



# Inorganic Chemistry Seminar Series

Tuesday, February 13, 2018, 12:30 pm

Seaver Science Library, Room 150

*SSC Auditorium next to the library*

## Professor James Neilson

*Department of Chemistry*

*Colorado State University*

### **Towards a paradigm of materials design: kinetic control in solid state chemistry**

#### **Abstract:**

A significant challenge that chemistry faces is the discovery of functional materials with properties that can unlock new technologies. The prevailing approach to this challenge involves the serendipitous discovery of materials or the incremental modification of solid-state reactions. Therefore, the search for new materials is often limited by phase equilibria or is inhibited by reactant diffusion and product nucleation. To circumvent these limitations, solid-state metathesis reactions have provided us with the opportunity to achieve kinetic control in solid-state chemistry. The pathways of these metathesis reactions can be altered in order to change how or what material is formed. For example, this has led to the isolation of a metastable superconductor (high-pressure  $\text{CuSe}_2$ ) using a kinetically-controlled synthesis under mild conditions. Insights into these solid-state reactions, as provided by study of these reactions in situ, reveal great potential for the formulation of new reactions which selectively form metastable materials that are not accessible through standard solid state chemistry, and push the field towards a paradigm of prescriptive synthesis.

Hosted by Professor Brent Melot

*The scientific community is invited*

**USC Department of Chemistry**

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