^{212}Pb β^- decay 1969Sc06,1984Ge07

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	K. Auranen and E. A. Mccutchan	NDS 168, 117 (2020)	1-Aug-2020

Parent: ^{212}Pb: E=0.0; $J^\pi=0^+$; $T_{1/2}$=10.622 h *7*; Q(β^-)=569.1 *18*; %β^- decay=100.0

Eγ: 1970Da28, 1968An08, 1968Da21, 1964Wi11, 1960Be11, 1960Ka09.

Iγ: 1992Li05, 1984Ge07, 1983Sc13, 1983Va22, 1982Sa36, 1978Av01, 1973Da38, 1969Sc06, 1968Da21, 1960Em01.

$\gamma\gamma$: 1961Gi02, 1960Ro16, 1958De25.

ce-data: 1978Av01, 1969Kr06, 1965Da07, 1957Ni11, 1956So24, 1955Ke39.

The level scheme is consistent as evidenced by the agreement between the Q value of the decay, 569.1 keV *18*, and the total energy release of 566.5 keV *57* as calculated by the RADLST code.

α: Additional information 1.

^{212}Bi Levels

E(level)†	J^π‡	$T_{1/2}$	Comments
0.0	$1^{(-)}$	60.55 min *6*	$T_{1/2}$: from the Adopted Levels.
115.183 *5*	$2^{(-)}$	8 ps *4*	$T_{1/2}$: from (ce)(ce)(t) (1971Va24).
238.632 *2*	$0^{(-)}$	1.0 ps *2*	J^π: (250<Eβ<350)(238.632γ)(θ) isotropic favors J=0 (1969Sc06). $T_{1/2}$: from $\beta\gamma$(t) (1963Li08). Other: ≤5 ps (β(ce)(t) 1971Va24).
415.272 *11*	$1^{(-)}$	≤10 ps	$T_{1/2}$: from β(ce)(t) (1971Va24). J^π: (300.087γ)(115.183γ)(θ) agrees only with 1(D)2(D)1 sequence if J(0.0 level)=1 and both 115.183γ and 300.087γ are D (1960Ro16,1961Gi02).

† From a least-squares fit to Eγ data.

‡ From the Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-†‡	Log *ft*	Comments
(153.8 *18*)	415.272	5.01 *7*	5.342 *17*	av Eβ=40.88 *51*
(330.5 *18*)	238.632	81.5 *10*	5.179 *10*	av Eβ=93.28 *56* E(decay): other: 330.7 keV *25* (1948Ma30), 338 keV *5* (1958Se71), and 340 keV (1949Gr26).
(569.1 *18*)	0.0	13.7 *10*	6.73 *4*	av Eβ=171.40 *62* E(decay): other: 590 keV *20* (1948Za05). Iβ^-: other: 12 *2* (1948Ma30).

† From I(γ+ce) imbalance, based on measured absolute γ-ray intensities.

‡ Absolute intensity per 100 decays.

γ(^{212}Bi)

Iγ normalization: from weighted average of the following measured absolute γ-ray intensities: Iγ(239)=44.1% *10* (1992Li05, from ^{232}Th decay), 43.3% *4* (1984Ge07, from ^{232}U decay), 43.5% *12* (1983Sc13, from ^{232}Th decay), and 44.0% *6* (1983Va22).

I(K x ray)/I(238.632γ)=0.73 *4* (1961Gi02); 0.76 *8* (1982Sa36).

I(Kα_1 x ray):I(Kα_2 x ray):I(Kβ x ray)=15.6 *9*: 11.0 *6*: 5.9 *4* (1982Sa36).

Continued on next page (footnotes at end of table)

^{212}Pb β^- decay 1969Sc06,1984Ge07 (continued)

$\gamma(^{212}Bi)$ (continued)

