^{127}In β^- decay (1.09 s) 2004Ga24

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	A. Hashizume	NDS 112, 1647 (2011)	1-Oct-2009

Parent: ^{127}In: E=0.0; J$^\pi$=(9/2$^+$); $T_{1/2}$=1.09 s *1*; Q(β^-)=6510 *30*; %β^- decay=100.0
2004Ga24: ^{235}U(n,F) E=th, on-line mass separation; γ, β, $\gamma\gamma$ coin, $\beta\gamma$ coin.
1980De35: ^{235}U(n,F) E=th, on-line mass separation; γ, β, ce, $\gamma\gamma$ coin, $\beta\gamma$ coin.
1986Go10: ^{235}U(n,F) E=th, on-line mass separation; γ, β, γ(t).
Others: 1975DeZU, 1978Al18, 1979DeZR.
The decay scheme is that proposed by 2004Ga24. Because of the large difference between the β-decay Q-value and the reported maximum level energy, evaluator considers that the decay scheme is not yet complete.

^{127}Sn Levels

Configurations are from (2004Ga24).

E(level)†	J$^\pi$‡	$T_{1/2}$	Comments
0.0	11/2$^-$	2.10 h *4*	Configuration=(ν $h_{11/2}$)$^{-1}$.
5.07 *6*	3/2$^+$	4.13 min *3*	Configuration=(ν $d_{3/2}$)$^{-1}$.
257.76 *8*	(1/2)$^+$		Configuration=(ν $s_{1/2}$)$^{-1}$.
646.31 *4*	(9/2)$^-$		Configuration=(^{128}Sn 2$^+$)(ν $h^{-1}_{11/2}$).
809.94 *6*	(5/2$^+$)		
953.95 *9*	(1/2,3/2)		Configuration=(^{128}Sn 2$^+$)(ν $d^{-1}_{3/2}$) or (^{128}Sn 2$^+$)(ν $s^{-1}_{1/2}$).
963.61 *6*	(7/2$^-$)		Configuration=(^{128}Sn 2$^+$)(ν $h^{-1}_{11/2}$).
1053.62 *6*	(7/2$^+$)		Configuration=(^{128}Sn 2$^+$)(ν $d^{-1}_{3/2}$).
1233.41 *24*	(3/2$^+$)		Configuration=(^{128}Sn 2$^+$)(ν $d^{-1}_{3/2}$) or (^{128}Sn 2$^+$)(ν $s^{-1}_{1/2}$).
1331.55 *11*	(5/2$^+$)		Configuration=(ν $d^{-1}_{5/2}$).
1555.91 *6*	(7/2$^-$,9/2$^+$)		
1602.65 *6*	(7/2$^+$)		Configuration=(ν $g^{-1}_{7/2}$).
1618.41 *16*	(7/2,9/2$^+$)		
1702.59 *7*	(7/2$^+$)		
1909.54 *7*	(7/2$^+$)		
2024.21 *8*	(7/2$^+$)		
2042.52 *11*	(7/2$^+$)		
2442.69 *10*	(7/2,9/2)		
2464.79 *10*	(7/2,9/2)		
2515.25 *15*	(7/2,9/2)		
2791.38 *15*	(7/2,9/2)		
2822.3 *3*	(7/2,9/2)		

† From a least-squares fit to E(γ's).
‡ From Adopted Levels.

β^- radiations

E(decay)‡	E(level)	Iβ^-†#	Log *ft*	Comments
(3.69×10^3 *3*)	2822.3	0.101 *17*	6.8	av Eβ=1568 *15*
(3.72×10^3 *3*)	2791.38	0.51 *6*	6.1	av Eβ=1583 *15*
(3.99×10^3 *3*)	2515.25	0.35 *4*	6.4	av Eβ=1713 *15*
(4.05×10^3 *3*)	2464.79	0.78 *8*	6.0	av Eβ=1737 *15*
(4.07×10^3 *3*)	2442.69	1.17 *11*	5.9	av Eβ=1747 *15*
(4.47×10^3 *3*)	2042.52	1.03 *8*	6.1	av Eβ=1936 *15*
(4.49×10^3 *3*)	2024.21	3.7 *3*	5.6	av Eβ=1945 *15*

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^{127}In β^- decay (1.09 s) 2004Ga24 (continued)

β^- radiations (continued)

