^{245}Bk α decay 1975Ba25,1974Po08

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	C. D. Nesaraja	NDS 130, 183 (2015)	30-Sep-2015

Parent: ^{245}Bk: E=0.0; $J^{\pi}=3/2^{-}$; $T_{1/2}$=4.95 d *3*; Q(α)=6454.5 *14*; %α decay=0.12 *1*

^{245}Bk-J^{π},$T_{1/2}$: From Adopted Levels in ^{245}Bk.

^{245}Bk-Q(α): From 2012Wa38.

1975Ba25:^{245}Bk produced from ^{243}Am(α,2n) reaction was radio-chemically separated and chemically prepared for α measurements using a magnetic α spectrograph.

1974Po08:α particles measured with Au-Si surface barrier detector.

1966Ah02: γ rays following the α decay was investigated by γ singles and γα-coin using Ge(Li) detectors.

1956Ch77: Measured γα-coin, from decay of ^{245}Bk . Measured Eγ, Iγ, Eα and Iα.

1951Hu39: measured properties of ^{245}Bk and reported half-life, α-decay energies and its intensities and branching ratio.

^{241}Am Levels

E(level)[†]	J^{π}[‡]	Comments
0.0	$5/2^{-}$	
41.176 *3*	$7/2^{-}$	
93.70 *10*	$9/2^{-}$	
157.50 *18*	$11/2^{-}$	
205.883 *10*	$5/2^{+}$	
235.2 *5*	$7/2^{+}$	
239		E(level): From 1975Ba25.
270		E(level): From 1975Ba25.
273.2 *5*	$9/2^{+}$	
319.8 *10*	$11/2^{+}$	
381.1? *1*	$13/2^{+}$	
459?		E(level): From 1975Ba25.
471.810 *9*	$3/2^{-}$	
495		E(level): From 1975Ba25.
504.449 *9*	$5/2^{-}$	
543?		E(level): From 1975Ba25.
550.4 *4*	$7/2^{-}$	

[†] From Adopted Levels except as noted.

[‡] From Adopted Levels.

α radiations

Eα[†]	E(level)	Iα[‡@]	HF[#]	Comments
5796	550.4	0.9 *1*	17.9 *25*	Eα,Iα: E is from 1975Ba25. They report Iα<1.3. 1974Po08 report Iα=0.9 *1* for Eα=5811 *3*. The evaluator assumes that the two references are seeing the same α transition.
5814[&]	543?			Eα: From 1975Ba25. Not reported by 1974Po08. No Iα is given since the peak is obscured by an impurity.
5852 *2*	504.449	1.4	20	Eα,Iα: From 1975Ba25. Iα≤3.7 (1975Ba25). 1974Po08 report Iα=4.1 *2* for Eα=5856 *3*. The evaluator assumes that this peak is the unresolved sum of the 5861 and 5852 peaks reported by 1975Ba25. This assumption leads to Iα(5852α)=1.4.
5861 *2*	495	2.7	12	Eα,Iα: From 1975Ba25. See comment on 5852α.
5886 *2*	471.810	21.5 *5*	1.96 *17*	Eα: Eα=5888 *3* (1974Po08). Iα=25 (1975Ba25).
5897[&]	459?			Eα: From 1975Ba25. Not reported by 1974Po08. No Iα is given since the peak is obscured by an impurity.

Continued on next page (footnotes at end of table)

^{245}Bk α decay 1975Ba25,1974Po08 (continued)

α radiations (continued)

