

# Fabrication and Characterization of Copper Doped Zinc Oxide on p-type and n-type Gallium Nitride by Sputtering

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## ABSTRACT

Zinc oxide (ZnO) is a wide band gap semiconductor (3.37eV) with promising applications in optoelectronic devices and flat panel display. Copper (Cu) doping changes the properties of ZnO. Pure and Cu doped ZnO (CZO) were deposited on p-type and n-type gallium nitride (GaN) using radio frequency (RF) magnetron sputtering of Cu/ZnO alloy target with ratio 10/90 at room temperature. The effect of different deposition thickness of the thin film on the crystal structure, surface morphology and surface roughness were investigated intensively using X-ray diffraction (XRD), field emission scanning electron microscopy (FE-SEM), energy dispersive X-ray spectroscopy (EDX) and atomic force microscopy (AFM) respectively. Results indicate that the films with hexagonal wurtzite structure and preferential c axis orientation were fabricated. Crystallization of thin film is dependent on the deposition thickness. As the thickness of the film increases, the grain size increases and surface roughness decreases.