Centennial Honors College

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Poster Presentation

Exploratory Solid State Synthesis

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Chemistry

Solid state materials can be synthesized by several different methods. A few examples of the current methods are high temperature, sol-gel, and hydrothermal synthesis. A sol-gel synthesis requires the use of a solution (sol) to suspend a solid resulting in the formation of a gel. The gel contains properties of both solids and liquids. Sol-gel synthesis is one of the most common approaches in the synthesis of solid state materials since high purity samples can be prepared with relative ease.

Using the solid state methods described above synthesized some single crystal salts that contained three different alkali metals (potassium, cesium, and rubidium) were synthesized.,2-4 Our experiment will replace those alkali metals with similar ions, and explore the differences this creates in the structure and physical properties of the crystals formed. Understanding what structural features cause difference in physical proprieties allows for the tailored synthesis of materials. Comparing our crystals to the ones formed in the literature will allow us to identify some structural moieties that are similar in each and then compare the physical properties to see if they are also similar. These single crystals are then examined via a scanning electron microscope to determine the quality of the crystals. This can be used to determine the composition of the elements in the crystal. The sample will also be subjected to X-Ray crystallography to precisely determine the atom positions of the atoms in relationship to each other.