Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Influence of growth parameters on the spin-filtering properties of epitaxial ferrite tunnel barriers[1] J.-B. MOUSSY[2], S. MATZEN[3], CEA-Saclay, R. MATTANA[4], F. PETROFF[5], UMR CNRS/Thales , G.-X. MIAO[6], J.S. MOODERA[7], Francis Bitter Magnet Lab., CEA TEAM, UMR CNRS/THALES TEAM, MIT TEAM — In spintronics, spin-filtering is a physical phenomenon which has the potential to produce highly spin-polarized currents by the spin-selective transport of electrons across a ferromagnetic tunnel barrier. The insulating ferrites $MnFe_2O_4$, $CoFe_2O_4$ and $NiFe_2O_4$, whose Curie temperatures are above 300K, are promising candidates for spin-filtering at room temperature. In this work, we report on the in-depth study of structural, chemical and physical properties of epitaxial ferrite ultra-thin films and associated spin-filtering measurements as a function of different growth parameters. We analyze the effect of oxidation on the physical properties and the resultant spin-polarization. The influence of structural defects on the spin-filter efficiency is also put on view by tunneling magnetoresistance. Finally, we show the impact of the $MgAl_2O_4(001)$ substrates on the magnetic behavior of cobalt ferrite tunnel barriers revealing the important role played by strains in the spin-filter properties.

[1]This work is supported by the Partner University Fund
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Date submitted: 10 Nov 2011 Electronic form version 1.4