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EFFECT OF GaN NUCLEATION LAYER TEMPERATURE ON STRUCTURAL AND MORPHOLOGICAL PROPERTIES OF ud-GaN TEMPLATE GROWN ON PSS

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ABSTRACT- In this study, the role of nucleation layer temperature on the ud-GaN crystal quality grown on cone-patterned sapphire substrate (PSS) by metalorganic chemical vapor deposition (MOCVD) was explored. To do this, the crystal qualities of bulk GaN were characterized by rocking curves of (002) and (102) planes in XRD measurement. Further, the atomic force microscopy (AFM) and field emission scanning electron microscope (FESEM) analysis were performed to study the morphology of ud-GaN growth at different temperature GaN nucleation layers. Results indicate that higher nucleation layer temperature works best to enhance the epitaxial layer quality in x-ray diffraction (XRD) analysis of the ud-GaN. Therefore, nucleation layer temperature proved to effectively control the nucleation sites and thus determine the crystal quality of ud-GaN.

Keywords: nucleation, ud-GaN, patterned sapphire substrate (PSS).