

Abstract Submitted
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Study on the electro-optic effect in Pb(Zr,Ti)O₃ (001) film using spectroscopic ellipsometry¹ TAE DONG KANG, Department of Physics, New Jersey Institute of Technology, XIAO BO, VITALIY AVRUTIN, ÜMIT ÖZGÜR, HADIS MORKOÇ, Department of Electrical and Computer Engineering, Virginia Commonwealth University, JUN WOO PARK, HO SUK LEE, HOSUN LEE, Department of Physics, Kyung Hee University, South Korea, XIAOYU WANG, DAVID SMITH, Department of Physics, Arizona State University — Spectroscopic ellipsometry was applied to study electro-optic effect in lead zirconate titanate (PZT) thin films grown epitaxially on Nb-doped SrTiO₃(001) substrates by RF magnetron sputtering. Multilayer model analysis was applied to extract the ordinary and extraordinary refractive indices of the PZT thin film with electric field applied along the (001) direction. The effective linear and quadratic coefficients at a wavelength of 632.8 nm were estimated to be -134.6×10^{-12} m/V and 8.5×10^{-18} m²/V², respectively, while the individual linear electro-optic coefficients r_{33} and r_{13} were -157.1 and 22 pm/V, respectively. We attributed existence of the linear electro-optic effect in unpoled PZT films to the presence of a built-in polarization and simultaneous poling during ellipsometric measurements.

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