

Chemical Technology

'Pincer' ligands



Greener catalyst production could follow from the development of unusually stable compounds containing uranium or early transition metals locked in a pincer-like grip.

Sue Askey

D Pugh *et al*
Dalton Trans., 2006 (DOI: 10.1039/b512133g)

Plastic chips



Chemists in the US are working towards using cheaper plastic chips rather than the more traditional glass for analysis of potential drug candidates.

Sophia Anderton

A Piruska *et al*
Lab Chip, 2005, **5**, 1348

Airborne mould

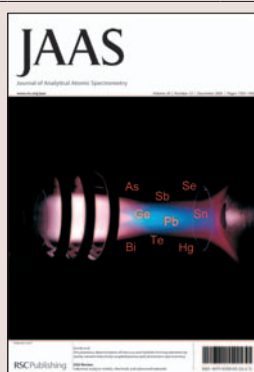


Researchers in Sweden have developed a highly specific polymerase chain reaction (PCR)-based system to measure a common airborne mould in environmental samples.

Rebecca Lavender

Q-Y Zeng *et al*
J. Environ. Monit., 2006 (DOI:10.1039/b509515h)

Analysis on a nanoscale



Nanoscale analysis to assess elemental composition in biological samples and gels has been carried out by analysts in Germany.

Robin Forder

J Sabine Becker *et al*, *J. Anal. At. Spectrom.*, 2005
(DOI: 10.1039/b514401a)

Application highlights

A lab-in-a-pill diagnostic device for remotely monitoring processes in vivo A gutsy approach

UK researchers have demonstrated a lab-in-a-pill diagnostic device for remotely monitoring temperature and pH in the guts of living animals.

Jon Cooper and colleagues at the Departments of Electronic and Electrical Engineering and the Faculty of Veterinary Medicine, University of Glasgow, have made devices that use wireless communication systems to transmit diagnostic data throughout a journey along the alimentary canal.

The gut is difficult to examine when it is inside a living creature. Doctors and vets have a wealth of techniques at their disposal, but each has its own limitations, so novel alternatives are needed.

Cooper's team demonstrated wireless tracking of their new device inside a pig's gut. The pill was fitted with a magnet that allowed its location to be pinpointed to within a centimetre. External



sensors recorded the temperature and pH as the device passed through the alimentary canal. The researchers say that data collected compared very favourably with literature reports.

The aim of this research is for

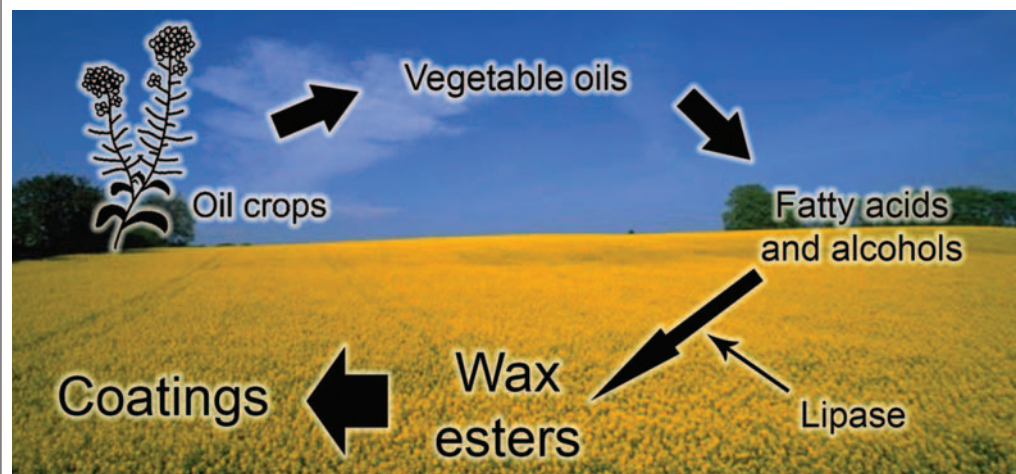
The researchers plan to develop a device that works as a patient continues with normal daily life

a human patient to continue with normal daily life while such a diagnostic pill does its work.
Niamh O'Connor

Reference

E A Johannessen et al, *Lab Chip*, 2006 (DOI: 10.1039/b507312j)

Solvent free, energy efficient, high yield transformation of oil into wax coatings Enzymatic synthesis of wood coatings



Researchers in Sweden have developed a solvent free, energy efficient and high yielding biotechnological method to transform rapeseed oil into a wax coating suitable for wooden surfaces.

