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The Growth of InGaN on Single Crystal ZnO (000-1) Substrate by Metal Modulation Epitaxy Method[1] YING-CHIEH WANG, C.H. SHIH, IKAI LO, C.C. YANG, C.D. TSAI, Department of Physics, National Sun Yat-Sen University, Kaohsiung, Taiwan — The growth of InGaN film on single crystal ZnO (000-1) substrate by plasma assisted-molecular beam epitaxy has been investigated. The metal modulation epitaxy (MME) technique was applied in this experiment. The growth mechanism of InGaN thin film on ZnO (000-1) was in the form of 2D growth model by *in-situ* observation of reflection high-energy electron diffraction (RHEED). From the observation of atomic force microscope (AFM), we found that surface roughness of InGaN thin film can be improved using MME technique. The crystal quality and the indium content of InGaN thin film was determined by the X-ray diffraction method. The full width at half-maximum (FWHM) and the indium content of InGaN thin film is 298.64 arc-sec and 17 %, respectively. According to the calculation of bowing parameters, the 17 % indium content of InGaN thin film closed to $In_{0.18}Ga_{0.82}N$ which is perfect lattice-matching to ZnO (000-1). The micro-structure analysis of InGaN grown on ZnO by high-resolution transmission electron microscope (HR-TEM) was performed, which shows that the interface between the substrate and the film is clearly indicating $In_{0.17}Ga_{0.83}N$ to be lattice-matching with ZnO (000-1).

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