**Abstract**

Copper doped nickel ferrites Ni(1−*x*)Cu*x*Fe2O4 (where *x*=0.2, 0.4, 0.6) nanoparticles are prepared by co-precipitation method and sintered at 600 °C. The XRD study confirms the formation of single-phase cubic spinel Ni–Cu ferrites. The particle size increases with Cu substitution. FT-IR spectra confirm the absorption bands around 554–547 cm−1 for the tetrahedral sites and around 448–450 cm−1 for the octahedral sites. The inclusion of copper shifts the tetrahedral band to lower values. The saturation magnetization (*M*s) and remanent magnetization (*M*r) decrease with increase in copper concentration and the coercivity (*H*c) is found to increase for all the compositions sintered at 600 °C. The dielectric constant decreases drastically for all the compositions and reaches a constant value. These nanoparticles can be tested for humidity sensing applications.