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

# EXFOR : Recent Compilation List (Added in Jun 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 $\mathrm{d}\Omega_1/\mathrm{d}\Omega_2/\mathrm{d}E'$ | NUD | Nu delayed |
| D3E | Triple differential $\mathrm{d}\Omega/\mathrm{d}E'_1/\mathrm{d}E'_2$ | NUF | Fragment neutrons |
| D4A | Quadruple diff. $\mathrm{d}\Omega_1/\mathrm{d}\Omega_2/\mathrm{d}E'_1/\mathrm{d}E'_2$ | POL | Polarization |
| DA | Differential $\mathrm{d}/\mathrm{d}\Omega$ | POD | Differential polarization |
| DAA | Double differential $\mathrm{d}\Omega_1/\mathrm{d}\Omega_2$ | PY | Product yield (other than fission) |
| DAE | Double differential $\mathrm{d}\Omega/\mathrm{d}E'$ | RI | Resonance integral |
| DAP | Partial differential $\mathrm{d}/\mathrm{d}\Omega$ | RP | Resonance parameter |
| DAT | Temperature-dependent Legendre coefficient | RR | Reaction rate |
| DE | Differential $\mathrm{d}/\mathrm{d}E'$ | 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, $\mathrm{d}/\mathrm{d}\Omega$ |
| 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) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,2$p$ | $^{nat}$Et | DA | 2GERJUL | 1.3+09 | 1.4+09 | Jour | EPJ/A,16,127 | 03 | M.Abdel-Bary+ | O0785 |
| $\alpha$,non | | CS | 2FR GAN | 3.2+08 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{6}$He,non | | CS | 2FR GAN | 2.2+08 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{7}$Li,non | | CS | 2FR GAN | 3.9+08 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{8}$Li,non | | CS | 2FR GAN | 3.4+08 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{9}$Li,non | | CS | 2FR GAN | 3.1+08 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{9}$Be,non | | CS | 2FR GAN | 6.1+08 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{10}$Be,non | | CS | 2FR GAN | 5.5+08 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{11}$Be,non | | CS | 2FR GAN | 5.0+08 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{14}$Be,$n$ | $^{14}$B | DAP | 2JPNIPC | 1.0+09 | | Jour | PL/B,515,(3-4),255 | Aug 01 | S.Takeuchi+ | E1797 |
| $^{14}$Be,$n$ | $^{14}$B | DE | 2JPNIPC | 1.0+09 | | Jour | PL/B,515,(3-4),255 | Aug 01 | S.Takeuchi+ | E1797 |
| $^{21}$F,non | | CS | 2FR GAN | 9.9+08 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{22}$F,non | | CS | 2FR GAN | 9.4+08 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{23}$F,non | | CS | 2FR GAN | 8.9+08 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{24}$F,non | | CS | 2FR GAN | 8.5+08 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{23}$Ne,non | | CS | 2FR GAN | 1.1+09 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{24}$Ne,non | | CS | 2FR GAN | 1.1+09 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{25}$Ne,non | | CS | 2FR GAN | 1.0+09 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{26}$Ne,non | | CS | 2FR GAN | 9.6+08 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{25}$Na,non | | CS | 2FR GAN | 1.2+09 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{26}$Na,non | | CS | 2FR GAN | 1.2+09 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{27}$Na,non | | CS | 2FR GAN | 1.1+09 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{28}$Na,non | | CS | 2FR GAN | 1.1+09 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{29}$Na,non | | CS | 2FR GAN | 1.0+09 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{29}$Mg,non | | CS | 2FR GAN | 1.2+09 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{30}$Mg,non | | CS | 2FR GAN | 1.2+09 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{31}$Mg,non | | CS | 2FR GAN | 1.1+09 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{32}$Mg,non | | CS | 2FR GAN | 1.1+09 | | Jour | NP/A,706,295 | 02 | A.Devismes+ | O1011 |
| $^{28}$Si,tcc | | CS | 2GERGSI | 1.4+10 | | Jour | RM,34,237 | 01 | F.Flesch+ | O0971 |
| $^{28}$Si,x | Many | CS | 2GERGSI | 1.4+10 | | Jour | RM,34,237 | 01 | F.Flesch+ | O0971 |
| $^{56}$Fe,x | Many | CS | 2GERGSI | 3.9+10 | | Jour | RM,31,533 | 99 | F.Flesch+ | O0968 |
| $^{238}$U,x | Many | CS | 2GERGSI | 2.4+11 | | Jour | NP/A,724,413 | 03 | J.Taieb+ | O1053 |



| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,el | $^{2}$H | DA | 2SWTPSI | 6.7+07 | | Jour | NP/A,581,131 | 95 | J.Balewski+ | 22717 |
| $n$,$n$ | incl | DAE | 2JPNOSA | 1.5+07 | 1.4+07 | Jour | NST,21,577 | Aug 84 | A.Takahashi+ | 21927 |
| $n$,$n$ | incl | DAE | 2SWTPSI | 6.7+07 | | Jour | NP/A,581,131 | 95 | J.Balewski+ | 22717 |
| $^{14}$Be,x | $^{14}$B | DE | 2JPNIPC | 1.0+09 | | Jour | PL/B,515,(3-4),255 | Aug 01 | S.Takeuchi+ | E1797 |

## 1 Hydrogen

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $^{12}$C,tcc | | CS | 2JPNIRS | 3.0+09 | 1.4+09 | Jour | PR/C,66,014609 | 02 | A.N.Golovchenko+ | O1044 |
| $^{12}$C,x | Many | CS | 2JPNIRS | 3.0+09 | 1.4+09 | Jour | PR/C,66,014609 | 02 | A.N.Golovchenko+ | O1044 |
| $^{12}$C,tcc | | CS | 2JPNIRS | 2.9+09 | 1.4+09 | Jour | PR/C,66,014609 | 02 | A.N.Golovchenko+ | O1044 |
| $^{12}$C,x | Many | CS | 2JPNIRS | 2.9+09 | 1.4+09 | Jour | PR/C,66,014609 | 02 | A.N.Golovchenko+ | O1044 |

## 2 Helium 3

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,el | $^{3}$He | POD | 2GERHAM | 1.2+07 | 1.6+07 | Jour | NP/A,129,666 | 69 | F.W.Busser+ | 22709 |
| $d$,$p$ | $^{4}$He | DA | 2JPNIPC | 1.4+08 | 2.7+08 | Jour | PL/B,533,(1-2),1 | May 02 | T.Uesaka+ | E1783 |
| $d$,$p$ | $^{4}$He | POD | 2JPNIPC | 1.4+08 | | Jour | PTP,104,(3),703 | Sep 00 | H.Kamada+ | E1784 |
| $d$,$p$ | $^{4}$He | POD | 2JPNIPC | 1.4+08 | 2.7+08 | Jour | PL/B,533,(1-2),1 | May 02 | T.Uesaka+ | E1783 |
| $d$,$p$ | $^{4}$He | POD | 2JPNIPC | 2.0+08 | 2.7+08 | Jour | PTP,104,(3),703 | Sep 00 | H.Kamada+ | E1784 |

## 2 Helium 4

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $^{18}$O,el | $^{4}$He | DA | 2SF JYV | 2.1+06 | 1.2+07 | Jour | PR/C,64,051302 | 01 | G.V.Rogachev+ | O0964 |

## 3 Lithium

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$n$ | incl | DAE | 2JPNOSA | 1.5+07 | 1.3+07 | Jour | NST,21,577 | Aug 84 | A.Takahashi+ | 21927 |

## 3 Lithium 7

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $^{3}$He,$d$ | $^{8}$Be | DAP | 3CHFTHU | 3.0+06 | | Jour | CHP,10,76 | 72 | Y.C.Lru | O1035 |
| $^{3}$He,$p$ | $^{9}$Be | DAP | 3CHFTHU | 1.8+06 | 3.2+06 | Jour | CHP,10,76 | 72 | Y.C.Lru | O1035 |

## 4 Berylium 9

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$n$ | incl | DAE | 2JPNOSA | 1.4+07 | | Rept | JAERI-M-88-065 | Mar 88 | A.Takahashi+ | 22770 |
| $n$,$n$ | incl | DAE | 2JPNOSA | 1.5+07 | 1.3+07 | Jour | NST,21,577 | Aug 84 | A.Takahashi+ | 21927 |
| $n$,$n$ | incl | DE | 2JPNOSA | 1.4+07 | | Rept | JAERI-M-88-065 | Mar 88 | A.Takahashi+ | 22770 |
| $d$,$n$ | incl | DA | 2SF JYV | 6.5+07 | | Jour | NIM/B,183,212 | 01 | Z.Radivojevic+ | O1050 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $d$,$n$ | incl | TTD | 2SF JYV | 6.5+07 | | Jour | NIM/B,183,212 | 01 | Z.Radivojevic+ | O1050 |
| $^{3}$He,$p$ | $^{11}$B | DAP | 3CHFSHI | 2.3+06 | 6.0+06 | Jour | CHP,19,99 | 81 | C.S.Lin+ | O1032 |
| $^{9}$Be,2$\alpha$ | $^{10}$Be | CSP | 1CANLUQ | 4.4+06 | 1.5+07 | Jour | NP/A,614,238 | 97 | A.Mukherjee+ | O0947 |
| $^{9}$Be,2$n$ | $^{16}$O | CSP | 1CANLUQ | 2.6+06 | 1.5+07 | Jour | NP/A,614,238 | 97 | A.Mukherjee+ | O0947 |
| $^{9}$Be,2$n$+$\alpha$ | $^{12}$C | CSP | 1CANLUQ | 4.4+06 | 1.5+07 | Jour | NP/A,614,238 | 97 | A.Mukherjee+ | O0947 |
| $^{9}$Be,$n$+$\alpha$ | $^{13}$C | CSP | 1CANLUQ | 2.6+06 | 1.5+07 | Jour | NP/A,614,238 | 97 | A.Mukherjee+ | O0947 |
| $^{9}$Be,$n$+$p$ | $^{16}$N | CSP | 1CANLUQ | 4.4+06 | 1.5+07 | Jour | NP/A,614,238 | 97 | A.Mukherjee+ | O0947 |
| $^{9}$Be,$p$ | $^{17}$N | CSP | 1CANLUQ | 2.6+06 | 1.5+07 | Jour | NP/A,614,238 | 97 | A.Mukherjee+ | O0947 |
| $^{208}$Pb,x | $^{136}$Sm | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{208}$Pb,x | $^{138}$Gd | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{208}$Pb,x | $^{174}$Hf | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{208}$Pb,x | $^{175}$Hf | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{208}$Pb,x | $^{176}$Hf | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{208}$Pb,x | $^{175}$Ta | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{208}$Pb,x | $^{176}$Ta | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{208}$Pb,x | $^{177}$Ta | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{208}$Pb,x | $^{179}$Ta | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{208}$Pb,x | $^{180}$Ta | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{208}$Pb,x | $^{179}$W | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{208}$Pb,x | $^{180}$W | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{208}$Pb,x | $^{181}$W | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{208}$Pb,x | $^{182}$W | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{208}$Pb,x | $^{181}$Re | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{208}$Pb,x | $^{185}$Re | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{208}$Pb,x | $^{200}$Pt | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{208}$Pb,x | $^{206}$Hg | ? | 2GERGSI | 2.1+11 | | Jour | PR/C,65,064604 | 02 | M.Pfuetzner+ | O0990 |
| $^{238}$U,f | | CS | 2GERGSI | 1.8+11 | | Jour | ZP/A,355,191 | 96 | P.Armbruster+ | O1012 |
| $^{238}$U,f | Many | FY | 2GERGSI | 1.8+11 | | Jour | ZP/A,355,191 | 96 | P.Armbruster+ | O1012 |
| $^{238}$U,x | Many | CS | 2GERGSI | 1.8+11 | | Jour | PL/B,415,111 | 97 | M.Bernas+ | O1014 |

## 5 Boron 11

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $^{7}$Li,2$\alpha$ | $^{10}$Be | CSP | 1CANLUQ | 2.4+06 | 1.1+07 | Jour | NP/A,614,238 | 97 | A.Mukherjee+ | O0947 |
| $^{7}$Li,2$n$ | $^{16}$O | CSP | 1CANLUQ | 2.4+06 | 1.1+07 | Jour | NP/A,614,238 | 97 | A.Mukherjee+ | O0947 |
| $^{7}$Li,2$n$+$\alpha$ | $^{12}$C | CSP | 1CANLUQ | 2.4+06 | 1.1+07 | Jour | NP/A,614,238 | 97 | A.Mukherjee+ | O0947 |
| $^{7}$Li,$n$+$\alpha$ | $^{13}$C | CSP | 1CANLUQ | 2.4+06 | 1.1+07 | Jour | NP/A,614,238 | 97 | A.Mukherjee+ | O0947 |
| $^{7}$Li,$n$+$p$ | $^{16}$N | CSP | 1CANLUQ | 2.9+06 | 1.1+07 | Jour | NP/A,614,238 | 97 | A.Mukherjee+ | O0947 |
| $^{7}$Li,$p$ | $^{17}$N | CSP | 1CANLUQ | 2.4+06 | 1.0+07 | Jour | NP/A,614,238 | 97 | A.Mukherjee+ | O0947 |

## 6 Carbon

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{10}$Be | CS | 3HUNKOS | 1.5+07 | | Jour | RCA,88,829 | 00 | F.Sudbrock+ | 31531 |
| $^{12}$C,non | | CS | 2JPNIPC | 1.0+09 | | Jour | NP/A,709,(1-4),103 | Oct 02 | T.Zheng+ | E1791 |
| $^{12}$C,tcc | | CS | 2JPNIRS | 3.0+09 | 1.3+09 | Jour | PR/C,66,014609 | 02 | A.N.Golovchenko+ | O1044 |
| $^{12}$C,x | Many | CS | 2JPNIRS | 3.0+09 | 1.3+09 | Jour | PR/C,66,014609 | 02 | A.N.Golovchenko+ | O1044 |
| $^{16}$C,non | | CS | 2JPNIPC | 1.3+09 | | Jour | NP/A,709,(1-4),103 | Oct 02 | T.Zheng+ | E1791 |
| $^{34}$Mg,inel | $^{nat}$C | CSP | 2JPNIPC | 1.5+09 | | Jour | PL/B,522,(3-4),227 | Dec 01 | H.Iwasaki+ | E1782 |

## 6 Carbon 12

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,2$n$ | $^{11}$C | CS | 2JPNTOK | 2.2+07 | 3.8+07 | Jour | NSE,122,247 | 96 | Y.Uno+ | 22702 |
| $n$,$\alpha$ | $^{9}$Be | CSP | 2GERKFK | 1.4+07 | | Jour | NIM,54,277 | 67 | D.Kopsch+ | 22710 |
| $n$,$\alpha$ | $^{9}$Be | ? | 2BLGLVN | 4.0+07 | 5.6+07 | Jour | NIM/A,343,563 | 94 | M.Moszynski+ | 22715 |
| $n$,$\alpha$ | incl | CS | 2BLGLVN | 4.2+07 | 7.3+07 | Jour | PR/C,53,1309 | 96 | I.Slypen+ | 22704 |
| $n$,$\alpha$ | incl | DAE | 2BLGLVN | 4.2+07 | 7.3+07 | Jour | PR/C,53,1309 | 96 | I.Slypen+ | 22704 |
| $n$,$d$ | $^{11}$B | CS | 2BLGLVN | 4.0+07 | 5.6+07 | Jour | NIM/A,343,563 | 94 | M.Moszynski+ | 22715 |
| $n$,$d$ | incl | CS | 2BLGLVN | 4.2+07 | 7.3+07 | Jour | PR/C,51,1303 | 95 | I.Slypen+ | 22705 |
| $n$,$d$ | incl | DAE | 2BLGLVN | 4.2+07 | 6.3+07 | Jour | PR/C,51,1303 | 95 | I.Slypen+ | 22705 |
| $n$,$p$ | incl | CS | 2BLGLVN | 4.2+07 | 7.3+07 | Jour | PR/C,51,1303 | 95 | I.Slypen+ | 22705 |
| $n$,$p$ | incl | DAE | 2BLGLVN | 4.2+07 | 6.3+07 | Jour | PR/C,51,1303 | 95 | I.Slypen+ | 22705 |
| $n$,$p$ | incl | DAE | 2BLGLVN | 6.3+07 | | Jour | PR/C,53,1309 | 96 | I.Slypen+ | 22704 |
| $n$,$t$ | $^{10}$B | CS | 2BLGLVN | 4.0+07 | 5.6+07 | Jour | NIM/A,343,563 | 94 | M.Moszynski+ | 22715 |
| $n$,$t$ | incl | CS | 2BLGLVN | 4.2+07 | 7.3+07 | Jour | PR/C,53,1309 | 96 | I.Slypen+ | 22704 |
| $n$,$t$ | incl | DAE | 2BLGLVN | 7.3+07 | | Jour | PR/C,53,1309 | 96 | I.Slypen+ | 22704 |
| $p$,inel | $^{12}$C | DAE | 2JPNOSA | 3.0+08 | | Rept | JAERI-C-96-008,110 | 96 | H.Murohka+ | O0973 |
| $p$,$n$ | incl | TTD | 2JPNJAE | 6.8+07 | | Rept | JAERI-C-96-008,217 | 96 | S.Meigo+ | O0975 |
| $d$,el | $^{12}$C | DA | 2JPNIPC | 1.4+08 | | Jour | PR/C,58,(4),2180 | Oct 98 | H.Okamura+ | E1702 |
| $d$,el | $^{12}$C | DA | 1USARIC | 6.3+05 | 1.4+06 | Jour | PR,117,1289 | Mar 60 | E.Kashy+ | T0287 |
| $d$,inel | $^{12}$C | DAE | 2JPNIPC | 2.7+08 | | Jour | PL/B,521,(3-4),153 | Nov 01 | Y.Satou+ | E1781 |
| $d$,inel | $^{12}$C | POD | 2JPNIPC | 2.7+08 | | Jour | PL/B,521,(3-4),153 | Nov 01 | Y.Satou+ | E1781 |
| $d$,$n$ | incl | DA | 2SF JYV | 5.0+07 | | Jour | NIM/B,183,212 | 01 | Z.Radivojevic+ | O1050 |
| $d$,$n$ | incl | TTD | 2SF JYV | 5.0+07 | | Jour | NIM/B,183,212 | 01 | Z.Radivojevic+ | O1050 |
| $d$,$p$ | $^{13}$C | DAP | 1USARIC | 7.4+05 | 2.0+06 | Jour | PR,117,1289 | Mar 60 | E.Kashy+ | T0287 |
| $\alpha$,$n$ | incl | TTD | 2JPNJAE | 1.0+08 | | Rept | JAERI-C-96-008,217 | 96 | S.Meigo+ | O0975 |
| $^{16}$O,el | $^{12}$C | DA | 2FR STR | 6.2+07 | 1.2+08 | Jour | PR/C,61,034609 | 00 | M.P.Nicoli+ | O1000 |
| $^{16}$O,inel | $^{12}$C | DAP | 2JPNJAE | 2.2+07 | 3.4+07 | Jour | PR/C,66,(2),024609 | Aug 02 | H.Fujita+ | E1786 |
| $^{28}$Si,tcc | | CS | 2GERGSI | 1.4+10 | | Jour | RM,34,237 | 01 | F.Flesch+ | O0971 |
| $^{28}$Si,x | Many | CS | 2GERGSI | 1.4+10 | | Jour | RM,34,237 | 01 | F.Flesch+ | O0971 |
| $^{56}$Fe,x | Many | CS | 2GERGSI | 3.9+10 | | Jour | RM,31,533 | 99 | F.Flesch+ | O0968 |

