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Ferroelectric control of spin injection in La0.7Sr0.3MnO3/BaTiO3/La0.5Ca0.5MnO3/La0.7Sr0.3MnO3 multiferroic tunnel junctions with a bilayer barrier YUEWEI YIN, L.D. MIAO, R.Z. DU, Q. LI, Pennsylvania State Univ — Using a ferroelectric (FE) barrier with ferromagnetic electrodes has become a promising method for controlling spin injection by purely electrical means, which is an important challenge in spintronics. Recently, we have designed a La0.7Sr0.3MnO3(LSMO) /BaTiO3(BTO) /La0.5Ca0.5MnO3(LCMO) /LSMO tunnel junctions in which the reversal of FE polarization of BTO will magnetoelectrically lead to a FM metallic - antiferromagnetic insulating phase transition in LCMO and result in an enhanced tunneling electroresistance (TER).[1] Using the bilayer barrier, we observed that the spin injection can be controlled by barrier polarization reversal as shown in the change of tunneling magnetoresistance (TMR). The temperature evolution of tunnel electromagnetoresistance (TEMR) (percentage ratio between the TMR values for the two polarization states), which is directly proportional to the change of tunnel-current spin polarization, was studied and larger TEMR was obtained with increasing temperature. Meanwhile, TEMR increases with TER effect for samples with different LCMO insertion thicknesses, suggesting a controllable strong electric control of tunnel-current spin polarization using a designed structure with proper interfaces. [1] Y. W. Yin et al, Nat. Mater. 12, 397 (2013)

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