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Electronic conduction in doped multiferroic BiFeO₃ CHAN-HO YANG, JAN SEIDEL, SANG-YONG KIM, M. GAJEK, P. YU, M.B. HOLCOMB, L.W. MARTIN, R. RAMESH, Department of Physics, and Material Science and Engineering, University of California, Berkeley, CA 94720, USA., Y.H. CHU, Department of Material Science and Engineering, National Chiao Tung University, HsinChu 30010, Taiwan. — Competition between multiple ground states, that are energetically similar, plays a key role in many interesting material properties and physical phenomena as for example in high- T_c superconductors (electron kinetic energy vs. electron-electron repulsion), colossal magnetoresistance (metallic state vs. charge ordered insulating state), and magnetically frustrated systems (spin-spin interactions). We are exploring the idea of similar competing phenomena in doped multiferroics by control of band-filling. In this paper we present systematic investigations of divalent Ca doping of ferroelectric BiFeO₃ in terms of structural and electronic conduction properties as well as diffusion properties of oxygen vacancies.

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