^{217}Ra α decay 1970To07,1970Va13,2019Mi08

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia	NDS 181, 475 (2022)	1-Jan-2022

Parent: ^{217}Ra: E=0.0; J^π=(9/2$^+$); $T_{1/2}$=1.6 μs *2*; Q(α)=9161 *6*; %α decay=100.0

^{217}Ra-J^π: From 2018Ko01 (A=217 evaluation).

^{217}Ra-$T_{1/2}$: from 8995α(t) (1970Va13 – good statistics). Others: 1.7 μs *3* (1990An19 – appears to supersede their earlier value 1.7 us *1* (1990AnZU)), 1.4 μs *+4–3* (2019Ya04), 4 μs *2* (1970To07), and 2.5 μs *2* (2019Mi08 – from time correlations between ^{221}Th and ^{217}Ra α decays). Weighted average of all the data, without 2.5 μs *2* (2019Mi08) yields the same value.

^{217}Ra-Q(α): From 2021Wa16.

Others: 2021Hu19, 1990An19, 1990AnZU.

1970To07: ^{221}Th was produced from ^{208}Pb(^{16}O,3n), E=10.6 MeV/nucleon, 99% enriched ^{208}Pb target, alpha spectra were obtained on-line using the helium-jet recoil transport method for ^{221}Th decay chain, Si(Au) detector. Measured Eα, $T_{1/2}$; deduced Qα. FWHM = 25 keV.

1970Va13: ^{221}Th was produced bombarding different targets with different projectiles, measured Eα of the ^{221}Th decay chain. Deduce t, Q.

2019Mi08: Studied ^{225}U α decay chain, produced by the fusion evaporation reactions of E=212, 217, and 226 MeV (mid-target) ^{48}Ca beams on a ≈530 μg/cm^2 ^{181}Ta target sandwiched between carbon layers of 50 μg/cm^2 upstream and 10 μg/cm^2 downstream. Evaporation residues (ERs) were separated by the SHIP velocity filter and implanted into the COMPAct Spectroscopy Set-up (COMPASS), consisting of a Double sided Silicon Strip Detector (DSSD), surrounded by 4 Single sided Silicon Strip Detectors (SSSDs). Measured energy and time spectra of correlations between ER and α particles from subsequent decays. Deduced halflife.

^{213}Rn Levels

E(level)	J^π	$T_{1/2}$	Comments
0.0	(9/2$^+$)	19.4 ms *2*	J^π,$T_{1/2}$: From Adopted Levels.

α radiations

2019Mi08 reported two Eα of values 8990 keV *40* (8.99 MeV *4*) and 8910 keV *40* (8.91 MeV *4*). 8990α is in good agreement with the literature value for the ^{217}Ra g.s. to ^{213}Rn g.s. decay. The other 8910α, if considered to decay from ^{217}Ra g.s., it would feed an excited level at about 84 keV *41* (deduced from Qα(^{221}Ra) and Eα). 2019Mi08 did not propose any depopulation or feeding level for this Eα, and no known excited levels in ^{217}Ra or ^{213}Rn are matching for the decay of this Eα.

Eα	E(level)	Iα[‡]	HF[†]	Comments
8992 *8*	0.0	100	1.69 *22*	Eα: Weighted average of 8990 *8* (1970To07, semi), 8995 *10* (1970Va13, semi), 8990 *40* (2019Mi08 – 8.99 MeV *4*), and 8988 *26* (2019Ya04). Uncertainty is the lowest input value. Other: 8966 *15* (2021Hu19).

[†] Using r_0(^{213}Rn)=1.5526 *27*, extrapolated value based on r_0(^{212}Rn)=1.5433 *36* and r_0(^{214}Rn)=1.5655 *13* (2020Si16).

[‡] Absolute intensity per 100 decays.