^{148}Pm β^- decay (41.29 d) 1977Ka14

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 117, 1 (2014)	1-Oct-2013

Parent: ^{148}Pm: E=137.9 *3*; $J^\pi=5^-,6^-$; $T_{1/2}$=41.29 d *11*; Q(β^-)=2471 *6*; %β^- decay=95.8 *6*
See also ^{148}Pm IT decay.
Measured: γ (1984LaZZ,1977Ka14,1971Mo04,1970GrYP,1963Ba31), $\gamma\gamma$ (1984LaZZ,1977Ka14,1963Ba31,1962Re03), $\gamma\gamma(\theta)$ (1977Ka14,1963Ba31,1962Sc04,1962Re03), β^- (1963Ba31), ce (1963Ba31,1970GrYP).
Decay scheme is that of 1977Ka14.

^{148}Sm Levels

E(level)†	J$^\pi$‡	Comments
0.0	0^+	
550.27 *3*	2^+	J=2 (1977Ka14).
1161.53 *4*	3^-	J=3 if J(1595)=5 (1963Ba31); J=3 or 4, J=4 excluded from γ intensity considerations (1977Ka14).
1180.24 *4*	4^+	J=4 consistent with $\gamma\gamma(\theta)$ (1963Ba31); J=4 (1977Ka14).
1594.31 *4*	5^-	J=3 or 5; γ from J=6 excludes J=3 (1977Ka14).
1733.48 *4*	4^+	J=4 (1977Ka14).
1894.93 *12*	4^+	J=4 probable (1977Ka14).
1905.94 *5*	6^+	J=6 (1963Ba31); J=6 (1977Ka14).
2095.57 *4*	6^+	J=6 (1963Ba31); J=4 or 6 with J=6 favored (1977Ka14).
2194.05 *4*	6^+	J=6 (1963Ba31); J=6 (1977Ka14).

† From a least-squares fit to Eγ data.
‡ Adopted values; supporting assignments from this data set are given in comments.

β^- radiations

E(decay)	E(level)	Iβ^-†‡	Log *ft*	Comments
(415 *6*)	2194.05	56.4 *5*	7.178 *22*	av Eβ=122.5 *21*
(513 *6*)	2095.57	19.5 *3*	7.949 *19*	av Eβ=156.3 *21*
(703 *6*)	1905.94	22.9 *4*	8.348 *16*	av Eβ=225.0 *23*
(1015 *6*)	1594.31	0.96 *23*	10.29 *11*	av Eβ=346.2 *25*

† From I(γ+ce) balance at each level and assuming no β^- feeding to the g.s..
‡ For absolute intensity per 100 decays, multiply by 0.958 *6*.

$\gamma(^{148}Sm)$

Iγ normalization: I(γ+ce)(550γ)=95.8% 6, and assuming no β^- decay to g.s..
α(K)exp were normalized to α(K)(550γ)=0.00825 (1963Ba31), and to α(K)(630γ)=0.0060 (1970GrYP), assuming both gammas to be E2.

E$_\gamma$	I$_\gamma$‡&	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.#	δ@	α†	Comments
98.48 *3*	2.78 *5*	2194.05	6^+	2095.57	6^+	M1+E2	0.18	1.79	α(K)=1.488 *21*; α(L)=0.236 *4*; α(M)=0.0511 *8*; α(N+..)=0.01333 *19* α(N)=0.01154 *17*; α(O)=0.001692 *24*; α(P)=9.42×10^{-5} *14* α(K)exp=1.0 *2* (1970GrYP), 1.9 *8* (1963Ba31).

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^{148}Pm β^- decay (41.29 d) 1977Ka14 (continued)

$\gamma(^{148}Sm)$ (continued)

