

## **Advancing nuclear forensics measurements utilizing gas-phase chemistry in ICP-MS/MS**

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Methods that rapidly and accurately measure analytes of interest (activation products, fission products, actinides) are important when characterizing post-detonation debris. Mass spectrometry is a proven alternative to radiometric counting techniques to determine isotopic compositions of actinides and many short/medium-lived radionuclides. Achieving desired detection limits (fg/g) typically necessitates time-consuming chemistry to remove isobaric and polyatomic interferences (ng/g to µg/g) prior to analysis. Several different types of current instrumentation can provide some discrimination against interferences but not to the levels needed for direct analysis (no sample preprocessing) of post-detonation debris. ICP-MS/MS utilizes a collision/reaction cell between two quadrupole mass filters, providing robust inline separation via gas phase reactions of many analyte-interferent pairs. Here we report multiple analytical methods that were developed on an Agilent 8900 to decrease the sample preparation and analysis time for samples relevant to the field of nuclear forensics.