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Negligible Magnetism in transition metal (Cr, Mn, Fe, Co) doped Nb:SrTiO3[1] SHIXIONG ZHANG, SATISH OGALE, WEGDAN RAMADAN, SANKAR DHAR, DARSHAN KUNDALIYA, 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 — In order to realize the possibility of carrier induced ferromagnetism in transition metal (TM) doped $SrTiO_3$, we have performed magnetic, electronic transport, and micro-structural measurements on 2% TM doped $SrTi_{0.98-x}Nb_xO_{3-\delta}$ (x=0.000, 0.005,0.010) thin films. Unfortunately, no unambiguous signature of ferromagnetism is observed in this system, even though its conductivity is seen to be greatly improved by the enhancement of carrier density due to Niobium doping. High-resolution Z-contrast Scanning Transmission Electron Microscopy shows no evidence of clustering, while Electron Energy Loss Spectroscopy indicates that the TM is enriched on the surface of the film whereas Niobium is mostly distributed in the bulk. It is believed that the absence of strong ferromagnetism in this system may be attributed to a spatial separation of the spins contributed by the TM and the carriers from Nb in the $SrTiO_3$ matrix.

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