**Investigating the Impact of Annealing Temperature on the Structural and Optical characteristics of ZnS nanoparticles**

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**Abstract**

Nanocrystalline ZnS was successfully synthesized employing a facile chemical precipitation method, with thiourea serving as the sulfur source. Subsequent annealing at 600 degrees Celsius was applied to enhance the material properties. The resulting annealed samples underwent comprehensive characterization through X-ray diffraction (XRD), and room temperature photoluminescence (PL) measurements. The structural evolution of ZnS and the concurrent formation of ZnO were validated using thermogravimetric (TG) analysis. This study contributes valuable insights into the synthesis, structural modification, and optical behavior of ZnS nanocrystals, paving the way for potential applications in diverse fields. The findings will be presented at the upcoming international conference, offering a significant contribution to the scientific community.