E(decay)‡	E(level)	Iβ^-†#	Log *ft*	Comments
(4.60×10^3 *3*)	1909.54	3.52 *24*	5.6	av Eβ=1999 *15*
(4.81×10^3 *3*)	1702.59	1.88 *16*	6.0	av Eβ=2097 *15*
(4.89×10^3 *3*)	1618.41	0.27 *7*	5.9	
(4.91×10^3 *3*)	1602.65	77 *4*	4.4	av Eβ=2145 *15* E(decay): Eβ=4890 *70* from weighted av of Eβ=4860 *80* and 4990 *160* (1978Al18).
(4.95×10^3 *3*)	1555.91	0.71 *25*	6.5	av Eβ=2167 *15*
(5.18×10^3@ *3*)	1331.55	0.34 *8*	6.9	av Eβ=2273 *15*
(5.46×10^3 *3*)	1053.62	4.7 *8*	5.8	av Eβ=2405 *15*
(5.86×10^3 *3*)	646.31	1.9 *12*	6.4	av Eβ=2598 *15*

† From intensity balance of γ transitions. Values are, however, still tentative. It is because unobserved γ's from higher levels.
‡ From 1978Al18.
\# Absolute intensity per 100 decays.
@ Existence of this branch is questionable.

γ(^{127}Sn)

Iγ normalization: assumes no direct β-feedings to the ground state and 5.07 level. 2004Ga24 announce that β-feeding to ground state is less than 5%. Even allowing for 5% β-feeds the value will not change significantly. Other: the absolute branching of the 646.1γ is 9.3% *7* or 6.2% *6* depending on the decay scheme used, after β and γ measurements. For the 1597.43γ, the absolute branching is 9.3 *7* or 6.2 *6*, depending on the decay scheme used 1993RuZW.

E$_\gamma$†	I$_\gamma$#b	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.&a	α@	Comments
144.02 *16*	0.13 *3*	953.95	(1/2,3/2)	809.94	(5/2$^+$)	[M1]	0.203	α(K)=0.175 *3*; α(L)=0.0222 *4*; α(M)=0.00435 *7*; α(N+..)=0.000890 *13* α(N)=0.000819 *12*; α(O)=7.10×10^{-5} *11*
243.75 *4*	0.84 *9*	1053.62	(7/2$^+$)	809.94	(5/2$^+$)	M1,E2	0.060 *11*	α(K)exp=0.043 *17* α(K)=0.051 *9*; α(L)=0.0075 *23*; α(M)=0.0015 *5*; α(N+..)=0.00029 *9* α(N)=0.00027 *8*; α(O)=2.0×10^{-5} *4*
252.70 *4*	0.39 *5*	257.76	(1/2)$^+$	5.07	3/2$^+$	M1	0.0446	α(K)=0.0387 *6*; α(L)=0.00482 *7*; α(M)=0.000944 *14*; α(N+..)=0.000193 *3* α(N)=0.0001776 *25*; α(O)=1.549×10^{-5} *22* Mult.: from 3.67-s decay.
^{x}270.9‡ *3*	0.2 *1*							
317.61 *16*	0.27 *3*	963.61	(7/2$^-$)	646.31	(9/2)$^-$	[M1]	0.0247	α(K)=0.0214 *3*; α(L)=0.00265 *4*; α(M)=0.000518 *8*; α(N+..)=0.0001060 *15* α(N)=9.75×10^{-5} *14*; α(O)=8.52×10^{-6} *12*
321.7 *4*	0.102 *11*	2024.21	(7/2$^+$)	1702.59	(7/2$^+$)	[M1]	0.0239	α(K)=0.0207 *3*; α(L)=0.00256 *4*; α(M)=0.000501 *8*; α(N+..)=0.0001026 *15* α(N)=9.43×10^{-5} *14*; α(O)=8.24×10^{-6} *12*

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$^{127}In\ \beta^-$ decay (1.09 s) 2004Ga24 (continued)

$\gamma(^{127}Sn)$ (continued)

