

Influence of Precursor Source and Concentration on Size and Crystalline Structure of Cadmium Telluride Nanoparticles

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CdTe, a group II-VI chalcogenide semiconductor, is an important semiconducting material with unique optical and electrical properties. Bulk CdTe is a direct band gap semiconductor with band gap of 1.44 eV at room temperature and atmospheric pressure, but at nano-regime it possesses tunable band gap at visible and near IR region. These properties are dependent on particle size and structure. The combination of wide bandgap, high quantum efficacy and multi-colour availability makes CdTe an attractive material for numerous potential applications. The CdTe nanoparticles were prepared by 'bottom up technique' using chemical precipitation method at a typical room temperature. The influence of the source compounds and concentrations of solution on the size and structure of nanoparticles were studied. The size was calculated from XRD data using Scherrer equation which were further verified from TEM images. Similarly, the crystalline structures were determined from XRD data and SAED pattern. Both sphalerite and wurtzite CdTe were observed having size of about 5nm.

Keywords: Group II-VI semiconductor, nanoparticles, band gap, quantum efficacy.