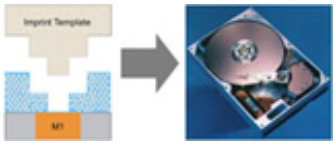
National Nanomanufacturing Network Newsletter

Volume 2 Issue 4 - April 2009

The NNN Newsletter

Nanomanufacturing Testbeds: Unique Opportunities for Industrial-Academic-Government Collaborations



Researchers involved in a broad range of science and technology enabled through nanoscale materials and phenomenon are reporting discoveries and innovations with increasing frequency. As these breakthroughs involve academia, industry, and government researchers, the next step in many cases is to understand the range of applications that would benefit from the research results and who the stakeholders would be.

While the applications and benefits may be obvious, bringing a technological innovation to the product level is not always as straight forward as developing a business plan or partnering with an industry leader. Typically the innovation must be further developed such that design, manufacturing, reliability, and yield issues are addressed to achieve the necessary economy of scale for a competitive product.

These concerns in general are not unique to nanotechnology and nanomanufacturing, although some considerations are. These involve the existing infrastructure, capabilities, and tools enabling further investigation into and development of the technologies being reported by research laboratories worldwide. One model that addresses these issues is the testbed. Testbeds provide a critical platform to bridge the gap between laboratory innovation and product implementation and to better understand the financial and societal benefits provided therein.

Over the coming months the NNN plans to highlight testbed programs around the United States, providing an overview of the goals, strategy, and outcomes of each. We will also seek input and feedback on these programs so that the appropriate information and results are shared with stakeholders, who may evaluate the technologies and further proliferate the capability for specific application areas. With this goal in mind, the NNN invites contributions of ideas, examples, and outcomes from testbed programs relevant to nanomanufacturing, and will work with the community at large to feature these through our online information clearinghouse, InterNano.

More...

Regards,
Jeff Morse, Managing Director,
National Nanomanufacturing Network

Upcoming Events

May 3 - 7, 2009
Nanotech 2009 Conference & Expo

May 11, 2009
Frontiers of Characterization and Metrology for Nanoelectronics

May 12 - 14, 2009
RAPID

May 14, 2009
Confocal Microscopy

May 16 - 17, 2009
Nano Cement, Steel, & Construction Industries

May 18 - 21, 2009
INC5

Affiliated Centers

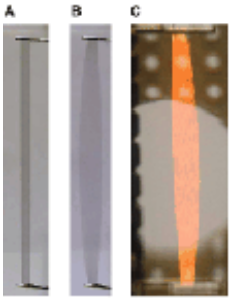
CHM
Center for Hierarchical Manufacturing
University of Massachusetts Amherst

Learn more about the NNN...

From Tubes to Ribbons: A Novel, Bulk Process

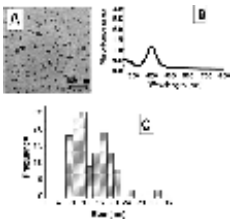
Take a carbon nanotube, split it down the middle and flatten it: what do you get? A graphene nanoribbon. While graphene itself is a material known for its strength and conductivity--as flat sheets of linked carbon--narrow ribbons of graphene can channel electrons length-wise, turning the the graphene into a semiconductor. James Tour and Dmitry Kosynkin from Rice University report a novel way to transform carbon nanotubes into nanoribbons. Their method, a room-temperature, chemical process, relies on sulfuric acid and potassium permanganate to effectively "unzip" the tubes. The process has been applied to single- and multi-walled carbon nanotubes, and allows for bulk production of ribbons. More...

Carbon Nanotube Sheets for Artificial Muscles



Approaches to mechanical actuation have continuously been investigated for a range of existing and future applications, most notably as artificial muscle. Recently, Aliev et. al. from Ray Baughman's group at the University of Texas-Dallas reported on their investigation of carbon nanotube aerogels exhibiting giant-stroke, superelastic properties. Their aerogel sheets exhibit behavior similar to low-modulus rubbers when stretched in sheet width direction by factors up to 300% thereby making this material an ideal candidate for large stroke actuation. More...

Nano Health Review: Toxicity Study of Silver Nanoparticles



Silver nanoparticles have been shown to exhibit antimicrobial activity, but their mechanisms of toxicity are unclear. A recent study by AshaRani, et al., proposes the mechanism of toxicity of starch coated silver nanoparticles in human lung and brain tumor cells is through disruption of the mitochondria, the main source of energy for the cell. Results indicate that an exposure to nanosilver may lead to a decrease in metabolism at the cellular level. However, further investigation is needed to determine if silver nanoparticles are safe for biological and medical applications. More...

Center for High-rate Nanomanufacturing

Center for Nanoscale Chemical-Electrical-Mechanical Manufacturing Systems

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Recently Published

From Our Affiliates

Multidimensional Separation of Chiral Amino Acid Mixtures in a Multilayered Three-Dimensional Hybrid Microfluidic/Nanofluidic Device
Analytical Chemistry 81(7):2715-2722

Bend, Buckle, and Fold: Mechanical Engineering with Nanomembranes
ACS Nano3(3):498-501

Multiplexed electrical sensor arrays in microfluidic networks
Sensors and Actuators B 136(2):350-358

Effect of Cross-Linking on the Diffusion of Water, Ions, and Small Molecules in Hydrogels
J Phys Chem B 113(11):3512-3520

Read more on InterNano

Functional DNA directed assembly of nanomaterials for biosensing
J Mater Chem 19(13):1788-1798

Directed Assembly of Polymer Blends Using Nanopatterned Templates
Advanced Materials 21(7):794-798

Antibody orientation enhanced by selective polymer-protein noncovalent interactions
Analytical and Bioanalytical Chemistry 393(5):1531-1538

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Supported by the National Science Foundation under Grant No. DMI-0531171.