

Rapid characterization of actinide abundances and isotopic compositions by HR-ICP-MS

GREGORY BRENNECKA AND JOSH WIMPENNY

Lawrence Livermore National Laboratory

Presenting Author: brennecka2@llnl.gov

The rapid, accurate determination of isotopic information is crucial for the field of nuclear forensics. In particular, high-precision actinide isotopic and elemental analyses typically require time-consuming sample preparation prior to analysis, and the measurement of U, Pu, Am, and Np each require different, multi-stage purification procedures. This is particularly true in samples with complicated matrices where actinides are trace constituents. Here, we present actinide isotopic and elemental data from historic fallout melt glass using high resolution inductively coupled plasma mass spectrometry (HR-ICP-MS). This is an analytical technique that requires minimal sample preparation. These data are directly compared to the results of high precision isotopic analyses and elemental assay by multi-collector (MC-ICP-MS), which requires lengthy sample processing involving spiking and purifying aliquots of individual elements. The comparison shows broad overlap between the results of the two techniques. Thus, although the data obtained by HR-ICP-MS is of significantly lower precision, it is a viable method to obtain actinide elemental and isotopic data on a more rapid timeframe than traditional high-precision techniques.