Abstract Submitted
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Towards Room Temperature Spin Filtering in Oxide Tunnel Junctions[1] JODI IWATA-HARMS, FRANKLIN WONG, University of California, Berkeley, ELKE ARENHOLZ, Advanced Light Source, Lawrence Berkeley National Laboratory, YURI SUZUKI, University of California, Berkeley — Spin filtering, in which the magnetic tunnel barrier preferentially filters spin-up and spin-down electrons from a nonmagnetic electrode, has been demonstrated in junction heterostructures. By incorporating two spin filtering barriers, double spin filter magnetic tunnel junctions (DSF-MTJs) were predicted to yield magnetoresistance (MR) values orders of magnitude larger than that of conventional magnetic tunnel junctions. Recently, DSF-MTJs have exhibited spin filtering with magnetic electrodes at room temperature and at low temperature with nonmagnetic electrodes in EuS-based devices [1,2]. We have fabricated DSF-MTJs with nonmagnetic $SrRuO_3$ electrodes and room temperature ferrimagnets, $NiFe_2O_4$ and $CoFe_2O_4$, for spin filters in pursuit of room temperature functionality. Atomic force microscopy shows smooth films quantified by roughness values between 0.1–0.5nm. X-ray magnetic circular dichroism reveals ferromagnetic Ni^{2+} and Co^{2+}, and element-specific hysteresis loops indicate the independent switching of the two spin filters. Transport data reveals junction MR and nonlinear I-V characteristics consistent with tunneling.

[1] M.G. Chapline et al., PRB, 74, 014418 (2006).
[2] G.- X. Miao et al., PRL, 102, 076601 (2009).

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