## 6 Carbon 13

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$\alpha$ | $^{10}$Be | CS | 3HUNKOS | 1.5+07 | | Jour | RCA,88,829 | 00 | F.Sudbrock+ | 31531 |
| $p$,$n$ | incl | TTD | 2SF JYV | 3.0+07 | | Jour | NIM/B,194,251 | 02 | Z.Radivojevic+ | O1026 |
| $d$,$p$ | $^{14}$C | CSP | 1USACLA | 6.4+05 | 2.8+06 | Jour | PR,103,167 | Jul 56 | J.B.Marion+ | T0288 |
| $d$,$p$ | $^{14}$C | DAP | 1USACLA | 6.4+05 | 2.9+09 | Jour | PR,103,167 | Jul 56 | J.B.Marion+ | T0288 |

## 7 Nitrogen

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$\alpha$ | incl | DAE | 2JPNJAE | 7.5+07 | | Jour | NSTS,2,(1),421 | Aug 02 | T.Sanami+ | 22830 |
| $n$,$d$ | incl | DAE | 2JPNJAE | 7.5+07 | | Jour | NSTS,2,(1),421 | Aug 02 | T.Sanami+ | 22830 |
| $n$,$p$ | incl | DAE | 2JPNJAE | 7.5+07 | | Jour | NSTS,2,(1),421 | Aug 02 | T.Sanami+ | 22830 |
| $n$,$t$ | incl | DAE | 2JPNJAE | 7.5+07 | | Jour | NSTS,2,(1),421 | Aug 02 | T.Sanami+ | 22830 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{10}$Be | CS | 3HUNKOS | 1.5+07 | | Jour | RCA,88,829 | 00 | F.Sudbrock+ | 31531 |

**7 Nitrogen 14**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$p$ | $^{14}$C | CS | 2JPNTOH | Maxwl | | Jour | NIM/A,394,368 | 97 | T.Sanami+ | 22719 |
| $\pi^+$,2$n$+2$p$ | $^{10}$C | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,2$n$+3$p$ | $^{9}$B | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,2$n$+$p$+$d$ | $^{9}$C | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,2$p$ | $^{12}$C | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,2$p$+2$d$ | $^{8}$Be | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,2$p$+$d$ | $^{10}$B | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,3$p$ | $^{11}$B | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,3$p$+$d$ | $^{9}$Be | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,4$p$ | $^{10}$Be | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,5$p$ | $^{9}$Li | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,abs | | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+2$d$ | $^{9}$C | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+2$p$ | $^{11}$C | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+2$p$+$d$ | $^{9}$B | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+3$p$ | $^{10}$B | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+3$p$+$d$ | $^{8}$Be | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+4$p$ | $^{9}$Be | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+$p$+2$d$ | $^{8}$B | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+$p$+$d$ | $^{10}$C | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$p$+$d$ | $^{11}$C | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $p$,$\pi^+$ | incl | CS | 2SWDSWD | 1.7+08 | 5.0+08 | Jour | PR/C,62,014610 | 00 | J.Martensson+ | O1058 |
| $p$,$\pi^+$ | incl | DAE | 2SWDSWD | 1.8+08 | 5.0+08 | Jour | PR/C,62,014610 | 00 | J.Martensson+ | O1058 |
| $\alpha$,el | $^{14}$N | DA | 2GERFRK | 7.5+06 | 9.8+06 | Jour | NIM/B,192,249 | 02 | W.Berky+ | O1023 |
| $\alpha$,el | $^{14}$N | ? | 2GERFRK | 9.0+06 | 9.8+06 | Jour | NIM/B,192,249 | 02 | W.Berky+ | O1023 |

**7 Nitrogen 15**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,$\alpha$ | $^{12}$C | DAP | 1USACAL | 9.1+05 | 2.9+06 | Jour | PR,108,1015 | Nov 57 | F.B.Hagedorn+ | T0286 |

**8 Oxygen**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$\alpha$ | incl | DAE | 2JPNJAE | 7.5+07 | | Jour | NSTS,2,(1),421 | Aug 02 | T.Sanami+ | 22830 |
| $n$,$d$ | incl | DAE | 2JPNJAE | 7.5+07 | | Jour | NSTS,2,(1),421 | Aug 02 | T.Sanami+ | 22830 |
| $n$,$n$ | incl | DAE | 2JPNOSA | 1.5+07 | 1.4+07 | Jour | NST,21,577 | Aug 84 | A.Takahashi+ | 21927 |
| $n$,$p$ | incl | DAE | 2JPNJAE | 7.5+07 | | Jour | NSTS,2,(1),421 | Aug 02 | T.Sanami+ | 22830 |
| $n$,$t$ | incl | DAE | 2JPNJAE | 7.5+07 | | Jour | NSTS,2,(1),421 | Aug 02 | T.Sanami+ | 22830 |
| $n$,x | $^{10}$Be | CS | 3HUNKOS | 1.5+07 | | Jour | RCA,88,829 | 00 | F.Sudbrock+ | 31531 |

**8 Oxygen 16**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$n$ | incl | DAE | 2JPNOSA | 1.4+07 | | Rept | OKTAV-A-92-01, | 92 | A.Takahashi+ | 22766 |
| $n$,$n$ | incl | DE | 2JPNOSA | 1.4+07 | | Rept | OKTAV-A-92-01, | 92 | A.Takahashi+ | 22766 |
| $n$,$t$ | $^{14}$N | CS | 2JPNTOK | 1.5+07 | 4.0+07 | Jour | RCA,75,1 | 96 | S.Shibata+ | 22707 |
| $^{16}$O,el | $^{16}$O | DA | 2FR STR | 7.5+07 | 1.2+08 | Jour | PR/C,60,064608 | 99 | M.P.Nicoli+ | O0999 |

**9 Fluorine 19**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$n$ | incl | DAE | 2JPNOSA | 1.5+07 | 1.3+07 | Jour | NST,21,577 | Aug 84 | A.Takahashi+ | 21927 |
| $n$,$p$ | $^{19}$O | CS | 2TUKCNA | 1.5+07 | 1.4+07 | Jour | ANE,30,1001 | 03 | I.A.Reyhancan | 22824 |

**10 Neon 22**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $\alpha$,$n$ | $^{25}$Mg | CS | 2GERTHS | 5.7+05 | 2.1+06 | Jour | ZP/A,338,367 | 91 | H.W.Drotleff+ | O0967 |

**11 Sodium 23**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,2$n$ | $^{22}$Na | CS | 2JPNTOK | 1.4+07 | 3.8+07 | Jour | NSE,111,391 | 92 | Y.Uwamino+ | 22703 |
| $d$,$\alpha$ | $^{21}$Ne | CSP | 3CHFTHU | 2.0+06 | 2.6+06 | Jour | CHP,11,105 | 73 | S.L.Huang+ | O1034 |
| $d$,$\alpha$ | $^{21}$Ne | DAP | 3CHFTHU | 2.0+06 | 2.6+06 | Jour | CHP,11,105 | 73 | S.L.Huang+ | O1034 |

**12 Magnesium**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,el | $^{nat}$Mg | CS | 4UKRIJD | 2.0+06 | 7.0+06 | Jour | UFZ,39,785 | 94 | I.A.Korzh+ | 32206 |
| $n$,el | $^{nat}$Mg | DA | 4UKRIJD | 2.0+06 | 7.0+06 | Jour | UFZ,39,785 | 94 | I.A.Korzh+ | 32206 |
| $n$,x | $^{24}$Na | CS | 2JPNTOK | 5.5+06 | 3.8+07 | Jour | NST,31,1 | 94 | Y.Uwamino+ | 22700 |
| $p$,x | $^{22}$Na | CS | 2JPNTOK | 6.6+06 | 5.0+07 | Jour | NP/A,174,539 | 71 | M.Furukawa+ | O0972 |
| $p$,x | $^{26}$Al | CS | 2JPNTOK | 6.2+06 | 5.1+07 | Jour | NP/A,174,539 | 71 | M.Furukawa+ | O0972 |

**12 Magnesium 24**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,inel | $^{24}$Mg | CS | 4UKRIJD | 2.0+06 | 7.0+06 | Jour | UFZ,39,785 | 94 | I.A.Korzh+ | 32206 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,inel | $^{24}$Mg | DAP | 4UKRIJD | 2.0+06 | 7.0+06 | Jour | UFZ,39,785 | 94 | I.A.Korzh+ | 32206 |
| $p$,el | $^{24}$Mg | DA | 3CHFTHU | 1.5+06 | 3.0+06 | Jour | CHP,10,16 | 72 | W.N.Wang+ | O1030 |
| $p$,$t$ | $^{22}$Mg | DAP | 2JPNTOK | 3.5+07 | | Jour | EPJ/A,14,(3),275 | Jul 02 | S.Michimasa+ | E1799 |

## 12 Magnesium 26

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,el | $^{26}$Mg | DA | 3CHFTHU | 1.5+06 | 3.0+06 | Jour | CHP,10,16 | 72 | W.N.Wang+ | O1030 |
| $p$,$n$ | $^{26}$Al | DAP | 2JPNTOH | 3.5+07 | | Jour | PL/B,539,(1-2),40 | Jul 02 | H.Orihara+ | E1793 |
| $d$,$\alpha$ | $^{24}$Na | DAP | 3CHFTHU | 2.5+06 | 3.1+06 | Jour | CHP,8,36 | 70 | E.K.Lin+ | O1029 |

## 13 Aluminium 27

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,2$n$ | $^{26}$Al | CS | 3HUNKOS | 1.5+07 | | Jour | RCA,88,829 | 00 | F.Sudbrock+ | 31531 |
| $n$,$^{7}$Be | $^{21}$F | CS | 2GERJUL | 5.3+07 | | Jour | RCA,62,107 | 93 | B.Scholten+ | 22708 |
| $n$,$\alpha$ | incl | DAE | 2JPNJAE | 7.5+07 | | Jour | NSTS,2,(1),421 | Aug 02 | T.Sanami+ | 22830 |
| $n$,$\alpha$ | $^{24}$Na | CS | 2JPNTOK | 3.5+06 | 3.8+07 | Jour | NSE,111,391 | 92 | Y.Uwamino+ | 22703 |
| $n$,$d$ | incl | DAE | 2JPNJAE | 7.5+07 | | Jour | NSTS,2,(1),421 | Aug 02 | T.Sanami+ | 22830 |
| $n$,$p$ | incl | DAE | 2JPNJAE | 7.5+07 | | Jour | NSTS,2,(1),421 | Aug 02 | T.Sanami+ | 22830 |
| $n$,$t$ | incl | DAE | 2JPNJAE | 7.5+07 | | Jour | NSTS,2,(1),421 | Aug 02 | T.Sanami+ | 22830 |
| $p$,0 | | RP | 2GRCATH | 8.9+05 | 2.0+06 | Jour | EPJ/A,6,303 | 99 | C.Chronidou+ | O1057 |
| $p$,$\alpha$ | incl | CS | 2JPNKYU | 1.6+06 | 1.6+07 | Jour | NST,34,(2),109 | Feb 97 | Y.Takao+ | E1787 |
| $p$,$\alpha$ | incl | CS | 2JPNKYU | 1.6+07 | 1.6+06 | Jour | NST,34,109 | 97 | Y.Takao+ | O0974 |
| $p$,$\gamma$ | $^{28}$Si | CS | 2GRCATH | 8.8+05 | 2.0+06 | Jour | EPJ/A,6,303 | 99 | C.Chronidou+ | O1057 |
| $p$,$n$ | incl | DAE | 2FR SAT | 1.2+09 | | Jour | PR/C,65,044621 | 02 | S.Leray+ | O0977 |
| $p$,x | $^{7}$Li | ? | 4RUSLIN | 1.0+09 | | Jour | ZP/A,350,1 | 94 | L.N.Andronenko+ | O0940 |
| $p$,x | $^{9}$Be | ? | 4RUSLIN | 1.0+09 | | Jour | ZP/A,350,1 | 94 | L.N.Andronenko+ | O0940 |
| $p$,x | $^{11}$B | ? | 4RUSLIN | 1.0+09 | | Jour | ZP/A,350,1 | 94 | L.N.Andronenko+ | O0940 |
| $p$,x | $^{22}$Na | CS | 4RUSITE | 6.7+07 | 2.6+09 | Conf | 99PRAHA,,26 | 99 | Yu.E.Titarenko+ | O0985 |
| $p$,x | $^{26}$Al | CS | 2JPNTOK | 1.5+07 | 5.2+07 | Jour | NP/A,174,539 | 71 | M.Furukawa+ | O0972 |
| $d$,$\alpha$ | $^{25}$Mg | CSP | 3CHFTHU | 2.4+06 | 2.9+06 | Jour | CHP,4,6 | 66 | E.K.Lin+ | O1031 |
| $d$,$\alpha$ | $^{25}$Mg | DAP | 3CHFTHU | 2.4+06 | 3.0+06 | Jour | CHP,4,6 | 66 | E.K.Lin+ | O1031 |
| $^{3}$He,$\alpha$ | $^{26}$Al | DAP | 3CHFTHU | 6.5+06 | | Jour | CHP,10,84 | 72 | C.S.Lin+ | O1033 |
| $^{3}$He,el | $^{27}$Al | DA | 3CHFTHU | 5.0+06 | 6.5+06 | Jour | CHP,10,84 | 72 | C.S.Lin+ | O1033 |
| $^{28}$Si,tcc | | CS | 2GERGSI | 1.3+10 | | Jour | RM,34,237 | 01 | F.Flesch+ | O0971 |
| $^{28}$Si,x | Many | CS | 2GERGSI | 1.3+10 | | Jour | RM,34,237 | 01 | F.Flesch+ | O0971 |
| $^{56}$Fe,x | Many | CS | 2GERGSI | 3.9+10 | | Jour | RM,31,533 | 99 | F.Flesch+ | O0968 |
| $^{129}$Xe,x | Many | CS | 2GERGSI | 1.0+11 | | Jour | PR/C,58,247 | 99 | J.Reinhold+ | O1015 |
| $^{238}$U,f | | CS | 2GERGSI | 1.8+11 | | Jour | ZP/A,355,69 | 96 | M.Hesse+ | O0955 |

## 14 Silicon

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$n$ | incl | DAE | 2JPNOSA | 1.5+07 | 1.4+07 | Jour | NST,21,577 | Aug 84 | A.Takahashi+ | 21927 |
| $n$,x | $^{27}$Mg | CS | 2JPNTOK | 9.5+06 | 3.8+07 | Jour | NST,31,1 | 94 | Y.Uwamino+ | 22700 |
| $n$,x | $^{28}$Al | CS | 2JPNTOK | 5.5+06 | 3.8+07 | Jour | NST,31,1 | 94 | Y.Uwamino+ | 22700 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{29}$Al | CS | 2JPNTOK | 6.5+06 | 3.8+07 | Jour | NST,31,1 | 94 | Y.Uwamino+ | 22700 |
| $p$,x | $^{22}$Na | CS | 2JPNTOK | 2.6+07 | 5.1+07 | Jour | NP/A,174,539 | 71 | M.Furukawa+ | O0972 |
| $p$,x | $^{26}$Al | CS | 2JPNTOK | 2.6+07 | 5.1+07 | Jour | NP/A,174,539 | 71 | M.Furukawa+ | O0972 |

**14 Silicon 28**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$^{7}$Be | $^{22}$Ne | CS | 2GERJUL | 5.3+07 | | Jour | RCA,62,107 | 93 | B.Scholten+ | 22708 |
| $n$,$\alpha$ | $^{25}$Mg | CSP | 2GERBER | 1.4+07 | | Jour | NP,83,369 | 66 | H.Morgenstern+ | 22720 |
| $n$,$\alpha$ | $^{25}$Mg | DAP | 2GERBER | 1.4+07 | 1.5+07 | Jour | NP,83,369 | 66 | H.Morgenstern+ | 22720 |
| $n$,el | $^{28}$Si | CS | 2GERDRE | 1.5+07 | | Jour | NP/A,134,289 | 69 | J.Hohn+ | 22701 |
| $n$,el | $^{28}$Si | DA | 2GERDRE | 1.5+07 | | Jour | NP/A,134,289 | 69 | J.Hohn+ | 22701 |
| $n$,inel | $^{28}$Si | CSP | 2GERDRE | 1.5+07 | | Jour | NP/A,134,289 | 69 | J.Hohn+ | 22701 |
| $n$,inel | $^{28}$Si | DAP | 2GERDRE | 1.5+07 | | Jour | NP/A,134,289 | 69 | J.Hohn+ | 22701 |
| $n$,$p$ | $^{28}$Al | DAP | 2GERBER | 1.4+07 | 1.5+07 | Jour | NP,83,369 | 66 | H.Morgenstern+ | 22720 |
| $\alpha$,el | $^{28}$Si | DA | 3SARDHA | 3.1+06 | 7.8+06 | Jour | NP/A,678,3 | 02 | A.Coban+ | O0962 |
| $\alpha$,el | $^{28}$Si | DA | 2SF ABA | 3.7+06 | 5.9+06 | Jour | ZP/A,356,287 | 96 | K.-M.Kallman | O0966 |
| $\alpha$,el | $^{28}$Si | DA | 3SARDHA | 6.0+06 | 6.8+06 | Jour | NP/A,678,3 | 02 | A.Coban+ | O0962 |
| $\alpha$,x | | RP | 2SF ABA | 3.9+06 | 6.0+06 | Jour | ZP/A,356,287 | 96 | K.-M.Kallman | O0966 |

**14 Silicon 30**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$n$+$p$ | $^{29}$Al | CS | 2JPNTOK | 1.8+07 | 3.8+07 | Jour | NSE,122,247 | 96 | Y.Uno+ | 22702 |

**16 Sulphur 32**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $\alpha$,el | $^{32}$S | DA | 3SARDHA | 4.0+06 | 8.9+06 | Jour | NP/A,645,3 | 99 | A.Coban+ | O0963 |

**18 Argon**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,$\pi^+$ | incl | CS | 2SWDSWD | 1.7+08 | 5.0+08 | Jour | PR/C,62,014610 | 00 | J.Martensson+ | O1058 |

**18 Argon 40**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $\pi^+$,2$d$ | $^{36}$Cl | CS | 2SWTPSI | 7.0+07 | 2.4+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,2$n$+2$p$ | $^{36}$Cl | CS | 2SWTPSI | 1.6+08 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,2$n$+3$p$ | $^{35}$S | CS | 2SWTPSI | 2.4+08 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |

