Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Piezoelectric and Dielectric Properties of $PbZr_{0.2}Ti_{0.8}O_3$/ZnO heterostructures. JUAN WANG, PAVEL SAVEL, ALEXEI GRIGORIEV, The University of Tulsa — The dielectric and piezoelectric properties of epitaxial ZnO films and $PbZr_{0.2}Ti_{0.8}O_3$/ZnO heterostructures were studied by electrical measurement and time-resolved x-ray diffraction (TRXRD). ZnO epitaxial thin films were prepared on n-GaN/Al_2O_3 (0001)-oriented substrates by rf magnetron sputtering. A typical diode I-V behavior of pure ZnO films evolved into a ferroelectric switching hysteresis loop after the deposition of a thin $PbZr_{0.2}Ti_{0.8}O_3$ (PZT) layer on top of the epitaxial ZnO film. A hysteresis was also observed in C-V characteristics of the heterostructure. TRXRD revealed piezoelectric strain in ZnO and PZT layers under an applied electric field. The simultaneous measurements of internal strains and I-V characteristics of the ferroelectric/semiconductor heterostructure enable direct access to internal electric fields, charge and polarization dynamics. This information provides unique opportunities to understand and control electronic properties of semiconductors by polarization coupling with ferroelectric materials.

Juan Wang
The University of Tulsa

Date submitted: 07 Nov 2016 Electronic form version 1.4