}\text{V}$	CS	1USAOSU	6.4+06	1.1+07	Jour	NP/A,224,492	74	A+	C0931
$\alpha,n+\alpha$	$^{44}\text{Sc}$	CS	1CANMCG	1.9+07	8.3+07	Jour	CJP,61,641	83	P.A.Beeley+	C0932

22

Titanium

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p,x$	$^{48}\text{V}$	CS	2BLGVUB	5.5+06	3.2+07	Jour	NIM/B,188,106	02	S.Takacs+	D4106
$^3\text{He},x$	$^{43}\text{Sc}$	CS	2SF ABA	2.3+07	3.6+07	Jour	NIM/B,168,337	00	F.Ditroi+	D4112
$^3\text{He},x$	$^{44}\text{Sc}$	CS	2SF ABA	9.5+06	3.6+07	Jour	NIM/B,168,337	00	F.Ditroi+	D4112
$^3\text{He},x$	$^{46}\text{Sc}$	CS	2SF ABA	4.3+06	3.6+07	Jour	NIM/B,168,337	00	F.Ditroi+	D4112
$^3\text{He},x$	$^{48}\text{Sc}$	CS	2SF ABA	2.2+07	2.7+07	Jour	NIM/B,168,337	00	F.Ditroi+	D4112
$^3\text{He},x$	$^{48}\text{V}$	CS	2SF ABA	2.3+06	3.6+07	Jour	NIM/B,168,337	00	F.Ditroi+	D4112
$^3\text{He},x$	$^{48}\text{Cr}$	CS	2SF ABA	6.7+06	3.6+07	Jour	NIM/B,168,337	00	F.Ditroi+	D4112
$^3\text{He},x$	$^{49}\text{Cr}$	CS	2SF ABA	6.7+06	2.7+07	Jour	NIM/B,168,337	00	F.Ditroi+	D4112

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Titanium

46

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\alpha, n$	$^{49}\text{Cr}$	CS	IUSAOSU	5.9+06	1.1+07	Jour	NP/A,224,492	74	A+	C0931

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Vanadium

51

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\alpha, n$	$^{54}\text{Mn}$	CS	IUSAOSU	6.8+06	1.1+07	Jour	NP/A,224,492	74	A+	C0931

24

Chromium

50

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\alpha, n$	$^{53}\text{Fe}$	CS	IUSAOSU	5.9+06	1.1+07	Jour	NP/A,224,492	74	A+	C0931

26

Iron

54

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\alpha, n$	$^{57}\text{Ni}$	CS	IUSAOSU	6.4+06	1.1+07	Jour	NP/A,224,492	74	A+	C0931

27

Cobalt

59

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\alpha, 2n$	$^{61}\text{Cu}$	CS	2JPNIRS	1.8+07	5.8+07	Jour	NIM/B,187,153	02	F.Szelecsenyi+	D4116
$\alpha, n$	$^{62}\text{Cu}$	CS	2JPNIRS	1.8+07	5.8+07	Jour	NIM/B,187,153	02	F.Szelecsenyi+	D4116

28

Nickel

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$p, x$	$^{57}\text{Ni}$	CS	2BLGVUB	1.4+07	3.1+07	Jour	NIM/B,188,106	02	S.Takacs+	D4106

28

Nickel

58

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\alpha, p$	$^{61}\text{Cu}$	CS	IUSAOSU	5.4+06	1.0+07	Jour	NP/A,224,492	74	A+	C0931

