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Overview of Uranium Isotopic Reference Materials at IRMM

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For the validation of mass spectrometric measurement procedures and for calibration of detector systems, suitable isotope reference materials are needed. IRMM is a well recognized provider for nuclear isotope reference materials to the nuclear industry and nuclear safeguards authorities, which can also be used for geological applications. This poster provides an overview of new synthetic uranium isotopic reference materials prepared and certified at IRMM during the recent 5 years. These materials are synthetic isotope reference materials prepared based on proven methods of purifying and gravimetrically mixing highly enriched oxides.

Firstly, the double spike IRMM-3636 with a 233U/236U ratio of 1:1 was prepared which allows internal mass fractionation correction for high precision 235U/238U ratio measurements. The 234U abundance of this double spike material is low enough to allow an accurate and precise correction of 234U/238U ratios, even for measurements of close to equilibrium uranium samples. The double spike IRMM-3636 is offered in 3 concentrations: 1mg/g, 0.1mg/g and 0.005mg/g.

Secondly, the 236U single spike IRMM-3660 was prepared and is offered in 3 concentrations: 1mg/g, 0.1mg/g and 0.01mg/g.

Thirdly, a quad-isotope reference material, IRMM-3101, has been prepared which is characterized by 233U/235U/236U/238U=1/1/1/1. This material is useful for checking Faraday cup efficiencies and inter-calibration of MIC (multiple ion counting) detectors. The quad-IRM is offered in 3 concentrations: 1mg/g, 0.1mg/g and 0.01mg/g.