



American Institute of Chemical Engineers

3rd Quarter 2008

Nanotech News

- Researchers have used the tip on a scanning tunneling microscope to etch graphene nanoribbons out of a graphene sheet. The researchers demonstrated that different shapes could be patterned.
<http://www.nature.com/nnano/journal/v3/n7/abs/nnano.2008.149.html>
- Gold nanoparticles become catalytically active at small diameters. However, it was recently discovered that 55-atom gold clusters can epoxidize styrene without the need for an initiator. The effect has a sharp size threshold, occurring only at diameters below 2 nm. The authors believe smaller size nanoparticles are capable of dissociating O₂ into individual O atoms, enabling a variety of oxygenated hydrocarbons.
<http://www.nature.com/nature/journal/v454/n7207/abs/nature07194.html>
- Thin meshes of superhydrophobic nanowires are capable of soaking up oil. The composite meshes could soak up to 20 times their weight. The membranes are durable and can be easily cleaned and reused.
<http://www.nature.com/nnano/journal/v3/n6/abs/nnano.2008.136.html>
- Researchers image hydrocarbon chains attached to a fullerene as it passes through the nanosized pores of a single wall carbon nanotube. Combined with molecular modeling, the authors show that molecules rotate and undergo conformational changes. Further, they observed that the hydrocarbon chain could penetrate through holes in the sidewall.
<http://www.nature.com/nnano/journal/vaop/ncurrent/abs/nnano.2008.263.html>
- Ordered mesoporous metals were fabricated using the self-assembly of block copolymers and stabilized platinum particles. The materials are expected to be important to a host of applications, including catalysis, separations, and electrodes for fuel cells and batteries.
<http://www.sciencemag.org/cgi/content/abstract/320/5884/1748>
- Tests confirm that graphene is the strongest material ever measured. A diamond-tipped atomic force microscope was used to measure both the elasticity and breaking point of defect-free graphene stretched across etched holes on a silicon substrate.
<http://www.sciencemag.org/cgi/content/abstract/321/5887/385>
- Selenium nanoparticles shown to collect the mercury vapors from broken fluorescent light bulbs. Fluorescent bulbs can be 3-6 times more efficient than incandescent bulbs. Although fluorescent bulbs still introduce less mercury to the environment than incandescent bulbs when the burning of coal is included, many consumers worry about the mercury vapor that is released if the bulb breaks. The sorbent nanoparticles were able to collect mercury 70 times better than other technologies.
<http://www.abc.net.au/science/articles/2008/08/25/2345818.htm>

AICHE 2008 Annual Meeting in Philadelphia during November 16-21, 2008

The NSEF has over 60 sponsored or co-sponsored sessions at the Annual Fall Meeting in Philadelphia. [Register now](#). Some highlights of the NSEF programming include:

- Dr. Meyya Meyyappan from NASA Ames will present his 2008 NSEF Forum Award Lecture entitled "One Dimensional Nanomaterials and their Applications" at the Chemical Engineering Principles for Nanotechnology I Session on Tuesday at 12:30 pm.
- The 2008 NSEF Young Investigator Award Lecture by Professor Ravi Kane from Rensselaer Polytechnic Institute entitled "The Design of Nanoscale Polyvalent Therapeutics" will be presented on Tuesday at 3:15 pm in the Chemical Engineering Principles for Nanotechnology II Session.
- On Monday evening, the NSEF Forum will host the Nanoscale Science and Engineering Poster session. Over 40 posters will be presented covering a wide variety of topics.
- The NSEF will have our Luncheon Planning Meeting on Tuesday at 11 am. Please join us to discuss future programming at AICHE meetings and the directions for the Forum. You can buy a ticket at <http://www.iche.org/Conferences/AnnualMeeting/index.aspx>

NSEF Core Programming includes:

- Nanoelectronic Materials I/II
- Chemical Engineering Principles for Nanotechnology I/II
- Commercialization of Nanotechnology
- Nanofabrication and Nanoscale Processing

