

Chemical Technology

Art restoration the nano way



Italian chemists recommend using nanoparticles of inorganic carbonates and hydroxides to restore works of art. The tiny crystals can penetrate the pores of paintings better than commercial compounds.

P Baglioni and R Giorgi
Soft Matter, 2006, **2**, 293

Clean energy in a crystalline form



Lithium batteries could have electrolytes made from a combination of the polymeric equivalents of crown ethers and ionic compounds, according to Peter Bruce of the University of St Andrews, UK.

P G Bruce
Dalton Trans., 2006, 1365

Wonky chocolate



A room temperature approach to shaping chocolate has been revealed. Solid chocolate is pressed in a die to create flexible straws that can be tied into knots or coiled like a spring.


Y Wen Chen and M R Mackley
Soft Matter, 2006, **2**, 304

Quantum dots detect DNA



Quantum dots that fluoresce at two different frequencies can rapidly detect small amounts of DNA with a high sensitivity. The method can be used over a range of temperatures and could reduce false positive results.

C Zhang and L W Johnson
Analyst, 2006, **131**, 484

 See www.rsc.org/chemicaltechnology for full versions of these articles

Application highlights

Nitrosamines can be selectively removed from a complex mix of compounds

Zeolites smoke out carcinogens



Carcinogens in cigarette smoke could be filtered out thanks to an absorbent material under development in China.

Jian hua Zhu, director of physical chemistry at Nanjing University,

China, and his colleagues used zeolites to selectively filter out nitrosamine carcinogens from cigarette smoke, which contain hundreds of different components. They sped up the absorption

Copper ions are distributed through the zeolite pores

of nitrosamines by chemically modifying the pore structure of the zeolite by adding copper ions that attract the N–NO group present in the compounds.

Zeolites preferentially adsorb certain molecules while excluding others. According to Zhu, both the porous structure and distribution of active components are fully optimised, creating better synergy between the two and making the selective trapping of nitrosamines far more effective.

Zhu and his team hope the materials will be used as new cigarette additives to lower smoking pollution. The zeolites could also play a significant role in the life sciences, for instance, in slow release drugs, enzyme-mimetic drugs and anti-tumour drugs, said Zhu.

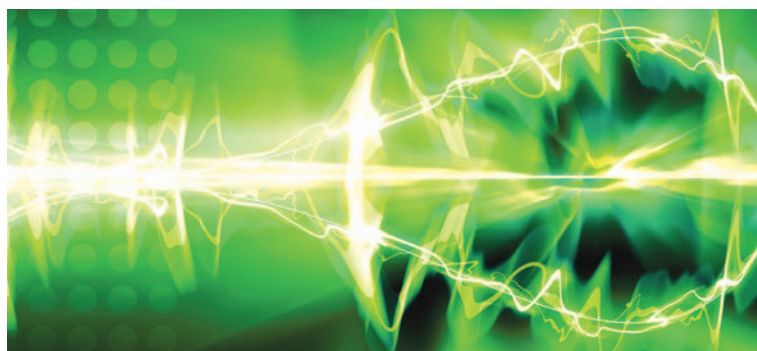
Stephen Wilkes

Reference

C F Zhou *et al.*, *J. Mater. Chem.*, 2006 (DOI: 10.1039/b514317a)

A rainbow of light emitting diodes could be available for electronic displays

Green light from polymers



Electroluminescent polymers with the potential for displaying the full spectrum of colour have been developed using a dopant/host strategy by Chinese chemists.

Lixiang Wang and colleagues at the Changchun Institute of Applied Chemistry have introduced a new

method for making green polymer light emitting diode (PLED) materials. They grafted small amounts of a green fluorescent dye onto the blue-emitting main chain of polyfluorene to create a green light PLED.

This latest dopant/host strategy

A green dye is attached to a blue-emitting polymer

is different from the common approach, in which a large amount of a light emitter is added to the main chain of a polymer, said Wang.

Energy is transferred from the polymer to the green fluorescent dye and light is only emitted from the dye. By chemically modifying the dye and the host polymer, polymers that emit light in the range 400–800 nm can be made. This means that they can give off any colour in the visible spectrum.

These electroluminescent polymers open up many new display product possibilities, such as displays on portable electronic devices, said Wang.

