

²³⁴Ac β⁻ decay 1986Gi08

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli		NDS 108, 681 (2007)	1-Jun-2006

Parent: ²³⁴Ac: E=0.0; T_{1/2}=44 s 7; Q(β⁻)≈4700; %β⁻ decay=100.0

The partial decay scheme is given as constructed by 1986Gi08.

The total K x-ray intensity expected from K conversion of the observed γ-ray transitions, by assuming that the multiplicities of the unplaced γ rays are not M3 or higher, is ≤24. The fact that the measured relative K x-ray intensity of 81±11 is much higher than the calculated intensity may suggest a presence of some E0 transitions, and/or M3 (or higher) multipolarity for lower-energy unplaced γ rays.

X rays(thorium):

relative I(x ray) for I(688.5γ)=100	

27 6	Kα ₂ x ray
42 6	Kα ₁ x ray
12 6	Kβ x ray

²³⁴Th Levels

E(level) [†]	J ^π [†]
0.0	0 ⁺
49.55 6	2 ⁺
163.0 1	4 ⁺
688.5 3	(1 ⁻)
1896 2	(1,2 ⁺)
1912 2	(1,2 ⁺)

[†] Adopted values.

γ(²³⁴Th)

E _γ [†]	I _γ [†]	E _i (level)	J _i ^π	E _f	J _f ^π	Mult. [‡]	α [#]	Comments
(49.55 6)		49.55	2 ⁺	0.0	0 ⁺	E2	326	α(L)=239.6; α(M)=65.3 E _γ : transition was not observed in ²³⁴ Ac β ⁻ decay; its energy is from ²³⁸ U α decay.
113.3 4	12 3	163.0	4 ⁺	49.55	2 ⁺	[E2]	6.63	α(K)=0.2375; α(L)=4.64; α(M)=1.275; α(N+..)=0.475 E _γ =113.5 1 was measured in ²³⁸ U α decay.
^x 395.1 3	27 9							
^x 400.1 3	14 8							
638.7 3	59 12	688.5	(1 ⁻)	49.55	2 ⁺	[E1]	0.00787	α(K)=0.00641; α(L)=0.001101
688.5 3	100 14	688.5	(1 ⁻)	0.0	0 ⁺	[E1]	0.00683	α(K)=0.00556; α(L)=0.000950
^x 693.2 3	68 13							
^x 906.8 4	55 15							
1751 2	67 16	1912	(1,2 ⁺)	163.0	4 ⁺			
1847 2	115 19	1896	(1,2 ⁺)	49.55	2 ⁺			
1896 2	74 17	1896	(1,2 ⁺)	0.0	0 ⁺			
1912 2	105 20	1912	(1,2 ⁺)	0.0	0 ⁺			
^x 1954 2	80 17							

[†] Measurements by 1986Gi08.

Continued on next page (footnotes at end of table)

${}^{234}\text{Ac}$ β^- decay **1986Gi08** (continued)

$\gamma({}^{234}\text{Th})$ (continued)

‡ Multipolarity of the 49.55-keV γ ray is from ${}^{238}\text{U}$ α decay; E1 multipolarity for the 638.7 and 688.5 γ rays are assumed from the level scheme.

Total theoretical internal conversion coefficients, calculated using the BrIcc code ([2008Ki07](#)) with Frozen orbital approximation based on γ -ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

^x γ ray not placed in level scheme.

^{234}Ac β^- decay 1986Gi08

Decay Scheme

Intensities: Relative I_γ

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)

