Abstract Submitted for the MAR10 Meeting of The American Physical Society

Charge transport in single crystalline indium nitride Nanowires JIA G. LU, SHENG CHU, PAICHUN CHANG, DONGDONG LI, University of Southern California, IGOR BELOBORODOV, Cal State Univ Northridge — Single crystalline InN nanowires have been synthesized via vapor-liquid-solid growth mechanism in a chemical vapor deposition system. It exhibits wurtzite hexagonal crystal structure with lattice constant a = 3.5Å and c = 5.7Å. Energy dispersive spectroscopy measurement indicates indium and nitrogen concentrations with stoichiometry of 1:1. The as-synthesized nanowires (average diameter of 100nm) are then configured into field effect transistor devices and measured in a variable temperature cryostat. From the electrical transport data, the nanowire channel shows typical n-type semiconductor behavior. As temperature increases from 4.2 K to room temperature, a metal-semiconductor transition is observed at a temperature around 80 K. It is found that in the semiconductor regime, the resistivity follows a power law dependence due to electron hopping mechanism. In addition, this is confirmed by the negative magneto-resistances observed for magnetic fields applied with directions both perpendicular and parallel to the nanowire axes.

> Jia G. Lu University of Southern California

Date submitted: 24 Nov 2009

Electronic form version 1.4