

## **Optical study of 0.65PbMg<sub>1/3</sub>Nb<sub>2/3</sub>O<sub>3</sub>-0.35PbTiO<sub>3</sub> thin films**

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### **ABSTRACT**

0.65PbMg<sub>1/3</sub>Nb<sub>2/3</sub>O<sub>3</sub>-0.35PbTiO<sub>3</sub> (PMN-PT) thin films with different deposition temperatures have been fabricated on (001)MgO single crystal substrates using pulsed laser deposition (PLD). X-ray diffraction (XRD) shown that the films are epitaxially grown on (001)MgO substrate. Spectroscopic ellipsometer (SE) was used to characterize the optical properties including refractive index as well as extinction coefficient of these PMN-PT films in the range of 0.75 – 3.5 eV. By fitting the measured ellipsometric spectra, film thicknesses, surface roughness and optical properties were derived for all PMN-PT films. The film thickness and surface roughness obtained by SE were consistent with these measured by scanning electron microscopy (SEM) and atomic force microscopy (AFM) respectively. The optical band gap energies of PMN-PT films were deduced from the obtained extinction coefficients using Tauc equation. These values were comparable to those obtained by optical transmittance measurements. Our analysis revealed that the optimum refractive index emerges as the film fabricated at ~670°C.