

High Temperature Structural Studies of HgS and HgSe nanoparticles

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Abstract

High quality colloidal mercury chalcogenide quantum dots were synthesized using a combination of strong Hg (II) coordinating ligands and precursor phase separation. The structural properties of the β -HgS and HgSe nanoparticles were investigated by x-ray diffraction as a function of temperature between 300-600 K. At room temperature, nanoparticles having dimensions less than 4.0 nm, showed reduced lattice parameters in comparison to their bulk values. For both HgS and HgSe, the zinc-blende structure remained stable up to 600 K. The particle size increased as a function of increasing temperature. The post heated nanoparticles had their dimensions increased to more than 10.0 nm and consequently bulk lattice parameters.