Review Article: The Role of Thioglycolic Acid and Organic Stabilizers in the Controlled Synthesis of CdS Nanocrystals

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Abstract

Cadmium sulfide (CdS) nanocrystals are widely studied due to their promising applications in areas such as photovoltaics, photocatalysis, sensors, and optoelectronics. Achieving control over their particle size, morphology, and surface chemistry is essential to enhancing their performance in these applications. Among the numerous approaches to synthesize CdS nanocrystals, the use of stabilizers or capping agents plays a pivotal role in ensuring particle stability and uniformity. This review highlights and compares three significant studies that focus on the role of thioglycolic acid (TGA) and other organic stabilizers in the synthesis of CdS nanoparticles. Zhang et al. (2015) demonstrated a green aqueous synthesis method where TGA acted both as a sulfur source and a stabilizer. Saraswathi Amma et al. (2007) evaluated different organic stabilizers and confirmed TGA's superior performance. Salavati-Niasari et al. (2008) explored TGA's influence in hydrothermal synthesis, enabling morphology control. The review underscores the versatility of TGA and its potential for developing environmentally friendly, controlled synthetic methods for high-quality CdS nanocrystals.