

$^{206}\text{Ra}$   $\alpha$  decay **1996Le09,1987He10,1967Va22**

| Type            | Author       | History Citation   | Literature Cutoff Date |
|-----------------|--------------|--------------------|------------------------|
| Full Evaluation | F. G. Kondev | NDS 196,342 (2024) | 1-Sep-2023             |

Parent:  $^{206}\text{Ra}$ :  $E=0.0$ ;  $J^\pi=0^+$ ;  $T_{1/2}=0.238$  s 18;  $Q(\alpha)=7415$  4;  $\% \alpha$  decay  $\approx 100$

$^{206}\text{Ra}$ - $T_{1/2}$ : Weighted average of 0.24 s 2 (1987He10), 0.21 s 50 (1996Le09) and 0.260 s 55 (2021Ni08).

**1996Le09**:  $^{206}\text{Ra}$  was produced in  $^{175}\text{Lu}(^{35}\text{Cl},4n)$  at 157 MeV and 166 MeV. The  $^{175}\text{Lu}$  target has a thickness of 320  $\mu\text{g}/\text{cm}^2$ .

At 157 MeV, the cross section is the highest, 1.7  $\mu\text{b}$ .  $^{206}\text{Ra}$  was also produced in  $^{171}\text{Yb}(^{40}\text{Ar},5n)$  at 204 MeV with 1.7  $\mu\text{b}$  cross section. The residues of  $^{206}\text{Ra}$  were separated by the gas-filled recoil separator (RITU) and identified on the basis of spatial and time correlations between the parent ( $^{206}\text{Ra}$ ) and the daughter ( $^{202}\text{Rn}$ ).

**1987He10**:  $^{206}\text{Ra}$  was produced in the reactions  $^{171}\text{Yb}(^{40}\text{Ar},5n)$ ,  $^{159}\text{Tb}(^{51}\text{V},4n)$  and  $^{154}\text{Sm}(^{58}\text{Fe},6n)$  with thin targets (200-850  $\mu\text{g}/\text{cm}^2$ ). The residues were separated by the velocity filter SHIP, then passed two large-area time-of-flight detectors and were finally implanted into an array of seven position-sensitive surface-barrier detectors, where  $\alpha$  decay was registered. The  $^{206}\text{Ra}$  were identified by the spatial and time correlations between the parent ( $^{206}\text{Ra}$ ) and the daughter ( $^{202}\text{Rn}$ ).

**1967Va22**:  $^{206}\text{Ra}$  was produced via  $^{197}\text{Au}(^{19}\text{F},10n)$  and  $^{206}\text{Pb}(^{12}\text{C},^{12}\text{N})$ . The mass-number assignment of  $^{206}\text{Ra}$  was made on the basis of excitation functions. Si(Au) surface-barrier detectors were used in the measurements. Measured  $E\alpha$ ,  $T_{1/2}(\alpha)$ .

 $^{202}\text{Rn}$  Levels

| $E(\text{level})^\dagger$ | $J^\pi^\dagger$ | $T_{1/2}^\dagger$ |
|---------------------------|-----------------|-------------------|
| 0.0                       | $0^+$           | 9.7 s 2           |

$^\dagger$  From Adopted Levels.

 $\alpha$  radiations

| $E\alpha$ | $E(\text{level})$ | $I\alpha^\ddagger$ | HF $^\dagger$ | Comments  |
|-----------|-------------------|--------------------|---------------|---|
| 7269 4    | 0.0               | 100                | $\approx 1$   | $E\alpha$ : Weighted average of 7268 keV 10 (1996Le09,1995Le15), 7270 keV 10 (1987He10), 7270 keV 5 (1967Va22), 7262 keV 15 (1995Uu01) and 7263 keV 20 (1995Le41). Other: 7294 keV 23 (2021Ni08). |

$^\dagger$   $r_0(^{202}\text{Rn})=1.529$  4 deduced with HF(7269 $\alpha$ )=1.

$^\ddagger$  For absolute intensity per 100 decays, multiply by  $\approx 1.00$ .