^{247}Es α decay (4.55 min) 1989Ha27

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. D. Nesaraja, E. A. Mccutchan	NDS 121, 695 (2014)	30-Sep-2013

Parent: ^{247}Es: E=0.0+x; J^π=(7/2$^+$); $T_{1/2}$=4.55 min *26*; Q(α)=7462 *20*; %α decay≈7.0

^{247}Es-$T_{1/2}$: from α(t) in 1989Ha27. Others: 5.0 min *3* (1967Mi06), 4.7 min *3* (1973Es01).

^{247}Es-%α decay: estimated by 1967Mi06 from observed α yield and calculated total cross section for ^{238}U(^{14}N,5n).

1989Ha27: ^{247}Es activity produced in the ^{249}Cf(p,3n) reaction with E(p)=18 to 33 MeV and the ^{238}U(^{15}N,4n) reaction with E(^{15}N)=82 to 103 MeV. Reaction products transferred via He jet and collected onto a moving tape or a rotating wheel. Measured Eα, Iα, α(t) using Si(Au) surface barrier detectors. FHWM=27 to 30 MeV for the 7.275 MeV α-group of ^{211m}Po.

Others: 1973Es01, 1967Mi06.

^{243}Bk Levels

E(level)[†]	J^π[‡]	Comments
≈18	(7/2$^+$)	E(level): ΔE=20 keV.
67 *20*	(9/2$^+$)	
131 *20*	(11/2$^+$)	

[†] Calculated from Q(α)=7462 from 2012Wa38 and the measured Eα's.

[‡] Hindrance factors for α decay from (7/2$^+$) ^{247}Es and the level spacings imply that these levels are probably members of a rotational band. From the unhindered character of the α transition (HF≈2.4) to the ≈18 keV level, the bandhead member should be the same state as that of the parent. Systematics of Nilsson states (see, for example, 1972El21) suggest either the 3/2[521] or the 7/2[633] orbital for ^{247}Es g.s. If the α decay was to the 3/2[521] orbital, the band parameter would be 9.4 which would not fit the local trend. By assuming a rotational band built on the 7/2[633] state, the rotational band parameter of 5.7 is consistent with band parameters for 7/2[633] bands in the region.

α radiations

Eα[†]	E(level)	Iα[‡&]	HF[#@]	Comments
7213 *5*	131	2.0 *7*	≈37	
7275 *3*	67	12 *2*	≈11	
7323 *1*	≈18	86 *4*	≈2.4	Eα: other: 7320 *30* from 1967Mi06 and 1973Es01.

[†] From 1989Ha27. The ^{212}Po α peak at 8784 MeV was used for energy calibration (Eα=8784.86 *12* is recommended by 1991Ry01).

[‡] Alpha intensities per 100 α decays, from 1989Ha27.

[#] $r_0(^{243}Bk)$=1.493 *7*, average of $r_0(^{242}Cm)$=1.4953 *9* and $r_0(^{244}Cf)$=1.490 *13* is used in the calculations.

[@] Because of the approximate value of %α decay, the hindrance factors should be taken as approximate.

[&] For absolute intensity per 100 decays, multiply by ≈7×10^{-2}.