Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

The annealing process and its relationship to superconductivity in the electron-doped superconductors HYE JUNG KANG, NIST, University of MD, PENGCHENG DAI, University of Tennessee, ORNL, BRANTON CAMPBELL, Brigham Young University, STEPHAN ROSENKRANZ, PETER CHUPUS, ANL, SHILIANG LI, University of Tennessee, Y. KURITA, SEIKI KOMIYA, YOICHI ANDO, CRIEPI, Japan — Superconductivity in the high transition temperature superconductors can be achieved when the antiferromagnetic insulating parent compounds are doped with holes or electrons. The discovery of the electron-doped superconductors has obtained special attention because of the symmetry with doped charge carriers. The electron-doped superconductors can provide important clues in the mechanism of high temperature superconductivity by finding fundamental features seen in the hole-doped superconductors. Unlike hole-doped superconductors, the electron-doped compounds require the annealing process to achieve superconductivity. The role and effects of the annealing process on superconductivity have been one of the unresolved problems in the electron-doped superconductors. To investigate how the annealing process is associated to superconductivity, we performed X-ray measurement on an as-grown, an annealed superconducting, an oxygenated nonsuperconducting, and a reannealed Pr0.88LaCe0.12CuO4 samples.

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Date submitted: 30 Nov 2005 Electronic form version 1.4