^{100}In ε decay (5.65 s) 2002Pl03

History

Type	Author	Citation	Literature Cutoff Date
Update	Balraj Singh and Jun Chen	ENSDF	15-Sep-2021

Parent: ^{100}In: E=0; J$^{\pi}$=(6^{+}); $T_{1/2}$=5.65 s *6*; Q(ε)=10016.4 *28*; %ε+%β^{+} decay=100.0
^{100}In-J$^{\pi}$,$T_{1/2}$: From ^{100}In Adopted Levels.
^{100}In-Q(ε): From 2021Wa16.
Q value updated to 2021Wa16 value, LOGFT code rerun, %εp value revised; B. Singh, Sept 15, 2021. No new references since Sept 15, 2021.
2002Pl03 (also 2003Pl02): ^{100}In produced by ^{50}Cr(^{58}Ni,3p5n) E=5.6 MeV/nucleon at GSI facility followed by mass separation. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\beta\gamma\gamma$-coin, lifetimes in high-resolution experiment using a HPGe detector, an EUROBALL-type cluster, a superclover from the VEGA array, and a low-energy photon spectrometer, and in a total-absorption experiment (TAS) using a large NaI(Tl) crystal, ancillary detectors, two Si detectors and one Ge detector. Deduced levels, β-decay branching ratios. Comparisons with available data.
Total decay energy deposit of 6552 keV *144* calculated by RADLIST code is lower than the expected value of 10016.4 keV *28*. Total absorption measurement suggest that a significant fraction of γ-ray intensity is missing in the level scheme.
All data are from 2002Pl03, unless otherwise noted.

^{100}Cd Levels

E(level)†	J$^{\pi}$#	Comments
0.0@	0^{+}	
1004.11@ *10*	2^{+}	
1798.97@ *14*	(4^{+})	
2046.16 *20*	(4^{+})	
2095.63@ *17*	(6^{+})	
2458.18 *18*	(6^{+})	
2548.43@ *20*	(8^{+})	
3164.16 *25*	(4^{+},5,6^{+})	J$^{\pi}$: 2002Pl03 suggest (5^{-},6^{+}) based on shell-model predictions and decay modes. But figure 12 in 2002Pl03 gives calculated positive parity levels, not the negative parity levels. Amongst the calculated levels, 4^{+}, two 5^{+} and 6^{+} levels lie close together.
3199.7 *3*	(8^{+})	J$^{\pi}$: from shell-model predictions (2002Pl03).
3.6×10^{3}‡ *2*		
3.8×10^{3}‡ *2*		
4.0×10^{3}‡ *2*		
4.2×10^{3}‡ *2*		
4.4×10^{3}‡ *2*		
4.6×10^{3}‡ *2*		
4.8×10^{3}‡ *2*		
5.0×10^{3}‡ *2*		
5.2×10^{3}‡ *2*		
5.4×10^{3}‡ *2*		
5.6×10^{3}‡ *2*		
5.8×10^{3}‡ *2*		
6.0×10^{3}‡ *2*		
6.2×10^{3}‡ *2*		
6.4×10^{3}‡ *2*		
6.6×10^{3}‡ *2*		
6.8×10^{3}‡ *2*		
7.0×10^{3}‡ *2*		

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^{100}In ε decay (5.65 s) 2002Pl03 (continued)

^{100}Cd Levels (continued)

E(level)[†]	E(level)[†]	E(level)[†]
7.2×10^3[‡] *2*	7.6×10^3[‡] *2*	8.0×10^3[‡] *2*
7.4×10^3[‡] *2*	7.8×10^3[‡] *2*	8.2×10^3[‡] *2*
		8.4×10^3[‡] *2*

[†] From least-squares fit to Eγ data, 658.2γ not used in the fitting procedure since with this γ, reduced χ^2=4.2 is high.
[‡] Pseudo-level suggested from TAS data in 200 keV intervals (2002Pl03). This group is not included in the Adopted Levels.
[#] From Adopted Levels, which are mostly adopted from assignments by 2002Pl03 based on g.s. yrast structure, systematics of even-even nuclei near closed shells and shell-model predictions unless otherwise noted.
[@] Band(A): g.s. Yrast structure.

