^{172}W ε decay (6.6 min) 1990Me12

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	08-Dec-2015

Parent: ^{172}W: E=0.0; $J^{\pi}=0^+$; $T_{1/2}$=6.6 min *9*; Q(ε)=2230 *40*; %ε+%β^+ decay=100.0

^{172}W-$T_{1/2}$: From ^{172}W Adopted Levels.

^{172}W-Q(ε): From 2012Wa38.

1990Me12: ^{172}W produced by ^{136}Ba(^{40}Ar,4n). Measured $T_{1/2}$, Eγ, Iγ, $\gamma\gamma$ coin.

Others:

1986Sz06: ^{172}W produced by ^{165}Ho(^{14}N,7n) E=117 MeV. Measured $T_{1/2}$, Eγ, Iγ. Three γ rays of 424, 547, and 631 keV were assigned to ^{172}W decay. This work confirmed only two γ rays out of 38 γ rays reported by 1974CaZR. Some of the other γ rays were assigned to ^{173}W decay by 1986Sz06. Absolute (per 100 decays of the parent) γ-ray intensities are given for a few γ rays. These values cannot be considered as reliable since the measured half-life of ^{172}W decay is reported by 1986Sz06 as 8.0 min *4*, closer to the adopted half-life of 7.6 min *2* for the decay of ^{173}W.

1974CaZR (also thesis by 1974CaZI): isotope produced by ^{176}Hf(^{3}He,7n) E=72 MeV. Measured $T_{1/2}$, Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma$(t), ce, anti-Compton spectrometer. 1974CaZR assigned 38 γ rays to ^{172}W decay, but 1986Sz06 confirmed only three γ rays of 424, 547 and 631 which belonged to ^{172}W decay. 1986Sz06 pointed out that many γ rays reported by 1974CaZR actually belonged to ^{173}W decay. Similar conclusions were drawn by 1990Me12. However, 1990Me12 reported many new γ rays. The following γ rays with Eγ(Iγ) reported by 1974CaZR are omitted here: 35.9 (142), 83.5 (6.9), 109.3 (23), 130.2 (100), 145.2 (17), 153.8 (37), 166.1 (15), 169.1 (9.2), 174.9 (77), 191.8 (3.3), 197.2 (13), 240.7 (12), 278.5 (2.7), 324.4 (26), 367.1 (3.9), 393.1 (6.5), 406.1 (3.5), 414.5 (9.9), 425.2 (6.5), 457.6 (367), 493.1 (13), 576.3 (3.7), 623.6 (102), 636.0 (19), 677.6 (10), 770.8 (15).

1970DeZF: measured Eγ, $\gamma\gamma$, $\gamma\gamma$(t), ce.

1969Ar22: ^{172}W produced by Re(p,X) E=660 MeV. No γ rays reported.

^{172}Ta Levels

E(level)†	J^{π}‡	$T_{1/2}$‡	Comments
0.0	(3^+)	36.8 min *3*	
3.2? *4*	($^+$)		
38.9 *4*			
93.0 *3*	(4^-)	7 ns *2*	
127.1 *4*			
260.1 *4*			
370.6 *4*			
462.3 *4*			
486.6? *5*			Ordering of 63-226 cascade is not established. Reverse ordering will give a level at 324, instead.
514.5 *5*			
533.1 *4*			
549.9 *4*			
584.6 *4*			
586.3 *5*			
607.6 *5*			
625.6 *5*			

† From least-squares fit to Eγ values.

‡ From Adopted Levels.

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γ(^{172}Ta)

Iγ normalization: Adequate data are lacking for normalization of decay scheme. Iγ(absolute: per 100 decays)=18.2 *15* (1986Sz06) suggests a normalization factor of 0.41 *4*; but intensities from 1986Sz06 for 545.7γ and 630.5γ differ from those given by 1990Me12, and are not considered as reliable by the evaluator due to a longer and discrepant half-life measured by 1986Sz06 for the decay of ^{172}W.

