^{104}In ε decay (1.80 min) 1989Va05,1978Hu06,1977Va06

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 108,2035 (2007)	30-Mar-2007

Parent: ^{104}In: E=0; $J^\pi=(6^+)$; $T_{1/2}$=1.80 min *3*; Q(ε)=7870 *80*; %ε+%$β^+$ decay=100.0

Activity: ^{106}Cd(p,xn) E=39 MeV (1978Hu06), ^{92}Mo(^{16}O,3np) E=100 MeV (1989Va05,1977Va06), ^{92}Mo(^{14}N,2n) E=72 MeV (1989Va05,1976CoYX), ^{92}Mo(^{20}Ne,3p5n) (1989Va05).

1989Va05 selected α=104 by means of the mass separator.

Measured: γ, γγ, β, βγ.

1991Sh19: from a measurement of mass ratio ^{104}In/^{103}In and combined with the mass of ^{104}Cd, they give a Q+=7938 keV *140* for ^{104}In.

The level scheme is mainly derived from 1989Va05.

Data from 1978Hu06 are consistent with the data from 1977Va06 and 1976CoYX but are more complete. Some discrepancies for the γ energies between 1978Hu06 and 1977Va06 should, however, be noted. An 884.8-keV γ line (Iγ=0.48) has been observed by 1978Hu06 but has not been seen by others. The levels above 2492 keV are from 1989Va05 and 1978Hu06 only.

$T_{1/2}$(^{104}In): weighted average of values from 1978Hu06, 1977Va06, 1976CoYX.

The 0^-, 658.0-, and 1492.1-keV levels are assumed to be the first members of the g.s. band and are therefore, assigned $J^\pi=0^+$, 2^+, and 4^+.

^{104}Cd Levels

E(level)	J^π	$T_{1/2}$	E(level)	J^π	E(level)	J^π
0	0^+	57.7 min *10*	2773.6 *5*		3687.2 *6*	
658.0 *2*	2^+		2844.3 *5*	(5,6,7)	3738.0 *9*	
1492.1 *4*	4^+		2903.2 *5*	8^+	3786.8 *7*	
2114.3 *4*	$(4)^+$		3080.5 *5*		3830.6 *9*	
2296.2 *7*			3110.5 *5*		3949.0 *6*	$(5^+,6^+,7^+)$
2370.2 *4*	6^+		3137.0 *4*		4151.3 *7*	
2435.4 *5*	6^+		3194.4 *5*		4253.9 *5*	
2492.3 *6*			3210.4 *5*	8^+	4311.1 *9*	
2539.2 *4*			3239.9 *5*		4400.0 *6*	$(5^+,6^+,7^+)$
2607.3 *5*			3252.6 *6*		4498.8 *6*	
2613.9 *4*			3297.9 *4*	8^+	4518.7 *5*	
2617.5 *5*			3391.8 *4*		4800	$(5^+,6^+,7^+)$
2723.6 *5*			3498.3 *5*		5200	$(5^+,6^+,7^+)$
2758.7 *9*			3616.6 *5*	$(5^+,6^+,7^+)$	5600	$(5^+,6^+,7^+)$

ε,$β^+$ radiations

E(decay)	E(level)	Iβ+ ‡	Iε†‡	Log *ft*	I(ε+β+)‡	Comments
(2.27×10^3 *8*)	5600	9.5 *18*	27 *3*	3.68 *8*	37 *4*	av Eβ=556 *36*; εK=0.64 *4*; εL=0.082 *5*; εM+=0.0204 *12*
(2.67×10^3 *8*)	5200	7.8 *15*	9.2 *18*	4.30 *10*	17 *3*	av Eβ=735 *37*; εK=0.47 *4*; εL=0.059 *5*; εM+=0.0148 *11*
(3.07×10^3 *8*)	4800	15 *2*	8.9 *13*	4.43 *8*	24 *3*	av Eβ=917 *37*; εK=0.32 *3*; εL=0.041 *4*; εM+=0.0102 *8*
(3.47×10^3 *8*)	4400.0	5.1 *19*	1.7 *7*	5.25 *17*	6.8 *25*	av Eβ=1101 *37*; εK=0.220 *17*; εL=0.0279 *22*; εM+=0.0069 *6*
(3.92×10^3 *8*)	3949.0	4.8 *11*	0.99 *23*	5.60 *11*	5.8 *13*	av Eβ=1311 *38*; εK=0.147 *11*; εL=0.0186 *14*; εM+=0.0046 *4*
(4.25×10^3 *8*)	3616.6	4.2 *4*	0.62 *8*	5.88 *7*	4.8 *5*	av Eβ=1467 *38*; εK=0.111 *8*; εL=0.0140 *10*; εM+=0.00350 *24*
(4.68×10^3 *8*)	3194.4	<0.3	<0.03	>7.3	<0.3	av Eβ=1666 *38*; εK=0.080 *5*; εL=0.0101 *7*; εM+=0.00252 *16*

