New 'frozen smoke' material: 1 ounce could carpet three football fields

EurekAlert

Scientists are reporting the development of a new, ultra-light form of "frozen smoke" — renowned as the world's lightest solid material — with amazing strength and an incredibly large surface area. The new so-called "multiwalled carbon nanotube (MCNT) aerogel" could be used in sensors to detect pollutants and toxic substances, chemical reactors, and electronics components. A report about the material appears in *ACS Nano*, a monthly journal.

Lei Zhai and colleagues explain that aerogels made from silicon dioxide (the main ingredient in sand) and other material already are used as thermal insulation in windows and buildings, tennis rackets, sponges to clean up oil spills, and other products. Aerogels are solid but so light that they have been compared to frozen smoke. However, only a few scientists have succeeded in making aerogels from carbon nanotubes, wisps of carbon so small that almost 50,000 would fit across the width of a human hair.

The report describes a process for making MCNT aerogels and tests to determine their properties. MCNT aerogels infused with a plastic material are flexible, for instance, like a spring that can be stretched thousands of times. If the nanotubes in a one-ounce cube were unraveled and placed side-to-side and end-to-end, they would carpet three football fields. The MCNT aerogels also are excellent conductors of electricity, making them ideal for sensing applications, such as sensing as little as 0.003527 ounce of a material resting in the palm of one hand, the report indicates.

SOURCE [1]

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