

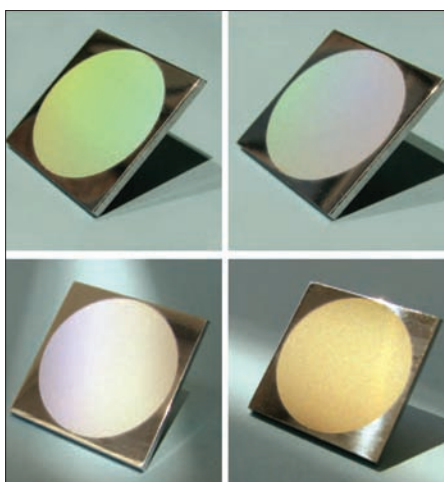
Femtosecond lasers turn the colour of aluminium to gold

The old alchemist's dream of turning base metals into gold is still just a dream, but a new technology allows metals to take on different colours without any need for a coating of any kind. AY Vorobyev and Chunlei Guo of the Institute of Optics at the University of Rochester in New York have shown that femtosecond laser pulses can produce nanostructures that make aluminium appear gold, black, or grey, irrespective of the viewing angle.

Other colours can be made, but with some dependence on the angle from which the surface is viewed. It is a low-cost procedure and could find a range of applications.

Further reading

AY Vorobyev and C Guo 2008 *Applied Physics Letters* **92** 041914.



The same 25x25 mm piece of aluminium exhibits different colours depending on the viewing angle.

Researchers create self-healing rubber

It may sound like something out of science fiction, but Philippe Cordier and colleagues at the Ecole Supérieure de Physique et Chimie Industrielles in Paris have made a new sort of rubber that can mend itself after being torn.

The idea is to have the cross linking done with hydrogen bonds and not, as is usually the case, with covalent bonds. If the rubber tears, the new ends have active hydrogen bonds, which will re-attach if the new surfaces are simply just pressed together.

This self-reparation takes place without glueing or heating, and is a genuinely novel evolution in making self-healing materials.

Further reading

P Cordier et al. 2008 *Nature* **451** 977.

The stability of sandcastles

Sandcastles are remarkably stable despite changes in the water content of the wet sand that they comprise, but it is only now that there is some solid understanding of why this is so. M Scheel of the Max Planck Institute for Dynamics and Self Organization in Göttingen, and colleagues, took X-ray cross sections of piles of wet glass beads with varying amounts of liquid contained within.

As more water is added, the capillary forces that hold moist beads together weaken but at the same time reach more surfaces, so that the two effects counterbalance each other over a large range of wetnesses.

Consequently, this makes the stiffness of



Properties of sand help sandcastles to stay up. (Courtesy Yory Frenklakh/Dreamstime.com.)

wet sand largely independent of the amount of water that is present.

Further reading

M Scheel et al. 2008 *Nature Materials* **7** 189.

Dynamism for 3D holograms

A new, updatable holographic display may open the window to new applications of 3D imaging. Savaş Tay of the University of Arizona, and colleagues have developed a photorefractive polymer that

can be written and updated in minutes with a hologram and used to produce a 10x10 cm 3D image – the largest photorefractive display ever made. It can be viewed for hours without refreshing and is completely erasable and rewritable with the appropriate lasers.

Further reading:

S Tay et al. 2008 *Nature* **451** 694.

Languages do not evolve smoothly

Researchers in the UK have found evidence that languages evolve in fits and bursts rather than smoothly over time. Quentin Atkinson of the University of Reading and colleagues have constructed evolutionary linguistic trees of Bantu, Indo-European and Austronesian languages, with the lengths of branches representing lexical divergence (the number of different words) and nodes representing splits where new language formed.

The study tested the hypothesis that if lexical divergence evolved smoothly, unaffected by the appearance of new languages, then the lengths of branches would be unaffected by the presence of nodes. However, this does not seem to be the case, because the team found that each split triggers a burst of change, and that such changes account for between a tenth and a third of all differences between languages.

Such large jumps might be attributed to idiosyncrasies of the members of groups that start off a new language or to a wish for a group speaking a new language to distinguish itself sharply from another group.

Further reading

Q D Atkinson et al. 2008 *Science* **319** 588.