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√ Optimization of Post-Annealing NH_3 Temperature for GaN Growth on GaAs (100) Substrate via Electron Beam Evaporator

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In recent years, gallium nitride (GaN) films have been widely grown by molecular beam epitaxy (MBE) and metal organic chemical vapour deposition (MOCVD). However, both are expensive techniques and require high maintenance and operation. Therefore, a more simple and cost-effective technique like electron beam (e-beam) evaporator should be more explored for growing GaN layer. So far, only few groups have work on this technique.

In this work, we aim at demonstrating growth of GaN films on gallium arsenide (GaAs) substrate by e-beam evaporator. Our initial observation found that the GaN films lack the N atom component. Thus, the samples were annealed in ammonia (NH_3) ambient, and the annealing temperature was varied at 650 ºC, 700 ºC, 800 ºC, 850 ºC, 900 ºC, 950 ºC and 980 ºC. The effects of using different annealing temperature on the properties of the GaN films were investigated through field emission scanning electron microscopy (FE-SEM), atomic force microscopy (AFM). X-ray diffraction (XRD), photoluminescence (PL) and Raman spectroscopy. Towards the end, the optimum annealing temperature that promoted significant improvement to the GaN films is proposed.