Abstract Submitted
for the TSF10 Meeting of
The American Physical Society

Surface Defect States in Nanopowder ZnO YURI M. STRZHEMECHNY, Texas Christian University, Fort Worth, TX, RAUL M. PETERS, Paine College, Augusta, GA, JACOB SHAFER[1], Tarleton State University, Stephenville, TX, JAMES SCHULMAN[2], Paschal High School, Fort Worth, TX, J. ANTONIO PARAMO, Texas Christian University, Fort Worth, TX — In our work we employed surface photovoltage (SPV) spectroscopy on a number of commercially available ZnO nanopowders to probe surface defect energies within the band gap, conduction vs. valence band nature of the defect-related transitions, as well as the surface photoresponse dynamics. SPV characterization was performed in ultra-high vacuum in situ with remote oxygen plasma treatments. Our experiments revealed a number of common spectral features related to surface states in the as-received and plasma-processed samples. Furthermore, we observed significant plasma-induced changes in the surface defect properties. Complementary ex situ photoluminescence measurements performed on the studied samples were correlated with the SPV results and demonstrated that our approach is efficient in detecting specific surface states in nanoscale ZnO specimens and in elucidating their nature.

[1]participant in TCU REU program, summer 2007, funded by NSF Grant 0851558
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Date submitted: 23 Sep 2010 Electronic form version 1.4