**29                      Copper**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,x</i>	<sup>58</sup> Co	CS	2JPNTOH	2.9+07	7.0+07	Jour	NIM/B,194,369	02	T.Ido+	D4114
<i>p,x</i>	<sup>62</sup> Zn	CS	2BLGVUB	1.5+07	3.2+07	Jour	NIM/B,188,106	02	S.Takacs+	D4106
<i>p,x</i>	<sup>63</sup> Zn	CS	2BLGVUB	6.2+06	3.2+07	Jour	NIM/B,188,106	02	S.Takacs+	D4106
<i>p,x</i>	<sup>65</sup> Zn	CS	2BLGVUB	6.2+06	3.2+07	Jour	NIM/B,188,106	02	S.Takacs+	D4106
<sup>3</sup> He,x	<sup>63</sup> Zn	CS	3HUNDEB	1.4+07	3.6+07	Jour	NIM/B,196,215	02	F.Tarkanyi+	D4109
<sup>3</sup> He,x	<sup>63</sup> Zn	TT	3HUNDEB	1.4+07	3.6+07	Jour	NIM/B,196,215	02	F.Tarkanyi+	D4109
<sup>3</sup> He,x	<sup>65</sup> Zn	CS	3HUNDEB	8.1+06	2.5+07	Jour	NIM/B,196,215	02	F.Tarkanyi+	D4109
<sup>3</sup> He,x	<sup>65</sup> Zn	TT	3HUNDEB	8.0+06	2.4+07	Jour	NIM/B,196,215	02	F.Tarkanyi+	D4109
<sup>3</sup> He,x	<sup>66</sup> Ga	CS	3HUNDEB	6.4+06	3.6+07	Jour	NIM/B,196,215	02	F.Tarkanyi+	D4109
<sup>3</sup> He,x	<sup>66</sup> Ga	TT	3HUNDEB	6.5+06	3.6+07	Jour	NIM/B,196,215	02	F.Tarkanyi+	D4109
<sup>3</sup> He,x	<sup>67</sup> Ga	CS	3HUNDEB	3.1+06	2.5+07	Jour	NIM/B,196,215	02	F.Tarkanyi+	D4109
<sup>3</sup> He,x	<sup>67</sup> Ga	TT	3HUNDEB	3.5+06	2.4+07	Jour	NIM/B,196,215	02	F.Tarkanyi+	D4109

**29                      Copper                      63**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,inel</i>	<sup>63</sup> Cu	?	4KASKAZ	1.0+06		Jour	IZV,65,(1),117	01	Yu.G.Kosyak+	41413

**29                      Copper                      65**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,inel</i>	<sup>65</sup> Cu	?	4KASKAZ	1.0+06		Jour	IZV,64,(3),402	00	Yu.G.Kosyak+	41412

**30                      Zinc**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,x</i>	<sup>62</sup> Zn	CS	2JPNIRS	2.4+07	7.0+07	Jour	ARI,58,377	03	F.Szelecsenyi+	D4117

**30                      Zinc                      66**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,x</i>	<sup>66</sup> Ga	CS	2JPNIRS	3.5+07	6.7+07	Jour	ARI,58,377	03	F.Szelecsenyi+	D4117

**31                      Gallium**

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

$p,x$	$^{68}\text{Ge}$	CS	3HUNDEB	1.3+07	5.6+07	Priv	TAKACS	Apr 03	S.Takacs+	D4111
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**31**

**Gallium**

**69**

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

$p,2n$	$^{68}\text{Ge}$	CS	3HUNDEB	1.3+07	5.0+07	Priv	TAKACS	Apr 03	S.Takacs+	D4111
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**32**

**Germanium**

**74**

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

$n,\gamma$	$^{75}\text{Ge}$	CS	4ZZZDUB	Maxwl		Jour	IZV,65,(1),111	01	Yu.P.Gangrskiy+	41414
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**34**

**Selenium**

**80**

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

$n,\gamma$	$^{81}\text{Se}$	CS	4ZZZDUB	Maxwl		Jour	IZV,65,(1),111	01	Yu.P.Gangrskiy+	41414
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**37**

**Rubidium**

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

$p,x$	$^{81}\text{Rb}$	CS	2JPNTOH	3.6+07	6.9+07	Jour	NIM/B,194,369	02	T.Ido+	D4114
$p,x$	$^{83}\text{Rb}$	CS	2JPNTOH	3.6+07	6.9+07	Jour	NIM/B,194,369	02	T.Ido+	D4114
$p,x$	$^{86}\text{Rb}$	CS	2JPNTOH	3.6+07	6.9+07	Jour	NIM/B,194,369	02	T.Ido+	D4114
$p,x$	$^{82}\text{Sr}$	CS	3HUNDEB	3.4+07	1.0+08	Priv	TAKACS	Apr 03	S.Takacs+	D4111
$p,x$	$^{82}\text{Sr}$	CS	2JPNTOH	3.4+07	6.9+07	Jour	NIM/B,194,369	02	T.Ido+	D4114
$p,x$	$^{82}\text{Sr}$	TT	2JPNTOH	4.0+07	7.0+07	Jour	NIM/B,194,369	02	T.Ido+	D4114
$p,x$	$^{85}\text{Sr}$	CS	2JPNTOH	3.6+07	6.9+07	Jour	NIM/B,194,369	02	T.Ido+	D4114

