

10 DISCOVERIES THAT WILL SHAPE THE FUTURE



An 'invisibility' device could have useful applications in surgery

Invisibility cloak

EVER WANTED TO disappear? A team at the University of Rochester has created an 'invisibility cloak' using a simple system of lenses and mirrors. **The technology could be used to help**

surgeons see through their hands while performing operations, they say. The system directs light around a 'doughnut-shaped' area that appears to be invisible when viewed through a lens.



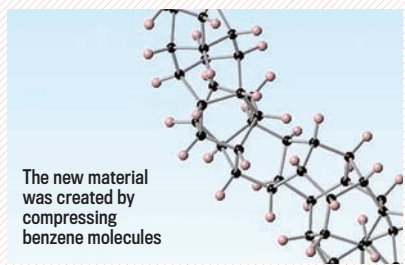
Can peanuts be made safe for those with allergies?

Allergen-free nuts

PEANUTS: FOR SOME they're a tasty snack to be enjoyed with a pint of beer, but for others one nibble can mean swollen lips, nausea or, in severe cases, death. Now, a team at the University of Florida has succeeded in removing 80 per cent of the harmful allergens from whole nuts, **potentially helping in the creation of allergen-free foods.** The allergen proteins were modified using concentrated bursts of light from xenon lamps, making them undetectable to human antibodies.

7 Diamond weaver

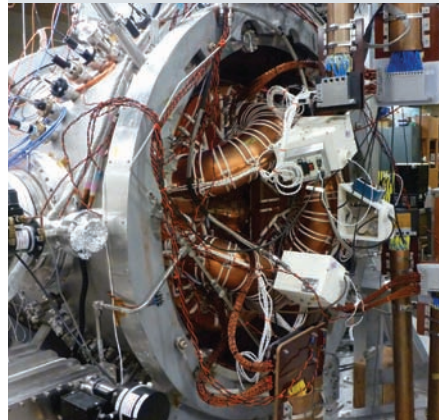
RESEARCHERS HAVE DEVELOPED ultra-thin threads that could be the strongest material yet. A team at Penn State University compressed benzene under high pressure to create a pyramid-structured, diamond-cored thread. It could be used wherever a strong, light substance is needed and **could perhaps even make building a space elevator possible,** they say.



The new material was created by compressing benzene molecules

9 Efficient fusion concept

IT'S AN ENVIRONMENTALIST'S dream: a fuel with no greenhouse emissions or harmful waste. Now, engineers at the University of Washington have **designed a concept for a fusion reactor that could be cheaper to run than fossil fuel plants.** Fusion reactors force atoms together to create energy as opposed to splitting them like current fission reactors. The new design is cheaper to build than other current designs as it requires no large, expensive superconductors.



This fusion experiment is one-tenth the size of the University of Washington's concept reactor

6 Day-glo dressings

A NEW SMART bandage developed at Harvard Medical School can measure the oxygenation of the tissue it covers. Oxygenation is a key indicator of the health of body tissue, and the bandage uses phosphorescent molecules that glow more brightly as oxygen concentration is reduced. **Eventually, the technology could be used for 'on-demand' drug administration.**



The new bandage would need to be removed less often

5 Electricity-generating material

RESEARCHERS AT COLUMBIA University in New York have created a piezoelectric material just one atom thick. Piezoelectrics generate a charge when subjected to pressure. Using a material called molybdenum disulphide, the team created a very thin material that generates charge when stretched. **It could be used in everything from transistors to tiny, self-powered machines.**



A new piezoelectric material is just one atom thick

3 Solar cell/battery combo

OHIO STATE UNIVERSITY scientists have combined a solar cell and energy storage into a single hybrid device **that's more efficient than separate solar cells and batteries.** A solar panel allows light and air to enter the cell. Inside, photons from the light and oxygen enable electrons to move between the panel and the electrode.

2 Tractor beam

IN THE LATEST sci-fi trope turned reality, physicists at the Australian National University have created a working laser tractor beam. The device works by heating up specific areas of the target particle. These in turn heat up

4



Future Mars landers could mimic the motion of sidewinder snakes

Snake robot

ROBOTICISTS AT CARNEGIE Mellon have figured out how the sidewinder rattlesnake is able to slither so deftly up steep sand dunes. It moves by creating waves down its body both horizontally and vertically. By manipulating the

vertical motion, the snake is able to alter the amount of its body that's in contact with the sand, providing extra grip where needed. **The discovery could lead to more effective search and rescue robots or even more advanced Mars rovers.**

1 Nanoparts for future computers

PHYSICISTS HAVE CREATED intricate 3D nanoparticles using DNA as a mould. They planted tiny gold 'seeds' inside a mould and then stimulated them to grow. The gold took on the shape of the mould in the same manner as the cube-shaped watermelons grown in boxes by Japanese farmers. **The technique could be used to create finely detailed parts for electronics.**



In future, computer components may be moulded using DNA