Adopted Levels, Gammas

History

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

Q(β^-)=−1508 *5*; S(n)=5693.0 *10*; S(p)=5575.1 *10*; Q(α)=6168.8 *10* 2012Wa38
S(2n)=12662.4 *16*; S(2p)=10351.1 *10* (2012Wa38).

First identification: 1950Re55 using ^{241}Am(n,γ)^{242m}Am, β decay to ^{242}Cm and then subsequent ^{242}Cm(n,γ) followed by chemical separation and mass-spectrograph identification.

Theoretical studies and systematics:

2013Zd01: $T_{1/2}$ for α decay calculated with phenomenological model based on Gamow theory with WKB approximation for Coulomb barrier penetration.
2012Ba35: $T_{1/2}$ for ^{34}Si cluster decay calculated with generalized liquid drop model.
2012Ku29: $T_{1/2}$ for ^{34}Si cluster decay calculated with different nuclear proximity potentials.
2012Ni16: $T_{1/2}$ and branching ratios calculated with Multichannel cluster model.
2012Ro34: $T_{1/2}$ and fission barriers calculated with a generalized liquid drop model.
2012Sa31: $T_{1/2}$ for ^{34}Si cluster decay calculated with a Coulomb and Proximity Potential model.
2012Ta10: $T_{1/2}$ for cluster decay calculated with a semi-empirical model.
2012Zh01: β_2, β_4, moment of inertia, and alignments calculated with a particle conserving method based on the cranked shell model.
2011Ad15: calculations of one-quasi-particle states.
2011Es05: calculated shape isomer yield for α + ^{239}Pu reaction.
2011Sh13: calculated cluster $T_{1/2}$ using effective liquid drop model.
2011Zh36: partial α decay $T_{1/2}$ to members of favored bands calculated with microscopic tunneling theory.
2010Ni02,2010Ni13: $T_{1/2}$, branching ratios and cluster performation factors calculated with generalized density dependent cluster model.
2007Ro08: calculated $T_{1/2}$ using generalized liquid drop model.
2006Sh19: levels, J^π, rotational bands, dipole and quadrupole moments calculated with a cluster model.
2005Pa73: neutron single particle energies calculated with a microscopic-macroscopic approach; $T_{1/2}$(SF) calculated with Swiatecki formula and extensions.
2005Re16,1990Bh02: calculation of spontaneous fission half-lives of ground and isomeric states.
2004Ro01: analysis of spontaneous-fission half-lives relative to liquid drop model predictions.
2004Sa55: analysis of shape isomer excitation energies.
2002Si26: compilation and evaluation of fission isomer data.
1997Ro12: systematic study of spontaneous fission half-lives.
1996St28,1994Du03: calculation of hindrance factors and intensities of alphas from ^{243}Cm ground state to the favored band in ^{239}Pu; 1996St28 also calculates anisotropy for this favored α decay.
1994Du03: structure of the ground state calculated using an enlarged superfluid model.
1991Bl07: calculation of partial $T_{1/2}$ for decay by ^{34}Si emission.
1990Bh02,1989Eg01,1987Gu03,1984Ku05,1981Re06,1980Ku14,1976Ga11, 1972We09,1971Br39: calculations of fission-barrier parameters.
1990Ig01,1989Eg01: fission barrier parameters deduced from analysis of ^{242}Cm(n,γ) cross sections.
1985Lo17,1978Po09: calculation of spontaneous fission half-life of ground state.
1984Ku05: fast-neutron induced fission cross-sections calculated and fission-barrier heights deduced from comparison with data.
1982Be62: evaluation of fast neutron-induced reaction data.
1981Re06: fission-barrier heights calculated from an analysis of fission probabilities deduced from induced fission reactions.
1980Ku14: study of dependence of fission barriers and γ(n)/γ(fission) on neutron number.
1979Is04: compilation of γ(n)/γ(fission) data.
1976Ga11: fission-barrier heights and γ(n)/γ(f) deduced from measurements of fission probability in (^{3}He,df) and (^{3}He,tf) reactions.
1974Ma17: calculation of level density at the neutron binding energy.
1972Ah03: calculation of surface distributions of alpha particles.

