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### IN THIS ISSUE

ISSN 1144-0546 CODEN NJCHES 32(9) 1457-1644 (2008)



### Cover

See S. T. Hyde et al., pp. 1484-1492. Knotted and linked structures are challenging targets for chemical syntheses due to the inherent connections between tangling, chirality and molecular properties. The image shows a simple example of a "ravelled" structure that is tangled, but contains neither knots nor links. This example is a ravelled tetrahedron. Background image used by permission of Beth Skwarecki. Image reproduced by permission from Toen Castle, Myfanwy E. Evans and S. T. Hyde from New J. Chem., 2008, 32, 1484.



### Inside Cover

See Stefan Spange et al., pp. 1493-1499. Hydrogen bond donor (HBD) strength parameters of 1-butyl-3-methylimidazolium-based ionic liquids with various anions were determined be means of Fe(phen)<sub>2</sub>(CN)<sub>2</sub> as the solvatochromic UV/Vis probe. Image reproduced with permission from Ralf Lungwitz. Manfred Friedrich, Wolfgang Linert and Stefan Spange from New J. Chem., 2008, 32, 1493.

### **CHEMICAL SCIENCE**

### C65

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.

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September 2008/Volume 5/Issue 9

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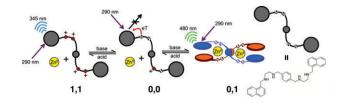
### **LETTER**



### A metallo-supramolecular approach to a half-subtractor

Miguel Vázquez López,\* M. Eugenio Vázquez, Clara Gómez-Reino, Rosa Pedrido and Manuel R. Bermejo

The tetraamine dinucleating ligand L, which bears naphthalene moieties at both ends, behaves as a combinatorial logic circuit for a molecular half-subtractor in the presence of Zn ions. The mechanism for this device is based on the assembly of 1:1 Zn<sup>II</sup>–L metallo-supramolecular adducts with fluorescent excimer emission properties.



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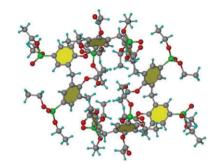
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### 1478

# Self-organised nano-arrays of *p*-phosphonic acid functionalised higher order calixarenes

Thomas E. Clark, Mohamed Makha,\* Alexandre N. Sobolev, Dian Su, Henry Rohrs, Michael L. Gross, Jerry L. Atwood and Colin L. Raston\*

A general synthetic protocol to the synthesis of water-soluble p-phosphonic acid calix[n]arenes (n = 5, 6 or 8), and solution and gas-phase studies of the formation of nano-arrays of around 20 calixarene units were observed using MALDI-TOF-MS and ESI-MS.

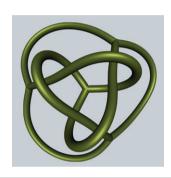


### 1484

# Ravels: knot-free but not free. Novel entanglements of graphs in 3-space

Toen Castle, Myfanwy E. Evans and S. T. Hyde\*

Nets can be tangled in a way that avoids any knotting or linking of loops in the net. If the entanglements are localised to a vertex, they are ravelled rather than knotted.

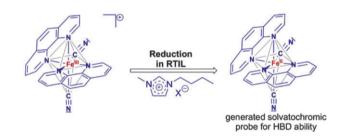


### 1493

# New aspects on the hydrogen bond donor (HBD) strength of 1-butyl-3-methylimidazolium room temperature ionic liquids

Ralf Lungwitz, Manfred Friedrich, Wolfgang Linert and Stefan Spange\*

Improved hydrogen bond donor (HBD) strength parameters of room temperature ionic liquids (RTILs) have been determined using Fe(phen)<sub>2</sub>(CN)<sub>2</sub> as a solvatochromic UV/Vis probe, which results from dissolution of [Fe(phen)<sub>2</sub>(CN)<sub>2</sub>|ClO<sub>4</sub>.

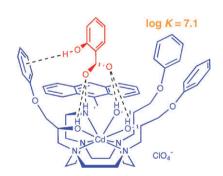


### 1500

# Fluorescent signaling provides deeper insight into aromatic anion uptake by metal-ion activated molecular receptors

Adam J. Bradbury, Stephen F. Lincoln and Kevin P. Wainwright\*

Fluorescent signaling of aromatic anion uptake by the metal-ion activated molecular receptor (blue) indicates greatly enhanced binding strength when classical hydrogen bonding is augmented by non-classical hydrogen bonding. Thus, salicylate (log K=7.1), for example, is much more strongly included than benzoate (log K=2.3).