**37**

**Rubidium**

**85**

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

$p,3n$	$^{83}\text{Sr}$	TT	2JPNTOH	3.0+07	5.0+07	Jour	NIM/B,194,369	02	T.Ido+	D4114
$p,4n$	$^{82}\text{Sr}$	CS	3HUNDEB	3.4+07	9.9+07	Priv	TAKACS	Apr 03	S.Takacs+	D4111

**38**

**Strontium**

**84**

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

$n,\gamma$	$^{85}\text{Sr}$	CS	4ZZZDUB	Maxwl		Jour	IZV,65,(1),111	01	Yu.P.Gangrskiy+	41414
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## Niobium

93

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,sct	<sup>93</sup> Nb	SIF	4ZZZDUB	1.0+05	2.2+02	Jour	YK,2002,(1-2),50	02	Yu.V.Grigoriev+	41426
<i>n</i> ,tot		CS	4ZZZDUB	1.0+05	1.0+02	Jour	YK,2002,(1-2),50	02	Yu.V.Grigoriev+	41426
$\alpha$ ,2 <i>n</i>	<sup>95</sup> Tc	CS	2BLGVUB	1.5+07	4.4+07	Jour	NIM/B,198,11	02	F.Tarkanyi+	D4113
$\alpha$ ,3 <i>n</i>	<sup>94</sup> Tc	CS	2BLGVUB	2.5+07	4.4+07	Jour	NIM/B,198,11	02	F.Tarkanyi+	D4113
$\alpha$ , <i>n</i>	<sup>96</sup> Tc	CS	2BLGVUB	9.0+06	4.4+07	Jour	NIM/B,198,11	02	F.Tarkanyi+	D4113
$\alpha$ , <i>n</i> + $\alpha$	<sup>92</sup> Nb	CS	2BLGVUB	2.6+07	4.4+07	Jour	NIM/B,198,11	02	F.Tarkanyi+	D4113

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## Molybdenum

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,sct	<sup>nat</sup> Mo	SIF	4ZZZDUB	1.0+05	2.2+02	Jour	YK,2002,(1-2),50	02	Yu.V.Grigoriev+	41426
<i>n</i> ,tot		CS	4ZZZDUB	1.0+05	1.0+02	Jour	YK,2002,(1-2),50	02	Yu.V.Grigoriev+	41426
<i>p</i> ,x	<sup>96</sup> Nb	CS	2BLGVUB	1.9+07	3.8+07	Jour	NIM/B,198,183	02	S.Takacs+	D4110
<i>p</i> ,x	<sup>96</sup> Tc	CS	2BLGVUB	4.5+06	3.8+07	Jour	NIM/B,198,183	02	S.Takacs+	D4110
<i>p</i> ,x	<sup>96</sup> Tc	TT	2BLGVUB	4.5+06	3.8+07	Jour	NIM/B,198,183	02	S.Takacs+	D4110
<i>d</i> ,x	<sup>92</sup> Nb	CS	2BLGVUB	1.0+07	2.0+07	Rept	IAEA-1065,113	99	M.Sonck+	D4107
<i>d</i> ,x	<sup>95</sup> Nb	CS	2BLGVUB	1.0+07	2.0+07	Rept	IAEA-1065,113	99	M.Sonck+	D4107
<i>d</i> ,x	<sup>99</sup> Mo	CS	2BLGVUB	6.2+06	2.0+07	Conf	97TRIEST,,1637	98	M.Sonck+	D4100
<i>d</i> ,x	<sup>99</sup> Mo	CS	2BLGVUB	6.2+06	2.0+07	Rept	IAEA-1065,113	99	M.Sonck+	D4107
<i>d</i> ,x	<sup>99</sup> Mo	CS	2BLGLVN	7.8+06	5.0+07	Conf	98DENTON,,978	99	M.Sonck+	D4098
<i>d</i> ,x	<sup>93</sup> Tc	CS	2BLGVUB	6.2+06	2.0+07	Rept	IAEA-1065,113	99	M.Sonck+	D4107
<i>d</i> ,x	<sup>94</sup> Tc	CS	2BLGVUB	1.0+07	2.0+07	Conf	97TRIEST,,1637	98	M.Sonck+	D4100
<i>d</i> ,x	<sup>94</sup> Tc	CS	2BLGVUB	1.0+07	2.0+07	Rept	IAEA-1065,113	99	M.Sonck+	D4107
<i>d</i> ,x	<sup>94</sup> Tc	CS	2BLGVUB	8.1+06	2.0+07	Conf	97TRIEST,,1637	98	M.Sonck+	D4100
<i>d</i> ,x	<sup>94</sup> Tc	CS	2BLGVUB	8.1+06	2.0+07	Rept	IAEA-1065,113	99	M.Sonck+	D4107
<i>d</i> ,x	<sup>95</sup> Tc	CS	2BLGVUB	6.2+06	2.0+07	Conf	97TRIEST,,1637	98	M.Sonck+	D4100
<i>d</i> ,x	<sup>95</sup> Tc	CS	2BLGVUB	6.2+06	2.0+07	Rept	IAEA-1065,113	99	M.Sonck+	D4107
<i>d</i> ,x	<sup>95</sup> Tc	CS	2BLGVUB	8.6+06	2.1+07	Conf	97TRIEST,,1637	98	M.Sonck+	D4100
<i>d</i> ,x	<sup>99</sup> Tc	CS	2BLGVUB	6.6+06	2.0+07	Conf	97TRIEST,,1637	98	M.Sonck+	D4100

