## $^{148}$Sm($\alpha$,2n$\gamma$) E= 30 MeV 1973Kr10

History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | S. K. Basu, A. A. Sonzogni | NDS 114, 435 (2013) | 1-Apr-2013 |

See 1976Ba18 for details of these authors' work.

### $^{150}$Gd Levels

$\gamma$-time coincidences indicated no isomerism in $^{150}$Gd with $T_{1/2}$>5 ns.

| E(level)† | Jπ‡ | E(level)† | Jπ‡ | E(level)† | Jπ‡ | E(level)† |
|---|---|---|---|---|---|---|
| 0. | $0^+$ | 1701.1 *7* | $5^-$ | 2307.1 *7* | $5^-$ | 2857.8 *8* |
| 638.5 *5* | $2^+$ | 1938.4 *8* | $6^+$ | 2393.3 *9* | $7^+$ | 3178.2 *10* |
| 1134.6 *7* | $3^-$ | 2117.3 *8* | $6^+$ | 2555.5 *8* | $8^+$ | 3265.5? *13* |
| 1289.0 *7* | $4^+$ | 2212.7 *8* | $7^-$ | 2711.5? *8* | | |

† Level energies calculated by evaluators using least squares adjustment procedures.
‡ From adopted values.

### $\gamma$($^{150}$Gd)

| Eγ | Iγ† | Ei(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.# | Comments |
|---|---|---|---|---|---|---|---|
| 95 | | 2212.7 | $7^-$ | 2117.3 | $6^+$ | | Iγ: placed from 2306.9 level by authors. From Iγ(95γ)/Iγ(274γ)=0.25 *+16−9* in adopted gammas one expects Iγ=10 *+6−4* for placement from the 2213 level as proposed in $^{150}$Tb ε decay (5.8 min). |
| 95 | | 2307.1 | $5^-$ | 2212.7 | $7^-$ | | Iγ: placed from 2306.9 level by authors. Placement from the 2211 level as proposed in $^{150}$Tb ε decay (5.8 min) is also expected. See comment on placement from 2212.7 level. |
| 146.2@ *5* | 17 *2* | 2857.8 | | 2711.5? | | | |
| ≈160 | | 2555.5 | $8^+$ | 2393.3 | $7^+$ | M1 | |
| x183.6 *5* | 75 *8* | | | | | | |
| x196.6 *5* | 111 *11* | | | | | | |
| 237.6‡ *5* | 41‡ *4* | 1938.4 | $6^+$ | 1701.1 | $5^-$ | E2 | |
| 274.5@ *5* | 39 *4* | 2212.7 | $7^-$ | 1938.4 | $6^+$ | E1 | |
| 342.6 *5* | 40 *4* | 2555.5 | $8^+$ | 2212.7 | $7^-$ | E1 | |
| 404.2@a *5* | 103 *10* | 2711.5? | | 2307.1 | $5^-$ | | Eγ: placed from 3220.7 keV ($10^-$) level by 1977Ha21; hence 2711.5 keV level not included in Adopted Levels. |
| 412.4 *5* | 21×10[1] *10* | 1701.1 | $5^-$ | 1289.0 | $4^+$ | E1 | |
| ≈415 | | 2117.3 | $6^+$ | 1701.1 | $5^-$ | E1 | |
| 438.4 *5* | 68 *7* | 2555.5 | $8^+$ | 2117.3 | $6^+$ | E2 | |
| 454.9 *5* | 80 *8* | 2393.3 | $7^+$ | 1938.4 | $6^+$ | (M1+E2) | |
| 496.5 *5* | 518 *52* | 1134.6 | $3^-$ | 638.5 | $2^+$ | E1 | |
| 511 | | 2212.7 | $7^-$ | 1701.1 | $5^-$ | E2 | Iγ: not resolved from γ±. From Iγ(511γ)/Iγ(274γ)=12 *+8−4* in adopted γ's (from ce decay), one expects Iγ(511γ)=470 *+320−170*. |
| 550.9@ *5* | 110 *11* | 2857.8 | | 2307.1 | $5^-$ | | Eγ: placed from 3368.8 keV ($11^-$) level by 1977Ha21; hence 2857.8 keV level not included in Adopted Levels. |
| 566.9 *5* | 312 *31* | 1701.1 | $5^-$ | 1134.6 | $3^-$ | E2 | |
| 606.8@ *5* | 300 *30* | 2307.1 | $5^-$ | 1701.1 | $5^-$ | | |
| 622.7 *5* | 104 *10* | 3178.2 | | 2555.5 | $8^+$ | | |

Continued on next page (footnotes at end of table)

## $^{148}$Sm($\alpha$,2n$\gamma$) E= 30 MeV 1973Kr10 (continued)

### $\gamma(^{150}Gd)$ (continued)

| $E_\gamma$ | $I_\gamma$[†] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[#] |
|---|---|---|---|---|---|---|
| 638.5 *5* | 10×10$^2$ *1* | 638.5 | $2^+$ | 0. | $0^+$ | E2 |
| ≈650 | 236[&] *28* | 1938.4 | $6^+$ | 1289.0 | $4^+$ | E2 |
| 650.1 *5* | 554[&] *84* | 1289.0 | $4^+$ | 638.5 | $2^+$ | E2 |
| 710[@a] | | 3265.5? | | 2555.5 | $8^+$ | |
| [x]734.8 *5* | 55 *6* | | | | | |
| [x]792.8 *5* | | | | | | |
| 828.3 *5* | 92 *9* | 2117.3 | $6^+$ | 1289.0 | $4^+$ | E2 |
| [x]880.3 *5* | | | | | | |
| 1017.2 *5* | 41 *4* | 2307.1 | $5^-$ | 1289.0 | $4^+$ | |
| [x]1429.4 *5* | | | | | | |
| [x]1517.2 *5* | | | | | | |

