^{206}Pb(α,5nγ) 1985Ra18

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 166, 1 (2020)	20-Apr-2020

Reaction: ^{205}Pb(α,5n) at E=60 MeV; measured Eγ, Iγ, $\gamma(\theta)$, γ(t), and $\gamma\gamma$(t). ^{204}Pb(α,3n) at Eα=43 MeV; measured conversion electron coefficients; Detectors: small Ge(Li) planar detectors, large coaxial Ge(Li) detectors, and Si(Li) detectors; Deduced: Level scheme, J$^{\pi}$, T$_{1/2}$, transition rates, and configurations.

Others: 1970Ya03, 1973Fo07, 1974Ro36 and 1977Go15.

^{205}Po Levels

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$	Comments
0.0[#]	5/2$^-$	1.74 h *8*	J$^{\pi}$,T$_{1/2}$: From Adopted Levels.
719.20[@] *20*	9/2$^-$		
880.1[&] *3*	13/2$^+$	0.645 ms *20*	T$_{1/2}$: From 719γ(t) in 1973Fo07.
1030.2[a] *3*	11/2$^-$		
1461.0[b] *4*	19/2$^-$	58 ms *2*	T$_{1/2}$: From 581γ(t) in 1973Fo07. Other: 57 ms *1* in 1974Ro36.
1477.2 *4*			
1516.4[c] *4*	17/2$^+$		
1890.3[d] *4*	21/2$^+$		
2224.5[e] *5*	25/2$^+$	2.0 ns *7*	T$_{1/2}$: From γ(t) in 1985Ra18, obtained from a two-isomers fit to 334.2γ, 373.9γ and 636.3γ time spectra.
2712.1[f] *5*	27/2$^+$		
2826.7 *5*	27/2$^+$		
2980.5[e] *5*	29/2$^+$		
3087.0[g] *5*	29/2$^-$	115 ns *10*	T$_{1/2}$: From γ(t) in 1985Ra18. Sample time spectra are presented in 1985Ra18. The absence of prompt component in the 260γ(t) spectrum indicates that 260γ directly depopulates the isomer.
3160.5 *6*	29/2$^+$		
3206.2 *6*	31/2$^+$		
3298.3 *5*	29/2$^+$		
3367.9 *6*	31/2$^+$		
3508.7 *6*	31/2$^-$		
3868.6 *6*	33/2$^-$		
4093.1 *6*	33/2$^-$		
4136.6 *6*	35/2$^+$		
4453.7 *6*	(37/2$^-$)		
4628.6 *6*	37/2$^+$		

[†] From least squares fit to Eγ.

[‡] From transition multipolarities deduced using the angular distributions and conversion electron data, and multiple decay branches, unless otherwise specified.

[#] configuration=$\nu(f^{-1}_{5/2})$.

[@] configuration=$\nu(f^{-1}_{5/2})\otimes\pi(h^{+2}_{9/2})_{2^+}$.

[&] configuration=$\nu(i^{-1}_{13/2})$.

[a] configuration=$\nu(f^{-1}_{5/2})\otimes\pi(h^{+2}_{9/2})_{4^+}$.

[b] configuration=$\nu(f^{-1}_{5/2})\otimes\pi(h^{+2}_{9/2})_{8^+}$.

[c] configuration=$\nu((f^{-2}_{5/2})_{2^+},i^{-1}_{13/2})$.

[d] configuration=$\nu((f^{-2}_{5/2})_{4^+},i^{-1}_{13/2})$.

[e] configuration=$\nu(i^{-1}_{13/2})\otimes\pi(h^{+2}_{9/2})_{8^+}$.

[f] configuration=$\nu(f^{-1}_{5/2})\otimes\pi(h^{+1}_{9/2},i^{+1}_{13/2})_{11^-}$.

[g] configuration=$\nu(f^{-1}_{5/2},(i^{-2}_{13/2})_{12^+})$.

^{206}Pb(α,5nγ) 1985Ra18 (continued)

γ(^{205}Po)