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1971Ko31: calculation of level energies with various possible configurations.
1969Po05: calculation of intensities of favored and hindered alpha-transitions to various bands.
α: Additional information 1.

^{243}Cm Levels

Cross Reference (XREF) Flags

A ^{247}Cf α decay
B ^{243}Bk ε decay
C ^{244}Cm(d,t)

E(level)†	Jπ‡	$T_{1/2}$	XREF	Comments
0.0#	5/2+	29.1 y *1*	ABC	%ε=0.29 *3*; %α=99.71 *3*; %SF=5.3×10^{-9} *9* μ=0.40 *8* (from 1973Ab03 with the uncertainty recommended by 2011StZZ). Jπ: spin was measured by 1973Ab03 (electron paramagnetic resonance). Orbital assignments are from measured μ values and (d,t) data. $T_{1/2}$: recommended by 1989Ho24 from weighted average of the revised values of 1986Ti03 and 1958Ch38. $T_{1/2}$=29.20 y *12* obtained by 1986Ti03 from relative ^{244}Cm and ^{243}Cm α activities using $T_{1/2}(^{244}Cm)$=18.11 y *2*. $T_{1/2}$=29.0 y *8* obtained by 1958Ch38 from α activities of ^{243}Cm and ^{244}Cm using $T_{1/2}(^{244}Cm)$=18.4 y *5*. A correction by the evaluators to the value of 1958Ch38 using the adopted $T_{1/2}(^{244}Cm)$=18.1 y *1* (2003Ak04) yields $T_{1/2}(^{243}Cm)$=28.5 y *8*. %ε: calculated by the evaluators from $T_{1/2}(\varepsilon)$=1.0×10^4 y *1*, as obtained by 1958Ch38 from ratio of ^{243}Am and ^{243}Cm α activities (correction for the adopted $T_{1/2}$'s of ^{243}Am and ^{243}Cm does not change the ε decay half-life), and from total half-life of 29.1 y *1*. %SF: from $T_{1/2}$(SF)=5.5×10^{11} y *9*, measured by 1987Po19 from SF and α activities, and total half-life of 29.1 y *1*. μ: estimated from EPR in 1973Ab03, relative to μ of ^{241}Am. Compiled by 2011StZZ.
42# *2*	7/2+		C	
87.4@ *1*	1/2+	1.08 μs *3*	BC	Jπ: E2 87.4γ to 5/2+; assignment in (d,t). $T_{1/2}$: from (K x-ray)(ce 87.4γ)(t) in ^{243}Bk ε decay. E(level): from 87.4 *1* γ-ray to ground state.
94# *2*	9/2+		C	E(level): assumed doublet consisting of the 9/2+ member of the 5/2[622] band and the 3/2+ member of the 1/2[631] band.
94@ *2*	3/2+		C	E(level): assumed doublet consisting of the 9/2+ member of the 5/2[622] band and the 3/2+ member of the 1/2[631] band.
114& *20*	(7/2+)		A C	XREF: A(95)C(133). E(level): no K x-rays were observed in coincidence with the α transition feeding the level. The level energy, therefore, must be less than the K-binding energy of 128 keV. E(level) is unweighted average of 133 keV *4* in (d,t) and 95 keV *16* in ^{247}Cf α decay derived from Q(α) and measured Eα. Jπ: unhindered α decay from probable 7/2[624] ground state of ^{247}Cf and assignment in (d,t).
153# *2*	(11/2+)		C	Jπ: tentative assignment as 11/2+ member of 5/2[622] band in (d,t).
164& *2*	(9/2+)		A C	E(level): other: 154 keV *16* from Q(α) and measured Eα in ^{247}Cf α decay. Jπ: population in α decay from the probable 7/2[624] ground state of ^{247}Cf and assignment in (d,t).
219# *3*	(13/2+)		C	Jπ: tentative assignment as 13/2+ member of 5/2[622] band in (d,t).
228& *3*	(11/2+)		C	Jπ: tentative assignment as 11/2+ member of 7/2[624] band in (d,t).