[†] Relative photon intensities for E=30 MeV are given.
[‡] Does not fit well to level spacing because $\gamma$ is doublet. From I$\gamma$/I$\gamma$(648.4$\gamma$) in 5.8-min $\varepsilon$ decay, one expects I$\gamma$≈6.
[#] Dipole-quadrupole nature of transitions was determined from angular distribution data, and multipolarities were inferred from details of the decay scheme, assuming spins and parities of $2^+$ and $4^+$ for the levels at 638 and 1288 keV respectively, and assuming all quadrupoles were E2 in nature.
[@] Placement may not be unique.
[&] Deduced from present experiment but not directly measured. I$\gamma$=790 *79* determined for the 650 peak. In the decay scheme a 650−$\gamma$ ray feeds the 1288 level and another depopulates it. By equating total intensity in against total out, the portion of I$\gamma$(650 peak)=790 to be assigned each of these two $\gamma$ rays was determined.
[a] Placement of transition in the level scheme is uncertain.
[x] $\gamma$ ray not placed in level scheme.

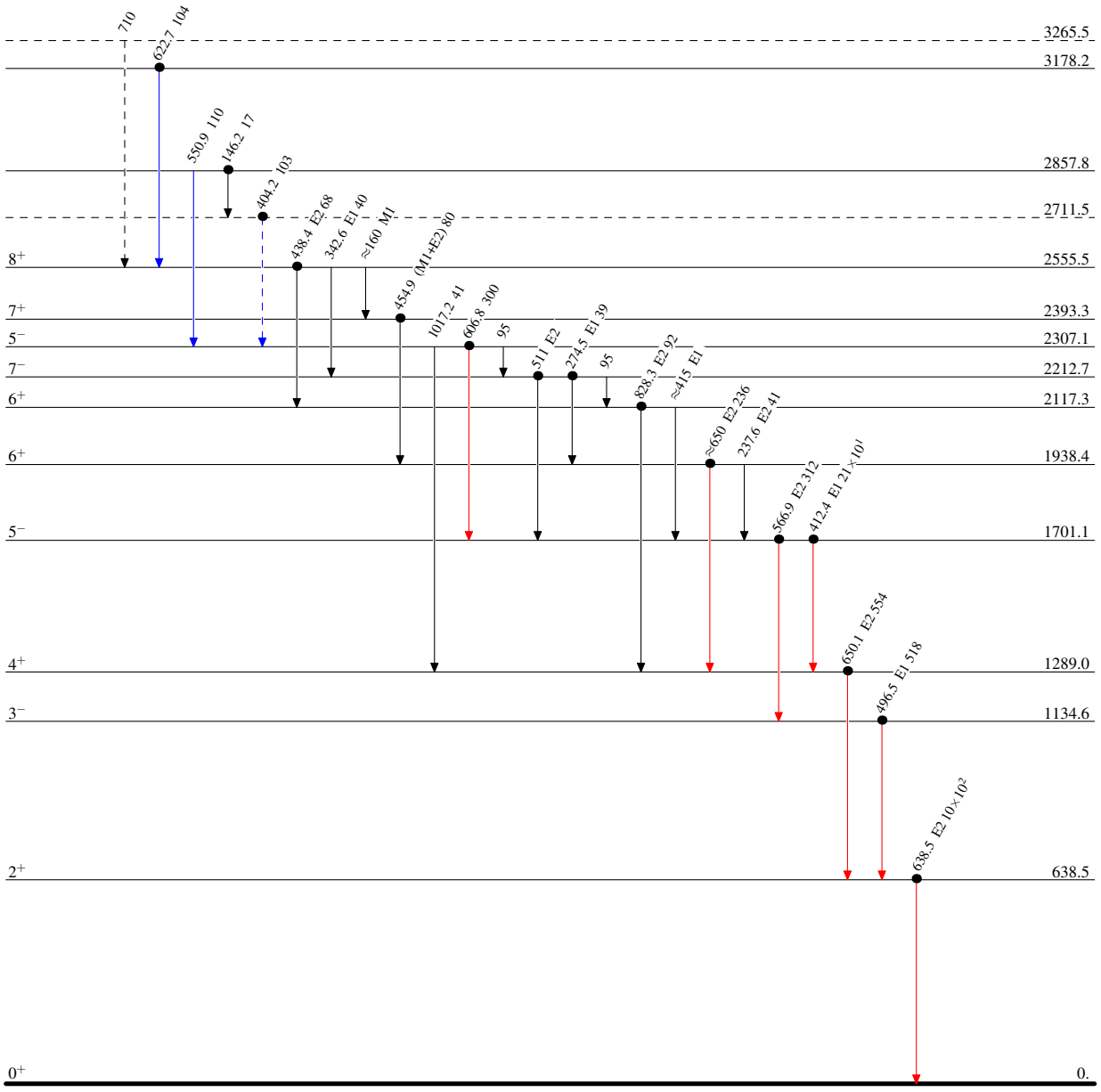
**$^{148}$Sm($\alpha$,2n$\gamma$) E= 30 MeV 1973Kr10**

Level Scheme

Intensities: Type not specified

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- $\gamma$ Decay (Uncertain)
- Coincidence




$^{150}_{64}Gd_{86}$