ε,β^+ radiations

E(decay)	E(level)	Iβ^+ [‡]	Iε[‡]	Log *ft*	I($\varepsilon+\beta^+$)[†‡]	Comments
(1.62×10^3 *20*)	8400	0.001	0.05	4.8	0.05	av Eβ=269 *87*; εK=0.84 *4*; εL=0.108 *6*; εM+=0.0270 *13*
(1.82×10^3 *20*)	8200	0.004	0.06	4.9	0.06	av Eβ=356 *88*; εK=0.80 *6*; εL=0.103 *8*; εM+=0.0257 *20*
(2.02×10^3 *20*)	8000	0.01	0.08	4.8	0.09	av Eβ=444 *89*; εK=0.74 *8*; εL=0.095 *11*; εM+=0.024 *3*
(2.22×10^3 *20*)	7800	0.030	0.100	4.8	0.13	av Eβ=532 *90*; εK=0.66 *9*; εL=0.085 *12*; εM+=0.021 *3*
(2.42×10^3 *20*)	7600	0.10	0.21	4.6	0.31	av Eβ=621 *90*; εK=0.58 *9*; εL=0.073 *12*; εM+=0.018 *3*
(2.62×10^3 *20*)	7400	0.32	0.42	4.3	0.74	av Eβ=711 *91*; εK=0.49 *9*; εL=0.062 *12*; εM+=0.015 *3*
(2.82×10^3 *20*)	7200	0.39	0.34	4.5	0.73	av Eβ=802 *92*; εK=0.41 *8*; εL=0.052 *11*; εM+=0.013 *3*
(3.02×10^3 *20*)	7000	1.05	0.67	4.3	1.72	av Eβ=893 *92*; εK=0.34 *7*; εL=0.043 *9*; εM+=0.0107 *23*
(3.22×10^3 *20*)	6800	2.4	1.2	4.1	3.57	av Eβ=984 *93*; εK=0.28 *6*; εL=0.035 *8*; εM+=0.0088 *19*
(3.42×10^3 *20*)	6600	5.2	1.9	3.9	7.12	av Eβ=1076 *93*; εK=0.23 *5*; εL=0.029 *7*; εM+=0.0073 *16*
(3.62×10^3 *20*)	6400	7.0	2.0	3.9	9.06	av Eβ=1169 *93*; εK=0.19 *4*; εL=0.024 *5*; εM+=0.0061 *13*
(3.82×10^3 *20*)	6200	11.0	2.5	3.9	13.54	av Eβ=1262 *94*; εK=0.16 *4*; εL=0.020 *4*; εM+=0.0051 *10*
(4.02×10^3 *20*)	6000	10.7	2.0	4.0	12.70	av Eβ=1356 *94*; εK=0.14 *3*; εL=0.017 *4*; εM+=0.0043 *8*
(4.22×10^3 *20*)	5800	9.5	1.4	4.2	10.90	av Eβ=1449 *95*; εK=0.114 *21*; εL=0.014 *3*; εM+=0.0036 *7*
(4.42×10^3 *20*)	5600	3.97	0.51	4.7	4.48	av Eβ=1544 *95*; εK=0.097 *17*; εL=0.0123 *22*; εM+=0.0031 *6*
(4.62×10^3 *20*)	5400	4.56	0.49	4.8	5.05	av Eβ=1638 *95*; εK=0.084 *14*; εL=0.0106 *18*; εM+=0.0026 *5*
(4.82×10^3 *20*)	5200	3.37	0.31	5.0	3.68	av Eβ=1733 *95*; εK=0.072 *12*; εL=0.0091 *15*; εM+=0.0023 *4*
(5.02×10^3 *20*)	5000	3.76	0.30	5.1	4.06	av Eβ=1828 *96*; εK=0.063 *10*; εL=0.0079 *12*; εM+=0.0020 *3*
(5.22×10^3 *20*)	4800	3.94	0.27	5.1	4.21	av Eβ=1923 *96*; εK=0.055 *8*; εL=0.0069 *10*; εM+=0.00173 *25*
(5.42×10^3 *20*)	4600	3.64	0.22	5.3	3.86	av Eβ=2018 *96*; εK=0.048 *7*; εL=0.0061 *9*; εM+=0.00152 *21*
(5.62×10^3 *20*)	4400	1.68	0.087	5.7	1.77	av Eβ=2114 *96*; εK=0.043 *6*; εL=0.0054 *8*; εM+=0.00134 *18*
(5.82×10^3 *20*)	4200	2.76	0.126	5.6	2.89	av Eβ=2210 *96*; εK=0.038 *5*; εL=0.0048 *6*; εM+=0.00119 *16*
(6.02×10^3 *20*)	4000	2.88	0.117	5.6	3.00	av Eβ=2306 *97*; εK=0.034 *5*; εL=0.0042 *6*; εM+=0.00106 *13*
(6.22×10^3 *20*)	3800	2.04	0.074	5.8	2.11	av Eβ=2402 *97*; εK=0.030 *4*; εL=0.0038 *5*; εM+=0.00095 *12*
(6.42×10^3 *20*)	3600	0.90	0.029	6.3	0.93	av Eβ=2498 *97*; εK=0.027 *3*; εL=0.0034 *4*; εM+=0.00085 *10*
(6817[#] *3*)	3199.7	<1.8	<0.046	>6.1	<1.8	av Eβ=2691.8 *14*; εK=0.02207 *3*; εL=0.002778 *4*;

