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IN THIS ISSUE

ISSN 1144-0546 CODEN NJCHES 32(8) 1269-1456 (2008)



Cover

See Backov *et al.*, pp. 1284–1299. Advanced functional materials having hierarchical structures can be tailor-made *via* the smart integration of soft chemistry-based pathways and the versatile processing conditions offered by soft-matter physico-chemistry. Image reproduced with permission from Renal Backov from *New J. Chem.*, 2008, **32**, 1284.



Inside Cover

See Hong *et al.*, pp. 1368. The image shows a blue phosphorescent organic light emitting diode (OLED) device using new host material TCTEB, with a sterically bulky structure due to nonbonded conformational locking interactions, and Firpic as dopant. Image reproduced with permission from Royal Philips Electronics, Netherlands from *New J. Chem.*, 2008, **32**, 1368.

CHEMICAL SCIENCE

C57

Drawing together the research highlights and news from all RSC publications, *Chemical Science* provides a 'snapshot' of the latest developments across the chemical sciences, showcasing newsworthy articles and significant scientific advances.

Chemical Science

August 2008/Volume 5/Issue 8

www.rsc.org/chemicalscience

EDITORIAL

1283

The bio-inspired design of novel materials

Laurent Bonnevot, a member of the *NJC* Editorial Board, introduces the interdisciplinary field of bio-inspired materials, the subject on which we have eight papers in this issue of the Journal.



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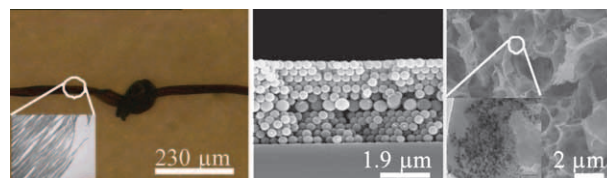
PERSPECTIVES

1284

Bio-inspired synthetic pathways and beyond: integrative chemistry

Eric Prouzet, Serge Ravaine, Clément Sanchez and Rénal Backov

Advanced functional materials having hierarchical structures can be tailor made *via* the smart integration of soft chemistry based pathways and the versatile processing conditions offered by soft-matter physico-chemistry.

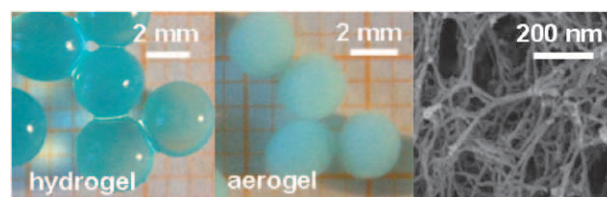


1300

Aerogel materials from marine polysaccharides

Françoise Quignard,* Romain Valentin and Francesco Di Renzo

Supercritical drying of natural hydrocolloids with different functional groups allows to obtain materials with high surface area and catalytic activity.



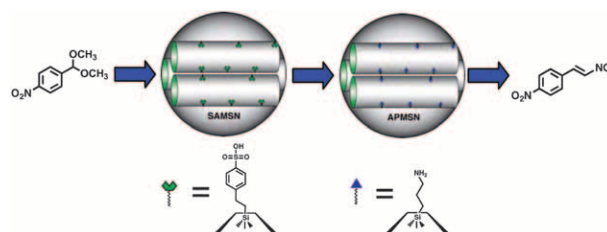
LETTER

1311

One-pot reaction cascades catalyzed by base- and acid-functionalized mesoporous silica nanoparticles

Yulin Huang, Brian G. Trewyn, Hung-Ting Chen and Victor S.-Y. Lin*

Mesoporous silica nanoparticles (MSNs) containing base (primary amine) and sulfonic acid inside the MCM-41 type porous channels were used as compatible catalysts for one-pot reaction cascades.



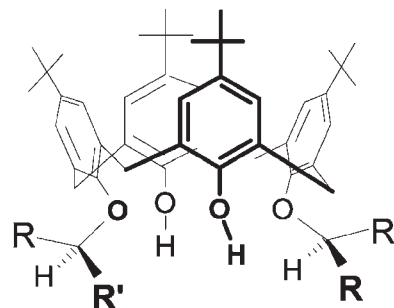
PAPER

1314

Graftable chiral ligands for surface organometallic materials: calixarenes bearing asymmetric centers directly attached to the lower rim

Andrew Solovyov, Justin M. Notestein, Kathleen A. Durkin and Alexander Katz*

The stereoselective synthesis of calixarene ligands having chiral centers directly attached to lower-rim oxygens was achieved, and factors that govern the induction of asymmetry in these structures was investigated *via* circular dichroism and ^1H NMR spectroscopies.



