Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Niobium doping effects on the ferromagnetism and microstructure of anatase Co: TiO_2 films[1] SHIXIONG ZHANG, SATISH OGALE, SANKAR DHAR, DARSHAN KUNDALIYA, WEGDAN RAMADAN, JOSHUA HIGGINS, RICHARD GREENE, THIRUMALAI VENKATESAN, Center for Superconductivity Research, Department of Physics, University of Maryland, College Park, MD 20742-4111., LIANFENG FU, NIGEL BROWNING, Lawrence Berkeley National Laboratory, NCEM, 1 Cyclotron Road, MS 72-150, Berkeley, CA 94720 —
Niobium doping is shown to have a significant effect on the ferromagnetism and microstructure of dilutely cobalt-doped anatase TiO_2 films. Epitaxial films of anatase TiO_2 with 3% Co, with and without 1% niobium doping were grown by pulsed-laser deposition at 875 ^{0}C at different oxygen pressures. For growth at 10^{-5}Torr Niobium doping suppresses ferromagnetism, while it enhances the same in films grown at 10^{-4}Torr. The results of High-resolution Z-contrast Scanning Transmission Electron Microscopy and Electron Energy Loss Spectroscopy study reveal uniform surface enrichment of cobalt in the form of $Ti_{1-x-y}Co_xNb_yO_{2-\delta}$g phase, without cobalt metal clusters. The transport and Hall effect results will also be presented and discussed.

[1]Work Supported under DARPA SpinS program

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Date submitted: 29 Nov 2005 Electronic form version 1.4