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### IN THIS ISSUE

ISSN 1359-7345 CODEN CHCOFS (32) 3693-3808 (2008)



Cover

See Simin Liu and Bruce C. Gibb, pp. 3709–3716. An aqueous solution that sequesters and separates hydrocarbon gases is one possibility when deep-cavity cavitands harness the hydrophobic effect. Image reproduced by permission of Simin Liu and Bruce C. Gibb from *Chem. Commun.*, 2008, 3709.



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#### Inside cover

See Edwin C. Constable *et al.*, pp. 3717–3719. New solar cells using copper rather than ruthenium offer a hope of a cheaper future technology. Image reproduced by permission of Takeru Bessho, Edwin C. Constable, Michael Graetzel, Ana Hernandez Redondo, Catherine E. Housecroft, William Kylberg, Md. K. Nazeeruddin, Markus Neuburger and Silvia Schaffner from *Chem. Commun.*, 2008, 3717.

### FEATURE ARTICLE

### 3709

### High-definition self-assemblies driven by the hydrophobic effect: synthesis and properties of a supramolecular nanocapsule

Simin Liu and Bruce C. Gibb\*

High definition self-assemblies normally rely on enthalpy to promote assembly. An alternative strategy, using entropy to drive assembly, is illustrated by a review of the properties of capsular complexes that assemble *via* the hydrophobic effect.

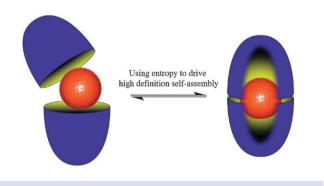


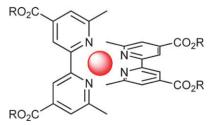
### 3717

### An element of surprise—efficient copper-functionalized dye-sensitized solar cells

Takeru Bessho, Edwin C. Constable,\* Michael Graetzel, Ana Hernandez Redondo, Catherine E. Housecroft, William Kylberg, Md. K. Nazeeruddin, Markus Neuburger and Silvia Schaffner

Copper(1) complexes of carboxylate-functionalized 2,2'bipyridine ligands prove surprisingly effective photosensitizers for DSSCs.





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### 3720

Anion hydrogen bond effects in the formation of planar or quintuple helical coordination polymers

Peter Byrne, Gareth O. Lloyd, Kirsty M. Anderson, Nigel Clarke and Jonathan W. Steed\*

A linear bis(pyridylurea) ligand forms a 1D coordination polymer with Ag(I) that twists into a quintuple helix *via* urea  $\cdots$  anion hydrogen bonding interactions.



### Surface immobilization of biomolecules by click sulfonamide reaction

Thimmaiah Govindaraju, Pascal Jonkheijm, Lars Gogolin, Hendrik Schroeder, Christian F. W. Becker, Christof M. Niemeyer and Herbert Waldmann\*

Alkyne-modified biomolecules can be immobilized site- and chemoselectively on sulfonylazide slides under very mild conditions by means of the click sulfonamide reaction.

### 3726

### Temperature-triggered reversible micellar self-assembly of linear-dendritic block copolymers

Hyung-il Lee, Jung Ah Lee, Zhiyong Poon and Paula T. Hammond\*

Polymeric micelles based on a thermoresponsive lineardendritic block copolymer were completely disrupted into unimers upon cooling the solution to a temperature below its LCST and reversibly regenerated upon heating again.

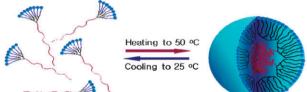
### 3729

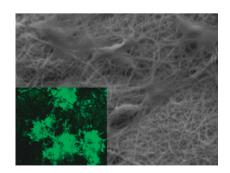
### 3D Bio-nanofibrous PPy/SIBS mats as platforms for cell culturing

Yong Liu, Xiao Liu, Jun Chen,\* Kerry J. Gilmore and Gordon G. Wallace\*

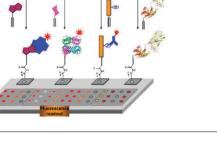
3D bio-nanofibrous PPy/SIBS mats, prepared *via* a vaporphase polymerization modified electrospinning process, provide excellent platforms for PC12 cells attachment and growth, indicating potential applications in areas requiring good mass transport such as nerve growth guidance channels.











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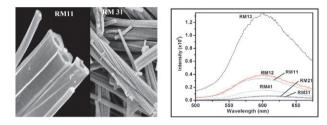
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### 3732

### Hierarchical tuning of 1-D macro morphology by changing the composition of a binary hydrogel and its influence on the photoluminescence property

Abhijit Saha, Swarup Manna and Arun K. Nandi\*

1-D morphological tuning in the riboflavine(R)-melamine(M) hydrogel system (from helical fibre to rod-like to tubular morphology) with an interesting photoluminescence property by changing the composition of the RM components.



