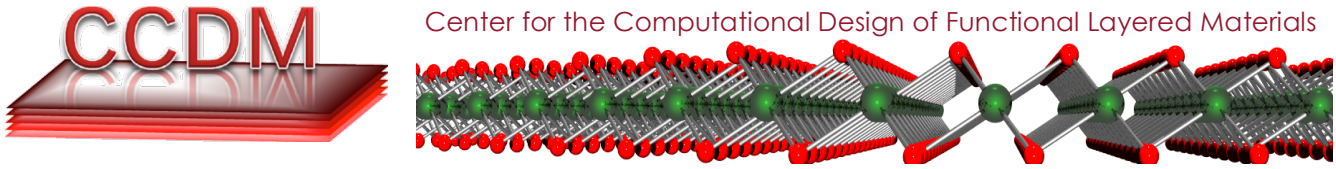


April 20, 2018
Temple University, SERC Room 703, 12:00 PM

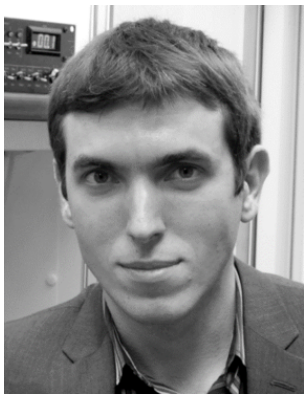
Graphene Nanoribbons, Transition Metal Chalcogenides and MXenes for Electronic Applications

Alexander Sinitskii, Department of Chemistry, University of Nebraska – Lincoln, Lincoln, NE

http://chemweb.unl.edu/sinitskii/

This talk will be focused on the synthesis and electrical characterization of emerging two-dimensional semiconductor materials and heterostructures. In the first part of this talk I will discuss bottom-up synthesis of atomically precise graphene nanoribbons (GNRs). Theoretical studies showed that narrow GNRs possess intriguing electronic and magnetic properties that strongly depend on the ribbon's width and edge structure. I will demonstrate that GNRs with various structures can be synthesized with atomic precision and fine-tuned properties by coupling properly designed molecular precursors and planarization of the resulting polymers. These GNRs can be employed in a variety of devices, including highly efficient gas sensors and electronic nose systems. In the second part of this talk I will discuss transition metal chalcogenides, such as MoS_2 or WSe_2, and demonstrate that they have great promise for memory devices with ferroelectric gating. These devices have a number of attractive characteristics, such as high on-off ratios, nondestructive data readout, low operation voltage, wide memory window and the possibility to write and erase them both electrically and optically. In the final part of my talk I will discuss the results of electrical characterization of some of the recently discovered 2D materials, such as TiS_3, which was theoretically predicted to exhibit high electron mobility, and Ti_3C_2 MXene, a promising material for energy storage.

Alexander Sinitskii, University of Nebraska – Lincoln, Lincoln, NE



Alexander Sinitskii received his B.S., and Ph.D. degrees in Materials Science from Moscow State University. After postdoctoral studies at Rice University in Houston, TX he moved to the University of Nebraska – Lincoln, where he is currently an Associate Professor of Chemistry. His research program is addressing the synthesis and properties of low-dimensional materials with potential applications in nanoelectronics, chemical sensing and energy storage. Sinitskii has published over 100 papers in peer-reviewed journals and is a co-inventor on 8 patents. He received several awards for his research and teaching, including a 2015 NSF CAREER Award and a 2017 UNL College of Arts and Sciences Distinguished Teaching Award.