

Structural and Optical Characterization of Silica@PbS Core-Shell Nanoparticles

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Abstract : The present work describes the preparation and characterization of nanosized SiO₂@PbS core-shell particles by using a simple wet chemical route. This method utilizes silica spheres formation followed by successive ionic layer adsorption and reaction method assisted lead sulphide shell layer formation. The final product was characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), UV–vis spectroscopic, infrared spectroscopy (IR) and transmission electron microscopy (TEM) experiments. The morphological studies revealed the uniformity in size distribution with core size of 250 nm and shell thickness of 18 nm. The electron microscopic images also indicate the irregular morphology of lead sulphide shell layer. The structural studies indicate the face-centered cubic system of PbS shell with no other trace for impurities in the crystal structure.

Keywords : core-shell, nanostructure, semiconductor, optical property, XRD

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