Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Fabrication of Gate Defined Quantum Dots in Tellurium Nanowires[1] KATIE WELCH, Hendrix College, SHIVA DAVARI, JEB STACY, RAVINDRA BASNET, MOURAD BENAMARA, JIN HU, HUGH CHURCHILL, University of Arkansas at Fayetteville — The purpose of this experiment was to create tellurium quantum dots using gate-based fabrication in order to study the quantum properties of tellurium. The effectiveness of the native oxide, TeO_2, was tested as an insulator for the development of the devices compared to synthesized insulator Al_2O_3. The native oxide on the tellurium wires seemed to raise more problems than solutions during the fabrication process. The amount of TeO_2 growth could be greater than expected, leading to the complications faced during device fabrication. Transmission electron microscopy was used on a tellurium growth that was suspected to have only nanowires, but other structures such as nanotubes and rolled planes were found. Due to this discovery, thorough investigation of tellurium growths will be needed before device fabrication in order to verify the compatibility of a nanostructure. Useful fabrication procedures regarding tellurium nanowires were discovered that could aid future work, such as the fragile nature of the nanowires, procedures that were altered for the material, and the discovery of a varying nanostructures from grown samples.

[1]This work is supported by the NSF/EEC 1922719 REU site: Tomorrow's Nanomanufacturing: Engineering with Science (TNEWS)

Todd Tinsley
Hendrix College

Date submitted: 31 Jan 2020 Electronic form version 1.4