

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen, Balraj Singh		NDS 164, 1 (2020)	15-Feb-2020

Q(β^-)=-1293×10¹ 40; S(n)=15250 SY; S(p)=410×10¹ 12; Q(α)=-3960 50 2017Wa10,2019Pa16
 Measured Q(β^-)=-12930 400 (2019Pa16, from β^- spectrum). 2017Wa10 give -13740 300 from systematic trend.
 Estimated uncertainty for S(n)=300 (2017Wa10).
 Q(ϵ p)=2880 50, S(2n)=28210 400 (syst), S(2p)=6030 50 (2017Wa10).

Other measurements:

1997Gr02: identification of an isomer in ⁹⁸Cd from separation of fragments from Ni(¹¹²Sn,X) at E=63 MeV/nucleon. A total of eight counts were assigned to a possible (8⁺), 0.2- μ s isomer. Deduced T_{1/2} of the isomer. See also 1998GrZS for T_{1/2} of the isomer populated by fragmentation of ¹⁰⁶Cd (ENAM conference Proc. p430, 1998, Bellaire, Michigan).
 1978EI09, 1992PI01: ⁹⁸Cd produced by spallation reaction Sn(p,x) at E=600 MeV followed by mass-separation.
 1969HaZU: ⁹²Mo(¹²C,6n γ),E=70-95 MeV. A 1435 γ assigned tentatively to deexcite first 2⁺ level in ⁹⁸Cd.
 Theory references: consult the NSR database (www.nndc.bnl.gov/nsr/) for 50 primary references, 45 dealing with nuclear structure calculations, and 5 with decay modes and half-lives.

Additional information 1.

⁹⁸Cd Levels

Cross Reference (XREF) Flags

A	⁹⁸ In ϵ decay (30 ms)	D	⁹ Be(¹²⁴ Xe,X γ)
B	⁹⁸ In ϵ decay (0.89 s)	E	⁴⁶ Ti(⁵⁸ Ni, α 2n γ)
C	⁹⁹ Sn ϵ p decay (24 ms)	F	⁵⁸ Ni(⁴⁶ Ti, α 2n γ)

E(level) [†]	J π [‡]	T _{1/2}	XREF	Comments
0.0 [#]	0 ⁺	9.3 s 1	AB DEF	% ϵ +% β^+ =100; % ϵ p<0.029 (2019Pa16) T=1 T _{1/2} : weighted average of 9.3 s 1 (2019Pa16, $\beta\gamma$ (t)) and 9.2 s 3 (1992PI01). Others: 8.1 s 5 (1988RyZY), \approx 8 s (1978EI09), 2002StZU. % ϵ p from 2019Pa16. Other: <0.025 (1996He25,1997Ra22).
1395.1 [#] 2	(2 ⁺)		B DEF	
2082.8 [#] 3	(4 ⁺)		B DEF	
2281.1 [#] 3	(6 ⁺)	13 ns 2	B DEF	%IT=100 T _{1/2} : from (147 γ)(198 γ +688 γ +1395 γ)(t) in (¹²⁴ Xe,X γ) (2017Pa35). Other: <20 ns in (⁵⁸ Ni, α 2n γ) (2004B110, centroid shift method).
2428.3 [#] 4	(8 ⁺)	154 ns 16	B DEF	%IT=100 T _{1/2} : from $\gamma\gamma$ (t) in (¹²⁴ Xe,X γ) (2017Pa35, note that 149 ns 14 is also quoted in authors' text). Others: 0.17 μ s +6-4 (2004B110) and 0.48 μ s 16 (1997Go18) in $\gamma\gamma$ (t) in (⁵⁸ Ni, α 2n γ); 0.20 μ s +30-17 (1997Gr02) and 0.19 μ s 2 (1998GrZS). Note that values from 1997Go18, 1997Gr02 and 1998GrZS could have contribution from the 224-ns isomer at 6635 also, first identified by 2004B110, since that isomer could have been also populated, but was not identified by 1997Go18, 1997Gr02 and 1998GrZS.
6585 2	(10 ⁺)		B D	XREF: B(?). Core-excited state as interpreted by 2017Pa35 in (¹²⁴ Xe,X γ).
6635 2	(12 ⁺)	224 ns 5	DEF	%IT=100 Core-excited state as interpreted by 2017Pa35, 2010B113 and 2004B110 in (¹²⁴ Xe,X γ) and (⁵⁸ Ni, α 2n γ). J π : tentatively assigned by 2004B110 in (⁵⁸ Ni, α 2n γ) based on shell-model predictions and observed isomeric decay. The same assignment is given in

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

⁹⁸Cd Levels (continued)

<u>E(level)[†]</u>	<u>J^π[‡]</u>	<u>T_{1/2}</u>	<u>XREF</u>	<u>Comments</u>
				2017Pa35, 2010B113, 2006Ve09 and 2004B110. T _{1/2} : from γγ(t) in (¹²⁴ Xe,Xγ) (2017Pa35). Others: 0.21 μs 2 (2019Ha26, γ(t) at RIBF-RIKEN); 0.23 μs +4-3 (2004B110) in (⁵⁸ Ni,α2nγ), 0.23 μs 8 (2010B113) in (¹²⁴ Xe,Xγ), 0.23 μs +8-9 (2006Ve09) in (⁴⁶ Ti,α2nγ).

[†] From γ-ray energies.

[‡] From 1997Go18 in (⁵⁸Ni,α2nγ), based on systematics of neighboring N=50 isotones and shell-model predictions of πg_{9/2}⁻² structure, unless otherwise noted.

