Ústav fyzikální chemie J. Heyrovského, v. v. i.
Akademie věd České republiky

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zve všechny zájemce na seminář, na kterém promluví

Dr. Mark C. Hersam

Department of Materials Science and Engineering,
Northwestern University, Evanston, USA

na téma

Fundamentals and Applications of Low-Dimensional Nanoelectronic Heterostructures

Seminář se koná v pondělí **12. září 2016 od 9:30 hod.**
ve velké posluchárně ústavu v Praze 8, Dolejškova 3.

Těšíme se na Vaši účast. Hosté jsou vítáni.

Fundamentals and Applications of Low-Dimensional Nanoelectronic Heterostructures

Mark C. Hersam
Department of Materials Science and Engineering, Northwestern University
2220 Campus Drive, Evanston, IL 60208-3108, USA
m-hersam@northwestern.edu; http://www.hersam-group.northwestern.edu/

Low-dimensional materials have emerged as promising candidates for next-generation electronic and optoelectronic applications. As is common for new materials, much of the early work has focused on measuring and optimizing intrinsic properties on small samples under idealized conditions. However, real-world devices and systems inevitably require large-area samples that are integrated with dielectrics, contacts, and other semiconductors at standard temperature and pressure conditions. These requirements are particularly challenging to realize for low-dimensional materials since their properties are highly sensitive to surface chemistry, defects, and the surrounding environment. This talk will thus explore methods for improving the uniformity of solution-processed low-dimensional materials with an eye toward realizing scalable processing of large-area thin-films. For example, density gradient ultracentrifugation allows the solution-based isolation of transition metal dichalcogenides (e.g., MoS_2, WS_2, $MoSe_2$, and WSe_2), boron nitride, and black phosphorus with homogeneous thickness down to the single-layer level. In addition to solution processing, this talk will also report on the integration of two-dimensional materials with dielectrics and other semiconductors. In particular, atomic layer deposition of dielectrics on two-dimensional black phosphorus suppresses ambient degradation, thereby preserving electronic properties in field-effect transistors at atmospheric pressure conditions. Finally, gate-tunable p-n heterojunction diodes with Type I and Type II band alignments are demonstrated by integrating n-type single-layer MoS_2 with p-type semiconducting single-walled carbon nanotubes and pentacene, respectively.