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^{104}In ε decay (1.80 min) 1989Va05,1978Hu06,1977Va06 (continued)

ε,β+ radiations (continued)

E(decay)	E(level)	Iβ+ ‡	Iε†‡	Log *ft*	I(ε+β+)‡	Comments
(5.03×10^3 *8*)	2844.3	3.6 *4*	0.28 *3*	6.36 *6*	3.9 *4*	av Eβ=1832 *38*; εK=0.062 *4*; εL=0.0079 *5*; εM+=0.00196 *12*

† From imbalances but 1989Va05 point out not reliable.
‡ Absolute intensity per 100 decays.

γ(^{104}Cd)

Iγ normalization: Σ I(γ+ce) to g.s.=100, assuming no Iε to g.s.
Above 4800 level, statistical gammas not resolved.

E_γ	I_γ‡@	E_i(level)	J_i^π	E_f	J_f^π
x173.2† *8*	0.22 *12*				
292.5† *12*	0.29 *18*	3137.0		2844.3	(5,6,7)
321.2 *2*	3.2 *4*	2435.4	6+	2114.3	(4)+
x330.5† *5*	0.46 *18*				
x337.4† *6*	0.42 *18*				
x342.3† *8*	0.41 *19*				
378.3 *5*	0.98 *20*	2492.3		2114.3	(4)+
403.3 *4*	0.77 *17*	2773.6		2370.2	6+
x419.8† *10*	0.40 *20*				
424.4† *6*	0.64 *20*	2539.2		2114.3	(4)+
467.7† *4*	0.70 *21*	2903.2	8+	2435.4	6+
473.9 *1*	5.2 *3*	2844.3	(5,6,7)	2370.2	6+
x481.9† *6*	0.50 *21*				
499.7† *2*	2.4 *3*	2613.9		2114.3	(4)+
502.6# *8*	4.3 *6*	2617.5		2114.3	(4)+
533.0 *3*	2.76 *23*	2903.2	8+	2370.2	6+
548.4† *6*	0.50 *22*	3391.8		2844.3	(5,6,7)
x614.3† *5*	1.00 *25*				
622.2 *2*	14.5 *4*	2114.3	(4)+	1492.1	4+
x631.0† *3*	0.76 *22*				
x636.0† *7*	0.57 *24*				
658.0 *2*	100	658.0	2+	0	0+
710.2† *3*	1.2 *3*	3080.5		2370.2	6+
760.5† *5*	0.65 *23*	3252.6		2492.3	
767.4† *8*	2.0 *3*	3137.0		2370.2	6+
772.4† *3*	0.6 *3*	3616.6	(5+,6+,7+)	2844.3	(5,6,7)
775.9† *4*	1.2 *5*	3210.4	8+	2435.4	6+
x793.8† *3*	1.12 *21*				
804.1† *6*	0.68 *23*	3239.9		2435.4	6+
817.2 *3*	1.6 *3*	3252.6		2435.4	6+
834.1 *3*	99 *3*	1492.1	4+	658.0	2+
841.1 *2*	1.38 *23*	3210.4	8+	2370.2	6+
x862.1† *5*	0.77 *24*				
878.1 *2*	29.4 *12*	2370.2	6+	1492.1	4+

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^{104}In ε decay (1.80 min) 1989Va05,1978Hu06,1977Va06 (continued)

γ(^{104}Cd) (continued)