Eα[†]	E(level)	Iα[‡@]	HF[#]	Comments
5983[&] *3*	381.1?	0.08 *2*	1.56×10^3 *42*	Eα,Iα: From 1974Po08. Not reported by 1975Ba25.
6035 *2*	319.8	0.55 *8*	466 *79*	Eα: Eα=6035 *4* (1974Po08). Iα<4.6 (1975Ba25).
6079	273.2			Eα: From 1975Ba25. Not reported by 1974Po08. No Iα is given since the peak is obscured by an impurity.
6085 *2*	270	6.2 *3*	74 *8*	Eα: Eα=6085 *3* (1974Po08). Iα=6.7 (1975Ba25).
6113	239	5.2	125	Eα,Iα: From 1975Ba25. Not observed by 1974Po08.
6118 *2*	235.2	10.0 *5*	68 *7*	Eα: Eα=6122 *4* (1974Po08). No Iα is reported by 1975Ba25 since the peak is obscured by the calibration line. The value of 15.2 *5* reported by 1974Po08 is assumed by the evaluator to include Iα(6113α), a peak reported only by 1975Ba25, and has been lowered to 10.0 to correct for the presence of this close-lying 6113α.
6147 *2*	205.883	18.3 *5*	52 *5*	Eα: Eα=6150 *4* (1974Po08). Iα=20.7 (1975Ba25).
6193 *2*	157.50	1.2 *1*	1.36×10^3 *17*	Eα: Eα=6198 *5* (1974Po08). Iα not given by 1975Ba25. Peak obscured by an impurity line.
6258 *2*	93.70	1.5 *1*	2.21×10^3 *24*	Eα: Eα=6263 *5* (1974Po08). Iα<2.7 (1975Ba25).
6308 *2*	41.176	15.0 *5*	393 *36*	Eα: Eα=6315 *5* (1974Po08). Iα=12.2 (1975Ba25).
6348 *2*	0.0	15.5 *5*	593 *54*	Eα: Eα=6354 *5* (1974Po08). Iα=15.1 (1975Ba25).

[†] From 1975Ba25. The resolution of this work is about 4 keV. The authors do not quote uncertainties; however, based on other work of the first author, and given an uncertainty of 0.5 keV in the calibration peak, the evaluator has assigned an uncertainty of 2 keV. 1974Po08 have also reported Eα values. The resolution of their detector system is about 20-25 keV. Energies of 1974Po08 are given in comments. Their values have been increased by the evaluator using the recommendations by 1991Ry01 to correct for changes in the calibration energies used by the authors (1974Po08). The correction increased from +3 keV to +6 keV for 5.808α up to the 6.348 α Others: 1951Hu39, 1956Ch77, 1956Ma32.

[‡] The intensities per 100 α decays are from 1974Po08. 1975Ba25 report intensities without uncertainties. Values of these authors are given in comments.

[#] $r_0(^{241}Am)$=1.4966 *8* average of $r_0(^{240}Pu)$=1.4979 *7* and $r_0(^{242}Cm)$=1.4953 *9*, is used in the calculations as given in 1998Ak04.

[@] For absolute intensity per 100 decays, multiply by 0.0012 *1*.

[&] Existence of this branch is questionable.

γ(^{241}Am)

For αγ coin data see 1966Ah02, 1956Ch77.

E_γ [†]	I_γ [‡ d]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [#]	δ [c]	α [b]	$I_{(\gamma+ce)}$ [d]	Comments
41.176 *3*		41.176	7/2$^-$	0.0	5/2$^-$	M1+E2	0.486 *23*	295 *17*		α(L)=216 *13*; α(M)=59 *4* α(N)=16.2 *10*; α(O)=3.90 *23*; α(P)=0.64 *4*; α(Q)=0.01151 *20* E_γ: From Adopted Gammas.
165.5 *5*	7.0 *15*	205.883	5/2$^+$	41.176	7/2$^-$	[E1]		0.162 *3*		α(K)=0.1243 *20*; α(L)=0.0282 *5*; α(M)=0.00692 *11* α(N)=0.00187 *3*; α(O)=0.000458 *8*; α(P)=8.00×10^{-5} *13*; α(Q)=3.48×10^{-6} *6*
195 *1*	≈1	235.2	7/2$^+$	41.176	7/2$^-$	[E1]		0.1110 *21*		α(K)=0.0860 *16*; α(L)=0.0188 *4*; α(M)=0.00460 *9* α(N)=0.001246 *24*; α(O)=0.000306 *6*; α(P)=5.40×10^{-5} *10*; α(Q)=2.46×10^{-6} *5*
207.4 *5*	33 *5*	205.883	5/2$^+$	0.0	5/2$^-$	E1		0.0964 *15*		α(K)=0.0749 *12*; α(L)=0.01617 *25*; α(M)=0.00395 *6* α(N)=0.001071 *17*; α(O)=0.000263 *4*; α(P)=4.66×10^{-5} *7*; α(Q)=2.16×10^{-6} *4* E_γ: The adopted Eγ is 205.879 *13* from ε decay.
(265.922[@] *12*)	0.12 *3*	471.810	3/2$^-$	205.883	5/2$^+$	[E1][a]		0.0552		α(K)=0.0433 *6*; α(L)=0.00894 *13*; α(M)=0.00218 *3* α(N)=0.000590 *9*; α(O)=0.0001456 *21*; α(P)=2.62×10^{-5} *4*; α(Q)=1.284×10^{-6} *18* I_γ: From Iγ/Iγ(472γ)=0.0056 *6* in ε decay. $I_{(\gamma+ce)}$: From I(γ+ce)/Iγ=6.6 *6* in ε decay.
(430.634[@] *20*)	1.25 *25*	471.810	3/2$^-$	41.176	7/2$^-$	E2		0.0805		α(K)=0.0416 *6*; α(L)=0.0285 *4*; α(M)=0.00767 *11* α(N)=0.00211 *3*; α(O)=0.000514 *8*; α(P)=8.88×10^{-5} *13*; α(Q)=2.08×10^{-6} *3* I_γ: From Iγ/Iγ(472γ)=0.057 *4* in ε decay.
471.8[&] *3*	22[&] *4*	471.810	3/2$^-$	0.0	5/2$^-$	[M1+E2][a]		0.22 *16*	31 *5*	ce(K)/(γ+ce)=0.14 *10*; ce(L)/(γ+ce)=0.033 *16*; ce(M)/(γ+ce)=0.008 *4* ce(N)/(γ+ce)=0.0023 *11*; ce(O)/(γ+ce)=0.0006 *3*; ce(P)/(γ+ce)=0.00010 *6*; ce(Q)/(γ+ce)=6.E−6 *5* α(K)=0.17 *14*; α(L)=0.040 *20*; α(M)=0.010 *5* α(N)=0.0028 *12*; α(O)=0.0007 *4*; α(P)=0.00013 *7*; α(Q)=7.E−6 *6* $I_{(\gamma+ce)}$: From Iγ and I(γ+ce)/Iγ=1.208 *86* in ε decay.

