^{78}Se(pol d,p),(d,p)   1978Mo12,1965Li08,2008Sc03

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 135, 193 (2016)	31-May-2016

Other: 1960Ca16 (^{78}Se(d,p)).

1978Mo12: ^{78}Se(pol d,p). E=12.5 MeV. FWHM=22 keV. Differential cross-section and vector-analyzing-power data for angles in the range 15° to 120° (C.M.). The beam polarization typically 44%. Results explained in terms of Coriolis-coupling model.

1965Li08: ^{78}Se(d,p). E=15 MeV.

2008Sc03, 2007ScZX: E=15 MeV beam provided by Yale tandem accelerator. Enriched target. Particles detected with Enge spectrograph and gas-filled focal plane detector backed by a scintillator. Measured cross sections. FWHM=40 keV. Spectroscopic factors deduced from analysis of cross section data by DWBA calculations using PTOLEMY code. The experiments were designed to determine occupation of valence neutron orbitals in the ground states of ^{76}Ge and ^{76}Se by precise measurements of cross sections through particle-transfer reactions. Cross sections were measured at angles where these are maximum.

^{79}Se Levels

	Cross-section data (2008Sc03,2007ScZX)		
Level	$d\sigma/d\Omega$ (mb/sr)(11°)	$\sigma(11°)/\sigma(28°)$	$\sigma(28°)/\sigma(37°)$
95	2.39	7.6	0.89
137	0.38	0.72	0.73
365	0.110	0.41	1.54
528	0.68	5.9	0.50
630	0.84	1.38	3.1
722	0.153	0.41	3.3
790	0.032	1.01	2.3
975	1.03	6.5	0.75
1089	0.166	2.1	1.56
1156	3.61	2.2	1.92
1254	2.38	1.56	3.0
1312	0.110	2.9	0.68
1491	0.40	2.25	2.0
1597	1.03	2.3	2.2
1671	0.32	1.49	2.4

Uncertainty in cross sections: statistical uncertainty of 1% for strong peaks; systematic uncertainties of 5% in absolute values and 3% in relative values.

E(level)[†]	J^{π}[‡]	L	S[#]	Comments
89 5	1/2$^-$	1	0.60	S: 0.57 (2008Sc03).
128 5	1/2$^-$	1	0.40	E(level): this level is considered as uncertain since it is not supported in any other reaction or study.
137	9/2$^+$	4	4.60	E(level): from Adopted Levels. 128 level is a doublet with L=1+4.
358 5	5/2$^-$	3	1.14	
519 5	3/2$^-$	1	0.50	S: 0.150 (2008Sc03).
622 5	5/2$^+$	2	0.77	
717 5	5/2$^+$	2	0.38	
968 5	3/2$^-$	1	0.37	S: 0.211 (2008Sc03).
1074 6		(1)		L: tentative value from 2008Sc03. J^{π}: (3/2) proposed by 2008Sc03.
1151 5	1/2$^+$	0	0.94	

Continued on next page (footnotes at end of table)

^{78}Se(pol d,p),(d,p)   **1978Mo12,1965Li08,2008Sc03 (continued)**

^{79}Se Levels (continued)

E(level)[†]	J$^{\pi}$[‡]	L	S[#]	Comments
1252 *5*	5/2$^+$	2	1.43	L: 2,4 in 2008Sc03.
1305?[@] *6*				
1491 *5*	1/2$^+$	0	0.09	
1552?[@] *6*				
1591 *12*	3/2$^+$	2	0.62	
1667 *12*	5/2$^+$	2	0.20	
1747 *12*	3/2$^+$	2	0.26	
1794?[@] *6*				
1856 *12*	3/2$^-$	1	0.16	S: 1965Li08 give 0.014.
1960[&] *20*				
2040[&] *20*		1	0.048	
2110[&] *20*		1	0.048	
2171 *12*	5/2$^+$	2	0.17	
2259[a] *12*	(3/2)$^-$	1	0.04	
2340[&] *20*	(5/2)$^+$	2	0.20	
2373 *12*	5/2$^+$	2	0.19	
2475 *12*	5/2$^+$	2	0.16	
2581 *12*	5/2$^+$	2	0.28	
2710[a] *12*	(5/2$^+$)	(2)	0.08	
2769[a] *12*	(5/2$^+$)	(2)	0.13	
2847 *12*	5/2$^+$	2	0.20	
2941[a] *12*	1/2$^+$	0	0.12	
2987 *12*				
3060[a] *12*	(3/2$^+$)	(2)	0.49	
3182[a] *12*	(3/2$^+$)	(2)	0.25	
3280[&] *20*	1/2$^+$	0	0.12	
3340[&] *20*	(3/2)$^+$	2	0.077	
3410 *12*	3/2$^+$	2	0.51	
3564[a] *12*	(3/2$^+$)	(2)	0.42	
3683 *12*	1/2$^+$	0	0.22	
3755[a] *12*	(3/2)$^+$	2	0.076	
3796[a] *12*	(3/2$^+$)	(2)	0.17	
3845[a] *12*	(3/2$^+$)	(2)	0.25	
3954[a] *12*	(3/2$^+$)	(2)	0.31	
4090[b] *20*	(3/2$^+$)	(2)	0.32	
4147 *12*	3/2$^+$	2	0.31	
4360[b] *20*	(3/2$^+$)	(2)	0.23	

[†] From 1978Mo12, unless otherwise indicated. The level energies seem to be shifted downward by≈6 keV as compared to values from γ-ray studies.

[‡] Mainly from (pol d,p) and L(d,p) data. See also Adopted Levels.

[#] Uncertainties are≈20%. Values given by 1978Mo12 and 1965Li08 agree well. In most cases values given here are from 1978Mo12.

[@] Reported by 1960Ca16 only. Treated as uncertain. Energies reported in 1960Ca16 have been corrected for a systematic deviation of 90 keV.

[&] Reported by 1965Li08 and 1960Ca16. Not seen by 1978Mo12. Energy from 1965Li08.

[a] Energy from 1978Mo12. L-transfer, J$^{\pi}$, and S-factor are from 1965Li08.

[b] Reported by 1965Li08 only.