- Nanoscale Structure In Polymers I/II: Self-Organization of Polymers at Surfaces and Interfaces
- Nanoscale Structure in Polymers II: Nanostructured Polymeric Materials
- Nanoscale Structure In Polymers III: Polymer Nanocomposites
- Nanoscale Structure in Polymers IV: Polymer Nanocomposites
- Nanotechnology and Nanobiotechnology for Sensors I/II/III
- Poster Session: Nanoscale Science and Engineering
- Self and Directed Assembly at the Nanoscale I/II
- Templated Assembly of Inorganic Nanomaterials
- Education Issues in Nanotechnology
- Carbon Nanotubes I: Synthesis
- Carbon Nanotubes II: Characterization, Functionalization, and Applications
- Carbon Nanotubes III: Adsorption and Transport
- Carbon Nanotubes IV
- Carbon Nanotubes V: Applications
- Sensors and Bio-Imaging Contrast Agents at the Cellular Level I/II
- Magnetic Nanoparticles In Biotechnology and Biomedicine I/II
- Bionanotechnology for Gene and Drug Delivery I/II/III
- Bionanotechnology: Plenary Session I/II
- Bionanotechnology Graduate Student Award Session
- Micro- and Nanodevices for Targeted Therapeutics
- Nanoscale Science and Engineering in Biomolecular Catalysis I/II/III
- Nanostructured Biomimetic and Biohybrid Materials and Devices
- Nanostructured Scaffolds for Tissue Engineering
- Nanotechnology for Biotechnology and Pharmaceuticals I/II
- Nanotechnology for In Vivo and in Vitro Imaging
- Polymers as Functional Components of Micro- and Nanodevices
- Self-Assembled Biomaterials II
- Nanowires I: Synthesis
- Nanowires II: Modeling, Integration Strategies and Applications
- Nanowires IV: Applications to Photovoltaics or Renewable Energy
- Nanowires V: Applications to Sensors, Devices and Energy Storage
- Nanowires III: Bulk Production, Dispersions and Composites

NSEF Co-sponsored Sessions include:

- Functional Nanoparticles and Nanocoatings on Particles
- Nanoscale Structure in Polymers II/III
- Nanostructured Biomaterials
- Processing of Nanocomposites
- Nanoscale Materials as Catalysts I/II
- Nanomaterials for Hydrogen Production and Fuel Cells
- Nanomaterials for Energy Storage I
- Nanomaterials for Photovoltaics I/II

Register to attend AIChE's Centennial Annual Meeting in Philadelphia now at <http://www.aiche.org/Conferences/AnnualMeeting/index.aspx>.

World Congress on Chemical Engineering

The 8th World Congress on Chemical Engineering will be held in Montreal Canada during August 23 – 27, 2009. The Congress is currently accepting papers until November 30, 2008. The theme of the conference is "Challenges for a Changing World" and features a Nanotechnology Technical Symposium.

The three day Nanotechnology symposium will provide a forum for communication and networking among engineers and scientists who share interests in research and technology development at the atomic, molecular or macromolecular levels. The scope of the symposium covers chemical, biological, and materials processes and products, and will broadly promote the exchange of ideas, concepts, know-how, and experiences in nanotechnology.

Specific themes include:

- **Nanoscale Structure in Polymers:** Topics include self-organization of polymers at surfaces and interfaces, nanostructured polymeric materials, functional colloids, polymer nanocomposites.
- **Self and Directed Assembly at the Nanoscale:** Topics include self-assembly processes, templated assembly of inorganic materials.
- **Chemical Engineering Principles for Nanotechnology:** Topics include applications of chemical engineering principles to the commercialization of products and processes that involve nanotechnology and nanomaterials, including: nanoscale characterization, nanocatalysts, nanofabrication and nanoelectronic and photonic materials.
- **Carbon Nanostructures and Inorganic Nanowires:** Topics include synthesis, characterization, functionalization and applications of fullerenes, carbon nanotubes and inorganic nanowires. In addition, papers are sought in the areas of adsorption and transport, modeling, applications to photovoltaics or renewable energy, sensors, energy storage, dispersions and composites.
- **Bionanomaterials and Technology:** Topics include magnetic nanoparticles in biotechnology and medicine, materials for gene and drug delivery, micro-and nano-devices for targeted therapeutics, nanomaterials and phenomena for biomolecular analysis, biomimetic and biohybrid materials, tissue

engineering, nanomaterials for imaging, sensors and contrast agents, self-assembled biomaterials.

Please visit http://www.wcce8.org/prog_tech_symposia_nanotec.html for more information.

Visit the NSEF Website

The NSEF website contains online Web/Forum Community at <http://forum.aiche.org/Forum23-1.aspx>. Visit the forum and exchange ideas, post suggestions, questions, or news to the NSEF community.

Comments and Feedback

Please let us know what you think of NSEF, its newsletter, or provide us with your suggestions by emailing: nano@aiiche.org.

2008© AIChE #3290