Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Robust Conductivity Changes in ZnO and MgZnO Nanoparticle Films from Annealing in Hydrogen SIRISHA CHAVA, HANNAH MARIE YOUNG, LORENA SANCHEZ, JOSEPH DICK, JOHN L. MORRISON, JESSE HUSO, LEAH BERGMAN, CHRISTINE BERVEN, University of Idaho — We report changes observed in the I-V characteristics of ZnO and MgZnO nanoparticle thin films after annealing in H_2 at sufficiently high temperatures. The nanoparticles were grown on insulating silicon substrates and had an average diameter of 30 nm. The devices were of a two terminal design, where the terminals consisted of two 25 μm diameter gold wires laid parallel to each other on the nanoparticle film to measure the current passing through the film. When exposed to H_2 gas at room temperature, no significant changes in the current-voltage behavior of the nanoparticles were observed relative to measurements done in vacuum. Annealing in H_2 below 140 $^\circ$C also resulted in no significant change in the current. When annealed above 140 $^\circ$C, we observed an increase of about a factor of ten that was semi-permanent. The origin of the change in I-V characteristics of ZnO and MgZnO nanoparticles when annealed in H_2 will be discussed.

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Date submitted: 20 Nov 2009 Electronic form version 1.4