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Direct Visualization of Electric-Field-Driven Migration and Decay of Oxygen Vacancy-induced Stripes in Pr$_{0.7}$Ca$_{0.3}$MnO$_3$. DONGMIN CHEN, Institute Of Physics, Chinese Academy of Sciences, ZHAOLIANG LIAO, Institute Of Physics, Chinese Academy of Sciences & Department of Physics and Astronomy, Louisiana State University, XUEDONG BAI, PENG GAO, Institute Of Physics, Chinese Academy of Sciences, JIANDI ZHANG, Department of Physics and Astronomy, Louisiana State University — We report on the microscopic evidence of electric-field driven migration and decay of oxygen vacancy stripes in Pr$_{0.7}$Ca$_{0.3}$MnO$_3$ (PCMO30). A local lattice stripe phase associated with oxygen vacancy migrating along the applied electric field was imaged in real time by using in-situ imaging with high-resolution transmission electron microscopy (TEM). Such a field-driven dynamic oxygen migration process should be responsible to the transport for the resistance switching effects observed in many metal-oxide-metal structures, thus providing a direct microscopic evidence for the oxygen migration model. A decay of oxygen vacancy stripes with a characteristic decay time has been observed, consistent with measurement of resistance relaxation in the materials.

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