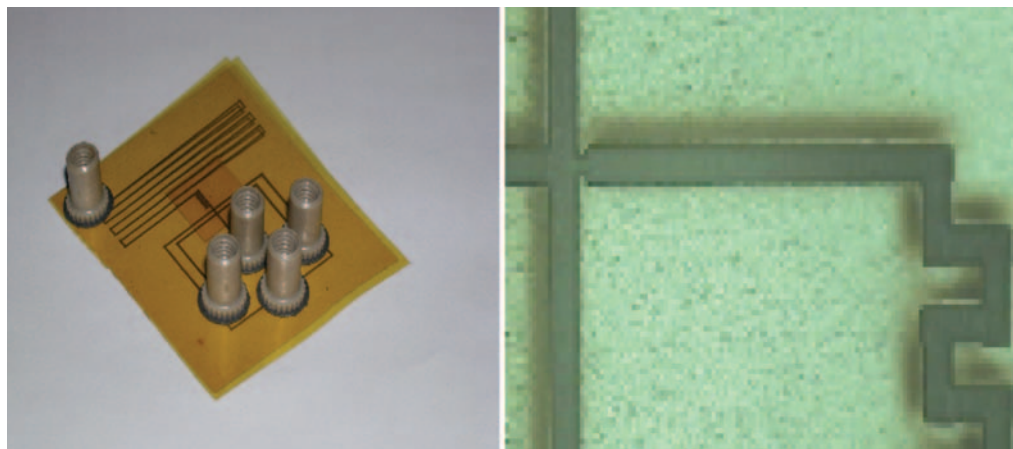
Debora Giovanelli

Reference

J Liu *et al.*, *J. Mater. Chem.*, 2006 (DOI: 10.1039/b514359d)

Reactions in lab-on-a-chip devices can be directly probed by x-rays

X-rays brighten up microfluidics



Combining x-ray scattering measurements with microfluidic devices has become easier than ever, according to French researchers.

Jean-Baptiste Salmon from the Laboratoire du Futur, France, and colleagues used a polymer, Kapton, to make microfluidic chips that

enable x-ray techniques to be applied easily. These could be used to study protein crystallisation and the flow of complex fluids, Salmon said.

Kapton is more resistant to high intensity x-ray beams than the plastics currently used, and does

The devices can be still be analysed by optical techniques

not scatter the beams too much. It is also transparent, so that other characterisation methods, such as optical microscopy, can still be used.

Microfluidics is a technique for carrying out chemical reactions and analyses that uses reagent volumes that are many times smaller than conventional experiments. This allows for lower costs and enhanced analytical performance. On-chip characterisation is important to achieve the best results. The problem in the past was that the materials used for the chips were not able to withstand the x-ray beams.

The French group have shown that both large and small angle x-ray scattering can be measured from Kapton chips with a precision of only a few microns.

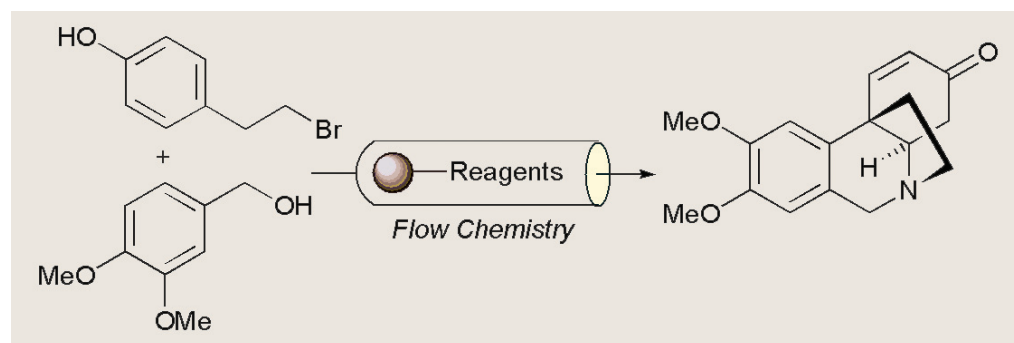
Sophia Anderton

Reference

R Barrett *et al*, *Lab Chip*, 2006, **6**, 494

Labour-saving methods might take some of the grind out of organic lab work

Flow chemistry: a more sustainable way



Organic chemists in the UK have created a labour-saving method for making molecules in the lab by using flow methods.

Steven Ley and colleagues from the University of Cambridge have developed the first multi-step synthesis of a structurally complex natural product using a continuous flow reaction.

They linked together seven

separate synthetic steps into one sequence to make oxomaritidine. The flow process uses microfluidic glass reaction chips and small columns pre-packed with immobilised reagents that carry out the chemical transformations. Material is pumped through a series of columns containing the reagents and catalysts which transform the compounds to produce the final

The technique removes long steps such as crystallisation

product.

This method saves time because it avoids labour intensive practices such as chromatography, crystallisation and distillation. Ley and co-workers said that their approach could be used in the synthesis of other compounds and that the future developments are considerable.

“We can envisage many exciting opportunities for the machine production of chemical entities on demand and online,” Ley said. “Processes can be scaled down or scaled up, creating possibilities for the preparation and online screening of compounds, or for their efficient production.”

