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EXAFS study of the role of apical oxygen on superconductivity in $\text{Pr}_{0.88}\text{LaCe}_{0.12}\text{CuO}_4$ S. ROSENKRANZ, D. HASKEL, M. BALASUBRAMANIAN, S. HEALD, Argonne National Laboratory, S. LI, P. DAI, University Tennessee and ORNL, Y. ANDO, CRIEPI — One of the longstanding puzzles surrounding high- T_C in cuprates concerns the apparent asymmetry between electron and hole doping. Whereas hole doping quickly induces superconductivity, electron doping alone in materials such as R_2CuO_4 is insufficient and superconductivity is only achieved after a high temperature, low-oxygen annealing. While it was believed that this annealing process removes small amounts of oxygen in apical positions assumed to induce localization of the doped electrons, this scenario is incompatible with Raman, infrared- transmission, and ultrasound studies. In contrast, based on synchrotron X-ray and neutron diffraction studies combined with chemical and thermo-gravimetric analysis measurements, we recently showed that the annealing process alleviates minor Cu- deficiencies present in the as-grown sample. Here we present EXAFS studies on powder and single-crystal samples of as-grown and annealed $\text{Pr}_{0.88}\text{LaCe}_{0.12}\text{CuO}_4$. Our results are consistent with no change in the occupation of apical oxygen between superconducting and as-grown samples, providing further evidence that the main effect of the annealing process is to repair defects in the superconducting planes due to Cu- deficiencies present in as grown samples. Work supported by US DOE BES-DMS DE-AC02-06CH11357

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