



Insights into the halide-driven polymorph control in the synthesis of metal chalcogenides

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Abstract: An ongoing challenge in solid-state and colloidal synthesis of materials is the ability to dial in reactions conditions that enable control of the final crystal structure. Of particular interest is the ability to access materials in a metastable structure and the discovery of new polymorphs. In colloidal synthesis, ligands can be used as handles to provide control over the final structure.

However, there is a need to understand the underlying molecular chemistry in relation to the kinetic and thermodynamic pathways. This talk will focus on our efforts to interrogate, from a molecular perspective, the role of halide precursors in driving structure/phase control in the synthesis of Mn and Sn chalcogenide nanoparticles. In these systems, polymorph/phase control can be achieved by varying the halide precursor, under otherwise identical conditions as confirmed by powder X-ray diffraction.

I will discuss in situ X-ray absorption and emission measurements, performed at relevant synthesis conditions to gain insights toward the coordination chemistry of the early stages of the reaction. The findings from these studies could potentially aid in the development of rational synthesis that achieve desired structure and phase control in other materials systems.

Wednesday, October 22nd | 2:00pm-3:15pm | Science Hall 126 & Zoom

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