replacing MAR16-2015-009178.

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Growth and Study of Cuprate Thin Film Heterostructures Combining $La_2CuO_{4+\delta}$ and $LaCuO_{3-\delta}$ RODRIGO MARMOL, FRANKLIN BURQUEST, NICHOLAS COX, BRITTANY NELSON-CHEESEMAN, University of St Thomas — Cuprate materials have shown promise as fuel cell cathode materials. Both the layered perovskite, $La_2CuO_{4+\delta}$, and its 3D perovskite counterpart, $LaCuO_{3-\delta}$, demonstrate the simultaneous electronic and ionic conduction necessary for fuel cell cathode materials. The layered perovskite allows for oxygen interstitial diffusion through the material. Meanwhile, the 3D perovskite readily creates oxygen vacancies, allowing for oxygen vacancy diffusion through the material. In this work, we investigate thin film heterostructures created from these two disparate materials to understand how the local oxygen diffusion phenomena affect the local structure and electrical transport of cuprates. The growth of these heterostructures is possible through the atomic monolayer control of Molecular Beam Epitaxy with in-situ monitoring via Reflective High Energy Electron Diffraction. The superlattice structure is characterized by x-ray reflectivity, and the crystal structure of the disparate phases is characterized by x-ray diffraction. A custom electrical transport system is used to characterize the electrical transport of the films. We compare these heterostructures with the single-phase films of $La_2CuO_{4+\delta}$ and $LaCuO_{3-\delta}$ in order to understand how this heterostructuring may modify the structure and electrical properties.

Rodrigo Marmol
University of St Thomas

Date submitted: 30 Nov 2015 Electronic form version 1.4