^{179}Tl α decay (0.426 s) 2017Ba46,2013An10,2010An01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jin Wu	NDS 206,1 (2025)	29-Oct-2024

Parent: ^{179}Tl: E=0.0; J^π=(1/2$^+$); $T_{1/2}$=0.426 s *10*; Q(α)=6709.1 *26*; %α decay=60 *2*

^{179}Tl-$T_{1/2}$: from 2017Ba46. Others: 0.265 s *10* (2013An10), 0.23 s *4* (1998To14), 0.42 s *6* (2002Ro17), 0.43 s *35* (1996Pa01), 0.16 s *+9−4* (1983Sc24). J^π: From J^π(g.s.) systematics for heavier odd-A Tl isotopes.

^{179}Tl-Q(α): From 2021Wa16.

^{179}Tl-%α decay: %α=60 *2* (2013An10).

2017Ba46: The ^{179}Tl was produced through the fusion-evaporation reaction ^{104}Pd(^{78}Kr,p2n)^{179}Tl, using a ^{78}Kr^{15+} beam of 358 MeV impinging on a self-supporting rotating ^{104}Pd target with a thickness and enrichment of 745 μg/cm^2 and 92.25%, respectively. The evaporation residues of interest were separated from beam and unwanted reaction products using the gas-filled separator RITU and transported to the focal plane, where the HPGe GREAT spectrometer is located to detect the emitted γ rays. The isotopes of interest were implanted into a 300−μm-thick double-sided silicon strip detectors (DSSDs) placed in the center of the GRETA spectrometer, in which the decay products of α particles were detected. Measured Eγ, Eα, $T_{1/2}$.

2013An10,2010An01: The ^{179}Tl was produced in two reactions. First reaction E(p)=1.4 GeV at ISOLDE-CERN, using a target of 50 g/cm^2 ^{238}U. The ^{179}Tl was ionized to 1$^+$ charge by the Resonance Ionization Laser Ion Source (RILIS) and mass separated by the High Resolution (HRS) and General Purpose (GPS) Separators. Second reaction E(^{40}Ca)=232 MeV provided by the UNILAC of GSI, using a target of ≈350 μg/cm^2 ^{144}Sm, separated by the velocity filter SHIP at GSI. Measured Eγ, Iγ, Eα, Iα, $T_{1/2}$, yield using a single Miniball Ge cluster and a DSSD. Deduced J^π, α branching ratio.

2002Ro17: The parent ^{179}Tl was produced using a projectile of ^{78}Kr at E=355 MeV (340 MeV at midtarget) bombarding a target of 90.4% enriched ^{202}Pb. The recoil residues were transported to a gas-filled separator and parallel-plate avalanche counters, finally implanted into a Si strip detector. The emitted γ rays were detected with the HPGe detector. Deduced $T_{1/2}$, corrected for random correlation rates.

1998To14: The parent ^{179}Tl was produced using a projectile of ^{92}Mo at E=420 MeV (404 MeV at midtarget) bombarding a target of ^{90}Zr. The recoil residues were transported to a gas-filled separator and parallel-plate avalanche counters, finally implanted into a double sided Si strip detector with 40 in horizontal and 40 in vertical. Measured: Eα, t, Iα.

1996Pa01: The parent ^{179}Tl was produced from heavy-ion fusion-evaporation reactions. The recoil residues were transported to a mass separator and implanted into a double-sided Si strip detector (FWHM≤20 keV). Measured Eα, parent and daughter $T_{1/2}$.

1983Sc24: The parent ^{179}Tl was produced using a projectile of ^{92}Mo at E=414-497 MeV bombarding a target of enriched (>95%) Rb-Mo isotopes. The recoil residues were implanted into an array of seven position surface Si detectors. The emitted γ rays were detected with the HPGe detector. Measured Eα, Iα.

^{175}Au Levels

E(level)	J^π	$T_{1/2}$	Comments
0.0	(1/2$^+$)	0.201 s *3*	J^π: from Adopted Levels. $T_{1/2}$: from Adopted Levels. 0.200 s *3* by 2017Ba46. Other: 0.207 s *7* (2013An10). E(level): It seems that 6568α is a g.s. to g.s. transition from ^{179}Tl (0.23 s) to ^{175}Au, and the observed 7069α and 7213α 's are from 0.0+x to 0.0+x state transitions between ^{179}Tl (1.5 ms) and ^{175}Au (1998To14).

α radiations

Eα	E(level)	Iα[#]	HF[†‡]	Comments
6557 *4*	0.0	100	2.17 *19*	Eα: from 2017Ba46. Others: 6560 *4* (2013An10). 6569 *10* (1998To14), 6568 *18* (1996Pa01), 6560 *20* (1983Sc24), 6568 (2002Ro17).

† Additional information 1.

‡ The nuclear radius parameter r_0(^{175}Au)=1.5297 *36* is deduced from interpolation of radius parameters of the adjacent even-even nuclides in 2020Si16.

For absolute intensity per 100 decays, multiply by 0.60 *2*.