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|---|---|---|---|---|---|---|---|---|---|---|
| $\pi^+$,2$n$+4$p$ | $^{34}$P | CS | 2SWTPSI | 3.3+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,2$n$+$p$+$d$ | $^{35}$Cl | CS | 2SWTPSI | 2.4+08 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,2$p$ | $^{38}$Cl | CS | 2SWTPSI | 7.0+07 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,2$p$+2$d$ | $^{34}$P | CS | 2SWTPSI | 1.2+08 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,2$p$+$d$ | $^{36}$S | CS | 2SWTPSI | 7.0+07 | 2.4+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,3$n$+2$p$ | $^{35}$Cl | CS | 2SWTPSI | 2.4+08 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,3$n$+3$p$ | $^{34}$S | CS | 2SWTPSI | 3.3+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,3$p$ | $^{37}$S | CS | 2SWTPSI | 7.0+07 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,3$p$+$d$ | $^{35}$P | CS | 2SWTPSI | 1.2+08 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,4$p$ | $^{36}$P | CS | 2SWTPSI | 1.2+08 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,5$p$ | $^{35}$Al | CS | 2SWTPSI | 1.6+08 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,6$p$ | $^{34}$Mg | CS | 2SWTPSI | 3.3+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,abs | | CS | 2SWTPSI | 7.0+07 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+2$d$ | $^{35}$Cl | CS | 2SWTPSI | 7.0+07 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+2$p$ | $^{37}$Cl | CS | 2SWTPSI | 7.0+07 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+2$p$+$d$ | $^{35}$S | CS | 2SWTPSI | 7.0+07 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+3$p$ | $^{36}$S | CS | 2SWTPSI | 7.0+07 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+3$p$+$d$ | $^{34}$P | CS | 2SWTPSI | 1.6+08 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+4$p$ | $^{35}$P | CS | 2SWTPSI | 1.6+08 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+5$p$ | $^{34}$Si | CS | 2SWTPSI | 3.3+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+$p$+2$d$ | $^{34}$S | CS | 2SWTPSI | 1.2+08 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+$p$+$d$ | $^{36}$Cl | CS | 2SWTPSI | 7.0+07 | 2.4+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$p$+2$d$ | $^{35}$S | CS | 2SWTPSI | 7.0+07 | 2.4+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$p$+$d$ | $^{37}$Cl | CS | 2SWTPSI | 7.0+07 | 3.3+08 | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $p$,$\pi^+$ | incl | DAE | 2SWDSWD | 1.8+08 | 5.0+08 | Jour | PR/C,62,014610 | 00 | J.Martensson+ | O1058 |

**19 Potassium 39**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$\alpha$ | $^{36}$Cl | CS | 3HUNKOS | 1.5+07 | | Jour | RCA,88,829 | 00 | F.Sudbrock+ | 31531 |

**20 Calcium**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{42}$K | CS | 2JPNTOK | 4.5+06 | 3.8+07 | Jour | NST,31,1 | 94 | Y.Uwamino+ | 22700 |
| $n$,x | $^{43}$K | CS | 2JPNTOK | 4.5+06 | 3.8+07 | Jour | NST,31,1 | 94 | Y.Uwamino+ | 22700 |
| $p$,x | Many | PY | 2ZZZCER | 6.0+08 | | Jour | NIM/B,26,72 | 87 | H.L.Ravn | O1059 |

**20 Calcium 40**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $d$,el | $^{40}$Ca | DA | 2JPNIPC | 1.4+08 | | Jour | PR/C,58,(4),2180 | Oct 98 | H.Okamura+ | E1702 |

## 22 Titanium

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$n$ | incl | DAE | 2JPNOSA | 1.4+07 | | Jour | NST,21,577 | Aug 84 | A.Takahashi+ | 21927 |
| $n$,$n$ | incl | DE | 2JPNOSA | 1.4+07 | | Jour | NST,21,577 | Aug 84 | A.Takahashi+ | 21927 |
| $n$,x | $^{46}$Sc | CS | 2ZZZEC | 1.3+07 | 2.0+07 | Jour | ARI,42,337 | 91 | N.I.Molla+ | 22763 |
| $n$,x | $^{47}$Sc | CS | 2ZZZEC | 1.3+07 | 2.0+07 | Jour | ARI,42,337 | 91 | N.I.Molla+ | 22763 |
| $n$,x | $^{48}$Sc | CS | 2ZZZEC | 1.3+07 | 2.0+07 | Jour | ARI,42,337 | 91 | N.I.Molla+ | 22763 |

## 22 Titanium 47

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$n$+$p$ | $^{46}$Sc | CS | 2JPNTOK | 1.8+07 | 3.8+07 | Jour | NSE,122,247 | 96 | Y.Uno+ | 22702 |

## 22 Titanium 48

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$n$+$p$ | $^{47}$Sc | CS | 2JPNTOK | 1.8+07 | 3.8+07 | Jour | NSE,122,247 | 96 | Y.Uno+ | 22702 |

## 23 Vanadium

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{46}$Sc | CS | 2JPNTOK | 1.8+07 | 3.8+07 | Jour | NST,31,1 | 94 | Y.Uwamino+ | 22700 |
| $n$,x | $^{47}$Sc | CS | 2JPNTOK | 7.5+06 | 3.8+07 | Jour | NST,31,1 | 94 | Y.Uwamino+ | 22700 |
| $p$,x | Many | PY | 2ZZZCER | 6.0+08 | | Jour | NIM/B,26,72 | 87 | H.L.Ravn | O1059 |

## 23 Vanadium 51

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$^{7}$Be | $^{45}$K | CS | 2GERJUL | 5.3+07 | | Jour | RCA,62,107 | 93 | B.Scholten+ | 22708 |
| $n$,$\alpha$ | $^{48}$Sc | CS | 2JPNTOK | 3.5+06 | 3.8+07 | Jour | NSE,111,391 | 92 | Y.Uwamino+ | 22703 |
| $n$,$p$ | $^{51}$Ti | CS | 2JPNTOK | 6.5+06 | 3.8+07 | Jour | NSE,111,391 | 92 | Y.Uwamino+ | 22703 |

## 24 Chromium

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$n$ | incl | DAE | 2JPNOSA | 1.4+07 | | Rept | JAERI-M-88-065 | Mar 88 | A.Takahashi+ | 22770 |
| $n$,$n$ | incl | DE | 2JPNOSA | 1.4+07 | | Rept | JAERI-M-88-065 | Mar 88 | A.Takahashi+ | 22770 |
| $n$,x | $^{52}$V | CS | 2JPNTOK | 5.5+06 | 3.8+07 | Jour | NST,31,1 | 94 | Y.Uwamino+ | 22700 |
| $n$,x | $^{53}$V | CS | 2JPNTOK | 4.5+06 | 3.8+07 | Jour | NST,31,1 | 94 | Y.Uwamino+ | 22700 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $d$,x | Many | TT | 2GERJUL | 7.9+06 | 1.3+07 | Jour | RCA,90,167 | 02 | A.T.J.Klein+ | O1017 |

**24 Chromium 50**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,2$n$ | $^{49}$Cr | CS | 2JPNTOK | 1.4+07 | 3.8+07 | Jour | NSE,111,391 | 92 | Y.Uwamino+ | 22703 |
| $n$,3$n$ | $^{48}$Cr | CS | 2JPNTOK | 2.6+07 | 3.8+07 | Jour | NSE,111,391 | 92 | Y.Uwamino+ | 22703 |

**24 Chromium 52**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,2$n$ | $^{51}$Cr | CS | 2JPNTOK | 1.8+07 | 3.8+07 | Jour | NSE,122,247 | 96 | Y.Uno+ | 22702 |

**25 Manganese 55**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,2$n$ | $^{54}$Mn | CS | 2JPNTOK | 1.2+07 | 3.8+07 | Jour | NSE,111,391 | 92 | Y.Uwamino+ | 22703 |
| $n$,4$n$ | $^{52}$Mn | CS | 2JPNTOK | 3.4+07 | 3.8+07 | Jour | NSE,111,391 | 92 | Y.Uwamino+ | 22703 |
| $n$,$p$+$\alpha$ | $^{51}$Ti | CS | 2JPNTOK | 2.2+07 | 3.8+07 | Jour | NSE,111,391 | 92 | Y.Uwamino+ | 22703 |
| $\alpha$,$n$ | $^{58}$Co | CS | 2GERJUL | 7.1+06 | 2.5+07 | Jour | PR/C,53,2885 | 96 | S.Sudar+ | O1040 |

**26 Iron**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$n$ | incl | DE | 2JPNOSA | 1.4+07 | | Rept | OKTAV-A-92-01, | 92 | A.Takahashi+ | 22766 |
| $p$,$n$ | incl | DAE | 2FR SAT | 8.0+08 | 1.6+09 | Jour | PR/C,65,044621 | 02 | S.Leray+ | O0977 |
| $d$,x | $^{58}$Co | CS | 2GERJUL | 3.7+06 | 1.3+07 | Jour | PR/C,53,2885 | 96 | S.Sudar+ | O1040 |

**26 Iron 56**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$^{7}$Be | $^{50}$Ti | CS | 2GERJUL | 5.3+07 | | Jour | RCA,62,107 | 93 | B.Scholten+ | 22708 |
| $p$,x | Many | CS | 4RUSITE | 2.6+09 | | Rept | ISTC-839B-99,100 | 01 | Yu.E.Titarenko | O0979 |
| $^{12}$C,$^{11}$B | $^{57}$Co | DAP | 3INDTRM | 6.0+07 | | Jour | PRM,53,843 | 99 | H.S.Patel+ | O1051 |
| $^{12}$C,$^{13}$C | $^{55}$Fe | DAP | 3INDTRM | 6.0+07 | | Jour | PRM,53,843 | 99 | H.S.Patel+ | O1051 |
| $^{12}$C,el | $^{56}$Fe | DA | 3INDTRM | 6.0+07 | | Jour | PRM,53,843 | 99 | H.S.Patel+ | O1051 |

**26 Iron 58**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,$n$ | $^{58}$Co | CS | 2GERJUL | 3.5+06 | 1.4+07 | Jour | PR/C,53,2885 | 96 | S.Sudar+ | O1040 |

**27 Cobalt 59**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,2$n$ | $^{58}$Co | CS | 2JPNTOK | 1.8+07 | 3.8+07 | Jour | NSE,122,247 | 96 | Y.Uno+ | 22702 |
| $n$,3$n$ | $^{57}$Co | CS | 2JPNTOK | 2.8+07 | 3.8+07 | Jour | NSE,122,247 | 96 | Y.Uno+ | 22702 |
| $n$,$^{7}$Be | $^{53}$V | CS | 2GERJUL | 5.3+07 | | Jour | RCA,62,107 | 93 | B.Scholten+ | 22708 |
| $n$,4$n$ | $^{56}$Co | CS | 2JPNTOK | 3.8+07 | | Jour | NSE,122,247 | 96 | Y.Uno+ | 22702 |
| $p$,el | $^{59}$Co | DA | 3BZLUSP | 3.0+07 | 5.5+07 | Jour | EPJ/A,1,143 | 98 | C.Muri+ | O0969 |
| $p$,inel | $^{59}$Co | DAP | 3BZLUSP | 3.0+07 | 3.4+07 | Jour | EPJ/A,1,143 | 98 | C.Muri+ | O0969 |
| $p$,x | Many | CS | 4RUSITE | 2.0+08 | 2.6+09 | Rept | ISTC-839-B,89 | 01 | Yu.E.Titarenko | O0984 |

**28 Nickel**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$n$ | incl | DE | 2JPNOSA | 1.4+07 | | Rept | OKTAV-A-92-01, | 92 | A.Takahashi+ | 22766 |
| $p$,$\alpha$ | incl | CS | 2JPNKYU | 4.0+05 | 1.6+07 | Jour | NST,34,(2),109 | Feb 97 | Y.Takao+ | E1787 |

**28 Nickel 58**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,2$n$ | $^{57}$Ni | CS | 2JPNTOK | 1.8+07 | 3.8+07 | Jour | NSE,122,247 | 96 | Y.Uno+ | 22702 |
| $p$,$\alpha$ | incl | CS | 2JPNKYU | 1.4+07 | 4.0+05 | Jour | NST,34,109 | 97 | Y.Takao+ | O0974 |
| $p$,x | $^{7}$Li | ? | 4RUSLIN | 1.0+09 | | Jour | ZP/A,350,1 | 94 | L.N.Andronenko+ | O0940 |
| $p$,x | $^{9}$Be | ? | 4RUSLIN | 1.0+09 | | Jour | ZP/A,350,1 | 94 | L.N.Andronenko+ | O0940 |
| $p$,x | $^{11}$B | ? | 4RUSLIN | 1.0+09 | | Jour | ZP/A,350,1 | 94 | L.N.Andronenko+ | O0940 |
| $p$,x | Many | CS | 4RUSITE | 2.6+09 | | Rept | ISTC-839B-99,101 | 01 | Yu.E.Titarenko | O0980 |
| $^{58}$Ni,el | $^{58}$Ni | DA | 2ITYPAD | 1.1+08 | 1.2+08 | Jour | ZP/A,355,41 | 96 | L.Vannucci+ | O0970 |
| $^{58}$Ni,inel | $^{58}$Ni | DAP | 2ITYPAD | 1.1+08 | 1.2+08 | Jour | ZP/A,355,41 | 96 | L.Vannucci+ | O0970 |

**28 Nickel 60**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $^{13}$C,$^{13}$N | $^{60}$Co | DAP | 2JPNIPC | 1.3+09 | | Jour | PRL,89,(14),142501 | Sep 02 | T.Ichihara+ | E1790 |
| $^{13}$C,el | $^{60}$Ni | DA | 2JPNIPC | 1.3+09 | | Jour | PRL,89,(14),142501 | Sep 02 | T.Ichihara+ | E1790 |

## 28 Nickel 62

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $^{58}$Ni,el | $^{62}$Ni | DA | 2ITYPAD | 1.1+08 | 1.2+08 | Jour | ZP/A,355,41 | 96 | L.Vannucci+ | O0970 |
| $^{58}$Ni,inel | $^{62}$Ni | DAP | 2ITYPAD | 1.1+08 | 1.2+08 | Jour | ZP/A,355,41 | 96 | L.Vannucci+ | O0970 |

