^{123}Cd β^- decay (2.10 s) 1989Hu03,1986Ho24

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 174, 1 (2021)	15-Apr-2021

Parent: ^{123}Cd: E=0.0; J$^\pi$=3/2$^{(+)}$; T$_{1/2}$=2.10 s *3*; Q(β^-)=6015 *20*; %β^- decay=100.0

^{123}Cd-J$^\pi$,T$_{1/2}$: From Adopted Levels of ^{123}Cd.

^{123}Cd-Q(β^-): From 2021Wa16.

1989Hu03: source of ^{123}Cd was produced via the U(n,F) reaction with fast neutrons produced from the Be(d,n) reaction at the TANDAR Laboratory. Fission products were separated by an electro-magnetic mass separator. γ rays were detected with two HPGe detectors (FWHM=1.95 keV at 1.33 MeV). Measured Eγ, Iγ, $\gamma\gamma$-coin, γ(t). Deduced levels, J, π, parent T$_{1/2}$, β-decay branching ratios, log *ft*. Systematics of neighboring odd-mass In isotopes. Comparisons with theoretical calculations.

1986Ho24: source of ^{123}Cd was produced via ^{235}U(n,F) with neutrons provided by the R2-0 reactor at Studvik. Fission products were separated by the mass separator OSIRIS. γ rays were detected with Ge detectors. Conversion electrons were detected with a small high-resolution Si detector. Measured Eγ, Iγ, $\gamma\gamma$-coin, γ(t). Deduced levels, J, π, parent T$_{1/2}$, β-decay branching ratios, log *ft*. Systematics of neighboring odd-mass In isotopes.

Others: 1973BaUR, 1981Ru07, 1983Re05, 1986Go10, 1986Ma42, 1987Sp09, 2014TeZY.

The decay scheme is that proposed by 1989Hu03. Fast-neutron fission favors high-spin isomer. γ-rays were distinguished by comparing the results from 1986Ho24. Decay scheme from 1986Ho24 is mixed from decays of g.s. and isomer. There are some discrepancies between the level scheme from 1989Hu03 and from 1986Ho24. The evaluator has adopted the g.s. decay scheme from 1989Hu03. However, there are many unplaced γ rays, as well as a large gap between the highest level and Q-value, therefore, the decay scheme is considered as incomplete and the deduced β-feedings and log *ft* as approximate.

^{123}In Levels

E(level)†	J$^\pi$‡	T$_{1/2}$‡
0.0	9/2$^+$	6.15 s *27*
327.21 *5*	1/2$^-$	47.4 s *8*
698.51 *4*	(3/2)$^-$	
1052.29 *3*	(5/2$^+$)	
1137.55 *5*	(3/2$^-$,5/2$^-$)	
1512.12 *4*	7/2$^+$,9/2$^+$	
1566.24 *4*	(9/2$^+$)	
1615.72 *7*	(1/2,3/2,5/2$^-$)	
1926.55 *6*	(1/2,3/2,5/2$^-$)	
2020.63 *4*	(7/2$^-$)	
2029.91 *6*	(1/2$^+$,3/2$^+$)	
2136.63 *4*	(1/2$^+$,3/2$^+$)	
2158.59 *7*	(1/2$^+$,3/2$^+$,5/2$^+$)	
2377.32 *9*	(1/2$^+$,3/2$^+$,5/2$^+$)	
2393.31 *4*	(5/2$^+$)	
2429.48 *6*	(1/2$^+$,3/2$^+$,5/2$^+$)	
2529.30 *6*	(1/2$^+$,3/2$^+$)	
2541.31 *5*	(1/2$^+$,3/2$^+$)	

† From a least-squares fit to γ-ray energies.
‡ From Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^-†‡	Log *ft*	Comments
(3474 *20*)	2541.31	14.3 *7*	4.8 *1*	av Eβ=1517 *16*
(3486 *20*)	2529.30	10.5 *5*	5.0 *1*	av Eβ=1523 *16*
(3586 *20*)	2429.48	5.3 *4*	5.3 *1*	av Eβ=1570 *16*
(3622 *20*)	2393.31	21.2 *12*	4.7 *1*	av Eβ=1587 *16*
(3638 *20*)	2377.32	4.4 *6*	5.4 *1*	av Eβ=1594 *16*
(3856 *20*)	2158.59	4.1 *3*	5.6 *1*	av Eβ=1697 *16*
(3878 *20*)	2136.63	13.7 *10*	5.0 *1*	av Eβ=1708 *16*
(3985 *20*)	2029.91	5.1 *9*	5.5 *1*	av Eβ=1758 *16*
(3994 *20*)	2020.63	1.21 *11*	6.2 *1*	av Eβ=1763 *16*
(4088 *20*)	1926.55	1.0 *4*	6.3 *2*	av Eβ=1807 *16*
(4399 *20*)	1615.72	2.9 *6*	6.0 *1*	av Eβ=1955 *16*
(4877 *20*)	1137.55	3.9 *8*	6.0 *1*	av Eβ=2182 *16*

