

Nanotechnology Still Moving At Fast Pace

A look at the growing interest in utilizing matter on a molecular level.



Nanotechnology is, at its most basic, the science of utilizing matter on a molecular level. When it comes to nanotechnology, there are several upcoming applications that move this emerging science beyond a laboratory and into the manufacturing environment. In addition to developing practical solutions to problems like energy management, top nanotechnology research and development companies are also dealing with the threat of foreign competition. Between China, the EPA and domestic R&D, it seems everyone is trying to get a piece of this molecular pie.

The Place For China

The latest Industry Report released by enabling MNT, a group of independent experts with extensive and wide-ranging industrial experience who advise micro- and nanotechnology organizations on product and business development, describes the threats and opportunities of the fast-growing Chinese micro/nanotechnology market.

According to the report, China's MEMS/Microsystems (MST) activities have seen a giant leap, and the country now counts over 600 nanotechnology companies, 1500 sensor manufacturers, 60 biochip companies, and 150 fabless design houses.

enablingMNT's assessment of the developments indicate that the Chinese MST/MEMS industry is firstly aiming at the semiconductors, automotive and telecommunications markets, but efforts to penetrate the medical, industrial and consumer markets are also evident. The analysis demonstrates that there are two strong drivers behind the Chinese MEMS industry, namely:

- Foreign companies starting joint ventures or subsidiaries.
- National and regional government investment.

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The major areas of interest to those investing companies are in two main areas: manufacturing equipment and components/sensor fabrication. In the latter group, tire pressure sensors are especially of interest, given the size of the automotive world market but also the Chinese domestic market.

Still, the report indicates that weaknesses in the supply chain will curb growth. Also, findings shows that politics do not really encourage the start-up of small and flexible technology-oriented companies in China, thus there remain interesting niches for foreign companies to exploit.

Who Is In Control?

Perhaps it's due to this fast pace that the EPA released a report in late spring on the need for regulatory oversight within this growth market. The report was released by EPA's Project on Emerging Nanotechnologies, a partnership between the Woodrow Wilson International Center for Scholars and The Pew Charitable Trusts and was entitled, "EPA and Nanotechnology: Oversight for the 21st Century."

Nanotechnology, which has been called "the next industrial revolution," could add billions of dollars to the U.S. economy, but that will not happen if it is shrouded in uncertainty about its environmental, health and safety consequences, stated David Rejeski, director of the Project on Emerging Nanotechnologies at the Wilson Center.

Among the more than 25 steps that the report recommends includes the creation of a joint research institute to conduct scientific research on nanotechnology effects; an additional \$50 million from Congress each year for research on the health and environmental effects of nanotechnology products and processes; and the elimination of constraints that limit the EPA's ability to require that companies collect and share necessary data and other information the agency needs to oversee nanotechnology.

Energy-Management

One interesting development in the field of nanotechnology comes in the form of a new product utilizing an interesting subfield called colloid science. A recent announcement from Magneco/Metrel, Inc., a leading developer and manufacturer of nanoparticulate refractory for the glass, aluminum, copper, ceramic, iron and steel industries, described potential energy-savings to be captured with the use of nanoparticulate refractory technology in furnace lining.

President of Magneco/Metrel, Charles Connors, Sr., explains: "Monolithic refractories offer several ways to save energy compared to traditional brick. The newer colloidal silica bonded monolithic refractories, such as Megneco/Metrel's Metpump line, offer further savings over those that are bonded with cement.

The idea here is that the energy savings will begin on the manufacturing level, as colloidal silica bonded refractories are produced without firing, drying, or other energy-intensive processes. The company also describes benefits in labor-saving. Connors explains, "the installation process takes fewer man-hours to complete—

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cutting downtime to weeks instead of months.”

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