

Fabrication and Characterization of N-doped ZnO Nanofilms by Plasma Enhanced Atomic Layer Deposition

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Nitrogen-doped ZnO films were prepared by plasma enhanced atomic layer deposition (PEALD). The films were grown temperature at 220°C with varying the R.F power from 0 to 300 W under (N₂+ O₂) mixing gas discharges. Structural, optical, electrical properties of these films were investigated with X-ray diffraction (XRD), photoluminescence (PL) and Hall-effect measurements, respectively. The N-doped ZnO nanofilms were grown along the [0002] direction in preference. Only sharp and strong UV emission at 370nm from room-temperature PL spectra was observed from all the ZnO nanofilms. The enhancement of conductivity in N-doped ZnO was attributed to an increase in nitrogen content in film. With, increasing the R.F power the mobility of the ZnO film increased but the resistance of the film decreased.