

^{224}U α decay 2014Lo10

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	ENSDF	30-Nov-2014

Parent: ^{224}U : $E=0.0$; $J^\pi=0^+$; $T_{1/2}=396 \mu\text{s}$ 17; $Q(\alpha)=8633$ 8; $\% \alpha$ decay=100.0

^{224}U - $Q(\alpha)$: Deduced by compilers from 8479 α branch to g.s. 2012Wa38 list 8620 12.

^{224}U - $T_{1/2}$: From evaporation residue (ER)-8479 α (t) correlations (2014Lo10). $T_{1/2}=561 \mu\text{s}$ 132 from (ER)-8095 α correlated events (2014Lo10). Others: $T_{1/2}$ $_{1/2}(^{224}\text{U})=0.7$ ms +0.5-0.2, measured by 1991An13; 1.0 ms 4, measured by 1992To02.

^{224}U - $\% \alpha$ decay: $\% \alpha=100$ from Adopted Levels of ^{224}U .

Compiled (unevaluated) dataset from 2014Lo10:

Eur Phys J A 50, 132 (2014).

Compiled by J.C. Batchelder (ORNL/ORAU) and C.D. Nesaraja (ORNL), October 27, 2014.

Additional information 1.

^{224}U produced using the fusion evaporation reaction $^{206}\text{Pb}(^{22}\text{Ne},4n)$, with 119 MeV ^{22}Ne beam produced at FLNR facility (Dubna). Evaporation residue (ER) was separated using SHELS separator and then passed through a TOF system and implanted into a DSSD in front of a HPGe. Position and time-correlated α decays were used to identify ER. Measured $E\alpha$, $I\alpha$, $E\gamma$, $I\gamma$, $\alpha\gamma$ -coin, (ER) α -coin and $T_{1/2}$ of ^{224}U g.s.

Cross section with lower limit of 600 nb 100 was obtained.

$\% \alpha(^{224}\text{U})=100$ in 1997Ar05, from a calculated upper limit for ε decay branch of $<1.2 \times 10^{-4}\%$ (1973Ta30). The partial half-life of ^{224}U β^+ decay has been calculated as >100 s in 1997Mo25.

 ^{220}Th Levels

E(level)	J^π	$T_{1/2}$	Comments
0	0^+	$9.7 \mu\text{s}$ 6	$T_{1/2}$: From Adopted Levels.
386.50 10	2^+		E(level): from $E\gamma$. $E\alpha=8095$ 11 feeding this level gives level energy of 391 14. The energies of the 2^+ to 0^+ and 4^+ to 2^+ transitions in ^{220}Th were previously assigned as 373.3 keV 1 keV and 386.5 keV 1 (2006Re15), respectively. Based on the observation of (8095 α)(386.5 γ)-coin, and on the energy of 8095 α group relative to that of 8479 α , 2014Lo10 suggest that previous assignment is incorrect, and that the ordering of the 373.3- and 386.5-keV transitions should be reversed, thus defining 386.5 keV as the first excited 2^+ state in ^{220}Th .

 α radiations

$E\alpha$	E(level)	$I\alpha^{\ddagger\#}$	HF^\dagger
8095 11	386.50	3.4 8	2.1 6
8479 8	0	96.6 8	1.0

† From 2014Lo10 using Preston's spin independent equation.

‡ Deduced by compilers using $I(8095\alpha)/I(8479\alpha)=0.035$ 8 measured in 2014Lo10.

$^\#$ Absolute intensity per 100 decays.

 $\gamma(^{220}\text{Th})$

E_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
386.5 1	386.50	2^+	0	0^+	E_γ : from Adopted Levels, where it is taken from 2006Re15. Authors in 2014Lo10 measured 386.7 18, where large uncertainty is due to poor statistics.

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Legend

Decay Scheme

- Coincidence

