

Properties of pure and Mn doped ZnO nanopowders by co-precipitation method

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Abstract. Pure and Mn doped zinc oxide nanopowders have been synthesized by co-precipitation method. The obtained powders after calcinations in air at 500°C were consolidated and sintered using conventional furnace. The obtained powders were characterized by X-ray diffraction, SEM images and Hall measurements. The effect of Mn concentration on the micro-structure on the density and on the electrical properties was successfully investigated. The studied nanopowders have : a high density of 7.26 (g/cm³) for 5%Mn powder. The XRD results indicate that pure and Mn doped ZnO powders are solid solutions crystallizing in pure wurtzite structure, and consisted of a mixture of nanoparticles with an average grain size between 11.68 and 39.12 nm. The grain size increases with increasing Mn concentration and reaches its highest value at 5 mol% Mn and increases with increasing particle size. On the other hand the increase of Mn concentration leads to an increase of the density and leads also to an increase of the charge carrier concentration of Zn%molMnO.

Keywords: Zinc oxide, manganese, nanopowders, Co-precipitation.