E_γ[†]	I_γ[#b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[&a]	α[@]	Comments
353.63 *9*	1.02 *10*	1909.54	(7/2⁺)	1555.91	(7/2⁻,9/2⁺)	[M1]	0.0188	α(K)=0.01628 *23*; α(L)=0.00201 *3*; α(M)=0.000392 *6*; α(N+..)=8.04×10⁻⁵ *12* α(N)=7.39×10⁻⁵ *11*; α(O)=6.47×10⁻⁶ *9*
421.56 *8*	0.155 *18*	2024.21	(7/2⁺)	1602.65	(7/2⁺)	[M1]	0.01207	α(K)=0.01048 *15*; α(L)=0.001284 *18*; α(M)=0.000251 *4*; α(N+..)=5.14×10⁻⁵ *8* α(N)=4.73×10⁻⁵ *7*; α(O)=4.14×10⁻⁶ *6*
424.4 *2*	0.60 *6*	2042.52	(7/2⁺)	1618.41	(7/2,9/2⁺)	[M1]	0.01187	α(K)=0.01031 *15*; α(L)=0.001262 *18*; α(M)=0.000247 *4*; α(N+..)=5.06×10⁻⁵ *8* α(N)=4.65×10⁻⁵ *7*; α(O)=4.08×10⁻⁶ *6*
468.3 *2*	2.34 *24*	2024.21	(7/2⁺)	1555.91	(7/2⁻,9/2⁺)	[M1]	0.00930 *13*	α=0.00930 *13*; α(K)=0.00808 *12*; α(L)=0.000987 *14*; α(M)=0.000193 *3*; α(N+..)=3.95×10⁻⁵ *6* α(N)=3.63×10⁻⁵ *6*; α(O)=3.19×10⁻⁶ *5*
487.2 *3*	0.23 *3*	2042.52	(7/2⁺)	1555.91	(7/2⁻,9/2⁺)	[M1]	0.00844 *12*	α=0.00844 *12*; α(K)=0.00734 *11*; α(L)=0.000895 *13*; α(M)=0.0001749 *25*; α(N+..)=3.58×10⁻⁵ α(N)=3.29×10⁻⁵ *5*; α(O)=2.89×10⁻⁶ *4*
502.6 *5*	0.18 *2*	1555.91	(7/2⁻,9/2⁺)	1053.62	(7/2⁺)			
ˣ523.3[‡] *3*	0.1 *1*							
549.14 *12*	0.50 *5*	1602.65	(7/2⁺)	1053.62	(7/2⁺)			
565.3 *10*	0.10 *3*	1618.41	(7/2,9/2⁺)	1053.62	(7/2⁺)			
577.9 *5*	0.36 *4*	1909.54	(7/2⁺)	1331.55	(5/2⁺)			
592.1 *4*	0.25 *4*	1555.91	(7/2⁻,9/2⁺)	963.61	(7/2⁻)			
639.07 *4*	6.0 *6*	1602.65	(7/2⁺)	963.61	(7/2⁻)			
646.34 *4*	14.5 *15*	646.31	(9/2)⁻	0.0	11/2⁻	M1,E2	0.0040 *3*	α(K)exp<0.004 α=0.0040 *3*; α(K)=0.0034 *3*; α(L)=0.000430 *21*; α(M)=8.4×10⁻⁵ *4*; α(N+..)=1.71×10⁻⁵ *10* α(N)=1.58×10⁻⁵ *8*; α(O)=1.34×10⁻⁶ *12*
649.1 *5*	0.32 *5*	1702.59	(7/2⁺)	1053.62	(7/2⁺)			
696.4 *3*	0.27 *4*	953.95	(1/2,3/2)	257.76	(1/2)⁺			
740.0 *8*	0.011 *7*	2442.69	(7/2,9/2)	1702.59	(7/2⁺)			
746.07 *8*	1.20 *12*	1555.91	(7/2⁻,9/2⁺)	809.94	(5/2⁺)			
748.9 *3*	0.23 *3*	1702.59	(7/2⁺)	953.95	(1/2,3/2)			
792.76 *5*	3.7 *4*	1602.65	(7/2⁺)	809.94	(5/2⁺)			
805.00 *5*	13.3 *14*	809.94	(5/2⁺)	5.07	3/2⁺			
808.8 *4*	0.60 *7*	1618.41	(7/2,9/2⁺)	809.94	(5/2⁺)			
809.7 *6*	0.13 *4*	2042.52	(7/2⁺)	1233.41	(3/2⁺)			
840.4 *8*	0.123 *17*	2442.69	(7/2,9/2)	1602.65	(7/2⁺)			

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^{127}In β^- decay (1.09 s) 2004Ga24 (continued)

γ(^{127}Sn) (continued)

