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 Ba₀.₆Sr₀.₄TiO₃ thin film in THz frequency range. The Ba₀.₆Sr₀.₄TiO₃ 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°C. The thickness and structure of Ba₀.₆Sr₀.₄TiO₃ 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.