

\$2 billion market in nanopore

July 15 2005

Sponges with pores only nanometers in diameter could help lead to advanced fuel cells in hydrogen-powered cars, as well as super-coolants to keep perishable drugs fresh and devices to clean out toxins in the body, experts told UPI's Nano World.

The current market for such nanoporous and microporous adsorbents is \$1.77 billion and is expected to rise to \$2.12 billion by 2012, noted technical market research firm Business Communications Company in Norwalk, Conn.

"The market for these nanoporous adsorbents will grow much more rapidly in dollar value than the microporous adsorbents," said Ravindra Deshpande, a market-research analyst in Harrisburg, Pa.

Adsorbents stick to any number of chemicals. They find use in everything from pet litter, where they soak up odors, to environmental remediation, where they help draw out toxins. The greater the surface area they have, the more molecules they can stick to. As the size of the pores on an adsorbent decreases, it offers more surface area per unit volume of the product.

"We have several thousand meters square per gram. Imagine five football fields in one gram of material," said Doug Smith, president of nanoporous adsorbent manufacturing company NanoPore in Albuquerque, N.M.

NanoPore has developed nanoporous adsorbents that soak up air and

thus act highly effectively as thermal insulation."We'll have nanoporous insulation winging up in the space shuttle," Smith said."People like Boeing and General Electric are our customers."

The real value of nanoporous adsorbents is how they enable whole new classes of products, Deshpande explained."One emerging technology is hydrogen storage for vehicles powered by hydrogen gas," he said."What these tanks have are adsorbents in them that hydrogen sticks to, so you could store more hydrogen per given unit weight.So nanoporous adsorbents are an enabling technology for some of the really major upcoming things."NanoPore has also developed a novel cooler that sucks out heat by evaporating water from nanoporous adsorbents."You get cooling on demand, seven times the cooling power of ice, with low weight and cost, for shipping drugs around, for instance," Smith said.

The biggest market for nanoporous adsorbents, Deshpande said, is in the petroleum and gas refining markets, where nanoporous adsorbents get metal stuck on them to become highly effective high surface area catalysts."Growth fields should include biological processing. There, they're an enabling technology that allow you to separate out complex fluids, to carry out complex catalytic reactions," he explained.

When it comes to fears of whether safety or environmental regulations might affect nanotechnology, "from the safety side, the big issues are whether nanosized particles can penetrate into the body. With our nanoporous adsorbents, the pores are very small but they're on objects you can see. So nobody's talking health effects there," Smith said.

"As far EPA rules, they'll help drive our business," he added."The more companies have to keep themselves clean, the more they'll use nanoporous adsorbents."

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Citation: \$2 billion market in nanopore (2005, July 15) retrieved 17 April 2024 from <https://phys.org/news/2005-07-billion-nanopore.html>

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