

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**Structure at low temperature of oxygen isotope exchanged  $\text{La}_{1.8875}\text{Sr}_{0.1125}\text{CuO}_4$** <sup>1</sup> A. R. MOODENBAUGH, D. E. COX, T. VOGT, B. NOHEDA, Brookhaven National Lab., M. K. CRAWFORD, E. M. MCCARRON, W. E. FARNETH, Dupont — The crystal structures at low temperatures of oxygen isotope-exchanged pairs of  $\text{La}_{1.8875}\text{Sr}_{0.1125}\text{CuO}_4$  were examined using high resolution synchrotron powder x-ray diffraction at NSLS X7A. This study was designed to examine the possibility that small structural differences might contribute to the observed superconducting isotope effects. The x-ray diffraction regions about the orthorhombic (200),(020) peaks of  $^{16}\text{O}$  and  $^{18}\text{O}$  isotope-exchanged pairs were studied in detail. There is no significant difference in orthorhombic lattice parameters at any temperature. A minority ( $\sim 10\%$ ) tetragonal (LTT) phase is also necessary to adequately account for the observed intensities at low temperatures. The fraction of LTT phase does not differ perceptibly with oxygen isotope exchange. We conclude, based on direct measurement of crystal structure at low temperatures, that the observed differences in superconductivity of oxygen isotope exchanged pairs are likely intrinsic effects.

<sup>1</sup>Research Supported by the U.S. Dept. of Energy Contract DE-AC02-98CH10886.

A. R. Moodenbaugh  
Brookhaven National Lab.

Date submitted: 30 Nov 2005

Electronic form version 1.4