

^{178}Yb β^- decay 1973Or03

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	E. Achterberg, O. A. Capurro, G. V. Marti		NDS 110, 1473 (2009)	31-May-2008

Parent: ^{178}Yb : $E=0.0$; $J^\pi=0^+$; $T_{1/2}=74$ min 3; $Q(\beta^-)=645$ 10; $\% \beta^-$ decay=100.0

^{178}Yb - $T_{1/2}$ from 1973Or03. $Q(\beta^-)$ from 2003Au03.

1973Or03: ^{178}Yb sources for the β decay studies were prepared by $^{176}\text{Yb}(t,p)$, $E(t)=12$ MeV, target enriched to 97.8%. Chemical separation, Ge(Li), NaI(Tl) and anthracene scintillator detectors. Measured E_γ , I_γ , $E\beta$, $\gamma\gamma$ and $\beta\gamma$ coincidences. $T_{1/2}$ measured for the ^{178}Yb g.s. decay. A preliminary report of this work was made in Bull. Am. Phys. Soc. 15, 523, DF10 (1970).

 ^{178}Lu Levels

E(level)	J^π	$T_{1/2}$	Comments
0.0	$1^{(+)}$	28.4 min 2	J^π : Spin from Adopted Levels. Tentative parity from $\log ft \leq 4.9$ for the β^- transition from the ^{178}Yb 0^+ g.s., and some support from $\log ft=6.6$ (1973Or03) for the g.s. to ^{178}Hf g.s. β decay branch. This latter value is also consistent with a first forbidden non-unique β decay (1973Ra10), and is thus only a very weak argument.
42.4 9	(2^+)		
390.8 9	(1^+)		

 β^- radiations

E(decay)	E(level)	$I\beta^-^\dagger$	Log ft	Comments
250 30	390.8	≤ 15	≥ 4.3	av $E\beta=70.5$ 31 E(decay): in coincidence with 390.8 γ . $I\beta^-$: Original $I\beta \approx 10\%$ estimate by 1973Or03 was based on the observation that there are no known $\log ft$ values less than 4.3 in the $A \approx 178$ region. Updated systematics for $\log ft$ values leads to the branching limit quoted here.
(645 10)	0.0	≥ 85	≤ 4.9	av $E\beta=201.1$ 36 The intensity of this β branch (1973Or03) was not determined directly due to strong contamination from intense β rays from ^{178}Lu also produced in their experiment. Deduced $I\beta$ from intensity balance of the ^{178}Yb g.s. decay (see comment for the 250-keV β branch).

† Absolute intensity per 100 decays.

 $\gamma(^{178}\text{Lu})$

E_γ	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. †	a^\ddagger
42.4	6.7	42.4	(2^+)	0.0	$1^{(+)}$	(M1)	7.48
348.4	64	390.8	(1^+)	42.4	(2^+)	(M1)	0.1146
390.8	100	390.8	(1^+)	0.0	$1^{(+)}$	(M1)	0.0845

† Multipolarities suggested in 1973Or03.

‡ 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.

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Decay Scheme

Intensities: Relative I_γ

Legend