Anna Petersson and colleagues

from the departments of technology and society, and biotechnology, Lund University, used rapeseed oil as a natural source of long-chain carboxylic acids and alcohols. They have developed a method to convert these acids and alcohols into their corresponding esters (wax esters).

Lipase converts acids and alcohols from rapeseed oil to the corresponding esters

This key reaction is catalysed by the environmentally benign enzyme lipase. The enzymatic process uses 34 per cent less energy and generates less waste than a standard chemical esterification reaction using a strong acid catalyst.

The wax esters make attractive starting materials for wood coatings, because they are non-hazardous and biodegrade well. Wood coatings made from these wax esters are resistant to water and partially resistant to fat stains, industrial tests showed.

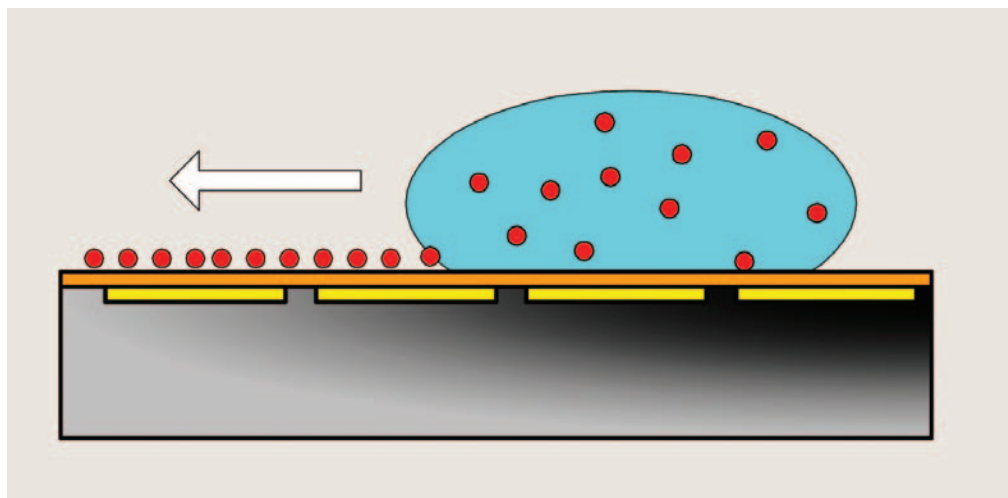
Further research will take this process to an industrial scale. Petersson said, 'in the longer term, demonstrating profitable industrial applications are important for motivating continued research efforts in this area'.
Nina Athey-Pollard

Reference

A E V Petersson et al, *Green Chem.*, 2005, 7, 837

Sample collection method for use with lab-on-a-chip analysis system

Microparticle sampling of biohazards



An important step towards portable sensors for airborne bacteria and toxic chemicals has been taken by US researchers.

Yuejun Zhao and Sung Kwon Cho of the Department of Mechanical Engineering, University of Pittsburgh, have devised a new method for sample collection which can be used with lab-on-a-chip

Collection system could improve the performance of sample processing

Reference

Y Zhao and S K Cho, *Lab Chip*, 2006 (DOI: 10.1039/b511645g)

analysis systems.

Lab-on-a-chip devices are capable of directly measuring airborne particles. These systems are portable, use extremely small amounts of sample and reagents, and can provide fast, automated analysis, with excellent sensitivity and selectivity. Current particle samplers use large volumes of liquid

and require numerous manual handling steps, and are impractical for use with automated, small volume lab-on-a-chip devices.

Measurement of particles in the air is highly important from both public health and national security perspectives. Such biological particles can cause a wide variety of respiratory diseases and other adverse health effects. Recently, there has also been increased concern about the use of biological warfare agents such as anthrax in terrorist attacks. Conventional methods for monitoring airborne bacteria are prone to error and involve complex, time consuming processes that must be carried out by skilled technicians.

