^{249}Cm β^- decay 2005Ah03

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. D. Nesaraja	NDS 195,718 (2024)	12-Oct-2023

Parent: ^{249}Cm: E=0.0; $J^\pi=1/2^+$; $T_{1/2}$=64.15 min *3*; Q(β^-)=904.4 *26*; %β^- decay=100

^{249}Cm-Q(β^-): From 2021Wa16.

2005Ah03: ^{249}Cm isotope prepared by neutron capture reactions on ^{248}Cm targets. The irradiations were performed at both the Livermore pool-type reactor and the General Electric test reactor in California. It was then followed by chemical separation to remove fission products. Measured Eγ and Iγ, with three Ge(Li) detectors, where only one was equipped with a NaI Compton-suppression shield and the Eβ and Iβ with a gas-flow proportional counter and the β spectrum and conversion electrons with a cooled Si(Li) detector. Note: No conversion electron data are given in 2005Ah03. All γ rays assigned to ^{249}Cm β-decay exhibited decays consistent with the adopted $T_{1/2}$ for the parent.

Others: 1975HoZA (unable to obtain this private communication), 1958Ea06.

^{249}Bk Levels

E(level)[†]	J^π	$T_{1/2}$[‡]	E(level)[†]	J^π	E(level)[†]	J^π
0.0	$7/2^+$	327.2 d *3*	377.49 *19*	$(1/2^+)$	558.05[@] *18*	$(3/2^-)$
8.71[#] *19*	$3/2^-$	0.3 ms	389.12 *17*	$(5/2^+)$	569.10[@] *20*	$(1/2^-)$
39.58[#] *19*	$5/2^-$		410.50?[a] *22*	$(3/2^+)$	643.05[&] *20*	$(1/2^-)$
82.65[a] *27*	$7/2^-$		421.18[a] *17*	$(5/2^+)$	661.50[&] *20*	$(3/2^-)$

[†] From least-squares fit to Eγ data by the evaluator.
[‡] From Adopted Levels.
[#] Band(A): 3/2[521].
[@] Band(B): 1/2[530].
[&] Band(C): 1/2[521].
[a] Seq.(D): 1/2[400].

β^- radiations

E(decay)	E(level)	Iβ^-[†‡]	Log *ft*	Comments
(242.9 *28*)	661.50	0.320 *17*	6.53 *3*	av Eβ=65.99 *77*
(261.4 *28*)	643.05	1.51 *10*	5.96 *4*	av Eβ=71.37 *79*
(335.3 *28*)	569.10	1.03 *8*	6.47 *4*	av Eβ=93.53 *80*
(346.4 *28*)	558.05	0.217 *17*	7.19 *4*	av Eβ=96.90 *80*
(493.9[#] *28*)	410.50?			
(526.9 *28*)	377.49	0.316 *23*	7.62 *4*	av Eβ=154.01 *86*
(895.7 *28*)	8.71	96.6 *2*	5.903 *5*	av Eβ=280.17 *93*

[†] Deduced by evaluator from intensity balance at each level in ^{249}Cm β-decay scheme.
[‡] Absolute intensity per 100 decays.
[#] Existence of this branch is questionable.

