

Beetles go red with switchable reflector

Many animals, such as squid and chameleons, alter their colours by changing the size of pigment-carrying cells, but the Panamanian golden tortoise beetle *Charidotella egregia* has a completely novel way of going from metallic gold to matt red. Jean Pol Vigneron and colleagues from the University of Namur in Belgium have found that the beetle has a layered shell, and that each layer reflects a different colour and bears patches of nanoscale grooves.

This particular beetle normally has body fluid between these layers, filling the grooves and giving rise to mirror-like reflections that result in the insect's metallic gold appearance. When the fluid is withdrawn, the mirror-like effect disappears and the layers act as windows, displaying the red pigment below. This is an entirely novel mechanism for the control of colour and has the potential to give rise to innovative new display technologies.



An adult tortoise beetle switches from gold (top) to red (bottom). The minimum time for this conversion is typically 1.5 minutes.

Further reading

Jean Pol Vigneron et al. 2007 *Phys. Rev. E* **76** 031907.

Wave-power pumps could reduce global warming

With evidence mounting that we seem to have changed carbon dioxide levels on the planet for the worse, is there anything we can do to fix the situation? James Lovelock of Oxford University (and father of the Gaia model of the Earth) and Chris Rapley of the Science Museum in London have suggested a radical approach to planetary medicine.

They suggest putting pipes, some 100–200 m in length and 10 m in diameter, with one-way flap valves onto the ocean floor. These would use wave power to pump nutrient-rich deep water to the surface,

boosting the growth of algae, which would then reduce carbon dioxide levels and also produce dimethyl sulphide. This substance contributes to the nucleation that produces clouds, which reflect sunlight. The net effect should be a cooler planet. Of course there would be other impacts of such a plan, but perhaps it makes sense to, as Lovelock and Rapley put it, “help the planet heal itself”.

Further reading

James E Lovelock and Chris G Rapley 2007 *Nature* **449** 403.

Rising radiation levels did not kill the dinosaurs

Surprisingly enough, scientists have found that they can test the hypothesis that some rise in radiation level was related to the demise of the dinosaurs by looking for fossil evidence of a rise in cancer. LC Natarajan and colleagues at the University of Kansas found one example of metastatic bone cancer in a sample of 708 dinosaurs. Based on this result, and comparisons with estimated cancer rates in modern vertebrates, the team concluded that elevated levels of ionizing radiation did not play a significant role in the Cretaceous–Tertiary extinction event 65 million years ago.

Further reading

LC Natarajan et al. 2007 <http://arxiv.org/abs/0704.1912>.

Paper becomes a supercapacitor and power source

Novel power sources could be built from thin sheets of a material that is little more than paper. Robert Linhardt and colleagues of Rensselaer Polytechnic Institute in Troy, New Jersey, have discovered that cellulose dissolved in an ionic liquid and poured over carbon nanotubes could dry to form a thin paper layer with a backing layer made from carbon nanotubes.

Folding the paper over forms a supercapacitor, while adding a coating of lithium oxide makes it into a battery. These functions can be combined to make a supercapacitor charged by a battery, with both components based on the same technology. This could ultimately be useful for electrically powered vehicles, which need large bursts of power that a capacitor could provide more easily than a battery alone.

Further reading

Victor L Pushparaj et al. 2007 *Proc. Nat. Acad. Sci.* **104** 13574.