^{153}Tm α decay (1.48 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=0.0; J^π=(11/2$^-$); $T_{1/2}$=1.48 s *1*; Q(α)=5248.3 *15*; %α decay=91 *3*

^{153}Tm-J^π,$T_{1/2}$: 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-$T_{1/2}$: Additional information 1.

^{153}Tm-Q(α): From 2021Wa16.

^{153}Tm-%α decay: From 1989Ko02. Others: %α=95 *+5−8* (1981HoZM,1979Ho10), 99 *23* (1989Wo02), 80 *10* (1979Be52), 90 *+10−20* (1977Ha48).

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.

Others:

1996Pa01: measured Eα.

1989Wo02: measured Eα, %α branching.

1988ScZW: measured Eα, $T_{1/2}$.

1982Bo04: measured $T_{1/2}$.

1982De11: measured Eα.

1981HoZM, 1979Ho10: measured Eα, %α branching.

1980Da09: measured Eα, $T_{1/2}$, production σ.

1979Be52, 1978AfZZ: measured Eα, %α branching.

1977Ha48: measured Eα, $T_{1/2}$, %α branching.

1964Ma45: measured Eα, $T_{1/2}$.

^{149}Ho Levels

E(level)†	J^π‡	$T_{1/2}$‡	Comments
0.0	(11/2$^-$)	21.0 s *2*	
49.0	(1/2$^+$)	56 s *3*	%ε+%β^+=100
220.4	(3/2$^+$)		
564.4	(5/2$^+$)		

† As given in 1988To13 based on Eγ data.

‡ From the Adopted Levels.

α radiations

Eα	E(level)	Iα†@	HF#	Comments
4586‡& *10*	564.4	<0.0045	>48	
4902‡& *15*	220.4	<0.0018	>6.6×10^3	
5109 *2*	0.0	100	1.23 *5*	Eα: weighted average of 5112 *5* (1996Pa01), 5111 *2* (1982De11), 5103 *3* (1982Bo04), 5109 *5* (1981HoZM,1979Ho10), 5106 *10* (1978AfZZ), 5112 *10* (1977Ha48), 5113 *20* (1964Ma45). Others: 5104 (1980Da09), 1988To13.

† From 1988To13. Iα(4586)/Iα(5109+5096)=4.5×10^{-5} *5*, Iα(4902)/Iα(5109+5096)=1.8×10^{-5} *4* (1988To13).

‡ 1988To13 suggest that this peak is a doublet, with components from both the 1.48- and 2.5-s isomers; although transitions from

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^{153}Tm α decay (1.48 s) 1988To13 (continued)

α radiations (continued)

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 0.91 *3*.

& Existence of this branch is questionable.

$\gamma(^{149}Ho)$

E_γ †	E_i(level)	J_i^π	E_f	J_f^π
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