

^{198}Fr α decay (1.1 ms):? [2013Ka16](#)

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh		NDS 177, 1 (2021)	3-Sep-2021

Parent: ^{198}Fr : $E=0+y$; $T_{1/2}=1.1$ ms 7; $Q(\alpha)=7869$ 20; $\% \alpha$ decay ≈ 100.0

^{198}Fr - $T_{1/2}$: From α decay timing ([2013Ka16](#)). This activity is not reported in [2013Uu01](#). The same half-life is adopted in ^{198}Fr Adopted Levels in the ENSDF database (Dec 2015 update).

^{198}Fr - $Q(\alpha)$: From [2021Wa16](#).

^{198}Fr - $\% \alpha$ decay: $\% \alpha \approx 100$ is assumed. Theoretical $T_{1/2}(\beta\text{-decay})=0.78$ s and $T_{1/2}(\alpha\text{ decay})=5$ ms ([2019Mo01](#)) suggests $\% \epsilon + \% \beta^+ < 1\%$. Proton decay is also possible from $S(p)=-780$ 40 ([2021Wa16](#)), but no information is available about this decay mode.

[2013Ka16](#): ^{198}Fr activity produced in $^{141}\text{Pr}(^{60}\text{Ni},3n)$ reaction at $E(^{60}\text{Ni})=282\text{-}300$ MeV using SHIP separator at UNILAC-GSI facility. Evaporation residues (ERs) were implanted in position-sensitive Si detector (PSDD). A BOX system of six Si detectors was used to detect α particles which escaped PSDD detector. Time-of-flight (tof) detectors were used to distinguish decay events from implantation events. A Ge Clover detector was used to detect γ -rays in singles or coincidence with PSSD events. Identification of ^{198}Fr was based on time and position correlations of implanted ERs with subsequent α decay chains. For ^{198}Fr , 72 (ERs)- α_1 - α_2 - α_3 correlated events were observed, which was assigned to $^{198}\text{Fr} \rightarrow ^{194}\text{At} \rightarrow ^{190}\text{Bi} \rightarrow ^{186}\text{Tl}$ α -decay chains on the basis of energies and times of α decays observed in succession.

This activity was not observed by [2013Uu01](#).

 ^{194}At Levels

E(level)	J^π	Comments
0+y	($9^-, 10^-$)	J^π : from the Adopted Levels. Observed $E\alpha=7580\text{-}7930$ from decay of 1.1-ms activity (2013Ka16).