

<sup>91</sup>Tc ε decay (3.3 min) 1976De37

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 114, 1293 (2013)	1-Sep-2013

Parent: <sup>91</sup>Tc: E=139.3 3; J<sup>π</sup>=(1/2)<sup>-</sup>; T<sub>1/2</sub>=3.3 min I; Q(ε)=6222 7; %ε+%β<sup>+</sup> decay=100.0

Other measurement: 1974Ia01.

1976De37:Ge(Li) anti-Compton spectrometer. Measured E<sub>γ</sub>, I<sub>γ</sub>, γγ coin (50 ns resolving time). A full description of the experiment, together with the complete set of data, is reported in 1975DeZX.

<sup>91</sup>Mo Levels

E(level)	J <sup>π</sup> †	T <sub>1/2</sub> †	Comments
0	9/2 <sup>+</sup>	15.49 min I	
652.94 10	1/2 <sup>-</sup>	64.6 s 6	Additional information 1.
1155.91 14	3/2 <sup>-</sup>		
1361.97 10	5/2 <sup>+</sup>		
2083.50 15	3/2 <sup>-</sup>		
2690.35 12	(3/2) <sup>-</sup>		

† From Adopted Levels.

ε,β<sup>+</sup> radiations

E(decay)	E(level)	Iβ <sup>+</sup> ‡	Iε ‡	Log ft	I(ε+β <sup>+</sup> ) †‡	Comments
(3671 7)	2690.35	6.0 5	0.89 8	5.62 4	6.9 6	av Eβ=1192.3 33; εK=0.1120 8; εL=0.01352 10; εM+=0.003107 22
(4278 7)	2083.50	3.9 5	0.31 4	6.21 6	4.2 5	av Eβ=1477.6 34; εK=0.0639 4; εL=0.00771 5; εM+=0.001771 11
(5205 7)	1155.91	42 4	1.6 1	5.67 5	44 4	av Eβ=1919.2 34; εK=0.03150 16; εL=0.003791 19; εM+=0.000871 5
(5708 7)	652.94	43 7	1.1 2	5.89 7	44 7	av Eβ=2160.8 34; εK=0.02274 10; εL=0.002735 12; εM+=0.000628 3

† Deduced from intensity balance.

‡ Absolute intensity per 100 decays.

γ(<sup>91</sup>Mo)

I<sub>γ</sub> normalization: From Σ (I(γ+ce) to g.s.)=100, I<sub>γ</sub>(652γ, equilibrium)=1364 60, %IT(652 level in <sup>91</sup>Mo)=50.0 16, I<sub>γ</sub>(652γ, 3.14-min decay)=22 2, assuming no ε+β<sup>+</sup> branch to the 1362 level (log f<sup>14</sup>t>8.5 implies <2.2% branch).

Since the difference in the half-lives of the two <sup>91</sup>Tc decays is too small to establish the assignment of γ's to specific isomer decays, the assignments are based on the feeding of levels with previously known J<sup>π</sup>. Levels deexcited by a γ to the 1/2<sup>-</sup> 653 level are presumed to be fed in the 3.3-min decay from the (1/2<sup>-</sup>) isomeric state. See the <sup>91</sup>Tc (3.14 min) decay data for γ-rays which could not be assigned on the basis of these arguments but which may nevertheless belong to the 3.3-min decay.

Because of the large number of unplaced γ's, small β feedings should be regarded with caution.

E <sub>γ</sub>	I <sub>γ</sub> <sup>#</sup>	E <sub>i</sub> (level)	J <sub>i</sub> <sup>π</sup>	E <sub>f</sub>	J <sub>f</sub> <sup>π</sup>	Mult.	α <sup>@</sup>	Comments
205.6 4	0.52 ‡ 15	1361.97	5/2 <sup>+</sup>	1155.91	3/2 <sup>-</sup>	[E1]	0.01572	α(K)=0.01383 21; α(L)=0.001569 24; α(M)=0.000279 5; α(N+..)=4.43×10 <sup>-5</sup> 7; α(N)=4.20×10 <sup>-5</sup> 7; α(O)=2.25×10 <sup>-6</sup> 4

Continued on next page (footnotes at end of table)

$^{91}\text{Tc}$   $\varepsilon$  decay (3.3 min) **1976De37** (continued) $\gamma(^{91}\text{Mo})$  (continued)

$E_\gamma$	$I_\gamma$ #	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult.	$\alpha^{\text{@}}$	Comments
502.9 2	956 <sup>†</sup> 40	1155.91	3/2 <sup>-</sup>	652.94	1/2 <sup>-</sup>			$I_\gamma(503)=1000$ 40 for (3.14 min + 3.3 min) decay (1976De37).
606.7 3 652.9 1	27.3 20	2690.35 652.94	(3/2) <sup>-</sup> 1/2 <sup>-</sup>	2083.50 0	3/2 <sup>-</sup> 9/2 <sup>+</sup>	M4	0.0374	$\alpha(\text{K})=0.0321$ 5; $\alpha(\text{L})=0.00440$ 7; $\alpha(\text{M})=0.000800$ 12; $\alpha(\text{N}+\dots)=0.0001265$ 18 $\alpha(\text{N})=0.0001203$ 17; $\alpha(\text{O})=6.21 \times 10^{-6}$ 9 $I_\gamma$ : 1367 60 in equilibrium. $I_\gamma(653)=918$ 40 for (3.3 min) decay, after correction by authors for 65 s $T_{1/2}$ (652 level) (1976De37). Mult.: from Adopted Gammas.
927.6 1	70 4	2083.50	3/2 <sup>-</sup>	1155.91	3/2 <sup>-</sup>			
1328.4 2	47.1 20	2690.35	(3/2) <sup>-</sup>	1361.97	5/2 <sup>+</sup>			
1362.0 1	46.6 <sup>‡</sup> 20	1361.97	5/2 <sup>+</sup>	0	9/2 <sup>+</sup>			
1430.4 2	36.9 20	2083.50	3/2 <sup>-</sup>	652.94	1/2 <sup>-</sup>			
1534.4 2	46.1 21	2690.35	(3/2) <sup>-</sup>	1155.91	3/2 <sup>-</sup>			
2037.4 1	9.8 9	2690.35	(3/2) <sup>-</sup>	652.94	1/2 <sup>-</sup>			

<sup>†</sup> Intensity of 3.14-min decay subtracted.

<sup>‡</sup> Calculated from intensity balance at the 1362 level, and  $I(206\gamma):I(1362\gamma)=3.6$  10:320 12, assuming the 1362 level is not fed in the 3.3-min  $\beta^-$  decay.

# For absolute intensity per 100 decays, multiply by 0.053 4.

<sup>@</sup> Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on  $\gamma$ -ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

$^{91}\text{Tc}$   $\epsilon$  decay (3.3 min) 1976De37

Decay Scheme

Intensities:  $I_{(\gamma+ce)}$  per 100 parent decays

Legend

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

