

The microwave-assisted synthesis and characterization of $\text{Zn}_{1-x}\text{Co}_x\text{O}$ nanopowders

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Abstract: In this paper, we present a simple microwave-assisted synthesis of $\text{Zn}_{1-x}\text{Co}_x\text{O}$ nanopowders. With the advantages of the microwave-assisted method, we have successfully synthesized good crystalline quality and good surface morphology $\text{Zn}_{1-x}\text{Co}_x\text{O}$ nanopowders. The nanopowders are characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), UV-VIS absorption, and micro-Raman spectroscopy. We found, in the synthesis process, the surfactant Triethanolamine (TEA) plays an important role on the morphology of $\text{Zn}_{1-x}\text{Co}_x\text{O}$ nanoparticles. The XRD study shows that for Co doping up to 5%, Co^{2+} ions are successfully incorporated into the ZnO host matrix. The absorption spectra of $\text{Zn}_{1-x}\text{Co}_x\text{O}$ ($x = 1-5\%$) nanopowders show several peaks at 660, 611 and 565 nm, indicating the presence of Co^{2+} ions in the tetrahedral sites. The Raman study shows that the linewidth of E_2^{low} mode increases with Co concentration, which further indicates the incorporation of Co^{2+} ions into the ZnO host matrix. ?? 2010 Elsevier B.V. All rights reserved.

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