

Adopted Levels

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, M. S. Basunia, Jun Chen et al. ,		NDS 192,315 (2023)	25-Sep-2023

$Q(\beta^-)=4581$ 16; $S(n)=3901$ 21; $S(p)=6110$ 25; $Q(\alpha)=5310$ 30 [2021Wa16](#)

$S(2n)=9565$ 21, $S(2p)=14580$ 300 (syst) ([2021Wa16](#)).

[1989Bu09](#): ^{222}At produced and identified in $^{232}\text{Th}(p,X),E=600$ MeV by spallation with a negative ion source where chemically pure beams of halogen elements were produced at the ISOLDE-CERN facility. The reaction products were mass separated, and the half-life of ^{222}At decay, as well as the isotopic yield were measured.

[2010Li02](#): measured mass excess using Schottky mass spectrometry at GSI.

[2010Al24](#): measurement of production cross-section in $^9\text{Be}(^{238}\text{U},X),E=1$ GeV/nucleon reaction at GSI.

Theoretical calculations:

[2022Xu10](#): calculated α -decay half-life using an improved semi-empirical formula.

[2021Sa52](#): calculated $Q(2\alpha)$, $T_{1/2}(2\alpha)$ with and without deformation effects using modified generalized liquid drop model (MGLDM), Coulomb and proximity potential model (CPPM) for double α decay.

[2012Zh46](#): calculated binding energy, rotational correction energy, β_2 using covariant density functional theory with the point-coupling interaction PC-PK1.

 ^{222}At Levels

E(level)	$T_{1/2}$	Comments
0	54 s 10	$\% \beta^- = 100$ Only the β^- decay mode has been observed. Measured yield=110 atoms/s (1989Bu09) in $^{232}\text{Th}(p,X),E=600$ MeV. E(level): observed activity is assumed to correspond to the ground state of ^{222}At . $T_{1/2}$: measured by 1989Bu09 from β^- decay curve. Theoretical β -decay half-life of 25.8 s and $10^{11.8}$ s for α decay in 2019Mo01 suggest dominant β decay mode. Other theoretical $T_{1/2}$ for β decay: ≈ 100 s (1973Ta30 , β -decay gross theory); 21.5 s (1984Kl06 , microscopic theory using Tamm-Dancoff approximation (TDA)).