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## Molybdenum

100

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p</i> ,x	<sup>99</sup> Mo	CS	2BLGVUB	5.7+06	3.8+07	Priv	TAKACS	May 03	S.Takacs+	D4115
<i>d</i> ,x	<sup>99</sup> Mo	CS	2BLGLVN	8.6+06	4.9+07	Conf	98DENTON,,978	99	M.Sonck+	D4098

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## Ruthenium

101

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,0		RP	4ZZZDUB	0.0+00	1.0+03	Jour	YF,29,(3),561	Mar 79	A.B.Popov+	40591



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Rhodium

103

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,n</i>	<sup>103</sup> Pd	CS	2BLGVUB	4.8+06	2.5+07	Jour	NIM/B,170,281	00	A.Hermanne+	D4108
<i>p,n</i>	<sup>103</sup> Pd	TT	2BLGVUB	3.5+06	2.0+07	Jour	NIM/B,170,281	00	A.Hermanne+	D4108
<i>p,x</i>	<sup>101</sup> Rh	CS	2BLGVUB	1.2+07	2.9+07	Jour	NIM/B,170,281	00	A.Hermanne+	D4108
<i>p,x</i>	<sup>101</sup> Pd	CS	2BLGVUB	2.0+07	2.9+07	Jour	NIM/B,170,281	00	A.Hermanne+	D4108
<i>d,2n</i>	<sup>103</sup> Pd	CS	2BLGVUB	2.0+07	4.1+06	Jour	NIM/B,187,03	02	A.Hermanne+	D4097
<i>d,x</i>	<sup>101</sup> Rh	CS	2BLGVUB	2.0+07	1.5+07	Jour	NIM/B,187,03	02	A.Hermanne+	D4097
<i>d,x</i>	<sup>102</sup> Rh	CS	2BLGVUB	2.0+07	8.7+06	Jour	NIM/B,187,03	02	A.Hermanne+	D4097

46

Palladium

102

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,γ</i>	<sup>103</sup> Ag	RR	1USANOT	0.0+00		Jour	NP/A,710,469	02	N.Ozkan+	C0904

46

Palladium

108

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,γ</i>	<sup>109</sup> Pd	CS	4ZZZDUB	Maxwl		Jour	IZV,65,(1),111	01	Yu.P.Gangrskiy+	41414

48

Cadmium

114

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,γ</i>	<sup>115</sup> Cd	CS	4ZZZDUB	Maxwl		Jour	IZV,65,(1),111	01	Yu.P.Gangrskiy+	41414

50

Tin

112

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n,γ</i>	<sup>113</sup> Sn	CS	4ZZZDUB	Maxwl		Jour	IZV,65,(1),111	01	Yu.P.Gangrskiy+	41414

50

Tin

116

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>p,γ</i>	<sup>117</sup> Sb	RR	1USANOT	0.0+00		Jour	NP/A,710,469	02	N.Ozkan+	C0904



**56 Barium 132**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\gamma$	$^{133}\text{Ba}$	CS	4ZZZDUB	Maxwl		Jour	IZV,65,(1),111	01	Yu.P.Gangrskiy+	41414

