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Title: From Radiochemical Synthesis to Separations at the Edge of the Periodic Table

Abstract:

Radiochemistry and nuclear chemistry are fundamental pillars of nuclear sciences and provide the foundational knowledge underlying most, if not every nuclear technology. Within the Nuclear Science and Security Consortium, the core mission of the radiochemistry and nuclear chemistry team is to train the next generation nuclear and radiochemistry workforce through basic science projects focused on chemical manipulation and characterization that will drive innovation and discoveries relevant to National Security applications. Our efforts therefore encompass the chemical synthesis of radionuclide-based compounds and study of their speciation, the use of advanced spectroscopic techniques for their characterization, and the harnessing of their radiochemical and physical properties to design new strategies for chemical separations. The development of efficient separation methods is critical for forensics analysis, recycling of ageing weapon materials, fabrication of nuclear fuels, radionuclide purification for use in pharmaceuticals or in radioactive thermoelectric generators, production of radiotracers for research, as well as manufacturing of high-purity actinide targets for the discovery of new elements. An overview of on-going projects that leverage our understanding of radionuclide chemical speciation for enhanced separations will be given, spanning wide portions of the Periodic Table.