

$^{222}\text{U}$   $\alpha$  decay (4.7  $\mu\text{s}$ ) 2015Kh09,1983Hi12

Type	History		Literature Cutoff Date
	Author	Citation	
Full Evaluation	Balraj Singh	ENSDF	10-Jun-2021

Parent:  $^{222}\text{U}$ :  $E=0.0$ ;  $J^\pi=0^+$ ;  $T_{1/2}=4.7 \mu\text{s}$  7;  $Q(\alpha)=9480$  50;  $\% \alpha$  decay=100

$^{222}\text{U}$ - $T_{1/2}$ : From  $^{222}\text{U}$  Adopted Levels in the ENSDF database (December 2015 update), where value is adopted from measurement by 2015Kh09.

$^{222}\text{U}$ - $Q(\alpha)$ : From 2021Wa16.

$^{222}\text{U}$ - $\% \alpha$  decay: Only  $\alpha$  decay has been observed. Theoretical partial  $T_{1/2}=17.5$  s for  $^{222}\text{U}$   $\varepsilon+\beta^+$  decay (2019Mo01) gives  $\% \varepsilon+\% \beta^+=2.7 \times 10^{-5}$ .

2015Kh09:  $^{222}\text{U}$  produced and identified in  $^{176}\text{Yb}(^{50}\text{Ti},4n)$ ,  $E(^{50}\text{Ti})=231$ -255 MeV reaction. Evaporation residues (Er), separated by using gas-filled TransActinide Separator and Chemistry Apparatus (TASCA). Measured  $E\alpha$ ,  $I\alpha$ , (Er) $\alpha$  correlated events from subsequent  $\alpha$ -decay chains, half-lives of parent nuclei corresponding to the evaporation residues. The identification of  $^{222}\text{U}$  was made based on observed (Er) $\alpha$ , two- or three-signal correlated events. A total of 81 Er traces were recorded for  $^{222}\text{U}$  and analyzed with subsequent  $\alpha$  decay chain:  $^{222}\text{U} \rightarrow ^{218}\text{Th} \rightarrow ^{214}\text{Ra}$ . An  $\alpha$  peak at 9.31 MeV 5 was observed in this work.

1983Hi12:  $W(^{40}\text{Ar},xn)$   $E=180$  MeV; products were separated from the primary beam by the velocity filter; parent of  $^{214}\text{Ra}$  (7.16-MeV  $\alpha$ ). An  $\alpha$  group at 12.08 MeV was observed, and interpreted as the superposition of  $\alpha$  rays from  $^{222}\text{U}$  and the short-lived daughter  $^{218}\text{Th}$ . One or both  $\alpha$  particles were presumed to leave the detector before they deposited their full energy.  $E\alpha$ , therefore, could not be determined in this work.

 $^{218}\text{Th}$  Levels

<u>E(level)</u>	<u><math>J^\pi</math></u>	<u><math>T_{1/2}</math></u>	<u>Comments</u>
0	$0^+$	122 ns 5	$T_{1/2}$ : from Adopted Levels. 2015Kh09 measured 0.16 $\mu\text{s}$ 4, in agreement with the Adopted value, but the uncertainty is large.

 $\alpha$  radiations

<u><math>E\alpha</math></u>	<u>E(level)</u>	<u><math>I\alpha^\ddagger</math></u>	<u>HF<math>^\dagger</math></u>	<u>Comments</u>
9310 50	0	100	1.0	$E\alpha$ : measured by 2015Kh09.

$^\dagger$  The nuclear radius parameter  $r_0(^{218}\text{Th})=1.529$  15 is deduced by assuming  $\text{HF}=1.0$  for the ground-state to ground-state alpha decay branch.

$^\ddagger$  Absolute intensity per 100 decays.