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Plasma-Assisted Molecular Beam Epitaxy Grown InN Epifilm LI-WEI TU, C.L. HSIAO, K.R. WANG, M. CHEN, Z.W. JIANG, Y.J. TU, Department of Physics and Center for Nanoscience and Nanotechnology, National Sun Yat-Sen University, Kaohsiung, Taiwan 80424, Republic of China — High quality InN epitaxial layer is grown by plasma-assisted molecular beam epitaxy. Substrates used are c-plane sapphire and (111) Si wafer. Various characterizations are performed to investigate the crystal structure, compositions, electrical and optical properties. Hall measurements yield unintentional doping concentration in a range of $10^{18} - 10^{20} \text{ cm}^{-3}$. Hall mobility reaches $1000 \text{ cm}^2/\text{Vs}$. High resolution x-ray rocking curve gives a full-width-at-half-maximum of $\sim 1000 \text{ arcsec}$ for InN (0002). No oxygen signal can be detected with electron probe micro-analysis. Field emission scanning electron microscopy and atomic force microscopy show the flatness of the film surface. Raman scattering spectroscopy reveals Raman modes only from the hexagonal phase of InN. Extensive photoluminescence measurements are carried out to explore the bandgap of InN. Discussion on the results will be reported in detail.

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