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Synthesis and investigation of optical and structural properties of core-shell CdS/ZnS nanoparticles

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Abstract: In this research, CdS nanoparticles and core/shell CdS/ZnS nanoparticles were prepared by using aqueous solution method and used 3-mercaptopropionic acid (MPA) as capping molecule. The effect of ZnS shell on optical and structural properties of CdS was investigated. X ray diffraction patterns of CdS nanoparticles at the room temperature and after heat treatment show zinc blende structure. X ray diffraction patterns of CdS/ZnS nanoparticles are wider because of overlapping diffraction patterns of ZnS and CdS. The size of CdS and CdS/ZnS nanoparticles was calculated by using Debay-Scherrer equation which is 2.7 nm and 1.7 nm at room temperature, respectively, and after heat treatment obtained 3.2 nm and 1.9 nm, respectively. FTIR studies were used to indicate coating of the MPA molecule on nanoparticles. In the TEM image of CdS/ZnS nanoparticles, it can be seen small nanoparticles and some agglomeration which is due to nonuniform distribution of particles on the grate sample holder in TEM measurement.

Keywords: *CdS; CdS/ZnS core/shell; optical properties; structure properties; nanoparticle; aqueous solution synthesis.*

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