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^{100}In ε decay (5.65 s) 2002Pl03 (continued)

ϵ,β^+ radiations (continued)

E(decay)	E(level)	Iβ^+ ‡	Iε‡	Log *ft*	I($\varepsilon+\beta^+$)†‡	Comments
						εM+=0.0006920 *1* I($\varepsilon+\beta^+$): apparent $\varepsilon+\beta^+$ feeding=6.1 *5*. $J^\pi=8^+$ level is not expected to be populated directly from (6$^+$) parent.
(6852# *3*)	3164.16	<1.8	<0.045	>6.1	<1.8	av Eβ=2709.0 *14*; εK=0.02169 *3*; εL=0.002729 *4*; εM+=0.0006800 *1* I($\varepsilon+\beta^+$): apparent $\varepsilon+\beta^+$ feeding=5.4 *7*.
(7468# *3*)	2548.43	<1.3	<0.024	>6.5	<1.3	av Eβ=3007.5 *14*; εK=0.016265 *21*; εL=0.002046 *3*; εM+=0.0005097 *7* I($\varepsilon+\beta^+$): apparent $\varepsilon+\beta^+$ feeding=9.4 *8*.
(7558# *3*)	2458.18	<1.3	<0.024	>6.5	<1.3	av Eβ=3051.3 *14*; εK=0.015628 *20*; εL=0.0019657 *2*; εM+=0.0004897 *6* I($\varepsilon+\beta^+$): apparent $\varepsilon+\beta^+$ feeding=16 *1*.
(7921# *3*)	2095.63	<3.0	<0.046	>6.3	<3.0	av Eβ=3227.7 *14*; εK=0.013379 *16*; εL=0.0016824 *2*; εM+=0.0004191 *5* I($\varepsilon+\beta^+$): apparent $\varepsilon+\beta^+$ feeding=33 *3*.
(7970# *3*)	2046.16	<0.9	<0.01	>6.8	<0.9	av Eβ=3251.8 *14*; εK=0.013107 *16*; εL=0.0016481 *2*; εM+=0.0004106 *5* I($\varepsilon+\beta^+$): apparent $\varepsilon+\beta^+$ feeding=5.3 *7*.
(8217# *3*)	1798.97	<0.9	<0.01	>6.9	<0.9	av Eβ=3372.3 *14*; εK=0.011850 *14*; εL=0.0014898 *1*; εM+=0.0003711 *5* I($\varepsilon+\beta^+$): apparent $\varepsilon+\beta^+$ feeding=21 *8*.
(9012# *3*)	1004.11	<0.99	<0.010	>7.0	<1.0	av Eβ=3760.6 *14*; εK=0.008754 *9*; εL=0.0011000 *1*; εM+=0.0002740 *3* I($\varepsilon+\beta^+$): apparent $\varepsilon+\beta^+$ feeding=5 *7*.

