

THE Alan G. MacDiarmid NanoTech Institute PRESENTS



Prof. Rod Ruoff
Cockrell Family Regents Chair
The University of Texas at Austin

Friday, July 1st at 1 p.m.
ECS South 3.503

Rod Ruoff joined The University of Texas at Austin as a Cockrell Family Regents endowed chair in September, 2007. He earned his Ph.D. in Chemical Physics from the University of Illinois-Urbana in 1988, and was a Fulbright Fellow in 1988-89 at the Max Planck Institute fuer Stroemungsforschung in Goettingen, Germany. Prior to joining UT-Austin, he was the John Evans Professor of Nanoengineering in the Department of Mechanical Engineering at Northwestern University and director of NU's Biologically Inspired Materials Institute from 2002-2007. He has co-authored 260 peer-reviewed publications devoted to chemistry, physics, materials science, mechanics, engineering, and biomedical science, is co-founder of Graphene Energy, Inc. and the founder of Graphene Materials, LLC. and Nanode, Inc. Dr. Ruoff is on the editorial board of *IEEE-Nano; Composites, Science, and Technology; Carbon; Journal of Nanoengineering and Nanosystems*; and is a Managing Editor and Editorial Board Member of *NANO*. He was a Distinguished Chair Visiting Professor at Sungkyukwan University's Advanced Institute of NanoTechnology (SAINT) for several years.

Dr. Ruoff's research interests include, among others:

- Synthesis, characterization, and properties of novel materials (e.g., graphene, nanotubes, others; composites)
- Energy and the environment
- Nanomanipulation and new tools for the biomedical sciences
- Technology transition

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Graphene-based and Graphene-derived Materials

Graphene-based materials are promising because of their electronic and thermal transport, mechanical properties, high specific surface area, that they can act as an atom thick layer, barrier, or membrane, among other reasons. Our micromechanical exfoliation approaches [1,2] conceived of in 1998 yielded multilayer graphene and one paper described in detail how monolayer graphene could be obtained [1]. Three main research areas of our group are: (i) Growth of large area graphene on metal substrates, characterization and physical properties, and studies of devices having graphene as a central component; (ii) Generation, study, and use of graphene-based platelets (typically derived from graphite oxide) including as dispersed in liquids, and powders derived from such colloids or generated by microwave or thermal treatment of graphite oxide; (iii) Generation and study of new types of carbon derived from graphene-based precursors, such as "activated microwave expanded graphite oxide", or 'aMEGO'[3]. I will briefly present each pioneering study (composites, thin films, transparent conductive films, electrical energy storage, large area monolayer CVD growth on copper, graphene as a protective coating, others) as well as discuss our on-going research in these areas.

A recent talk given at Harvard may be of use to those audience members wanting to familiarize themselves with research from my group; it also provides a (brief) history of the experimental discovery of graphene: http://bucky-central.me.utexas.edu/RuoffsPDFs/Ruoff_Master_2011 .

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1. Lu XK, Yu MF, Huang H, and Ruoff RS, *Tailoring graphite with the goal of achieving single sheets*, *Nanotechnology*, **10**, 269-272 (1999).
2. Lu XK, Huang H, Nemchuk N, and Ruoff RS, *Patterning of highly oriented pyrolytic graphite by oxygen plasma etching*, *Applied Physics Letters*, **75**, 193-195 (1999).
3. Zhu, Yanwu; Murali, Shanthi; Stoller, Meryl D.; Ganesh, K. J.; Cai, Weiwei; Ferreira, Paulo J.; Pirkle, Adam; Wallace, Robert M.; Cychosz, Katie A.; Thommes, Matthias; Su, Dong; Stach, Eric A.; Ruoff, Rodney S. *Carbon-Based Supercapacitors Produced by Activation of Graphene*. *Science* (2011), DOI: 10.1126/science.1200770.