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Ali Javey

Distinguished Lecture Series

Presents

2D Semiconductor Electronics: Advances, Challenges and Opportunities

Professor Ali Javey

University of California, Berkeley

Abstract

Two-dimensional (2-D) semiconductors exhibit excellent device characteristics, as well as novel optical, electrical, and optoelectronic characteristics. In this talk, I will present our recent advancements in defect passivation, contact engineering, surface charge transfer doping, and heterostructure devices of layered chalcogenides. We have developed a defect repair/passivation technique that allows for observation of near-unity quantum yield in monolayer MoS2. The work presents the þrst demonstration of an optoelectronically perfect monolayer. Forming Ohmic contacts for both electrons and holes is necessary in order to exploit the performance limits of enabled devices while shedding light on the intrinsic properties of a material system. In this regard, we have developed different strategies, including the use of surface charge transfer doping at the contacts to thin down the Schottky barriers, thereby, enabling efþcient injection of electrons or holes. We have been able to show high performance n- and p-FETs with various 2D materials. Additionally, I will discuss the use of layered chalcogenides for various heterostructure device applications, exploiting charge transfer at the van der Waals heterointerfaces. I will also present progress towards achieving tunnel transistors using layered semiconductors.

Thursday, October 29, 2015
12:45 pm, ZHS Room 159