

Synthesis and characterization of hexagonal shaped zinc oxide nanoparticles by solution process

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Synthesis of spherical shaped zinc oxide nanoparticles was successfully synthesized by the sol-gel method using zinc acetate di-hydrate ($Zn(CH_3COO)_2 \cdot 2H_2O$) and Urea (NH_2CONH_2) at a temperature of about $\sim 90^\circ C$ and reflux for 12 hours after refluxing the white powder sample was annealed in air for two hours at four different temperatures i.e., 500, 700 and $900^\circ C$. The particle sizes were increased from 20nm to 200nm with increasing annealing temperature. The FTIR standard peak of zinc oxide was present at 457cm^{-1} . Furthermore the structural characterization was also carried out by the TEM, high resolution TEM and selected area electron diffraction (SEAD) patterns reveal that the particles are spherical shaped with the distance between two lattice fringes of about 0.52 nm, corresponding to the (0001) fringe, which is consistent with that of a bulk wurtzite ZnO crystal.