

Abstract Submitted
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Ferroelectric and Magnetic SrTiCoO₃ films on Silicon and Niobium-doped SrTiO₃ substrates MEHMET ONBASLI, ANDY CRUZ, Massachusetts Institute of Technology, T. GOTO, Toyohashi Univ. of Tech, CAROLINE ROSS, Massachusetts Institute of Technology — Perovskites hold great potential for fundamental studies of structure-multiferroicity relationship as well as technological applications such as multi-level memories. We demonstrate multiferroic behavior of Cobalt-substituted SrTiO₃ (STCo) films on Silicon and on Niobium-doped SrTiO₃ substrates (Nb:STO). STCo films were grown on Si, silicon-on-insulator, Nb:STO, 3 μm thick SiO₂ coated Si, and pure STO substrates using pulsed laser deposition under different oxygen pressures (1, 3, 6 μTorr , 1.6 mTorr). The film composition is SrTi_{0.70}Co_{0.30}O_{3- δ} , as confirmed by ω - 2θ scans of x-ray diffractometer. Magnetic hysteresis loops indicate that the films have out-of-plane easy axis with anisotropy field of several kOe, which is attributed to magnetoelastic anisotropy. Saturation magnetizations of 0.9, 0.3, 0.5 and 0.2 $\mu\text{B}/\text{Co}$ ion were obtained for samples grown on Nb:STO under oxygen pressures 1, 3, 6 μTorr , 1.6 mTorr, respectively. Ferroelectric saturation polarizations of 67 to 118 $\mu\text{C}/\text{cm}^2$ and resistivities between $1\text{e}6$ to $1\text{e}9 \Omega \cdot \text{cm}$ were obtained for STCo on Nb:STO and on Silicon. The origin of the magnetic and ferroelectric properties will be discussed.

Mehmet Onbasli
Massachusetts Institute of Technology

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