$\gamma(^{249}Bk)$

E_γ [†]	I_γ [@ a]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [#]	δ [#]	α [&]	$I_{(\gamma+ce)}$ [a]	Comments
(8.77)		8.71	$3/2^-$	0.0	$7/2^+$	[M2]		3.07×10^6 *4*	99.9765 *31*	α(M)=2.222×10^6 *31* α(N)=6.49×10^5 *9*; α(O)=1.653×10^5 *23*; α(P)=2.97×10^4 *4*; α(Q)=1564 *22* E_γ: Deduced by evaluator from level-energy difference. $I_{(\gamma+ce)}$: Deduced by evaluator from intensity balance at g.s., with Iβ to g.s.=0; $\Sigma I\gamma(1+\alpha)$ to g.s.=100.
(30.85‡ *1*)		39.58	$5/2^-$	8.71	$3/2^-$	M1+E2	0.114 *+29–18*	3.1×10^2 *4*		α(L)=231 *29*; α(M)=59 *8* α(N)=16.3 *23*; α(O)=4.1 *6*; α(P)=0.78 *9*; α(Q)=0.0441 *6*
(42.98‡ *1*)		82.65	$7/2^-$	39.58	$5/2^-$	M1+E2	0.111 *+25–16*	103 *6*		α(L)=77 *5*; α(M)=19.3 *13* α(N)=5.3 *4*; α(O)=1.37 *9*; α(P)=0.263 *15*; α(Q)=0.01647 *24*
(43.7)		421.18	$(5/2^+)$	377.49	$(1/2^+)$	[E2]		1070	≈0.036	E_γ: Placed in decay scheme by the evaluator on the basis of intensity balance at 421.2-keV level.
(73.82‡ *1*)		82.65	$7/2^-$	8.71	$3/2^-$	E2		84.9 *12*		α(L)=61.2 *9*; α(M)=17.38 *24* α(N)=4.86 *7*; α(O)=1.191 *17*; α(P)=0.1964 *28*; α(Q)=0.000663 *9*
85.2 *2*	0.0054 *5*	643.05	$(1/2^-)$	558.05	$(3/2^-)$					%Iγ=0.0054 *5*
136.9 *1*	0.039 *3*	558.05	$(3/2^-)$	421.18	$(5/2^+)$	[E1]		0.256 *4*		α(K)=0.1918 *27*; α(L)=0.0483 *7*; α(M)=0.01194 *17* α(N)=0.00326 *5*; α(O)=0.000812 *11*; α(P)=0.0001447 *20*; α(Q)=6.41×10^{-6} *9* %Iγ=0.039 *3*
158.6 *1*	0.0029 *4*	569.10	$(1/2^-)$	410.50?	$(3/2^+)$	[E1]		0.1842 *26*		α(K)=0.1397 *20*; α(L)=0.0334 *5*; α(M)=0.00824 *12* α(N)=0.002253 *32*; α(O)=0.000563 *8*; α(P)=0.0001013 *14*; α(Q)=4.69×10^{-6} *7* %Iγ=0.0029 *4*
168.8 *2*	0.0022 *2*	558.05	$(3/2^-)$	389.12	$(5/2^+)$	[E1]		0.1599 *23*		α(K)=0.1217 *17*; α(L)=0.0286 *4*; α(M)=0.00705 *10* α(N)=0.001929 *28*; α(O)=0.000482 *7*; α(P)=8.72×10^{-5} *12*; α(Q)=4.11×10^{-6} *6* %Iγ=0.0022 *2*
180.5 *1*	0.0200 *14*	558.05	$(3/2^-)$	377.49	$(1/2^+)$	[E1]		0.1373 *19*		α(K)=0.1049 *15*; α(L)=0.02426 *34*; α(M)=0.00597 *8* α(N)=0.001634 *23*; α(O)=0.000409 *6*; α(P)=7.43×10^{-5} *10*; α(Q)=3.57×10^{-6} *5* %Iγ=0.0200 *14*

^{249}Cm β^- decay 2005Ah03 (continued)

$\gamma(^{249}Bk)$ (continued)

