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Electric and Magnetic Characterization of patterned $La_{0.6}Sr_{0.4}MnO_3/SrTiO_3/Si$ junctions using strained $SrTiO_3$ as a Ferroelectric Barrier. PARISA JALILI SHAFIGHI, RYAN COTTIER, DANIEL.A CURRIE, BARRY.D KOEHNE, Texas State university,San marcos, ANDREW JOHNSON, JOSHUA. P VEAZEY, Hope College, Holland, MI, NIKOLETA THEODOROPOULOU, Texas State university,San marcos, TEXAS STATE UNIVERSITY, SAN MARCOS, TX TEAM, HOPE COLLEGE, HOLLAND, MI TEAM — Controlling a magnetic device via electrical means is a sought-after goal for technological devices and can be achieved through magnetoelectric coupling between ferroelectric and ferromagnetic materials. We investigate such as possibility through a by epitaxially growing a magnetic oxide, $La_{0.6}Sr_{0.4}MnO_3$ (LSMO) as an active magnetic electrode on a ferroelectric oxide, strained $SrTiO_3$ (STO) on Si. STO thin films grown on Si are compressively strained (1.7 %) and can be ferroelectric at T=300 K when less than 5nm thick. LSMO is ferromagnetic up to 340 K (in bulk), has an in-plane crystal constant of a =0.3870 nm, and is closely lattice matched to STO (a =0.3905 nm) with a 0.9% in-plane tensile strain. Since STO is compressively strained in Si, an even smaller lattice mismatch is expected between LSMO and STO/Si. We investigate the epitaxial growth of LSMO/STO/Si and electrical characteristics in a capacitor type structure fabricated using photolithography as a function of Temperature and Magnetic Field. Acknowledgements: Support by the NSF-Career grant, DMR-1255629, Hope College Frissel Research Fund, NSF-MRI Grant, CHE-1126462 is gratefully acknowledged.

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