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**Magneto-transport in $Fe_3O_4$/Nb:$SrTiO_3$ schottky junction diode**
DARSHAN KUNDALIYA, S.B. OGALE, J. HIGGINS, T. VENKATESAN, Center for Superconductivity Research, University of Maryland, College Park, MD-20742, L.F. FU, N.D. BROWNING, LBNL, NCEM, One Cyclotron Road, Berkeley, CA-94720 — Among the half metallic ferromagnets, $Fe_3O_4$ is of particular interest because of its half metallicity, high curie temperature and a charge ordering transition at 120K (popularly known as Verwey transition ($T_V$)). These materials are also expected to show 100% spin polarization. In view of these fascinating properties, we studied temperature dependent transport, magnetic, structural and interface characteristics of epitaxial schottky junctions between $Fe_3O_4$ and Nb:$SrTiO_3$ (with different Nb concentrations). Epitaxial thin films of $Fe_3O_4$ were grown on Nb:$SrTiO_3$ substrates by PLD technique. The films show epitaxial growth along (100)-axis direction. We also performed HR-TEM and EELS study to ensure a better quality interface. In the temperature range above $T_V$, 300K-130K, the I-V characteristic shifts towards higher forward bias voltage upon lowering temperature. On further decreasing temperature (below $T_V$), the trend is reversed. Junction parameters such as the Schottky barrier height ($\phi_B$) and ideality factor ($\eta$) are extracted using thermionic emission theory at all temperatures. These parameters show interesting and systematic trends above and below $T_V$. From the magnetic field dependence of non linear I-V characteristics data, a spin polarization of $\sim$80% is estimated for the magnetite electrode at $T_V$.

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