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Surface Structure and Property Coupling of $Sr_3(Ru_{1-x}Mn_x)_2O_7$[1] CHEN CHEN, Louisiana State University, CORENTIN DURAND, AN-PING LI, Oak Ridge National Laboratory, JIANDI ZHANG, RONGYING JIN, WARD PLUMMER, Louisiana State University — The double-layered Ruthenate $Sr_3Ru_2O_7$ exhibits interesting behavior under the influence of pressure, while partial substitution of Mn for Ru generates a dramatic response in the physical properties. Even more striking is the structure-property relationship observed at the surface. Combining LEED $I-V$,with STM/STS and high-resolution electron energy loss spectroscopy (HREELS), we document a very unique surface phase diagram. The octahedra are tilted at the surface (not in the bulk) for low Mn doping, and the surface stabilizes and enhances the octahedra rotation, present in the bulk for Mn doping less that $\sim 20\%$. The structure-property relationship at the surface is consistent with calculations of a tilt/rotation phase diagram (PRB 64, 020509 (2001)). Tilt distortion at the surface favors an insulating AFM ordered phase and when tilt is removed by doping of Mn the surface becomes conducting.

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