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Ferromagnetism in $A_{1-x}La_xMn_{0.5}Ru_{0.5}O_3$ Perovskites: Is Double Exchange, Superexchange or Band Magnetism Responsible[1] PATRICK WOODWARD, JENNIFER SOLIZ, REBECCA RICCIARDO, HEATHER CUTHBERT, Department of Chemistry, Ohio State University, BRENDAN KENNEDY, Department of Chemistry, University of Sydney — In this presentation the properties of $A_{1-x}La_xMn_{0.5}Ru_{0.5}O_3$ (A = Ca, Sr) are presented. When A = Ca the sample displays clear magnetic phase separation into a ferromagnetic phase with T_C ∼200 K and an antiferromagnetic G-type phase with T_N ∼100 K. The high conductivity suggests itinerant electron magnetism is at least partially responsible for the ferromagnetic behavior that describes the majority of the sample. Interestingly on substituting La for Ca the conductivity decreases dramatically (by 8 orders of magnitude at ∼20 K) but the ferromagnetism remains. This suggests that localized magnetism, presumably superexchange, is also playing an important role. Replacing Ca with Sr restores the metallic-like conductivity, while retaining the ferromagnetic behavior. In this presentation we present the structural, magnetic and electrical transport properties of these compounds to shed light on the complex underlying mechanisms that drive magnetism.

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