

<sup>136</sup>Ce IT decay (1.9 μs) 1991Mu07,2013Va10

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	E. A. Mccutchan	NDS 152, 331 (2018)	1-Apr-2018

Parent: <sup>136</sup>Ce: E=3095.0; J<sup>π</sup>=10<sup>+</sup>; T<sub>1/2</sub>=1.9 μs I; %IT decay=100.0

1991Mu07: <sup>9</sup>Be(<sup>132</sup>Xe,5n) with E(<sup>136</sup>Ce)=6.3 MeV/nucleon followed by recoil ion separation using gas filled GARIS. Measured E<sub>γ</sub>, I<sub>γ</sub> using four Ge detectors.

2013Va10: <sup>96</sup>Zr(<sup>48</sup>Ca,α4nγ) with E(<sup>48</sup>Ca)=180 MeV. Measured recoil-γ coincidences, γ(t) using RITU gas-filled separator, JUROGAM array consisting of 39 Compton-suppressed HPGe detectors, and GREAT spectrometer.

Others: 1975Yo01, 1978Mu09, 1980Ba68, 1982Ri09, 1983Da29.

<sup>136</sup>Ce Levels

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub>	Comments
0.0	0 <sup>+</sup>		
552.1	2 <sup>+</sup>		
1314.4	4 <sup>+</sup>		
1978.6	5 <sup>-</sup>		
2214.4	6 <sup>+</sup>		
2307.1	7 <sup>-</sup>		
2366.8	6 <sup>+</sup>		
2990.1	8 <sup>+</sup>		
3095.0	10 <sup>+</sup>	1.9 μs I	g=-0.180 2 (1981Ba69) T <sub>1/2</sub> : weighted average of 552γ(t), 623γ(t), 762γ(t), and 1052γ(t) (2013Va10); γ(t) for each transition fit with exponential decay curve after background subtraction. Other: 2.2 μs 2 from γ(t) in 1975Yo01. g: from TDPAD. Other: 0.180 3 (1982Ri09, TDPAD). Q: Q/Q(10 <sup>+</sup> , <sup>138</sup> Ce)=1.45 4 (1983Da29, TDPAD).

<sup>†</sup> From a least-squares fit to E<sub>γ</sub>, by evaluator.

<sup>‡</sup> From the Adopted Levels.

γ(<sup>136</sup>Ce)

I<sub>γ</sub> normalization: From ΣI(γ+ce)=100. As 1991Mu07 do not provide uncertainties on transition intensities, these values should be considered approximate.

E <sub>γ</sub> <sup>†</sup>	I <sub>γ</sub> <sup>†#</sup>	E <sub>i</sub> (level)	J <sub>i</sub> <sup>π</sup>	E <sub>f</sub>	J <sub>f</sub> <sup>π</sup>	Mult. <sup>‡</sup>	α <sup>@</sup>	I <sub>(γ+ce)</sub> <sup>#</sup>	Comments
104.9	36.6	3095.0	10 <sup>+</sup>	2990.1	8 <sup>+</sup>	E2	1.730	100	α(K)=1.054 15; α(L)=0.529 8; α(M)=0.1179 4; α(O)=0.00358 5 I <sub>γ</sub> : deduced by evaluator from I(γ+ce)=100 from intensity balance and α.
328.5	1.6	2307.1	7 <sup>-</sup>	1978.6	5 <sup>-</sup>	E2	0.0367		α(K)=0.0297 5; α(L)=0.00549 8; α(M)=0.001178 17; α(N)=0.000257 4; α(O)=3.93×10 <sup>-5</sup> 6 α(P)=1.99×10 <sup>-6</sup> 3
552.1	100	552.1	2 <sup>+</sup>	0.0	0 <sup>+</sup>	E2	0.00827		α(K)=0.00693 10; α(L)=0.001055 15; α(M)=0.000223 4; α(N)=4.90×10 <sup>-5</sup> 7; α(O)=7.72×10 <sup>-6</sup> 11 α(P)=4.91×10 <sup>-7</sup> 7
623.3	63	2990.1	8 <sup>+</sup>	2366.8	6 <sup>+</sup>	E2	0.00605		α(K)=0.00510 8; α(L)=0.000751 11; α(M)=0.0001582 23; α(N)=3.48×10 <sup>-5</sup> 5;