E_γ †	I_γ #b	E_i(level)	J_i^π	E_f	J_f^π
855.94 *4*	1.94 *20*	1909.54	(7/2+)	1053.62	(7/2+)
892.65 *4*	1.91 *19*	1702.59	(7/2+)	809.94	(5/2+)
909.67 *8*	0.72 *7*	1555.91	(7/2−,9/2+)	646.31	(9/2)−
945.9 *2*	0.66 *8*	1909.54	(7/2+)	963.61	(7/2−)
948.90 *17*	1.00 *10*	953.95	(1/2,3/2)	5.07	3/2+
956.32 *9*	10.1 *10*	1602.65	(7/2+)	646.31	(9/2)−
963.61 *12*	7.8 *8*	963.61	(7/2−)	0.0	11/2−
970.5 *2*	0.47 *5*	2024.21	(7/2+)	1053.62	(7/2+)
972.5 *6*	0.047 *13*	1618.41	(7/2,9/2+)	646.31	(9/2)−
975.8 *4*	0.07 *2*	1233.41	(3/2+)	257.76	(1/2)+
x977‡ *1*	0.3 *1*				
x980‡ *1*	0.2 *1*				
989.4 *2*	0.38 *4*	2042.52	(7/2+)	1053.62	(7/2+)
1048.54 *3*	11.9 *11*	1053.62	(7/2+)	5.07	3/2+
1070.54 *10*	0.89 *13*	2024.21	(7/2+)	953.95	(1/2,3/2)
1073.8 *8*	0.050 *15*	1331.55	(5/2+)	257.76	(1/2)+
1088.34 *9*	0.26 *5*	2042.52	(7/2+)	953.95	(1/2,3/2)
1099.6 *2*	0.97 *10*	1909.54	(7/2+)	809.94	(5/2+)
1111.0 *6*	0.09 *3*	2442.69	(7/2,9/2)	1331.55	(5/2+)
1133.2 *7*	0.045 *15*	2464.79	(7/2,9/2)	1331.55	(5/2+)
1184.0 *9*	0.027 *12*	2515.25	(7/2,9/2)	1331.55	(5/2+)
1214.04 *9*	1.84 *18*	2024.21	(7/2+)	809.94	(5/2+)
1228.4 *3*	0.06 *2*	1233.41	(3/2+)	5.07	3/2+
1262.8 *5*	0.07 *2*	1909.54	(7/2+)	646.31	(9/2)−
1326.47 *9*	1.01 *10*	1331.55	(5/2+)	5.07	3/2+
1389.07 *8*	1.19 *12*	2442.69	(7/2,9/2)	1053.62	(7/2+)
1411.3 *2*	0.14 *4*	2464.79	(7/2,9/2)	1053.62	(7/2+)
x1436.6‡ *3*	0.6 *1*				
1555.70 *10*	2.37 *24*	1555.91	(7/2−,9/2+)	0.0	11/2−
1597.43 *6*	100	1602.65	(7/2+)	5.07	3/2+
1602.6 *5*	0.5 *2*	1602.65	(7/2+)	0.0	11/2−
1618.7 *3*	0.28 *2*	1618.41	(7/2,9/2+)	0.0	11/2−
1632.7 *3*	0.36 *5*	2442.69	(7/2,9/2)	809.94	(5/2+)
1697.3 *2*	0.60 *6*	1702.59	(7/2+)	5.07	3/2+
1705.3 *2*	0.07 *3*	2515.25	(7/2,9/2)	809.94	(5/2+)
1737.8 *3*	0.14 *4*	2791.38	(7/2,9/2)	1053.62	(7/2+)
1768.8 *3*	0.05 *2*	2822.3	(7/2,9/2)	1053.62	(7/2+)
x1771‡ *1*	0.2 *1*				
1796.2 *6*	0.05 *2*	2442.69	(7/2,9/2)	646.31	(9/2)−
1818.6 *4*	0.10 *3*	2464.79	(7/2,9/2)	646.31	(9/2)−
1827.5 *6*	0.027 *13*	2791.38	(7/2,9/2)	963.61	(7/2−)
1858.4 *6*	0.030 *9*	2822.3	(7/2,9/2)	963.61	(7/2−)
1904.1 *2*	0.46 *4*	1909.54	(7/2+)	5.07	3/2+
1981.40 *17*	0.57 *6*	2791.38	(7/2,9/2)	809.94	(5/2+)
2145.2 *4*	0.056 *10*	2791.38	(7/2,9/2)	646.31	(9/2)−
2175.7 *7*	0.078 *12*	2822.3	(7/2,9/2)	646.31	(9/2)−
2464.70 *12*	0.93 *10*	2464.79	(7/2,9/2)	0.0	11/2−
x2511‡ *1*	1.0 *1*				
2515.2 *2*	0.45 *4*	2515.25	(7/2,9/2)	0.0	11/2−

† From 2004Ga24.
‡ γ assigned either to 1.09-s or 3.65-s ^{127}In by (1980De35). There is also possible contribution from 1.04-s ^{127}In (evaluator).

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^{127}In β^- decay (1.09 s) 2004Ga24 (continued)

$\gamma(^{127}Sn)$ (continued)

However, these γ's were not reported by 2004Ga24.

