^{196}Tl ε decay (1.41 h) 1968Pe13,1960Ju01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Huang Xiaolong	NDS 108, 1093 (2007)	1-Jan-2006

Parent: ^{196}Tl: E=395.; $J^\pi=(7^+)$; $T_{1/2}$=1.41 h *2*; Q(ε)=4330 *12*; %ε+%$β^+$ decay=96.2 *4*

^{196}Tl-%ε+%$β^+$ decay: Based upon the assumption that essentially all ε decays go through the 84(E2) transition in ^{196}Hg and all IT decays go through the 120(M4) transition in ^{196}Tl; ce(L3)(84)/ce(L3)(120)=16.9 *17* (1960Ju01), and theoretical conversion coefficients with 1.5% uncertainties.

Source prepared by Pb(p,spallation)^{196}Tl, E(p)=3 GeV, scin,semi, mass separator (1968Pe13); TH(p,spallation products), E(p)=600 MeV, scin, semi, isotope separator (1973BeYM).

The measurement reported here are for sources prepared by spallation reactions. There appears to be a significant admixture of the low-spin decay formed during the reaction and from IT decay.

For comments on unobserved and expected levels and gammas, see ^{196}Tl g.s. decay.

^{196}Hg Levels

E(level)†	J^π‡	$T_{1/2}$	Comments
0.0	0^+	stable	
426.3 *5*	2^+		
1061.6 *7*	4^+		
1757.0 *9*	5^-	0.555 ns *17*	$T_{1/2}$: from ce-γ(t) (1970To14).
1785.1 *10*	(6^+)		
1841.0 *9*	7^-	5.22 ns *16*	$T_{1/2}$: from ce-γ(t) (1970To14).
2346.0? *10*	$(5^-,6,7^-)$		

† From least-squares fit to Eγ′s.
‡ From Adopted Levels.

ε,$β^+$ radiations

E(decay)	E(level)	Iβ+ †	Iε†	Log *ft*	I(ε+$β^+$)†	Comments
(2379 *12*)	2346.0?	0.48 *21*	16 *7*	6.73 *19*	16 *7*	av Eβ=623.1 *53*; εK=0.7834 *7*; εL=0.14088 *17*; εM+=0.04542 *6*
(2884 *12*)	1841.0	6.0 *15*	69 *17*	6.25 *11*	75 *19*	av Eβ=845.1 *54*; εK=0.7448 *12*; εL=0.13254 *24*; εM+=0.04266 *8*
(2940 *12*)	1785.1	0.4 *3*	5 *3*	7.4 *3*	5 *3*	av Eβ=869.7 *54*; εK=0.7391 *13*; εL=0.13141 *25*; εM+=0.04229 *8*

† For absolute intensity per 100 decays, multiply by 0.962 *4*.

γ(^{196}Hg)

Measured electron intensities from 1960Ju01

Eγ(keV)	Mult	Shell	I_e
84.4 *3*	E2	L_{iii}	1690 *170*

Continued on next page (footnotes at end of table)

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γ(^{196}Hg) (continued)

E_γ[†]	I_γ[†‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[#]	$I_{(\gamma+ce)}$[‡]	Comments
84.03 *9*		1841.0	7^-	1757.0	5^-	E2	11.4	97 *15*	α(L3)=3.85; α(L)=8.46; α(M)=2.2025; N+=0.688 B(E2)(W.u.)=30.9 *11* $I_{(\gamma+ce)}$: required for intensity balance at 1757 level. E_γ: identified in conversion electron spectrum (1968Pe13). Mult.: L1:L2:L3=<0.07:1.00 *4*:0.97 *4*; M1:M2:M3:(M4+M5)=<0.3:1.00 *7*:0.96 *7*:0.028 *16*; L/M=4.0 *4*; M/N=3.4 *4* (1960Ju01).
[x]222.9 *10*	6 *3*								
[x]301.5 *12*	9 *5*								
426.3 *5*	102 *15*	426.3	2^+	0.0	0^+	E2	0.0401	106 *15*	α(K)=0.0277 *4*; α(L)=0.00940 *14*; α(M)=0.00234 *4*; α(N+..)=0.000688 *10* $I_{(\gamma+ce)}$: required for intensity balance at 426 level. I_γ: from I(γ+ce)/(1+α). Measured Iγ=222 *33* includes 1.84-h component.
505.2 *7*	14 *7*	2346.0?	$(5^-,6,7^-)$	1841.0	7^-				
588.8 *7*	3.7 *20*	2346.0?	$(5^-,6,7^-)$	1757.0	5^-				
635.3 *5*	104 *15*	1061.6	4^+	426.3	2^+	E2	0.01547	106 *15*	α(K)=0.01177 *17*; α(L)=0.00282 *4*; α(M)=0.000681 *10*; α(N+..)=0.000202 *3* $I_{(\gamma+ce)}$: required for intensity balance at 1062 level. I_γ: from I(γ+ce)/(1+α). Measured Iγ=125 *19* includes 1.84-h component. Mult.: supported by α(K)exp=0.014 *4* (1968Pe13), 0.012 (1973BeYM).
695.4 *5*	100 *15*	1757.0	5^-	1061.6	4^+	E1	0.00456		α(K)=0.00380 *6*; α(L)=0.000583 *9*; α(M)=0.0001340 *19*; α(N+..)=4.01×10^{-5} *6* Mult.: based upon α(K)exp=0.0041 *12* (1968Pe13), also 0.0034 *9* from 1973BeYM.
723.5 *6*	6 *3*	1785.1	(6^+)	1061.6	4^+				
[x]900.7 *10*									

[†] From 1968Pe13.
[‡] For absolute intensity per 100 decays, multiply by 0.90 *13*.
[#] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[x] γ ray not placed in level scheme.

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Decay Scheme

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

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$