^{136}Te β^- decay (17.63 s) 1979Ke02,1977Sc21

History

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

Parent: ^{136}Te: E=0.0; $J^\pi=0^+$; $T_{1/2}$=17.63 s *9*; Q(β^-)=5120 *14*; %β^- decay=100.0

1979Ke02: ^{136}Te activity from ^{235}U(n,F), E=thermal followed by mass separation at LOHENGRIN. Measured Eγ, Iγ, Eβ, Iβ, β-γ coincidences using Ge(Li) detector and β-detector telescope consisting of two plastic scintillators operated as ΔE-E detectors; deduced decay Q values.

1979Bo26: ^{136}Te activity from ^{235}U(n,F) and ^{241}Pu(n,F), E=thermal. High precision measurement of Eγ using curved crystal spectrometer.

1978Ze08: ^{136}Te activity from ^{235}U(n,F), E=thermal followed by chemical separation. Measured Eγ, Iγ using Ge(Li) detectors. Report γ-ray energies and intensities for transitions below 800 keV.

1977Sc21: ^{136}Te activity from ^{235}U(n,F), E=thermal followed by mass separation at LOHENGRIN. Measured Eγ, Iγ, Eβ, Iβ, β-γ coincidences using Ge(Li) detector and β-detector telescope consisting of two plastic scintillators operated as ΔE-E detectors. Similar results by same group are reported in 1977Pf01.

Other: 1977Wo06.

A total energy release of 5060 keV *190* is calculated by the evaluator using the RadList code. This is in reasonable agreement with the decay Q value of 5120 keV *14*.

α: Additional information 1.

^{136}I Levels

E(level)†	J^π‡
0.0	(1^-)
86.73 *6*	$(2^-,1^-,0^-)$
222.11 *6*	
333.97 *6*	$(0^-,1)$
578.77 *3*	(0,1,2)
630.53 *16*	$(0^-,1)$
738.21 *19*	(0,1,2)
2656.42 *22*	1^+#
3137.1 *5*	1^+#
3235.2 *3*	1^+#

† From a least-squares fit to Eγ, by evaluator.

‡ From the Adopted Levels.

1977Sc21 suggest possible configurations of $[(\nu\ h9/2)(\pi\ h11/2)(\pi\ g7/2)^2_{0+}]_{1+}$ and $[(\nu\ f7/2)(\pi\ h11/2)(\pi\ g7/2)^2_{2+}]_{0^+,1+}$.

β^- radiations

Level	Eβ (βγ)†
222	4890 *200* (87γ), 4710 *200* (135γ)
334	4825 *150*, 4750 *160* (1977Sc21) (333γ)
579	4420 *200* (491γ), 4340 *200* (579γ)
631	4525 *200* (297γ), 4470 *150*, 4460 *150* (1977Sc21) (631γ)
738	4290 *170* (738γ)
2656	2600 *200* (579γ and 2569γ), 2465 *150*, 2480 *190* (1977 Sc21) (2078γ)

† From 1979Ke02 (βγ-coin. Ge(Li),scin), except as noted

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β^- radiations (continued)

E(decay)	E(level)	Iβ^-‡	Log *ft*	Comments
(1885 *14*)	3235.2	21.4 *24*	4.5 *1*	av Eβ=727.8 *63*
(1983 *14*)	3137.1	4.3 *5*	5.3 *1*	av Eβ=771.9 *64*
(2464 *14*)	2656.42	38 *4*	4.7 *1*	av Eβ=990.8 *65* E(decay): other: 2520 *150*, weighted average of $\beta\gamma$ data, see table.
(4382 *14*)	738.21	0.56 *7*	7.6 *1*	av Eβ=1886.5 *66* E(decay): other: 4290 *170* from $\beta\gamma$ data, see table.
(4489 *14*)	630.53	12.2 *14*	6.3 *1*	av Eβ=1937.2 *66* E(decay): other: 4480 *150*, weighted average of $\beta\gamma$ data, see table.
(4541 *14*)	578.77	≤0.5	≥7.7	av Eβ=1961.6 *66* E(decay): other: 4380 *200*, weighted average of $\beta\gamma$ data, see table.
(4786 *14*)	333.97	15.8 *18*	6.3 *1*	av Eβ=2077.0 *66* E(decay): other: 4790 *150*, weighted average of $\beta\gamma$ data, see table.
(4898 *14*)	222.11	2.0 *6*	7.25 *13*	av Eβ=2129.8 *66* E(decay): other: 4800 *200*, weighted average of $\beta\gamma$ data, see table.
(5120 *14*)	0.0	<8.6†	>6.7	av Eβ=2234.5 *66* E(decay): others: 5095 *100* (1979Ke02), 5100 *150* (1977Sc21).

† Estimated from ΔJ^π (evaluator).
‡ Absolute intensity per 100 decays.

$\gamma(^{136}I)$

Iγ normalization: from ΣI(γ+c.e.)(to g.s.)=95 *4* assuming %β^-n=1.1 *6* (1983ReZX,1984Ma39) and Iβ(g.s.)<8.6% (from ΔJ^π).
10% uncertainty added in quadrature to the uncertainty in Iγ-normalization since ΔIγ were not given.