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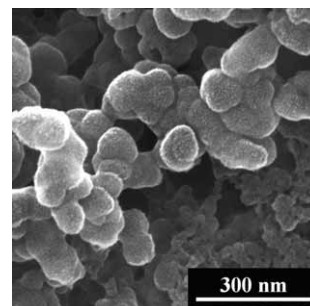
PAPERS

1326

Calcium phosphate nanoparticles as nuclei for the preparation of colloidal calcium phytate

Kathirvel Ganesan and Matthias Eppe*

Nanoparticles of calcium phytate were prepared by treating a dispersion of calcium phosphate with sodium phytate.

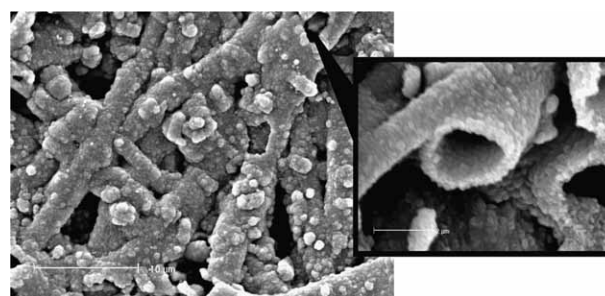


1331

Porous materials *via* egg-constituents templating

Valentin Valtchev,* Feifei Gao and Lubomira Tosheva

Porous materials with pre-determined composition, hierarchical porosity and controlled morphology were prepared by employing egg yolk, egg white and eggshell membrane as templates.

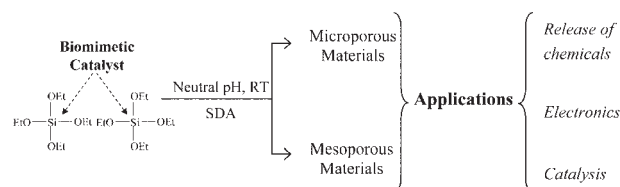


1338

Biomimetic synthesis of microporous and mesoporous materials at room temperature and neutral pH, with application in electronics, controlled release of chemicals, and catalysis

A. Corma,* M. Moliner, M. J. Díaz-Cabañas, P. Serna, B. Femenia, J. Primo and H. García

Microporous and mesoporous molecular sieve materials with application in electronics, controlled release of chemicals, and catalysis have been synthesized using silica mobilizing agents that are functional mimics of silicateine bioinspiration from living marine organisms.

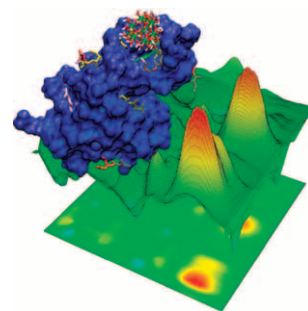


1346

Interactions of aluminium hydrolytic species with biomolecules

Olivier Deschaume, Agathe Fournier, Kirill L. Shafran and Carole C. Perry*

The formation and properties of bioinorganic assemblies between the basic globular protein lysozyme and aqueous aluminium species including Al_{13} -mer, Al_{30} -mer and colloidal aluminium hydroxide, demonstrated by 2D-infrared spectroscopy combined to suspensions characterization techniques.





42nd IUPAC CONGRESS Chemistry Solutions

2–7 August 2009 | SECC | Glasgow | Scotland | UK

On behalf of IUPAC, the RSC is delighted to host the 42nd Congress (IUPAC 2009), the history of which goes back to 1894. RSC and IUPAC members, groups and networks have contributed a wealth of ideas to make this the biggest UK chemistry conference for several years.

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- Industry & Innovation
- Materials
- Synthesis & Mechanisms

Plenary speakers

Peter G Bruce, University of St Andrews
 Chris Dobson, University of Cambridge
 Ben L Feringa, University of Groningen
 Sir Harold Kroto, Florida State University
 Klaus Müllen, Max-Planck Institute for Polymer Research
 Sir J Fraser Stoddart, Northwestern University
 Vivian W W Yam, The University of Hong Kong
 Richard N Zare, Stanford University

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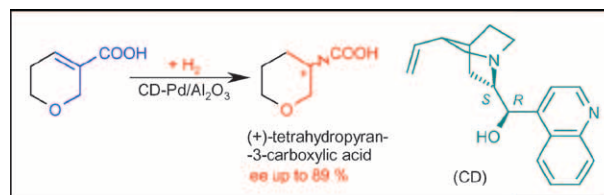
LETTER