E_γ	I_γ ‡@	E_i(level)	J_i^π	E_f	J_f^π
x884.8†	0.48				
927.6† 2	2.0 3	3297.9	8^+	2370.2	6^+
943.3 6	14.9 8	2435.4	6^+	1492.1	4^+
x956.7† 5	0.81 22				
1000.5 6	9.7 6	2492.3		1492.1	4^+
1021.4† 2	1.27 20	3391.8		2370.2	6^+
x1039.6† 3	1.34 25				
1047.7† 4	1.0 2	2539.2		1492.1	4^+
1115.2† 3	0.54 22	2607.3		1492.1	4^+
1125.4 3	1.0 3	2617.5		1492.1	4^+
x1138.6† 9	0.38 23				
x1146.4† 9	0.48 25				
x1164.9† 6	0.68 25				
x1211.5† 10	0.32 23				
x1229.0† 19	0.31 24				
1231.5† 3	0.38 18	2723.6		1492.1	4^+
1245.4† 7	0.49 24	3738.0		2492.3	
x1268.1† 16	0.4 3				
x1275.3† 10	0.40 24				
1281.9 3	2.4 4	2773.6		1492.1	4^+
1316.9† 4	1.3 3	3687.2		2370.2	6^+
x1328.2† 11	0.30 23				
1338.0† 7	0.52 24	3830.6		2492.3	
x1344.0† 5	1.1 3				
1353.0† 9	1.0 3	2844.3	(5,6,7)	1492.1	4^+
x1360.8† 13	0.35 24				
x1382.1† 13	0.5 3				
x1408.3† 6	0.54 24				
1416.5† 5	1.2 3	3786.8		2370.2	6^+
1456.2† 7	0.6 3	2114.3	$(4)^+$	658.0	2^+
x1460.5† 3	0.8 4				
x1467.6† 11	0.31 23				
x1491.9† 4	1.1 3				
1496.5† 3	0.8 4	4400.0	$(5^+,6^+,7^+)$	2903.2	8^+
1514.4† 5	1.6 4	3949.0	$(5^+,6^+,7^+)$	2435.4	6^+
x1539.5† 7	0.8 3				
x1573.4† 9	0.48 25				
1578.7† 7	0.6 3	3949.0	$(5^+,6^+,7^+)$	2370.2	6^+
1618.4† 3	1.9 7	3110.5		1492.1	4^+
1638.2† 6	0.7 3	2296.2		658.0	2^+
1644.6† 2	1.2 5	3137.0		1492.1	4^+
x1654.7† 14	0.34 23				
x1667.0† 5	0.64 24				
1674.5† 3	2.0 4	4518.7		2844.3	(5,6,7)
1701.2 8	0.6 3	3194.4		1492.1	4^+
1715.6† 5	0.7 3	4151.3		2435.4	6^+

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^{104}In ε decay (1.80 min) 1989Va05,1978Hu06,1977Va06 (continued)

γ(^{104}Cd) (continued)

E_γ	I_γ‡@	E_i(level)	E_f	J^π_f
x1723.8† 9	0.38 24			
x1730.8†	0.10 5			
x1736.7† 7	0.6 3			
1747.8† 5	0.65 25	3239.9	1492.1	4+
x1752.9† 9	0.39 23			
x1771.0† 11	0.5 3			
x1800.7† 12	0.35 24			
1818.2† 3	0.9 5	4253.9	2435.4	6+
x1855.0† 9	0.45 24			
1881.3† 5	1.1 3	2539.2	658.0	2+
1940.8† 8	0.7 3	4311.1	2370.2	6+
x1998.0† 5	1.0 3			
2006.2 3	1.8 4	3498.3	1492.1	4+
2006.2† 3	1.8 4	4498.8	2492.3	
x2074.0† 4	0.74 24			
2100.7† 8	0.6 3	2758.7	658.0	2+
x2110.4† 21	0.33 25			
x2131.5† 11	0.27 21			
x2136.9† 9	0.54 25			
x2152.2† 11	0.37 23			
x2206.4† 9	0.45 24			
x2220.9† 4	0.7 3			
x2252.8† 6	0.9 3			
x2422.1† 10	0.46 25			
x2480.6† 8	0.52 23			
x2498.3† 7	0.60 23			
x2655.7† 13	0.25 20			
x2667.6† 8	0.51 22			
x2702.3† 6	0.55 22			
x2712.2† 11	0.26 18			
x2758.8† 14	0.24 20			
x2923.6† 8	0.40 19			
x2934.6† 11	0.31 18			
x3139.2† 9	0.31 18			
x3150.0† 6	0.62 21			
x3316.5† 12	0.22 15			
x3351.5† 10	0.25 15			
x3380.0† 14	0.17 13			
x3547.3† 17	0.17 14			
x3707.5† 9	0.26 13			
x3733.7† 12	0.13 10			
x3740.7† 8	0.26 12			
x3819.1† 9	0.31 13			
x3850.7† 12	0.17 12			
x3937.3† 14	0.14 11			
x3943.6† 12	0.21 12			
x3965.1† 12	0.18 11			

