



Contribution ID: 104

Type: Oral

Studies on the Measurement of Impurities in Uranium Sample with ICP-MS

Wednesday, 9 July 2014 14:40 (20 minutes)

Introduction:

The impurities of nuclear material vary slightly according to the produced method employed and local environment. By comparing the measured data to database information, this characteristic information can be used to trace to the source of nuclear material together with other clues. Because of the complexity of emission spectrum, uranium will have a serious interference on the measurement of impurities. Therefore, impurities have to be separated from uranium matrix before measurement. This work aims to separate impurities from uranium sample using TBP, UTEVA or TEVA extraction chromatography, and the recovery of impurities was obtained by the determination of separated fraction of sample by ICP-MS.

Methods:

Marinated in Milli-Q water for 24h after washing several times, the resin was packed in a quartz column. Conditioning of the column was carried out passing Milli-Q water, 0.5 mol/L HNO₃ and Milli-Q water in sequence to convert the resin to be neutral. Finally 20 ml volume of 3M HNO₃ was passed through the column to balance the resin. Sample was passed through the resin, and the elution was collected and converted to 2% HNO₃(v/v)-solution that can be measured directly by ICP-MS. A blank test was carried out using the same procedure as the uranium sample.

Results:

The content of impurities in separated fraction has been determined by standard curve method, and the measurement result showed that: (1) the decontamination factor for U is more than 104; (2) the recovery of 90% to 110% was achieved for most of the impurities (such as Cr, Mn, Ni, Cu, Cd etc); (3) the content of the impurities in uranium sample is in good accordance with the reference value which confirms the feasibility of the method.

Primary author: Mr ZHU, L-C. (China Institute of Atomic Energy)

Co-authors: XU, C-K. (China Institute of Atomic Energy); ZHAO, L-F. (China Institute of Atomic Energy); WANG, T-X. (China Institute of Atomic Energy); ZHAO, X-H. (China Institute of Atomic Energy); JIANG, X-Y. (China Institute of Atomic Energy); ZHAO, Y-G. (China Institute of Atomic Energy)

Presenter: Mr ZHU, L-C. (China Institute of Atomic Energy)

Session Classification: Technical Session 3F