Zhao and Cho say their method will eliminate manual handling of particle collection media and so improve the performance of sample processing. They hope that the new technique will enable a fully automated portable monitoring system for airborne microorganisms.
Christopher Ingle

Developing better blue LEDs – a step towards a flatter future for technology

Aluminium complexes for blue emission

Francesco Lelj, Mauro Ghedini and colleagues at the Università della Basilicata and Università della Calabria, Italy have perfected the recipe for better small-molecule aluminium complexes which emit light in the blue region of the spectrum.

The promise of using Organic Light Emitting Diodes, OLEDs, for flat full-colour displays has led researchers to design better small molecules whose luminescence can be tuned. Of the three primary colours (blue, green and red), blue is the hardest colour of emission to achieve but all are vital in the development of organic flat screens.

Some progress has been achieved by moving from using aluminium compounds with ligands based

Blue is the hardest colour emission to achieve of the three primary colours

Reference

M La Deda *et al*, *Dalton Trans*, 2005 (DOI: 10.1039/b510463g)



on quinoline alone to those that also contain phenol derivatives. However the reasons why these

new complexes are stable and efficient blue emitters have been unclear up to now. Lelj and Ghedini have used the combined tools of theory and spectroscopy to study all the possible contributing factors.

It was thought that changing the substituents and changing the electronic profile of the quinolate ligand attached to the aluminium would allow tuning of the colour of light. However this group have shown that far greater effect is due to crystal packing of the complex in the solid phase as this increases the intensity of emission within the blue region of the spectrum.

Blue OLED fabrication has now been demystified and better flat displays are one step closer.
Suzanne J Abbott

Essential elements

Do you DOI?

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A DOI is a unique tag, consisting of a sequence of numbers and letters, assigned

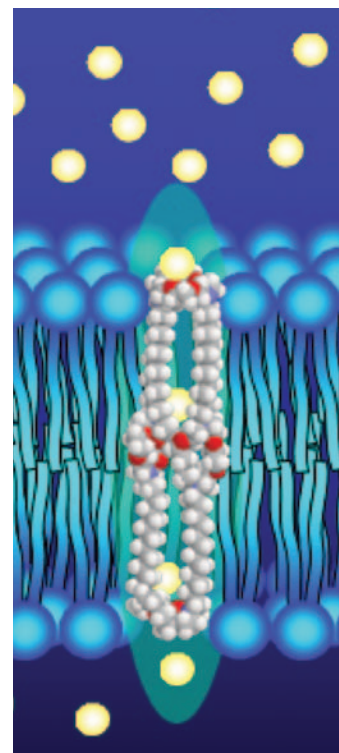
by the publisher to a unit of work, most commonly a journal article. This identifies the work and can link directly to the article on the publisher's web page. Documents can then be retrieved (depending on access permissions) or bought online, and ultimately cited. This elegant system, established by scholarly publishers, enables researchers to navigate electronically throughout the web and gain access to publications with just a couple of clicks. Among the main advantages of the system is that it allows citation of an Advance Article before the full citation is

available. In addition the DOI is a persistent link, unlike a URL which may change over the years. Examples of the DOI in use can be seen at the top of articles published in RSC journals.

The potential benefits are huge. At a time when information retrieval is becoming more digitised, an international standard is essential. This new system provides a citation backbone to electronic publishing and will be indispensable for the publishing community and beyond.

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Chemistry World reporter wins award

Chemistry World science correspondent Katharine Sanderson has been named New Business Features Journalist of the Year by the UK's Periodical Publishers Association's Periodicals Training Council.

The award, made to new journalists with no more than three years' experience, was based on three feature articles written during 2005. Sanderson's features were praised by judges for turning a subject they found 'impenetrable' into pieces that were 'readable, interesting and absorbing.'

Sanderson welcomed the recognition of chemistry alongside topics covered by other publications highlighted



by the awards, which included *The Guardian*. 'So chemistry isn't so impenetrable after all,' she said.

Sanderson was selected from hundreds of new journalists whittled down to a shortlist of 10. The topics she covered included the chemistry of cooking, with multi-Michelin-starred

Heston Blumenthal (May); the international diplomatic role of Britain's science attachés (February); and one-time chemist Gordon Moore, along with his eponymous law that has driven the electronics industry for 40 years (July).

To read the articles, visit www.rsc.org/chemistryworld

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