

## Aluminum Nitride Thin Films Grown Sol-gel Spin Coating Technique

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In this study, aluminum nitride (AlN) thin films were grown on p-type silicon (100) substrate by sol-gel spin coating method. Two types of ethanol-based precursors were prepared, namely, precursors with and without the aid of diethanolamine (DEA). The objective of this work is to investigate the effects of the DEA on the surface morphology, structural and optical properties of the deposited thin films. The coating films were undergone nitridation process under ammonia ambient at 1100 °C for 60 min. The surface morphology and structural properties of the deposited AlN thin films were investigated by atomic force microscopy (AFM) and X-ray diffraction (XRD). The AFM results showed that the AlN thin films has uniform and smooth surface. XRD results revealed that both samples of the deposited AlN thin films have AlN (100) preferred orientation. In addition, the crystallinity of sample without the aid of DEA is higher compared with the sample with the aid of DEA. The optical properties of AlN thin films were investigated by Raman and UV-Vis spectroscopy. Raman results showed the present of  $E_1(\text{TO})$  peak at  $670\text{ cm}^{-1}$  for sample without DEA and no peak is observed for sample with the aid of DEA. It was observed from UV-vis reflectance spectra that both samples were having energy band gap at around 5 eV. Finally, all the results revealed that the present of DEA affects the properties of AlN thin films.

**Keywords:** Aluminum nitride, sol-gel, spin coating, structural properties, optical properties.