

Abstract Submitted  
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**Effect of Heating and H gas Exposure on MgZnO Nanoparticle Conductivity.** CHRIS BERVEN, JOSEPH DICK, LEAH BERGMAN, JOHN MORRISON, JESSE HUSO, University of Idaho — Changes in the conductivity of  $\text{Mg}_x\text{Zn}_{1-x}\text{O}$  ( $x = 0.15$ ) nanoparticles as a function gas exposure and temperature are reported. The nanoparticles were prepared using wet chemical techniques on insulating thermally grown  $\text{SiO}_x$  Si substrates. Contact to the nanoparticle film was by gold wires laid across about 2 mm apart. The experiments were performed in a custom-built environmental chamber with the ability to evacuate or introduce various gases. For these experiments, the temperature was varied over a range of about 300 K to 420 K. Our measurements showed history-dependant behavior in changes of the conductance of the nanoparticle film. When the device was heated to  $\sim 120$  K in vacuum or in an Ar the current increased by the same amount. When repeated with  $\text{H}_2$ , the current increase was less. Initially, the effect was quite pronounced with a relative change by a factor of 20. With repetitions of the experiments, the same effect was observed but to a lesser degree suggesting a saturation phenomena. When the experiment was modified so that the  $\text{H}_2$  gas was introduced at a high temperature to an evacuated chamber the current dropped but not by the same degree as before. A similar response to exposure to  $\text{H}_2$  was found for exposure to  $\text{O}_2$ . Possible explanations for the observations will be presented.

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