

Polarization Rotation by Barium Titanate (BaTiO₃) Thin Film with an External Electric Field

Abstract

Barium Titanate (BaTiO₃) thin films are suitable for many applications especially photonic due to its large electro-optic (EO) coefficient where the EO effect causes a change of optical refractive index in a film due presence of an electric field. The first step towards the development of thin film based EO modulators is to study its EO properties. The thin film BaTiO₃ was prepared by a sol gel process and annealed at 900°C and then subjected to EO interrogation via the Sénarmont technique. It shows that the technique affected the electro-optic properties of the thin film and the electro-optic behaviour. The Sénarmont technique also utilized the EO measurement of BaTiO₃ thin films from negative 20V up to positive 20V by connecting the electrical and optical domain with different angles of polarizer that are from 0° up to 180°. The results show that the power measurement is much higher between 30° to 50° with positive 20V. It is found that electric field disrupts the EO behaviour of the film.