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	Comments
34.0 *4*	6.4 *4*	127.1		93.0	(4$^-$)		
38.9 *4*	100	38.9		0.0	(3$^+$)		I_γ: 35 *3* for Eγ=39.6 *3* (1974CaZR). Mult.: α(L)exp=2.2 *2*, α(M)exp=0.09 *5* (1974CaZR) suggest E1.
51.4 *3*	16.1 *22*	584.6		533.1			
63.3@ *3*	‡	549.9		486.6?			Ordering of 63-226 cascade is not established.
75.8 *3*	12.6 *8*	625.6		549.9			
87.5 *3*	7.4 *5*	549.9		462.3			
89.8 *3*	33.0 *20*	93.0	(4$^-$)	3.2?	(+)	(E1)	B(E1)(W.u.)=3.2×10^{-5} *10* I_γ: 16 *2* for Eγ=90.1 *8* (1974CaZR). Mult.: α(K)exp=9.9 *13*, α(L)exp=6.9 *11* (1974CaZR). K/L ratio suggests M1+E2 (δ=1.0 *2*), but α(K)exp and α(L)exp are larger than α(K)(M1,E2) and α(L)(M1,E2). For E1+M2, α(K)exp and α(L)exp give δ=0.60 *5*.
93.0 *3*	11.5 *7*	93.0	(4$^-$)	0.0	(3$^+$)	(E1)	B(E1)(W.u.)=1.0×10^{-5} *3* I_γ: 8.1 *19* for Eγ=93.2 *7* (1974CaZR).
x103.4 *4*	7.3 *5*						
x105.3 *4*	8.5 *6*						In γγ coin with 464γ.
x112.4 *4*	5.4 *4*						
x113.5 *4*	17.0 *10*						
x114.9 *4*	13.3 *8*						
122.5 *4*	13.2 *8*	584.6		462.3			
x126.1 *4*	‡						
127.1 *4*	‡	127.1		0.0	(3$^+$)		
162.5 *3*	1.7 *3*	533.1		370.6			
163.3 *3*	3.6 *4*	625.6		462.3			
214.1 *4*	‡	584.6		370.6			
x217.3 *4*	14.0 *20*						
221.3 *4*	29 *7*	260.1		38.9			I_γ: 8 *5* for Eγ=221.4 *7* (1974CaZR).
226.5@ *5*	4.4 *8*	486.6?		260.1			I_γ: 3.9 *10* for Eγ=227.9 (1974CaZR). Ordering of 63-226 cascade is not established.
254.4 *4*	3.0 *6*	514.5		260.1			
272.9 *4*	5.5 *6*	533.1		260.1			I_γ: 2.0 *13* for Eγ=273.9 *10* (1974CaZR).
289.8 *3*	4.0 *6*	549.9		260.1			
x321.2 *4*	4.0 *6*						In γγ coin with 227γ.
331.7 *4*	6.9 *8*	370.6		38.9			
365.5 *4*	10.2 *9*	625.6		260.1			Placement shown incorrectly (in 1990Me12) from 586 level.
423.3 *4*	44 *3*	462.3		38.9			I_γ: 24 *2* for Eγ=423.42 *19* (1974CaZR). Iγ(per 100 decays)=18.2 *15* (1986Sz06).
459.2 *4*	14.2 *20*	586.3		127.1			
x464.0 *5*	‡						In γγ coin with 105γ.
475.6 *4*	‡	514.5		38.9			
480.5 *4*	8.0 *20*	607.6		127.1			
494.2 *4*	15.0 *20*	533.1		38.9			I_γ: 13 *2* for Eγ=494.8 *4* (1974CaZR).
511.1 *5*	‡	549.9		38.9			
545.7 *5*	16.0 *20*	584.6		38.9			Iγ(absolute)=17.3 *18* (1986Sz06).
584.6 *5*	6.0 *10*	584.6		0.0	(3$^+$)		
x630.5 *6*	11.0 *20*						Iγ(absolute)≈2.6 (1986Sz06). Iγ=12 for Eγ=631.0 *4*

Continued on next page (footnotes at end of table)

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$\gamma(^{172}Ta)$ (continued)

E_γ †	I_γ †	E_i(level)	Comments
			(1974CaZR).
			In $\gamma\gamma$ coin $\gamma\gamma$ with 90γ, 93γ.
[x]673.7 *6*	16.0 *20*		In $\gamma\gamma$ coin with 103γ.
			I_γ: 9.9 *21* for Eγ=674.6 *5* (1974CaZR).

† From 1990Me12. For comparison, intensities of γ rays are given under comments. The intensities given by 1974CaZR are normalized to 100 for a 130.2γ, which does not seem to belong to ^{172}W decay. Normalization relative to 423γ suggests that Iγ values from 1974CaZR should be multiplied by ≈1.8 for normalization of data between 1990Me12 and 1974CaZR. Iγ(423γ)/Iγ(547γ)=1.05 (1986Sz06) disagrees with 2.7 from 1990Me12. The 547γ was not reported by 1974CaZR.

‡ Intensity is not given due to the presence of a contaminant activity.

From Adopted Gammas.

@ Placement of transition in the level scheme is uncertain.

[x] γ ray not placed in level scheme.

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Legend

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

Decay Scheme

Intensities: Relative I_γ