^{243}Bk α decay 1966Ah02,1991Ry01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 122, 293 (2014)	30-Jun-2013

Parent: ^{243}Bk: E=0.0; J^π=(3/2$^-$); $T_{1/2}$=4.5 h *2*; Q(α)=6874 *4*; %α decay≈0.15

Additional information 1.

αγ: 1956Ch77, 1966Ah02.

K x ray: Iγ=8 *3*.

2013Ni13: calculated branching ratios to three rotational bands. Others: 2011Zh36, 2010Ni02.

^{239}Am Levels

E(level)	J^π†	$T_{1/2}$	E(level)	J^π†	E(level)	J^π†
0.0‡	(5/2)$^-$	11.9 h *1*	187.1# *5*	(5/2$^+$)	≈370#	(13/2$^+$)
40.7‡ *7*	(7/2$^-$)		220# *6*	(7/2$^+$)	557@ *6*	(3/2$^-$)
94‡ *6*	(9/2$^-$)		260# *6*	(9/2$^+$)	586@ *6*	(5/2$^-$)
156‡ *7*	(11/2$^-$)		317# *7*	(11/2$^+$)		

† From Adopted Levels.

‡ Band(A): g.s. rotational band. calculated α branching=29.8% (2013Ni13).

Band(B): rotational band built on 187 level. Calculated α branching=52.8% (2013Ni13).

@ Band(C): favored rotational band built on 557 level calculated α branching=17.5% (2013Ni13).

α radiations

Eα†	E(level)	Iα‡@	HF#	Eα†	E(level)	Iα‡@	HF#
6185 *4*	586	3.9 *5*	≈10	6577 *4*	187.1	25.6 *16*	≈111
6213 *4*	557	13.6 *9*	≈4.1	6608 *5*	156	≈0.7	≈5560
≈6397	≈370	≈0.2	≈2120	6669 *4*	94	≈1.2	≈6060
6449 *5*	317	0.7 *2*	≈1060	6721 *4*	40.7	12.5 *9*	≈982
6505 *4*	260	6.9 *7*	≈195	6761 *4*	0.0	15.4 *10*	≈1190
6545 *4*	220	19.4 *13*	≈104				

† From 1966Ah02 (semi) recalibrated by 1991Ry01.

‡ From 1966Ah02. Intensity per 100 α decays.

Using $r_0(^{239}Am)$=1.496, average of $r_0(^{238}Pu)$=1.5013 *10*, $r_0(^{240}Pu)$=1.4979 *7*, $r_0(^{238}Cm)$=1.490 *20*, and $r_0(^{240}Cm)$=1.495 *12* (1998Ak04). HF values are approximate because of the imprecise value of≈0.15% for the alpha-particle branching.

@ For absolute intensity per 100 decays, multiply by ≈0.0015.

γ(^{239}Am)

E_γ‡	I_γ#&	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α†	Comments
42[b] *3*	4	40.7	(7/2$^-$)	0.0	(5/2)$^-$	[M1]	79 *20*	α(L)=59 *15*; α(M)=15 *4*; α(N+..)=5.2 *13* α(N)=4.0 *10*; α(O)=1.00 *25*; α(P)=0.19 *5*; α(Q)=0.012 *3* I_γ: is inconsistent with decay scheme; Iγ≤0.3 from transition intensity balance.
146.4 *5*	8 *3*	187.1	(5/2$^+$)	40.7	(7/2$^-$)	(E1)@	0.215 *4*	α(K)=0.164 *3*; α(L)=0.0384 *7*; α(M)=0.00943 *16*; α(N+..)=0.00329 *6*

Continued on next page (footnotes at end of table)

^{243}Bk α decay 1966Ah02,1991Ry01 (continued)

γ(^{239}Am) (continued)