## 29 Copper

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{62}$Co | CS | 2JPNTOK | 7.5+06 | 3.8+07 | Jour | NST,31,1 | 94 | Y.Uwamino+ | 22700 |
| $p$,x | $^{7}$Be | CS | 2JPNIRS | 2.3+08 | | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | Many | PY | 2JPNIRS | 2.3+08 | | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | Many | CS | 2JPNIRS | 2.3+08 | | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{42}$K | CS | 2JPNIRS | 2.3+08 | | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{43}$K | ? | 2JPNIRS | 2.3+08 | | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{44}$Sc | CS | 2JPNIRS | 1.0+08 | 2.3+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{46}$Sc | CS | 2JPNIRS | 2.3+08 | 1.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{47}$Sc | CS | 2JPNIRS | 2.3+08 | 1.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{48}$Sc | ? | 2JPNIRS | 2.3+08 | | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{49}$Cr | CS | 2JPNIRS | 2.3+08 | | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{51}$Cr | CS | 2JPNIRS | 2.3+08 | 6.3+07 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{52}$Mn | ? | 2JPNIRS | 2.3+08 | | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{54}$Mn | CS | 2JPNIRS | 2.3+08 | 1.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{56}$Mn | ? | 2JPNIRS | 1.0+08 | 2.3+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{59}$Fe | CS | 2JPNIRS | 2.3+08 | 1.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{55}$Co | CS | 2JPNIRS | 2.3+08 | 1.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{57}$Co | CS | 2JPNIRS | 4.8+07 | 2.3+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{58}$Co | CS | 2JPNIRS | 2.3+08 | 1.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{60}$Co | ? | 2JPNIRS | 1.0+08 | 2.3+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{61}$Co | ? | 2JPNIRS | 1.0+08 | 2.3+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{62}$Co | ? | 2JPNIRS | 1.0+08 | 2.3+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{65}$Ni | ? | 2JPNIRS | 1.0+08 | 2.3+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{61}$Cu | CS | 2JPNIRS | 2.3+08 | 2.7+07 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{64}$Cu | CS | 2JPNIRS | 2.3+08 | 1.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $p$,x | $^{63}$Zn | CS | 2JPNIRS | 2.3+08 | 1.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{7}$Be | CS | 2JPNIRS | 9.2+08 | 4.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | Many | PY | 2JPNIRS | 4.0+08 | 9.2+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | Many | CS | 2JPNIRS | 4.0+08 | 9.2+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{22}$Na | CS | 2JPNIRS | 4.0+08 | 9.2+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{24}$Na | CS | 2JPNIRS | 4.0+08 | 9.2+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{28}$Mg | CS | 2JPNIRS | 9.2+08 | | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{29}$Al | CS | 2JPNIRS | 9.2+08 | | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{34}$Cl | CS | 2JPNIRS | 9.2+08 | | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{38}$Cl | CS | 2JPNIRS | 3.0+08 | 9.2+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{39}$Cl | CS | 2JPNIRS | 9.2+08 | | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{41}$Ar | CS | 2JPNIRS | 9.2+08 | 4.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{42}$K | CS | 2JPNIRS | 9.2+08 | 4.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{43}$K | ? | 2JPNIRS | 4.0+08 | 9.2+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{44}$Sc | CS | 2JPNIRS | 4.0+08 | 9.2+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{46}$Sc | CS | 2JPNIRS | 9.2+08 | 4.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{47}$Sc | CS | 2JPNIRS | 9.2+08 | 4.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{48}$Sc | ? | 2JPNIRS | 4.0+08 | 9.2+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{49}$Cr | CS | 2JPNIRS | 9.2+08 | 4.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $\alpha$,x | $^{51}$Cr | CS | 2JPNIRS | 9.2+08 | 4.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{52}$Mn | ? | 2JPNIRS | 4.0+08 | 9.2+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{54}$Mn | CS | 2JPNIRS | 9.2+08 | 4.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{56}$Mn | ? | 2JPNIRS | 4.0+08 | 9.2+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{59}$Fe | CS | 2JPNIRS | 9.2+08 | 4.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{55}$Co | CS | 2JPNIRS | 9.2+08 | 4.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{57}$Co | CS | 2JPNIRS | 4.0+08 | 9.2+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{58}$Co | CS | 2JPNIRS | 9.2+08 | 4.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{60}$Co | ? | 2JPNIRS | 4.0+08 | 9.2+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{61}$Co | ? | 2JPNIRS | 4.0+08 | 9.2+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{62}$Co | ? | 2JPNIRS | 4.0+08 | 9.2+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{65}$Ni | ? | 2JPNIRS | 4.0+08 | 9.2+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{64}$Cu | CS | 2JPNIRS | 9.2+08 | 4.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $\alpha$,x | $^{63}$Zn | CS | 2JPNIRS | 9.2+08 | 4.0+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{7}$Be | CS | 2JPNIRS | 2.8+09 | 1.2+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | Many | PY | 2JPNIRS | 1.2+09 | 2.8+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | Many | CS | 2JPNIRS | 1.2+09 | 2.8+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{22}$Na | CS | 2JPNIRS | 2.8+09 | 6.4+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{24}$Na | CS | 2JPNIRS | 2.8+09 | 6.4+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{27}$Mg | CS | 2JPNIRS | 2.8+09 | | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{28}$Mg | CS | 2JPNIRS | 2.8+09 | 1.2+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{29}$Al | CS | 2JPNIRS | 2.8+09 | | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{34}$Cl | CS | 2JPNIRS | 2.8+09 | 1.2+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{38}$Cl | CS | 2JPNIRS | 2.8+09 | 6.4+08 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{39}$Cl | CS | 2JPNIRS | 2.8+09 | 1.2+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{41}$Ar | CS | 2JPNIRS | 2.8+09 | 1.2+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{42}$K | CS | 2JPNIRS | 2.8+09 | 1.2+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{43}$K | ? | 2JPNIRS | 1.2+09 | 2.8+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{44}$Sc | CS | 2JPNIRS | 1.2+09 | 2.8+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{46}$Sc | CS | 2JPNIRS | 2.8+09 | 1.2+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{47}$Sc | CS | 2JPNIRS | 2.8+09 | 1.2+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{48}$Sc | ? | 2JPNIRS | 1.2+09 | 2.8+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{49}$Cr | CS | 2JPNIRS | 2.8+09 | 1.2+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{51}$Cr | CS | 2JPNIRS | 2.8+09 | 1.2+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{52}$Mn | ? | 2JPNIRS | 1.2+09 | 2.8+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{54}$Mn | CS | 2JPNIRS | 2.8+09 | 1.2+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{56}$Mn | ? | 2JPNIRS | 1.2+09 | 2.8+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{59}$Fe | CS | 2JPNIRS | 2.8+09 | 1.2+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{55}$Co | CS | 2JPNIRS | 2.8+09 | 1.2+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{57}$Co | CS | 2JPNIRS | 1.2+09 | 2.8+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{58}$Co | CS | 2JPNIRS | 2.8+09 | 1.2+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{60}$Co | ? | 2JPNIRS | 1.2+09 | 2.8+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{61}$Co | ? | 2JPNIRS | 1.2+09 | 2.8+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{62}$Co | ? | 2JPNIRS | 1.2+09 | 2.8+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{65}$Ni | ? | 2JPNIRS | 1.2+09 | 2.8+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{64}$Cu | CS | 2JPNIRS | 2.8+09 | 1.2+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{12}$C,x | $^{63}$Zn | CS | 2JPNIRS | 2.8+09 | 1.2+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{7}$Be | CS | 2JPNIRS | 4.6+09 | 2.0+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | Many | PY | 2JPNIRS | 2.0+09 | 4.6+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | Many | CS | 2JPNIRS | 2.0+09 | 4.6+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{22}$Na | CS | 2JPNIRS | 4.6+09 | 1.1+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{24}$Na | CS | 2JPNIRS | 4.6+09 | 1.1+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{27}$Mg | CS | 2JPNIRS | 4.6+09 | | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{28}$Mg | CS | 2JPNIRS | 4.6+09 | 2.0+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{29}$Al | CS | 2JPNIRS | 4.6+09 | | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{34}$Cl | CS | 2JPNIRS | 4.6+09 | 2.0+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{38}$Cl | CS | 2JPNIRS | 4.6+09 | 1.1+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $^{20}$Ne,x | $^{39}$Cl | CS | 2JPNIRS | 4.6+09 | 2.0+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{41}$Ar | CS | 2JPNIRS | 4.6+09 | 2.0+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{42}$K | CS | 2JPNIRS | 4.6+09 | 2.0+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{43}$K | ? | 2JPNIRS | 2.0+09 | 4.6+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{44}$Sc | CS | 2JPNIRS | 2.0+09 | 4.6+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{46}$Sc | CS | 2JPNIRS | 4.6+09 | 1.1+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{47}$Sc | CS | 2JPNIRS | 4.6+09 | 2.0+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{48}$Sc | ? | 2JPNIRS | 2.0+09 | 4.6+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{49}$Cr | CS | 2JPNIRS | 4.6+09 | 2.0+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{51}$Cr | CS | 2JPNIRS | 4.6+09 | 2.0+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{52}$Mn | ? | 2JPNIRS | 2.0+09 | 4.6+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{54}$Mn | CS | 2JPNIRS | 4.6+09 | 2.0+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{56}$Mn | ? | 2JPNIRS | 2.0+09 | 4.6+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{59}$Fe | CS | 2JPNIRS | 4.6+09 | 2.0+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{55}$Co | CS | 2JPNIRS | 4.6+09 | 2.0+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{57}$Co | CS | 2JPNIRS | 2.0+09 | 4.6+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{58}$Co | CS | 2JPNIRS | 4.6+09 | 2.0+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{60}$Co | ? | 2JPNIRS | 2.0+09 | 4.6+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{61}$Co | ? | 2JPNIRS | 2.0+09 | 4.6+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{62}$Co | ? | 2JPNIRS | 2.0+09 | 4.6+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{65}$Ni | ? | 2JPNIRS | 2.0+09 | 4.6+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{64}$Cu | CS | 2JPNIRS | 4.6+09 | 2.0+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{20}$Ne,x | $^{63}$Zn | CS | 2JPNIRS | 4.6+09 | 2.0+09 | Jour | PR/C,66,044607 | 02 | H.Yashima+ | O1003 |
| $^{28}$Si,tcc | | CS | 2GERGSI | 1.2+10 | | Jour | RM,34,237 | 01 | F.Flesch+ | O0971 |
| $^{28}$Si,x | Many | CS | 2GERGSI | 1.2+10 | | Jour | RM,34,237 | 01 | F.Flesch+ | O0971 |
| $^{56}$Fe,x | Many | CS | 2GERGSI | 3.9+10 | | Jour | RM,31,533 | 99 | F.Flesch+ | O0968 |
| $^{208}$Pb,x | Many | CS | 2GERGSI | 2.1+11 | | Jour | NP/A,590,785 | 95 | H.G.Clerc+ | O0956 |
| $^{238}$U,f | | CS | 2GERGSI | 1.8+11 | | Jour | ZP/A,355,69 | 96 | M.Hesse+ | O0955 |
| $^{238}$U,x | Many | CS | 2GERGSI | 2.3+11 | | Jour | NP/A,590,785 | 95 | H.G.Clerc+ | O0956 |

## 29 Copper 63

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,2$n$ | $^{62}$Cu | CS | 2JPNTOK | 1.2+07 | 3.8+07 | Jour | NSE,111,391 | 92 | Y.Uwamino+ | 22703 |
| $n$,3$n$ | $^{61}$Cu | CS | 2JPNTOK | 2.2+07 | 3.8+07 | Jour | NSE,111,391 | 92 | Y.Uwamino+ | 22703 |
| $p$,x | Many | CS | 4RUSITE | 2.0+08 | 2.6+09 | Rept | ISTC-839B-99,91 | 01 | Yu.E.Titarenko | O0983 |

## 29 Copper 65

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$p$ | $^{65}$Ni | CS | 2JPNTOK | 3.5+06 | 3.8+07 | Jour | NSE,111,391 | 92 | Y.Uwamino+ | 22703 |
| $p$,$\gamma$ | $^{66}$Zn | CSP | 3CHFTHU | 1.3+06 | 2.6+06 | Jour | CHP,24,204 | 86 | Sc.Wu+ | O1036 |
| $p$,$n$ | $^{65}$Zn | CS | 3CHFTHU | 2.1+06 | 2.7+06 | Jour | CHP,24,204 | 86 | Sc.Wu+ | O1036 |
| $p$,x | Many | CS | 4RUSITE | 2.0+08 | 2.6+09 | Rept | ISTC-839B-99,93 | 01 | Yu.E.Titarenko | O0982 |

**30 Zinc**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{65}$Ni | CS | 2JPNTOK | 9.5+06 | 3.8+07 | Jour | NST,31,1 | 94 | Y.Uwamino+ | 22700 |
| $n$,x | $^{64}$Cu | CS | 2JPNTOK | 3.5+06 | 3.8+07 | Jour | NST,31,1 | 94 | Y.Uwamino+ | 22700 |
| $n$,x | $^{66}$Cu | CS | 2JPNTOK | 7.5+06 | 3.8+07 | Jour | NST,31,1 | 94 | Y.Uwamino+ | 22700 |
| $n$,x | $^{68}$Cu | CS | 2JPNTOK | 5.5+06 | 3.8+07 | Jour | NST,31,1 | 94 | Y.Uwamino+ | 22700 |

**30 Zinc 64**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,2$n$ | $^{63}$Zn | CS | 2JPNTOK | 1.4+07 | 3.8+07 | Jour | NSE,111,391 | 92 | Y.Uwamino+ | 22703 |
| $n$,3$n$ | $^{62}$Zn | CS | 2JPNTOK | 2.4+07 | 3.8+07 | Jour | NSE,111,391 | 92 | Y.Uwamino+ | 22703 |
| $n$,$t$ | $^{62}$Cu | CS | 2JPNTOK | 2.4+07 | 3.8+07 | Jour | NSE,111,391 | 92 | Y.Uwamino+ | 22703 |

**30 Zinc 68**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,2$n$ | $^{67}$Ga | CS | 2GERJUL | 7.1+07 | 2.0+07 | Jour | RCA,90,309 | 02 | T.Stoll+ | O1002 |
| $p$,2$p$ | $^{67}$Cu | CS | 2GERJUL | 7.1+07 | 2.5+07 | Jour | RCA,90,309 | 02 | T.Stoll+ | O1002 |
| $p$,3$n$ | $^{66}$Ga | CS | 2GERJUL | 6.9+07 | 2.6+07 | Jour | RCA,90,309 | 02 | T.Stoll+ | O1002 |

**30 Zinc 70**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,2$n$ | $^{69}$Zn | CS | 2GERJUL | 1.0+07 | 1.2+07 | Jour | PR/C,68,(2),024603 | 03 | C.D.Nesaraja+ | 22823 |

**31 Gallium 69**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$p$ | $^{69}$Zn | CS | 2GERJUL | 6.3+06 | 1.2+07 | Jour | PR/C,68,(2),024603 | 03 | C.D.Nesaraja+ | 22823 |

**31 Gallium 71**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$p$ | $^{71}$Zn | CS | 2GERJUL | 8.4+06 | 1.2+07 | Jour | PR/C,68,(2),024603 | 03 | C.D.Nesaraja+ | 22823 |

**32 Germanium**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $^{3}$He,x | $^{73}$Se | CS | 2GERJUL | 1.3+07 | 2.4+07 | Jour | PR/C,38,645 | 88 | S.M.Qaim+ | O1041 |

**32 Germanium 70**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $\alpha$,$n$ | $^{73}$Se | CS | 2GERJUL | 1.1+07 | 2.8+07 | Jour | PR/C,38,645 | 88 | S.M.Qaim+ | O1041 |

**32 Germanium 72**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$\alpha$ | $^{69}$Zn | CS | 2GERJUL | 7.4+06 | 1.2+07 | Jour | PR/C,68,(2),024603 | 03 | C.D.Nesaraja+ | 22823 |

**32 Germanium 74**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$\alpha$ | $^{71}$Zn | CS | 2GERJUL | 7.5+06 | 1.2+07 | Jour | PR/C,68,(2),024603 | 03 | C.D.Nesaraja+ | 22823 |

**33 Arsenic 75**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$^{7}$Be | $^{69}$Cu | CS | 2GERJUL | 5.3+07 | | Jour | RCA,62,107 | 93 | B.Scholten+ | 22708 |
| $p$,3$n$ | $^{73}$Se | CS | 2GERJUL | 2.5+07 | 4.5+07 | Jour | PR/C,38,645 | 88 | S.M.Qaim+ | O1041 |
| $d$,4$n$ | $^{73}$Se | CS | 2GERJUL | 2.8+07 | 5.5+07 | Jour | PR/C,38,645 | 88 | S.M.Qaim+ | O1041 |

**34 Selenium 74**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,$\gamma$ | $^{75}$Br | CS | 3HUNDEB | 1.5+06 | 3.5+06 | Jour | PR/C,68,055803 | 03 | Gy.Gyurky+ | O0849 |
| $p$,$\gamma$ | $^{75}$Br | RR | 3HUNDEB | 0.0+00 | | Jour | PR/C,68,055803 | 03 | Gy.Gyurky+ | O0849 |

**34 Selenium 76**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,$\gamma$ | $^{77}$Br | CS | 3HUNDEB | 1.5+06 | 3.5+06 | Jour | PR/C,68,055803 | 03 | Gy.Gyurky+ | O0849 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $p,\gamma$ | $^{77}$Br | ? | 3HUNDEB | 0.0+00 | | Jour | PR/C,68,055803 | 03 | Gy.Gyurky+ | O0849 |

**34 Selenium 82**

| Reaction | Product | Quantity | Lab. | Energy (eV) | | Type | Documentation | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Max | | Ref Vol Page | | | |
| $p,n$ | $^{82}$Br | CS | 3HUNDEB | 1.3+06 | 3.6+06 | Jour | PR/C,68,055803 | 03 | Gy.Gyurky+ | O0849 |
| $p,n$ | $^{82}$Br | RR | 3HUNDEB | 0.0+00 | | Jour | PR/C,68,055803 | 03 | Gy.Gyurky+ | O0849 |

**35 Bromine**

| Reaction | Product | Quantity | Lab. | Energy (eV) | | Type | Documentation | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Max | | Ref Vol Page | | | |
| $p$,x | $^{71}$As | CS | 3SAFNAC | 1.0+08 | 6.6+07 | Jour | ARI,57,907 | 02 | D.Devilliers+ | O1022 |
| $p$,x | $^{74}$As | CS | 3SAFNAC | 1.0+08 | 3.4+07 | Jour | ARI,57,907 | 02 | D.Devilliers+ | O1022 |
| $p$,x | $^{72}$Se | CS | 3SAFNAC | 1.0+08 | 5.2+07 | Jour | ARI,57,907 | 02 | D.Devilliers+ | O1022 |
| $p$,x | $^{73}$Se | CS | 3SAFNAC | 1.0+08 | 4.2+07 | Jour | ARI,57,907 | 02 | D.Devilliers+ | O1022 |
| $p$,x | $^{75}$Se | CS | 3SAFNAC | 1.0+08 | 1.6+07 | Jour | ARI,57,907 | 02 | D.Devilliers+ | O1022 |
| $p$,x | $^{75}$Br | CS | 3SAFNAC | 1.0+08 | 4.2+07 | Jour | ARI,57,907 | 02 | D.Devilliers+ | O1022 |
| $p$,x | $^{77}$Br | CS | 3SAFNAC | 1.0+08 | 2.5+07 | Jour | ARI,57,907 | 02 | D.Devilliers+ | O1022 |
| $p$,x | $^{80}$Br | CS | 3SAFNAC | 1.0+08 | 1.3+07 | Jour | ARI,57,907 | 02 | D.Devilliers+ | O1022 |
| $p$,x | $^{76}$Kr | CS | 3SAFNAC | 1.0+08 | 3.9+07 | Jour | ARI,57,907 | 02 | D.Devilliers+ | O1022 |
| $p$,x | $^{77}$Kr | CS | 3SAFNAC | 1.0+08 | 2.5+07 | Jour | ARI,57,907 | 02 | D.Devilliers+ | O1022 |
| $p$,x | $^{79}$Kr | CS | 3SAFNAC | 1.0+08 | 9.1+06 | Jour | ARI,57,907 | 02 | D.Devilliers+ | O1022 |

**35 Bromine 81**

| Reaction | Product | Quantity | Lab. | Energy (eV) | | Type | Documentation | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Max | | Ref Vol Page | | | |
| $n$,tot | | CS | 2JPNJAE | 5.2+01 | 1.4+05 | Jour | NST,18,(10),745 | Oct 81 | M.Ohkubo+ | 21294 |

**36 Krypton**

| Reaction | Product | Quantity | Lab. | Energy (eV) | | Type | Documentation | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Max | | Ref Vol Page | | | |
| $p,\pi^-$ | incl | DAP | 2SWDSWD | 1.5+08 | 5.0+08 | Jour | PR/C,62,014610 | 00 | J.Martensson+ | O1058 |
| $p,\pi^+$ | incl | CS | 2SWDSWD | 1.7+08 | 4.9+08 | Jour | PR/C,62,014610 | 00 | J.Martensson+ | O1058 |
| $p,\pi^+$ | incl | DAE | 2SWDSWD | 1.8+08 | 5.0+08 | Jour | PR/C,62,014610 | 00 | J.Martensson+ | O1058 |
| $p,\pi^+$ | incl | DAP | 2SWDSWD | 1.8+08 | 5.0+08 | Jour | PR/C,62,014610 | 00 | J.Martensson+ | O1058 |
| $p$,x | $^{81}$Rb | TT | 2ITYMIL | 1.5+07 | 4.1+07 | Jour | ARI,32,465 | 81 | E.Acerbi+ | O0847 |
| $p$,x | $^{82}$Rb | TT | 2ITYMIL | 1.0+07 | 4.1+07 | Jour | ARI,32,465 | 81 | E.Acerbi+ | O0847 |
| $p$,x | $^{84}$Rb | TT | 2ITYMIL | 1.1+07 | 4.1+07 | Jour | ARI,32,465 | 81 | E.Acerbi+ | O0847 |

**37 Rubidium**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,tot | | CS | 2JPNJAE | 6.7+02 | 7.2+02 | Jour | NST,21,254 | 84 | M.Ohkubo+ | 22764 |

**37 Rubidium 85**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,0 | | RP | 2JPNJAE | 0.0+00 | | Jour | NST,21,254 | 84 | M.Ohkubo+ | 22764 |
| $n$,tot | | CS | 2JPNJAE | 1.9+04 | 2.1+03 | Jour | NST,21,254 | 84 | M.Ohkubo+ | 22764 |
| $p$,3$n$ | $^{83}$Sr | CS | 2GERJUL | 2.1+07 | 1.0+08 | Jour | ARI,56,685 | 02 | S.Kastleiner+ | O0961 |
| $p$,3$n$ | $^{83}$Sr | TT | 2GERJUL | 3.0+07 | 3.5+07 | Jour | ARI,56,685 | 02 | S.Kastleiner+ | O0961 |
| $p$,4$n$ | $^{82}$Sr | CS | 2GERJUL | 3.8+07 | 1.0+08 | Jour | ARI,56,685 | 02 | S.Kastleiner+ | O0961 |
| $p$,5$n$ | $^{81}$Sr | CS | 2GERJUL | 5.6+07 | 1.0+08 | Jour | ARI,56,685 | 02 | S.Kastleiner+ | O0961 |
| $p$,$n$ | $^{85}$Sr | CS | 2GERJUL | 3.1+06 | 9.4+07 | Jour | ARI,56,685 | 02 | S.Kastleiner+ | O0961 |

**37 Rubidium 87**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,0 | | RP | 2JPNJAE | 0.0+00 | | Jour | NST,21,254 | 84 | M.Ohkubo+ | 22764 |
| $n$,tot | | CS | 2JPNJAE | 1.2+05 | 2.1+04 | Jour | NST,21,254 | 84 | M.Ohkubo+ | 22764 |

**38 Strontium**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,x | $^{87}$Y | CS | 2GERJUL | 4.5+06 | 2.6+07 | Jour | RCA,90,845 | 02 | K.Kettern+ | O1027 |
| $p$,x | $^{88}$Y | CS | 2GERJUL | 2.6+07 | 4.5+06 | Jour | RCA,90,845 | 02 | K.Kettern+ | O1027 |

