

Enhanced of Blue and Green Emission by Ce–ZnO Thin Films Prepared by Sol–Gel Technique

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In this work, pure and cerium-doped ZnO thin films were synthesized on glass and silicon substrates via sol–gel spin-coating technique. Cerium (Ce) was incorporated with different concentrations of 1, 3, and 5 at.%. Optical, structural, and morphological properties were studied. X-ray diffraction analysis shows that all thin films are polycrystalline with a hexagonal wurtzite structure. SEM images expose zinc oxide nanospheres. High transmittance (over 80%) in the visible region is observed with band gap varying from 3.02 to 3.19 eV. The photoluminescence analysis indicates the existence of one violet emission, four blue emissions, and one green emission for all samples. The improvement in emission intensities depends on the increase of cerium content. The measured electrical resistivity of these thin films is in the order of $10^{-2} \Omega \cdot \text{cm}$.

Keywords: ZnO, sol–gel, thin films, cerium, photoluminescence.

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