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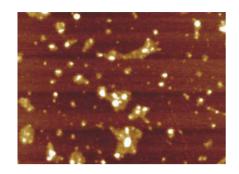
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### 1509

# AFM and TEM image of phenylacetylene polymerization on Rh/PVP colloidal nanoparticles

Marta Kopaczyńska, Jurgen H. Fuhrhop, Anna M. Trzeciak,\* Józef J. Ziółkowski and Robert Choukroun

Rh/PVP nanoparticles were used as a new kind of catalyst in polymerization of phenylacetylene (PA).

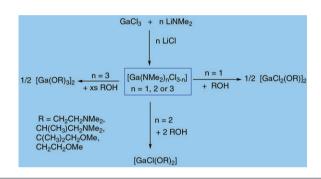


### 1513

### Synthesis and structures of gallium alkoxides

Siama Basharat, Caroline E. Knapp, Claire J. Carmalt,\* Sarah A. Barnett and Derek A. Tocher

The synthesis and characterisation of gallium alkoxides, of the type  $[Ga(OR)_nCl_{3-n}]$ , incorporating donor functionalised ligands is described.

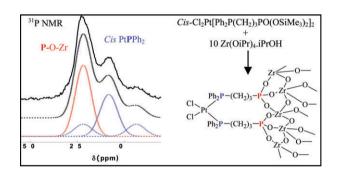


### 1519

# Immobilization of platinum(II) and palladium(II) complexes on metal oxides by sol-gel processing and surface modification using bifunctional phosphine-phosphonate esters

Gilles Guerrero, P. Hubert Mutin,\* E. Framery and André Vioux

Phosphine ligands and Pt(II) and Pd(II) complexes were immobilized on metal oxide supports using phosphonate esters as anchoring groups that provide a valuable alternative to phosphonic acids.

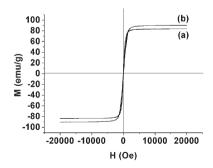


### 1526

# Fe<sub>3</sub>O<sub>4</sub> polyhedral nanoparticles with a high magnetization synthesized in mixed solvent ethylene glycol-water system

Shao-Wen Cao, Ying-Jie Zhu\* and Jiang Chang

Well-dispersed  $Fe_3O_4$  polyhedral nanoparticles showing superparamagnetism with a high magnetization close to that of bulk  $Fe_3O_4$  were prepared by a solvothermal approach in the ethylene glycol (EG)– $H_2O$  system.



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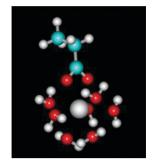
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### 1531

Luminescence from cerium(III) acetate complexes in aqueous solution: considerations on the nature of carboxylate binding to trivalent lanthanides

M. Emília Azenha, Hugh D. Burrows,\* Sofia M. Fonseca, M. Luísa Ramos, José Rovisco, J. Seixas de Melo, Abilio J. F. N. Sobral and Ksenija Kogej

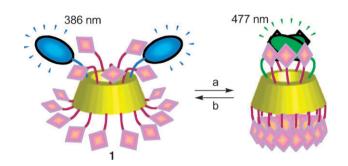
A short lived luminescence is seen in aqueous solutions of cerium(III) in the presence of acetate ion and attributed to a 1:1 complex involving weak bidentate coordination of the carboxylate ligand.



### 1536

# Dual emission of a bis(pyrene)-functionalized, perbenzylated $\beta$ -cyclodextrin

Cheng Huo, Jean-Claude Chambron\* and Michel Meyer The monomer/excimer fluorescence of 1 is switched by change in solvent composition or presence of the appropriate substrate: (a) H<sub>2</sub>O–DMSO (80 : 20 v/v); (b) DMSO or heptanoic acid.

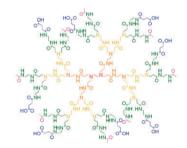


### 1543

# The Dotted Cap Notation: A concise notation for describing variegated dendrimers

Benjamin P. Roberts, Martin J. Scanlon, Guy Y. Krippner and David K. Chalmers\*

A new notation has been developed to concisely describe the surface functionalisation of variegated dendrimers.



