

Carbon nanotubes twice as strong as once thought

15 September 2010

Carbon nanotubes -- those tiny particles poised to revolutionize electronics, medicine, and other areas — are much bigger in the strength department than anyone ever thought, scientists are reporting.

New studies on the strength of these submicroscopic cylinders of carbon indicate that on an ounce-for-ounce basis they are at least 117 times stronger than steel and 30 times stronger than Kevlar, the material used in bulletproof vests and other products. The findings, which could expand commercial and industrial applications of nanotube materials, appear in the monthly journal [ACS Nano](#).

Stephen Cronin and colleagues point out that nanotubes — barely 1/50,000th the width of a human hair — have been renowned for exceptional strength, high electrical conductivity, and other properties. Nanotubes can stretch considerably like toffee before breaking. This makes them ideal for a variety of futuristic applications, even, if science fiction ever become reality, as cables in "space elevators" that lift objects from the Earth's surface into orbit.

To resolve uncertainties about the actual strength of nanotubes, the scientists applied immense tension to individual carbon nanotubes of different lengths and widths. They found that nanotubes could be stretched up to 14 percent of their normal length without breaking, or more than twice that of previous reports by others. The finding establishes "a new lower limit for the ultimate strength of carbon nanotubes," the article noted.

More information: "A New Lower Limit for the Ultimate Breaking Strain of Carbon Nanotubes", *ACS Nano*.

Provided by American Chemical Society

APA citation: Carbon nanotubes twice as strong as once thought (2010, September 15) retrieved 18 May 2021 from <https://phys.org/news/2010-09-carbon-nanotubes-strong-thought.html>

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