**58 Cerium 136**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\gamma$	$^{137}\text{Ce}$	CS	4ZZZDUB	Maxwl		Jour	IZV,65,(1),111	01	Yu.P.Gangrskiy+	41414

**58 Cerium 138**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\gamma$	$^{139}\text{Ce}$	CS	4ZZZDUB	Maxwl		Jour	IZV,65,(1),111	01	Yu.P.Gangrskiy+	41414

**60 Neodymium 143**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\alpha$		RP	4UKRIJD	2.4+04		Conf	80KIEV,2,229	Sep 80	Yu.Andzheevsky+	40580
$n,\alpha$	$^{140}\text{Ce}$	CSP	4UKRIJD	2.4+04		Conf	80KIEV,2,229	Sep 80	Yu.Andzheevsky+	40580

**62 Samarium 144**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$\alpha,n$	$^{147}\text{Gd}$	CS	2GERJUL	1.3+07	2.5+07	Jour	RCA,69,209	95	F.O.Denzler+	D4119

**62 Samarium 147**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
$n,\alpha$		RP	4UKRIJD	2.4+04		Conf	80KIEV,2,229	Sep 80	Yu.Andzheevsky+	40580
$n,\alpha$	$^{144}\text{Nd}$	CS	4UKRIJD	2.4+04		Conf	80KIEV,2,229	Sep 80	Yu.Andzheevsky+	40580
$n,\alpha$	$^{144}\text{Nd}$	CSP	4UKRIJD	2.4+04		Conf	80KIEV,2,229	Sep 80	Yu.Andzheevsky+	40580
$^3\text{He},3n$	$^{147}\text{Gd}$	CS	2GERJUL	1.1+07	3.4+07	Jour	RCA,69,209	95	F.O.Denzler+	D4119
$^3\text{He},4n$	$^{146}\text{Gd}$	CS	2GERJUL	1.1+07	3.4+07	Jour	RCA,69,209	95	F.O.Denzler+	D4119
$^3\text{He},x$	$^{147}\text{Eu}$	CS	2GERJUL	1.4+07	3.4+07	Jour	RCA,69,209	95	F.O.Denzler+	D4119

**66                      Dysprosium                      162**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,inel	<sup>162</sup> Dy	DAP	4RUSKUR	Fiss		Jour	YF,65,(5),819	02	L.I.Govor+	41417
<i>n</i> ,inel	<sup>162</sup> Dy	?	4RUSKUR	Fiss		Jour	YF,65,(5),819	02	L.I.Govor+	41417

**78                      Platinum                      196**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> , $\gamma$	<sup>197</sup> Pt	CS	4ZZZDUB	Maxwl		Jour	IZV,65,(1),111	01	Yu.P.Gangrskiy+	41414

**80                      Mercury                      196**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> , $\gamma$	<sup>197</sup> Hg	CS	4ZZZDUB	Maxwl		Jour	IZV,65,(1),111	01	Yu.P.Gangrskiy+	41414

**82                      Lead**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,tot		CS	4ZZZDUB	1.0+05	1.0+02	Jour	YK,2002,(1-2),50	02	Yu.V.Grigoriev+	41426

**83                      Bismuth                      209**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<sup>3</sup> He,2 <i>n</i>	<sup>210</sup> At	CS	3HUNDEB	1.5+07	2.8+07	Jour	RCA,65,87	94	Z.Szucs+	D4118
<sup>3</sup> He,4 <i>n</i>	<sup>208</sup> At	CS	3HUNDEB	2.5+07	2.8+07	Jour	RCA,65,87	94	Z.Szucs+	D4118

**90                      Thorium                      232**

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
<i>n</i> ,f		DA	4RUSKUR	1.6+06	1.4+06	Jour	YF,47,(2),320	Feb 88	B.M.Gokhberg+	40965
<i>n</i> ,f	<sup>129</sup> Sb	?	4RUSKUR	1.6+06	1.4+06	Jour	YF,47,(2),320	Feb 88	B.M.Gokhberg+	40965
<i>n</i> ,inel	<sup>232</sup> Th	CSP	4RUSRI	3.0+06		Jour	YK,1988,(2),56	May 88	A.A.Filatenkov+	40966



98

Californium

252

Reaction	Product	Quantity	Lab.	Energy (eV)		Type	Documentation Ref Vol Page	Date	Author	Data #
				Min	Max					
0,f		DE	4RUSRI	Spont		Conf	80KIEV,3,109	Sep 80	M.V.Blinov+	40535