Electronic transport in defective low dimensional carbon materials: nanotubes and graphene

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ABSTRACT:
Electronic transport properties of carbon nanotubes and graphene are of interest due to their potential use in future electronic devices but also from a fundamental point of view. These materials, due to their low dimensionality and peculiar band structure, present a broad spectrum of electronic transport regimes.
In this talk I will first talk about our experimental work on carbon nanotubes focusing on the effect of different scattering mechanism: atomic scale defects [1] and high energy phonons [2], I will finish trying to give an overview of the phase diagram of electronic transport in carbon nanotubes.
Then I will focus on our work on chemically derived graphene. These graphene layers are obtained by a mass production technique based in the oxidation and subsequent reduction of graphite [3]. I will describe our experiments with the aim of characterizing this material from a structural [4], electronic [3,5] and mechanical [6] point of view. I will also discuss a route for enhancement of its conductivity [7].
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4 (7), 534 (2005).
[2] Sundqvist, P. et al., Voltage and length-dependent phase diagram of the electronic transport in carbon nanotubes. Nano Letters 7 (9), 2568 (2007).
[3] Gomez-Navarro, C. et al., Electronic Transport Properties of Individual Chemically Reduced Graphene Oxide Sheets. Nano Letters 7 (11), 3499 (2007).
[4] Gomez-Navarro, C. et al., Atomic Structure of Reduced Graphene Oxide.
Nano Letters 10 (4), 1144 (2010).
[5] Kaiser, A. et al., Electrical Conduction Mechanism in Chemically Derived Graphene Monolayers. Nano Letters 9 (5), 1787 (2009).
[6] Gomez-Navarro, C., Burghard, M., and Kern, K., Elastic properties of chemically derived single graphene sheets. Nano Letters 8 (7), 2045 (2008).
[7] Lopez, V. et al., Chemical Vapor Deposition Repair of Graphene Oxide: A Route to Highly Conductive Graphene Monolayers. Advanced Materials 21 (46),
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