E_γ[†]	I_γ[@ a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[#]	α[&]	Comments
191.6 *1*	0.0100 *9*	569.10	(1/2$^-$)	377.49	(1/2$^+$)	[E1]		0.1199 *17*	α(K)=0.0920 *13*; α(L)=0.02097 *29*; α(M)=0.00516 *7* α(N)=0.001411 *20*; α(O)=0.000354 *5*; α(P)=6.45×10^{-5} *9*; α(Q)=3.15×10^{-6} *4* %Iγ=0.0100 *9*
368.76 *6*	0.350 *23*	377.49	(1/2$^+$)	8.71	3/2$^-$				%Iγ=0.350 *23*
389.0 *2*	0.0063 *8*	389.12	(5/2$^+$)	0.0	7/2$^+$	M1		0.764 *11*	α(K)=0.599 *8*; α(L)=0.1234 *17*; α(M)=0.0302 *4* α(N)=0.00832 *12*; α(O)=0.002141 *30*; α(P)=0.000423 *6*; α(Q)=2.95×10^{-5} *4* %Iγ=0.0063 *8*
(402.0[‡] *1*)		410.50?	(3/2$^+$)	8.71	3/2$^-$				
421.3 *2*	0.0092 *10*	421.18	(5/2$^+$)	0.0	7/2$^+$	[M1,E2]		0.35 *26*	α(K)=0.26 *22*; α(L)=0.068 *31*; α(M)=0.017 *7* α(N)=0.0047 *20*; α(O)=0.0012 *5*; α(P)=2.3×10^{-4} *11*; α(Q)=1.3×10^{-5} *10* %Iγ=0.0092 *10*
475.4 *2*	0.0072 *12*	558.05	(3/2$^-$)	82.65	7/2$^-$	[E2]		0.0705 *10*	α(K)=0.0374 *5*; α(L)=0.02420 *34*; α(M)=0.00652 *9* α(N)=0.001815 *26*; α(O)=0.000453 *6*; α(P)=8.16×10^{-5} *11*; α(Q)=2.296×10^{-6} *32* %Iγ=0.0072 *12*
518.5 *1*	0.088 *6*	558.05	(3/2$^-$)	39.58	5/2$^-$	[M1,E2]		0.20 *15*	α(K)=0.15 *12*; α(L)=0.037 *19*; α(M)=0.009 *4* α(N)=0.0026 *12*; α(O)=6.6×10^{-4} *32*; α(P)=1.3×10^{-4} *7*; α(Q)=8.E−6 *6* %Iγ=0.088 *6*
529.5 *2*	0.0070 *8*	569.10	(1/2$^-$)	39.58	5/2$^-$	[E2]		0.0545 *8*	α(K)=0.0312 *4*; α(L)=0.01709 *24*; α(M)=0.00457 *6* α(N)=0.001270 *18*; α(O)=0.000318 *4*; α(P)=5.77×10^{-5} *8*; α(Q)=1.825×10^{-6} *26* %Iγ=0.0070 *8*
549.4 *1*	0.030 *5*	558.05	(3/2$^-$)	8.71	3/2$^-$	[M1,E2]		0.17 *12*	α(K)=0.13 *10*; α(L)=0.032 *16*; α(M)=0.008 *4* α(N)=0.0022 *11*; α(O)=5.6×10^{-4} *27*; α(P)=1.1×10^{-4} *6*; α(Q)=7.E−6 *5* %Iγ=0.030 *5*
560.4 *1*	0.84 *6*	569.10	(1/2$^-$)	8.71	3/2$^-$	(M1+E2)	0.75 *20*	0.198 *30*	α(K)=0.152 *25*; α(L)=0.034 *4*; α(M)=0.0085 *9* α(N)=0.00234 *26*; α(O)=0.00060 *7*; α(P)=0.000117 *14*; α(Q)=7.5×10^{-6} *12* %Iγ=0.84 *6*
603.4 *2*	0.0064 *9*	643.05	(1/2$^-$)	39.58	5/2$^-$	[E2]		0.0406 *6*	α(K)=0.02499 *35*; α(L)=0.01145 *16*; α(M)=0.00303 *4* α(N)=0.000841 *12*; α(O)=0.0002111 *30*; α(P)=3.87×10^{-5} *5*; α(Q)=1.392×10^{-6} *20* %Iγ=0.0064 *9*
621.9 *1*	0.180 *13*	661.50	(3/2$^-$)	39.58	5/2$^-$				%Iγ=0.180 *13*

$^{249}_{97}Bk_{152}$-3

^{249}Cm β^- decay 2005Ah03 (continued)

$\gamma(^{249}Bk)$ (continued)

E_γ [†]	I_γ [@ a]	E_i(level)	J_i^π	E_f	J_f^π	Comments
634.3 *1*	1.5 *1*	643.05	(1/2$^-$)	8.71	3/2$^-$	%Iγ=1.5 *1*
652.8 *1*	0.14 *1*	661.50	(3/2$^-$)	8.71	3/2$^-$	%Iγ=0.14 *1*