1354

The enantioselective hydrogenation of 5,6-dihydro-2*H*-pyran-3-carboxylic acid over a cinchona alkaloid-modified palladium catalyst: asymmetric synthesis of a cockroach attractant

Kornél Szőri, György Szöllősi* and Mihály Bartók

The enantioselective hydrogenation of 5,6-dihydro-2*H*-pyran-3-carboxylic acid over 5% Pd/Al₂O₃ modified by cinchonidine proved to be an efficient method for the asymmetric synthesis of the cockroach attractant methyl (+)-tetrahydro-2*H*-pyran-3-carboxylate.



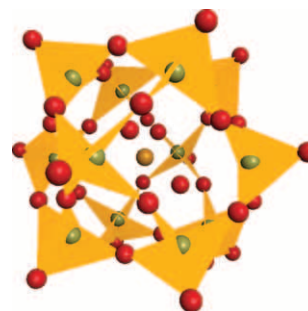
PAPERS

1359

Detecting delocalization

Adam J. Bridgeman* and Christopher J. Empson

The construction of chemical connections *ab initio* from electronic structure calculations and the automatic detection of multicentre bonding is introduced and used to probe the bonding in electron-deficient and electron-rich molecules.

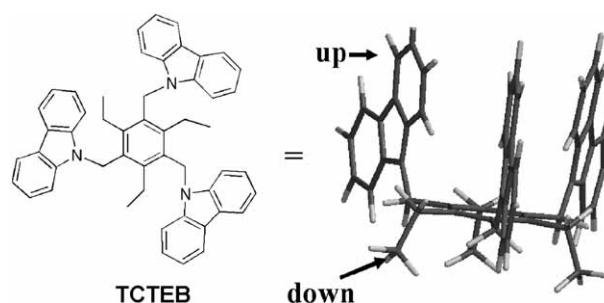


1368

Efficient blue phosphorescent host through nonbonded conformational locking interactions

Jongchul Kwon, Tae-Hyuk Kwon, Hyo Soon Cho, Myoung Ki Kim, Ik-Soo Shin, Dae-Yup Shin, Su Jin Park and Jong-In Hong*

The maximum quantum efficiency, current efficiency and power efficiency of the OLED device using the TCTEB host were 8.5%, 13.7 cd A⁻¹, and 11.3 lm W⁻¹, respectively, when doped with 8 wt% FIrpic.

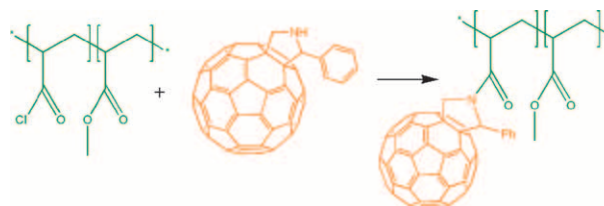


1373

The synthesis of high-content fullerene functionalised polymers through the controlled addition of an amine-tagged fullerene derivative

Christopher M. Tollan,* Paul R. Birkett and Norman S. Allen

Reaction of an acryloyl chloride-*co*-methyl methacrylate copolymer with the amine group of a fulleropyrrolidine resulting in high fullerene content polymeric products.



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Metallomics Integrated biometal science

060877



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Contact the editor, Niamh O'Connor, at metallomics@rsc.org for further information or visit the website.

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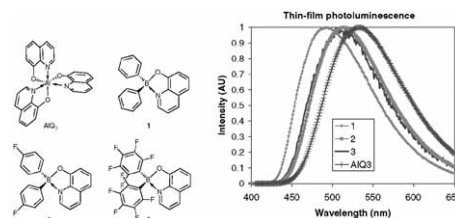
PAPERS

1379

The effect of fluorination on the luminescent behaviour of 8-hydroxyquinoline boron compounds

Sondra L. Hellstrom, Juri Ugolotti, George J. P. Britovsek,*
Tim S. Jones* and Andrew J. P. White

The luminescent behaviour of a variety of OLED devices made using fluorinated boron quinolate compounds has been investigated

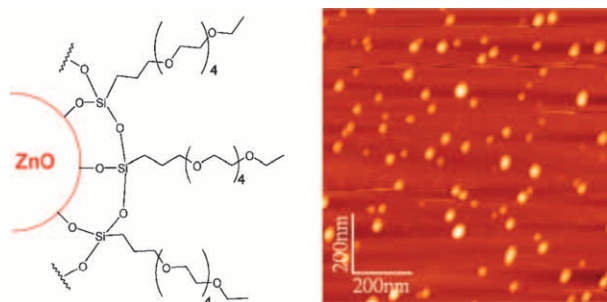


1388

Synthesis and characterization of water-soluble ZnO quantum dots prepared through PEG-siloxane coating

Ralph-Olivier Moussodia, Lavinia Balan and
Raphaël Schneider*

Stable, water-soluble, and luminescent colloidal dispersions of ZnO nanoparticles were prepared by functionalization of hydrophobic oleate-capped ZnO QDs with a poly(ethylene glycol) siloxane.

