

Influence of annealing temperature on the structural and optical properties of sol-gel prepared ZnO thin films

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Zinc oxide thin films have been prepared via a sol-gel process. The structural and optical properties of ZnO thin films were characterized by X-ray diffraction, scanning electron microscopy, UV-VIS transmission, and photoluminescence. The influence of annealing temperature on the structural and optical properties has been investigated. It was found that the films had a polycrystalline hexagonal wurtzite structure with no preferred orientation. The annealing temperature has great effects on the optical properties of ZnO thin films: the optical band gap is narrowed due to the increase in crystallite size and the reduction of amorphous phase amount with the increasing annealing temperature; absorption or desorption of oxygen during the annealing process has caused the observed yellow or green emission band.