Characterization of $M$-plane GaN film grown on $\beta$-LiGaO$_2$ (100) by plasma-assisted molecular beam epitaxy CHIA-HSUAN HU, IKAI LO, CHENG-HUNG SHIH, WEN-YUAN PANG, YING-CHIEH WANG, Department of Physics, National Sun Yat-Sen University, Kaohsiung, Taiwan, MITCH M.C. CHOU, Department of Materials and Optoelectronic Science, National Sun Yat-Sen University, Kaohsiung, Taiwan — Lithium gallate (LiGaO$_2$) has an orthorhombic crystal structure that can be described as a wurtzite-like structure. The $M$-plane basis of GaN wurtzite structure is nearly matched to the selected lattice axes of pseudo-hexagonal LiGaO$_2$. $M$-plane GaN thin films have been grown on $\beta$-LiGaO$_2$ (100) substrates by plasma-assisted molecular-beam epitaxy in our group. Pure $M$-plane GaN crystal films have been verified by the measurements of x-ray diffraction, micro-Raman scattering, polarization-dependent photoluminescence and atomic force microscopy. The measurements of x-ray diffraction and micro-Raman scattering exhibited the evidences of large compressive stress on the $M$-plane GaN thin films. Based on experimental results, we showed that the large compressive stress is the major source leading to the peeling of $M$-plane GaN thin film off substrate after thermal recycles.