In chemistry, the term chalcogenide refers to anions of the group 16 elements sulfur, selenium, and tellurium. Metal chalcogenide complexes can include alkali (Li, Na, K, Rb, Cs) and alkaline earth (Be, Mg, Ca, Sr, Ba) metals, while common transition metal chalcogenides are made using metals such as copper and molybdenum. These complexes are typically prepared using high temperature melts, hydrothermal synthesis, or liquid ammonia reactions. This research focuses primarily on a hydrothermal preparation method of polychalcogenide compounds.