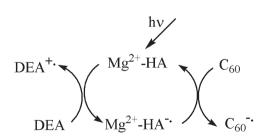
A<u>•</u>B<u>••</u>A<u>•</u>B•••A<u>•</u>B•••A<u>•</u>B•••A<u>•</u>B

### 1555

# Photodynamic properties of supramolecular assembly constructed by magnesium complex of hypocrellin A and fullerene $C_{60}$

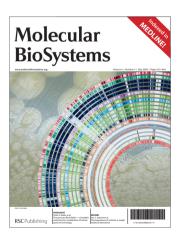
Yunyan Gao, Zhize Ou,\* Jingrong Chen, Guoqiang Yang,\* Xuesong Wang,\* Baowen Zhang, Mimi Jin and Lihua Liu

 $Mg^{2\,+}{\rm -HA}$  acts as a light-harvesting antenna in the supramolecular system  $Mg^{2\,+}{\rm -HA/C_{60}}$  and mediates electron transfer from diethylaniline (DEA) to  $C_{60}.$ 



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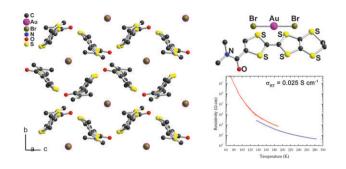
\*2007 Thomson Scientific (ISI) Journal Citation Reports ®



# Square-lattice hybrid organic–inorganic conducting layers in the $\tau$ phase of a TTF tertiary amide derivative

Pascal Cauliez, Cécile Mézière, Pascale Auban-Senzier, Rodolphe Clérac and Marc Fourmigué\*

A rare stoichiometric  $\tau$  phase is identified in  $\tau$ -(EDT-TTF-CONMe<sub>2</sub>)<sub>2</sub>(AuBr<sub>2</sub>)<sub>2</sub>·TCE, characterised by a square lattice of orthogonal radical cations and a sizeable conductivity for a 1:1 salt.



### 1567

# Synthesis of 5-(bromomethylene)furan-2(5*H*)-ones and 3-(bromomethylene)isobenzofuran-1(3*H*)-ones as inhibitors of microbial quorum sensing

Tore Benneche, Zainab Hussain, Anne Aamdal Scheie and Jessica Lönn-Stensrud

5-Bromomethylenefuran-2(5*H*)-ones and 3-(bromomethylene)isobenzofuran-1(3*H*)-ones inhibit bacterial communication and can be readily made from maleic anhydrides and phthalic anhydrides, respectively.

### 1573

# Synthesis and characterisation of [(triphos)Fe(CO)H<sub>2</sub>] and its protonation to a dihydrogen complex *via* an unconventional hydrogen-bonded intermediate

Gemma Guilera, G. Sean McGrady,\* Jonathan W. Steed,\* Richard P. L. Burchell, Peter Sirsch and Anthony J. Deeming

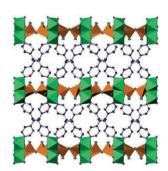
Protonation of an iron(II) dihydride complex proceeds via an unconventionally hydrogen bonded intermediate to give a stretched  $H_2$  complex.

### 1582

# Topological description of a 3D self-catenated nickel hybrid vanadate Ni(bpe)(VO<sub>3</sub>)<sub>2</sub>. Thermal stability, spectroscopic and magnetic properties

Roberto Fernández de Luis, José L. Mesa,\* Miren K. Urtiaga, Luis Lezama, María I. Arriortua and Teófilo Rojo

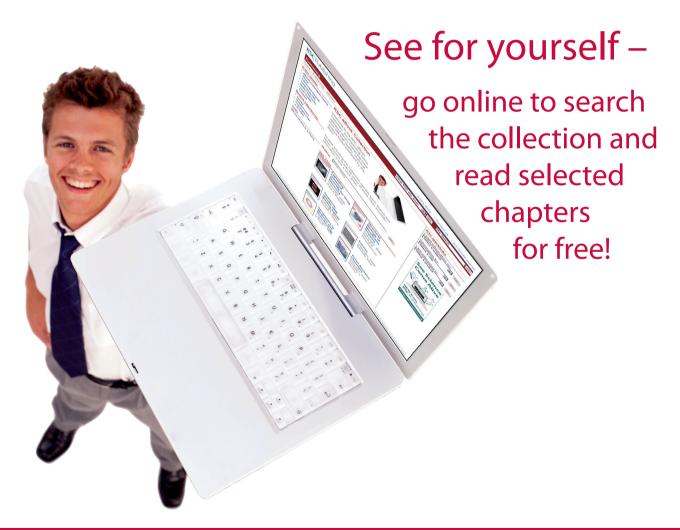
Crystal structure of 3D self-catenated NiBpe(VO<sub>3</sub>)<sub>2</sub>.



