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Terahertz study of m-plane GaN thin films SHAHAM QUADIR, DER-JUN JANG, CHING-LIANG LIN, IKAI LO, Natl Sun Yat Sen Univ — We investigate the optical properties of m-plane GaN thin films using the terahertz time domain spectroscopy. The m-plane GaN thin films were grown on γ -LiAlO₂ substrates with buffer layers of low temperature grown GaN. The thin films were illuminated with terahertz radiation generated by a LT-GaAs antenna and the transmitted signal was detected by a ZnTe crystal. The polarization of the terahertz wave was chosen to be either parallel or perpendicular to the GaN [0001] direction. We compared the transmitted signals of the m-plane GaN thin films to that of the LAO substrate. The samples as well as the LAO substrate exhibited polarization dependence of absorption in terahertz spectrum. The carrier densities and the mobilities were derived from the transmittance of the THz wave using extended Drude model. We found, in all samples, both the carrier densities and mobilities along the GaN [0001] direction were smaller than those along the GaN [11 $\bar{2}$ 0] direction due to the stripe formation along the GaN [11 $\bar{2}$ 0].

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