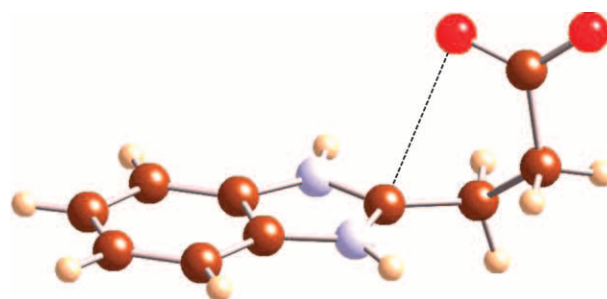


1394

The clash of the synthons: crystal structures of benzimidazole–alcohol–carboxylic acids

Franck Delval, Alexandra Spyratou, Simon Verdan,
Gerald Bernardinelli and Alan F. Williams*

The scorpion's tail: intramolecular coulombic attraction between the two parts of a zwitterion, or intermolecular carboxylate–benzimidazolium attractions can compete effectively with π -stacking interactions in crystal packing.

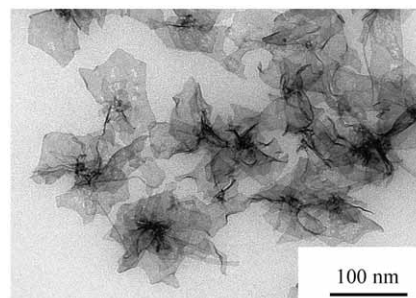


1403

Palladium nanostructures synthesized by radiolysis or by photoreduction

Tanafit Redjala, Gabriela Apostolecu, Patricia Beaunier,
Mehran Mostafavi, Arnaud Etcheberry, Denis Uzio,
Cécile Thomazeau and Hynd Remita*

Palladium nanostructures formed by nanowires, nanoplates or having a flower-like shape were synthesized by slow reduction either by photoreduction or by radiolysis of palladium acetylacetonate in 2-propanol under CO atmosphere.





Chemistry-Biology Interface

Chemistry-Biology Interface theme issue

This theme issue covers topical areas at the chemistry–biology interface from a chemical perspective. The biological consequences of specific molecular interactions have long been a part of scientific (and non-scientific) activities throughout human history. The last century witnessed a myriad of discoveries in the life sciences at molecular detail, and the associated growth of the pharmaceutical and biotech industries. This century has seen a further growth in the field with a resultant increase in publications and journals.

Reviews include:

Nucleic acid encoding to program self-assembly in chemical biology

Zbigniew L. Pianowski and Nicolas Winssinger

Chemical technologies for probing embryonic development

Ilya A. Shestopalov and James K. Chen

Interspecies and interkingdom communication mediated by bacterial quorum sensing

Colin A. Lowery, Tobin J. Dickerson and Kim D. Janda

Small molecule inhibition of microbial natural product biosynthesis—an emerging antibiotic strategy

Justin S. Cisar and Derek S. Tan

Identification of the cellular targets of bioactive small organic molecules using affinity reagents

Benjamin J. Leslie and Paul J. Hergenrother

Expanding dialogues: from natural autoinducers to non-natural analogues that modulate quorum sensing in Gram-negative bacteria

Grant D. Geske, Jennifer C. O'Neill and Helen E. Blackwell

Guest editor:



David Spring

University of Cambridge, UK

"The interface with biology is a fertile scientific pursuit for chemists"

060833

See also:

Molecular BioSystems issue 6, 2008 – Emerging Investigators theme issue

For more details see www.molecularbiosystems.org/ei

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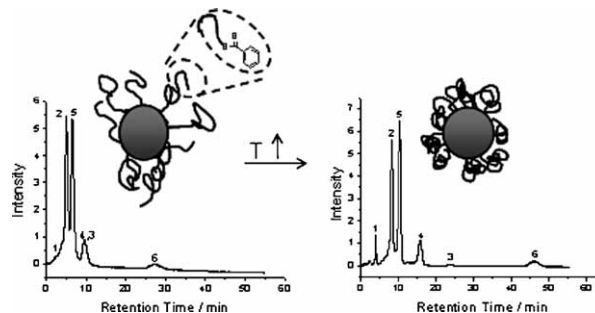
PAPERS