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Adopted Levels, Gammas (continued)

^{243}Cm Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$	XREF	Comments
260[@] *2*	(9/2+)		C	
530 *3*			C	Jπ: suggested J^π=(15/2−) and 7/2[743] band member in (d,t).
729[a] *2*	1/2−		C	
769 *2*			C	E(level): assumed doublet in (d,t). Jπ: suggested J^π= (3/2−) and (5/2−) in (d,t) assuming doublet corresponds to the 3/2− and 5/2− members of the 1/2[501] band.
798 *2*			C	Jπ: suggested J^π=(5/2+) and 3/2[631] band member in (d,t).
842 *2*			C	
860? *4*			C	
892 *2*			C	Jπ: suggested J^π=(9/2+) and 3/2[631] band member in (d,t).
904 *3*			C	
930 *4*			C	
973 *2*			C	
1015 *3*			C	
1023 *2*			C	
1046 *4*			C	
1136 *2*			C	Jπ: suggested J^π=(5/2−) as 5/2[503] bandhead in (d,t).
1217 *3*			C	
1222 *4*			C	
1359 *3*			C	
1367 *4*			C	
1.9×10^3 *3*		42 ns *6*		%SF≤100 Spontaneously fissioning shape isomer, only SF decay has been observed. $T_{1/2}$: from 1972Wo05. Measured values are: 45 ns (1969Me11), 38 ns *10* (1970Po01), 45 ns *20* (1971Re11), 40 ns (1972Ga42,1974GaZD), 42 ns *6* (1972Wo07). See 1977VaZW and 1980Bj02 for reviews of SF isomers. See also 1973PoZA for compilation of experimental half-lives. E(level): recommended by 1980Bj02. E=1500 *200* was deduced by 1973Br04 from ^{242}Pu(α,3n) excitation function and $T_{1/2}$(level) using a statistical model. Some calculated level energies are: E=1400 (1990Bh02), 1850 (1972We09), 2000 *300* (1971Br39). Assignment: ^{243}Am(d,2n) (1970Po01,1971Re11); ^{242}Pu(α,3n) excit (1971Br39).

[†] From ^{244}Cm(d,t), except where noted.
[‡] From ^{244}Cm(d,t), except where noted. Assignments were made from comparison of experimental cross sections with those expected from theory with cross sections measured at θ=140° and 90°.
[#] Band(A): 5/2[622] band. α=5.5.
[@] Band(B): 1/2[631] band.
[&] Band(C): 7/2[624] band. α=5.7.
[a] Band(D): 1/2[501] band head.

γ(^{243}Cm)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	α	Comments
87.4	1/2+	87.4 *1*	100	0.0	5/2+	E2	35.1	α(L)=25.4 *4*; α(M)=7.18 *11*; α(N)=2.00 *3* α(O)=0.483 *8*; α(P)=0.0800 *12*; α(Q)=0.000296 *5* B(E2)(W.u.)=0.0316 *10* Mult.: from ce data in ^{243}Bk ε decay. E_γ: from ^{243}Bk ε decay.

