## $^{150}$Sm(pol t,$\alpha$)    **1979St18**

### History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | Balraj Singh and Jun Chen | NDS 185, 2 (2022) | 23-Aug-2022 |

1979St18: E(t)=17 MeV, beam polarization=80% from the FN tandem Van de Graaff at the Los Alamos Scientific Laboratory. Targets of 99.9% $^{150}$Sm 100 $\mu$g/cm$^2$ on carbon backing. $\sigma(\theta)$ measured at 7 angles, for both spin up and spin down tritons. FWHM$\approx$25 keV. Q3D spectrometer calibrated using $^{152}$Sm(t,$\alpha$) reaction (1972Bu22). Uncertainties in absolute and relative $\sigma$ values are about 20% and 5%, respectively.

Other: 1978Sh17. $^{150}$Sm(t,$\alpha$),E=17 MeV. Spectrum shown up to 2 MeV.

### $^{149}$Pm Levels

Cross sections listed under comments are at 25° with respect to the beam direction.

| E(level) | J$^{\pi\ddagger}$ | L$^{\#}$ | S$^{\dagger}$ | Comments |
|---|---|---|---|---|
| 0 5 | 7/2$^+$ | 4 | 3.2 | d$\sigma$/d$\Omega$=325 $\mu$b/sr. |
| 114 5 | 5/2$^+$ | 2 | 2.1 | d$\sigma$/d$\Omega$=483 $\mu$b/sr. |
| 188 5 | 3/2$^+$ | 2 | 0.07 | d$\sigma$/d$\Omega$=16 $\mu$b/sr. |
| 210 5 | 5/2$^+$ | 2 | 0.05 | d$\sigma$/d$\Omega$=9 $\mu$b/sr. |
| 240 5 | 11/2$^-$ | 5 | 2.8 | d$\sigma$/d$\Omega$=268 $\mu$b/sr. |
| 272 5 | 7/2$^-$ | 3 | 0.16 | d$\sigma$/d$\Omega$=44 $\mu$b/sr. |
| 360 5 | 7/2$^+$ | 4 | 0.35 | d$\sigma$/d$\Omega$=32 $\mu$b/sr. |
| 390 5 | 1/2$^+$ | 0 | 0.27 | d$\sigma$/d$\Omega$=66 $\mu$b/sr. |
| 420 5 | 3/2$^+$ | 2 | 0.55 | d$\sigma$/d$\Omega$=119 $\mu$b/sr. |
| $\approx$462 | | (1,4) | 0.05 | d$\sigma$/d$\Omega$=5 $\mu$b/sr. |
| | | | | L,J$^{\pi}$: 1979St18 give L=4 and J=L−1/2 which is inconsistent with 3/2$^-$ from Adopted Levels. After discussion with one of the authors of 1979St18, in 1985 evaluation of A=149, it was agreed that the data are not inconsistent with L=1, J=L+1/2. |
| 513 5 | | | | d$\sigma$/d$\Omega$=32 $\mu$b/sr. |
| 556 5 | (11/2$^-$) | (5) | 0.40 | d$\sigma$/d$\Omega$=37 $\mu$b/sr. |
| $\approx$646 | (1/2$^+$) | (0) | 0.02 | d$\sigma$/d$\Omega$=8 $\mu$b/sr. |
| 725 5 | 7/2$^+$ | 4 | 0.43 | d$\sigma$/d$\Omega$=43 $\mu$b/sr. |
| 756 5 | 3/2$^+$ | 2 | 0.43 | d$\sigma$/d$\Omega$=103 $\mu$b/sr. |
| 795 5 | 11/2$^-$ | 5 | 0.53 | d$\sigma$/d$\Omega$=48 $\mu$b/sr. |
| 881 5 | (5/2$^+$) | (2) | 0.19 | d$\sigma$/d$\Omega$=54 $\mu$b/sr. |
| 909 5 | 1/2$^+$ | 0 | 0.18 | d$\sigma$/d$\Omega$=36 $\mu$b/sr. |
| 950 5 | (5/2$^+$) | (2) | 0.27 | d$\sigma$/d$\Omega$=68 $\mu$b/sr. |
| 1331 5 | 3/2$^+$ | 2 | 0.15 | d$\sigma$/d$\Omega$=35 $\mu$b/sr. |
| 1392 5 | 3/2$^+$ | 2 | 0.13 | d$\sigma$/d$\Omega$=33 $\mu$b/sr. |
| 1648 5 | (3/2$^+$) | 2 | 0.14 | d$\sigma$/d$\Omega$=33 $\mu$b/sr. |

$^{\dagger}$ $\sigma$(exp)/(N$\times\sigma$(theory)). $\sigma$(theory) derived from a DWBA calculation using the same optical model parameters and normalization factor as in $^{152}$Sm(t,$\alpha$) (1972Bu22). Absolute and relative values have uncertainties of 30% to 50% and 10%, respectively.

$^{\ddagger}$ From Ay($\theta$) in this reaction. The assignments are the same in Adopted Levels.

$^{\#}$ From comparison of $\sigma(\theta)$ with DWBA calculations.