

IBS CINAP Seminar

June 12, 2019, 3:00PM

Room 86120 (N Center), Sungkyunkwan University, Suwon

Study of van-der Waals heterostructures based on 2-dimensional materials

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Abstract

In electronic and optoelectronic devices, two dimensional (2D) semiconductors bring a huge revolution specially to construct van der Waals heterojunction p-n diodes. Conventionally, such diodes are composed of n-type and p-type semiconductors and each region transport opposite charges and exhibit reverse in nature. Foremost, here we are reporting a unique tungsten disulfide (WS_2)/Black phosphorus (BP) van der waals heterojunction p-n diode which is manipulating the gate dependent static rectification, effect of temperature on its efficiency and photovoltaic effect. Moreover, first time we also demonstrate the effect of temperature on Zener breakdown voltage (ZBV) and avalanche breakdown voltage (ABV) and ideality factor also. During static rectification, our WS_2 /BP is displaying a high ON/OFF ratio of $\sim 10^4$, so these features will bring a revolution in electronics for next generation.

Brief Bio



Research Interest:

- ♣ Graphene and 2D- Materials (h-BN, MoS_2 , WS_2 , $MoTe_2$, WSe_2), based heterostructure.
- ♣ Spin and charge transport in 2D-materials and thin-films
- ♣ Mesoscopic Physics ♣ Nanomaterials and Polymers
- ♣ Fabrication and characterization of semiconductor devices (diodes, FET and sensors).
- ♣ Low temperature vertical spin transport, Quantum Hall transport, Phase coherent transport,
- ♣ Chemical and gas doping of 2D- Materials (Graphene, MoS_2 , WS_2 , $MoTe_2$, WSe_2).
- ♣ Flexible and conducting fabrics ♣ Flexible and transparent electronic

Qualifications:

Ph.D. in Physics (June-2019)

Department of Physics and Graphene Research Institute, Sejong University

M.Sc. in Nanotechnology and Nanoelectronics Devices (2013)

Department of Physics, University of agriculture, Faisalabad, Pakistan.