Controlling Graphene Hydrogenation at Atomic Scale

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Since atomic hydrogen forms strong bonds with graphene it can be considered as the simplest adsorbate able to profoundly change electronic structure of this wonder material. We combined scanning tunneling microscopy (STM) measurements and density functional theory (DFT) calculations to study small hydrogen structures formed on graphene as well as basic mechanisms governing their kinetic stability with respect to H₂ recombination. In addition to these results I’ll also describe two promising approaches employed to achieve partial control over the shape and distribution of hydrogen nanostructures grown on graphene, which represents the first step in efforts to tailor its electronic properties.

Željko Šljivančanin has received PhD in Physics from University of Belgrade, Serbia and spent several years as a postdoctoral fellow at University of Aarhus, Denmark and at EPFL in Lausanne, Switzerland. He is a research professor at Vinča Institute of Nuclear Science in Belgrade and the leader of a group specialized in computational modeling of materials based on DFT. His research interest are focused on computational studies of physical properties of novel two-dimensional materials, modeling of simple catalytic processes on metal surfaces and magnetism. Dr Šljivančanin has published 50 papers in leading international journals, such as Physical Review Letters, Nature Materials, JACS, ACS Nano, Physical Review B, Carbon and the Journal of Physical Chemistry C.

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