Abstract Submitted
for the SES13 Meeting of
The American Physical Society

The Effects of Substrates, Buffer and Seeding Layers and Thermal Treatments on Zinc Oxide Nanostructure Formation ANDREW TRENCHARD, RICHARD MU, Fisk University, NANOSCALE MATERIALS & SENSORS GROUP TEAM — Zinc Oxide nanostructures have many potential applications due to their wide direct band gap (3.37 eV), large exciton binding energy ($\sim$ 60 meV at room temperature), piezoelectric properties and high electron mobility. A few examples include sensors, transistors and solar cells. Many of these applications could be further enhanced with greater control of the nanostructures being used. Samples are prepared on both Si and SiO_2 substrates and both with and without the Au layer. Fifty nanometers of SiO_2 is deposited on the substrate through sputtering deposition, and then 5 nm of Au is deposited with the same method. Next, 20 nm of ZnO is deposited through electron beam deposition. Finally, the samples are then thermally annealed at 700, 750 and 800 C, with some being annealed once for only 30 minutes and others being annealed twice or three times under the same conditions. The samples have been characterized by studying the optical absorbance and photoluminescence, x-ray diffraction and scanning electron microscopy. The experimental results will be discussed under the context of preferential nanostructure formation and crystal orientation due to substrates and thermal treatments. The knowledge obtained from the investigation will give more insight on the future of ZnO nanostructure fabrication and control.

Andrew Trenchard
Fisk Univ

Date submitted: 20 Sep 2013 Electronic form version 1.4