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Multiferroic study of $PbZr_{0.53}Ti_{0.47}O_3/PbFe_{2/3}W_{1/3}O_3$ Thin Films on various substrates ASHOK KUMAR, University of Puerto Rico, J.F. SCOTT, University of Cambridge, RAM S. KATIYAR, University of Puerto Rico — Magnetoelectric (ME) multiferroics (MF), which display simultaneous magnetic, electric, and ferroelastic ordering with their coupling, have drawn increasing interest due to their multi-functionality. Recently we have discovered a novel single phase $xPb(Fe_{2/3}W_{1/3})O_3$ (PFW)/(1-x)$PbZr_{0.53}Ti_{0.47}O_3$ (PZT) (x=0.20) materials which showed room temperature multiferroic properties. Various compositions of PFW/PZT (x =0.20-0.80) thin films were fabricated on single crystalline (STO, LSAT, MgO, Si (100) substrates. All these films showed good ferroelectric and ferromagnetic properties at room temperature. Their ferroelectric to relaxor ferroelectric properties varies with increase of PFW compositions. Their magnetizations also increase with increasing iron concentrations. Substrates with higher lattice mismatch showed better tetragonality hence higher polarization. The single crystalline thin films with $0.20 \leq x \leq 0.50$ showed very high polarization ~ 55 $\mu C/cm^2$, very high piezo electric response, and well saturated ferromagnetism at room temperature.

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