Title:	Effect of N Doping on the Optical and Electrical Properties of Thermal Spray Pyrolyzed ZnO Thin Films
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Abstract:

This paper considers the experimental study of Nitrogen doped ZnO (ZnO:N) thin films deposited on a glass substrate at 350ºC using low cost homemade thermal spray pyrolysis technique in a typical environmental condition. In this study the average reflectance, transmittance, and absorbance were experimentally measured 20%, 35%, and 45%, respectively. Absorption coefficient is obtained 3.5x104 cm-1 for N doped ZnO sample. However, direct bandgap energy varies from 3.08 to 2.99 eV and indirect band gap energy varies from 2.86 to 2.67 eV. XRD analysis shows that the (002) plane is present in the experimental sample and the average grain size decreases with the increasing N concentration. Surface morphology of the sample is studied by Scanning Electron Microscopy. It is seen that few voids are present in the hexagonal crystal grains. The surface exhibits more or less uniform surface morphology with some clusters on the whole surface. Hall Effect study confirms that Nitrogen doped ZnO (ZnO:N) thin films using Vander Pauws method were made at room temperature at a constant field of 9.75 KG. Experimentally (1, 2, 3, and 4) % N doped ZnO thin films have shown negative Hall Constant (RH), which exhibits N-type characteristics. RH and Hall concentration (n) increase with increasing N doping concentration.