Adopted Levels

History

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

Q(β^-)=−2300 *SY*; S(n)=7115 *SY*; S(p)=3403 *4*; Q(α)=6874 *4* 2012Wa38
ΔQ(β^-)=114; ΔS(n)=200 (2012Wa38).
S(2n)=13485 syst *200*; S(2p)=8823 *4* (2012Wa38).

First identification: 1950Th52 in α particle bombardment of Americium, chemical separation.

Theoretical calculations:

2013Zd01: $T_{1/2}$ for α decay calculated with a phenomenological model based on Gamow theory with WKB approximation for Coulomb barrier penetration.
2012Ni16: α decay $T_{1/2}$ and fine structure calculated with Multichannel cluster model.
2012Po01: calculated α decay $T_{1/2}$ with a universal decay law using α-like R matrix theory.
2012Sa05,2011Sa40: calculated $T_{1/2}$ and α decay fine structure using Coulomb and proximity potential model.
2012Zh01: β_2, β_4, moment of inertia, and alignments calculated with a particle conserving method based on the cranked shell model.
2011Zh36: partial α decay $T_{1/2}$ to members of favored band calculated with a microscopic quantum tunneling theory.
2010Ni02: $T_{1/2}$ and branching ratios calculated using generalized density dependent cluster model.
2008Do12: calculated binding energies with additional terms beyond standard Bethe Weizsacker formula.
2004Pa40: deformation parameters, pairing gap, and single particle energy levels calculated with a macroscopic-microscopic model.
2002Lo05: calculated binding energies, Q(α), pairing gap, ground state deformation and single-particle levels with a relativistic mean field approach.
1985Lo17,1978Po09: calculated spontaneous-fission half-life of ground state.
1984Ku05: systematic study of fission-barrier parameters.
1980Ka41: hindrance factors for alpha's from ^{243}Bk were calculated with R-matrix method.

^{243}Bk Levels

Cross Reference (XREF) Flags

A ^{247}Es α decay (4.55 min)

E(level)	J^π	$T_{1/2}$	XREF	Comments
0.0	(3/2$^-$)	4.6 h *2*		%ε+%β^+≈99.85 (1953Hu60,1956Ch77); %α≈0.15 $T_{1/2}$: from 1950Th52. Others: 4.5 h *1* (1953Hu60), 4.5 h *3* (1956Ch77); note that both are unpublished reports. J^π: analogy with ^{245}Bk suggests 3/2$^-$,3/2[521] assignment; see also footnote on J^π of (7/2$^+$), ≈18−keV level. Partial half-life for spontaneous-fission decay calculated by 1985Lo17 and 1978Po09: log[$T_{1/2}$(SF in years)]≈3.6 and ≈5.0 from plots in 1985Lo17 and 1978Po09, respectively, yield spontaneous fission branchings≈1.3×10^{-5}% and ≈5.1×10^{-7}%.
≈18[‡]	(7/2$^+$)[†]		A	E(level): ΔE=20 keV with level energy derived from Qα and Eα. This allows the possibility of the (7/2$^+$) state being the ground state, although systematics suggest the ground state is (3/2$^-$).
67[‡] *20*	(9/2$^+$)[†]		A	
131[‡] *20*	(11/2$^+$)[†]		A	
≈2200		5 ns		%SF≤100 $T_{1/2}$: from 1972Ga42. Assignment: ^{241}Am(α,2n) systematics (1972Ga42). Spontaneously fissioning shape isomer, only SF decay has been observed.

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Adopted Levels (continued)

^{243}Bk Levels (continued)

E(level)	J^{π}	$T_{1/2}$	XREF	Comments
				E(level): 1972Vy07 deduced level energy from ^{241}Am(α,2n) excitation function and reaction threshold; suggested E=2.2 MeV *2* as the best level energy.

† 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.

‡ Band(A): 7/2[633] band. α=5.7 for β=0.0.

Adopted Levels

Band(A): 7/2[633] band

$(11/2^+)$ **131**

$(9/2^+)$ **67**

$(7/2^+)$ **≈18**

$^{243}_{97}Bk_{146}$