Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Synthesis and device applications of doped perovskite manganite nanowires BO LEI, CHAO LI, CHONGWU ZHOU, Dept. of E.E.-Electrophysics, University of Southern California, Los Angeles, CA 90089 — Doped perovskite manganite films such as $LaCaMnO_3$ and $LaSrMnO_3$ have been studied intensively over the past years due to their colossal magnetoresistance (CMR) properties. It is expected that these doped manganite in the form of nanowires may offer great opportunities to explore intriguing physics and also practical applications in the emerging field of spintronics. We have developed a "nanocasting" technique to produce high-quality single-crystalline $La_{0.67}Ca_{0.33}MnO_3$and $La_{0.67}Sr_{0.33}MnO_3$ nanowires [1]. This was achieved by using pulsed laser deposition to epitaxially grow the desired manganite on single-crystalline MgO nanowire templates. The core-shell structures of these novel nanowires were clearly revealed using transmission electron microscopy (TEM). Following the material characterization, systematic transport studies have been performed based on devices consisting of individual manganite nanowires. We observed the metal-insulator transition with pronounced colossal magnetoresistance and also anisotropic effects related to the high aspect ratio of these nanowires. These devices could find application for spin injection and magnetic data storage.
[1] Nano Letters 4, 1241 (2004).

Bo Lei
USC

Date submitted: 07 Dec 2004 Electronic form version 1.4