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# New and Improved Tools for More Sensitive ICP-MS Assays

*Wednesday, 24 May 2017 14:30 (20 minutes)*

This presentation will discuss two areas of recent research at Pacific Northwest National Laboratory: the determination of K in ultralow background detector materials and the automation of complex sample separations for the ultrasensitive determination of U and Th.

Along with the U and Th decay series species, 40K is a naturally-occurring radioactive contaminant that can cause problematic backgrounds in rare-event physics detectors. As such, its characterization and screening is required to ensure sufficiently low levels are introduced to the detector to meet sensitivity specifications. This presentation will discuss the operation and advantages of a triple-quadrupole ICP-MS for the quick and sensitive determination of 40K in NaI scintillator crystals, as well as in polymers and copper.

A second brief discussion will focus on exploring the advantages and performance of a newly installed and employed automated anion exchange separation system used for assays. The automated system mimics the demanding work that would previously be conducted manually by a chemist. The automated anion exchange separation removes much of the matrix, such as copper, in an acid dissolved solution while retaining and preconcentrating the U and Th for later detection by ICP-MS. This study also directly benefits our ultrasensitive polymer assay method, which employs the dry ashing of polymers in ultralow background electroformed copper crucibles. The metal residue (i.e., U and Th) remaining in the copper crucible is completely dissolved and separated using the automated system, just as for copper assay.

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