E$_\gamma$†	I$_\gamma$†&	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.‡	δ‡	α	Comments
87.3 *2*	64	86.73	(2$^-$,1$^-$,0$^-$)	0.0	(1$^-$)	M1(+E2)	<0.18	1.22 *6*	α(K)=0.960 *21*; α(L)=0.135 *11*; α(M)=0.0273 *24*; α(N)=0.0055 *5*; α(O)=0.00063 *4* I$_\gamma$: other: 53 *5* (1978Ze08). α: experimental value from Iγ(x) (1977Sc21), corrected for 12 % *2* contribution to I(x) from conversion of other transitions. Mult.,δ: from α(exp) in 1977Sc21.
135.385# *3*	15	222.11		86.73	(2$^-$,1$^-$,0$^-$)	[M1,E2]		0.46 *15*	α(K)=0.36 *9*; α(L)=0.08 *5*; α(M)=0.016 *10*; α(N)=0.0032 *18*; α(O)=0.00033 *16* I$_\gamma$: other: 13 *2* (1978Ze08). Mult.: assumed M1+E2 for the purpose of balancing intensity through the 87.3-keV level.
297.3 *5*	3	630.53	(0$^-$,1)	333.97	(0$^-$,1)				I$_\gamma$: other: 8 *2* (1978Ze08).
333.99# *6*	100	333.97	(0$^-$,1)	0.0	(1$^-$)				
356.78# *6*	11	578.77	(0,1,2)	222.11					I$_\gamma$: other: 19 *3* (1978Ze08).
491.3 *3*	13	578.77	(0,1,2)	86.73	(2$^-$,1$^-$,0$^-$)				I$_\gamma$: other: 16 *3* (1978Ze08).
543.2 *3*	12	630.53	(0$^-$,1)	86.73	(2$^-$,1$^-$,0$^-$)				I$_\gamma$: other: 10 *3* (1978Ze08).
578.75# *3*	98	578.77	(0,1,2)	0.0	(1$^-$)				I$_\gamma$: other: 98 *2* (1978Ze08).
630.7 *2*	56	630.53	(0$^-$,1)	0.0	(1$^-$)				I$_\gamma$: other: 55 *4* (1978Ze08).
x644.8 *5*	3								

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$\gamma(^{136}I)$ (continued)

E_γ †	I_γ †&	E_i(level)	J_i^π	E_f	J_f^π	Comments
x684.9 *5*	4					
738.2 *2*	29	738.21	(0,1,2)	0.0	(1$^-$)	I_γ: other: 29 *3* (1978Ze08).
x1341.2 *5*	10					
x1566.9 *5*	7					
2077.9 *3*	119	2656.42	1$^+$	578.77	(0,1,2)	
2496.9 *5*	26	3235.2	1$^+$	738.21	(0,1,2)	
2569.4 *3*	82	2656.42	1$^+$	86.73	(2$^-$,1$^-$,0$^-$)	
2604.8 *6*	6	3235.2	1$^+$	630.53	(0$^-$,1)	
2656.0[a@b] *6*	≈3.6[@]	2656.42	1$^+$	0.0	(1$^-$)	
2656.0[ab] *6*	≈3.4[@]	3235.2	1$^+$	578.77	(0,1,2)	
2804.0 *6*	12	3137.1	1$^+$	333.97	(0$^-$,1)	
3049.5 *6*	11	3137.1	1$^+$	86.73	(2$^-$,1$^-$,0$^-$)	
3235.1 *4*	80	3235.2	1$^+$	0.0	(1$^-$)	

† From 1977Sc21, except where noted.
‡ From the Adopted Gammas. Support from assignments derived from this dataset are indicated in the comments.
# From 1979Bo26. Assignment based on agreement with Eγ given by 1977Bl12.
@ Alternate placement suggested by evaluator due to intensity imbalance problems for the 579 level. Iγ=7 divided by evaluator to give zero imbalance at 579 level.
& For absolute intensity per 100 decays, multiply by 0.186 *21*.
a Multiply placed.
b Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

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Decay Scheme

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

Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)
- Coincidence

0^+ 0.0 17.63 s *9*

Q_{β^-}=5120 *14* $\%\beta^-$=100

$^{136}_{52}Te_{84}$

Iβ⁻	Log *ft*		
21.4	4.5	1^+	3235.2
4.3	5.3	1^+	3137.1
38	4.7	1^+	2656.42
0.56	7.6	(0,1,2)	738.21
12.2	6.3	$(0^-,1)$	630.53
≤0.5	≥7.7	(0,1,2)	578.77
15.8	6.3	$(0^-,1)$	333.97
2.0	7.25		222.11
		$(2^-,1^-,0^-)$	86.73
<8.6	>6.7	(1^-)	0.0

3235.1 14.9; 2656.0 ≈0.63; 2604.8 1.12; 2496.9 4.8; 3049.5 2.05; 2804.0 2.2; 2656.0 ≈0.67; 2569.4 15.3; 2077.9 22.1; 738.2 5.4; 630.7 10.4; 543.2 2.2; 297.3 0.56; 578.75 18.2; 491.3 2.4; 356.78 2.05; 333.99 18.6; 135.385 [M1,E2] 4.1; 87.3 M1(+E2) 26

$^{136}_{53}I_{83}$