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^{123}Cd β^- decay (2.10 s) 1989Hu03,1986Ho24 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ⁻ [†‡]	Log *ft*	Comments
(4963 *20*)	1052.29	15.2 *18*	5.5 *1*	av Eβ=2222 *16*
(5316 *20*)	698.51	≤2	≥6.5	av Eβ=2390 *16*

[†] From γ+ce intensity imbalance at each level. Quoted values should be considered as approximate due to incomplete decay scheme.
[‡] Absolute intensity per 100 decays.

$\gamma(^{123}In)$

Iγ normalization: From ΣI(γ+ce to g.s.+327)=100. No β feeding is expected to g.s. (2nd forbidden) and feeding to 327 level is assumed to be negligible (≤1 from log *ft*=6.9 for 1st forbidden in this mass region).

E_γ [†]	I_γ [†@]	E_i(level)	J^π_i	E_f	J^π_f	Mult.	α [&]	Comments
[x]244.0 *3*	0.37 *22*							
256.69 *5*	2.8 *4*	2393.31	(5/2⁺)	2136.63	(1/2⁺,3/2⁺)			
347.48 *8*	3.0 *5*	2377.32	(1/2⁺,3/2⁺,5/2⁺)	2029.91	(1/2⁺,3/2⁺)			
353.63 *7*	3.6 *4*	1052.29	(5/2⁺)	698.51	(3/2)⁻			
363.7 *6*	0.25 *2*	2393.31	(5/2⁺)	2029.91	(1/2⁺,3/2⁺)			
371.32 *3*	52 *3*	698.51	(3/2)⁻	327.21	1/2⁻	M1 [#]	0.0153	α(K)=0.0133; α(L)=0.00161; α(M)=0.00031 Eγ: other: 371.2 *2* (1981Ru07).
438.68 [‡] *5*	2.32 *25*	1137.55	(3/2⁻,5/2⁻)	698.51	(3/2)⁻			
454.25 *5*	0.25 *3*	2020.63	(7/2⁻)	1566.24	(9/2⁺)			
512.0 *5*	0.41 *8*	2541.31	(1/2⁺,3/2⁺)	2029.91	(1/2⁺,3/2⁺)			
[x]525.20 *20*	1.01 *14*							
[x]545.4 *3*	2.64 *22*							
602.73 *3*	1.22 *2*	2529.30	(1/2⁺,3/2⁺)	1926.55	(1/2,3/2,5/2⁻)			
615.1 *9*	1.39 *13*	2541.31	(1/2⁺,3/2⁺)	1926.55	(1/2,3/2,5/2⁻)			
[x]714.00 *25*	0.46 *14*							
810.29 *3*	6.3 *6*	1137.55	(3/2⁻,5/2⁻)	327.21	1/2⁻			
813.63 *9*	1.9 *3*	2429.48	(1/2⁺,3/2⁺,5/2⁺)	1615.72	(1/2,3/2,5/2⁻)			
827.23 *25*	0.33 *15*	2393.31	(5/2⁺)	1566.24	(9/2⁺)			
881.17 *5*	4.4 *9*	2393.31	(5/2⁺)	1512.12	7/2⁺,9/2⁺			
883.0 *9*	0.25 *6*	2020.63	(7/2⁻)	1137.55	(3/2⁻,5/2⁻)			
[x]913.41 *15*	2.0 *4*							
917.16 *6*	4.4 *5*	1615.72	(1/2,3/2,5/2⁻)	698.51	(3/2)⁻			
999.12 *15*	1.4 *3*	2136.63	(1/2⁺,3/2⁺)	1137.55	(3/2⁻,5/2⁻)			
[x]1044.88 *12*	1.7 *3*							
1052.28 *3*	25.1 *16*	1052.29	(5/2⁺)	0.0	9/2⁺			Eγ: other: 1052.3 *2* (1981Ru07).
1084.32 *3*	5.0 *4*	2136.63	(1/2⁺,3/2⁺)	1052.29	(5/2⁺)			
1227.50 [‡] *5*	2.48 *24*	1926.55	(1/2,3/2,5/2⁻)	698.51	(3/2)⁻			
1255.65 *5*	2.62 *21*	2393.31	(5/2⁺)	1137.55	(3/2⁻,5/2⁻)			
1288.35 *20*	0.38 *7*	1615.72	(1/2,3/2,5/2⁻)	327.21	1/2⁻			
1324.77 *15*	1.4 *3*	2377.32	(1/2⁺,3/2⁺,5/2⁺)	1052.29	(5/2⁺)			
1331.44 *5*	6.6 *6*	2029.91	(1/2⁺,3/2⁺)	698.51	(3/2)⁻			
1341.06 *5*	3.1 *3*	2393.31	(5/2⁺)	1052.29	(5/2⁺)			
1377.36 *10*	1.39 *20*	2429.48	(1/2⁺,3/2⁺,5/2⁺)	1052.29	(5/2⁺)			
1403.37 *15*	0.44 *11*	2541.31	(1/2⁺,3/2⁺)	1137.55	(3/2⁻,5/2⁻)			

