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Build-in Electric Field Induced Mechanical Property Change TE-YU CHIEN, Univ of Wyoming, JIAN LIU, University of Tennessee, Knoxville, ANDREW J. YOST, University of Wyoming, JACQUES CHAKHALIAN, University of Arkansas, JOHN W. FREELAND, NATHAN P. GUISINGER, Argonne National Laboratory — Mechanical properties describe how materials respond to external stress. Microscopically, many intrinsic and extrinsic factors, such as bond length and strength (intrinsic) and grain boundaries (extrinsic), may affect the mechanical property of the materials. In this study, we observed a change of fracturing behavior of Nb-doped $SrTiO_3$ in a Schottky barrier near the interfaces with metallic $LaNiO_3$ films. Through cross-sectional scanning tunneling microscopy and spectroscopy (XSTM/S) experiments and theoretical analysis, the observed fractured topography could be explained by the change of the bond length caused alternation of mechanical property inside the Schottky barrier. Same model could also explain the widely observed dielectric dead layer for $SrTiO_3$ in contact with metal electrodes.

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