

ZnO films grown on GaN/sapphire substrates by pulsed laser deposition

Jooyoung Suh, Hooyoung Song, Myoung Jun Shin, Young Jin Park, and Eun Kyu Kim

Quantum-Function Research Laboratory and Department of Physics, Hanyang University

Both ZnO and GaN have excellent physical properties in optoelectronic devices such as blue light emitting diode (LED), blue laser diode (LD), and ultra-violet (UV) detector. The ZnO/GaN heterostructure, which has a potential to achieve the cost efficient LED technology, has been fabricated by using radio frequency (RF) sputtering, pyrolysis, metal organic chemical vapor deposition (MOCVD), direct current (DC) arc plasmatron, and pulsed laser deposition (PLD) methods. Among them, the PLD system has a benefit to control the composition ratio of the grown film from the mixture target. A 500-nm-thick ZnO film was grown by PLD technique on c-plane GaN/sapphire substrates. The post annealing process was executed at some varied temperature between from 300°C to 900°C. The morphology and crystal structural properties obtained by using atomic force microscope (AFM) and x-ray diffraction (XRD) showed that the crystal quality of ZnO thin films can be improved as increasing the annealing temperature. We will discuss the post-treatment effect on film quality (uniformity and reliability) of ZnO/GaN heterostructures.