

^{217}Pa α decay (1.08 ms) [2002He29,2000He17,1998Ik01](#)

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

Parent: ^{217}Pa : E=1860 7; $T_{1/2}$ =1.08 ms 3; $Q(\alpha)$ =8489 4; % α decay=73 4

^{217}Pa -E: From [2021Ko07](#) – NUBASE. Other: 1855 6 can be deduced from the energy difference of the 10157 keV 5 and 8336 keV 4 ($E\alpha$ – see ^{217}Pa α decay (3.8 ms)) $E\alpha$, emitted in the decay of ^{217}Pa isomer (1.08-ms) and g.s. (3.8-ms), respectively, by assuming these α particles feeding the g.s. of ^{213}Ac . In [2002He29](#) and [2018Ko01](#) – 1854 keV 7, considering using $E\alpha$ =8337 keV 5 for the ^{217}Pa g.s. α decay.

^{217}Pa - J^π : Tentative $J^\pi=(29/2^-)$ in [2002He29](#). In [2018Ko01](#) (A=217 evaluation) recommended spin-parity is $(23/2^-)$.

^{217}Pa - $T_{1/2}$: From [2018Ko01](#) (A=217 evaluation).

^{217}Pa - $Q(\alpha)$: From [2021Wa16](#).

^{217}Pa -% α decay: From [2002He29](#).

Others: [1996An21](#), [1979Sc09](#), and [2008DoZZ](#).

[2002He29](#): ^{217}Pa produced through $^{181}\text{Ta}(^{40}\text{Ar},4n)^{217}\text{Pa}$, Target: 99.988% natural tantalum; E=182 MeV; Detector: 16-strip PIPS-detector, Ge-Clover detector of 4 crystals; Measured: $E\alpha$, $I\alpha$, α - α coincidences.

[2000He17](#): ^{217}Pa produced through $^{170}\text{Er}(^{51}\text{V},4n)^{217}\text{Pa}$; E=214-286 MeV; Detector: 16-strip PIPS-detector, a HPGe detector; Measured: $E\alpha$, $I\alpha$.

[1998Ik01](#): ^{217}Pa produced through $^{194}\text{Pt}(^{28}\text{Si},p4n)^{217}\text{Pa}$; E=163–MeV and 175-MeV; Detector: double sided position sensitive strip detector; Measured: $E\alpha$, $T_{1/2}$.

[1996An21](#): ^{217}Pa from $^{170}\text{Er}(^{51}\text{V},4n)^{217}\text{Pa}$; E=28-87 MeV; evaporation residue were separated in flight, 16-strip PIPS detector, a HPGe detector; Measured: $E\alpha$, $T_{1/2}$.

[1979Sc09](#): $^{181}\text{Ta}(^{40}\text{Ar},4n)^{217}\text{Pa}$; E=165-202 MeV; Measured: $E\alpha$, $T_{1/2}$.

 ^{213}Ac Levels

E(level) [†]	J^π	$T_{1/2}$	Comments
0.0	$9/2^-$	738 ms 16	J^π : From Adopted Levels.
466.5 2			
612.8 1			
634.30 10			J^π : Tentative $J^\pi=(13/2^-)$ in 2002He29 .
1063.2? 2			E(level): Proposed in 2002He29 (Fig. 4) for connecting the excited level at 188 (assumed $J^\pi=(21/2^-)$) with the 634 level (assumed $J^\pi=(13/2^-)$) through 820.8 γ -450 γ -cascade.
1884.0 3			E(level): Others: 1887 9 or 1882 9 – using the $E\alpha$, $Q(\alpha)$, and the isomeric state of ^{217}Pa at 1860 keV 7 or 1855 keV 6.
			J^π : Tentative $J^\pi=(21/2^-)$ in 2002He29 .

[†] From $E\gamma$.

 α radiations

$E\alpha$ [‡]	E(level)	$I\alpha$ ^{‡#}	HF [†]	Comments
8306 5	1884.0	11 2	5.0 11	
9533 5	634.30	6 1	1.35×10^4 26	$E\alpha$: Other: 9540 50 (1998Ik01).
9552 5	612.8	9 1	9.9×10^3 15	$E\alpha$: Other: 9648 15 (2000He17).
9697 5	466.5	2 1	9.5×10^4 49	$E\alpha$: Other: 9694 20 (2000He17).
10157 5	0.0	72 4	2.61×10^4 28	$E\alpha$: Others: 10155 15 (2000He17), 10140 50 (1998Ik01), 10155 15 (1996An21), and 10160 20 (1979Sc09).

[†] Using $r_0(^{213}\text{Ac})=1.491$ 21, unweighted average of $r_0(^{212}\text{Ra})=1.4695$ 14 and $r_0(^{214}\text{Th})=1.512$ 14 ([2020Si16](#)).

[‡] From [2002He29](#).

[#] For absolute intensity per 100 decays, multiply by 0.73 4.

$\gamma(^{213}\text{Ac})$

‡ Placement of transition in the level scheme is uncertain.

Decay Scheme

	$E\alpha$	$I\alpha$	HF
	8306	8.0	5.0
	9533	4.4	13500
	9552	6.6	9900
	9697	1.5	95000
	10157	53	26100