

$^{204}\text{Pb}(^{12}\text{C},6n\gamma)$  2004He25

| Type            | Author                 | History | Citation            | Literature Cutoff Date |
|-----------------|------------------------|---------|---------------------|------------------------|
| Full Evaluation | M. Shamsuzzoha Basunia |         | NDS 121, 561 (2014) | 31-Mar-2014            |

Enriched (99.73%)  $^{204}\text{Pb}$  target ( $450 \mu\text{g}/\text{cm}^2$ ) bombarded with  $^{12}\text{C}$  beam,  $E=68\text{-}136 \text{ MeV}$ . Recoiling evaporation products from the target  $\approx 5 \text{ MeV}$  were separated by the velocity filter SHIPS at GSI and implanted into a position-sensitive 16-strip PIPS (passivated ion-implanted position-sensitive) detector. Three experimental runs were performed. In run 1,  $\gamma$ -ray energies and intensities were measured with a HPGe detector; in run 2,  $\gamma$ - $\gamma$  coin with a clover HPGe detector, and in run 3, isomeric state half-lives were estimated from  $\gamma$ -decay.

 $^{210}\text{Ra}$  Levels

| E(level) <sup>†</sup> | $J^\pi$ <sup>‡</sup> | $T_{1/2}$            | Comments  |
|-----------------------|----------------------|----------------------|---|
| 0.0                   | $0^+$                |                      |   |
| 604.5 6               | $2^+$                |                      |   |
| 1206.6 8              | $4^+$                |                      |   |
| 1379.1 7              | $4^+$                |                      |   |
| 1957.1 8              | $6^+$                |                      |   |
| 2053.8 9              | $8^+$                | 2.36 $\mu\text{s}$ 5 | $T_{1/2}$ : Estimated by measuring the time intervals between implantation and the $\gamma$ decay within a time-range window of 15 $\mu\text{s}$ . Unweighted mean of measured values 2.24 $\mu\text{s}$ 5 (578 $\gamma$ ), 2.44 $\mu\text{s}$ 3 (602.1 $\gamma$ ), 2.44 $\mu\text{s}$ 3 (604.5 $\gamma$ ), 2.42 $\mu\text{s}$ 8 (750.5 $\gamma$ ), and 2.27 $\mu\text{s}$ 6 (774.6 $\gamma$ ). |

<sup>†</sup> From a least squares fit to  $\gamma$ -ray energies.

<sup>‡</sup> From Adopted Levels.

 $\gamma(^{210}\text{Ra})$ 

| $E_\gamma$           | $I_\gamma$         | $E_i(\text{level})$ | $J_i^\pi$ | $E_f$  | $J_f^\pi$ | Mult. | Comments                    |
|----------------------|--------------------|---------------------|-----------|--------|-----------|-------|-----------------------------|
| 96.7 5               | 9.1 7              | 2053.8              | $8^+$     | 1957.1 | $6^+$     | (E2)  | Mult.: From Adopted Gammas. |
| 578.0 4              | 100                | 1957.1              | $6^+$     | 1379.1 | $4^+$     |       |                             |
| 602.1 <sup>†</sup> 6 | 215 <sup>†</sup> 6 | 1206.6              | $4^+$     | 604.5  | $2^+$     |       |                             |
| 604.5 <sup>†</sup> 6 | 215 <sup>†</sup> 6 | 604.5               | $2^+$     | 0.0    | $0^+$     |       |                             |
| 750.5 4              | 52.9 19            | 1957.1              | $6^+$     | 1206.6 | $4^+$     |       |                             |
| 774.6 4              | 95 3               | 1379.1              | $4^+$     | 604.5  | $2^+$     |       |                             |

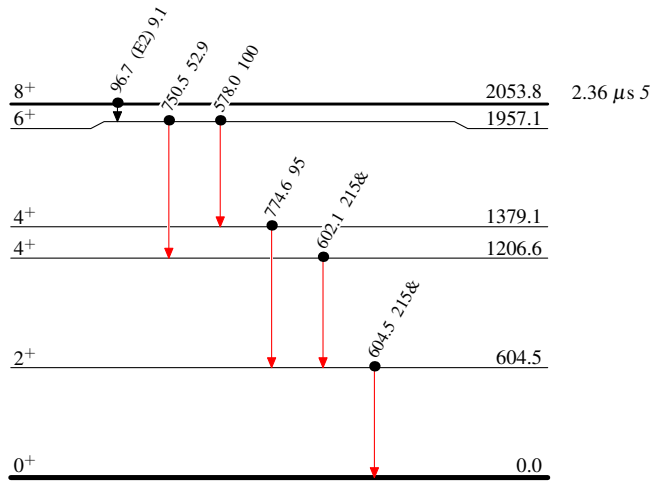
<sup>†</sup> Multiply placed with undivided intensity.

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**Level Scheme**  
 Intensities: Relative  $I_\gamma$   
 & Multiply placed: undivided intensity given

Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- Coincidence

 $^{210}_{88}\text{Ra}_{122}$