^{76}Se(d,^{3}He),(pol d,^{3}He)   1983Ro08,2009Ka06,2008KaZT

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Alexandru Negret, Balraj Singh	NDS 114, 841 (2013)	30-Jun-2013

Includes ^{76}Se(pol d,^{3}He).

1983Ro08: (d,^{3}He) E=25.2 MeV. Enriched and natural targets. Magnetic spectrograph; DWBA calculations; FWHM=9-13 keV, measured Q values, $\sigma(\theta)$ at angles between 6° and 33°.

2009Ka06 (also 2008KaZT): E=80 MeV vector-polarized beam of deuterons with A_y=0.520 10 provided by the avf cyclotron at rcnp, Osaka. Enriched target. ^{3}He outgoing particles detected and analyzed with Grand Raiden magnetic spectrometer, with an angular aperture of ±1.1°. FWHM=50 keV Measured precise absolute cross sections and relative cross sections where these are maximum for the relevant L transfer, angular distributions and polarization asymmetries. Vector analyzing powers were deduced from the measured polarization asymmetries. Spectroscopic factors were deduced from analysis of cross section data by DWBA calculations using ptolemy code and six different sets of optical-model potential parameters and two bound-state potential parameters. The polarized deuteron beam is also used to obtain asymmetries and subsequent information about parities of levels. Uncertainty in cross sections: statistical uncertainty of 1% for strong peaks; systematic uncertainties of 5% in absolute values and 3% in relative values. Multiplets have larger uncertainties.

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 Measured cross sections and polarization asymmetries (2008KaZT)
 Level      dσ/dΩ(4.5°)        dσ/dΩ(8°)          dσ/dΩ(12°)
 keV        mb/sr              mb/sr              mb/sr      V.A.P (10°)
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0          3.20 a             0.87               0.55       -0.151 9
199        0.37 4     a         0.078              0.070
265        1.46 16    a         0.39               0.37        -0.054 12
280        0.54               2.57 28    a         0.72
304        0.27               0.25               0.22 4     a
469        0.96 a             0.23               0.19       +0.046 18
572        0.079              0.072 11    a        0.044       -0.079 25
585        0.29 4               0.081              0.056
822        0.21               0.21               0.18
1075       0.68 a             0.23               0.13
1129       0.18 a             0.052              0.043
1204       0.14 a             0.074              0.048
1272       0.086              0.094              0.079 a     +0.033 19
1309       0.16               0.067              0.028       +0.039 20
1431       0.036 6    a         0.009              0.007
1431       0.16               0.15               0.13 2     a   +0.063 25
1606       0.19 a             0.070              0.045       +0.022 17
1691       0.20               0.19               0.15        +0.015 26
1808       0.096              0.083              0.057 a     +0.040 14
1874       0.29 a             0.15               0.093       +0.050 14
1928       0.73               0.62               0.50        +0.050 14
2246       0.15 a             0.066              0.031
2380       0.16 a             0.073              0.031
    a: cross section used to deduce the spectroscopic factors.
    V.A.P.: vector analyzing power from measured polarization asymmetry.
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^{75}As Levels

E(level)[†]	J^π	L	C^2S^a	Comments
0	3/2⁻	1	0.83[b]	C^2S: 1.15 in 1983Ro08.
198 2	1/2⁻	1	0.094[c]	E(level): unresolved from 265 group, line-fitting procedure used to obtain separate cross sections. C^2S: 0.12 in 1983Ro08.

^{76}Se(d,^{3}He),(pol d,^{3}He)   **1983Ro08,2009Ka06,2008KaZT (continued)**

^{75}As Levels (continued)

E(level)[†]	J$^\pi$	L	C^{2}S[a]	Comments
264[‡] 2	3/2$^-$	1	0.38[b]	C^{2}S: 0.73 in 1983Ro08.
278[‡] 2	5/2$^-$	3	3.09[c]	C^{2}S: 3.25 in 1983Ro08.
303[‡] 3	9/2$^+$	4	0.36[b]	C^{2}S: 1.23 in 1983Ro08.
399 3		2	0.18[b]	Level observed only in 1983Ro08.
467 2	1/2$^-$[&]	1	0.25	C^{2}S: 0.44 in 1983Ro08.
573[#] 4	5/2$^-$	3	0.090[c]	C^{2}S: 0.25 in 1983Ro08.
585[#]	1/2$^-$	1	0.076[c]	E(level): from 2008KaZT.
617? 3		1	0.12[c]	Observed only in 1983Ro08.
820 5	7/2$^-$	3	0.55[b]	C^{2}S: from 1983Ro08.
857 6		0	0.017	Observed only in 1983Ro08.
1073 5	3/2$^-$	1	0.18[b]	C^{2}S: 0.22 in 1983Ro08.
1127 6		1	0.046[b]	C^{2}S: 0.06 in 1983Ro08.
1201 6	3/2$^-$	1	0.037[b]	C^{2}S: 0.04 in 1983Ro08.
1272? 10	9/2$^+$[&]	4	0.147	E(level),J$^\pi$,L,C^{2}S: from new level in 2008KaZT.
1309 6	7/2$^-$[&]	3		C^{2}S: 0.20 in 1983Ro08.
1430[@] 8		1	0.009[b]	C^{2}S: 0.12 in 1983Ro08.
1430[@] 8	9/2$^+$[&]	4	0.24	
1606 8	1/2$^-$[&]	1	0.048	C^{2}S: 0.07 in 1983Ro08 for 3/2$^-$.
1691 9	7/2$^-$[&]	3	0.61	C^{2}S: from 1983Ro08.
1808	9/2$^+$[&]	4	0.11	E(level): from 2008KaZT.
1878 10	1/2$^-$[&]	1	0.075	C^{2}S: 0.07 in 1983Ro08 for 3/2$^-$.
1928 10	7/2$^-$[&]	3	1.15	C^{2}S: from 1983Ro08.
2246	3/2$^-$	1	0.039	E(level): from 2008KaZT, assumed to be unresolved doublet corresponding to 2239.5 and 2228.6 levels in Adopted Levels.
2380		1	0.043	E(level): from 2008KaZT.

[†] From 1983Ro08, unless otherwise stated.

[‡] 265, 280 and 304 groups are unresolved in 2008KaZT, angle-to-angle ratios of cross sections used to assign separate cross sections.

[#] 572 and 585 groups are unresolved in 2008KaZT, angle-to-angle ratios of cross sections used to assign separate cross sections.

[@] 1431 group in 2008KaZT corresponds to L=1+4 doublet as in earlier literature (although L=1 was also proposed in another study, albeit with a poor fit to angular distribution), angle-to-angle ratios of cross sections used to assign separate cross sections.

[&] From measured polarization asymmetry and deduced vector analyzing powers in 2008KaZT.

[a] From 2008KaZT if not specified otherwise. The spectroscopic factors were deduced for different L transfers as follows: 4.5° data for L=1, 8° data for L=3, and 12° data for L=4. The values are the ratios of experimental cross sections and calculated DWBA cross sections using the finite-range PTOLEMY code. Six different sets of optical-model potential parameters and two different bound-state potential parameters were used for the calculations. Differences in C^{2}S values were less than 10% for different sets of optical parameters used. The effects of the bound-state parameters were also within the uncertainties. Authors of 1983Ro08 say that the influence of J on S is only of the order of 20%. They also note that S should be multiplied by 1.2 if J$^\pi$=1/2$^-$ rather than 3/2$^-$ and by a factor of 1.7 if J$^\pi$=5/2$^-$ rather than 7/2$^-$.

[b] For L+1/2.

[c] For L-1/2.