Our lab has been investing crystals in the Perovskite family of crystals. Perovskites are based on the chemical formula CaTiO$_3$ or ABX$_3$ as a more general formula. These crystals have been shown to have physical properties such as colossal magnetoresistance, ferroelectricity, superconductivity, charger ordering, spin dependent transport, and high thermopower. Since Perovskite materials have been thoroughly studied our group is focused on synthesizing analogues of these materials. In this work we have been working towards the synthesis of MgCuFe$_4$S$_{12}$. While this formula looks different than the ABX$_3$ formula mentioned early it is still considered an analog of a Perovskite based on the way it crystallizes. For example the material CaCu$_3$Fe$_4$O$_{12}$ has been recently synthesized and reported. This material demonstrates the physical property of inverse electron charge transfer. Our material substitutes magnesium for calcium and sulfur for oxygen. We believe these changes will increase the useful properties of the material since sulfur is known for forming bonds with itself which allows for better electrical communication compared to oxides which often demonstrate not oxygen-oxygen bonds. This poster will focus on the preparation of the materials required for synthesis, the synthesis of the desired materials, and also selection of the desired material out of a reaction mixture.