

^{180}Ta β^- decay [1980Ry01,1962Ga07](#)

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	E. A. Mccutchan	NDS 126, 151 (2015)	1-Feb-2015

Parent: ^{180}Ta : $E=0.0$; $J^\pi=1^+$; $T_{1/2}=8.154$ h 6; $Q(\beta^-)=702$ 3; $\% \beta^-$ decay=15 3

[1980Ry01](#): ^{180}Ta activity from $\text{Ta}(n,2n)$ with $E(n)=14$ MeV. Measured $E\gamma$, $I\gamma$, $\beta\text{-}\gamma$, and $\gamma\text{-x-ray}$ coincidences using Ge(Li) and LEPS detectors and a $4\pi\beta$ proportional counter.

[1962Ga07](#): ^{180}Ta activity from $^{180}\text{Hf}(d,2n)$ with $E(d)=11$ MeV. Measured $E\gamma$, $I\gamma$, Ice, $\beta\gamma$ coincidences.

Others: [1974HeYW](#), [1965Hu02](#), [1963De21](#), [1962Fo05](#), [1951Br87](#).

A total energy release of 105 keV 15 is calculated for this decay scheme using the RADLST code, in good agreement with the effective Q value of 105 keV 21.

α : [Additional information 1](#).

 ^{180}W Levels

E(level) [†]	J^π [‡]	$T_{1/2}$	Comments
0.0	0 ⁺	1.8×10^{18} y 2	$T_{1/2}$: from the Adopted Levels.
103.6 2	2 ⁺	1.28 ns 5	$T_{1/2}$: weighted average of 1.33 ns 5 (1962Fo05), 1.19 ns 4 (1963De21), and 1.37 ns 3 (1965Hu02).

[†] From $E\gamma$.

[‡] From the Adopted Levels.

 β^- radiations

E(decay)	E(level)	$I\beta^-$ [†]	Log ft	Comments
(598 3)	103.6	3.6 7	7.06 9	av $E\beta=183.7$ 11 E(decay): other: 610 15 (1962Ga07), ≈ 600 (1951Br87).
(702 3)	0.0	10.4 15	6.84 7	av $E\beta=220.8$ 11 E(decay): other: 710 15 (1962Ga07), 705 15 (1951Br87).

[†] Absolute intensity per 100 decays.

 $\gamma(^{180}\text{W})$

$I\gamma$ normalization: From decay scheme using $\Sigma(I(\gamma+ce)(93\gamma \text{ with } \varepsilon) + (I(\gamma+ce)(104\gamma \text{ with } \beta^-)))=100\%$; $I\beta(\text{g.s.})/I\beta(104)=3.00$ 45 ([1962Ga07](#)); $I\varepsilon(\text{g.s.})/I\varepsilon(93)=2.36$ 9 (weighted average of 2.20 33 ([1962Ga07](#)) and 2.37 9 ([1980Ry01](#))); $I\gamma(104\gamma)/I\gamma(93\gamma)=0.180$ 35, Ge(Li) ([1974HeYW](#)); and theoretical conversion coefficients for the 104 and 93 g.s. transitions in ^{180}W and ^{180}Hf , respectively. $I\beta(\text{g.s.})/I\beta(103.6 \text{ keV})=4.22$ 31 measured by [1980Ry01](#) in a $4\pi\beta\gamma$ coin experiment “critically depends” on the detector’s efficiency response to the β^- particle energy, and it may be less reliable than the value given by [1962Ga07](#).

$E\gamma$ [†]	$I\gamma$ ^{‡#}	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult.	α	Comments
103.6 2	18.0 35	103.6	2 ⁺	0.0	0 ⁺	E2	3.39 6	$\alpha(\text{K})=0.826$ 12; $\alpha(\text{L})=1.94$ 4; $\alpha(\text{M})=0.491$ 9; $\alpha(\text{N})=0.1158$ 20; $\alpha(\text{O})=0.0159$ 3 $\alpha(\text{P})=6.53 \times 10^{-5}$ 10 Mult.: from $\alpha(\text{K})_{\text{exp}}=0.92$ 23 (1962Ga07).

[†] From [1974HeYW](#).

[‡] From [1974HeYW](#), relative to $I\gamma(93.4\gamma \text{ with } \varepsilon)=100$.

For absolute intensity per 100 decays, multiply by 0.048 10.

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Decay Scheme

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