Eγ†	Iγ†	Ei(level)	J^π_i	Ef	J^π_f	Mult.‡	Comments
106.5 2	1.90 19	3087.0	29/2−	2980.5	29/2+		
114.6 2		2826.7	27/2+	2712.1	27/2+		Eγ: Inferred from coincidence relations in 1985Ra18.
160.9 2	7.9 8	880.1	13/2+	719.20	9/2−	M2	Mult.: (α(L1)exp+α(L2)exp)=2.3 (1985Ra18); K/L=2.95 15 (1974Ro36).
210.4 2	5.0 5	3508.7	31/2−	3298.3	29/2+	E1	Mult.: α(K)exp=0.060 6; A_2=−0.28 7, A_4=0.12 1.
225.7 2	2.40 24	3206.2	31/2+	2980.5	29/2+	M1	Mult.: α(K)exp=1.02 10.
260.3 2	4.8 5	3087.0	29/2−	2826.7	27/2+	E1	Mult.: α(K)exp=0.0160 16; A_2=−0.14 1, A_4=−0.1 2.
268.0 2	5.0 5	4136.6	35/2+	3868.6	33/2−	(E1)	Mult.: α(K)exp<0.03; Note, that reported A_2=0.16 5 and A_4=−0.05 7 values (1985Ra18) are inconsistent with these expected for J to J-1 E1 transition.
311.0 2	2.20 22	1030.2	11/2−	719.20	9/2−	M1+E2	Mult.: α(K)exp=0.27 3.
334.2 2	48.7 24	2224.5	25/2+	1890.3	21/2+	E2	Mult.: α(K)exp=0.0460 23; A_2=0.31 2, A_4=−0.08 3.
360.6 2	1.40 14	4453.7	(37/2−)	4093.1	33/2−	E2	Mult.: α(K)exp=0.057 6.
373.9 2	55 3	1890.3	21/2+	1516.4	17/2+	E2	Mult.: α(K)exp=0.0330 17; A_2=0.29 2, A_4=−0.09 3.
374.8 2	6.4 6	3087.0	29/2−	2712.1	27/2+		
387.4 2	1.60 16	3367.9	31/2+	2980.5	29/2+	M1	Mult.: α(K)exp=0.27 3; A_2=−0.27 11, A_4=0.02 20.
447.0 2	1.00 10	1477.2		1030.2	11/2−		
448.4 2	5.9 6	3160.5	29/2+	2712.1	27/2+	M1	Mult.: α(K)exp=0.140 14; A_2=−0.19 7, A_4=−0.06 11.
471.6 2	2.7 3	3298.3	29/2+	2826.7	27/2+	M1(+E2)	Mult.: α(K)exp=0.030 3.
487.6 2	16.5 8	2712.1	27/2+	2224.5	25/2+	M1	Mult.: α(K)exp=0.120 6; A_2=−0.38 2, A_4=−0.05 2.
492.0 2	2.6 3	4628.6	37/2+	4136.6	35/2+	M1	Mult.: α(K)exp=0.11 1.
580.9 2	22.7 11	1461.0	19/2−	880.1	13/2+	E3	Mult.: α(K)exp=0.0420 21 (1985Ra18); K/(L+M)=1.55 16 (1974Ro36).
584.4 2	4.3 4	4093.1	33/2−	3508.7	31/2−	M1	Mult.: α(K)exp=0.050 5; A_2=−0.12 11, A_4=0.4 2.
602.2 2	4.6 5	2826.7	27/2+	2224.5	25/2+	M1	Mult.: α(K)exp=0.085 9; A_2=−0.41 5, A_4=−0.10 8.
636.3 2	60 3	1516.4	17/2+	880.1	13/2+	E2	Mult.: α(K)exp=0.0130 7; A_2=0.35 2, A_4=−0.06 3.
719.2 2	100 5	719.20	9/2−	0.0	5/2−	E2	Mult.: α(K)exp=0.0120 6. Note that reported A_2=0.04 1 value in 1985Ra18 is inconsistent with that expected one for a stretched E2 transition.
756.0 2	8.7 9	2980.5	29/2+	2224.5	25/2+	E2	Mult.: α(K)exp=0.0090 9; A_2=0.34 4, A_4=−0.02 5.
781.6 2	7.0 7	3868.6	33/2−	3087.0	29/2−	E2	Mult.: α(K)exp=0.0120 12; A_2=0.36 3, A_4=−0.08 5.
1073.8 2	2.8 3	3298.3	29/2+	2224.5	25/2+	E2	Mult.: α(K)exp=0.0080 8.

† From 1985Ra18, unless otherwise stated. The authors in 1985Ra18 quote ΔIγ=5-10%. The evaluator assumes ΔIγ=5% for Iγ≥10 and ΔIγ=10% for Iγ<10.

‡ From 1985Ra18 based on angular distribution and conversion electron data, coupled with the observed multiple decay branches. The authors in 1985Ra18 quote uncertainty in the measured conversion coefficients of 5% for the stronger and 10% for the weaker γ rays. Evaluator assumes uncertainty of 5% for γ rays with Iγ≥10 and 10% for Iγ<10.

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Level Scheme

Intentities: Relative I_γ