^{198}Rn α decay (65 ms) 1984Ca32,1995Bi17,1999Ta03

History

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

Parent: ^{198}Rn: E=0.0; $J^\pi=0^+$; $T_{1/2}$=65 ms *2*; Q(α)=7349 *4*; %α decay≈100.0

^{198}Rn-$T_{1/2}$: Weighted average of 66 ms *+3−2* (1999Ta03), 64 ms *2* (1995Bi17), and 50 ms *9* (1984Ca32). Others: 38 ms *+13−8* (2014Ka23), 22 ms *+110−10* (2005Uu02). Value is 65 ms *3* in the Adopted Levels of ^{198}Rn in the ENSDF database (Dec 2015 update).

^{198}Rn-Q(α): From 2021Wa16.

^{198}Rn-%α decay: %α≈100 assumed.

1984Ca32: ^{198}Rn was produced by the spallation of thorium at the ISOLDE mass separator with 600 MeV proton from the CERN synchrocyclotron. Selected ions are implanted into a thin carbon foil and α particles were detected with a silicon surface-barrier detector (FWHM=24 keV). Measured Eα, Iα, decay-time distribution. Deduced levels, parent $T_{1/2}$.

1995Bi17 (also 2000Va34): ^{198}Rn was produced by the spallation of thorium-carbide target with 1.0 GeV protons from ISOLDE at CERN. α particles were detected with PIPS detectors and conversion electrons were detected with a BaF_2 detector at the implantation station. Measured Eα, Iα, α(ce)-coin, decay-time distribution. Deduced parent $T_{1/2}$.

1999Ta03: ^{198}Rn was produced in the ^{166}Er(^{36}Ar,4n) reaction with 175 MeV ^{36}Ar beam from the K130 cyclotron at the University of Jyvaskyla, separated by the gas-filled recoil separation RITU and implanted into a position-sensitive ion-implanted planar silicon detector. Measured Eα, decay-time distribution. Deduced parent $T_{1/2}$.

2005Uu02, 2005Uu03: ^{198}Rn produced in ^{141}Pr(^{63}Cu,α2n), E=278-288 MeV followed by mass separation using RITU gas-filled separator, and also in α decay ^{202}Ra produced in ^{141}Pr(^{63}Cu,2n) channel.

2014Ka23: ^{198}Rn from α decay of ^{202}Ra using SHIP facility at GSI. Measured position and time correlations between evaporation residues (ER) and α events, Eα, half-lives of ground state and ^{198}Rn, ER-α-α correlations. Comparison with previous experimental results. A total of 16 (ER)αα correlated events were assigned to ^{202}Ra -> ^{198}Rn -> ^{194}Po -> ^{190}Pb decay chain.

^{194}Po Levels

E(level)	J^π	$T_{1/2}$	Comments
0.0	0^+	0.392 s *4*	$T_{1/2}$: from Adopted Levels. Other: 0.34 s *+11−7* (2014Ka23).
319 *10*	2^+		

α radiations

Eα	E(level)	Iα†#	HF‡	Comments
6893 *8*	319	0.07 *2*	110 *40*	Eα,Iα: measured by 1995Bi17.
7196 *4*	0.0	99.93 *2*	1.0	Eα: weighted average of 7198 *6* (2014Ka23), 7190 *4* (1999Ta03), 7205 *5* (1995Bi17), and 7196 *10* (1984Ca32).

† Per 100 α decays.

‡ $r_0(^{194}Po)$=1.551 fm *10* is deduced, assuming HF(7196α)=1.0.

For absolute intensity per 100 decays, multiply by ≈1.0.