[#] From 2004Ga24. Relative to Iγ(1597γ)=100.

[@] Theoretical conversion coefficients are calculated using BrIcc code for the multipolarity indicated.

[&] From α(K)exp (1980De35) and from K/L(1980De35).

[a] The multipolarities in brackets were assumed by evaluator to obtain transition intensities, and not used for spin and parity determination.

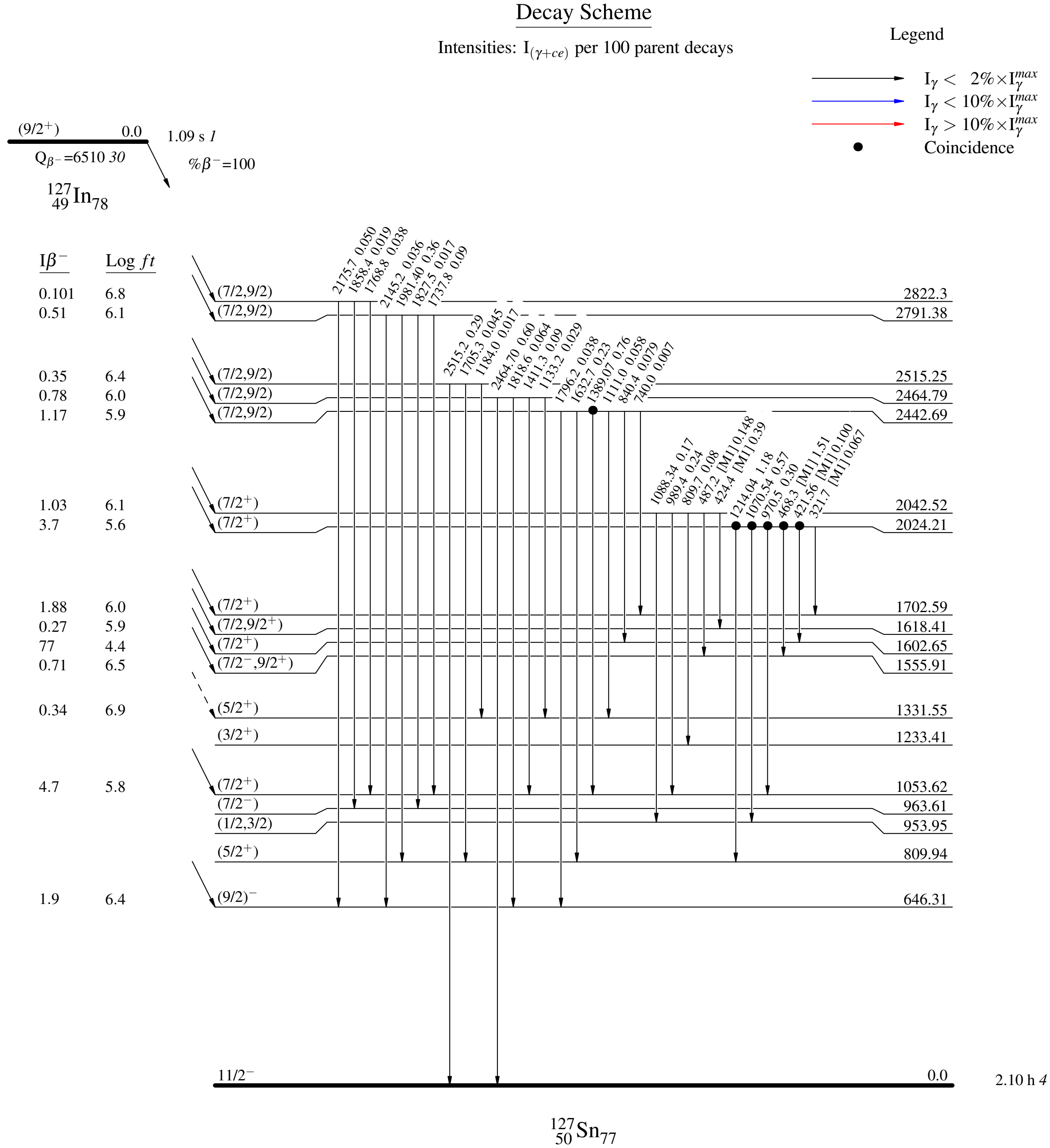
[b] For absolute intensity per 100 decays, multiply by 0.64 *3*.

[x] γ ray not placed in level scheme.

^{127}In β^- decay (1.09 s) 2004Ga24

Decay Scheme

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



^{127}In β^- decay (1.09 s) 2004Ga24

Decay Scheme (continued)

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