

Elucidation of morphological and optoelectronic properties of highly crystalline CuInCuInSe₂ nanoparticles

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CuInSe₂ nanoparticles and CuInSe₂-Cu₂Se (core-shell) nanoparticles have been prepared by hot-injection method and by sol-gel process respectively. The thermal annealing effects on the structural and optoelectronic properties of highly crystalline CuInSe₂ core-shell nanoparticles have been elucidated. The nanoparticles were characterized by TEM, XRD, X-ray photoelectron spectroscopy (XPS), UV-Vis absorption spectra and PL spectra. The microstructural analysis of synthesized samples would be done using electron diffraction (ED) and high-resolution transmission electron microscopy (HRTEM). The TEM image of the prepared CIS nanocrystals is shows that the sizes of nanoparticles range from 20 nm to 200 nm with good dispersibility and the shape of nanocrystals is close to rectangle. The FFT pattern of the HRTEM image of CuInSe₂ nanoparticles illustrates that the particles has quasi-single crystal tetragonal structure.

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