† From total absorption spectrum (2002Pl03). Apparent feedings from γ-intensity balances are given under comments.
‡ Absolute intensity per 100 decays.
# Existence of this branch is questionable.

γ(^{100}Cd)

Iγ normalization: I(γ)(1004γ)=98.34 *3*, assuming no other g.s. transition exists in this decay, and delayed proton branch %εp=1.66 *3* from ^{100}In Adopted Levels.

E$_\gamma$	I$_\gamma$‡	E$_i$(level)	J$^\pi_i$	E$_f$	J$^\pi_f$	Mult.	α#	Comments
(90.7 *1*)	0.43	2548.43	(8$^+$)	2458.18	(6$^+$)	[E2]	2.12 *3*	I$_\gamma$: deduced from branching ratio in Adopted Gammas.
296.8 *1*	60 *3*	2095.63	(6$^+$)	1798.97	(4$^+$)			
362.7 *1*	8.9 *10*	2458.18	(6$^+$)	2095.63	(6$^+$)			
411.7 *3*	2.8 *4*	2458.18	(6$^+$)	2046.16	(4$^+$)			
452.8 *1*	9.4 *8*	2548.43	(8$^+$)	2095.63	(6$^+$)			
658.2† *3*	4.2 *4*	2458.18	(6$^+$)	1798.97	(4$^+$)			
794.9 *1*	88 *5*	1798.97	(4$^+$)	1004.11	2$^+$			
1004.1 *1*	100 *5*	1004.11	2$^+$	0.0	0$^+$			
1041.9 *2*	8.1 *6*	2046.16	(4$^+$)	1004.11	2$^+$			
1068.5 *2*	2.9 *4*	3164.16	(4$^+$,5,6$^+$)	2095.63	(6$^+$)			
1104.1 *2*	6.1 *5*	3199.7	(8$^+$)	2095.63	(6$^+$)			
1365.3 *5*	2.5 *5*	3164.16	(4$^+$,5,6$^+$)	1798.97	(4$^+$)			

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^{100}In ε decay (5.65 s) 2002Pl03 (continued)

γ(^{100}Cd) (continued)

