Adopted Levels, Gammas

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. J. Martin, C. D. Nesaraja	NDS 186, 261 (2022)	31-Dec-2021

Q(β^-)=−2950 *SY*; S(n)=6969.4 *12*; S(p)=5419.6 *4*; Q(α)=6215.63 *8* 2021Wa16
ΔQ(β^-)=140 (syst,2021Wa16).
S(2n)=13063.2 *17*, S(2p)=9899.6 *4* (2021Wa16).

For references on theory, refer to the NSR file at the Web site given in the abstract.

^{242}Cm Levels

Cross Reference (XREF) Flags

- A ^{242}Am β^- decay (16.01 h)
- B ^{242}Bk ε decay
- C ^{246}Cf α decay
- D ^{241}Am(^{209}Bi,^{208}Pbγ)

E(level)	J$^\pi$	T$_{1/2}$	XREF	Comments
0.0†	0$^+$	162.88 d *8*	A CD	%α=100; %SF=6.2×10^{-6} *3*; %^{34}Si=1.0×10^{-14} *+4−3* %SF: Deduced from the adopted T$_{1/2}$(SF); %^{34}Si was determined by 2000Og01. T$_{1/2}$: The measured values (in units of days) are 162.5 *20* (1950Ha14), 162.46 *32* (1954Gl37), 163.0 *18* (1954Hu32), 162.7 *1* (L.N.Treiman, R.A.Penneman, B.Bevan quoted in 1957Ho71), 163.2 *2* (1975Ke02), 163.1 *4* (1965Fl02, revised by 1977Di04), 162.76 *8*, (1977Di04), 163.02 *18* (1979Ch41), 161.35 *30* (1981Us03), 163.17 *11* and 162.82 *26* (1982Ag02), 163.0 *2* (1984Wi14). The uncertainties given for 1954Gl37, 1977Di04, 1979Ch41, 1981Us03, and 1982Ag02 are reassignments by 1986LoZT of the authors′ original values. The evaluators consider the value of 1981Us03 to be an outlier. A weighted average of the other values is 162.877 *63*. The evaluators adopt 162.88 *8* where the uncertainty is the smallest of the input values. T$_{1/2}$(SF)=7.0×10^6 y *2* is recommended by 2000Ho27 from measured partial half-lives of 7.2×10^6 y *2* (1951Ha87), 6.82×10^6 y *18* (1967Ar09, revised value; see 2000Ho27), 7.46×10^6 y *6* (1979Ch41), 7.15×10^6 y *15* (1982Ra33), 6.89×10^6 y *17* (1982UmZZ), 6.98×10^6 y *33* (1986Ze06; revised value; see 2000Ho27), 6.96×10^6 y *18* (1989Us04). The partial half-life for ^{34}Si decay was deduced by 2000Og01 as 1.4×10^{23} s *+5−3*. Their earlier results were reported in JINR-E7-93-57, p.48 (1993) and in 1997Tr17.
42.13† *5*	2$^+$		A CD	J$^\pi$: E2 γ to 0$^+$.
137† *2*	4$^+$		A CD	J$^\pi$: energy fit to the band; γ to 2$^+$; α hindrance factor.
288† *6*	6$^+$		A CD	J$^\pi$: energy fit to the band; γ to 4$^+$; α hindrance factor.
489.1† *13*	8$^+$		D	J$^\pi$: energy fit to the band; γ to 6$^+$.
735.9† *14*	10$^+$		D	J$^\pi$: energy fit to the band; γ to 8$^+$.
1026.2† *15*	12$^+$		D	J$^\pi$: energy fit to the band; γ to 10$^+$.
1355.2† *15*	14$^+$		D	J$^\pi$: energy fit to the band; γ to 12$^+$.
1720.8† *16*	16$^+$		D	J$^\pi$: energy fit to the band; γ to 14$^+$.
2119.5† *17*	18$^+$		D	J$^\pi$: energy fit to the band; γ to 16$^+$.
0+x		40 ps *15*		%SF=100 Only SF decay observed. 100% SF branching is consistent with systematics of spontaneously fissioning isomer half-lives (see 1975Me28,1976Sl01).

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{242}Cm Levels (continued)

E(level)	J^π	$T_{1/2}$	XREF	Comments
				$T_{1/2}$: measured by 1976Sl01. Assignment: ^{240}Pu(α,2n) E(α)=26 MeV, ^{243}Am(p,2n) E(p)=13 MeV (1976Sl01). Calculations of 1972We09 yield E=1.83 MeV, $T_{1/2}$=4.6 ps for the energy and half-life of the SF isomer.
2549.3† *18*	20^+		D	J^π: energy fit to the band; γ to 18^+.
2.8×10^3 *4*		180 ns *70*		%SF=?; %IT=? $T_{1/2}$: measured by 1971Re11. Assignment: ^{240}Pu(α,2n) excit (1971Br39), ^{243}Am(p,2n) E(p)=20 MeV (1971Re11). It is not established whether the level decays by γ transition to the spontaneously fissioning 40-ps isomer, or by spontaneous fission (or both). E(level)=2.8 *4* MeV deduced by 1973Br38 from threshold energy for production of the isomer through ^{240}Pu(α,2n) reaction. See also 1971Br39. From the anomalously high isomer excitation energy for the longer-lived isomer, 1971Br39 proposed that the longer-lived isomer was an excited state in the second potential well. 1976Sl01 suggested that analogous to ^{238}Pu, a two-quasiparticle isomeric state would be expected at about 1 MeV higher excitation energy than the 40-ps state.
3008.8† *18*	22^+		D	J^π: energy fit to the band; γ to 20^+.
3497.4† *19*	(24^+)		D	J^π: energy fit to the band; γ to 22^+.
4015.7?† *20*	(26^+)		D	

† Band(A): K=0 g.s. Band.

