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Large room temperature ferroelectric polarization in thin films of solid solution of bismuth ferrite and lead titanate RAJESH KATOCH, RAJEEV GUPTA, ASHISH GARG, Indian Inst of Tech-Kanpur — $BiFeO_3$ and $PbTiO_3$ form a solid solution i.e. (1-x)$BiFeO_3$-x$PbTiO_3$ showing a morphotropic phase boundary (MPB) at x = 0.30 with high Curie temperature ($T_c \sim 630$ °C).Here we present the results of our investigations on the structure and properties of thin films grown by pulsed laser deposition and chemical solution deposition method on Pt/Si substrates and show that the use of $PbTiO_3$ buffer layer leads to improvement in the room temperature (RT) ferroelectric response. X ray diffraction and Raman spectroscopy reveal structure to be tetragonal (*P4mm*) at x = 0.35, rhombohedral (*R3c*) at x = 0.25 and two phase (*R3c+P4mm)* at x = 0.30 exhibiting giant tetragonality (c/a=1.17) in bulk. However, PLD grown films remain tetragonal (*P4mm*) for all compositions with P_r =40 microcoulombs/cm^2 while solution grown films showed the structure to be monoclinic (*Cm*)at x=0.25 and a coexistence of *Cm* and *P4mm* phases for x=0.30 and x=0.35 with c/a=1.02 resulting in large polarization with P_r =80microcoulombs/cm^2 and E_c =130 kV/cm.

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