

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Defects in ZnO Nanoparticles¹ SAMUEL TEKLEMICHAEL, MATTHEW MCCLUSKEY, Department of Physics and Astronomy, Washington State University, Pullman, WA 99164-2814 — Zinc oxide (ZnO) has a paramount potential for opto-electronic applications. In this work, we study defect properties of ZnO nanoparticles, grown by a solid-state pyrolytic reaction method, using IR spectroscopy. A series of IR spectral lines have been observed at liquid-helium temperatures with an acceptor hole binding energy of $\sim 0.4\text{eV}$. Deuterium-grown samples reveal no isotopic shift for the lines, indicating they are electronic and not vibrational. Furthermore, electron paramagnetic resonance (EPR) showed lines at $g = 1.96$ and $g = 2.003$. The former is assigned as shallow donors, whereas the latter may be attributed to holes on oxygen atoms which surround zinc vacancies.

¹This work was supported by the National Science Foundation and Department of Energy

Samuel Teklemichael
Department of Physics and Astronomy,
Washington State University, Pullman, WA 99164-2814

Date submitted: 17 Nov 2009

Electronic form version 1.4