**38 Strontium 87**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{86}$Rb | CS | 2JPNJAE | 1.5+07 | | Jour | ANE,30,1847 | 03 | H.Sakane+ | 22827 |

**38 Strontium 88**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,$\gamma$ | $^{89}$Y | CS | 2GERTHS | 1.4+06 | 4.9+06 | Jour | PR/C,67,015801 | 03 | S.Galanopoulos+ | O1054 |

**39 Yttrium 89**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,2$n$ | $^{88}$Y | CS | 2GERJUL | 1.1+07 | 1.5+07 | Jour | RCA,76,3 | 97 | R.M.Klopries+ | 31532 |
| $n$,2$n$ | $^{88}$Y | CS | 4UKRKGU | 1.4+07 | | Jour | NSTS,2,(1),425 | Aug 02 | S.V.Begun+ | 32205 |
| $n$,$\alpha$ | $^{86}$Rb | CS | 4UKRKGU | 1.4+07 | | Jour | NSTS,2,(1),425 | Aug 02 | S.V.Begun+ | 32205 |
| $n$,$\alpha$ | $^{86}$Rb | CS | 2GERJUL | 8.5+06 | 1.5+07 | Jour | RCA,76,3 | 97 | R.M.Klopries+ | 31532 |
| $n$,$p$ | $^{89}$Sr | CS | 2GERJUL | 7.8+06 | 1.5+07 | Jour | RCA,76,3 | 97 | R.M.Klopries+ | 31532 |

**40 Zirconium**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,$n$ | incl | DAE | 2FR SAT | 1.2+09 | | Jour | PR/C,65,044621 | 02 | S.Leray+ | O0977 |
| $p$,$n$ | $^{90}$Nb | CS | 2GERJUL | 1.5+07 | 7.5+06 | Jour | RCA,90,1 | 02 | S.Busse+ | O1016 |
| $p$,$n$ | $^{90}$Nb | TT | 2GERJUL | 1.5+07 | 8.1+06 | Jour | RCA,90,1 | 02 | S.Busse+ | O1016 |

**40 Zirconium 90**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,2$n$ | $^{89}$Nb | CS | 2GERJUL | 1.9+07 | 1.7+07 | Jour | RCA,90,1 | 02 | S.Busse+ | O1016 |
| $p$,$d$ | incl | DAE | 4KASKAZ | 3.0+07 | | Jour | PR/C,67,044608 | 03 | A.Duisebayev+ | O1060 |
| $p$,$d$ | incl | DE | 4KASKAZ | 3.0+07 | | Jour | PR/C,67,044608 | 03 | A.Duisebayev+ | O1060 |
| $p$,$n$ | $^{90}$Nb | CS | 2GERJUL | 1.9+07 | 1.2+07 | Jour | RCA,90,1 | 02 | S.Busse+ | O1016 |
| $p$,$p$ | incl | DAE | 4KASKAZ | 3.0+07 | | Jour | PR/C,67,044608 | 03 | A.Duisebayev+ | O1060 |
| $p$,$p$ | incl | DE | 4KASKAZ | 3.0+07 | | Jour | PR/C,67,044608 | 03 | A.Duisebayev+ | O1060 |
| $^{16}$O,$^{14}$C | $^{92}$Mo | DAP | 3INDTRM | 9.0+07 | | Jour | EPJ/A,15,389 | 02 | V.Jha+ | O1048 |
| $^{16}$O,$^{15}$N | $^{91}$Nb | DAP | 3INDTRM | 9.0+07 | | Jour | EPJ/A,15,389 | 02 | V.Jha+ | O1048 |
| $^{16}$O,$^{15}$O | $^{91}$Zr | DAP | 3INDTRM | 9.0+07 | | Jour | EPJ/A,15,389 | 02 | V.Jha+ | O1048 |
| $^{16}$O,$^{17}$O | $^{89}$Zr | DAP | 3INDTRM | 9.0+07 | | Jour | EPJ/A,15,389 | 02 | V.Jha+ | O1048 |
| $^{16}$O,el | $^{90}$Zr | DA | 3INDTRM | 9.0+07 | | Jour | EPJ/A,15,389 | 02 | V.Jha+ | O1048 |
| $^{40}$Ca,el | $^{90}$Zr | DA | 2ITYPAD | 1.4+08 | 1.5+08 | Jour | JP/G,23,1431 | 97 | G.Montagnoli+ | O1043 |
| $^{40}$Ca,el | $^{90}$Zr | DA | 2ITYPAD | 1.5+08 | | Jour | EPJ/A,15,351 | 02 | G.Montagnoli+ | O1049 |
| $^{40}$Ca,el | $^{90}$Zr | DA | 2ITYPAD | 9.3+07 | 1.1+08 | Jour | NP/A,633,421 | 98 | H.Timmers+ | O1047 |
| $^{40}$Ca,fus | | CS | 2ITYPAD | 1.3+08 | 1.6+08 | Jour | NP/A,633,421 | 98 | H.Timmers+ | O1047 |
| $^{40}$Ca,x | Many | CS | 2ITYPAD | 1.4+08 | 1.5+08 | Jour | JP/G,23,1431 | 97 | G.Montagnoli+ | O1043 |
| $^{40}$Ca,x | Many | DA | 2ITYPAD | 1.5+08 | | Jour | EPJ/A,15,351 | 02 | G.Montagnoli+ | O1049 |

**40 Zirconium 92**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,$d$ | incl | DAE | 4KASKAZ | 3.0+07 | | Jour | PR/C,67,044608 | 03 | A.Duisebayev+ | O1060 |
| $p$,$d$ | incl | DE | 4KASKAZ | 3.0+07 | | Jour | PR/C,67,044608 | 03 | A.Duisebayev+ | O1060 |
| $p$,$p$ | incl | DAE | 4KASKAZ | 3.0+07 | | Jour | PR/C,67,044608 | 03 | A.Duisebayev+ | O1060 |
| $p$,$p$ | incl | DE | 4KASKAZ | 3.0+07 | | Jour | PR/C,67,044608 | 03 | A.Duisebayev+ | O1060 |

## 40 Zirconium 96

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $^{40}$Ca,el | $^{96}$Zr | DA | 2ITYPAD | 1.4+08 | 1.5+08 | Jour | JP/G,23,1431 | 97 | G.Montagnoli+ | O1043 |
| $^{40}$Ca,el | $^{96}$Zr | DA | 2ITYPAD | 1.5+08 | 1.3+08 | Jour | EPJ/A,15,351 | 02 | G.Montagnoli+ | O1049 |
| $^{40}$Ca,el | $^{96}$Zr | DA | 2ITYPAD | 8.7+07 | 1.1+08 | Jour | NP/A,633,421 | 98 | H.Timmers+ | O1047 |
| $^{40}$Ca,fus | | CS | 2ITYPAD | 1.2+08 | 1.6+08 | Jour | NP/A,633,421 | 98 | H.Timmers+ | O1047 |
| $^{40}$Ca,x | Many | CS | 2ITYPAD | 1.4+08 | 1.5+08 | Jour | JP/G,23,1431 | 97 | G.Montagnoli+ | O1043 |
| $^{40}$Ca,x | Many | DA | 2ITYPAD | 1.5+08 | 1.3+08 | Jour | EPJ/A,15,351 | 02 | G.Montagnoli+ | O1049 |
| $^{40}$Ca,x | $^{41}$Ca | DA | 2ITYPAD | 1.4+08 | 1.5+08 | Jour | JP/G,23,1431 | 97 | G.Montagnoli+ | O1043 |
| $^{40}$Ca,x | $^{42}$Ca | DA | 2ITYPAD | 1.4+08 | 1.5+08 | Jour | JP/G,23,1431 | 97 | G.Montagnoli+ | O1043 |
| $^{40}$Ca,x | $^{43}$Ca | DA | 2ITYPAD | 1.4+08 | 1.5+08 | Jour | JP/G,23,1431 | 97 | G.Montagnoli+ | O1043 |
| $^{40}$Ca,x | $^{44}$Ca | DA | 2ITYPAD | 1.5+08 | | Jour | JP/G,23,1431 | 97 | G.Montagnoli+ | O1043 |
| $^{40}$Ca,x | $^{45}$Ca | DA | 2ITYPAD | 1.5+08 | | Jour | JP/G,23,1431 | 97 | G.Montagnoli+ | O1043 |
| $^{40}$Ca,x | $^{46}$Ca | DA | 2ITYPAD | 1.5+08 | | Jour | JP/G,23,1431 | 97 | G.Montagnoli+ | O1043 |
| $^{40}$Ca,x | $^{47}$Ca | DA | 2ITYPAD | 1.5+08 | | Jour | JP/G,23,1431 | 97 | G.Montagnoli+ | O1043 |

## 41 Niobium 93

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$^{7}$Be | $^{87}$Rb | CS | 2GERJUL | 5.3+07 | | Jour | RCA,62,107 | 93 | B.Scholten+ | 22708 |
| $n$,$n$ | incl | DE | 2JPNOSA | 1.4+07 | | Rept | OKTAV-A-92-01, | 92 | A.Takahashi+ | 22766 |
| $p$,x | Many | CS | 4RUSITE | 2.6+09 | | Rept | ISTC-839B-99,102 | 01 | Yu.E.Titarenko | O0981 |
| $^{3}$He,x | $^{89}$Zr | CS | 2GERJUL | 3.5+07 | 3.1+07 | Jour | PR/C,56,2654 | 97 | B.Strohmaier+ | O1039 |
| $^{3}$He,x | $^{92}$Nb | CS | 2GERJUL | 3.5+07 | 1.1+07 | Jour | PR/C,56,2654 | 97 | B.Strohmaier+ | O1039 |
| $^{3}$He,x | $^{93}$Mo | CS | 2GERJUL | 3.5+07 | 1.7+07 | Jour | PR/C,56,2654 | 97 | B.Strohmaier+ | O1039 |

## 42 Molybdenum

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,x | $^{94}$Tc | CS | 2ITYMIL | 4.9+06 | 4.4+07 | Jour | ARI,57,617 | 02 | M.Bonardi+ | O0845 |
| $p$,x | $^{94}$Tc | CS | 2ITYMIL | 4.9+06 | 4.4+07 | Jour | ARI,57,617 | 02 | M.Bonardi+ | O1013 |
| $p$,x | $^{95}$Tc | CS | 2ITYMIL | 4.9+06 | 4.4+07 | Jour | ARI,57,617 | 02 | M.Bonardi+ | O0845 |
| $p$,x | $^{95}$Tc | CS | 2ITYMIL | 4.9+06 | 4.4+07 | Jour | ARI,57,617 | 02 | M.Bonardi+ | O1013 |
| $p$,x | $^{96}$Tc | CS | 2ITYMIL | 4.9+06 | 4.4+07 | Jour | ARI,57,617 | 02 | M.Bonardi+ | O0845 |
| $p$,x | $^{96}$Tc | CS | 2ITYMIL | 4.9+06 | 4.4+07 | Jour | ARI,57,617 | 02 | M.Bonardi+ | O1013 |

## 42 Molybdenum 92

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,$d$ | incl | DAE | 4KASKAZ | 3.0+07 | | Jour | PR/C,67,044608 | 03 | A.Duisebayev+ | O1060 |
| $p$,$d$ | incl | DE | 4KASKAZ | 3.0+07 | | Jour | PR/C,67,044608 | 03 | A.Duisebayev+ | O1060 |
| $p$,el | $^{92}$Mo | DA | 1USALRL | 1.5+07 | | Jour | PR/C,4,934 | 71 | H.F.Lutz+ | T0289 |
| $p$,inel | $^{92}$Mo | CSP | 1USALRL | 1.5+07 | | Jour | PR/C,4,934 | 71 | H.F.Lutz+ | T0289 |
| $p$,inel | $^{92}$Mo | DAP | 1USALRL | 1.5+07 | | Jour | PR/C,4,934 | 71 | H.F.Lutz+ | T0289 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,$n$ | $^{92}$Tc | CSP | 1USALRL | 1.6+07 | 2.6+07 | Jour | PR/C,11,158 | Jan 75 | S.M.Grimes+ | T0284 |
| $p$,$n$ | $^{92}$Tc | DAP | 1USALRL | 1.6+07 | 2.6+07 | Jour | PR/C,11,158 | Jan 75 | S.M.Grimes+ | T0284 |
| $p$,$n$ | $^{92}$Tc | DAP | 1USALRL | 2.2+07 | 2.6+07 | Jour | PR/C,13,548 | Feb 76 | V.A.Madsen+ | T0285 |
| $p$,$p$ | incl | DAE | 4KASKAZ | 3.0+07 | | Jour | PR/C,67,044608 | 03 | A.Duisebayev+ | O1060 |
| $p$,$p$ | incl | DE | 4KASKAZ | 3.0+07 | | Jour | PR/C,67,044608 | 03 | A.Duisebayev+ | O1060 |

**42 Molybdenum 94**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,el | $^{94}$Mo | DA | 1USALRL | 1.5+07 | | Jour | PR/C,4,934 | 71 | H.F.Lutz+ | T0289 |
| $p$,inel | $^{94}$Mo | CSP | 1USALRL | 1.5+07 | | Jour | PR/C,4,934 | 71 | H.F.Lutz+ | T0289 |
| $p$,inel | $^{94}$Mo | DAP | 1USALRL | 1.5+07 | | Jour | PR/C,4,934 | 71 | H.F.Lutz+ | T0289 |
| $p$,$n$ | $^{94}$Tc | CSP | 1USALRL | 1.6+07 | 2.6+07 | Jour | PR/C,11,158 | Jan 75 | S.M.Grimes+ | T0284 |
| $p$,$n$ | $^{94}$Tc | DAP | 1USALRL | 1.6+07 | 2.6+07 | Jour | PR/C,11,158 | Jan 75 | S.M.Grimes+ | T0284 |

**42 Molybdenum 95**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{94}$Nb | CS | 2JPNJAE | 1.5+07 | 1.4+07 | Jour | ANE,30,1847 | 03 | H.Sakane+ | 22827 |
| $p$,$n$ | $^{95}$Tc | CSP | 1USALRL | 1.6+07 | 2.6+07 | Jour | PR/C,11,158 | Jan 75 | S.M.Grimes+ | T0284 |
| $p$,$n$ | $^{95}$Tc | DAP | 1USALRL | 1.6+07 | 2.6+07 | Jour | PR/C,11,158 | Jan 75 | S.M.Grimes+ | T0284 |

**42 Molybdenum 96**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,el | $^{96}$Mo | DA | 1USALRL | 1.5+07 | | Jour | PR/C,4,934 | 71 | H.F.Lutz+ | T0289 |
| $p$,inel | $^{96}$Mo | CSP | 1USALRL | 1.5+07 | | Jour | PR/C,4,934 | 71 | H.F.Lutz+ | T0289 |
| $p$,inel | $^{96}$Mo | DAP | 1USALRL | 1.5+07 | | Jour | PR/C,4,934 | 71 | H.F.Lutz+ | T0289 |
| $p$,$n$ | $^{96}$Tc | CSP | 1USALRL | 1.6+07 | 2.6+07 | Jour | PR/C,11,158 | Jan 75 | S.M.Grimes+ | T0284 |
| $p$,$n$ | $^{96}$Tc | DAP | 1USALRL | 1.6+07 | 2.6+07 | Jour | PR/C,11,158 | Jan 75 | S.M.Grimes+ | T0284 |

**42 Molybdenum 97**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$p$ | $^{97}$Nb | CS | 2TUKCNA | 1.4+07 | 1.5+07 | Jour | ANE,30,1821 | 03 | M.Bostan+ | 22826 |
| $p$,$n$ | $^{97}$Tc | CSP | 1USALRL | 1.6+07 | 2.6+07 | Jour | PR/C,11,158 | Jan 75 | S.M.Grimes+ | T0284 |
| $p$,$n$ | $^{97}$Tc | DAP | 1USALRL | 1.6+07 | 2.6+07 | Jour | PR/C,11,158 | Jan 75 | S.M.Grimes+ | T0284 |

**42 Molybdenum 98**

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

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,el | $^{98}$Mo | DA | 1USALRL | 1.5+07 | | Jour | PR/C,4,934 | 71 | H.F.Lutz+ | T0289 |
| $p$,inel | $^{98}$Mo | CSP | 1USALRL | 1.5+07 | | Jour | PR/C,4,934 | 71 | H.F.Lutz+ | T0289 |
| $p$,inel | $^{98}$Mo | DAP | 1USALRL | 1.5+07 | | Jour | PR/C,4,934 | 71 | H.F.Lutz+ | T0289 |
| $p$,$n$ | $^{98}$Tc | CSP | 1USALRL | 1.6+07 | 2.6+07 | Jour | PR/C,11,158 | Jan 75 | S.M.Grimes+ | T0284 |
| $p$,$n$ | $^{98}$Tc | CSP | 1USALRL | 1.8+07 | 2.6+07 | Jour | PR/C,13,548 | Feb 76 | V.A.Madsen+ | T0285 |
| $p$,$n$ | $^{98}$Tc | DAP | 1USALRL | 1.6+07 | 2.6+07 | Jour | PR/C,11,158 | Jan 75 | S.M.Grimes+ | T0284 |
| $p$,$n$ | $^{98}$Tc | DAP | 1USALRL | 1.8+07 | 2.6+07 | Jour | PR/C,13,548 | Feb 76 | V.A.Madsen+ | T0285 |

**42 Molybdenum 100**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{99}$Nb | CS | 2JPNJAE | 1.5+07 | 1.3+07 | Jour | ANE,30,1847 | 03 | H.Sakane+ | 22827 |
| $p$,el | $^{100}$Mo | DA | 1USALRL | 1.5+07 | | Jour | PR/C,4,934 | 71 | H.F.Lutz+ | T0289 |
| $p$,inel | $^{100}$Mo | CSP | 1USALRL | 1.5+07 | | Jour | PR/C,4,934 | 71 | H.F.Lutz+ | T0289 |
| $p$,inel | $^{100}$Mo | DAP | 1USALRL | 1.5+07 | | Jour | PR/C,4,934 | 71 | H.F.Lutz+ | T0289 |
| $p$,$n$ | $^{100}$Tc | CSP | 1USALRL | 1.6+07 | 2.6+07 | Jour | PR/C,11,158 | Jan 75 | S.M.Grimes+ | T0284 |
| $p$,$n$ | $^{100}$Tc | CSP | 1USALRL | 1.8+07 | 2.6+07 | Jour | PR/C,13,548 | Feb 76 | V.A.Madsen+ | T0285 |
| $p$,$n$ | $^{100}$Tc | DAP | 1USALRL | 1.6+07 | 2.6+07 | Jour | PR/C,11,158 | Jan 75 | S.M.Grimes+ | T0284 |
| $p$,$n$ | $^{100}$Tc | DAP | 1USALRL | 1.8+07 | 2.6+07 | Jour | PR/C,13,548 | Feb 76 | V.A.Madsen+ | T0285 |

**43 Technetium 99**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,x | Many | CS | 4RUSITE | 1.0+08 | 2.6+09 | Conf | 99PRAHA,,26 | 99 | Yu.E.Titarenko+ | O0985 |

