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STM study of the Mn-dopants on the surface of $Sr_3(Ru_{1-x}Mn_x)_2O_7$(x=6%, 16%)[1] WARD PLUMMER, GUORONG LI, Louisiana State University, QING LI, MINGHU PAN, Oak Ridge National Laboratory, BIAO HU, VON BRAUN NASCIMENTO, JIANDI ZHANG, RONGYING JIN, Louisiana State University — The double-layered $Sr_3Ru_2O_7$is a paramagnetic metal, but the substitution of Mn for Ru ($Sr_3(Ru_{1-x}Mn_x)_2O_7$) results in a metal-to-insulator transition at T_{MIT} and antiferromagnetic (AF) ordering at T_M (the two transitions are closely coupled for x < 6%). STM measurements at 4.2 K and 100 K on the surface of $Sr_3(Ru_{1-x}Mn_x)_2O_7$ (x = 6%, 16%) reveal a ($\sqrt{2} \times \sqrt{2}$)R45^o unit cell, consistent with the orthorhombic bulk structure. The Mn dopant has been identified through bias-dependent STM topography and dI/dV mapping. The Mn dopant equally occupies two sites which are anti-phase - one sitting at the center and the other on the corner of the ($\sqrt{2} \times \sqrt{2}$)R45° unit cell. We have directly imaged the chirality of MnO_6 rotation at the anti-phase sites. In contrast to the bulk measurements, the surface is always metallic for x= 16% and insulating only for 4.2K measurements on the x = 6% sample. The surface apparently suppresses the Mn-induced insulating (AF) phase observed in the bulk.

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