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Optical properties of $Zn_{1-x}Fe_xO$ nanoparticles

Authors: T. A. Abd-Elbaset

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$Zn_{1-x}Fe_xO$ ($x=0,4,6,8,10$) nanoparticles were synthesized using co-precipitation technique at low temperature. X-ray diffraction confirms that the samples have a single-phase wurtzite structure which the bond lengths and the dislocation density increases with an increasing dopant concentration which attributed to the different ionic radii of Fe ions substituted in the ZnO lattice. Optical constant such as optical energy band gap E_g and the reflective index, and the dielectric constant have been determined. The direct optical band gap and the Urbach energy of the $Zn_{1-x}Fe_xO$ NPs decreased with increasing Fe content. The refractive index, the lattice dielectric constant and the optical conductivity are increased with increasing Fe content.