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Structural, Electrical and Optical Properties of $BaTiO_3$(BT)/$Ba_{(1-x)}Sr_xTiO_3$(BST) and $SrTiO_3$(ST)/BST Superlattices NORA ORTEGA, ASHOK KUMAR, RAM KATIYAR, Department of Physics, Institute of Functional Nanomaterials, University of Puerto Rico, UNIVERSITY OF PUERTO RICO TEAM — Superlattices (SL) have attracted interests due to the possibility of producing superior and new properties compared to the parent constituents. We have fabricated SL of BT/BST and ST/BST with x= 0 - 1 by pulse laser deposition. The films modulation period (Λ) in all SL were Λ= 80 Å, that is, $BT_{\Lambda/2}$or $ST_{\Lambda/2}/BST_{\Lambda/2}$and the total thickness of each SL film was ∼600 nm. XRD revealed (00l) perovskite structure and the so-called satellite peaks typical of modulated structures. The angular distance (θ_n) between the satellite peaks for BT/BST (ST/BST) increases (decrease) with increase (decrease) of x concentration. The polarized Raman spectra of BT/BST SL at room temperature are very close to those of BT; however the activation of folded acoustic phonons in SL was observed when the θ_n increase (BT/ST, $BT/BST_{x=0.7}$). The $BT/BST_{x=0.7}$showed well defined ferroelectric loop (∼10 $\mu C/cm^2$), and the dielectric constant and loss values at 10 kHz was 350 and 0.05 respectively. Temperature dependent Raman studies will be discussed.

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