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## EFFECTS OF DIFFERENT AMOUNTS OF SURFACTANT ON CHARACTERISTICS OF SOL-GEL DIP COATED GALLIUM NITRIDE THIN FILMS

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**ABSTRACT-** In the present study, sol-gel dip coating method was used to synthesize gallium nitride (GaN) thin films. Gallium nitrate hydrate ( $\text{Ga}(\text{NO}_3)_3 \cdot x\text{H}_2\text{O}$ ) powder, ethanol and diethanolamine (DEA) were used as starting material, solvent, and surfactant, respectively. Different amounts of DEA, i.e., 0 ml, 0.10 ml, 0.25 ml, 0.50 ml, 0.75 ml and 1.0 ml, were added into the precursor. The effects of different amounts of DEA on GaN thin films on structural and optical properties of the deposited films were investigated. High resolution X-ray diffraction results revealed that hexagonal wurtzite structure GaN thin film with (002) preferred orientation was synthesized. The intensity of the GaN(002) diffraction peaks increases with the increase of amount of surfactant from 0 ml to 0.75 ml and degraded at 1.0 ml. Raman signal of  $E_2$  (high) GaN peaks increases and becomes stronger at 0.75 ml. Further increase in the amount of surfactant has caused the intensity of  $E_2$  (high) GaN peak decreases. The measured results shows that the amount of surfactant plays an important role in improving crystallinity of GaN thin films.

**Keywords:** gallium nitride, surfactant, sol gel, dip coating.