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Optimization of CdxTeyOz Nanocomposite Film Synthesis via the SILAR Method for Controlled Structural and Phase Properties

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This study focuses on the synthesis of CdxTeyOz films using the SILAR (Successive Ionic Layer Adsorption and Reaction) method, a cost-effective chemical deposition technique that enables precise control of nanocomposite structures. By investigating two batches of films with varying treatment cycles (five and ten), the research highlights the relationship between synthesis conditions and the resulting structural and phase properties. The first batch, with fewer cycles, yielded thinner films with a more uniform structure, while the second batch exhibited increased layer thickness and material accumulation, leading to a more irregular surface morphology.

The study employed advanced characterization techniques such as scanning electron microscopy (SEM), X-ray diffraction (XRD), and energy-dispersive X-ray spectroscopy (EDX). These methods confirmed the formation of a CdxTeyOz nanocomposite layer on a CdS/ZnO substrate, with differences in the chemical composition and crystallinity between the two batches. The experimental findings suggest that the SILAR method allows for fine-tuning the properties of the resulting nanocomposite films, which can have potential applications in photovoltaics, photocatalysis, and sensor development.

Overall, the research contributes to optimizing the SILAR process for producing nanocomposites with targeted electronic and optical properties. Future work will focus on further refining the synthesis parameters to enhance material homogeneity while maintaining the advantages of the SILAR method in terms of cost-effectiveness and structural control.

Type of presence

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