



Nanoscale Science & Engineering Forum

Advancing nanoscale science & engineering

American Institute of Chemical Engineers

4th Quarter 2006

Nanotech News

- Iron oxide nanoparticles were shown to be highly effective for arsenic adsorption and magnetic separation, suggesting a new, easy-to-implement water treatment technology.
<http://dx.doi.org/doi:10.1126/science.1131475>
- Iron, cobalt, and nickel nanoparticles are catalysts for single-walled carbon nanotube formation. A Japanese research team discovered that gold, silver, and other nanoparticles can also catalyze the formation of single-walled carbon nanotubes.
<http://dx.doi.org/doi:10.1021/nl061797g>
- Commercial advances in nanotechnology-enhanced paints and coating materials are described in the November issue of *Chemical Engineering Progress*.
http://www.aiche.org/uploadedFiles/CEP/Issues/2006-11/110606_Rev.pdf
- Chemical engineers at Johns Hopkins University have developed a technique to prepare micron-sized containers that self-assemble from photolithographically-derived 2-D shapes.
http://pubs3.acs.org/acs/journals/doi/lookup?in_doi=10.1021/ja063100z
- ASTM International Committee E56 on Nanotechnology has approved its first standard, E 2456, Terminology for Nanotechnology. NSEF worked in collaboration to develop this standard.
<http://www.aiche.org/uploadedFiles/Nano/ASTM%20E2456%20Press%20Release.doc>
- Daily nanotechnology-related new items are available from the Nano Science and Technology Institute (<http://www.nsti.org/news/>) and Nanowerk (<http://www.nanowerk.com/>).

Society News

Call for NSEF awards nominations

NSEF offers two awards -- the Forum Award and the Young Investigator Award. The Forum Award recognizes outstanding contributions in the advancement of nanoscale science and engineering in the field of chemical engineering through scholarship, education or service. The Young Investigator Award recognizes outstanding interdisciplinary research in nanoscience and nanotechnology by engineers or scientists in the early stages of their professional careers (within 10 years of completion of highest degree).

Follow the instructions on the AICHE Award Form to nominate a colleague (<http://www.aiche.org/Nano/index.aspx>). The original and 8 copies are required. You may send PDF files to: nano@aiche.org. Hard copies can be mailed to: Ms. June C. Wispelwey, AICHE, 3 Park Ave, 19th Floor, New York, NY 10016. **The deadline is April 30, 2007.**

New Officers

The new slate of officers was announced at the AICHE Annual Meeting. Please join us in thanking Dan Coy for all of his work in 2006.

The new officers are

Past Chair	Dan Coy	Nanophase Technologies
Chair	Nick Abbott	University of Wisconsin
1st Vice Chair	Bill Grieco	Alkermes
2nd Vice Chair	Michael Wong	Rice University
Secretary/Treasurer	Jong-in Hahn	Pennsylvania State University
Director of Marketing	Bert Diemer	DuPont

AICHE Meeting Events

Meeting Events

The 3rd SBE International Conference on Bioengineering and Nanotechnology will be held on August 12-15, 2007 in Biopolis, Singapore. The Call for Papers can be viewed at http://www.icbn2007.com/index.php?page=Call_For_Papers&linkid=16. Student travel awards are available.

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. Visit our website: <http://www.aiiche.org/DivisionsForums/ViewAll/NSEF.aspx>

Gold Level Sponsors

Hielscher USA, Inc.: Ultrasonic Dispersing, Deagglomeration and Milling Equipment Nanomaterials are currently on the way from lab to production. Very small powders and particles are available for materials, such as metal oxides, nanotubes or nanoclays. Often these materials need to be mixed into liquid formulations. This is where agglomeration and aggregation blocks surface area from contact with other matter. In particular very fine powders and carbon nanotubes are very cohesive and hard to disperse. As surface activity is a key aspect of nanomaterials, only well dispersed or single-dispersed particles allow utilization of the full potential of the nanomaterials. In result good dispersing reduces the quantity of nanomaterials needed to achieve the same effects. Conventional processing devices, e.g. high-shear or rotor-stator mixers, high-pressure homogenizers or colloid and disk mills fall short in separating the nanoparticles into discrete particles.

Ultrasonic cavitation is very effective in breaking agglomerates, aggregates and even primaries. When ultrasound is being used for the milling of high concentration batches, the liquid jets streams resulting from ultrasonic cavitation make the particles collide with each other at velocities of up to 1000km/h. This breaks van der Waals forces in agglomerates and even primary particles (milling).

Hielscher manufactures ultrasonic devices for the efficient dispersing, deagglomeration and milling of nanomaterials in lab, bench-top and production level. With devices from 50 to 16,000 watts you can select the appropriate device for quantities from 1mL to several tons/hour. There is more information available at: <http://hielscher.com/ultrasonics/nano.htm>



The advertisement banner for Nanophase Technologies features a top navigation bar with categories: COSMETICS, COATINGS, ANTI-MICROBIAL, ELECTRONICS, POLISHING, PERSONAL CARE, and CATALYSTS. Below this is a row of six small images illustrating these applications. The main text reads: "Driving Product Innovation. TODAY. TO DELIVER REAL INNOVATION, YOU NEED REAL TECHNOLOGY." It asks, "How do you reduce the time it takes to bring a real innovation to market?" and answers, "Ask the leader in nanomaterials technology. At Nanophase, our integrated family of complementary nanomaterial solutions can help you accelerate every step of your product development cycle—with proven, commercially-scaled technology." It also states, "Partnering with Nanophase Technologies means innovation in delivering real nanomaterial solutions that speed real products to market." The Nanophase logo is on the right, and the bottom of the banner contains the address: 1319 MARQUETTE DRIVE | ROMEOVILLE, IL 60446 | 630.771.6700 | www.nanophase.com

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