γ(^{242}Cm)

E_i(level)	J_i^π	E_γ†	I_γ	E_f	J_f^π	Mult.	Comments
42.13	2^+	42.129 *7*	100	0.0	0^+	E2	E_γ: from ^{242}Am β^- decay. Other: 42 *3* from ^{246}Cf α decay. Mult.: from conversion electron ratio in ^{242}Am β^- decay.
137	4^+	96 *3*	100	42.13	2^+		E_γ: From ^{246}Cf α Decay.
288	6^+	150.2 *5*	100	137	4^+	[E2]	E_γ: from (^{209}Bi,^{208}Pbγ). Other: 147 *5* from ^{246}Cf α decay.
489.1	8^+	200.8 *5*	100	288	6^+		
735.9	10^+	246.8 *5*	100	489.1	8^+		
1026.2	12^+	290.3 *5*	100	735.9	10^+		
1355.2	14^+	329.0 *5*	100	1026.2	12^+		
1720.8	16^+	365.6 *5*	100	1355.2	14^+		
2119.5	18^+	398.7 *5*	100	1720.8	16^+		
2549.3	20^+	429.8 *5*	100	2119.5	18^+		
3008.8	22^+	459.5 *5*	100	2549.3	20^+		
3497.4	(24^+)	488.6‡ *5*	100	3008.8	22^+		
4015.7?	(26^+)	518.3‡ *5*	100	3497.4	(24^+)		

† From (^{209}Bi,^{208}Pbγ), except as noted.

‡ Placement of transition in the level scheme is uncertain.

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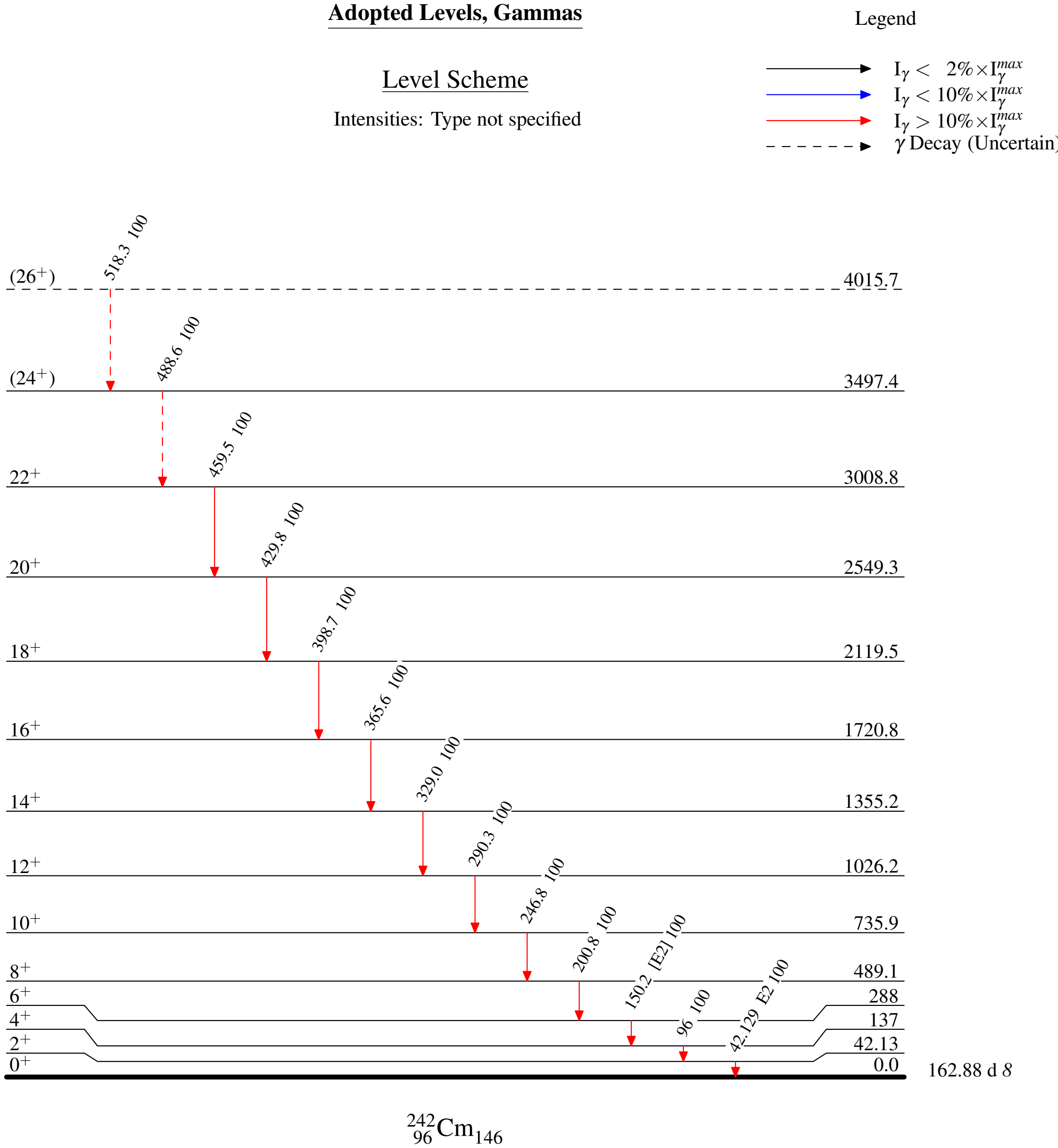
Level Scheme

Intensities: Type not specified



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