E_γ	I_γ ‡&	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	δ@	α†	Comments
189.63 *3*	1.24 *3*	2095.57	6^+	1905.94	6^+	M1,E2		0.264 *16*	α(K)=0.21 *3*; α(L)=0.045 *12*; α(M)=0.010 *3*; α(N+..)=0.0025 *7* α(N)=0.0022 *6*; α(O)=0.00031 *7*; α(P)=1.2×10^{-5} *4* α(K)exp=0.11 *4* (1970GrYP), 0.17≈(1963Ba31).
288.11 *3*	14.11 *10*	2194.05	6^+	1905.94	6^+	M1+E2	+0.088 *21*	0.0898	α(K)=0.0763 *11*; α(L)=0.01062 *15*; α(M)=0.00228 *4*; α(N+..)=0.000599 *9* α(N)=0.000516 *8*; α(O)=7.75×10^{-5} *11*; α(P)=4.82×10^{-6} *7* α(K)exp=0.048 *9* (1970GrYP), 0.062 *20* (1963Ba31). δ: from 1977Ka14.
299.1 *2*	0.10 *2*	2194.05	6^+	1894.93	4^+				
311.63 *3*	4.40 *5*	1905.94	6^+	1594.31	5^-	E1		0.01337	α(K)=0.01141 *16*; α(L)=0.001546 *22*; α(M)=0.000330 *5*; α(N+..)=8.58×10^{-5} *12* α(N)=7.43×10^{-5} *11*; α(O)=1.091×10^{-5} *16*; α(P)=6.29×10^{-7} *9* α(K)exp=0.011 *2* (1970GrYP), 0.012 *4* (1963Ba31). δ(M2/E1)=+0.003 *19* (1977Ka14).
362.09 *3*	0.20 *2*	2095.57	6^+	1733.48	4^+				
414.07 *3*	20.97 *17*	1594.31	5^-	1180.24	4^+	E1+M2	−0.013 *10*	0.00670 *11*	α=0.00670 *11*; α(K)=0.00572 *9*; α(L)=0.000766 *13*; α(M)=0.000163 *3*; α(N+..)=4.26×10^{-5} *7* α(N)=3.68×10^{-5} *6*; α(O)=5.44×10^{-6} *9*; α(P)=3.22×10^{-7} *6* α(K)exp=0.0065 *20* (1963Ba31).
432.78 *3*	6.01 *7*	1594.31	5^-	1161.53	3^-	E2		0.0190	α(K)=0.01544 *22*; α(L)=0.00281 *4*; α(M)=0.000617 *9*; α(N+..)=0.0001586 *23* α(N)=0.0001382 *20*; α(O)=1.96×10^{-5} *3*; α(P)=8.75×10^{-7} *13* Mult.: α(K)exp=0.017 *5* (1963Ba31), 0.017 *3* (1970GrYP). δ(M3/E2)=+0.25 *37* (1977Ka14).
460.57 *3*	0.47 *2*	2194.05	6^+	1733.48	4^+				
501.26 *3*	7.58 *8*	2095.57	6^+	1594.31	5^-	E1+M2	−0.017 *14*	0.00431 *8*	α=0.00431 *8*; α(K)=0.00369 *7*; α(L)=0.000489 *9*; α(M)=0.0001042 *20*; α(N+..)=2.72×10^{-5} *5* α(N)=2.35×10^{-5} *5*; α(O)=3.49×10^{-6} *7*; α(P)=2.09×10^{-7} *4* α(K)exp=0.0032 *8* (1970GrYP), 0.0033 *9* (1963Ba31).
550.27 *3*	106.6 *8*	550.27	2^+	0.0	0^+	E2		0.00998 *14*	α=0.00998 *14*; α(K)=0.00825 *12*; α(L)=0.001360 *19*; α(M)=0.000296 *5*;

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^{148}Pm β^- decay (41.29 d) 1977Ka14 (continued)

$\gamma(^{148}Sm)$ (continued)