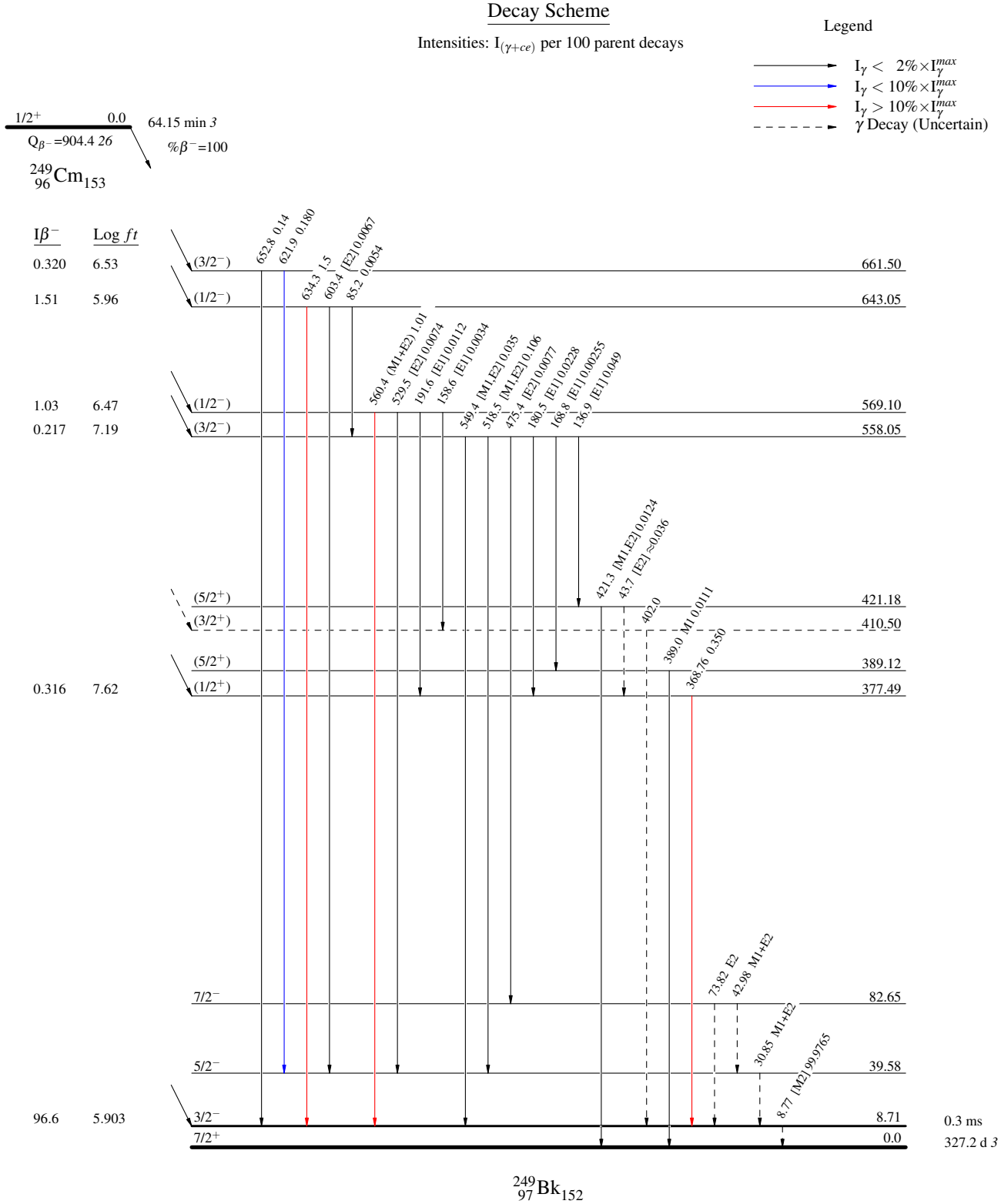
† From 2005Ah03, except as noted.
‡ From Adopted Gammas.
# From Adopted Gammas. Note that in the previous evaluation, 2011Ab07 had provided multipolarities and mixing ratio for Eγ=368.76 keV, 621.9 keV, 634.3 keV and 652.8 keV from 1975HoZA. These values are not given in the current evaluation as the evaluator is unable to verify the information.
@ From 2005Ah03.
& Additional information 1.
a Absolute intensity per 100 decays.

