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Electronic Interfacial Effects in Epitaxial Heterostructures based on $LaMnO_3$. HANS M. CHRISTEN, M. VARELA, H.N. LEE, D.H. KIM, M.F. CHISHOLM, C. CANTONI, L. PETIT, T.C. SCHULTHESS, D.H. LOWNDES, Oak Ridge National Laboratory, Oak Ridge, TN, USA — Studies of chemically abrupt interfaces provide an ideal platform to study the effects of discontinuities and asymmetries of the electronic configuration on the transport and magnetic properties of complex oxides. In addition, the behavior of complex materials near interfaces plays the most crucial role not only in devices and nanostructures but also in complex structures in the form of composites and superlattices, including artificial multiferroics. Interfaces in the ABO_3 perovskite system are particularly attractive because structurally similar oxides with fundamentally different physical properties can be integrated epitaxially. To explore the electronic effects at interfaces and to probe the physical properties that result from local electronic changes, we have synthesized structures containing $LaMnO_3$ and insulating perovskites using pulsed laser deposition. The local electron energy loss spectroscopy (EELS) capability of a scanning transmission electron microscope (STEM) is used to probe the electronic configuration in the $LaMnO_3$ films as a function of the distance from the interfaces. The results are compared to macroscopic measurements and theoretical predictions. Research sponsored by the U.S. Department of Energy under contract DE-AC05-00OR22725 with the Oak Ridge National Laboratory, managed by UT-Battelle, LLC.

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