

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Vacuum-aging effect on electronic structure of $\text{YBa}_2\text{Cu}_3\text{O}_{6+x}$ thin film: a STM/STS study Y.H. LIU, J. XIONG, D. YAROTSKI, Q. JIA, A.J. TAYLOR, MPA-CINT, MS K771, Los Alamos National Laboratory, NM 87545 — It is well known that oxygen plays a key role in the occurrence of superconductivity in high-temperature cuprate superconductors. Variation of oxygen content changes carrier concentration and directly affects electronic structure and superconducting properties of cuprate superconductors. Majority of previous studies relied on the intake process of oxygen to change the oxygen content in samples, while the reverse process, oxygen depletion, was rarely investigated. Nevertheless, the escape of oxygen from the surface of cuprate sample that was kept at room temperature under ultrahigh vacuum for extended period of time might lead to significant degradation of its superconducting properties due to the decrease of the carrier concentration. Here, we report this so-called vacuum-aging effect in $\text{YBa}_2\text{Cu}_3\text{O}_{6+x}$ thin films grown by laser-MBE technique. In particular, we use variable-temperature scanning tunneling microscopy/spectroscopy to follow the evolution of superconductivity and pseudogap states in this material as a function of aging time and tip position on the surface.

Y. H. Liu
MPA-CINT, MS K771, Los Alamos National Laboratory, NM 87545

Date submitted: 28 Dec 2010

Electronic form version 1.4