^{221}Th α decay 1970Va13,1970To07,1990An19

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. A. Mccutchan, S. K. Rathi, S. Garg	NDS 147, 382 (2018)	1-Dec-2017

Parent: ^{221}Th: E=0.0; J^π=(7/2$^+$); $T_{1/2}$=1.75 ms *3*; Q(α)=8626 *4*; %α decay=100.0

^{221}Th-$T_{1/2}$: The adopted half-life of the parent ^{221}Th is the weighted average of 1.68 ms *6* (1970To07), 1.8 ms *3* (1970Va13), 1.9 ms *1* (1993AnZS), 2.0 ms *+3−2* (2000He17), 1.73 ms *3* (2001Ko07), and 1.78 ms *3* (2014Lo10).

1990An19: ^{221}Th activity from ^{20}Ne on ^{208}Pb followed by separation using the VASSILISSA kinematic separator. Measured Eα, Iα using 7 surface barrier detectors. Secondary reports by same group include 1990AnZU and 1993AnZS.

1970Va13: ^{221}Th activity from ^{20}Ne on ^{208}Pb and He gas jet system. Measured Eα, Iα using Si surface-barrier detectors.

1970To07: ^{221}Th activity from ^{16}O on ^{208}Pb and He gas jet system. Measured Eα, Iα using Si(Au) surface-barrier detector.

^{217}Ra Levels

E(level)[†]	J^π[‡]	$T_{1/2}$	Comments
0.0	(9/2$^+$)	1.6 μs *2*	$T_{1/2}$: from 1970Va13. Others: 1.7 μs *3* (1990An19), 4 μs *2* (1970To07), 1.7 μs *1* (1990AnZU), 1.9 μs *1* (1993AnZS).
209? *11*			
333 *5*	(11/2$^+$)		E(level): 330.8 *2* from (HI,xnγ) data.
752 *6*	(7/2$^+$)		

[†] Deduced by evaluators from α energies.
[‡] From adopted dataset.

α radiations

Eα[†]	E(level)	Iα[‡@]	HF[#]	Comments
7731 *4*	752	6 *1*	2.1 *4*	Eα: weighted average of 7725 *10* (1970Va13), 7733 *8* (1970To07), 7730 *10* (1990An19,1993AnZS), 7732 *15* (2000He17), 7732 *4* (2001Ku07). Iα: weighted average of 6 *1* (1970Va13), 6 *2* (1993AnZS) and 4 *3* (2000He17). Others 6.0 (1970To07), 7 (1990An19) and 7 (2001Ku07).
8143 *3*	333	53 *3*	4.4 *3*	Eα: weighted average of 8145 *10* (1970Va13), 8146 *5* (1970To07), 8150 *10* (1990An19,1993AnZS), 8135 *10* (2000He17), 8142 *3* (2001Ku07). Iα: weighted average of 56 *3* (1970Va13), 57 *6* (1993AnZS) and 48 *9* (2000He17). Others 62.4 (1970To07), 62 (1990An19), 72 (2001Ku07).
8265 *10*	209?	4	131	Eα: from 1990An19. Included here because of an α peak observed at 8243 keV (2014Lo10), however, marked as questionable since 1993AnZS do not report this peak. Iα: from 1990An19.
8469 *4*	0.0	37 *2*	53 *4*	Eα: weighted average of 8470 *8* (1970Va13), 8472 *5* (1970To07), 8470 *10* (1990An19,1993AnZS), 8458 *10* (2000He17), 8469 *4* (2001Ku07). Iα: weighted average of 39 *2* (1970Va13), 37 *5* (1993AnZS) and 48 *9* (2000He17). Others 31 (1990An19), 21 (2001Ku07) and 31.6 (1970To07).

[†] From weighted average of measured energies, as listed for each alpha. One additional α with energy 8375 keV is listed by 1990An19 and 1993AnZS. This α is not included here because its assignment has not been confirmed in later works. Note that E_α's of 1970Va13 quoted here are those given in their paper as their best values, and these values are slightly different than those listed in table iv.

[‡] Weighted average of intensities measured by 1970Va13, 1993AnZS and 2000He17. Relative intensities quoted here are normalized such that the sum of alpha intensities is 100 %. The re-normalization is done by excluding 8375 *10* (1990An19) and 8375 *15* (1990AnZU) because these are not confirmed in later works. Before taking the weighted average of I_α's, the intensity given by 1990An19 and 1993AnZS are re-normalized by the evaluators by excluding the α's seen only by them. Note that I_α's of 1970Va13 quoted here are those given in their paper as their best values and these values are slightly different than those listed in

Continued on next page (footnotes at end of table)

^{221}Th α decay 1970Va13,1970To07,1990An19 (continued)

α radiations (continued)

Table IV.

[#] The nuclear radius parameter $r_0(^{217}Ra)=1.5525\ 85$ is deduced from interpolation (or unweighted average) of radius parameters of the adjacent even-even nuclides.

[@] Absolute intensity per 100 decays.