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An Unusual Mott Transition at the Surface of $Ca_{1.9}Sr_{0.1}RuO_4$ -R.G. Moore *The Univ of Tennessee, Knoxville, TN 37996*, Jiandi Zhang *Florida International Univ, Miami, FL 33199*, Ismail, S.V. Kalinin, J. Guo, R. Jin, D. Mandrus, A.P. Baddorf, E.W. Plummer *Oak Ridge National Lab, Oak Ridge, TN 37831 and Univ of Tennessee, Knoxville, TN 37996*

The Mott insulating phase is key in understanding transition-metal oxides (TMOs), fullerene compounds, as well as organic conductors. The electronic instabilities in these materials can induce metal-insulator transitions (MIT). Normally at a crystal surface, reduced atomic coordination enhances electron-electron correlations and stabilizes the Mott-insulating phase resulting in higher MIT temperatures than in the bulk. Surprisingly, $Ca_{1.9}Sr_{0.1}RuO_4$ exhibits an unusual surface MIT 20K lower than the bulk as evidenced by phonon and Drude tail dynamics measured by HREELS and the appearance of an energy gap measured by STS. LEED-IV shows no symmetry change associated with the MIT, but a compression of the RuO_6 octahedral normal to the surface. This is similar to a surface-induced uniaxial stress which typically drives the bulk to a metallic phase.

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