Doping Dependence of Structural, Electrical and Magnetic Properties of Sr$_3$(Ru$_{1-x}$Mn$_x$)$_2$O$_7$ Single Crystals

BIAO HU, Department of Physics and Astronomy, Louisiana State University, GREGORY T. MCCANDLESS, Department of Chemistry, Louisiana State University, E.W. PLUMMER, RONGYING JIN, Department of Physics and Astronomy, Louisiana State University — We have studied the doping dependence of structural, electrical and magnetic properties of Sr$_3$(Ru$_{1-x}$Mn$_x$)$_2$O$_7$ with $0.0 \leq x \leq 1.0$. Our single crystal X-ray diffraction refinements show that the RuO$_6$ octahedron rotates about $7^\circ$ in undoped Sr$_3$Ru$_2$O$_7$. With the partial substitution of Ru by Mn, the rotation is gradually attenuated. Correspondingly, the electrical and magnetic properties of Sr$_3$(Ru$_{1-x}$Mn$_x$)$_2$O$_7$ vary with x. We will discuss the correlation between structure and physical properties in this system.

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