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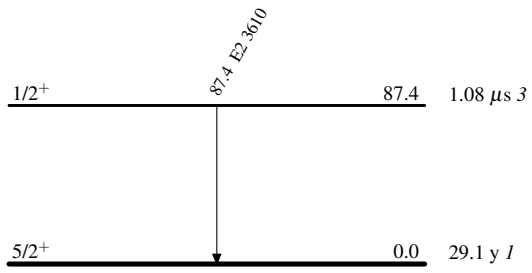
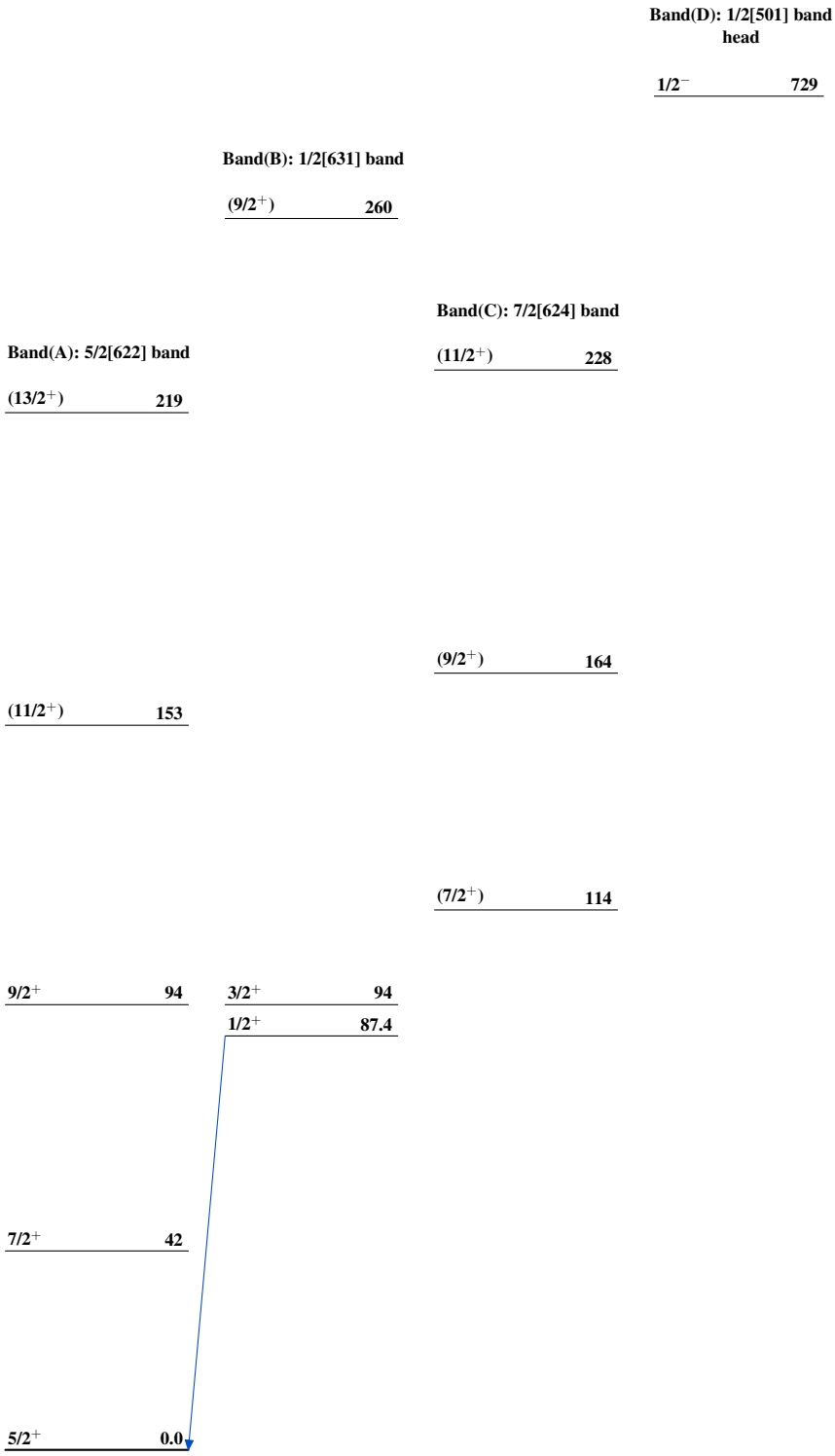
Level Scheme

Intensities: Relative $I_{(\gamma+ce)}$



$^{243}_{96}Cm_{147}$

Adopted Levels, Gammas



$^{243}_{96}Cm_{147}$