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PVA/CdS, PVA/ZnS and PVA/CdS/ZnS Core/Shell Nanocomposites: Synthesis, Characterization and Studies on some Structural Aspects

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Abstract

This paper reports a study on the effect of reaction time, shell thickness and matrix concentration upon synthesized CdS, ZnS and CdS/ ZnS core/ shell nanoparticles implanted in non-conducting matrix Polyvinyl Alcohol (PVA). A simple chemical technique is adopted for the synthesis of CdS, ZnS and CdS/ ZnS nanoparticles. In all, four different sets of samples have been synthesized by varying various parameters like reaction time, shell concentration and PVA concentration. Various characterization techniques have been used to analyse the optical and structural characteristics of the as-synthesized nanoparticles which include UV-Vis Spectroscopy (UV-vis), Photoluminescence (PL) Spectroscopy, X-Ray Diffraction (XRD), Scanning Electron Microscopy (SEM), Energy Dispersive Analysis of X-Rays (EDAX), and Transmission Electron Microscopy (TEM). The result obtained confirms the formation of nanoparticles of CdS, ZnS and CdS/ ZnS core/ shell nanoparticles.

Keywords: Core/shell, nanoparticles, characterization, Synthesis