

<sup>241</sup>Cm  $\alpha$  decay 1975Ah05

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia	NDS 107, 3323 (2006)	15-Mar-2006

Parent: <sup>241</sup>Cm: E=0.0; J <sup>$\pi$</sup> =1/2<sup>+</sup>; T<sub>1/2</sub>=32.8 d 2; Q( $\alpha$ )=6185.2 6; % $\alpha$  decay=1.0 1

Others: 1971Bb10,1967Ba42,1957As85.

<sup>241</sup>Cm source was prepared by irradiation of <sup>239</sup>Pu with 40-MeV  $\alpha$ -particles;  $\alpha$ -spectrum was taken with magnetic spectrometer;

Measured E $\alpha$ ,I $\alpha$ .

% $\alpha$ =1.0 $\pm$ 0.1.

Ag(t): ( $\alpha$ )(145 $\gamma$ )(t) T<sub>1/2</sub>=0.18 s 2 (1957St67).

<sup>237</sup>Pu Levels

E(level) <sup>†</sup>	J <sup><math>\pi</math></sup> <sup>‡</sup>	T <sub>1/2</sub>	Comments
0.0 <sup>#</sup> 6	7/2 <sup>-</sup>		J <sup><math>\pi</math></sup> : From 145.5 $\gamma$ E3 transition to the g.s.
47.3 <sup>#</sup> 6	9/2 <sup>-</sup>		
106.3 <sup>#</sup> 6	11/2 <sup>-</sup>		
145.536 <sup>@</sup> 9	1/2 <sup>+</sup>	0.18 s 2	E(level): From 145.536 $\gamma$ . E $\alpha$ gives a value of 145.9 6. J <sup><math>\pi</math></sup> : Favored $\alpha$ transition (hindrance factor 2.6 3) from <sup>241</sup> Cm g.s. (J <sup><math>\pi</math></sup> =1/2 <sup>+</sup> ) to this level (1975Ah05).
157.9 <sup>@</sup> 6	3/2 <sup>+</sup>		
171.3 <sup>#</sup> 6	13/2 <sup>-</sup>		
201.1 <sup>@</sup> 2	5/2 <sup>+</sup>		
223.2 <sup>@</sup> 5	7/2 <sup>+</sup>		
302.5 <sup>@</sup> 4	9/2 <sup>+</sup>		
369.6 <sup>&amp;</sup> 4	3/2 <sup>+</sup>		
402.2 <sup>&amp;</sup> 5	5/2 <sup>+</sup>		

<sup>†</sup> Deduced by evaluator from Q( $\alpha$ )=6185.2 6 (<sup>241</sup>Cm), E $\alpha$ , and feeding level energy, except otherwise noted.

<sup>‡</sup> From Adopted Levels, except otherwise noted.

<sup>#</sup> 7/2[743] band; rotational const.= 5.3 keV.

<sup>@</sup> 1/2[631] band; rotational const.= 6.224 keV; decoupling parameter = -0.4696.

<sup>&</sup> 3/2[631] band; rotational const.= 6.76 keV.

$\alpha$  radiations

$\alpha$ 's of 5828, 5821, 5807, 5781, 5778, and 5729 keV, reported in 1967Ba42, were not observed in 1975Ah05 (<0.3%); therefore, these  $\alpha$  groups are assumed to be due to impurities.

E $\alpha$ <sup>†</sup>	E(level)	I $\alpha$ <sup>‡&amp;</sup>	HF <sup>#</sup>	Comments
5687 3	402.2	0.22 5	34 9	
5719 3	369.6	0.08 4	142 73	
5785 3	302.5	$\approx$ 0.07	$\approx$ 372	I $\alpha$ =1.8 from 1967Ba42.
5863 3	223.2	0.14 5	4.9 $\times$ 10 <sup>2</sup> 19	
5884.7 <sup>@</sup> 6	201.1	11.8 4	7.5 8	I $\alpha$ =11.5 2 is given in 1976BaZZ. I $\alpha$ =11.7 8 is recommended in 1991Ry01 from measurements of 11.8 4 (1975Ah05) and 11.5 (1967Ba42). E $\alpha$ (to 201 level)=E $\alpha$ (145 level)-54.71 3=5884.3 7 (54.71 is from the difference of 55.64 3 in level energies and includes recoil).
5914 4	171.3	0.12 5	1.06 $\times$ 10 <sup>3</sup> 46	

