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THz Characterization of Ferroelectric BSTO Thin Film by THz Time-Domain Spectroscopy

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Terahertz time-domain spectroscopy(THz-TDS) has been used to characterize the optical and dielectric properties of a ferroelectric $Ba_{0.6}Sr_{0.4}TiO_3$ thin film in THz frequency range. The $Ba_{0.6}Sr_{0.4}TiO_3$ film was deposited on (001)MgO substrate by pulsed laser deposition with a KrF(λ=248 nm) excimer laser in 140 mTorr of oxygen pressure at a substrate temperature of 800℃. The thickness and structure of $Ba_{0.6}Sr_{0.4}TiO_3$ thin film was investigated by a cross-section scanning electron microscope(SEM) and X-ray diffractometer(XRD). The absorption coefficient, complex refractive index, and complex dielectric constants were measured in the frequency range of 0.3 to 3 THz.