Seq.(A): Yrast cascade.

γ(⁹⁸Cd)

<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_γ</u>	<u>I_γ</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult.</u>	<u>α[†]</u>	<u>Comments</u>
1395.1	(2 ⁺)	1395.1 2	100	0.0	0 ⁺			E _γ : weighted average of 1395.5 2 in ⁹⁸ In decay (0.89 s), 1394.8 2 in (⁵⁸ Ni,α2nγ) and 1395.1 3 in (⁴⁶ Ti,α2nγ).
2082.8	(4 ⁺)	687.7 2	100	1395.1	(2 ⁺)			E _γ : weighted average of 687.8 2 in ⁹⁸ In decay (0.89 s), 687.7 3 in (⁵⁸ Ni,α2nγ) and 687.7 2 in (⁴⁶ Ti,α2nγ).
2281.1	(6 ⁺)	198.3 1	100	2082.8	(4 ⁺)	[E2]	0.1336	B(E2)(W.u.)=4.7 8 α(K)=0.1105 17; α(L)=0.0188 3; α(M)=0.00366 6 α(N)=0.000627 10; α(O)=2.28×10 ⁻⁵ 4 E _γ : weighted average of 198.4 1 in ⁹⁸ In decay (0.89 s) and 198.1 2 in (⁵⁸ Ni,α2nγ). Other: 197.6 1 in (⁴⁶ Ti,α2nγ), seems low in energy as compared to the other two values.
2428.3	(8 ⁺)	147.2 1	100	2281.1	(6 ⁺)	(E2)	0.381	B(E2)(W.u.)=1.43 15 α(K)=0.306 6; α(L)=0.0609 11; α(M)=0.01198 22 α(N)=0.00202 4; α(O)=6.04×10 ⁻⁵ 10 E _γ : weighted average of 147.2 1 in ⁹⁸ In decay (0.89 s) and 147.2 2 in (⁵⁸ Ni,α2nγ). Other: 146.5 2 in (⁴⁶ Ti,α2nγ), seems low in energy as compared to the other two values.
6585	(10 ⁺)	4158 2	100	2428.3	(8 ⁺)			Mult.: from α(K)exp in (⁵⁸ Ni,α2nγ). E _γ : from (¹²⁴ Xe,Xγ).
6635	(12 ⁺)	(49 2)	0.68 18	6585	(10 ⁺)	[E2]	19 4	α(K)=9.8 12; α(L)=7.5 17; α(M)=1.5 4; α(N)=0.25 6; α(O)=0.00166 19 B(E2)(W.u.)=2.0 9 E _γ : from (¹²⁴ Xe,Xγ) only (2017Pa35, and priv. comm. Dec 14, 2019 from J. Park).
		4207 1	100 2	2428.3	(8 ⁺)	[E4]	0.0001 6	B(E4)(W.u.)=3.03 16 E _γ : from 2006Ve09 in (⁴⁶ Ti,α2nγ). Other: 4207 2 in ⁹ Be(¹²⁴ Xe,Xγ).

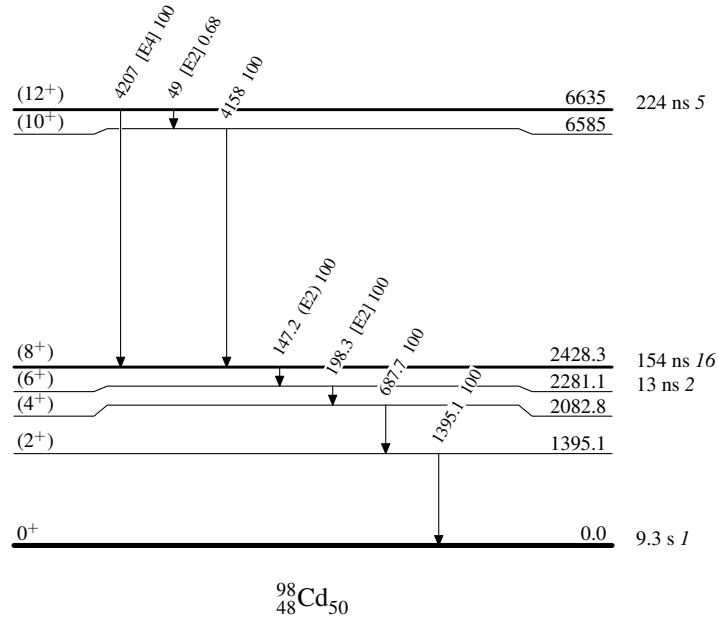
[†] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

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Legend

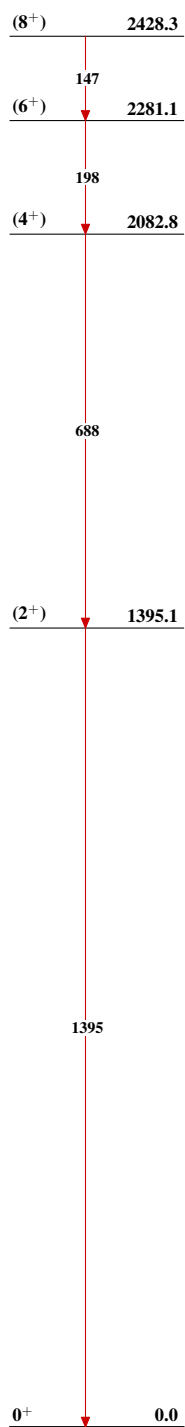
Level Scheme

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain)

Adopted Levels, Gammas

Seq.(A): Yrast cascade

 $^{98}_{48}\text{Cd}_{50}$