Continued on next page (footnotes at end of table)

$^{136}\text{Ce}$  IT decay (1.9  $\mu\text{s}$ ) [1991Mu07](#), [2013Va10](#) (continued) $\gamma(^{136}\text{Ce})$  (continued)

$E_\gamma$ <sup>†</sup>	$I_\gamma$ <sup>‡#</sup>	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. <sup>‡</sup>	$\alpha$ <sup>@</sup>	Comments
664.2	1.9	1978.6	5 <sup>-</sup>	1314.4	4 <sup>+</sup>	E1	0.00192	$\alpha(\text{O})=5.52\times 10^{-6}$ 8 $\alpha(\text{P})=3.64\times 10^{-7}$ 5 $\alpha(\text{K})=0.001652$ 24; $\alpha(\text{L})=0.000209$ 3; $\alpha(\text{M})=4.33\times 10^{-5}$ 6; $\alpha(\text{N})=9.59\times 10^{-6}$ 14
683.1	1.2	2990.1	8 <sup>+</sup>	2307.1	7 <sup>-</sup>	[E1]	0.00181	$\alpha(\text{O})=1.550\times 10^{-6}$ 22; $\alpha(\text{P})=1.165\times 10^{-7}$ 17 $\alpha(\text{K})=0.001557$ 22; $\alpha(\text{L})=0.000197$ 3; $\alpha(\text{M})=4.08\times 10^{-5}$ 6; $\alpha(\text{N})=9.03\times 10^{-6}$ 13
762.3	100	1314.4	4 <sup>+</sup>	552.1	2 <sup>+</sup>	E2	0.00371	$\alpha(\text{O})=1.460\times 10^{-6}$ 21; $\alpha(\text{P})=1.099\times 10^{-7}$ 16 $\alpha(\text{K})=0.00315$ 5; $\alpha(\text{L})=0.000443$ 7; $\alpha(\text{M})=9.29\times 10^{-5}$ 13; $\alpha(\text{N})=2.05\times 10^{-5}$ 3; $\alpha(\text{O})=3.27\times 10^{-6}$ 5
775.7	37	2990.1	8 <sup>+</sup>	2214.4	6 <sup>+</sup>	E2	0.00356	$\alpha(\text{P})=2.27\times 10^{-7}$ 4 $\alpha(\text{K})=0.00302$ 5; $\alpha(\text{L})=0.000424$ 6; $\alpha(\text{M})=8.89\times 10^{-5}$ 13; $\alpha(\text{N})=1.96\times 10^{-5}$ 3; $\alpha(\text{O})=3.13\times 10^{-6}$ 5
900.0	37	2214.4	6 <sup>+</sup>	1314.4	4 <sup>+</sup>	E2	0.00254	$\alpha(\text{P})=2.18\times 10^{-7}$ 3 $\alpha(\text{K})=0.00217$ 3; $\alpha(\text{L})=0.000295$ 5; $\alpha(\text{M})=6.18\times 10^{-5}$ 9; $\alpha(\text{N})=1.366\times 10^{-5}$ 20; $\alpha(\text{O})=2.19\times 10^{-6}$ 3
1052.4	63	2366.8	6 <sup>+</sup>	1314.4	4 <sup>+</sup>	E2	0.00181	$\alpha(\text{P})=1.567\times 10^{-7}$ 22 $\alpha(\text{K})=0.001548$ 22; $\alpha(\text{L})=0.000206$ 3; $\alpha(\text{M})=4.31\times 10^{-5}$ 6; $\alpha(\text{N})=9.53\times 10^{-6}$ 14 $\alpha(\text{O})=1.534\times 10^{-6}$ 22; $\alpha(\text{P})=1.124\times 10^{-7}$ 16

<sup>†</sup> From [1991Mu07](#), except where noted.

<sup>‡</sup> From the Adopted Levels.

<sup>#</sup> Absolute intensity per 100 decays.

<sup>@</sup> Total theoretical internal conversion coefficients, calculated using the BrIcc code ([2008Ki07](#)) with Frozen orbital approximation based on  $\gamma$ -ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

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## Decay Scheme

Intensities:  $I_{(\gamma+ce)}$  per 100 parent decays  
 $\%IT=100.0$

## Legend

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

