

Graphene research at ICN2

Pablo Ordejón^{1,2}

¹ ICN2 - Institut Català de Nanociència i Nanotecnologia
Campus UAB, 08193 Bellaterra, Spain

² CSIC - Consejo Superior de Investigaciones Científicas
Edifici ICN2, Campus UAB, 08193 Bellaterra, Spain
pablo.ordejon@icn.cat

ICN2 is a research center focused on the discovery and exploration of the properties that arise in matter at the nanometer scale, and on the development of technologies that exploit these properties. These advances have the potential of changing virtually all aspects of our lives, by producing new technologies that will have an enormous economic and social impact.

ICN2 is turning research into marketable technologies with the expertise of over 200 scientists and technicians that put their work in the whole value chain, from fundamental research all the way to design, fabrication, and evaluation of nanotechnology-based devices. The Institute offers a full suite of advanced instruments available for research and innovation in fields such as energy, biosystems (medical and environmental), and information and communication technologies.

Our activities take place in a stimulating environment, close to Barcelona, where over 500 researchers and 200 technicians work on materials science and micro/nanotechnologies within the Barcelona Nanotechnology Cluster - Bellaterra (<http://www.bnc-b.net>), a cluster comprising several public and private research centers, the Universitat Autònoma de Barcelona, and the ALBA Synchrotron.

Graphene research is one of the cornerstones of the work developed by ICN2's multidisciplinary groups. The Institute promotes collaboration among scientists from diverse backgrounds (physics, chemistry, biology, engineering) to conduct basic and applied research, always seeking interaction with local and global industries. In this sense, graphene is one of the basic tools that ICN2 uses to develop its science and technology. The ultimate goal is to produce devices for real life applications, which can be only developed from the discovery and deep knowledge of the most fundamental aspects of the materials and nanostructures.

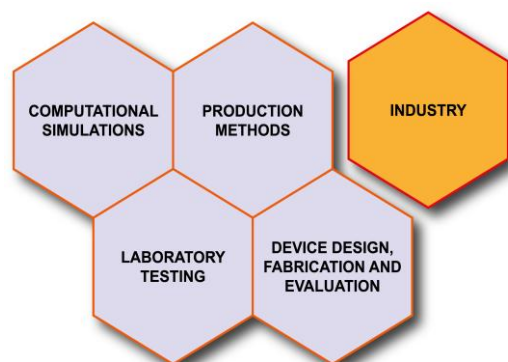
Graphene research at ICN2 encompasses four major areas:

Computational simulations. Theoretical scientists and experimentalists work together to create, validate, and refine models that predict the behavior of graphene.

Production methods. ICN2 conducts research to achieve higher levels of control over size, shape, and layers and to produce customized graphene-based materials.

Characterization and testing. ICN2 research groups define properties of graphene, measure electronic and quantum phenomena in graphene-based devices, and test how graphene reacts to realistic external forces.

Device design, fabrication and evaluation. Graphene-based biosensors, solar cells, supercapacitors, and information and communication devices are being developed.



More information can be found at www.icn2.cat/graphene

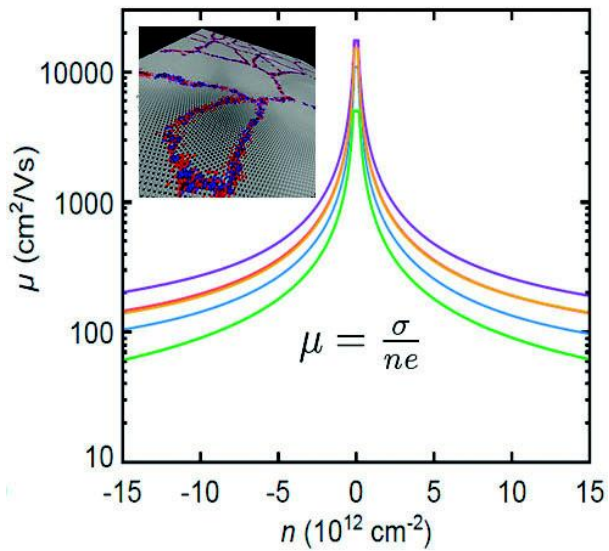


Figure 1:

Simulated charge mobility of polycrystalline graphene.
 D.V. Tuan, J. Kotakoski, T. Louvet, F. Ortmann, J. C. Meyer, and S. Roche, *Nano Letters*, 13(4), 1730–1735 (2013)

Figure 2.

Top: Scanning Tunnelling Microscopy image of a triangular graphene nanoisland grown on a Ni(111) surface

Middle: Suspended graphene multiply connected

Bottom: Silicon chip covered with graphene.

