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Structural, morphological and magnetic properties of pure and Ni-doped ZnO nanoparticles synthesized by sol-gel method

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In this work pure and Ni-doped ZnO nanoparticles have been prepared by sol-gel method. Influence of nickel doping on structural, morphological and magnetic properties of prepared nanoparticles was investigated by X-ray diffraction technique (XRD), Scanning electron microscopy (SEM) and Pulse field magnetic hysteresis loop. X-ray diffraction pattern shows the formation of a single phase with hexagonal wurtzite structure of both pure and Ni-doped ZnO nanoparticles. The lattice parameters 'an' and 'c' of Ni-doped ZnO is slightly less than that of pure ZnO nanoparticles. The crystalline size of prepared nanoparticles is found to be in 29 and 31 nm range. SEM technique used to examine the surface morphology of samples, SEM image confirms the nanocrystalline nature of present samples. From the pulse field hysteresis loop technique pure and Ni-doped ZnO nanoparticles show diamagnetic and ferromagnetic behavior at room temperature respectively.

Topics

Magnetic properties, Diamagnetic materials, Doping, Ferromagnetic materials, Magnetic materials, Sol-gel process, Nanomaterials, Nanoparticle, Metal oxides, Transition metals

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