^{235}Am ε decay 2004As12

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 122, 205 (2014)	1-Feb-2014

Parent: ^{235}Am: E=0; J^π=(5/2$^-$); $T_{1/2}$=10.3 min *6*; Q(ε)=2442 *56*; %ε+%$β^+$ decay=99.60 *5*

^{235}Am-$T_{1/2}$: From 2004Sa05.

^{235}Am-%ε+%$β^+$ decay: %α=0.40 *5* (2004Sa05).

2004As12: Activity produced by ^{233}U(^{6}Li,4n), E=34-42 MeV. Reaction products stopped in He gas loaded with PbI_2 clusters, and transported into an ion source of ISOL by gas-jet stream. Products mass separated with a resolution of M/ΔM≈800. separated ions implanted into a Si α detector, two Ge detectors used for γ-rays. Measured: α, γ, αγ, γγ, Np K x ray, and Pu K x ray, L x ray, studied ^{235}Am ε and α decay. Others: 2002As08, 2003Na10.

2004Sa05: Measured Eα, $T_{1/2}$.

2000SaZO: Activity produced by ^{233}U(^{6}Li,4n), E=45.5 MeV. Mass-separated and assigned to ^{235}Am. Measured γ rays, Pu K x ray, Np K x ray, α particles (Eα). Detectors: Si-pin photodiodes for α particles; High-purity Ge for γ rays. Deduced half-life, α/ε branching ratio. No specific γ rays were reported, and no decay scheme was constructed.

All data are from 2004As12, unless otherwise stated.

^{235}Pu Levels

E(level)	J^π[†]	Comments
0.0	5/2$^+$	Possible configuration=ν5/2[633].
41.90 *19*	(7/2$^+$)	possible configuration=ν5/2[633].
183.70 *17*	(3/2$^+$)	J^π: Possible configuration=ν1/2[631].
265.37 *16*	(5/2$^+$)	Suggested configuration=ν3/2[631].
290.53 *16*	(5/2$^-$)	Suggested Configuration=ν5/2[752].
535.10 *17*	(5/2$^+$)	Suggested Configuration=ν5/2[622].
639.1 *3*		
825.9 *3*		
1029.5 *3*		
1118.8 *3*		

[†] Configurations are suggested based on expected log *ft* values and similar transitions in neighboring nuclides.

ε,$β^+$ radiations

E(decay)	E(level)	Iβ$^+$ [#]	Iε[#]	Log *ft*	I(ε+$β^+$)[†#]	Comments
(2.44×10^3 *6*)	0.0	<0.40	<32	>6.0	<32[‡]	av Eβ=652 *26*; εK=0.7605 *11*; εL=0.1678 *6*; εM+=0.05912 *23* I(ε+$β^+$): Estimated intensity to g.s.+42 level based on observed K x ray − K x ray based on all γ′s, except 183.7γ, assumed E1. 183.7γ is M1+E2.

[†] Not determined explicitly in 2004As12 due to lack of knowledge of total internal conversion coefficients of observed γ transitions.

[‡] Combined for 0+41.9 level is deduced (2004As12) As 20 *12* from analysis of Pu K x ray intensity.

[#] For absolute intensity per 100 decays, multiply by 0.9960 *5*.

^{235}Am ε decay 2004As12 (continued)

γ(^{235}Pu)

I(Pu $K_{\alpha 1}$ x rays)=240 *50*; observed in coincidence with ^{235}Pu γ rays.

E_γ	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
(41.9)		41.90	$(7/2^+)$	0.0	$5/2^+$		E_γ: transition not observed due to its large internal conversion coefficient.
[x]169.6 *2*	13 *4*						
183.7 *2*	20 *6*	183.70	$(3/2^+)$	0.0	$5/2^+$	M1+E2	α(K)exp=3.3 *13* α(K)exp: from intensity ratio between the 183.7 γ-rays and Pu K_α x- contribution of x rays from electron capture was subtracted in this analysis by 2004As12.
223.5 *2*	42 *9*	265.37	$(5/2^+)$	41.90	$(7/2^+)$		
244.6 *2*	13 *6*	535.10	$(5/2^+)$	290.53	$(5/2^-)$		
248.6 *2*	19 *8*	290.53	$(5/2^-)$	41.90	$(7/2^+)$		
265.3 *2*	35 *8*	265.37	$(5/2^+)$	0.0	$5/2^+$		
269.7 *2*	38 *11*	535.10	$(5/2^+)$	265.37	$(5/2^+)$		
290.6 *2*	100 *14*	290.53	$(5/2^-)$	0.0	$5/2^+$		
351.4 *2*	30 *9*	535.10	$(5/2^+)$	183.70	$(3/2^+)$		
373.7 *2*	33 *12*	639.1		265.37	$(5/2^+)$		
642.2 *2*	20 *6*	825.9		183.70	$(3/2^+)$		
739.0 *2*	36 *11*	1029.5		290.53	$(5/2^-)$		
[x]749.1 *2*	36 *11*						
828.3 *2*	27 *8*	1118.8		290.53	$(5/2^-)$		

† Determined from both singles and coincidence γ-ray spectra. The large uncertainties are due to low statistics and poor peak-to-background ratios.

[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