**44 Ruthenium 104**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{103}$Tc | CS | 2JPNJAE | 1.5+07 | 1.4+07 | Jour | ANE,30,1847 | 03 | H.Sakane+ | 22827 |

**45 Rhodium 103**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$\gamma$ | $^{104}$Rh | CS | 2JPNKTO | 2.5-02 | | Jour | NSE,144,94 | 03 | S.Lee+ | 22828 |
| $p$,3$n$ | $^{101}$Pd | CS | 2GERJUL | 2.2+07 | 4.0+07 | Jour | ARI,56,821 | 02 | S.Sudar+ | O1010 |
| $p$,4$n$ | $^{100}$Pd | CS | 2GERJUL | 3.1+07 | 4.0+07 | Jour | ARI,56,821 | 02 | S.Sudar+ | O1010 |
| $p$,$n$ | $^{103}$Pd | CS | 2GERJUL | 3.0+06 | 4.0+07 | Jour | ARI,56,821 | 02 | S.Sudar+ | O1010 |

**46 Palladium 106**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{105}$Rh | CS | 2JPNJAE | 1.5+07 | 1.4+07 | Jour | ANE,30,1847 | 03 | H.Sakane+ | 22827 |

**47 Silver**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $^{28}$Si,tcc | | CS | 2GERGSI | 1.2+10 | | Jour | RM,34,237 | 01 | F.Flesch+ | O0971 |
| $^{28}$Si,x | Many | CS | 2GERGSI | 1.2+10 | | Jour | RM,34,237 | 01 | F.Flesch+ | O0971 |
| $^{56}$Fe,x | Many | CS | 2GERGSI | 3.9+10 | | Jour | RM,31,533 | 99 | F.Flesch+ | O0968 |

**47 Silver 109**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,x | $^{7}$Li | ? | 4RUSLIN | 1.0+09 | | Jour | ZP/A,350,1 | 94 | L.N.Andronenko+ | O0940 |
| $p$,x | $^{9}$Be | ? | 4RUSLIN | 1.0+09 | | Jour | ZP/A,350,1 | 94 | L.N.Andronenko+ | O0940 |
| $p$,x | $^{11}$B | ? | 4RUSLIN | 1.0+09 | | Jour | ZP/A,350,1 | 94 | L.N.Andronenko+ | O0940 |

**48 Cadmium 110**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,tot | | CS | 1USACOL | 4.0+03 | 1.5+01 | Jour | PR/C,10,709 | Aug 74 | H.I.Liou+ | 10527 |
| $^{3}$He,3$n$ | $^{110}$Sn | TT | 2GERJUL | 2.5+07 | | Jour | ARI,48,19 | 97 | F.Rosch+ | O1037 |

**48 Cadmium 112**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,tot | | CS | 1USACOL | 7.0+03 | 1.5+01 | Jour | PR/C,10,709 | Aug 74 | H.I.Liou+ | 10527 |

**48 Cadmium 113**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{112}$Ag | CS | 2JPNJAE | 1.5+07 | 1.4+07 | Jour | ANE,30,1847 | 03 | H.Sakane+ | 22827 |

**48 Cadmium 114**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,tot | | CS | 1USACOL | 5.0+03 | 1.5+01 | Jour | PR/C,10,709 | Aug 74 | H.I.Liou+ | 10527 |

**48 Cadmium 116**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{115}$Ag | CS | 2JPNJAE | 1.5+07 | 1.4+07 | Jour | ANE,30,1847 | 03 | H.Sakane+ | 22827 |

**50 Tin 112**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,x | Many | CS | 4ZZZDUB | 6.6+08 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{44}$Sc | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{86}$Y | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{87}$Y | CS | 4ZZZDUB | 6.6+08 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{95}$Nb | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{94}$Tc | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{95}$Tc | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{99}$Rh | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{101}$Rh | CS | 4ZZZDUB | 6.6+08 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{102}$Rh | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{104}$Ag | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{108}$In | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{110}$In | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |

**50 Tin 116**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $^{40}$Ca,fus | | CS | 2ITYPAD | 1.1+08 | 1.3+08 | Jour | NC/A,111,895 | 98 | A.M.Stefanini+ | O1042 |

**50 Tin 118**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{117}$In | CS | 2JPNJAE | 1.5+07 | 1.4+07 | Jour | ANE,30,1847 | 03 | H.Sakane+ | 22827 |
| $p$,3$n$ | $^{116}$Sb | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | Many | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{44}$Sc | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{52}$Mn | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{84}$Rb | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{86}$Y | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{87}$Y | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,x | $^{95}$Nb | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{93}$Tc | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{94}$Tc | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{95}$Tc | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{99}$Rh | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{101}$Rh | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{102}$Rh | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{104}$Ag | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{113}$Ag | CS | 4ZZZDUB | 6.6+08 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{108}$In | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{110}$In | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{117}$In | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $^{16}$O,el | $^{118}$Sn | DA | 3INDIND | 7.0+07 | 9.0+07 | Jour | PRM,53,553 | 99 | S.Saha+ | O1056 |
| $^{16}$O,fus | | CS | 3INDIND | 4.9+07 | 5.2+07 | Jour | PRM,53,553 | 99 | S.Saha+ | O1056 |
| $^{16}$O,inel | $^{118}$Sn | DAP | 3INDIND | 7.0+07 | 9.0+07 | Jour | PRM,53,553 | 99 | S.Saha+ | O1056 |
| $^{16}$O,x | Many | DA | 3INDIND | 7.0+07 | 9.0+07 | Jour | PRM,53,553 | 99 | S.Saha+ | O1056 |

**50 Tin 119**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{118}$In | CS | 2JPNJAE | 1.5+07 | | Jour | ANE,30,1847 | 03 | H.Sakane+ | 22827 |

**50 Tin 120**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{119}$In | CS | 2JPNJAE | 1.5+07 | | Jour | ANE,30,1847 | 03 | H.Sakane+ | 22827 |
| $p$,5$n$ | $^{116}$Sb | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | Many | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{44}$Sc | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{84}$Rb | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{86}$Y | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{87}$Y | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{93}$Tc | CS | 4ZZZDUB | 1.0+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{94}$Tc | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{95}$Tc | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{99}$Rh | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{101}$Rh | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{102}$Rh | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{104}$Ag | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{117}$Cd | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{108}$In | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{110}$In | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{117}$In | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |

**50 Tin 124**

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

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,x | Many | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{44}$Sc | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{84}$Rb | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{86}$Y | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{87}$Y | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{95}$Nb | CS | 4ZZZDUB | 6.6+08 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{94}$Tc | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{95}$Tc | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{99}$Rh | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{101}$Rh | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{102}$Rh | CS | 4ZZZDUB | 8.1+09 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{104}$Ag | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{112}$Ag | CS | 4ZZZDUB | 6.6+08 | | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{117}$Cd | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{108}$In | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{110}$In | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $p$,x | $^{117}$In | CS | 4ZZZDUB | 1.0+09 | 8.1+09 | Jour | YF,65,810 | 02 | V.E.Aleksandryan+ | O0988 |
| $^{40}$Ca,fus | | CS | 2ITYPAD | 1.1+08 | 1.3+08 | Jour | NC/A,111,895 | 98 | A.M.Stefanini+ | O1042 |
| $^{40}$Ca,x | Many | CS | 2ITYPAD | 1.3+08 | | Jour | NC/A,111,895 | 98 | A.M.Stefanini+ | O1042 |
| $^{40}$Ca,x | Many | CS | 2ITYPAD | 1.7+08 | | Jour | PR/C,54,201 | 96 | L.Corradi+ | O1046 |
| $^{40}$Ca,x | $^{40}$Ar | DA | 2ITYPAD | 1.7+08 | | Jour | PR/C,54,201 | 96 | L.Corradi+ | O1046 |
| $^{40}$Ca,x | $^{41}$Ar | DA | 2ITYPAD | 1.7+08 | | Jour | PR/C,54,201 | 96 | L.Corradi+ | O1046 |
| $^{40}$Ca,x | $^{42}$Ar | DA | 2ITYPAD | 1.7+08 | | Jour | PR/C,54,201 | 96 | L.Corradi+ | O1046 |
| $^{40}$Ca,x | $^{40}$K | DA | 2ITYPAD | 1.7+08 | | Jour | PR/C,54,201 | 96 | L.Corradi+ | O1046 |
| $^{40}$Ca,x | $^{41}$K | DA | 2ITYPAD | 1.7+08 | | Jour | PR/C,54,201 | 96 | L.Corradi+ | O1046 |
| $^{40}$Ca,x | $^{42}$K | DA | 2ITYPAD | 1.7+08 | | Jour | PR/C,54,201 | 96 | L.Corradi+ | O1046 |
| $^{40}$Ca,x | $^{41}$Ca | DA | 2ITYPAD | 1.7+08 | | Jour | PR/C,54,201 | 96 | L.Corradi+ | O1046 |
| $^{40}$Ca,x | $^{42}$Ca | DA | 2ITYPAD | 1.7+08 | | Jour | PR/C,54,201 | 96 | L.Corradi+ | O1046 |

## 51 Antimony

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$n$ | incl | DE | 2JPNOSA | 1.4+07 | | Rept | JAERI-M-91-032 | Mar 91 | M.Gotoh+ | 22186 |
| $n$,$n$ | incl | DE | 2JPNOSA | 1.4+07 | | Rept | OKTAV-A-92-01, | 92 | A.Takahashi+ | 22766 |

## 51 Antimony 121

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,0 | | RP | 4RUSKUR | 6.2+00 | 6.6+02 | Conf | 83KIEV,2,366 | Oct 83 | F.N.Belyaev+ | 41431 |
| $n$,$\gamma$ | $^{122}$Sb | ? | 4RUSKUR | 6.2+00 | 6.6+02 | Conf | 83KIEV,2,366 | Oct 83 | F.N.Belyaev+ | 41431 |

## 52 Tellurium 123

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{122}$Sb | CS | 2JPNJAE | 1.5+07 | | Jour | ANE,30,1847 | 03 | H.Sakane+ | 22827 |

**52 Tellurium 128**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{127}$Sb | CS | 2JPNJAE | 1.5+07 | 1.4+07 | Jour | ANE,30,1847 | 03 | H.Sakane+ | 22827 |

**52 Tellurium 130**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{129}$Sb | CS | 2JPNJAE | 1.5+07 | 1.4+07 | Jour | ANE,30,1847 | 03 | H.Sakane+ | 22827 |

**53 Iodine 129**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$\gamma$ | $^{130}$I | CS | 2JPNYOK | Maxwl | | Jour | NST,33,(4),283 | Apr 96 | S.Nakamura+ | 22819 |
| $n$,$\gamma$ | $^{130}$I | RI | 2JPNYOK | 5.0-01 | | Jour | NST,33,(4),283 | Apr 96 | S.Nakamura+ | 22819 |

**54 Xenon**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $\pi^+$,2$n$+2$p$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,2$n$+3$p$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,2$n$+$p$+$d$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,2$p$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,2$p$+2$d$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,2$p$+$d$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,3$n$+2$p$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,3$p$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,3$p$+$d$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,4$p$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,5$p$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,abs | | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+2$d$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+2$p$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+2$p$+$d$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+3$p$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+3$p$+$d$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+4$p$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+$p$+2$d$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$n$+$p$+$d$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$p$+2$d$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $\pi^+$,$p$+$d$ | Many | CS | 2SWTPSI | 2.4+08 | | Jour | EPJ/A,9,537 | 00 | B.Kotlinski+ | O1117 |
| $p$,$\pi^+$ | incl | CS | 2SWDSWD | 1.7+08 | 4.9+08 | Jour | PR/C,62,014610 | 00 | J.Martensson+ | O1058 |
| $p$,$\pi^+$ | incl | DAE | 2SWDSWD | 1.8+08 | 5.0+08 | Jour | PR/C,62,014610 | 00 | J.Martensson+ | O1058 |

**57 Lanthanum 138**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n,\alpha$ | $^{135}$Cs | CS | 4UKRKGU | 1.4+07 | | Jour | NSTS,2,(1),425 | Aug 02 | S.V.Begun+ | 32205 |

**57 Lanthanum 139**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n,\alpha$ | $^{136}$Cs | CS | 4UKRKGU | 1.4+07 | | Jour | NSTS,2,(1),425 | Aug 02 | S.V.Begun+ | 32205 |
| $n,n+\alpha$ | $^{135}$Cs | CS | 4UKRKGU | 1.4+07 | | Jour | NSTS,2,(1),425 | Aug 02 | S.V.Begun+ | 32205 |
| $n,p$ | $^{139}$Ba | CS | 4UKRKGU | 1.4+07 | | Jour | NSTS,2,(1),425 | Aug 02 | S.V.Begun+ | 32205 |
| $n,t$ | $^{137}$Ba | CS | 4UKRKGU | 1.4+07 | | Jour | NSTS,2,(1),425 | Aug 02 | S.V.Begun+ | 32205 |
| $p$,x | Many | PY | 2ZZZCER | 6.0+08 | | Jour | NIM/B,26,72 | 87 | H.L.Ravn | O1059 |
| $p$,x | Many | ? | 2ZZZCER | 0.0+00 | 1.4+09 | Jour | NP/A,701,137 | 02 | U.Georg+ | O1006 |

**58 Cerium 140**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n,2n$ | $^{139}$Ce | CS | 2TUKCNA | 1.4+07 | 1.5+07 | Jour | ANE,30,1539 | 03 | I.A.Reyhancan+ | 22825 |

**60 Neodymium 142**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n,2n$ | $^{141}$Nd | CS | 2TUKCNA | 1.4+07 | 1.5+07 | Jour | ANE,30,1539 | 03 | I.A.Reyhancan+ | 22825 |

**61 Promethium 147**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n,\gamma$ | $^{148}$Pm | CS | 2GERKFK | Maxwl | | Jour | AP,582,1251 | Jan 03 | R.Reifarth+ | 22829 |

**61 Promethium 148**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n,\gamma$ | $^{149}$Pm | CS | 2GERKFK | Maxwl | | Jour | AP,582,1251 | Jan 03 | R.Reifarth+ | 22829 |

**61 Promethium 149**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n,\gamma$ | $^{150}$Pm | CS | 2GERKFK | Maxwl | | Jour | AP,582,1251 | Jan 03 | R.Reifarth+ | 22829 |

**62 Samarium 144**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n,2n$ | $^{143}$Sm | CS | 2TUKCNA | 1.4+07 | 1.5+07 | Jour | ANE,30,1539 | 03 | I.A.Reyhancan+ | 22825 |
| $\alpha$,inel | $^{144}$Sm | DAE | 2JPNOSA | 3.9+08 | | Jour | PL/B,549,(1-2),58 | Nov 02 | M.Itoh+ | E1796 |

**62 Samarium 148**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $\alpha$,inel | $^{148}$Sm | DAE | 2JPNOSA | 3.9+08 | | Jour | PL/B,549,(1-2),58 | Nov 02 | M.Itoh+ | E1796 |

**62 Samarium 150**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $\alpha$,inel | $^{150}$Sm | DAE | 2JPNOSA | 3.9+08 | | Jour | PL/B,549,(1-2),58 | Nov 02 | M.Itoh+ | E1796 |

**62 Samarium 152**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $\alpha$,inel | $^{152}$Sm | DAE | 2JPNOSA | 3.9+08 | | Jour | PL/B,549,(1-2),58 | Nov 02 | M.Itoh+ | E1796 |

**62 Samarium 154**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $\alpha$,inel | $^{154}$Sm | DAE | 2JPNOSA | 3.9+08 | | Jour | PL/B,549,(1-2),58 | Nov 02 | M.Itoh+ | E1796 |

**63 Europium 151**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n,2n$ | $^{150}$Eu | CS | 2GERJUL | 9.7+06 | 1.1+07 | Jour | ARI,43,1065 | 92 | S.M.Qaim+ | 22758 |

## 65 Terbium 159

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,2$n$ | $^{158}$Tb | CS | 2GERJUL | 8.7+06 | 1.1+07 | Jour | ARI,43,1065 | 92 | S.M.Qaim+ | 22758 |

## 67 Holmium 165

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$\gamma$ | $^{166}$Ho | CS | 4RUSNIR | Maxwl | | Jour | AE,73,(2),154 | Aug 92 | S.M.Masyanov+ | 41123 |

## 67 Holmium 166

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,0 | | RP | 4RUSNIR | 0.0+00 | | Jour | AE,73,(2),154 | Aug 92 | S.M.Masyanov+ | 41123 |
| $n$,$\gamma$ | $^{167}$Ho | CS | 4RUSNIR | Maxwl | | Jour | AE,73,(2),154 | Aug 92 | S.M.Masyanov+ | 41123 |
| $n$,$\gamma$ | $^{167}$Ho | RI | 2JPNKTO | 5.0-01 | | Jour | NST,39,(7),705 | Jul 02 | T.Katoh+ | 22687 |
| $n$,$\gamma$ | $^{167}$Ho | RI | 4RUSNIR | 5.0-01 | | Jour | AE,73,(2),154 | Aug 92 | S.M.Masyanov+ | 41123 |

## 73 Tantalum 181

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$\alpha$ | $^{178}$Lu | CS | 4UKRKGU | 1.4+07 | 1.5+07 | Jour | NSTS,2,(1),425 | Aug 02 | S.V.Begun+ | 32205 |
| $n$,$d$ | $^{180}$Hf | CS | 4UKRKGU | 1.4+07 | | Jour | NSTS,2,(1),425 | Aug 02 | S.V.Begun+ | 32205 |
| $n$,$n$ | incl | DE | 2JPNOSA | 1.4+07 | | Rept | OKTAV-A-92-01, | 92 | A.Takahashi+ | 22766 |
| $n$,$p$ | $^{181}$Hf | CS | 4UKRKGU | 1.4+07 | 1.5+07 | Jour | NSTS,2,(1),425 | Aug 02 | S.V.Begun+ | 32205 |
| $n$,x | $^{180}$Hf | CS | 4UKRKGU | 1.4+07 | 1.5+07 | Jour | NSTS,2,(1),425 | Aug 02 | S.V.Begun+ | 32205 |
| $p$,$n$ | incl | CSN | 2ZZZCER | 1.2+09 | | Jour | NIM/A,414,100 | 98 | D.Hilscher+ | O0953 |
| $p$,x | Many | CS | 4ZZZDUB | 6.0+08 | 1.0+08 | Jour | NIM/A,489,448 | 02 | S.A.Karamian+ | O1038 |
| $p$,x | Many | PY | 4ZZZDUB | 6.0+08 | 1.0+08 | Jour | NIM/A,489,448 | 02 | S.A.Karamian+ | O1038 |
| $^{16}$O,f | | CS | 3INDIND | 1.1+08 | 9.2+07 | Jour | PRM,53,563 | 99 | B.R.Behera+ | O1055 |
| $^{16}$O,f | | DA | 3INDIND | 9.2+07 | 1.1+08 | Jour | PRM,53,563 | 99 | B.R.Behera+ | O1055 |
| $^{48}$Ca,x | Many | CS | 2JPNIPC | 3.1+09 | | Jour | PL/B,542,(1-2),49 | Aug 02 | M.Notani+ | E1785 |