E_γ[‡]	I_γ[#&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[†]	Comments
								α(N)=0.00255 *5*; α(O)=0.000622 *11*; α(P)=0.0001077 *18*; α(Q)=4.53×10^{-6} *8*
187.1 *5*	40 *10*	187.1	(5/2$^+$)	0.0	(5/2)$^-$	(E1)[@]	0.1220 *19*	α(K)=0.0943 *15*; α(L)=0.0208 *4*; α(M)=0.00509 *8*; α(N+..)=0.00178 *3* α(N)=0.001380 *22*; α(O)=0.000338 *6*; α(P)=5.96×10^{-5} *10*; α(Q)=2.68×10^{-6} *4*
536[ab] *10*	<10[a]	557	(3/2$^-$)	40.7	(7/2$^-$)	[E2]	0.0473 *22*	α(K)=0.0283 *11*; α(L)=0.0139 *9*; α(M)=0.00369 *24*; α(N+..)=0.00131 *9* α(N)=0.00101 *7*; α(O)=0.000248 *16*; α(P)=4.4×10^{-5} *3*; α(Q)=1.30×10^{-6} *6* E_γ: probable unresolved doublet to g.s. and 40.7 levels. Iγ has not been divided.
536[ab] *10*	<10[a]	557	(3/2$^-$)	0.0	(5/2)$^-$	[M1,E2]	0.16 *11*	α(K)=0.12 *10*; α(L)=0.028 *15*; α(M)=0.007 *4*; α(N+..)=0.0025 *12* α(N)=0.0019 *9*; α(O)=0.00048 *23*; α(P)=9.E−5 *5*; α(Q)=5.E−6 *4* E_γ: probable unresolved doublet to g.s. and 40.7 levels. Iγ has not been divided.

† Additional information 2.
‡ From 1966Ah02 (αγ-semi), 1956Ch77 (αγ-scin).
# Photon intensity per 100 α decays (1966Ah02,1956Ch77).
@ Multipolarity is E1 or E2 from relative photon and K x ray intensities. However, the ratio of reduced transition probabilities suggests E1 multipolarity.
& For absolute intensity per 100 decays, multiply by ≈0.0015.
a Multiply placed with undivided intensity.
b Placement of transition in the level scheme is uncertain.

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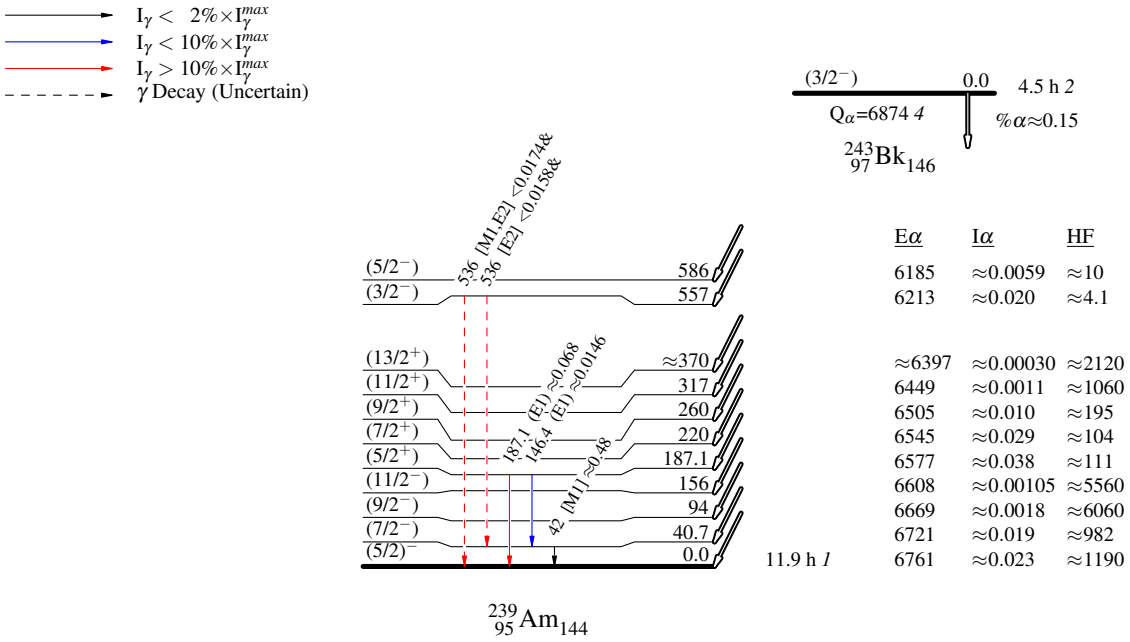
Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