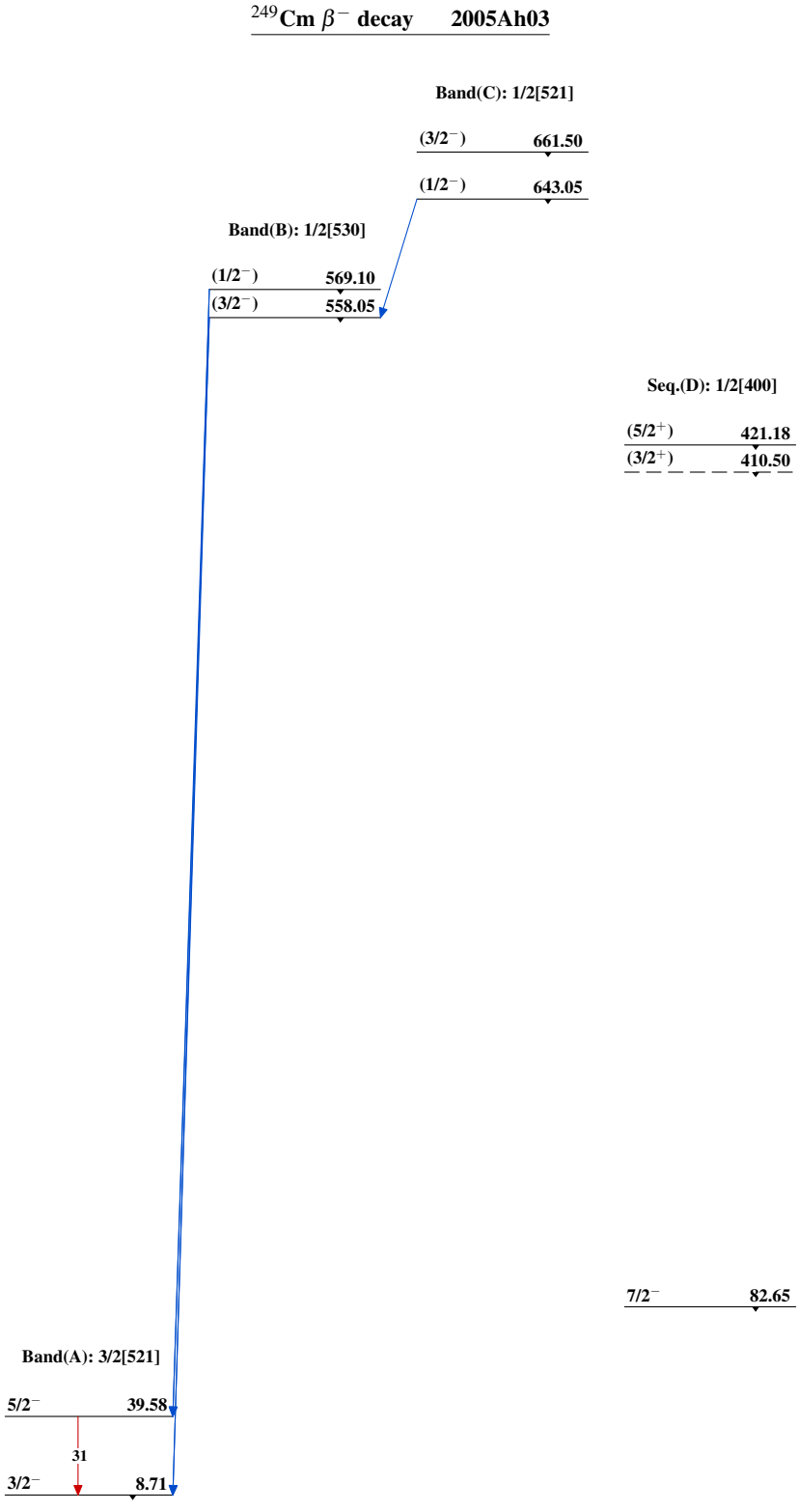
$^{249}_{97}Bk_{152}$-4

^{249}Cm β^- decay 2005Ah03

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays




249Cm β− decay 2005Ah03
Band(C): 1/2[521]
(3/2−) 661.50
(1/2−) 643.05
Band(B): 1/2[530]
(1/2−) 569.10
(3/2−) 558.05
Seq.(D): 1/2[400]
(5/2+) 421.18
(3/2+) 410.50
7/2− 82.65
Band(A): 3/2[521]
5/2− 39.58
31
3/2− 8.71

$^{249}_{97}Bk_{152}$