## 74 Tungsten

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,$n$ | incl | DAE | 2FR SAT | 1.2+09 | | Jour | PR/C,65,044621 | 02 | S.Leray+ | O0977 |

**74 Tungsten 182**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,x | Many | CS | 4RUSITE | 2.0+08 | 1.6+09 | Rept | ISTC-839B-99,52 | 01 | Yu.E.Titarenko | O1018 |

**74 Tungsten 183**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,x | Many | CS | 4RUSITE | 2.0+08 | 1.6+09 | Rept | ISTC-839B-99,56 | 01 | Yu.E.Titarenko | O1019 |

**74 Tungsten 184**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{183}$Ta | CS | 2JPNJAE | 1.5+07 | 1.4+07 | Jour | ANE,30,1847 | 03 | H.Sakane+ | 22827 |
| $p$,x | Many | CS | 4RUSITE | 2.0+08 | 1.6+09 | Rept | ISTC-839B-99,60 | 01 | Yu.E.Titarenko | O1020 |
| $p$,x | Many | CS | 4RUSITE | 2.0+08 | 1.6+09 | Rept | ISTC-839B-99,64 | 99 | Yu.E.Titarenko | O1021 |

**74 Tungsten 186**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{185}$Ta | CS | 2JPNJAE | 1.5+07 | 1.4+07 | Jour | ANE,30,1847 | 03 | H.Sakane+ | 22827 |
| $p$,$t$ | $^{184}$W | DAP | 1USAYAL | 1.8+07 | | Jour | PRL,29,71 | Jul 72 | C.H.King+ | T0279 |
| $p$,x | Many | CS | 4RUSITE | 2.0+08 | 1.6+09 | Rept | ISTC-839B-99,64 | 99 | Yu.E.Titarenko | O1021 |

**75 Rhenium**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,x | Many | CS | 4ZZZDUB | 6.0+08 | 1.5+08 | Jour | NIM/A,489,448 | 02 | S.A.Karamian+ | O1038 |
| $p$,x | Many | PY | 4ZZZDUB | 6.0+08 | | Jour | NIM/A,489,448 | 02 | S.A.Karamian+ | O1038 |

**76 Osmium 189**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{188}$Re | CS | 2JPNJAE | 1.5+07 | | Jour | ANE,30,1847 | 03 | H.Sakane+ | 22827 |

## 76 Osmium 190

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,x | $^{189}$Re | CS | 2JPNJAE | 1.5+07 | | Jour | ANE,30,1847 | 03 | H.Sakane+ | 22827 |

## 79 Gold 197

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,2$n$ | $^{196}$Au | CS | 4ZZZDUB | 6.0+06 | | Jour | ARI,58,169 | Nov 02 | S.Stoulos+ | 41433 |
| $n$,2$n$ | $^{196}$Au | CS | 2JPNTOK | 8.5+06 | 3.8+07 | Jour | NSE,111,391 | 92 | Y.Uwamino+ | 22703 |
| $n$,$^{7}$Be | $^{191}$Re | CS | 2GERJUL | 5.3+07 | | Jour | RCA,62,107 | 93 | B.Scholten+ | 22708 |
| $n$,4$n$ | $^{194}$Au | CS | 2JPNTOK | 2.4+07 | 3.8+07 | Jour | NSE,111,391 | 92 | Y.Uwamino+ | 22703 |
| $n$,$\gamma$ | $^{198}$Au | CS | 4ZZZDUB | 0.0+00 | | Jour | ARI,58,169 | Nov 02 | S.Stoulos+ | 41433 |
| $p$,$\alpha$ | incl | CS | 2JPNKYU | 1.0+07 | | Jour | NST,34,109 | 97 | Y.Takao+ | O0974 |
| $p$,$n$ | incl | CSN | 2ZZZCER | 1.2+09 | | Jour | NIM/A,414,100 | 98 | D.Hilscher+ | O0953 |
| $p$,$n$ | incl | TTD | 2JPNJAE | 6.8+07 | | Rept | JAERI-C-96-008,217 | 96 | S.Meigo+ | O0975 |
| $p$,$n$ | $^{197}$Hg | CS | 3CHFTHU | 1.6+06 | 2.6+06 | Jour | CHP,24,204 | 86 | Sc.Wu+ | O1036 |
| $\alpha$,$n$ | incl | TTD | 2JPNJAE | 1.0+08 | | Rept | JAERI-C-96-008,217 | 96 | S.Meigo+ | O0975 |

## 80 Mercury

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,x | Many | CS | 4RUSITE | 1.0+08 | 2.6+09 | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{46}$Sc | CS | 4RUSITE | 2.6+09 | | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{82}$Br | CS | 4RUSITE | 1.0+08 | 2.6+09 | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{84}$Rb | CS | 4RUSITE | 2.6+09 | | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{95}$Nb | CS | 4RUSITE | 1.0+08 | 2.6+09 | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{96}$Tc | CS | 4RUSITE | 8.0+08 | 2.6+09 | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{100}$Rh | CS | 4RUSITE | 2.6+09 | | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{172}$Lu | CS | 4RUSITE | 8.0+08 | | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{186}$Ir | CS | 4RUSITE | 2.0+08 | 2.6+09 | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{190}$Ir | CS | 4RUSITE | 2.0+08 | 2.6+09 | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{192}$Ir | CS | 4RUSITE | 8.0+08 | 2.6+09 | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{191}$Au | CS | 4RUSITE | 2.0+08 | | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{192}$Au | CS | 4RUSITE | 1.0+08 | 2.6+09 | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{194}$Au | CS | 4RUSITE | 1.0+08 | 2.6+09 | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{196}$Au | CS | 4RUSITE | 1.0+08 | 2.6+09 | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{198}$Au | CS | 4RUSITE | 1.0+08 | 2.6+09 | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{194}$Tl | CS | 4RUSITE | 1.0+08 | 8.0+08 | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{195}$Tl | CS | 4RUSITE | 1.0+08 | 2.0+08 | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{197}$Tl | CS | 4RUSITE | 1.0+08 | 2.0+08 | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |
| $p$,x | $^{198}$Tl | CS | 4RUSITE | 1.0+08 | 2.0+08 | Rept | LA-UR-00-3600, | 00 | Yu.E.Titarenko+ | O0782 |

## 81 Thallium 205

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

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,inel | $^{205}$Tl | DAP | 1USABRK | 2.0+07 | | Jour | NP/A,222,65 | 74 | C.Glashausser+ | T0291 |

## 82 Lead

| Reaction | Product | Quantity | Lab. | Energy (eV) | | Type | Documentation | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min | Max | | Ref Vol Page | | | |
| $n$,f | | CS | 4RUSLIN | 3.0+07 | 2.0+08 | Conf | 2001DUBNA,,236 | May 01 | O.A.Shcherbakov+ | 41429 |
| $n$,f | | ? | 4RUSLIN | 3.0+07 | 2.0+08 | Conf | 2001DUBNA,,236 | May 01 | O.A.Shcherbakov+ | 41429 |
| $n$,$n$ | incl | DAE | 2JPNOSA | 1.5+07 | 1.3+07 | Jour | NST,21,577 | Aug 84 | A.Takahashi+ | 21927 |
| $p$,f | | CS | 4RUSLIN | 2.1+08 | 1.0+09 | Conf | 2002MOSCOW,,229 | 02 | A.A.Kotov+ | O0991 |
| $p$,$n$ | incl | PY | 2JPNKEK | 5.0+08 | 1.5+09 | Jour | NIM/A,431,(3),521 | Jul 99 | S.Meigo+ | E1788 |
| $p$,$n$ | incl | TTD | 2JPNLEP | 5.0+08 | 1.5+09 | Jour | NIM/A,431,521 | 99 | S.Meigo+ | O0976 |
| $^{32}$Mg,inel | $^{nat}$Pb | CSP | 2JPNIPC | 1.4+09 | | Jour | PL/B,522,(3-4),227 | Dec 01 | H.Iwasaki+ | E1782 |
| $^{34}$Mg,inel | $^{nat}$Pb | CSP | 2JPNIPC | 1.5+09 | | Jour | PL/B,522,(3-4),227 | Dec 01 | H.Iwasaki+ | E1782 |
| $^{28}$Si,tcc | | CS | 2GERGSI | 1.2+10 | | Jour | RM,34,237 | 01 | F.Flesch+ | O0971 |
| $^{28}$Si,x | Many | CS | 2GERGSI | 1.2+10 | | Jour | RM,34,237 | 01 | F.Flesch+ | O0971 |
| $^{56}$Fe,x | Many | CS | 2GERGSI | 3.9+10 | | Jour | RM,31,533 | 99 | F.Flesch+ | O0968 |
| $^{205}$At,f | | CS | 2GERGSI | 8.6+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{206}$At,f | | CS | 2GERGSI | 8.6+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{205}$Rn,f | | CS | 2GERGSI | 6.2+10 | 8.6+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{206}$Rn,f | | CS | 2GERGSI | 8.6+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{207}$Rn,f | | CS | 2GERGSI | 8.7+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{208}$Rn,f | | CS | 2GERGSI | 8.7+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{209}$Rn,f | | CS | 2GERGSI | 8.8+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{208}$Fr,f | | CS | 2GERGSI | 8.7+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{209}$Fr,f | | CS | 2GERGSI | 6.3+10 | 8.8+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{210}$Fr,f | | CS | 2GERGSI | 6.3+10 | 8.8+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{211}$Fr,f | | CS | 2GERGSI | 8.9+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{212}$Fr,f | | CS | 2GERGSI | 6.4+10 | 8.9+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{216}$Fr,f | | CS | 2GERGSI | 6.5+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{217}$Fr,f | | CS | 2GERGSI | 6.5+10 | 9.1+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{218}$Fr,f | | CS | 2GERGSI | 6.5+10 | 9.2+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{210}$Ra,f | | CS | 2GERGSI | 6.3+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{211}$Ra,f | | CS | 2GERGSI | 8.9+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{212}$Ra,f | | CS | 2GERGSI | 6.4+10 | 8.9+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{213}$Ra,f | | CS | 2GERGSI | 6.4+10 | 9.0+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{214}$Ra,f | | CS | 2GERGSI | 6.4+10 | 9.0+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{215}$Ra,f | | CS | 2GERGSI | 6.4+10 | 9.0+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{216}$Ra,f | | CS | 2GERGSI | 9.1+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{217}$Ra,f | | CS | 2GERGSI | 6.5+10 | 9.1+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{218}$Ra,f | | CS | 2GERGSI | 6.5+10 | 9.2+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{219}$Ra,f | | CS | 2GERGSI | 6.6+10 | 9.2+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{220}$Ra,f | | CS | 2GERGSI | 6.6+10 | 9.2+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{221}$Ra,f | | CS | 2GERGSI | 9.3+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{222}$Ra,f | | CS | 2GERGSI | 9.3+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{223}$Ra,f | | CS | 2GERGSI | 9.4+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{215}$Ac,f | | CS | 2GERGSI | 9.0+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{216}$Ac,f | | CS | 2GERGSI | 6.5+10 | 9.1+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{217}$Ac,f | | CS | 2GERGSI | 9.1+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{218}$Ac,f | | CS | 2GERGSI | 6.5+10 | 9.2+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{219}$Ac,f | | CS | 2GERGSI | 6.6+10 | 9.2+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{220}$Ac,f | | CS | 2GERGSI | 6.6+10 | 9.2+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{221}$Ac,f | | CS | 2GERGSI | 6.6+10 | 9.3+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{222}$Ac,f | | CS | 2GERGSI | 6.7+10 | 9.3+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |

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|---|---|---|---|---|---|---|---|---|---|---|
| $^{223}$Ac,f | | CS | 2GERGSI | 6.7+10 | 9.4+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{224}$Ac,f | | CS | 2GERGSI | 6.7+10 | 9.4+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{225}$Ac,f | | CS | 2GERGSI | 6.8+10 | 9.4+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{226}$Ac,f | | CS | 2GERGSI | 6.8+10 | 9.5+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{221}$Th,f | | CS | 2GERGSI | 9.3+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{222}$Th,f | | CS | 2GERGSI | 9.3+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{223}$Th,f | | CS | 2GERGSI | 6.7+10 | 9.4+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{224}$Th,f | | CS | 2GERGSI | 6.7+10 | 9.4+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{225}$Th,f | | CS | 2GERGSI | 6.8+10 | 9.4+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{226}$Th,f | | CS | 2GERGSI | 6.8+10 | 9.5+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{227}$Th,f | | CS | 2GERGSI | 6.8+10 | 9.5+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{228}$Th,f | | CS | 2GERGSI | 6.8+10 | 9.6+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{229}$Th,f | | CS | 2GERGSI | 9.6+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{226}$Pa,f | | CS | 2GERGSI | 9.5+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{227}$Pa,f | | CS | 2GERGSI | 6.8+10 | 9.5+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{228}$Pa,f | | CS | 2GERGSI | 6.8+10 | 9.6+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{229}$Pa,f | | CS | 2GERGSI | 6.9+10 | 9.6+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{230}$Pa,f | | CS | 2GERGSI | 6.9+10 | 9.7+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{231}$Pa,f | | CS | 2GERGSI | 9.7+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{232}$Pa,f | | CS | 2GERGSI | 7.0+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{235}$Pa,f | | CS | 2GERGSI | 7.0+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{231}$U,f | | CS | 2GERGSI | 9.7+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{232}$U,f | | CS | 2GERGSI | 7.0+10 | 9.7+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{233}$U,f | | CS | 2GERGSI | 7.0+10 | 9.8+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{234}$U,f | | CS | 2GERGSI | 7.0+10 | 9.8+10 | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{235}$U,f | | CS | 2GERGSI | 7.0+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{236}$U,f | | CS | 2GERGSI | 7.1+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{237}$U,f | | CS | 2GERGSI | 7.1+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |
| $^{238}$U,f | | CS | 2GERGSI | 7.1+10 | | Jour | NP/A,713,3 | Jan 03 | A.Heinz+ | O1004 |

**82 Lead 204**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,2$n$ | $^{203}$Pb | CS | 4UKRKGU | 1.4+07 | 1.5+07 | Jour | NSTS,2,(1),425 | Aug 02 | S.V.Begun+ | 32205 |
| $n$,inel | $^{204}$Pb | CS | 4UKRKGU | 1.4+07 | 1.5+07 | Jour | NSTS,2,(1),425 | Aug 02 | S.V.Begun+ | 32205 |

**82 Lead 206**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$\alpha$ | $^{203}$Hg | CS | 4UKRKGU | 1.4+07 | | Jour | NSTS,2,(1),425 | Aug 02 | S.V.Begun+ | 32205 |
| $p$,inel | $^{206}$Pb | DAP | 1USABRK | 2.0+07 | | Jour | NP/A,222,65 | 74 | C.Glashausser+ | T0291 |

**82 Lead 208**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$\alpha$ | $^{205}$Hg | CS | 4UKRKGU | 1.4+07 | | Jour | NSTS,2,(1),425 | Aug 02 | S.V.Begun+ | 32205 |
| $n$,$p$ | $^{208}$Tl | CS | 4UKRKGU | 1.4+07 | 1.5+07 | Jour | NSTS,2,(1),425 | Aug 02 | S.V.Begun+ | 32205 |