E_γ	I_γ ‡&	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	δ@	α†	Comments
									α(N+..)=7.67×10^{-5} *11* α(N)=6.66×10^{-5} *10*; α(O)=9.59×10^{-6} *14*; α(P)=4.78×10^{-7} *7* α(K)exp=0.0079 *6* (1970GrYP).
553.24 *3*	0.45 *4*	1733.48	4$^+$	1180.24	4$^+$	M1+E2	+1.66 *20*	0.0117 *4*	α(K)=0.0098 *4*; α(L)=0.00150 *4*; α(M)=0.000324 *8*; α(N+..)=8.43×10^{-5} *22* α(N)=7.30×10^{-5} *18*; α(O)=1.07×10^{-5} *3*; α(P)=5.83×10^{-7} *24*
571.95 *3*	0.24 *1*	1733.48	4$^+$	1161.53	3$^-$	E1		0.00320 *5*	α=0.00320 *5*; α(K)=0.00274 *4*; α(L)=0.000361 *5*; α(M)=7.68×10^{-5} *11*; α(N+..)=2.01×10^{-5} *3* α(N)=1.735×10^{-5} *25*; α(O)=2.58×10^{-6} *4*; α(P)=1.564×10^{-7} *22*
599.74 *3*	14.09 *13*	2194.05	6$^+$	1594.31	5$^-$	E1+M2	−0.021 *11*	0.00290 *5*	α=0.00290 *5*; α(K)=0.00249 *4*; α(L)=0.000327 *6*; α(M)=6.96×10^{-5} *12*; α(N+..)=1.82×10^{-5} *3* α(N)=1.57×10^{-5} *3*; α(O)=2.34×10^{-6} *4*; α(P)=1.424×10^{-7} *24*
611.26 *3*	6.16 *10*	1161.53	3$^-$	550.27	2$^+$	E1		0.00277 *4*	α(K)exp=0.0020 *7* (1970GrYP). α=0.00277 *4*; α(K)=0.00237 *4*; α(L)=0.000312 *5*; α(M)=6.63×10^{-5} *10*; α(N+..)=1.735×10^{-5} *25* α(N)=1.499×10^{-5} *21*; α(O)=2.23×10^{-6} *4*; α(P)=1.358×10^{-7} *19*
629.97 *3*	100	1180.24	4$^+$	550.27	2$^+$	E2		0.00710 *10*	α(K)exp=0.0025 *8* (1970GrYP), 0.0024 *8* (1963Ba31). α=0.00710 *10*; α(K)=0.00591 *9*; α(L)=0.000932 *13*; α(M)=0.000202 *3*; α(N+..)=5.25×10^{-5} *8* α(N)=4.55×10^{-5} *7*; α(O)=6.61×10^{-6} *10*; α(P)=3.46×10^{-7} *5*
714.7 *2*	0.051 *6*	1894.93	4$^+$	1180.24	4$^+$	M1+E2		0.0070 *18*	α(K)exp=0.0060 *12* (1963Ba31). δ: δ(M3/E2)=−0.007 *5* (1977Ka14). α=0.0070 *18*; α(K)=0.0060 *16*; α(L)=0.00084 *18*; α(M)=0.00018 *4*; α(N+..)=4.7×10^{-5} *10* α(N)=4.1×10^{-5} *9*; α(O)=6.1×10^{-6} *14*; α(P)=3.6×10^{-7} *11*
725.70 *3*	36.9 *3*	1905.94	6$^+$	1180.24	4$^+$	E2		0.00506 *7*	α=0.00506 *7*; α(K)=0.00424 *6*; α(L)=0.000642 *9*; α(M)=0.0001389 *20*; α(N+..)=3.61×10^{-5} *5*

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^{148}Pm β^- decay (41.29 d) 1977Ka14 (continued)

$\gamma(^{148}Sm)$ (continued)

E_γ	I_γ[‡][&]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	δ[@]	α[†]	Comments
									α(N)=3.13×10^{-5} *5*; α(O)=4.58×10^{-6} *7*; α(P)=2.50×10^{-7} *4* α(K)exp=0.0046 *4* (1970GrYP), 0.0038 *7* (1963Ba31). δ(M3/E2)=+0.002 *8* (1977Ka14).
915.33 *3*	19.29 *20*	2095.57	6$^+$	1180.24	4$^+$	E2		0.00300 *5*	α=0.00300 *5*; α(K)=0.00254 *4*; α(L)=0.000364 *5*; α(M)=7.83×10^{-5} *11*; α(N+..)=2.04×10^{-5} *3* α(N)=1.769×10^{-5} *25*; α(O)=2.61×10^{-6} *4*; α(P)=1.508×10^{-7} *22* α(K)exp=0.0025 *4* (1970GrYP), 0.0025 *5* (1963Ba31). δ(M3/E2)=+0.016 *27* (1977Ka14).
1013.81 *3*	22.79 *19*	2194.05	6$^+$	1180.24	4$^+$	E2+M3	−0.025 *14*	0.00243 *4*	α=0.00243 *4*; α(K)=0.00206 *4*; α(L)=0.000290 *5*; α(M)=6.22×10^{-5} *10*; α(N+..)=1.62×10^{-5} *3* α(N)=1.404×10^{-5} *22*; α(O)=2.08×10^{-6} *4*; α(P)=1.224×10^{-7} *20* α(K)exp=0.0024 *4* (1970GrYP), 0.0020 *4* (1963Ba31). Additional information 1.
1344.6 *2*	0.066 *5*	1894.93	4$^+$	550.27	2$^+$	E2		0.001392 *20*	α=0.001392 *20*; α(K)=0.001163 *17*; α(L)=0.0001570 *22*; α(M)=3.35×10^{-5} *5*; α(N+..)=3.86×10^{-5} α(N)=7.59×10^{-6} *11*; α(O)=1.133×10^{-6} *16*; α(P)=6.93×10^{-8} *10*; α(IPF)=2.98×10^{-5} *5*

[†] Additional information 2.
[‡] Relative intensity from 1977Ka14.
[#] From adopted gammas. Supporting data from this decay are from α(K)exp (1963Ba31,1970GrYP), $\gamma\gamma(\theta)$ (1977Ka14).
[@] From adopted gammas. δ from $\gamma\gamma(\theta)$ (1977Ka14) are given in comments.
[&] For absolute intensity per 100 decays, multiply by 0.890 *9*.

^{148}Pm β^- decay (41.29 d) 1977Ka14

Decay Scheme

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