Poster Presentation

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Competing Superexchange Interactions in Double Perovskite Osmates

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Double perovskites, A2BB'O6, containing mixed transition metal ions have exhibited numerous desirable properties such as colossal magnetoresistance, half metallic transport, and high temperature ferrimagnetism. However, a predictive understanding of the superexchange mechanisms which control the magnetism of these materials when they are insulating and B is 3d transition metal and B' is a 4d or 5d transition metal has remained elusive. In this work, a number of insulating double perovskite osmates, A2BOsO6 (A=Sr,Ca,La; B=Cr,Fe,Co,Ni) have been chosen and studied using magnetometry, specific heat, XMCD, and neutron powder diffraction techniques in order to systematically probe the effects of electronic configuration and bonding geometry on the magnetic ground state. It is concluded that the magnetic properties of these materials are controlled by a competition between short range B−O−Os and long range superexchange interactions which are sensitive to bonding geometry resulting in tunability of the magnetic ground state.

[1] *R. Morrow, R. Mishra, O. R. Restrepo et al. J. Am. Chem. Soc., 2013, 135, 18824-18830.*

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