^{86}Se β^- decay (14.3 s) 1980Ze04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Alexandru Negret, Balraj Singh	NDS 124, 1 (2015)	30-Nov-2014

Parent: ^{86}Se: E=0; $J^\pi=0^+$; $T_{1/2}$=14.3 s *3*; Q(β^-)=5129 *4*; %β^- decay=100.0
^{86}Se-$T_{1/2}$: From Adopted Levels for ^{86}Se.
^{86}Se-Q(β^-): From 2012Wa38.
1980Ze04 (also 1978ZeZZ): Measured Eγ, Iγ, $\gamma\gamma$.
1982Li09: measured absolute γ branching.
Others: 1977Pf01, 1975Hu02, 1973Ta19, 1960Sa05.

^{86}Br Levels

E(level)	J^π †	Comments
0	(1$^-$)	
5.1 *3*	(2$^-$)	E(level): deduced from the differences of the 430.5γ-435.5γ and 1042.0γ-1047.1γ doublets. Another evidence for the existence of this level is from the depopulation of the 207.5 level by the 154.2γ-48.3γ cascade.
53.3 *3*	(3$^-$)	J^π: log *ft* value of 6.2 is in conflict with (3$^-$) proposed from in-beam γ-ray studies.
207.39 *24*	(1$^-$,2$^-$)	
298.2 *4*	(0$^-$ to 4$^-$)	
435.65 *25*	(1$^-$,2)	
1047.2 *3*	(1$^-$,2)	
1170.4 *4*	(1$^-$,2$^-$)	
2446.3 *3*	1$^+$	
2665.1 *4*	1$^+$	E(level): the level may be at 2660 if 2660γ feeds the g.s..

† From Adopted Levels.

β^- radiations

E(decay)	E(level)	Iβ^- †	Log *ft*	Comments
(2464 *4*)	2665.1	21.6 *23*	4.57 *5*	av Eβ=1020.2 *19*
(2683 *4*)	2446.3	69 *7*	4.22 *5*	av Eβ=1123.3 *19*
(3959 *4*)	1170.4	0.82 *20*	6.88 *11*	av Eβ=1732.5 *20*
(4082‡ *4*)	1047.2	0.4 *4*	7.2 *5*	av Eβ=1791.7 *20*
(4693‡ *4*)	435.65	0.6 *6*	7.3 *5*	av Eβ=2086.5 *20*
(4831‡ *4*)	298.2	<0.1	>8.2	av Eβ=2152.9 *20*
(4922 *4*)	207.39	1.7 *7*	6.98 *18*	av Eβ=2196.8 *20*
(5076‡ *4*)	53.3	12 *4*	6.19 *15*	av Eβ=2271.2 *20* log *ft* value of 6.2 is too low to be realistic for 0$^+$ to (3$^-$) β transition. It is possible that there are unobserved transitions from higher energy levels feeding the 53-keV level.
(5124‡ *4*)	5.1	<5	>8.5[1u]	av Eβ=2292.1 *20*
(5129‡ *4*)	0	<20	>6.0	av Eβ=2297.0 *20*

† Absolute intensity per 100 decays.
‡ Existence of this branch is questionable.

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$\gamma(^{86}Br)$

Iγ normalization: from 1982Li09. Other: 0.44 *4* (1980Ze04). Both from comparison with 1564.9γ (in ^{86}Kr), corrected by the evaluators to the adopted Iγ(absolute)(1564.9γ in ^{86}Br β^- decay)=62% 5.

The decay scheme seems incomplete. Some problems occur with the 5.1 level: it has been assumed in this evaluation that the 5.1 level decays completely by γ decay to the g.s. in agreement with the fact that only one half-life has been observed for the β^- decay of ^{86}Br to ^{86}Kr and with the probable E1 or M1 nature of the 5.1γ. 1980Ze04 proposed J^π(g.s.)=(3$^-$), J^π(5.1)=(1$^-$,2$^-$) based on the lack of a g.s. transition from the 2446 level. However, a β^- branch to the ^{86}Kr g.s. seems to be established in ^{86}Br β^- decay, which limits J^π(g.s.)=0,1,2$^-$.

