

## **Growth of GaN films on LiNbO<sub>3</sub> using molecular beam epitaxy**

**Man Hoai Nam, Wochul Yang\*, ChulGoo Son<sup>1</sup>, YunHee Shin<sup>1</sup>, and Moon Deock Kim<sup>1</sup>**

Dept. of Physics, Dongguk Univ., Seoul, Korea

<sup>1</sup>Dept. of Physics, Chungnam National Univ., Daejeon, Korea

GaN semiconductors have been used for high power, high frequency electronic devices and optoelectronic devices such as light emitting diodes and laser diodes. Most of the GaN films are grown on sapphire (0001) substrates and silicon (111) substrates. In this work, we are trying to grow GaN films on ferroelectric lithium niobate (LiNbO<sub>3</sub>) substrates using molecular beam epitaxy (MBE). As a ferroelectric material, lithium niobate has a spontaneous polarization which may provide excellent control of polarity of GaN(Ga-face and N-face). Prior to growth of the GaN films, the substrate of LiNbO<sub>3</sub> was annealed in air at high temperature of 1000°C for 2 hrs., which resulted in atomically flat surfaces. Then, the AlN buffer layer was grown at 550-600°C. GaN films were grown on the AlN buffer layers. The growth temperatures were 700-800°C. Also, we grew GaN films without AlN buffer layer to compare the crystal quality of the GaN films with the buffer layer. The surface morphology of GaN films were characterized by using atomic force microscopy (AFM) and scanning electron microscopy (SEM), the crystal structures were studied by X-ray diffraction (XRD), and the optical properties were characterized by photoluminescence (PL).

\* corresponding author: [wyang@dongguk.edu](mailto:wyang@dongguk.edu)