



IBS Center for Multidimensional Carbon Materials



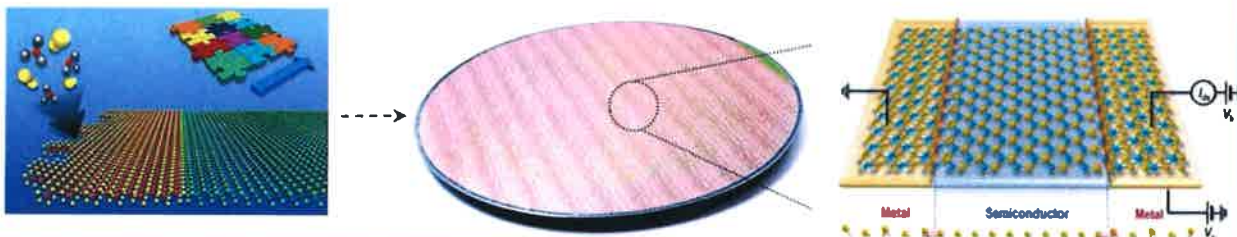
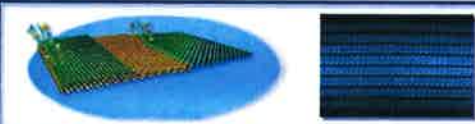
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JAN 17 | Bldg. 101
WED 2 PM | Seminar room on the 1st floor

Atomically Thin, Coplanar Electrical Circuitry by Polymorphic Heteroepitaxy

We have fabricated coplanar field-effect transistors (FETs), where atomically thin semiconductors and metals are integrated within the single atomic-planes by polymorphic heteroepitaxy. To build this new device architecture, we utilized a concept of the crystal and electronic polymorphism in a certain class of two-dimensional (2D) transition-metal dichalcogenides (TMDCs); for the first time we have achieved coplanar heteroepitaxy of distinct metallic (1T') and semiconducting (2H) atomic layer crystals by a sequential chemical vapor deposition. It was verified that these coplanar metal-semiconductor contacts are atomically coherent, showing the lowest contact barrier height ever-reported, which immediately contributed to the substantial outperformance of the coplanar FETs over conventional top-contact 2D TMDC FETs. Synthetic integration of atomically-thin 2D electronic polymorphs in this work may establish a new design rule of the true 2D semiconductor circuitry, built with only one atomic layer.

MATERIALS
Heteroepitaxial Growth of Atomically Thin Semiconductors, Correlated Metals and Insulators:
Artificial Atomic 2D Heterointerfaces for 2D Physics Platforms



MATERIALS PHYSICS
Electronic and Photonic Processes at the Atomic 2D Heterointerfaces:
Electron and Photon Manipulations at Atomic Scale Confinements



DEVICE PHYSICS
Atomic 2D Electronics, Photonics and Plasmonics:
Novel 2D Device Platforms and Energy Conversion Processes



Special Guest Seminar

You are cordially invited to attend!