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Growth and Characterization of Homoepitaxial GaN on N-face GaN Free-standing Substrate by Plasma-Assisted Molecular-Beam Epitaxy CHENG-DA TSAI, IKAI LO, Department of Physics, National Sun Yat-Sen University, Kaohsiung 80424, Taiwan, R. O. C, WEI-I LEE, CHUO-HAN LEE, Electrophysics, National Chiao Tung University, 1001University Road, Hsinchu 30010,Taiwan,R. O.C., YING-CHIEH WANG, CHIA-HSUAN HU, CHENG-HUNG SHIH, CHEN-CHI YANG, YU-CHIAO LIN, SHUO-TING YOU, Department of Physics, National Sun Yat-Sen University, Kaohsiung 80424, Taiwan, R. O. C, ELECTROPHYSICS, NATIONAL CHIAO TUNG UNIVERSITY, 1001UNIVERSITY ROAD, HSINCHU 30010,TAIWAN,R. O.C. TEAM — As compared to the commercial GaN based LED with the Ga-face GaN substrate, the GaN film grown along N-face GaN has been considered to have better current injection efficiency for GaN p-n junction. In this paper, we have studied the growth of GaN epi-layer on N-face GaN free-standing substrate. The N-face GaN free-standing substrate was prepared by hydride vapor phase epitaxy and its full width at half maximum is 469.2 arc-sec by X-ray analysis. The homoepitaxial GaN samples were grown atop the prepared N-face GaN free-standing substrate by plasma-assisted molecular-beam epitaxy under different growth conditions. The homoepitaxial GaN samples were characterized by the in-situ reflection high-energy electron diffraction, X-ray diffractometry, field emission secondary electron microscope, and atomic force microscope. In addition, the optical properties of the samples were analyzed by polarization-dependent photoluminescence.

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