

Abstract

ZnS nanoparticles doped with Alkali metals (Li) was successively synthesized by a basic and a very simple chemical method using cetyl trimethyl ammonium bromide (CTAB) as capping agent. The influence of various reaction conditions and dopant concentrations on the formation, phase, morphology and optical properties of NPs have been investigated and discussed. XRD studies clearly showed the formation of zinc blende phase (cubic) of ZnS and also confirm that Alkali metal atoms are incorporated into the lattice of ZnS as no impurity peak of dopants was found. But broadening in the diffraction peaks with different molar concentrations of Alkali metal ions suggests the presence of ions on the surface of ZnS. The average crystallite size decreases as the concentration of dopants was increased. By the addition of dopants the lattice constant of samples decreases slightly. The band gap of the NPs was calculated from the absorption spectra and found to be lower than that of the bulk counterpart. Also, UV-visible studies showed that band gap of ZnS decreases as the concentration of dopant increases.