

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Carrier localization in correlated nickelates by electron doping¹

YOU ZHOU, JIAN SHI², SHRIRAM RAMANATHAN, Harvard University — The electronic properties of transition metal oxides are often sensitive to the orbital occupancy of the $3d$ electrons due to non-degenerate energy levels and strong electron correlations. A prototypical rare earth nickelate, SmNiO_3 exhibits thermally driven insulator-metal transition at 400 K with one to two orders of magnitude change in its resistivity, characterized by charge ordering of the Ni sites. In this work, by modifying the e_g orbital filling of Ni through electron doping with reversible hydrogenation and lithium/magnesium intercalation, we realize a deep insulating phase with greater than eight orders of magnitude change in resistivity at room temperature. The band gap can be modulated by nearly 3 eV. We will consider the mechanisms leading to these striking observations in depth in this presentation.

¹We acknowledge National Science Foundation grants CCF- 0926148, National Academy of Sciences and NSF DMR-0952794 for financial support.

²Now with Department of Materials Science and Engineering, Rensselaer Polytechnic Institute

You Zhou
Harvard University

Date submitted: 03 Oct 2014

Electronic form version 1.4