

## Quenching of luminosity in copper doped ZnO nanopowder

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Copper (Cu) doped Zinc Oxide (ZnO) nanopowder of different molar ratios was synthesized by wet chemical reaction method.. Crystalline phases, morphology, optical properties and magnetic properties of prepared samples were determined by XRD, SEM, UV-absorption analysis, PL, Confocal laser scanning microscopy (CLSM), and vibrating sample magnetometer measurement (VSM). The structure, lattice parameters, average particle size, percentage of lattice contraction, dislocation density, specific surface area, and volume weighted strain of the samples were calculated from the XRD. A morphology index (MI) was developed from Full width at half maximum (FWHM) of XRD to understand interrelationship of particle size and specific surface area. XRD analysis revealed that Cu doped ZnO crystallized in hexagonal wurtzite structure. The incorporation of  $\text{Cu}^{2+}$  in the place of  $\text{Zn}^{2+}$  provoked an increase in the size of nano crystals. Quenching of luminosity in ZnO upon  $\text{Cu}^{2+}$  doping at higher concentration was observed in the PL study (Figure 1). The magnetic measurement by VSM clearly indicates ferromagnetic interaction at room-temperature in  $\text{Cu}^{2+}$  doped ZnO nanocrystals (Figure 2).

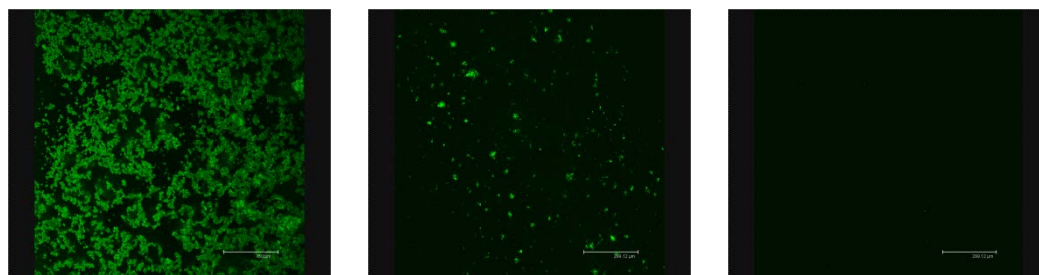


Fig. 1 Confocal laser scanning images of a) undoped ZnO b) 5 mol% Cu/ZnO c) 30mol% Cu/ZnO

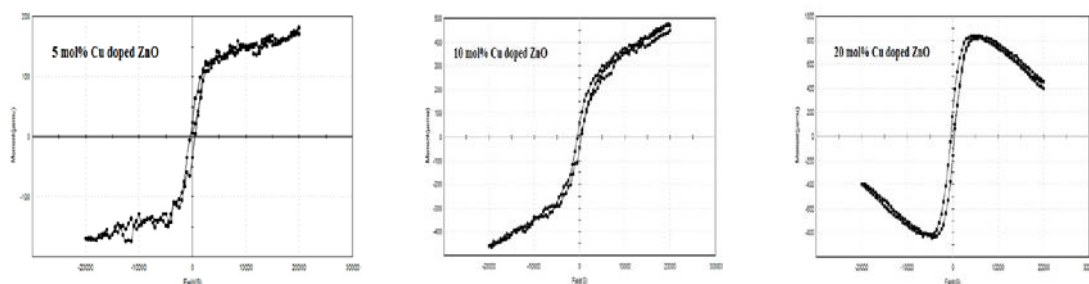


Fig. 2 M-H curves at room-temperature for  $\text{Cu}^{2+}$  doped ZnO