Abstract Submitted
for the SES17 Meeting of
The American Physical Society

Ion Migration Studies in 2D Molybdenum Trioxide Thin Flake through Ionic Liquid Gating CHENG ZHANG, PUSHPA PUDASAINI, AKINOLA OYEDELE, ANTHONY WONG, ANNA HOFFMAN, Department of Materials Science and Engineering, University of Tennessee, KAI XIAO, Center for Nanophase Materials Sciences, Oak Ridge National Laboratory, DAVID MANDRUS, Department of Materials Science and Engineering, University of Tennessee, THOMAS WARD, Materials Science and Technology Division, Oak Ridge National Laboratory, PHILIP RACK, Department of Materials Science and Engineering, University of Tennessee — Ionic liquid is well known for its ability to electrostatically enhance the carrier densities of devices and thin films. The formation of an electric double layer can electrostatically induced charge carriers and/or intercalate ions in and out of the lattice which can induce a large change of the electronic and optical properties and even crystal structures. We present a systematic study on exfoliated molybdenum trioxide devices regarding the property changes and the underlying ion migration during the biasing process through ionic liquid. A close to nine orders of magnitude modulation of the MoO_3 conductivity was obtained via ionic liquid gating. Two types of ionic liquids are involved and rapid on/off switching can be realized through the lithium containing ionic liquid. Secondary ion mass spectrometry investigation is performed which reveals the ion migration details.

Cheng Zhang
University of Tennessee, Knoxville

Date submitted: 11 Oct 2017 Electronic form version 1.4