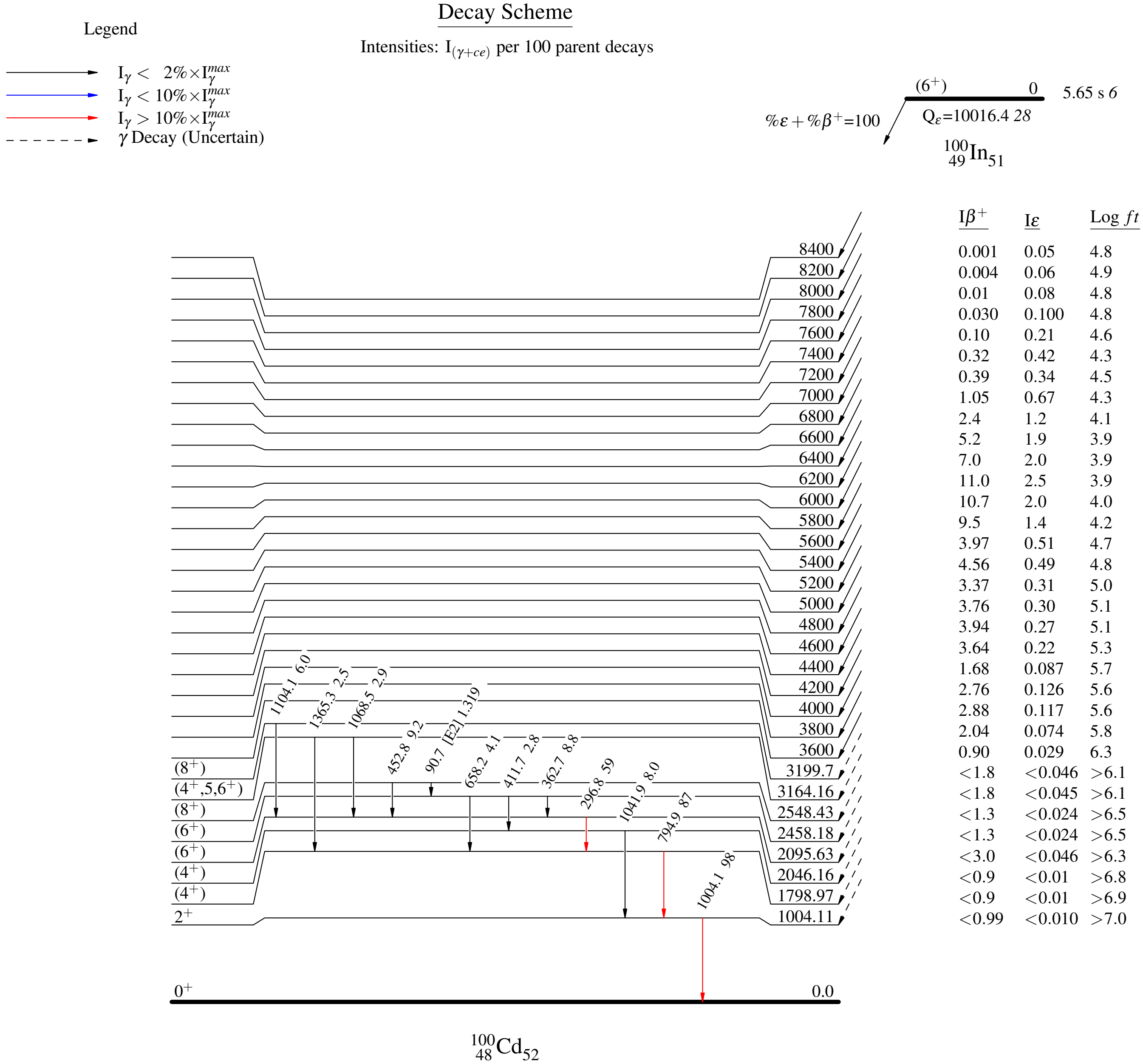
† Poor fit; level-energy difference=659.2.

‡ For absolute intensity per 100 decays, multiply by 0.9834 *3*.

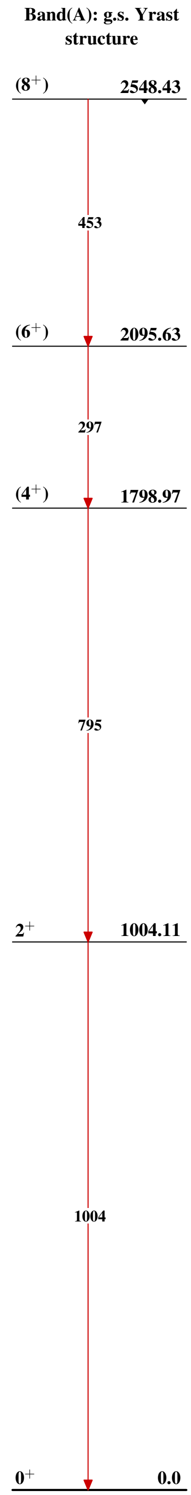
Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

^{100}In ε decay (5.65 s) 2002Pl03

Decay Scheme



^{100}In ε decay (5.65 s) 2002Pl03



$^{100}_{48}Cd_{52}$