^{212}Po – Comments on evaluation of decay data
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Evaluated: July/August 2001
Re-evaluated: January 2004 and May 2010

Evaluation Procedures

Limitation of Relative Statistical Weight Method (LWM) was applied to average numbers throughout the evaluation. The uncertainty assigned to the average value was always greater than or equal to the smallest uncertainty of the values used to calculate the average.

Decay Scheme

^{212}Po is an extremely short-lived radionuclide populated via the beta decay of ^{212}Bi and the alpha decay of ^{216}Rn. 100 % alpha decay of ^{212}Po occurs directly to the ground state of ^{208}Pb (2005Br03).

Nuclear Data

Half-life

^{212}Po is an extremely short-lived radionuclide populated primarily via the alpha decay of ^{216}Rn and the beta decay of ^{212}Bi. The recommended half-life of 3.00 (2) × 10^{-7} s is the weighted mean of six sets of measurements (1949Bu09, 1962Fl03, 1963As02, 1972Mc29, 1975Sa06 and 1981Bo29).

Reference	Half-life (s)
1949Bu09	3.04 (4) x 10^{-7}
1962Fl03	3.05 (25) x 10^{-7}
1963As02	3.05 (5) x 10^{-7}
1972Mc29	3.04 (8) x 10^{-7}
	3.00 (8) x 10^{-7}
1975Sa06	2.96 (2) x 10^{-7} *
1981Bo29	3.09 (11) x 10^{-7}
Recommended value	3.00 (2) x 10^{-7}

* Uncertainty adjusted to ± 2.7 x 10^{-9} to reduce the weighting below 50 %.

Alpha Particle

Energy

A Q-value of 8954.12 (11) keV was used (2003Au03) to determine the energy and uncertainty of the single alpha-particle transition to the ground state of ^{208}Pb, while allowing for the significant recoil component. Thus, an alpha-particle energy of 8785.17 (11) keV has been calculated.

Emission Probability

The emission probability of the single alpha particle was defined as 100 % (2005Br03).

Alpha-particle energy and emission probability per 100 disintegrations of ^{212}Po, and hindrance factor.

E_α(keV)	P_α	HF
	Recommended value*	
8785.17 (11)	100.0	1.00

* Only one α transition directly to the ground state of ^{208}Pb.

Data Consistency

A Q_α-value of 8954.12 (11) keV has been adopted from the atomic mass evaluation of Audi *et al*. (2003Au03) while in the course of formulating the decay scheme of ^{212}Po. This value has subsequently been compared with the Q-value calculated by summing the contributions of the individual emissions to the ^{212}Po alpha-decay process:

$$\text{calculated Q-value} = \sum (E_i \times P_i) = 8954.12\ (11)\ \text{keV}$$

Percentage deviation from the Q-value of Audi *et al*. is (0.000 ± 0.002) %, which supports the derivation of a highly consistent decay scheme.

References

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