Continued on next page (footnotes at end of table)

$^{241}\text{Cm}$   $\alpha$  decay 1975Ah05 (continued) $\alpha$  radiations (continued)

$E\alpha^\dagger$	E(level)	$I\alpha^\ddagger$	HF#	Comments
5927.2 <sup>@</sup> 15	157.9	18.1 5	8.2 9	$I\alpha=16.3$ 2 is given in 1976BaZZ. 1991Ry01 recommend $I\alpha=17.7$ 8, from measured values of 16.3 (1967Ba42) and 18.1 5 (1975Ah05). $E\alpha(\text{to } 155 \text{ level})=E\alpha(145 \text{ level})-9.75$ 3=5929.3 7. (9.75 is from the difference of 9.91 3 in level energies and includes recoil).
5939.0 <sup>@</sup> 6	145.536	68.9 10	2.5 3	$I\alpha=71.6$ 5 is given in 1976BaZZ. 1991Ry01 recommend $I\alpha=69.5$ 8 from measured values of 71.5 (1967Ba42) and 68.9 10 (1975Ah05). $E\alpha=5939.4$ 6 from $Q(\alpha)=6185.2$ 6 (2003Au03) and $E(\text{level})=145.544$ 10.
5978 3	106.3	0.28 7	$9.8 \times 10^2$ 27	
6036 3	47.3	0.12 4	$4.5 \times 10^3$ 16	$I\alpha=0.10$ in 1967Ba42.
6080.9 <sup>@</sup> 17	0.0	0.15 5	$6.2 \times 10^3$ 22	$I\alpha=0.64$ in 1967Ba42. 1991Ry01 recommend $I\alpha=0.15$ 5. $Q(\alpha)=6185.2$ 6 ( $^{241}\text{Cm}$ ) gives $E\alpha=6082.5$ 6 to the 0.0 level.

<sup>†</sup> From 1975Ah05, except where noted.

<sup>‡</sup>  $\alpha$  intensity per 100  $\alpha$  decays (1975Ah05). Measurements of 1967Ba42 are noted for comparison.

#  $r_0(^{237}\text{Pu})=1.498$  2, average of  $r_0(^{236}\text{Pu})=1.4949$  18 and  $r_0(^{238}\text{Pu})=1.5013$  10 (1998Ak04).

<sup>@</sup> Recommended in 1991Ry01 from  $E\alpha$ 's in 1967Ba42, 1971Bb10 and 1975Ah05. The original energies of 1967Ba42, 1971Bb10 and 1975Ah05 have been adjusted by +0.6, +0.4 and -0.3 keV, respectively, due to changes in calibration energies (1991Ry01).

<sup>&</sup> For absolute intensity per 100 decays, multiply by 0.010 1.

 $\gamma(^{237}\text{Pu})$ 

$E_\gamma$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult.	Comments
145.536 9	145.536	$1/2^+$	0.0	$7/2^-$	E3	$B(E3)(\text{W.u.})=1.46$ 17 $E_\gamma$ : From 1974Po08 (s ce); $E_\gamma=145.552$ 12 in $^{237}\text{Am}$ $\epsilon$ decay. Mult.: $\alpha(\text{K})\text{exp}\leq 3$ , $\alpha(\text{L})\text{exp}=39$ 8 was determined from relative x-ray and 145 $\gamma$ intensities, assuming that all delayed x-rays were from conversion of the 145 $\gamma$ (1957St67). See also $^{237}\text{Am}$ $\epsilon$ decay.

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Decay Scheme

