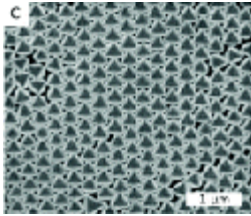




### The NNN Newsletter

#### Nanostructured Sensors for Homeland Security Applications



An important beneficiary of emerging nanomanufacturing techniques has been in the area of detection and sensing for homeland security and defense applications. Examples of sensor technologies directly benefiting from nanostructured

materials and processes include ultra-microelectrode arrays, which effectively increase the surface area of an electrochemical detection electrode by incorporation of three-dimensional (3D) nanostructures, or Surface Enhanced Raman Scattering (SERS), which detects biological or chemical species by analyzing the shift in SERS spectrum due to species adsorbing on 3D nanostructures over the detection surface. Other sensors utilize nanowires or nanotubes of specific materials that exhibit a change in resistance as a result of chemical or biological molecules adsorbing to the surface.

While the methods for applying these and other sensors remain application specific, issues associated with specificity, selectivity, sensitivity, and operating environment remain. As the understanding of sensor operations has improved, advances in nanofabrication techniques have rendered the design and fabrication of the sensor devices more precise. Combined with improved theoretical models for optimization and prediction of sensor performance, the ability to produce nanostructured sensors by design is rapidly advancing these technologies from laboratory science a few years ago, to manufacturing and deployment today.

[More...](#)

Regards,  
Jeff Morse, Managing Director,  
National Nanomanufacturing Network

Learn More about the 

#### Organic Electrophoretic Inks Utilizing Encapsulated-Dye Nanoparticles

Electrophoretic image display (EPID) technologies are

### Upcoming Events

November 30 - December 4, 2009

[2009 MRS Fall Meeting](#)

December 1 - 4, 2009

[PowerMEMS](#)

December 7 - 9, 2009

[3rd International Conference on One-dimensional Nanomaterials](#)

December 8 - 9, 2009

[Fuel Cells Durability and Performance](#)

December 18 - 19, 2009

[ICSCT 2009](#)

December 28 - 30, 2009

[ICMENS 2009](#)

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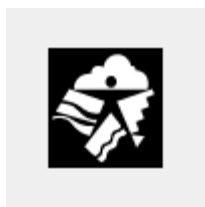


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generating significant promise for E-books, E-newspapers, and low-power portable display applications having high brightness, good contrast ratio, and reduced manufacturing costs. EPIDs use fluorescent nanoparticles to display images and text by means of charged particle motion in response to an applied voltage. To date, inorganic materials such as TiO<sub>2</sub>, ZnO<sub>2</sub>, ZrO, and Al<sub>2</sub>O<sub>3</sub> have been investigated for their enhanced optical and electronic properties resulting from the quantum confinement effects. In contrast, organic nanoparticles for electrophoretic inks have the advantages of being lighter weight and having higher mobility than inorganic particles, thereby improving the responsivity to electric field stimulus. While organic nanoparticles for colored inks would enable a lower-cost pathway to manufacturing, the issue remains to control the size and size distribution of the structures generated via batch processes. Oh and colleagues report a straightforward synthesis route for manufacturing colored electrophoretic inks with controlled size and surface charge density of the particles. [More....](#)

## NIEHS Call for Applications to Study ENM Interactions with Biological Processes



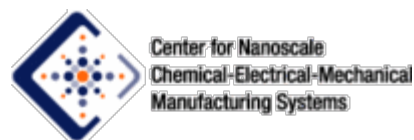
The National Institute of Environmental Health Sciences (NIEHS) announced a new funding opportunity to understand how physical and chemical characteristics of engineered nanomaterials (ENMs) influence their molecular interactions with biological matrices and elicit biological responses. Because the global demand for nanomaterials and nano-enabled devices is expected to reach \$1.3 trillion by 2015 and because the unique physical and chemical properties of ENMs make their interactions difficult to predict, there is a critical need to explore and characterize ENMs with regard to their impact on and interactions with biological matrices. [More....](#)

## NNN Welcomes Hyung Gyu Park, J. Alexander Liddle to Editorial Team

The National Nanomanufacturing

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and solutions  
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### Affiliated Centers



### Recently Published

From Our Affiliates

Locally Anisotropic Porous Materials from Polyethylene and Crystallizable Diluents  
[Macromolecules 42\(22\): 8827-8834](#)

Enhanced Resistance of DNA Nanostructures to Enzymatic Digestion  
[Chemical Communications 45:](#)



Network is pleased to add two new Contributing Editors to the InterNano editorial team. Hyng Gyu Park and J. Alexander Liddle

will bring their expertise to bear on our Fundamental Science and Advanced Processes + Tools categories, respectively. "We are very excited to have two high caliber scientists contributing to the editorial staff of Internano," said Jeff Morse, Managing Director of the National Nanomanufacturing Network. "The experience they bring in their respective fields of nanotechnology will significantly enhance our ability to provide new information and timely expert reviews to the InterNano community." [More...](#)

[Read more on](#) **InterNano**

[7036-7038](#)

Chromism and Molecular Weight of Polyaniline Derivatives  
[Synthetic Metals 159\(19-20\): 2153-2156](#)

Abasic Site-Containing DNAzyme and Aptamer for Label-Free Fluorescent Detection of Pb<sup>2+</sup> and Adenosine with High Sensitivity, Selectivity, and Tunable Dynamic Range  
[JACS 131\(42\): 15352-15357](#)

Mechanics of Hemispherical Electronics  
[Applied Physics Letters 95\(18\): 181912](#)



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