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Electric field tuning of magnetic properties in FeGa films on ferroelastic Pb(Zr,Ti)O_3 thin films probed by ferromagnetic resonance[1]
ARUN LUYKX, SAMUEL LOFLAND, VARATHARAJAN ANBUSATHAIAH, VALANOOR NAGARAJAN, FRANSISKA KARTAWIDJAJA, JOHN WANG, ICHIRO TAKEUCHI — In order to investigate the possibility of fabricating electric field tunable thin film magnetic devices using a multiferroic transduction effect, we have patterned $Fe_{0.7}Ga_{0.3}$ (FeGa) films sputter-deposited on $PbZr_{0.3}Ti_{0.7}O_3$ (PZT(30/70))/$PbZr_{0.7}Ti_{0.3}O_3$ (PZT(70/30)) tetragonal/rhombohedral bilayers on Pt/Ti/SiO_2/Si wafers. Previous piezoforce microscopy studies have shown that the PZT bilayers exhibit presence of ferroelastic domains where the fraction of the local c/a domain ratio can be tuned by an applied electric field. The FeGa top layer was patterned into 20 μm x 20 μm capacitor devices in order to apply electric field to the multilayers, and ferromagnetic resonance (FMR) measurements at 9.2 GHz were performed. Typically, a relatively sharp FMR signal observed before application of the electric field would get substantially broadened after initial application of +4 kV/cm. Angular dependent FMR indicates that magnetic anisotropy in the FeGa is indeed affected by application of electric field.

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Arun Luykx
Dept of Materials Science and Engineering,
University of Maryland, College Park

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