Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Controlled Intergrowth of 248 and 247 Phases of Y-Ba-Cu-O in Epitaxial Films and Heterostructures[1] H. ZHANG, University of Toronto, N. GAUQUELIN, G.A. BOTTON, Canadian Centre for Electron Microscopy and McMaster University, J.Y.T. WEI, University of Toronto and Canadian Institute for Advanced Research — Recent studies have shown that superconductivity in the Y-Ba-Cu-O (YBCO) family of cuprates can also be rooted in the quasi-1D Cu-O chains [1], even when the CuO_2 planes are not conducting [2]. The critical temperature (T_c) depends on the phase of YBCO present, such as $Y_2Ba_4Cu_8O_{16}$ (248) and $Y_2Ba_4Cu_7O_{15}$ (247). Recent studies have also shown that heterostructuring YBCO with other oxides such as $La_{2/3}Ca_{1/3}MnO_3$ (LCMO) can strongly influence the former's T_c [3]. This talk reports on a reexamination of these issues, by probing and controlling the intergrowth of the various YBCO phases in thin films and heterostructures. The samples were grown epitaxially by pulsed laser-ablated deposition, and characterized by electrical transport, XRD and high-resolution TEM with in-situ EELS. We observed the presence of 248 and 247 phases in YBCO/LCMO heterostructures. We also observed conversion between different phases of YBCO depending on the thermodynamics of the growth and annealing conditions. The implication of our results on the T_c variation in YBCO/LCMO heterostructure is discussed.

[1] J. Ngai *et al.*, PRL. 98, 177003 (2007).
[2] E. Berg *et al.*, PRB. 76, 214505 (2007).
[3] Z. Sefrioui *et al.*, PRB. 67, 21451 (2003)

[1]Work supported by NSERC, CFI/OIT and CIFAR.

H. Zhang
University of Toronto

Date submitted: 23 Nov 2011 Electronic form version 1.4