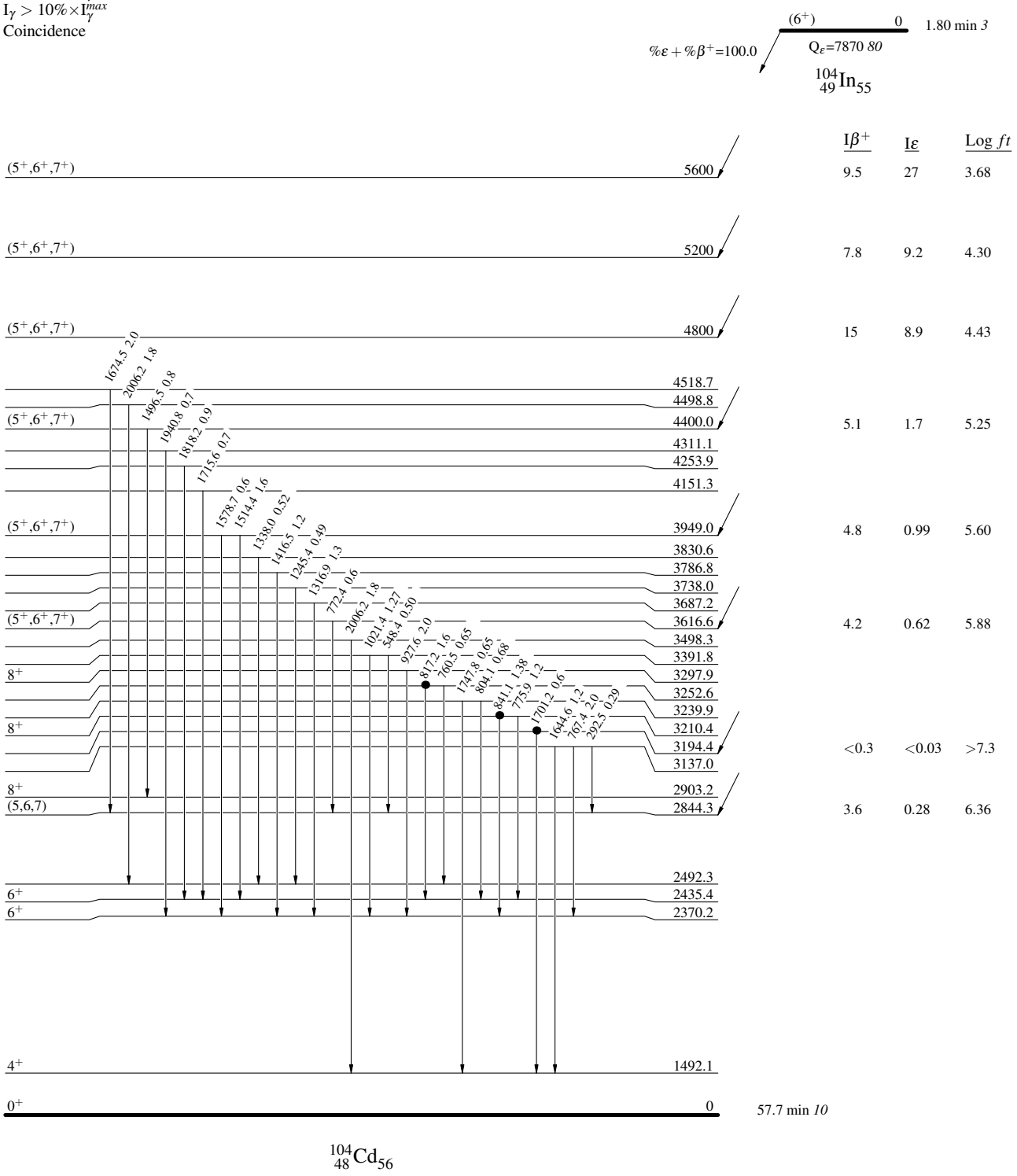
† Seen only by 1989Va05.
‡ From 1989Va05.
# Not seen by 1989Va05.
@ Absolute intensity per 100 decays.
x γ ray not placed in level scheme.

^{104}In ε decay (1.80 min) 1989Va05,1978Hu06,1977Va06

Decay Scheme

Intensities: I_γ per 100 parent decays

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



^{104}In ε decay (1.80 min) 1989Va05,1978Hu06,1977Va06

Decay Scheme (continued)

Intensities: I_γ per 100 parent decays