

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Electrical transport properties of ReS₂ with polymer electrolyte gating in the high-doping limit DMITRY OVCHINNIKOV, ADRIEN ALLAIN, DIEGO PASQUIER, DUMITRU DUMCENCO, Ecole Polytech Fed de Lausanne, CHING-HWA HO, YING-SHENG HUANG, National Taiwan University of Science and Technology, OLEG YAZYEV, ANDRAS KIS, Ecole Polytech Fed de Lausanne — Two-dimensional (2D) materials have emerged as promising candidates for future electronic applications. Among them, transition metal dichalcogenides (TMDs) demonstrate not only potential as ultrathin transistor channel material, but also intriguing spin and valley physics, which in principle could allow new types of devices and circuits. Here we report on the first study of two-dimensional anisotropic ReS₂ at high doping levels, enabled by polymer electrolyte gating. Significantly increasing the doping level using electrolyte instead of standard solid gate, we measured an unusual modulation of the conductivity at high carrier densities in monolayer ReS₂. In the case of thicker flakes, the effect is milder and an insulator-metal-insulator sequence with increasing doping is observed. Transport measurements provide the evidence of major influence of ionic disorder. Furthermore, we discuss possible band structure effects.

Dmitry Ovchinnikov
Ecole Polytech Fed de Lausanne

Date submitted: 06 Nov 2015

Electronic form version 1.4