E_γ	I_γ[†][@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α	Comments
[x]42.11[#]								
[x]47.91[#]								
[x]48.56[#]								
[x]52.91[#]								
[x]56.72[#]								
115.183 *5*	1.368 *17*	115.183	$2^{(-)}$	0.0	$1^{(-)}$	M1	6.80	α(K)=5.53 *8*; α(L)=0.972 *14*; α(M)=0.229 *4*; α(N)=0.0585 *9*; α(O)=0.01196 *17* α(P)=0.001423 *20* E_γ: weighted average of 115.190 *6* (1977Ku25), 115.179 *9* (1963Ew06), 115.174 *8* (1963Se20). (Eγ have been recalculated by the evaluator from the B×ρ measurements of 1963Ew06 and 1963Se20). I_γ: others: 1.4 *3* (1961Gi02), 1.3 *3* (1972DaZA), 1.4 *1* (1978Av01), and 1.65 *12* (1982Sa36). Mult.: from α(K)exp=5.8 *9* (measured K x ray/γ in coincidence experiment, 1960Ro16) and L1:L2:L3=1:0.12 *1*: <0.02 (1957Kr49).
123.5[#]		238.632	$0^{(-)}$	115.183	$2^{(-)}$			
[x]164.2[#]								
176.68 *5*	0.120 *14*	415.272	$1^{(-)}$	238.632	$0^{(-)}$	M1	2.02	α(K)=1.645 *23*; α(L)=0.287 *4*; α(M)=0.0674 *10*; α(N)=0.01725 *25*; α(O)=0.00352 *5* α(P)=0.000419 *6* E_γ: from 1957Zh05. I_γ: others: 0.50 *10* (1961Gi02) and 0.10 *3* (1972DaZA). Mult.: from K/L=5.6 *6* (1957Kr49) and α(K)exp=1.9 *2* (Ice of 1957Zh05, adopted Iγ and α(L1)(115.178γ, M1)=0.912).
238.632 *2*	100.0 *8*	238.632	$0^{(-)}$	0.0	$1^{(-)}$	M1	0.872	α(K)=0.710 *10*; α(L)=0.1232 *18*; α(M)=0.0290 *4*; α(N)=0.00741 *11*; α(O)=0.001514 *22* α(P)=0.000180 *3* I(ce(K))/($\Sigma\beta^-$)=0.313 *6* (1948Ma30), 0.288 (1948Fe09). Other: 1955Ni19. E_γ: from 1979He10. Others: 238.625 *6* (1977Ku25), 238.624 *9* (1965Gr05, Eγ recalculated by the evaluator from B×ρ measurement). Mult.: from α(K)exp=0.74 *7* (measured K x ray/γ in coincidence experiment, 1960Ro16), K/L and L-subshell ratios (1969Ge01,1967Ho13,1959Se59,1957Kr49, 1957Vo22).
300.087 *10*	7.57 *7*	415.272	$1^{(-)}$	115.183	$2^{(-)}$	M1	0.464	α(K)=0.378 *6*; α(L)=0.0653 *10*; α(M)=0.01535 *22*; α(N)=0.00392 *6*; α(O)=0.000802 *12* α(P)=9.55×10^{-5} *14* E_γ: from 1977Ku25. I_γ: others: 7.7 *4* (1960Ro16), 6.9 *4* (1961Gi02), 7.7 *15* (1972DaZA), 6.3 *2* (1978Av01), 6.7 *5* (1982Sa36), 7.5 *2* (1983Sc13), 7.32 *14* (1983Va22) and 7.6 *3* (1992Li05). Mult.: from K/L1=5.7 *6* (1957Vo22) and α(K)exp=0.37 *4* (from Ice of 1957Vo22, adopted Iγ and α(K)(238.632γ, M1)=0.740).
415.2	0.030 *5*	415.272	$1^{(-)}$	0.0	$1^{(-)}$	(M1)	0.192	α(K)=0.1572 *22*; α(L)=0.0269 *4*; α(M)=0.00632

Continued on next page (footnotes at end of table)

^{212}Pb β^- decay 1969Sc06,1984Ge07 (continued)

$\gamma(^{212}Bi)$ (continued)

E_γ	E_i(level)	Comments
		9; α(N)=0.001617 *23*; α(O)=0.000330 *5* α(P)=3.94×10^{-5} *6* E_γ: from 1963Da11, 1957Vo22. I_γ: from Iγ(415)/Iγ(300)=0.0039 *6* (1990VeZW). Other values: Iγ(415)=0.33 *5* (1961Gi02), Iγ(415)≈0.3 (1960Ro16). Others: 1957Zh05, 1957Vo22. Mult.: From α(K)exp≈0.23 (from ce(K)=0.003% (1957Kr49) and Iγ=0.013% *2*).

† Relative intensity from 1984Ge07. Others: 1992Li05, 1983Sc13, 1983Va22.
‡ From the Adopted Gammas. For cases where support derives from this dataset, supporting evidence is given in the comments.
# From 1975SlZZ, observed with ^{212}Pb source and found to be converted in Bi.
@ For absolute intensity per 100 decays, multiply by 0.436 *4*.
x γ ray not placed in level scheme.

^{212}Pb β^- decay 1969Sc06,1984Ge07

Decay Scheme

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