$\gamma(^{241}\text{Am})$ (continued)

† From 1966Ah02, except where noted otherwise.
‡ From 1966Ah02, except where noted otherwise. Intensities are per 100 α decays. Other: 1956Ch77.
# From adopted gammas. Values in square brackets are based on the level scheme.
@ From ^{241}Cm ε decay. Not observed in ^{245}Bk α decay.
& From 1976Ah03.
a Anomalous E1 transition. See ^{241}Cm ε decay.
b Additional information 1.
c If No value given it was assumed δ=1.00 for E2/M1, δ=1.00 for E3/M2 and δ=0.10 for the other multipolarities.
d For absolute intensity per 100 decays, multiply by 0.0012 *1*.

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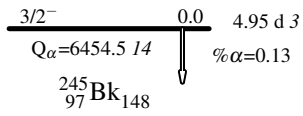
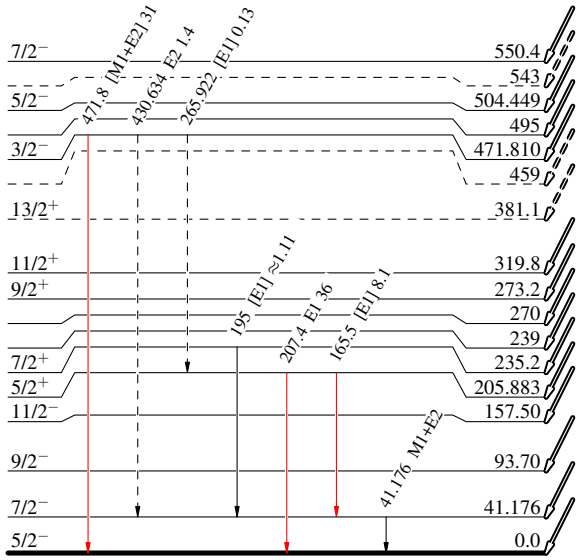
Decay Scheme

Legend

Intensities: $I_{(\gamma+ce)}$ per 100 decays through this branch

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)





$^{241}_{95}Am_{146}$

Eα	Iα	HF
5796	0.00108	17.9
5814		
5852	0.00168	20
5861	0.0032	12
5886	0.0258	1.96
5897		
5983	0.00010	1560
6035	0.00066	466
6079		
6085	0.0074	74
6113	0.0062	125
6118	0.0120	68
6147	0.0220	52
6193	0.00144	1360
6258	0.00180	2210
6308	0.0180	393
6348	0.0186	593