

Abstract Submitted  
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**Surface dynamics and electronic properties of parent and Mn doped  $\text{Sr}_3\text{Ru}_2\text{O}_7$** <sup>1</sup> JING TENG, CHEN CHEN, BIAO HU, JIANDI ZHANG, RONGYING JIN, WARD PLUMMER, Louisiana State University — High resolution Electron Energy Loss Spectroscopy has been utilized to measure the temperature dependence of the low energy excitations at the surface of cleaved  $\text{Sr}_3(\text{Ru}_{1-x}\text{Mn}_x)_2\text{O}_7$  single crystals ( $x = 0, 0.16$ ). Four loss peaks are observed and assigned as the  $A_{1g}(2)$ ,  $A_{2u}(3)$ ,  $A_{2u}(2)$ , and  $A_{1g}(1)$  vibration modes. The continuous electronic excitation spectra, Drude tail, shows that the parent compound is metallic at all temperatures investigated (80K to RT). But the  $A_{1g}(1)$  mode splits into two peaks between 145K and 210K indicating a structural transition at the surface. For the 16% Mn doped samples the bulk is insulating and antiferromagnetic below 160K. In contrast, the surface is always metallic. Upon cooling from RT the  $A_{1g}(1)$  mode hardens with its width broadening from RT to 160K, and then softens and narrows quickly until 80K. The Drude tail exhibits similar behavior. Evidently the presence of the surface suppresses AF ordering and kills the insulating phase.

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