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|---|---|---|---|---|---|---|---|---|---|---|
| $\pi^+$,$n$ | incl | CSN | 2ZZZCER | 1.9+09 | 4.9+09 | Jour | NIM/A,414,100 | 98 | D.Hilscher+ | O0953 |
| $\pi^+$,$n$ | incl | MLT | 2ZZZCER | 1.8+09 | 4.8+09 | Jour | NIM/A,414,100 | 98 | D.Hilscher+ | O0953 |
| $K^+$,$n$ | incl | MLT | 2ZZZCER | 2.5+09 | | Jour | NIM/A,414,100 | 98 | D.Hilscher+ | O0953 |
| $\pi^-$,$n$ | incl | MLT | 2ZZZCER | 3.9+09 | 4.9+09 | Jour | NIM/A,414,100 | 98 | D.Hilscher+ | O0953 |
| $p$,2$p$ | $^{207}$Tl | D3A | 3SAFNAC | 2.0+08 | | Jour | PR/C,66,034602 | 02 | R.Neveling+ | O1045 |
| $p$,2$p$ | $^{207}$Tl | POD | 3SAFNAC | 2.0+08 | | Jour | PR/C,66,034602 | 02 | R.Neveling+ | O1045 |
| $p$,6$n$ | $^{203}$Bi | CS | 4RUSITE | 1.0+09 | | Jour | PR/C,65,064610 | 02 | Yu.E.Titarenko+ | O0978 |
| $p$,$\alpha$ | $^{205}$Tl | DAP | 1USABRK | 3.5+07 | | Jour | NP/A,222,65 | 74 | C.Glashausser+ | T0291 |
| $p$,$d$ | $^{207}$Pb | DAP | 1USAANL | 1.1+07 | | Jour | PRL,27,1457 | Nov 71 | H.J.Koerner+ | T0280 |
| $p$,$n$ | incl | CSN | 2ZZZCER | 1.2+09 | | Jour | NIM/A,414,100 | 98 | D.Hilscher+ | O0953 |
| $\bar{p}$,$n$ | incl | CSN | 2ZZZCER | 1.2+09 | | Jour | NIM/A,414,100 | 98 | D.Hilscher+ | O0953 |
| $p$,$n$ | incl | CSN | 2ZZZCER | 1.2+09 | 4.2+09 | Jour | NIM/A,414,100 | 98 | D.Hilscher+ | O0953 |
| $p$,$n$ | incl | CSN | 2ZZZCER | 2.0+08 | | Jour | NIM/A,414,117 | 98 | B.Lott+ | O0954 |
| $p$,$n$ | incl | CSN | 2ZZZCER | 4.2+09 | | Jour | NIM/A,414,100 | 98 | D.Hilscher+ | O0953 |
| $p$,$n$ | incl | MLT | 2ZZZCER | 1.2+09 | 4.1+09 | Jour | NIM/A,414,100 | 98 | D.Hilscher+ | O0953 |
| $\bar{p}$,$n$ | incl | MLT | 2ZZZCER | 3.3+09 | 5.9+09 | Jour | NIM/A,414,100 | 98 | D.Hilscher+ | O0953 |
| $p$,$n$ | incl | MLT | 2ZZZCER | 4.2+09 | | Jour | NIM/A,414,100 | 98 | D.Hilscher+ | O0953 |
| $p$,$n$ | incl | PY | 2ZZZCER | 2.0+08 | | Jour | NIM/A,414,117 | 98 | B.Lott+ | O0954 |
| $p$,$n$ | $^{208}$Bi | CSP | 1USACLA | 2.5+07 | 3.9+07 | Jour | NP/A,198,542 | 72 | T.J.Woods+ | T0294 |
| $p$,$n$ | $^{208}$Bi | CSP | 1USACLA | 2.5+07 | 4.7+07 | Jour | PRL,22,724 | Apr 69 | G.J.Igo+ | T0281 |
| $p$,$n$ | $^{208}$Bi | DAP | 1USACLA | 3.0+07 | | Jour | NP/A,198,542 | 72 | T.J.Woods+ | T0294 |
| $p$,$n$+$p$ | $^{207}$Pb | DAP | 1USACLA | 3.9+07 | 4.6+07 | Jour | PRL,22,724 | Apr 69 | G.J.Igo+ | T0281 |
| $p$,$t$ | $^{206}$Pb | DAP | 1USAPUP | 1.8+07 | | Jour | PR/C,7,2500 | Jun 73 | K.A.Erb+ | T0278 |
| $p$,$t$ | $^{206}$Pb | DAP | 2NEDFUL | 2.0+07 | | Jour | NP/A,442,397 | 85 | H.Wienke+ | O1001 |
| $p$,$t$ | $^{206}$Pb | DAP | 1USABRK | 4.0+07 | | Jour | PL/B,47,237 | 73 | J.A.Macdonald+ | T0293 |
| $p$,$t$ | $^{206}$Pb | DAP | 1USAORL | 4.1+07 | | Jour | NP/A,158,497 | 70 | S.M.Smith+ | T0290 |
| $p$,$t$ | $^{206}$Pb | DAP | 2NEDGRN | 5.0+07 | | Jour | NP/A,442,397 | 85 | H.Wienke+ | O1001 |
| $p$,$t$ | $^{206}$Pb | POD | 1USABRK | 4.0+07 | | Jour | PL/B,47,237 | 73 | J.A.Macdonald+ | T0293 |
| $p$,x | Many | CS | 4RUSITE | 1.0+09 | | Jour | PR/C,65,064610 | 02 | Yu.E.Titarenko+ | O0978 |
| $p$,x | Many | ? | 2ZZZCER | 0.0+00 | 1.4+09 | Jour | NP/A,701,137 | 02 | U.Georg+ | O1006 |
| $p$,x | $^{46}$Sc | CS | 4RUSITE | 1.0+09 | | Jour | PR/C,65,064610 | 02 | Yu.E.Titarenko+ | O0978 |
| $p$,x | $^{82}$Br | CS | 4RUSITE | 1.0+09 | | Jour | PR/C,65,064610 | 02 | Yu.E.Titarenko+ | O0978 |
| $p$,x | $^{86}$Rb | CS | 4RUSITE | 1.0+09 | | Jour | PR/C,65,064610 | 02 | Yu.E.Titarenko+ | O0978 |
| $p$,x | $^{95}$Nb | CS | 4RUSITE | 1.0+09 | | Jour | PR/C,65,064610 | 02 | Yu.E.Titarenko+ | O0978 |
| $p$,x | $^{96}$Tc | CS | 4RUSITE | 1.0+09 | | Jour | PR/C,65,064610 | 02 | Yu.E.Titarenko+ | O0978 |
| $p$,x | $^{172}$Lu | CS | 4RUSITE | 1.0+09 | | Jour | PR/C,65,064610 | 02 | Yu.E.Titarenko+ | O0978 |
| $p$,x | $^{190}$Ir | CS | 4RUSITE | 1.0+09 | | Jour | PR/C,65,064610 | 02 | Yu.E.Titarenko+ | O0978 |
| $p$,x | $^{192}$Au | CS | 4RUSITE | 1.0+09 | | Jour | PR/C,65,064610 | 02 | Yu.E.Titarenko+ | O0978 |
| $p$,x | $^{194}$Au | CS | 4RUSITE | 1.0+09 | | Jour | PR/C,65,064610 | 02 | Yu.E.Titarenko+ | O0978 |
| $p$,x | $^{196}$Au | CS | 4RUSITE | 1.0+09 | | Jour | PR/C,65,064610 | 02 | Yu.E.Titarenko+ | O0978 |
| $p$,x | $^{198}$Au | CS | 4RUSITE | 1.0+09 | | Jour | PR/C,65,064610 | 02 | Yu.E.Titarenko+ | O0978 |
| $d$,el | $^{208}$Pb | DA | 2JPNIPC | 1.4+08 | | Jour | PR/C,58,(4),2180 | Oct 98 | H.Okamura+ | E1702 |
| $d$,$n$ | incl | CSN | 2ZZZCER | 1.9+08 | | Jour | NIM/A,414,117 | 98 | B.Lott+ | O0954 |
| $d$,$n$ | incl | MLT | 2ZZZCER | 8.9+08 | 3.4+09 | Jour | NIM/A,414,100 | 98 | D.Hilscher+ | O0953 |
| $d$,$n$ | incl | PY | 2ZZZCER | 1.9+08 | | Jour | NIM/A,414,117 | 98 | B.Lott+ | O0954 |
| $d$,$t$ | $^{207}$Pb | DAP | 1USAANL | 8.0+06 | 1.1+07 | Jour | PRL,27,1457 | Nov 71 | H.J.Koerner+ | T0280 |
| $\alpha$,$n$ | incl | CSN | 2ZZZCER | 2.1+08 | | Jour | NIM/A,414,117 | 98 | B.Lott+ | O0954 |
| $^{238}$U,f | | CS | 2GERGSI | 1.8+11 | | Jour | ZP/A,355,69 | 96 | M.Hesse+ | O0955 |
| $^{238}$U,f | | CS | 2GERGSI | 1.8+11 | | Jour | ZP/A,355,191 | 96 | P.Armbruster+ | O1012 |
| $^{238}$U,f | Many | FY | 2GERGSI | 1.8+11 | | Jour | ZP/A,355,191 | 96 | P.Armbruster+ | O1012 |

**83 Bismuth 208**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,f | | CS | 4ZZZDUB | 1.0+09 | 3.6+09 | Jour | YF,65,1417 | 02 | V.I.Yurevich+ | O1028 |

**83 Bismuth 209**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,$^{7}$Be | $^{203}$Au | CS | 2GERJUL | 5.3+07 | | Jour | RCA,62,107 | 93 | B.Scholten+ | 22708 |
| $n$,$\alpha$ | $^{206}$Tl | CS | 4UKRKGU | 1.4+07 | | Jour | NSTS,2,(1),425 | Aug 02 | S.V.Begun+ | 32205 |
| $n$,f | | CS | 4RUSLIN | 3.0+07 | 2.0+08 | Conf | 2001DUBNA,,236 | May 01 | O.A.Shcherbakov+ | 41429 |
| $n$,f | | ? | 4RUSLIN | 3.0+07 | 2.0+08 | Conf | 2001DUBNA,,236 | May 01 | O.A.Shcherbakov+ | 41429 |
| $n$,inel | $^{209}$Bi | DAP | 2UK EDG | 1.4+07 | | Jour | NIM/A,297,452 | 90 | R.B.Galloway+ | 22706 |
| $n$,$n$ | incl | DE | 2JPNOSA | 1.4+07 | | Rept | OKTAV-A-92-01, | 92 | A.Takahashi+ | 22766 |
| $p$,f | | CS | 4RUSLIN | 2.1+08 | 1.0+09 | Conf | 2002MOSCOW,,229 | 02 | A.A.Kotov+ | O0991 |
| $p$,$t$ | $^{207}$Bi | DAP | 1USAPUP | 1.8+07 | | Jour | PR/C,7,2500 | Jun 73 | K.A.Erb+ | T0278 |

**90 Thorium 232**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,f | | CS | 4RUSLIN | 5.8+05 | 2.0+08 | Conf | 2001DUBNA,,257 | May 01 | O.A.Shcherbakov+ | 41430 |
| $n$,f | | ? | 4RUSLIN | 5.8+05 | 2.0+08 | Conf | 2001DUBNA,,257 | May 01 | O.A.Shcherbakov+ | 41430 |
| $p$,3$n$ | $^{230}$Pa | CS | 2SF ABA | 1.8+07 | 1.4+07 | Jour | YF,60,2121 | 97 | A.Roshchin+ | O0965 |
| $p$,f | | CS | 4ZZZDUB | 1.0+09 | 2.6+09 | Jour | YF,65,1417 | 02 | V.I.Yurevich+ | O1028 |
| $p$,f | Many | PY | 2SF JYV | 2.5+07 | | Jour | NIM/B,126,201 | 97 | M.Huhta+ | O1009 |
| $p$,$\gamma$ | $^{233}$Pa | CS | 2SF ABA | 1.8+07 | 1.1+07 | Jour | YF,60,2121 | 97 | A.Roshchin+ | O0965 |
| $p$,$n$ | incl | DAE | 2FR SAT | 1.2+09 | | Jour | PR/C,65,044621 | 02 | S.Leray+ | O0977 |
| $p$,$n$ | $^{232}$Pa | CS | 2SF ABA | 1.8+07 | 1.1+07 | Jour | YF,60,2121 | 97 | A.Roshchin+ | O0965 |
| $p$,x | Many | CS | 4RUSITE | 1.0+08 | 8.0+08 | Conf | 99PRAHA,,(PC-24) | 99 | Yu.E.Titarenko+ | O0997 |
| $p$,x | Many | CS | 4RUSITE | 2.0+08 | 1.6+09 | Rept | ISTC-839B-99,72 | 99 | Yu.E.Titarenko | O0987 |
| $p$,x | Many | PY | 2ZZZCER | 6.0+08 | | Jour | NIM/B,26,72 | 87 | H.L.Ravn | O1059 |
| $p$,x | Many | ? | 2ZZZCER | 0.0+00 | 1.4+09 | Jour | NP/A,701,137 | 02 | U.Georg+ | O1006 |
| $p$,x | $^{231}$Th | ? | 2SF ABA | 1.8+07 | 1.1+07 | Jour | YF,60,2121 | 97 | A.Roshchin+ | O0965 |

**92 Uranium**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,x | Many | CS | 4RUSITE | 1.0+08 | 1.6+09 | Rept | ISTC-839B-99,79 | 01 | Yu.E.Titarenko | O0986 |
| $p$,x | Many | CS | 4RUSITE | 1.0+08 | 8.0+08 | Conf | 99PRAHA,,(PC25) | 99 | Yu.E.Titarenko+ | O0996 |
| $p$,x | Many | CS | 2SF JYV | 2.5+07 | | Jour | NIM/B,126,201 | 97 | M.Huhta+ | O1009 |
| $p$,x | Many | PY | 2SF JYV | 2.5+07 | | Jour | NIM/B,126,201 | 97 | M.Huhta+ | O1009 |

## 92 Uranium 233

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,f | | CS | 4RUSLIN | 5.8+05 | 2.0+08 | Conf | 2001DUBNA,,257 | May 01 | O.A.Shcherbakov+ | 41430 |
| $n$,f | | DA | 4RUSFEI | 2.0+04 | 6.4+06 | Jour | YF,61,(8),1436 | 98 | D.L.Shpak | 41432 |
| $n$,f | | ? | 4RUSFEI | 2.0+04 | 6.4+06 | Jour | YF,61,(8),1436 | 98 | D.L.Shpak | 41432 |
| $n$,f | | ? | 4RUSLIN | 5.8+05 | 2.0+08 | Conf | 2001DUBNA,,257 | May 01 | O.A.Shcherbakov+ | 41430 |

## 92 Uranium 235

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,f | | CS | 4ZZZDUB | 1.0+09 | | Jour | YF,65,1417 | 02 | V.I.Yurevich+ | O1028 |
| $p$,f | | CS | 4RUSLIN | 2.1+08 | 1.0+09 | Conf | 2002MOSCOW,,229 | 02 | A.A.Kotov+ | O0991 |
| $p$,f | Many | FY | 1USAORL | 8.0+06 | 1.3+07 | Jour | PR/C,7,2510 | 73 | R.L.Ferguson+ | T0283 |
| $p$,f | Many | KE | 1USAORL | 8.0+06 | 1.3+07 | Jour | PR/C,7,2510 | 73 | R.L.Ferguson+ | T0283 |
| $p$,f | $^{134}$I | FY | 2JPNJAE | 1.4+07 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |
| $p$,f | $^{136}$I | FY | 2JPNJAE | 1.4+07 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |
| $^{12}$C,f | $^{134}$I | FY | 2JPNJAE | 8.6+07 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |
| $^{12}$C,f | $^{136}$I | FY | 2JPNJAE | 8.6+07 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |
| $^{19}$F,f | $^{134}$I | FY | 2JPNJAE | 1.1+08 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |
| $^{19}$F,f | $^{136}$I | FY | 2JPNJAE | 1.1+08 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |

## 92 Uranium 236

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,0 | | RP | 4UKRIJI | 1.8+03 | | Jour | AE,75,(5),396 | 93 | O.A.Purtov+ | 41143 |

## 92 Uranium 238

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,2$n$ | $^{237}$U | CS | 4ZZZDUB | 6.0+06 | | Jour | ARI,58,169 | Nov 02 | S.Stoulos+ | 41433 |
| $n$,f | | CS | 4RUSLIN | 5.8+05 | 2.0+08 | Conf | 2001DUBNA,,257 | May 01 | O.A.Shcherbakov+ | 41430 |
| $n$,f | | ? | 4RUSLIN | 5.8+05 | 2.0+08 | Conf | 2001DUBNA,,257 | May 01 | O.A.Shcherbakov+ | 41430 |
| $n$,$\gamma$ | $^{239}$U | CS | 4ZZZDUB | 0.0+00 | | Jour | ARI,58,169 | Nov 02 | S.Stoulos+ | 41433 |
| $\pi^+$,$n$ | incl | MLT | 2ZZZCER | 3.9+09 | 4.9+09 | Jour | NIM/A,414,100 | 98 | D.Hilscher+ | O0953 |
| $p$,f | | CS | 4ZZZDUB | 1.0+09 | 2.6+09 | Jour | YF,65,1417 | 02 | V.I.Yurevich+ | O1028 |
| $p$,f | | CS | 4RUSLIN | 2.1+08 | 1.0+09 | Conf | 2002MOSCOW,,229 | 02 | A.A.Kotov+ | O0991 |
| $p$,f | | DA | 1USAPTN | 1.6+07 | 4.2+07 | Jour | PR/C,5,1402 | Apr 72 | M.Rajagopalan+ | T0282 |
| $p$,f | $^{134}$I | FY | 2JPNJAE | 1.4+07 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |
| $p$,f | $^{136}$I | FY | 2JPNJAE | 1.4+07 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |
| $p$,$n$ | incl | CSN | 2ZZZCER | 1.2+09 | 4.2+09 | Jour | NIM/A,414,100 | 98 | D.Hilscher+ | O0953 |
| $p$,$n$ | incl | MLT | 2ZZZCER | 1.2+09 | 4.2+09 | Jour | NIM/A,414,100 | 98 | D.Hilscher+ | O0953 |
| $p$,x | Many | CS | 2BLGLVN | 3.0+07 | | Jour | EPJ/A,14,365 | 02 | K.Kruglov+ | O1005 |
| $p$,x | Many | CS | 2BLGBLG | 3.0+07 | | Jour | PR/C,61,054308 | 00 | W.F.Mueller+ | O1007 |
| $p$,x | Many | PY | 2ZZZCER | 1.0+09 | | Jour | NP/A,616,29 | 97 | D.Habs+ | O1052 |
| $p$,x | Many | PY | 2ZZZCER | 6.0+08 | | Jour | NIM/B,26,72 | 87 | H.L.Ravn | O1059 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $p$,x | Many | ? | 2ZZZCER | 0.0+00 | 1.4+09 | Jour | NP/A,701,137 | 02 | U.Georg+ | O1006 |
| $^{3}$He,x | Many | PY | 2ZZZCER | 9.1+08 | | Jour | NIM/B,26,72 | 87 | H.L.Ravn | O1059 |
| $\alpha$,f | | CS | 2BLGLVN | 2.3+07 | 1.7+07 | Jour | PRL,84,2342 | 00 | M.Trotta+ | O1065 |
| $^{6}$He,f | | CS | 2BLGLVN | 2.9+07 | 1.5+07 | Jour | PRL,84,2342 | 00 | M.Trotta+ | O1065 |
| $^{12}$C,f | $^{134}$I | FY | 2JPNJAE | 8.6+07 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |
| $^{12}$C,f | $^{136}$I | FY | 2JPNJAE | 8.6+07 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |
| $^{19}$F,f | $^{134}$I | FY | 2JPNJAE | 1.1+08 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |
| $^{19}$F,f | $^{136}$I | FY | 2JPNJAE | 1.1+08 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |

**93 Neptunium 237**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,f | | CS | 4RUSLIN | 5.8+05 | 2.0+08 | Conf | 2001DUBNA,,257 | May 01 | O.A.Shcherbakov+ | 41430 |
| $n$,f | | ? | 4RUSLIN | 5.8+05 | 2.0+08 | Conf | 2001DUBNA,,257 | May 01 | O.A.Shcherbakov+ | 41430 |
| $p$,f | | CS | 4ZZZDUB | 1.0+09 | 2.6+09 | Jour | YF,65,1417 | 02 | V.I.Yurevich+ | O1028 |
| $p$,f | $^{134}$I | FY | 2JPNJAE | 1.4+07 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |
| $p$,f | $^{136}$I | FY | 2JPNJAE | 1.4+07 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |
| $p$,x | Many | CS | 4ZZZDUB | 6.6+08 | | Jour | YF,65,797 | 02 | J.Adam+ | O0989 |
| $^{12}$C,f | $^{134}$I | FY | 2JPNJAE | 8.6+07 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |
| $^{12}$C,f | $^{136}$I | FY | 2JPNJAE | 8.6+07 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |
| $^{19}$F,f | $^{134}$I | FY | 2JPNJAE | 1.1+08 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |
| $^{19}$F,f | $^{136}$I | FY | 2JPNJAE | 1.1+08 | | Jour | RCA,88,(1),1 | 00 | N.Shinohara+ | E1792 |

**94 Plutonium 239**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,f | | CS | 4RUSLIN | 5.8+05 | 2.0+08 | Conf | 2001DUBNA,,257 | May 01 | O.A.Shcherbakov+ | 41430 |
| $n$,f | | ? | 4RUSLIN | 5.8+05 | 2.0+08 | Conf | 2001DUBNA,,257 | May 01 | O.A.Shcherbakov+ | 41430 |

**95 Americium 241**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $n$,f | | CS | 2JPNKTO | Maxwl | 1.0+04 | Jour | NSE,126,201 | 97 | S.Yamamoto+ | 22713 |
| $p$,x | Many | CS | 4ZZZDUB | 6.6+08 | | Jour | YF,65,797 | 02 | J.Adam+ | O0989 |
| $d$,$p$ | $^{242}$Am | DAP | 2DENNBI | 1.2+07 | | Jour | PS,14,263 | 76 | T.Grotdal+ | O0696 |
| $d$,$t$ | $^{240}$Am | DAP | 2DENNBI | 1.2+07 | | Jour | PS,14,263 | 76 | T.Grotdal+ | O0696 |

**95 Americium 243**

| Reaction | Product | Quantity | Lab. | Energy (eV) Min | Energy (eV) Max | Type | Documentation Ref Vol Page | Date | Author | Data # |
|---|---|---|---|---|---|---|---|---|---|---|
| $d$,$p$ | $^{244}$Am | DAP | 2DENNBI | 1.2+07 | | Jour | PS,14,263 | 76 | T.Grotdal+ | O0696 |
| $d$,$t$ | $^{242}$Am | DAP | 2DENNBI | 1.2+07 | | Jour | PS,14,263 | 76 | T.Grotdal+ | O0696 |