

Centennial Honors College
Thomas E. Helm Undergraduate Research Day 2024

ABSTRACT

Major: Physics

Poster

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The Refractive Index and Optical Band Gap in Strontium Borate Glasses

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Glasses doped with rare earth ions are important materials that find applications in a variety of fields like light sources and optical communication devices. The light emission behavior of rare earth ions doped in glasses strongly depends on their chemical environment. When we vary the composition of a glass, it changes the chemical environment of rare earth ions. These changes can be studied by measuring the refractive index and the optical band gap of the glasses. Refractive index and optical band gap have been widely used over the years to study various aspects and applications of glasses. We prepared a series of strontium borate glasses using boric acid (H_3BO_3), bismuth oxide (Bi_2O_3), samarium oxide (Sm_2O_3) with varying amounts of strontium carbonate ($SrCO_3$). The mixtures of these compounds were melted and flattened to make glass samples which were then annealed and polished. The refractive index was measured using a Brewster's Angle set up. The optical band gap was determined from the optical absorption spectra recorded with a UV Vis spectrometer. Our results show that adding strontium carbonate increases the refractive index but changes the optical band gap significantly. We do not see a steady increase or decrease in the band gap for each sample which might be caused due to structural variations. The sample containing 10 moles of strontium carbonate is an outlier and will be retested to understand the issues causing the fluctuation in the data set.