1409

Thin thermo-responsive polymer films onto the pore system of chromatographic beads *via* reversible addition–fragmentation chain transfer polymerization

Farnoosh Roohi and Maria Magdalena Titirici*

Thermo-responsive silica–PNIPAAm composites were produced using RAFT polymerization and used as stationary phases in HPLC for separation of a mixture of steroids under aqueous isocratic conditions by changing the temperature of the column.

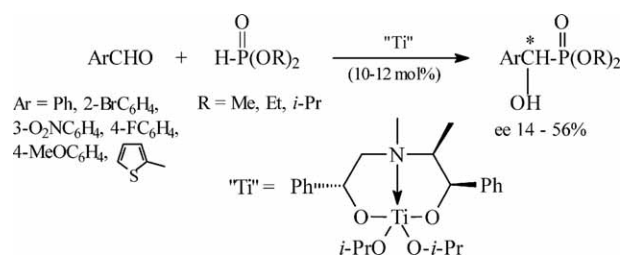


1415

Titanium complexes based on chiral enantiopure dialkanolamines: synthesis, structures and catalytic activity

Kirill V. Zaitsev,* Maxim V. Bermeshev, Alexey A. Samsonov, Juri F. Oprunenko, Andrei V. Churakov, Judith A. L. Howard, Sergey S. Karlov* and Galina S. Zaitseva

Synthesis and structure of new titanium(IV) complexes based on enantiopure dialkanolamines are described. These compounds were tested as catalysts in the Abramov reaction and demonstrated moderate enantiomeric activity.

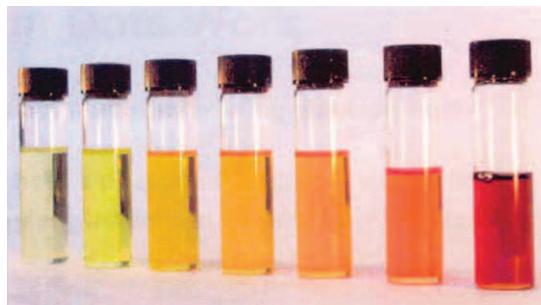


1432

A new synthetic route to organically capped cadmium selenide nanoparticles

Oluwatobi Samuel Oluwafemi and Neerish Revaprasadu*

We report a novel, simple environmentally friendly, and inexpensive method for the preparation of monodispersed hexadecylamine (HDA) and tri-*n*-octylphosphine oxide (TOPO) capped CdSe nanoparticles.

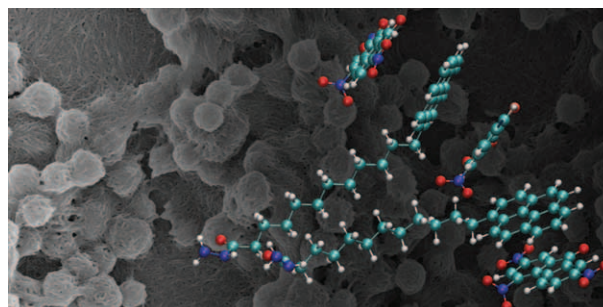


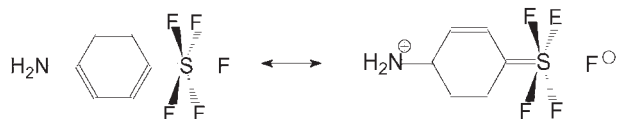
1438

Pyrene derived functionalized low molecular weight organic gelators and gels

Arno Hahma,* Shreedhar Bhat, Kimmo Leivo, Juha Linnanto, Manu Lahtinen and Kari Rissanen

A pyrene based functionalized organogelator creates a complex gel network containing evenly sized agglomerates due to competition between aromatic interactions and bonding within and between the supramolecules through the free standing functional groups.





Negative hyperconjugation of some fluorine containing groups

Otto Exner and Stanislav Böhm*

The groups CF_3 , SF_5 and SCF_3 behave in the theory of substituent effects as resonance acceptors; when this should be pictured in resonance formulae, it is necessary to use the no-bond formulae/negative hyperconjugation. These formulae predict correctly that the bonds to fluorine are weakened and elongated.

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