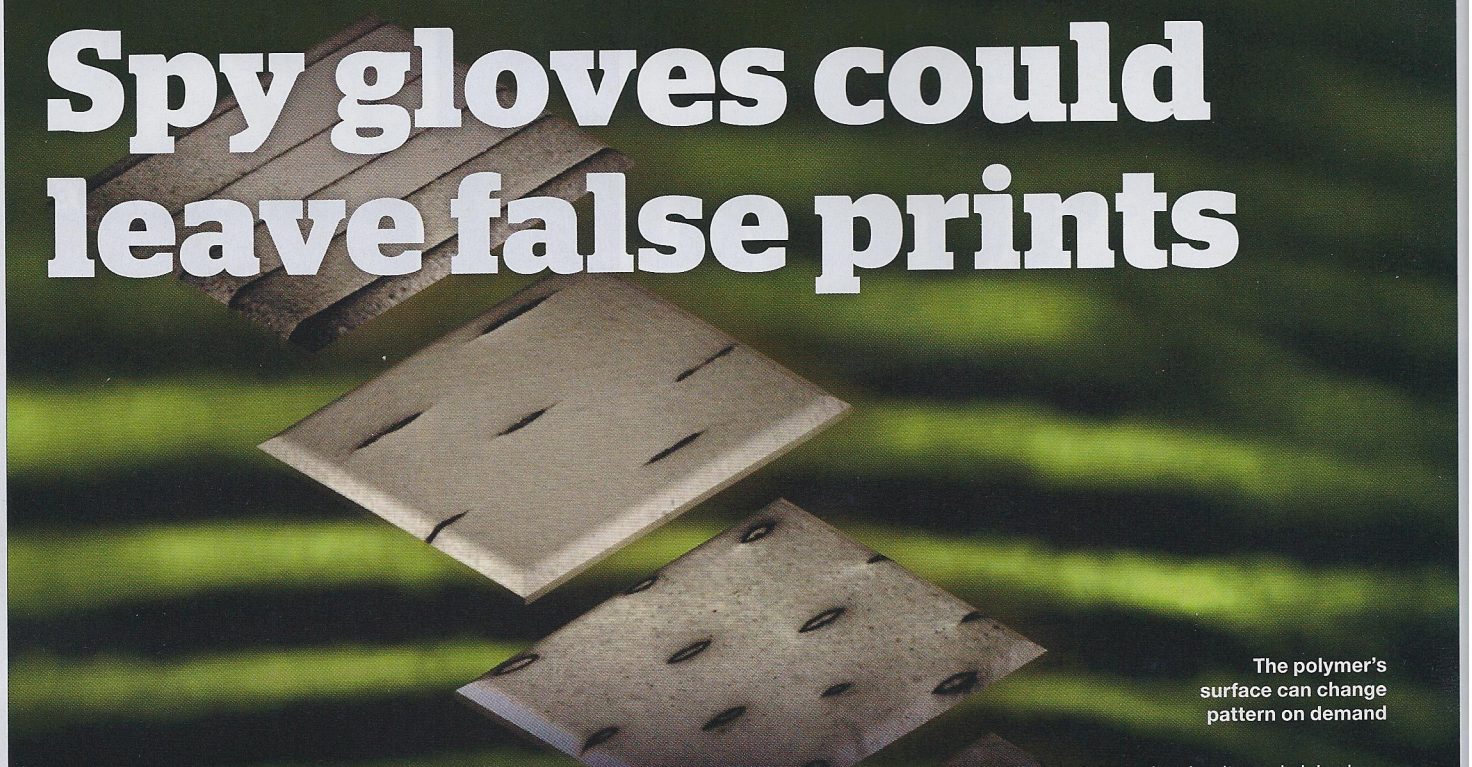
Spy gloves could leave false prints



The polymer's surface can change pattern on demand

Rubber gloves that can produce intricate, fingerprint-like surface patterns at the flick of a switch might sound like something Q would give to James Bond, but they could soon be a reality. Engineers in the US have created a polymer that can change its surface texture on demand, before changing back again.

As well as hypothetical 'spy gloves', the material could be used in everything from shoe soles to medical implants. "There are many instances where you'd want to be able to change a surface from one that is rough to slippery and back again," says Xuanhe Zhao, Assistant Professor of Mechanical Engineering and Materials Science at Duke University.

The shape-shifting happens when a voltage is applied to the polymer, and engineers have managed to create surface patterns. "The patterns we have created in the lab include circles and straight and curved lines, which are the basic elements of fingerprints," says Zhao.

The material was constructed by bonding a polymer layer that deforms onto a more rigid one. This stiff surface was coated with a metal layer that acts as an electrode. The flexible polymer was also coated with an electrode that can deform, leaving it sandwiched between two electrodes.

When a voltage was applied between them, an electric field developed in the polymer and it began to fold in on itself, forming surface features such as ridges and creases. Pre-stretching the polymer before the voltage is switched on enables these features to be aligned in a particular direction. When the voltage is switched off, the pattern disappears.

Another application could be medical implants that release a drug when the polymer's surface changes.

XUANHE ZHAO, JI-KAI LIU

Killer mushroom is bang to rights

The mushroom now known to be the cause of some mysterious deaths in southwest China appears to have an unusual way of killing its victims: causing a dramatic drop in blood sugar.

More than 400 people had died from 'Yunnan sudden death syndrome', some reportedly mid-sentence. In 2010 these deaths were linked to a small white mushroom, *Trogia venenata*, pictured, which had been consumed by the victims. Now, chemists at the Chinese Academy of Sciences have identified three toxic substances in the fungus – two amino acids, plus a known toxin called ϒ-guanidinobutyric acid. The toxins only have a mild effect on the heart, but one possibility is that the amino acids could reduce the body's ability to produce the energy-containing chemicals ATP and glucose. Mice given a mushroom extract suddenly develop a low blood sugar level.

The detective work continues. "Next, we will collect more mushrooms and pay attention to some of the smaller peptides that we haven't focused on before," says research leader Dr Ji-Kai Liu.

LOOK BACK

75 YEARS AGO
Joseph-Armand Bombardier is granted a patent for a vehicle with a caterpillar track on the back and steerable skis on the front – today called a snowmobile.

20 YEARS AGO
The first baboon-to-human liver transplant is carried out at the University of Pittsburgh Medical Center.