E_γ[†]	I_γ[‡@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[&]	Comments
5.1		5.1	(2$^-$)	0	(1$^-$)			E_γ: from level energy difference. $I_{(\gamma+ce)}$: 155 *22* if 2660γ feeds the g.s.; 206 *22* if 2660γ feeds the 5.1 level. Iβ^-(g.s.)=2.3 *23* has been used to yield Ti(γ rays to g.s.)=97.7 *23*.
48.3 *3*	35.7 *18*	53.3	(3$^-$)	5.1	(2$^-$)	M1	0.889 *21*	α(K)=0.785 *18*; α(L)=0.0884 *21*; α(M)=0.0141 *4*; α(N+..)=0.00130 *3* α(N)=0.00130 *3*
154.2 *4*	7.0 *4*	207.39	(1$^-$,2$^-$)	53.3	(3$^-$)	[M1,E2]	0.11 *7*	α(K)=0.09 *7*; α(L)=0.011 *8*; α(M)=0.0018 *13*; α(N+..)=0.00016 *11* α(N)=0.00016 *11*
207.5 *3*	18.1 *9*	207.39	(1$^-$,2$^-$)	0	(1$^-$)	[M1+E2]	0.038 *22*	α(K)=0.033 *19*; α(L)=0.0039 *23*; α(M)=0.0006 *4*; α(N+..)=6.E−5 *4* α(N)=6.E−5 *4*
228.4 *4*	3.9 *2*	435.65	(1$^-$,2)	207.39	(1$^-$,2$^-$)			
293.2 *4*	2.4 *1*	298.2	(0$^-$ to 4$^-$)	5.1	(2$^-$)			
382.4 *3*	17.8 *9*	435.65	(1$^-$,2)	53.3	(3$^-$)			
430.5 *4*	2.3 *1*	435.65	(1$^-$,2)	5.1	(2$^-$)			
435.5 *4*	1.8 *1*	435.65	(1$^-$,2)	0	(1$^-$)			
611.6 *5*	0.7	1047.2	(1$^-$,2)	435.65	(1$^-$,2)			
749.0 *4*	2.5 *1*	1047.2	(1$^-$,2)	298.2	(0$^-$ to 4$^-$)			
839.6 *5*	0.7	1047.2	(1$^-$,2)	207.39	(1$^-$,2$^-$)			
993.8 *4*	7.7 *4*	1047.2	(1$^-$,2)	53.3	(3$^-$)			
1042.0 *4*	1.8 *1*	1047.2	(1$^-$,2)	5.1	(2$^-$)			
1047.1 *5*	0.8	1047.2	(1$^-$,2)	0	(1$^-$)			
1117.0 *4*	7.0 *3*	1170.4	(1$^-$,2$^-$)	53.3	(3$^-$)			
1275.8 *4*	5.1 *3*	2446.3	1$^+$	1170.4	(1$^-$,2$^-$)			
1399.0 *3*	13.3 *7*	2446.3	1$^+$	1047.2	(1$^-$,2)			
2010.6 *3*	23.7 *12*	2446.3	1$^+$	435.65	(1$^-$,2)			
2239.0 *3*	17.9 *9*	2446.3	1$^+$	207.39	(1$^-$,2$^-$)			
2441.1 *3*	100 *5*	2446.3	1$^+$	5.1	(2$^-$)			
2660.0[a] *3*	50.2 *25*	2665.1	1$^+$	5.1	(2$^-$)			Placement of this transition to the 5.1 level is arbitrary.

[†] Uncertainty of 0.3-0.5 keV assigned (evaluators) based on a general statement by 1980Ze04, that these are 0.3 keV for strong lines and 0.5 keV for weaker lines.

[‡] ≈5% uncertainty is assigned by the evaluators.

[#] From Adopted Gammas.

[@] For absolute intensity per 100 decays, multiply by 0.43 *4*.

Continued on next page (footnotes at end of table)

^{86}Se β^- decay (14.3 s) 1980Ze04 (continued)

$\gamma(^{86}Br)$ (continued)

& 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.

[a] Placement of transition in the level scheme is uncertain.

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Decay Scheme

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