	Eα	Iα	HF
	6185	≈0.0059	≈10
	6213	≈0.020	≈4.1
	≈6397	≈0.00030	≈2120
	6449	≈0.0011	≈1060
	6505	≈0.010	≈195
	6545	≈0.029	≈104
	6577	≈0.038	≈111
	6608	≈0.00105	≈5560
	6669	≈0.0018	≈6060
	6721	≈0.019	≈982
	6761	≈0.023	≈1190

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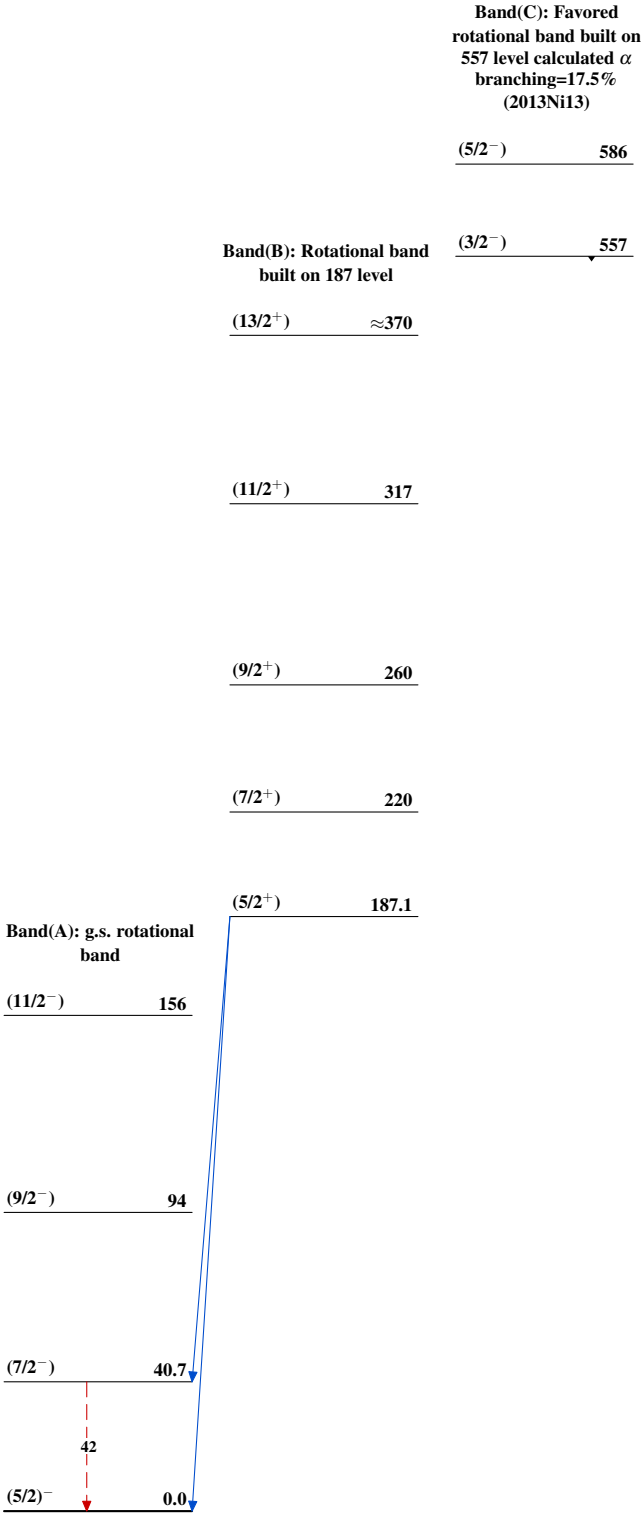

$^{239}_{95}Am_{144}$