Abstract Submitted
for the HAW14 Meeting of
The American Physical Society

Development of the collection apparatus for recoil products for study of the deexcitation process of ^{235m}U YUDAI SHIGEKAWA, YOSHITAKA KASAMATSU, ATSUSHI SHINOHARA, Osaka University — ^{235m}U has very low excitation energy (76.8 eV) and decays predominantly by the internal conversion process. Because the deexcitation of ^{235m}U is caused by the interaction between the nucleus and outer-shell electrons, the variation of the decay constant depending on its chemical environment was reported. We are aiming to clarify the deexcitation process of ^{235m}U by measuring the decay constants and the energy spectra of the internal-conversion electrons for ^{235m}U with various chemical forms. In this work, we developed an apparatus for collecting ^{235m}U recoiling out of ^{239}Pu. We evaluated the performance of the apparatus by using ^{224}Ra recoiling out of ^{228}Th. The collection yields of ^{224}Ra were determined in various applied voltages, air pressures, and ^{228}Th source shapes. Based on these results, we determined suitable experimental conditions for the collection of ^{235m}U from ^{239}Pu. In addition, the detection apparatus for the low-energy internal-conversion electrons are under development.

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Date submitted: 30 Jun 2014 Electronic form version 1.4