

ABSTRACT

NiO and Cu-doped NiO nanoparticles have been successfully synthesized by chemical co-precipitation method at room temperature using sodium hydroxide (NaOH) as precipitating agent. The as-prepared Cu-doped NiO powder samples were subjected to five different doping concentrations such as, 0, 2.5, 5, 7.5 and 10 *at.*%. Crystal structure, morphology, and optical properties are investigated by means of X-ray diffraction (XRD), Scanning Electron Microscope (SEM), Fourier Transformation Infrared Spectroscopy (FTIR), and UV-Vis Spectroscopy. XRD analysis of un-doped and doped samples confirms its FCC structure. The average crystallite size shows a decreasing trend with increase in doping ratio up to 5% and then increased with further increase in doping ratio up to 10%. Agglomeration and spherical shape of particles can be observed from surface morphology. Chemical bonding and presence of various functional groups is exposed by using FTIR. UV-Vis analysis demonstrates a significant decrease in optical band gap energy from 3.79 eV, for un-doped NiO, to 3.30 eV for 10% Cu-doped NiO. Such Cu doped nanocrystalline NiO material can be used as an alternative material for energy applications, such as p-type semiconductor material for solar cells, electrochemical capacitors, photocatalysis, and as an antimicrobial agent.