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Intrinsic nature of oxygen isotope effect in $La_{2-x}Sr_xCuO_4$ using x--ray diffraction: no structural differences observed at low temperatures[1]
A.R. MOODENBAUGH, D.E. COX, BNL, M.K. CRAWFORD, Dupont — High resolution synchrotron x-ray diffraction was used to study the structural transformations at low temperatures of $La_{2--x}Sr_xCuO_4$.[2] A fraction, estimated from diffraction intensities to be on the order of 10 percent, of Low Temperature Tetragonal (LTT) phase is observed in majority Low Temperature Orthorhombic (LTO1) phase for x$\sim$0.12. The remarkable superconducting oxygen isotope effects in these materials[3] has been firmly established, and still attracts great interest. We revisit the M=Sr materials x$\sim$0.12 to search for possible subtle structural differences in oxygen isotope exchanged sample pairs, which might contribute to transition temperature variations. Analyzed are both lattice parameters and ratio of LTT:LTO1 intensities. Preliminary results suggest that the low temperature structures of oxygen isotope exchanged pairs are indistinguishable at all temperatures. These results confirm the intrinsic nature of the observed isotope effects.

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[2]A. R. Moodenbaugh et al., Phys. Rev. B 58 (1998) 9549.
[3]M. K. Crawford et al., Science 250 (1990) 1390

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