

## **Growth and Characterization of $\text{Al}_{0.2}\text{In}_{0.1}\text{Ga}_{0.7}\text{N}$ on AlN/Sapphire Substrates by rf-magnetron sputtering for Ultraviolet light-emitting diodes**

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A deep ultraviolet (UV) light emitting devices using quaternary  $\text{Al}_{0.2}\text{In}_{0.1}\text{Ga}_{0.7}\text{N}$  have been grown on sapphire substrate with AlN as a buffer layer. AlN as a buffer layer was grown on c-plane (0001) sapphire substrate at temperature of 300 °C and 100 W rf-plasma power followed by the growth of AlInGaN films using radio-frequency (RF) magnetron sputtering at different temperatures (100-500 °C) and radio frequency power (80-150 W). We found that the quaternary films grown at temperatures of 400°C and 100W show the highest optical and structural properties. The optical, structural and morphology of the films were characterized by X-ray diffraction (XRD), Scanning Electron Microscope (SEM), Hall Effect Measurement, Photoluminescence (PL) and Raman Spectroscopy.