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Magnetic properties of Mn-doped Sr2IrO4[1] M.D. LUMSDEN, S. CALDER, Oak Ridge National Laboratory, G.-X. CAO, University of Tennessee and Oak Ridge National Laboratory, J.W. KIM, Argonne National Laboratory, Z. GAI, B.C. SALES, Oak Ridge National Laboratory, D. MANDRUS, University of Tennessee and Oak Ridge National Laboratory, A.D. CHRISTIANSON, Oak Ridge National Laboratory — In 5d electron transition metal oxides, interplay between spin-orbit coupling and electronic interactions can lead to novel properties. One example is the Mott state in Sr_2IrO_4 which is believed to be associated with the formation of a J_{eff}=1/2 band due to large spin-orbit splitting of the t_{2g} band. We use bulk measurements and resonant magnetic x-ray scattering to explore the effects of substituting Mn for Ir in single crystals of $Sr_2Ir_{0.9}Mn_{0.1}O_4$. These measurements indicate that 10% Mn doping is sufficient to suppress the magnetic ordering temperature from 240 K to 155 K. Resonant magnetic x-ray scattering measurements indicate a change in the long-range magnetic order when compared to that of undoped Sr_2IrO_4. Despite the large change in transition temperature and the altered magnetic structure, we observe a difference in the resonant enhancement between the L_2 and L_3 edges which is very similar to that seen in the pure material. This suggests that the magnetic structure of Sr_2IrO_4 can be altered by small perturbations whereas the J_{eff}=1/2 state is robust.

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