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Leakage current reduction and magneto-electric coupling studies in $BiFeO_3$ thin films N.M. MURARI, ASHOK KUMAR, UPR, RAM S. KATIYAR, University of Puerto Rico — The sol-gel derived $BiFeO_3$ thin films were prepared on Pt/Si substrate with less than 20nm of interfacial layer of $Ba_{0.25}Sr_{0.75}TiO_3$ (BST). The XRD data revealed a single-phase compound having crystallite size of 25-50 nm. Surface morphology was characterized utilizing atomic force microscope and the surface roughness and the particle size were found to be reduced compared to BFO films grown without the BST sheet layer. Current voltage characteristic graphs indicated a significant reduction in leakage current of 2-3 orders of magnitude. Anomalies in the dielectric constant as a function of temperature were observed near the Neel's temperature ∼600K which are indicative of the so called magneto-electric coupling in this compounds. Tangent loss spectra as a function of temperature and frequencies indicated the dielectric relaxation near the Neel temperature. Micro Raman spectroscopy was carried out as a function of temperature shows the disappearance of normal modes in the range of 300-600 cm^{-1} and there was a shift towards the low frequency side with increase in half width. The anomalies in Raman spectra also support the spin-phonon coupling near the Neel temperature.

Ashok Kumar
University of puerto Rico

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