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### 1590

# Reactions of thiacalix[4]arene 1,3-bistriflate: formation of thiacalix[2]phenoxathiins—structural and complexation studies

Almeqdad Habashneh, Chester R. Jablonski, Julie Collins and Paris E. Georghiou\*

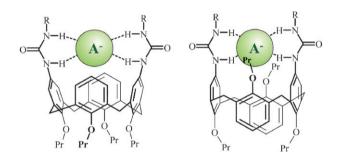
Sonogashira reactions with thiacalix[4]arene bistriflate fail to produce arylethynyl products. Instead, a novel thia[2]phenoxathiin is produced, likely *via* an Ullmann-type mechanism. An unprecedented Pd(0)-mediated hydride-displacement of a lower-rim triflate was also observed. Five new X-ray structures are reported.

### 1597

# Systematic approach to new ligands for anion recognition based on ureido-calix[4]arenes

Ivan Stibor,\* Jan Budka, Veronika Michlová, Marcela Tkadlecová, Michaela Pojarová, Petra Cuřínová and Pavel Lhoták\*

Mono-, di-, tri- and tetraureido-calix[4]arenes were synthesised and systematically studied for their complexation ability towards anions. A new type of very efficient ligands based on a 1.3-alternate conformation was discovered.



### 1608

# Ring-chain tautomerism and protolytic equilibria of 3-hydroxy-3-phosphonoisobenzofuranone studied by <sup>1</sup>H, <sup>13</sup>C and <sup>31</sup>P NMR-controlled titrations

Sven Augner, Jan Kehler, Zoltán Szakács, Eli Breuer\* and Gerhard Hägele\*

Multinuclear NMR and potentiometric titrations revealed concerted ring—chain and protolytic equilibria involving 3-hydroxy-3-phosphonoisobenzofuranone and *ortho*-(phosphonatoformyl)benzoate.

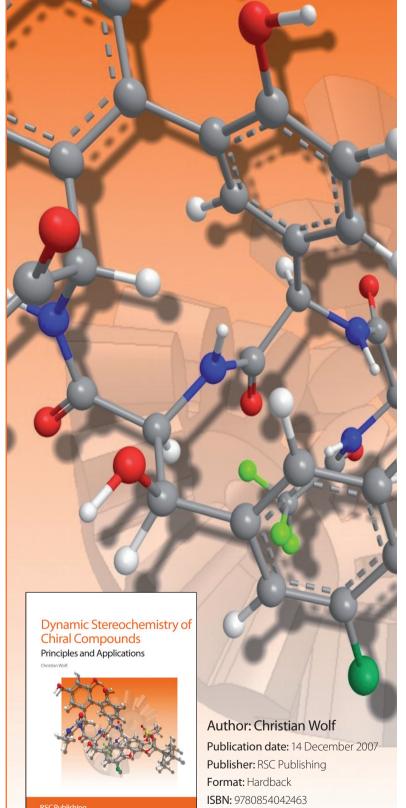
### 1617

# Investigation on the flexibility of chiral tricyclic derivatives

Maria Altamura, Paolo Dapporto, Antonio Guidi, Nicholas J. S. Harmat, Loïc Jierry, Elisa Libralesso, Paola Paoli\* and Patrizia Rossi

Results of the investigations, by *ab initio* calculations and NMR spectroscopy, on the inversion barrier of enantiomeric conformers of tricyclic compounds bearing different heteroatoms on the central seven-membered ring, are presented.

$$X = 0, S, SO_2$$
 $Y = COOH, COOMe$ 



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- More than 550 figures, schemes and tables illustrating mechanisms of numerous asymmetric reactions and stereomutations of chiral compounds
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- A comprehensive glossary with stereochemical definitions and terms which facilitate understanding and reinforce learning

This book will be of particular interest to advanced undergraduates, graduates and professionals working and researching in the fields of synthetic organic chemistry and stereochemistry.

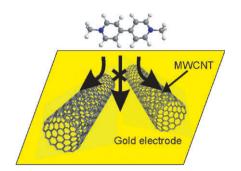
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### 1628

Investigating the voltammetric reduction of methylviologen at gold and carbon based electrode materials. Evidence for a surface bound adsorption mechanism leading to electrode 'protection' using multi-walled carbon nanotubes

Lei Xiao, Gregory G. Wildgoose and Richard G. Compton\*

The mechanistic redox behaviour of methylviologen in water is reported for several electrode materials. It was also found that multi-walled carbon nanotubes provides diffusional protection to underlying substrates.

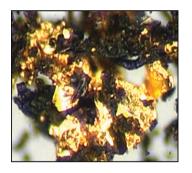


### 1634

# Recovery of precious metals by using chemically modified waste paper

Chaitanya Raj Adhikari, Durga Parajuli, Katsutoshi Inoue,\* Keisuke Ohto, Hidetaka Kawakita and Hiroyuki Harada

Chemically modified waste paper reduces  $\mathrm{Au}(\Pi)$  in acidic solution to elemental form.