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^{123}Cd β^- decay (2.10 s) 1989Hu03,1986Ho24 (continued)

γ(^{123}In) (continued)

E_γ [†]	I_γ [†@]	E_i(level)	J^π_i	E_f	J^π_f
1438.13 *5*	8.4 *7*	2136.63	(1/2$^+$,3/2$^+$)	698.51	(3/2)$^-$
1460.07 *5*	4.1 *3*	2158.59	(1/2$^+$,3/2$^+$,5/2$^+$)	698.51	(3/2)$^-$
1488.91 *5*	2.6 *3*	2541.31	(1/2$^+$,3/2$^+$)	1052.29	(5/2$^+$)
1512.09 *5*	4.28 *25*	1512.12	7/2$^+$,9/2$^+$	0.0	9/2$^+$
[x]1519.48 *10*	1.09 *16*				
1566.09 *5*	0.33 *2*	1566.24	(9/2$^+$)	0.0	9/2$^+$
[x]1594.8 *7*	0.63 *6*				
1599.23 *12*	1.17 *19*	1926.55	(1/2,3/2,5/2$^-$)	327.21	1/2$^-$
[x]1641.86 *20*	0.63 *13*				
1694.81 *5*	7.1 *5*	2393.31	(5/2$^+$)	698.51	(3/2)$^-$
1702.37[‡] *7*	2.2 *3*	2029.91	(1/2$^+$,3/2$^+$)	327.21	1/2$^-$
1730.95 *6*	1.99 *19*	2429.48	(1/2$^+$,3/2$^+$,5/2$^+$)	698.51	(3/2)$^-$
1809.50 *9*	1.72 *18*	2136.63	(1/2$^+$,3/2$^+$)	327.21	1/2$^-$
1830.78 *5*	6.1 *4*	2529.30	(1/2$^+$,3/2$^+$)	698.51	(3/2)$^-$
1842.86 *5*	7.8 *5*	2541.31	(1/2$^+$,3/2$^+$)	698.51	(3/2)$^-$
[x]1976.00 *10*	2.2 *3*				
2020.71 *4*	0.71 *5*	2020.63	(7/2$^-$)	0.0	9/2$^+$
2202.14 *7*	3.2 *3*	2529.30	(1/2$^+$,3/2$^+$)	327.21	1/2$^-$
2214.33 *10*	1.61 *21*	2541.31	(1/2$^+$,3/2$^+$)	327.21	1/2$^-$
2393.46 *15*	0.71 *2*	2393.31	(5/2$^+$)	0.0	9/2$^+$

[†] From 1989Hu03, unless otherwise noted. Values are also available in the decay schemes in 1986Ho24 but no tabulated data are given.

[‡] Poor fit. Uncertainty are increased to 0.2 keV in the fitting procedure.

[#] As given in the decay scheme in 1986Ho24 based on ce data. The same values are adopted in Adopted Gammas. No ce data is explicitly given by 1986Ho24.

[@] Absolute intensity per 100 decays.

[&] 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