

Abstract Submitted
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Dynamic observation of magnetoelectric coupling effect using magnetic force microscopy and Lorentz TEM¹ SUNG HWAN LIM, TODD BRINTLINGER, DAISUKE KAN, YI QI, JOHN CUMINGS, ICHIRO TAKEUCHI, LOURDES SALAMANCA-RIBA, University of Maryland — Dynamic observation of the strain mediated magnetoelectric (ME) coupling effect was pursued by applying an external electric (E) field to a Fe_{0.7}Ga_{0.3}/BaTiO₃(FeGa/BTO) TEM sample in the Lorentz imaging mode in a TEM. An epitaxial piezoelectric BTO layer followed by a polycrystalline magnetostrictive FeGa layer were synthesized by pulsed laser deposition and magnetron sputtering, respectively. The BTO film had $P_s = 17 \mu\text{C}/\text{cm}^2$ measured using SrRuO₃ (bottom) and FeGa (top) electrodes. The FeGa film showed strong magnetic anisotropy with in-plane easy axis. To apply an E field in-plane, FeGa was patterned on BTO using e-beam lithography. The change of magnetic domain structure was observed under an applied magnetic field in TEM. The ME effect was also investigated using MFM. After applying an E field (100 kV/cm) on the BTO layer, a reorientation of the magnetic moments in the FeGa layer along the E field direction was observed.

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