## $^{149}$Sm(t,p) 2005Bu21

| Type | Author | History Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | Balraj Singh | NDS 110, 1 (2009) | 20-Nov-2008 |

E=15 MeV. Measured E(proton), $\sigma(\theta,E_p)$ with an Enge split-pole magnetic spectrograph using photographic plates as detectors. Excitation energies for peaks in the spectra were obtained from a magnet calibration previously determined using $\alpha$ particles from a radioactive source of $^{212}$Pb. FWHM=15 keV. DWBA analysis.

$J^\pi$($^{149}$Sm g.s.)=7/2$^-$.

### $^{151}$Sm Levels

Relative (t,p) strengths are for levels populated by L=0 transitions, normalized to 100 for the strongest transition in each nuclide are given under comments. The values were obtained from the scaling factors necessary for the DWBA curves to best fit the data points, and thus make use of measured cross sections at all angles.

| E(level)[†] | J$^\pi$ | L[#] | S[&a] | Comments |
|---|---|---|---|---|
| 0.5 *12* | 5/2$^-$&3/2$^-$[‡] | (2) | 6 *1* | E(level): doublet corresponding to g.s. and 4.821 levels (as in 'Adopted Levels'). Non-observation of the 91, 5/2$^-$ level with 3/2[521] configuration in $^{151}$Sm(t,p)$^{153}$Sm suggests that $^{151}$Sm g.s. does not have a large admixture of the 3/2[521] configuration. The 5/2[523] and 3/2[532] orbits form the dominant components of the $^{151}$Sm g.s. configuration. |
| 65.8 | 7/2$^-$ | 0 | 170 *8* | Relative L=0 strength=100. E(level): probable doublet corresponding to 65.826, 7/2$^-$ and 69.703, 5/2$^-$ levels (as in 'Adopted Levels'), but L(t,p)=0 suggests main contribution from 65.826, 7/2$^-$ level. |
| 209 *1* | 7/2$^-$ | 0 | 4 *1* | Relative L=0 strength=3. |
| 295 | 9/2$^-$[‡] | @ | 9 *3* | |
| 303 | 7/2$^-$ | 0 | 26 *4* | Relative L=0 strength=20. |
| 315 | (1/2$^-$,3/2$^-$)&(3/2$^-$)[‡] | @ | 6 *2* | E(level): doublet corresponding to 313.85 and 315.28 levels (as in 'Adopted Levels levels'). |
| 422 *1* | (11/2)$^-$[‡] | @ | 7 *1* | |
| 449 *1* | (3/2)$^-$[‡] | (2) | 6 *1* | |
| 478 *2* | | @ | 5 *1* | |
| 715 *1* | 7/2$^-$ | 0 | 122 *6* | Relative L=0 strength=100. |
| 843 *2* | (1/2$^-$,3/2$^-$)[‡] | @ | 7 *1* | |
| 885 *2* | (5/2$^-$,7/2)[‡] | | 12 *1* | |
| 926 *2* | (5/2,7/2)[‡] | | 4 *2* | |
| 952 *2* | (3/2$^-$)&3/2$^{(+)}$[‡] | | 4 *1* | E(level),J$^\pi$: 2005Bu21 quote only (3/2$^-$) component, but from energy considerations in 'Adopted Levels', the level in (t,p) could be a doublet. |
| 1022 *2* | | @ | 12 *1* | |
| 1079 *2* | | @ | 7 *1* | |
| 1096 *2* | | | 7 *1* | |
| 1145 *2* | | | | |
| 1189 *2* | | | 4 *2* | |
| 1226 *4* | | @ | 6 *1* | |
| 1354 *3* | 7/2$^-$ | 0 | 11[b] *2* | Relative L=0 strength=16. |
| 1388 *2* | | @ | 14[b] *2* | |
| 1479 *2* | | | 11 *2* | |
| 1705 *3* | | | 8 *3* | |
| 1815 *3* | | | 8 *1* | |

Continued on next page (footnotes at end of table)

## $^{149}$Sm(t,p) 2005Bu21 (continued)

### $^{151}$Sm Levels (continued)

† Experimental excitation energies are quoted relative to the precisely-known value for the strongly populated 65.8 level. The uncertainty includes the statistical error and an estimated calibration uncertainty.
‡ From 'Adopted Levels'.
# Obtained from comparison of $\sigma(\theta)$ data with DWBA calculations.
@ $\sigma(\theta)$ distribution shown for this group by 2005Bu21, but no L value was deduced.
& Label=d$\sigma$/d$\Omega$ $\mu$b/sr (30°).
a The uncertainty is statistical only, ≈15% uncertainty in the absolute normalization is not included. The normalization factors to convert intensities of peaks in the spectra to absolute cross sections were obtained using a cooled Si surface-barrier monitor counter in the target chamber, recording elastically scattered beam particles at $\theta$=30°. The solid angles for the monitor and spectrograph were known, and elastic scattering cross sections at $\theta$=30° were obtained from DWBA calculations.
b This peak was obscured by an impurity group at $\theta$=30°. The value given is for $\theta$=22.5°.