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Ferroelectrical and Dielectric Properties of $BaTiO_3/Ba_{(1-x)}Sr_xTiO_3$ Superlattices NORA ORTEGA, ASHOK KUMAR, RAM S. KATIYAR, University of Puerto Rico — Artificially designed superlattices (SL) composed of alternate layers of $BaTiO_3$ (BT) and $SrTiO_3$ (ST) have attracted interests due to the possibility of producing superior and new functional properties, which are attractive for device applications. We have fabricated SL of BT/$Ba_{(1-x)}Sr_xTiO_3$ (BST) with x = 0, 0.3, 0.4, 0.5, 0.6, 0.7, 1, utilizing multi-target by pulsed laser deposition technique. The modulation period (Λ) in all SL was Λ= 80 Å and the total thickness of each SL films were 600 nm. The x-ray diffraction revealed well oriented (00l) perovskite structure and the so-called satellite peaks. The polarized Raman spectra showed the substantial transformation of the ferroelectric E(1TO) soft mode, depending of the ratio of Ba/Sr in BST layer. The dielectric constant of SL showed linear frequency dispersion above of 20 kHz, and their values are in the range of 400 to 900 at 1 kHz, while the tangent loss values were below to 0.1 at 1 kHz. Well defined ferroelectric loop was observed in all the SL at different frequencies (1 kHz-10 kHz), with remanent polarization ($2P_r$) 10 $\mu C/cm^2$. Improvement in saturation in the ferroelectric loop was observed with increase of Ba composition in BST layer. All these superlattices show very low leakage current far above its coercive field.

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