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Editorial



Nanotechnology

Moves Toward Reality

The future is here — nanotechnology, once a blue-sky topic, is slowly becoming a reality. As Tim Harper, Cristina Román Vas and Paul Holister of Científica Ltd. note in our 16-page nanotechnology supplement (pp. 33S–48S), “Over the past year, it seems as though ‘nanotechnology’ has become a household term.”

Nanotechnology is in mainstream literature, such as books written by popular authors like Michael Crichton. It has even reached homes through the television set in ads run by Hewlett-Packard, which proclaim that “N is for nanotechnology.” The latter example is fitting, since a great deal of progress in nanotechnology has been made in the field of electronics.

According to BCC’s Mindy Rittner, the total world market for nanoparticulate materials is expected to exceed \$900 million in 2005, with electronic, magnetic and optoelectronic applications for nanoparticles accounting for 74.2% of the 2005 market (pp. 38S–42S). The other key areas of growth that Rittner identifies are biomedical, pharmaceutical and cosmetic applications (16.1%), and energy, catalytic and structural applications (9.8%). A great deal of activity has also taken place in the development of nanosensors. In Daniela L. Carillo’s article (pp. 43S–45S), she predicts that nanosized temperature sensors will generate revenues of \$4.6 million by 2004 in the chemical process industries, and then substantially increase to \$217.4 million/yr by 2011.

With such great potential, many countries have made substantial investments into nanotechnology R&D. Mihail Roco, senior advisor at the National Science Foundation, notes that the top three estimated government expenditures (in millions/yr) for 2003 are: Japan — \$800; U.S. — \$770 million; and Western Europe (European Union and Switzerland) — \$650 million. In the U.S., the National Nanotechnology Initiative (NNI), which coordinates the efforts of 17 U.S. government departments and independent agencies, requested \$849 million for the FY 2004 budget, up \$79 million from the current plan in FY 2003.

With all of these funds being dedicated to nanotechnology, it comes as no surprise that there are hundreds of companies that are focusing on nanotechnology R&D and commercialization. To help you get an idea of who is doing what, we have excerpted a table from Científica Ltd.’s “The Nanotechnology Opportunity Report, 2nd Ed.,” which contains an extensive list of who’s who in nanotechnology (pp. 46S–47S).

Chemical engineers will continue to play a vital role in the field of nanotechnology. Gretchen Holtzer, this month’s Profile subject (p. 80), is one young engineer who holds a great deal of promise in making major breakthroughs in nanotechnology. Recently bestowed the prestigious Perkin Scholarship, Holtzer, a PhD candidate at Pennsylvania State Univ., is focusing on research in nanoparticles.

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