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Structural, Morphological and Optical Properties of Zinc Oxide Nanoparticles by Polymer Capping

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Abstract: Structural, morphological and optical properties of zinc oxide nanoparticles by polymer capping were investigated. Polyvinyl alcohol (PVA) is used as capping agent. A zinc oxide nanoparticle was synthesized by precipitation method. The resulting nanoparticles were characterized by X-ray diffraction (XRD), Scanning Electron Microscopy (SEM), Energy Dispersive X-ray Analysis (EDAX), Atomic Force Microscopy (AFM), Transmission Electron Microscopy (TEM), UV-vis absorption spectroscopy and Fourier Transform Infrared Spectroscopy (FTIR). The optical properties of polymer capped zinc oxide nanoparticles were characterized by UV-visible spectroscopy. The XRD results revealed that the zinc oxide nanoparticles are highly crystalline, having the hexagonal wurtzite crystal structure. The SEM image showed that the nanoparticles prepared in this study were spherical in shape. The UV absorption edges exhibited a blue shift, which might be caused by nanosize effect. The nanocomposites size can be calculated from Debye-Scherrer's formula.

Keywords: ZnO nanoparticles, XRD, SEM, TEM, Optical, Polymer, UV-Visible spectroscopy.

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