Abstract Submitted
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A Novel Method to Detect Oxygen Vacancies in the Grain Boundaries of High-Tc Superconductors[1] TAKAHIRO TOMITA, JAMES S. SCHILLING, Department of Physics, Washington University, St. Louis, MO, LI-HUA CHEN, BOYD W. VEAL, HELMUT CLAUS, Materials Science Division, Argonne National Labs — A new diagnostic method is introduced (pressure-induced J_c relaxation) which is capable of detecting oxygen vacancies in the grain boundaries of oxide superconductors. A series of bicrystalline rings of $YBa_2Cu_3O_x$ containing single [001]-tilt grain boundaries with mismatch angles from 0 to 31 degrees are studied. Even for samples with nearly optimal doping in the bulk, a significant oxygen deficiency in the grain boundary region is revealed. In addition, compressing the grain boundary region is found to lead to a considerable enhancement of the critical current density J_c.

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