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Electric control of tunnel magnetoresistance in oxide multiferroic tunnel junction J. TORNOS, Univ. Complutense Madrid, LIU YAOHUA, Argonne National Laboratory, G. SANCHEZ-SANTOLINO, Univ. Complutense Madrid, C. MUNUERA, Intituto de Ciencia de Materiales de Madrid CSIC, S.G.E. TE VELTHUIS, Argonne National Laboratory, F. MOMPEAN, M. GARCIA-HERNANDEZ, Intituto de Ciencia de Materiales de Madrid CSIC, M. VARELA, S.J. PENNYCOOK, Oak Ridge National Laboratory, Z. SEFRIOUI, C. LEON, J. SANTAMARIA, Univ. Complutense Madrid — Magnetic tunnel junctions with a ferroelectric barrier are systems amenable to control the spin dependent tunnel conductance by the electric field. We have investigated La0.7Sr0.3MnO3(LSMO)/BaTiO3(BTO)/LSMO tunnel junctions and, despite their symmetric structure, we have found very large tunnel electroresistance (TER) close to 1000% at low temperatures. This is interpreted in terms of a variation of the effective barrier thickness due to a large modulation of electron charge at the BTO/LSMO interface that is induced by the switching of ferroelectric polarization in BTO. Moreover, for the orientation of ferroelectric polarization that leads to the larger conductance value, the bias and temperature dependence of the tunnel magnetoresistance (TMR) is consistent with a depolarization (spin filtering) of the tunneling current. This behavior might be related to the presence of an induced Ti magnetic moment in BTO interface, antiparallel to that of Mn in LSMO, as detected by XMCD measurements. Our results reveal the possibility to tune spin dependent transport by an electric field through the reversal of the ferroelectric polarization of the barrier.

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