Abstract Submitted
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Chemical, magnetic and orbital order in the substituted double perovskite $\mathbf{Sr_{(1x)}Ca_{(x)}Mn_{0.5}Ru_{0.5}O_3}$[1] REBECCA RICCIARDO, Ohio State University, PATRICK WOODWARD, HEATHER CUTHBERT, QINGDI ZHOU, BRENDAN KENNEDY, ZHAOMING ZHANG, MAXIM AVDEEV, LING-YUN JANG — The structural and magnetic properties of $Sr_{(1x)}Ca_{(x)}Mn_{0.5}Ru_{0.5}O_3$ have been investigated. $SrMn_{0.5}Ru_{0.5}O_3$ exhibits antiferromagnetic ordering, $T_N \approx 200$ K. Neutron powder diffraction of this perovskite indicates the presence of orbital ordering of the occupied Mn^{+3} d_z2 orbitals, stabilizing the spin ordering corresponding to the AFM C-type structure. The substitution of smaller Ca^{+2} for Sr^{+2} on the A-site induces a change in the octahedral tilt system, ($a^0a^0c^-$) to ($a^-b^+a^-$) forcing a loss of this type of orbital ordering for $x \geq 0.2$. This is accompanied by a crossover to a ferromagnetic ground state with $200K \leq T_C \leq 300K$ even in the absence of long range chemical order. Magnetic data and neutron powder diffraction of $CaMn_{0.5}Ru_{0.5}O_3$ and $Sr_{0.5}Ca_{0.5}Mn_{0.5}Ru_{0.5}O_3$ reveal reduced magnetic moments and imply a complex magnetic behavior as well as a complete loss of orbital ordering for $CaMn_{0.5}Ru_{0.5}O_3$. X-ray absorption studies show increased electron transfer from Mn to Ru.

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