^{153}Tm α decay (2.5 s)   1988To13

History

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

Parent: ^{153}Tm: E=43.2 2; J$^{\pi}$=(1/2$^+$); T$_{1/2}$=2.5 s 2; Q(α)=5248.3 15; %α decay=92 3

^{153}Tm-E,J$^{\pi}$,T$_{1/2}$: From ^{153}Tm Adopted Levels in the ENSDF database (August 2020 update); no new references since this update. Half-life in the ENSDF database is adopted from 1988ScZV.

^{153}Tm-Q(α): From 2021Wa16.

^{153}Tm-%α decay: %α=92 3 (1989Ko02).

1988To13 (also 1991To12,1989Ko02): ^{153}Tm ions were produced with ^{92}Mo(^{64}Zn,3p) reaction with E=267 MeV (center of target) ^{64}Zn beam from the Lawrence Berkeley Laboratory SuperHILAC on 93.37% enriched ^{92}Mo foil target, followed by mass separation with the OASIS online facility, and collected in a moving table to a counting station. Charged particles were detected with a Si ΔE-E telescope and a plastic scintillator; γ rays were detected with Ge detectors. Measured Eγ, Iγ, E(α), I(α), $\alpha\gamma$-coin. Deduced levels.

1988ScZV: measured Eα, T$_{1/2}$.

^{149}Ho Levels

E(level)	J$^{\pi}$[†]	T$_{1/2}$[†]	Comments
49.0	(1/2$^+$)	56 s 3	%ε+%β^+=100
220.4	(3/2$^+$)		
564.4	(5/2$^+$)		

[†] From the Adopted Levels.

α radiations

Eα	E(level)	Iα[†@]	HF[#]	Comments
4586[‡&] 10	564.4	<0.0045	>135	
4902[‡&] 15	220.4	<0.0018	>1.8×10^4	
5096 4	49.0	100	1.9 2	Eα: 1988To13 quote value from 1988ScZV.

[†] From 1988To13. Iα(4586)/Iα(5109+5096)=4.5×10^{-5} 5, Iα(4902)/Iα(5109+5096)=1.8×10^{-5} 4 (1988To13). Values are relative to 100 for 5096α.

[‡] 1988To13 suggest that this peak is a doublet, with components from both the 1.48- and 2.5-s isomers; although transitions from 2.5-s, (1/2$^+$) parent would be favored in view of low L value involved rather than much higher L value implied by the 1.48-s, (11/2$^-$) parent.

[#] The nuclear radius parameter r$_0$(^{149}Ho)=1.5621 20 is deduced from interpolation (or unweighted average) of radius parameters of the adjacent even-even nuclides in 2020Si16.

[@] For absolute intensity per 100 decays, multiply by 0.92 3.

[&] Existence of this branch is questionable.

$\gamma(^{149}$Ho)

Eγ[†]	E$_i$(level)	J$^{\pi}_i$	E$_f$	J$^{\pi}_f$
171.4	220.4	(3/2$^+$)	49.0	(1/2$^+$)
344.0	564.4	(5/2$^+$)	220.4	(3/2$^+$)

[†] From 1988To13. The γ rays are from the decay of either one of the activities of ^{153}Tm or both. However, (1/2$^+$) parent would be favored in view of low L value involved rather than much higher L value implied by the 1.48-s, (11/2$^-$) parent.

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Decay Scheme

$(1/2^+)$ 43.2   2.5 s *2*

Q_α=5248.3 *15*   %α=92

$^{153}_{69}$Tm$_{84}$

	Eα	Iα	HF
$(5/2^+)$ 564.4	4586	<0.0041	>135
$(3/2^+)$ 220.4	4902	<0.0017	>18000
$(1/2^+)$ 49.0 56 s *3*	5096	92	1.9

344.0

171.4

$^{149}_{67}$Ho$_{82}$