

09/10/2008

We believe: Rice professor is one for the books

Believe It or Not!

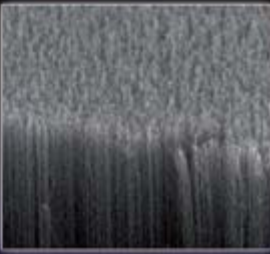
DARK DISCOVERY

Scientists at Rice University in Houston, Texas, and Rensselaer Polytechnic Institute in Troy, New York, have created a material so dark that it reflects only 0.045 percent of all light shined upon it, making it 100 times darker than the paint on a black car. The new material is made of sheets of carbon rolled into microscopic tubes just one atom thick.

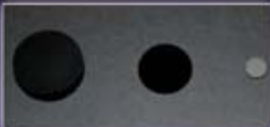
Researchers have spent years trying to create the ideal black material, which absorbs all the colors of light and reflects none of them. An alloy of nickel and phosphorus developed in London, England, in 2003, reflected 0.16 percent of light, but that was bettered in 2008 by the American team led by Dr. Pulickel Ajayan and Professor Shawn Lin.

Choosing carbon—one of nature's darkest materials—as their base, they built a "forest" of vertically aligned carbon nanotubes, hollow cylinders made entirely of carbon atoms. Each nanotube measured about one-hundredth of an inch long—and that was 300,000 times greater than its width! After a year of experimentation, they found that the complex setup reflected only a tiny fraction of light.


It is hoped that by absorbing nearly all light, the new material could be used in the collection and storage of solar energy. As it reflects very little, it could also help to improve optical instruments such as telescopes.



A slide shows the structure of the carbon-based creation to a magnification of 2,500.



The new dark material (center) compared with a National Institute of Standards and Technology reflectance standard (left) and a piece of glassy carbon (right).



Ripley's research

Astronomers believe that visible matter—such as stars, galaxies, gas, and dust—makes up only a small fraction of the mass of the universe and that the majority is made of stuff that we cannot see, or dark matter. Although it sounds mysterious, dark matter is simply the name given to anything that cannot be seen through an astronomer's telescope, because it does not emit or reflect enough light to be detectable. Instead, scientists can only estimate where it is by its effects on visible matter through gravity.

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Dr. Pulickel Ajayan (left) and fellow researcher Lijie Ci exhibit a piece of the dark material. The carbon substance absorbs more than 99.9 percent of light shined upon it.

That a Rice University professor took part in the creation of the darkest material ever is apparently a matter of belief.

Or not.

The dark material created by Rice professor Pulickel

Ajayan, left, with postdoctoral research associate Lijie Ci, is featured in a new anthology published by Ripley's Believe It or Not titled "Prepare to Be Shocked!" The discovery was announced earlier this year with co-investigator Shawn-Yu Lin, a physicist at Rensselaer Polytechnic Institute.

Billed as a yearbook for "the weird, the beautiful, the disgusting, the macabre and the amazing," the book also features a man who can cook a fish in his hands, a wheelchair-bound man who can walk after immersing himself in deep water and a restaurant that offers gilt chocolate topped with edible gold dust.

"Believe it or not, I never thought of being in such company," said Ajayan, whose discovery has also been accepted as a Guinness World Record as the darkest material ever.

The material consists of a thin carpet of nanotubes that reflects only 0.045 percent of the light that strikes it and may find uses in solar power applications, telescopes and special coatings.

Ajayan said the team has yet to come up with anything darker, but the study is not complete. "We are extending this to other wavelengths, outside the visible range that was reported earlier," he said.