

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Properties of layered iron oxychalcogenides with checkerboard structure¹ LIANG L. ZHAO, DANIEL WARD, DOUGLAS NATELSON, EMILIA MOROSAN, Department of Physics and Astronomy, Rice University, Houston TX 77005 — The layered iron oxychalcogenides $\text{La}_2\text{O}_3\text{Fe}_2\text{X}_2$ ($\text{X} = \text{S}, \text{Se}$) have a unique checkerboard-like Fe_2OX_2 sublattice. Their Mott insulating behavior makes them promising candidates for novel superconductors. In this talk, we present results on the isostructural $\text{A}_2\text{F}_2\text{Fe}_2\text{OS}_2$ ($\text{A} = \text{Sr}, \text{Ba}$) compounds. Both pure and doped samples are characterized by magnetization, resistivity, heat capacity and Raman spectroscopy measurements. In addition to the previously reported antiferromagnetic transition around $T_N \approx 100$ K, we observed another phase transition in the ordered state, as well as a possible structural phase transition near room temperature. A change in the excitation gap at the high temperature (structural) phase transition is indicated by the temperature dependent resistivity.

¹This work is supported by AFOSR-MURI

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Date submitted: 19 Nov 2010

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