



ADVERTISEMENT

BBC AMERICA SHOP
 BBC America Shop delivers right to your door.



UK version **International version** | [About the versions](#)

[Low graphics](#) | [Accessibility help](#)



WATCH One-Minute World News

News services
 Your news when you want it



News Front Page



[Africa](#)

[Americas](#)

[Asia-Pacific](#)

[Europe](#)

[Middle East](#)

[South Asia](#)

[UK](#)

[Business](#)

[Health](#)

[Science/Nature](#)

[Technology](#)

[Entertainment](#)

[Also in the news](#)

[Video and Audio](#)

[Have Your Say](#)

[In Pictures](#)

[Country Profiles](#)

[Special Reports](#)

RELATED BBC SITES

[SPORT](#)

[WEATHER](#)

[ON THIS DAY](#)

[EDITORS' BLOG](#)

Last Updated: Wednesday, 16 January 2008, 17:56 GMT

[E-mail this to a friend](#)

[Printable version](#)

'Darkest ever' material created

By **Helen Briggs**
 BBC News science reporter

The "darkest ever" substance known to science has been made in a US laboratory.

The material was created from carbon nanotubes - sheets of carbon just one atom thick rolled up into cylinders.

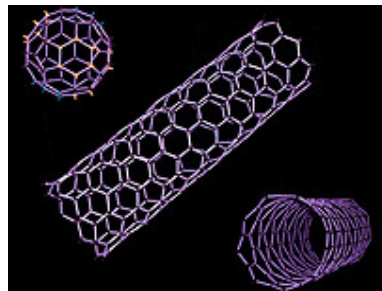
Researchers say it is the closest thing yet to the ideal black material, which absorbs light perfectly at all angles and over all wavelengths.

The discovery is expected to have applications in the fields of electronics and solar energy.

Theoretical clues

An ideal black object absorbs all the colours of light and reflects none of them. In theory, it should be possible to make something that approaches the "perfect absorber".

But it has proved difficult to construct an object that does not reflect light at all.



Carbon nanotubes are a basic building block of nanotechnology

“ They've made the blackest material known to science ”

Researchers at Rensselaer Polytechnic Institute in Troy, New York, turned to carbon nanotubes - structures made from carbon, billionths of a metre across, that have unique properties.

Theory suggests that nanotubes might make a super black object, and experts are just starting to test these predictions.

[Click here to see a nanotech future](#)

NANOTECHNOLOGY'S FUTURE

LATEST NEWS



Nanotech review
 The UK government responds to a report into nanotech with another review.

- [Toxic warnings for nano industry](#)
- ['Tighter control' for tiny science](#)
- [Prince warns of science 'risks'](#)
- [Nanotech guru turns back on 'goo'](#)
- [Tiny science lost on UK public](#)
- [Tiny particles 'threaten brain'](#)
- [Sainsbury cools 'nano-nonsense'](#)
- [Nanotech under the microscope](#)

BACKGROUND

- [Myths and realities of nanotech](#)
- [OPEN](#) [Guide to nanotech future](#)
- [OPEN](#) [Nanotech in our lives](#)

RELATED BBC LINKS

[The Science of Small Things](#)

RELATED INTERNET LINKS

[Nano Letters](#)
 The BBC is not responsible for the content of external internet sites

TOP SCIENCE/NATURE STORIES

- [Synthetic life 'advance' reported](#)
- [Massive wind farm 'turned down'](#)
- [Boost for Africa's depleted soils](#)
- [News feeds](#)

MOST POPULAR STORIES NOW

[MOST E-MAILED](#) [MOST READ](#)

- [Germany's 'last' WWI veteran dies](#)
- [Police search rogue trader's flat](#)
- [Egyptians retreat from Gaza fence](#)
- [Honour sought for 'Soldier Bear'](#)
- [Musharraf issues warning to West](#)

[Most popular now, in detail](#)

A team led by Dr Pulickel Ajayan, who is presently at Rice University in Houston, Texas, built an array of vertically aligned, low-density carbon nanotubes. Dr Shawn Lin measured the optical properties.

The roughness of the material's surface was tuned to minimise its optical reflectance.

Experiments showed that this "forest" of carbon nanotubes was very good at absorbing light, and very poor at reflecting it.

Reporting their findings in the journal Nano Letters, Dr Ajayan, Dr Lin and colleagues say the reflectance of the material is three times lower than previously achieved.

This makes it the "darkest man-made material ever".

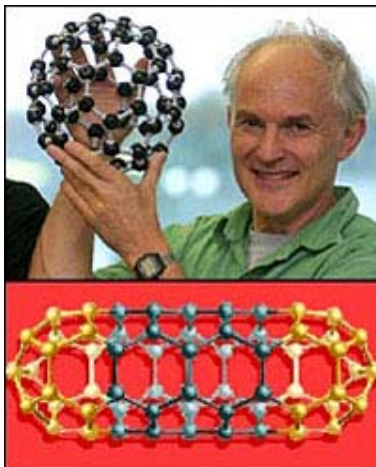
"The periodic nanotube structures make an ideal candidate for creating superdark materials, because it allows one to tailor light absorption by controlling the dimensions and periodicities of nanotubes in the structure," said Dr Ajayan.

Commenting on the study, Professor Sir John Pendry, who first predicted that such a discovery might be possible, said the results were promising.

"They've made the blackest material known to science," the theoretical physicist from Imperial College, London, told BBC News.

"The application will be to things like more efficient solar cells, more efficient solar panels and any application where you need to harvest light," he added.

BUCKYBALLS AND NANOTUBES



Closed cages of carbon atoms
Appear as spheres and tubes
Electrical properties tuneable
Could form tiny circuit wires
Tubes make strong materials
Buckyballs will block HIV virus

SOME POTENTIAL USES OF NANOTECHNOLOGIES



- 1 - Organic Light Emitting Diodes (OLEDs) for displays
- 2 - Photovoltaic film that converts light into electricity

- 3 - Scratch-proof coated windows that clean themselves with UV
- 4 - Fabrics coated to resist stains and control temperature
- 5 - Intelligent clothing measures pulse and respiration
- 6 - Bucky-tubeframe is light but very strong
- 7 - Hip-joint made from biocompatible materials
- 8 - Nano-particle paint to prevent corrosion
- 9 - Thermo-chromic glass to regulate light
- 10 - Magnetic layers for compact data memory
- 11 - Carbon nanotube fuel cells to power electronics and vehicles
- 12 - Nano-engineered cochlear implant

[Click here to return](#)

 [E-mail this to a friend](#)

 [Printable version](#)

Bookmark with:

[What are these?](#)

[Delicious](#)

[Digg](#)

[reddit](#)

[Facebook](#)

[StumbleUpon](#)

FEATURES, VIEWS, ANALYSIS



Ethnic strife

People flee brutal gang violence in Kenyan town of Nakuru



Race and gender

Identity politics infuse the Clinton-Obama clash in South Carolina



On the mend

Indonesians wonder if Suharto's 'recovery' is a feat or a fraud

PRODUCTS & SERVICES

[E-mail news](#)

[Mobiles](#)

[Alerts](#)

[News feeds](#)

[Podcasts](#)

MMVIII

Most Popular Now | The most e-mailed story right now is: Honour sought for 'Soldier Bear'

[Back to top](#) ^^

[Help](#) | [Privacy and cookies policy](#) | [News sources](#) | [About the BBC](#) | [Contact us](#) | [Advertise with us](#)