Abstract Submitted
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Magnetic phase separation-induced coercivity enhancement in epitaxial $Nd_{0.5}Sr_{0.5}CoO_3$ films[1] M. SHARMA, UMN, J. GAZQUEZ, M. VARELA, ORNL, C. LEIGHTON, UMN — Interfacial magneto-electronic phase separation has recently been observed in epitaxial thin films of the doped perovskite cobaltite $La_{1-x}Sr_xCoO_3$ at doping values where no such phase separation exists in bulk. Such systems also display anomalously large coercivity, which is not understood. To achieve a better understanding of this phenomenon we have extended this study to $Nd_{1-x}Sr_xCoO_3$ (x = 0.5), the perovskite cobaltite with the largest coercivity in bulk. Thin films of $Nd_{0.5}Sr_{0.5}CoO_3$ are grown via high pressure reactive sputtering on $SrTiO_3$ (001) substrates. We have observed a rapid deterioration in magnetization and onset of large intercluster-type magnetoresistance below a critical thickness of 80 Å, signatures of interfacial magneto-electronic phase separation also seen in our earlier work on $La_{1-x}Sr_xCoO_3$. The temperature, angular, and thickness dependence of the coercivity (H_c) was studied using magnetoresistance. Low temperature H_C values become very large (up to 3.6 Tesla) at low thickness, and a strong, superlinear T dependence emerges. We propose that the coercivity enhancement arises due to efficient domain wall pinning by the inhomogeneous magnetically phase separated region near the $SrTiO_3$ substrate.

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