### **AUTHOR INDEX**

Aamdal Scheie, A., 1567 Adhikari, Chaitanya Raj, 1634 Altamura, Maria, 1617 Arriortua, María I., 1582 Atwood, Jerry L., 1478 Auban-Senzier, Pascale, 1561 Augner, Sven, 1608 Azenha, M. Emília, 1531 Barnett, Sarah A., 1513 Basharat, Siama, 1513 Benneche, Tore, 1567 Bermejo, Manuel R., 1473 Bradbury, Adam J., 1500 Breuer, Eli, 1608 Budka, Jan, 1597 Burchell, Richard P. L., 1573 Burrows, Hugh D., 1531 Cao, Shao-Wen, 1526 Carmalt, Claire J., 1513 Castle, Toen, 1484 Cauliez, Pascal, 1561 Chalmers, David K., 1543 Chambron, Jean-Claude, 1536 Chang, Jiang, 1526 Chen, Jingrong, 1555 Choukroun, Robert, 1509 Clark, Thomas E., 1478 Clérac, Rodolphe, 1561 Collins, Julie, 1590 Compton, Richard G., 1628

Cuřínová, Petra, 1597 Dapporto, Paolo, 1617 Deeming, Anthony J., 1573 Evans, Myfanwy E., 1484 Fernández de Luis. Roberto, 1582 Fonseca, Sofia M., 1531 Fourmigué, Marc, Framery, E., 1519 Friedrich, Manfred, 1493 Fuhrhop, Jurgen H., 1509 Gao, Yunyan, 1555 Georghiou, Paris E., 1590 Gómez-Reino, Clara, 1473 Gross, Michael L., 1478 Guerrero, Gilles, 1519 Guidi, Antonio, 1617 Guilera, Gemma, 1573 Habashneh, Almegdad, 1590 Hägele, Gerhard, 1608 Harada, Hiroyuki, 1634 Harmat, Nicholas J. S., 1617 Huo, Cheng, 1536 Hussain, Zainab, 1567 Hyde, S. T., 1484 Inoue, Katsutoshi, 1634 Jablonski, Chester R., 1590 Jierry, Loïc, 1617 Jin, Mimi, 1555 Kawakita, Hidetaka, 1634

Kehler, Jan, 1608 Knapp, Caroline E., 1513 Kogej, Ksenija, 1531 Kopaczyńska, Marta, 1509 Krippner, Guy Y., 1543 Lezama, Luis, 1582 Lhoták, Pavel, 1597 Libralesso, Elisa, 1617 Lincoln, Stephen F., 1500 Linert, Wolfgang, 1493 Liu, Lihua, 1555 Lönn-Stensrud, Jessica, 1567 Lungwitz, Ralf, 1493 Makha, Mohamed, 1478 McGrady, G. Sean, 1573 Mesa, José L., 1582 Meyer, Michel, 1536 Mézière, Cécile, 1561 Michlová, Veronika, 1597 Mutin, P. Hubert, 1519 Ohto, Keisuke, 1634 Ou, Zhize, 1555 Paoli, Paola, 1617 Parajuli, Durga, 1634 Pedrido, Rosa, 1473 Pojarová, Michaela, 1597 Ramos, M. Luísa, 1531 Raston, Colin L., 1478 Roberts, Benjamin P., 1543 Rohrs, Henry, 1478

Rojo, Teófilo, 1582 Rossi, Patrizia, 1617 Rovisco, José, 1531 Scanlon, Martin J., 1543 Seixas de Melo, J., 1531 Sirsch, Peter, 1573 Sobolev, Alexandre N., 1478 Sobral, Abilio J. F. N., Spange, Stefan, 1493 Steed, Jonathan W., 1573 Stibor, Ivan, 1597 Su, Dian, 1478 Szakács, Zoltán, 1608 Tkadlecová, Marcela, 1597 Tocher, Derek A., 1513 Trzeciak, Anna M., 1509 Urtiaga, Miren K., 1582 Vázquez, M. Eugenio, 1473 Vázquez López, Miguel, 1473 Vioux, André, 1519 Wainwright, Kevin P., 1500 Wang, Xuesong, 1555 Wildgoose, Gregory G., 1628 Xiao, Lei, 1628 Yang, Guoqiang, 1555 Zhang, Baowen, 1555 Zhu, Ying-Jie, 1526 Ziółkowski, Józef J., 1509

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