Sarah M Corcoran

Reference

I R Baxendale *et al*, *Chem. Commun.*, 2006 (DOI: 10.1039/b600382f)

Free RSC archive for developing countries

The RSC is to provide free access to its journals back-catalogue in over 50 developing countries, it has been announced, making it the first learned society to make such a gesture.

The launch of the programme Archives for Africa in London, UK, in February was preceded by an announcement by RSC president Simon Campbell at the inaugural meeting of the Federations of African Societies of Chemistry in Addis Ababa, Ethiopia.

The RSC archive contains every paper published in its journals in over 160 years – from 1841 to 2004. The programme for the enhancement of research information (PERI) is helping host the archive. The archive is also available to a number of developing countries outside Africa.

PERI asks that developing



nations make a contribution for materials they receive. For a nominal fee, the latest three years of RSC content can be bought. 'In any initiative there has to be an African pull as well as Western push,' said Campbell who went on to describe how

the RSC is building on the UK government's stated intention to build science and technology capacity in Africa, following the publication of the Commission for Africa's report on 11 March 2005.

'It was really hard in Addis

for me to get hold of the right papers,' said Hareg Tadesse, a PhD student from Addis Ababa University, Ethiopia, 'this is where the archives are going to be so useful. Now students like me in Addis can get the RSC Archives straight away, when we need them. On behalf of all my fellow students in Ethiopia, I would like to congratulate the RSC on such a gesture.'

To find out more and to register, visit: www.rsc.org/archivedc

And finally....

Fundamental Toxicology – a new textbook published by the RSC – gathers together the most up to the minute developments in toxicology.

Based on the highly successful *Fundamental Toxicology for Chemists*, it has been expanded and updated to include the very latest in this exciting area of science. It covers well established areas of toxicology as well as rapidly developing topics such as toxicogenomics, reproductive toxicology, behavioural toxicology and ecotoxicology.

Complete with a suggested curriculum, an extensive glossary and recommended further reading this definitive resource is essential reading for students, teachers and lecturers alike. A must for anyone interested in toxicology!

To find out more visit: www.rsc.org/books

Growth and great science for *CrystEngComm*

CrystEngComm, a pioneering crystal engineering e-journal, is now published in monthly issues. Editor, Jamie Humphrey explains, 'This development to monthly issues is possible thanks to the continued growth in high quality submissions, and reinforces the RSC's commitment to the development of the journal.'

Each monthly issue of *CrystEngComm* features stunning artwork illustrating an article in that issue and contains a dynamic mix of

communications, full papers and highlights. Taking full advantage of the electronic environment, publication in *CrystEngComm* is exceptionally fast - typically 65 days from receipt for full papers and just 40 days for urgent communications.

But it's not just fast publication times that get *CrystEngComm* noticed. It's official: the science is hot. A *CrystEngComm* article has just been highlighted as a Fast Breaking Paper by Essential Science IndicatorsSM from

Thomson Scientific. Fast Breaking Papers are highly cited papers that are attracting the attention of the scientific community; they show the largest recent percentage increase in citations.

The article by Proserpio and co-workers presents an algorithm enabling crystal engineers to discover new properties, like interpenetration, in substances (see Blatov *et al*, *CrystEngComm*, 2004, 6, 378).

To find out more, visit: www.crystengcomm.org

Chemical Technology (ISSN: 1744-1560) is published monthly by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge UK CB4 0WF. It is distributed free with *Chemical Communications*, *Journal of Materials Chemistry*, *Analyst*, *Lab on a Chip*, *Journal of Environmental Monitoring*, *Green Chemistry*, *CrystEngComm* and *Analytical Abstracts*. *Chemical Technology* can also be purchased separately. 2006 annual subscription rate: £199; US \$364. All orders accompanied by payment should be sent to Sales and Customer Services, RSC (address above). Tel +44 (0) 1223 432360, Fax +44 (0) 1223 426017 Email: sales@rsc.org

Editor: Neil Withers

Associate editors: Nicola Nugent, Celia Clarke

Essential Elements: Melanie James, Valerie, Sarah Day, Michele Zgraggen

Publishing Assistant: Kate Nussey

Publisher: Graham McCann

Apart from fair dealing for the purposes of research or private study for non-commercial purposes, or criticism or review, as permitted under the Copyright, Designs and Patents Act 1988 and the copyright and Related Rights Regulations 2003, this publication may only be reproduced, stored or transmitted, in any form or by any means, with the prior permission of the Publisher or in the case of reprographic reproduction in accordance with the terms of licences issued by the Copyright Licensing Agency in the UK. US copyright law is applicable to users in the USA.

The Royal Society of Chemistry takes reasonable care in the preparation of this publication but does not accept liability for the consequences of any errors or omissions.

Royal Society of Chemistry: Registered Charity No. 207890.

RSC Publishing