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Decay branching ratios of ^{197m}Hg and ^{195m}Hg determined by decay curve analysis/崩壊曲線分析による^{197m}Hg と^{195m}Hg の崩壊分岐比の決定

Thursday, 14 November 2024 16:00 (2 hours)

We studied the decay branching ratios of ^{197m}Hg (24 h) and ^{195m}Hg (42 h) by offline γ-ray spectroscopy of a natural platinum foil irradiated by α-particles at 29 MeV. We observed strong cooling time dependence in the isomeric ratios of ^{197}Hg and ^{195}Hg determined by the conventional activation cross section formula. To eliminate the cooling time dependence, we performed decay curve analysis with the decay branching ratios of these metastable states as adjustable parameters assuming that the isomeric ratios do not depend on the cooling time. We resolved the time dependence by adjusting the isomeric transition branching ratios to 94.5±0.7% and 48.9±1.8% for ^{197m}Hg and ^{195m}Hg , respectively. The ^{197m}Hg decay branching ratio obtained by us is very close to 94.68±0.09% published by Lebeda et al. in 2020 [1].

Reference

[1] O. Lebeda, F.G. Kondev, J. Cervenak, "Branching ratio and γ-ray emission probabilities in the decay of the J^{π}=13/2^{+} isomer in ^{197}Hg", Nucl. Instrum. Methods Phys. Res. Sect. A Accelerat. Spectrom. Detect. Assoc. Equip. 959, (2020), 163481.

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