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Template Synthesis of Uranium-Based Metal Organic Frameworks and Clusters under Ionothermal Conditions JOSEMARIA SORIANO, St. Marys University, TSUYOSHI KOHLGRUBER, PETER BURNS, University of Notre Dame — Nuclear physics applications for nuclear waste management demand a deep understanding of the behavior, physical and chemical properties of the actinides elements. In this research, uranium (VI) compounds (uranyl nitrate and uranyl acetate) were used as starting materials to form clusters, chains, and metal organic frameworks (MOFs) with commercially available organic ligands. Ionic liquids, novel compounds with the ability of acting as both the solvent and templating agent, were also employed in the hydrothermal synthesis. Different templates, such as 1,4-diazabicyclo [2.2.2] octane and Pluronic F127 were used in the process. The physics behind the template and ionothermal synthesis effect was also examined. Likewise, different ratios and thermodynamic conditions were tested for optimizing the experimental method. The resulting clusters and MOFs obtained were characterized by X-ray diffraction techniques (single crystal, powder, and small angle) and spectroscopy techniques such as Raman, NMR, and mass spectroscopy.

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