### 3735

### Electrochemically and photochemically active Palladium(II) heterotopic metallacalix[3]arenes

Miguel A. Galindo, Andrew Houlton,\* William Clegg, Ross W. Harrington, José Dobado, Francisco Santoyo-Gonzalez, Fatima Linares, M. Angustias Romero\* and Jorge A. R. Navarro\*

The cyclic trinuclear system,  $[(en)_3Pd_3(4,7\text{-phen})_3]^{6+}$ , undergoes a ligand exchange reaction with 5-R-2-hydroxypyrimidine derivatives to give  $[(en)_3Pd_3(4,7\text{-phen})_2(\text{Rpymo})]^{5+}$ , functional supramolecular receptors.

### 3738

#### Generation of a triplet diradical from a donor-acceptor cross conjugate upon acid-induced electron transfer

Mats O. Sandberg, Osami Nagao, Zhikun Wu, Michio M. Matsushita and Tadashi Sugawara\*

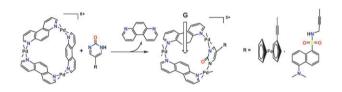
Protonation of a *para*-quinodiimine unit leads to the intramolecular electron transfer from the cross-conjugated donor unit, giving rise to a diradical species.

### 3741

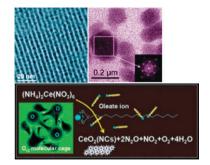
### One-pot synthesis of monodisperse $\mbox{CeO}_2$ nanocrystals and superlattices

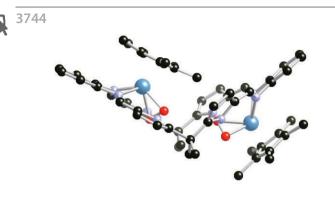
Ziyang Huo, Chen Chen, Xiangwen Liu, Deren Chu, Haohang Li, Qing Peng and Yadong Li\*

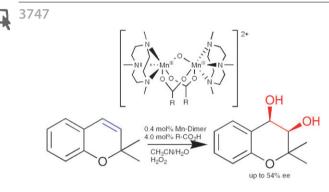
3 nm monodisperse CeO<sub>2</sub> nanocrystals and submicrometer colloidal particles with superlattice structures have been synthesized from ethanol–water mixed solvent by a one-pot approach using icosahedral (NH<sub>4</sub>)<sub>2</sub>Ce(NO<sub>3</sub>)<sub>6</sub> as precursor. Using the as-obtained NCs as support, an Au/CeO<sub>2</sub> catalyst exhibited good catalytic property for CO oxidation at room temperature.











3750



### Binuclear organometallic ruthenium complexes of a Schiff base expanded porphyrin

Luciano Cuesta, Elisa Tomat, Vincent M. Lynch and Jonathan L. Sessler\*

The synthesis of binuclear "piano stool" ruthenium complexes of a Schiff base oligopyrrolic macrocycle is reported. Hydrogen bonding donors play a role in stabilizing these complexes, with an unprecedented hydrogen bond interaction being observed between the pyrrole NH's and a metal-bound dioxygen ligand in one complex.

### Manganese catalysed asymmetric $\ensuremath{\textit{cis}}\xspace$ -dihydroxylation with $H_2O_2$

Johannes W. de Boer, Wesley R. Browne, Syuzanna R. Harutyunyan, Laura Bini, Theodora D. Tiemersma-Wegman, Paul L. Alsters, Ronald Hage and Ben L. Feringa\*

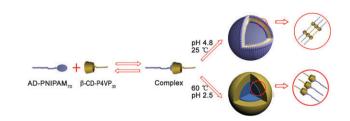
High turnover enantioselective alkene *cis*-dihydroxylation with  $H_2O_2$  catalysed by manganese based complexes containing chiral carboxylato ligands.

#### Catalytic asymmetric deprotonation of phosphine boranes and sulfides as a route to *P*-stereogenic compounds

Jonathan J. Gammon, Steven J. Canipa, Peter O'Brien,\* Brian Kelly and Sven Taylor

Comparing phosphine boranes and sulfides in their catalytic asymmetric deprotonation using RLi and sub-stoichiometric (–)-sparteine has revealed superior catalytic efficiency with phosphine sulfides.

3753



### Construction and micellization of a noncovalent double hydrophilic block copolymer

Jianguo Zeng, Keyu Shi,\* Yuying Zhang, Xuehui Sun and Baolong Zhang

The first noncovalent double hydrophilic block copolymer was constructed through inclusion complexation between  $\beta$ -cyclodextrin and the adamantyl group; it can further self-assemble into two distinctly different micelles in response to pH and temperature in dilute aqueous solution.

### 3756

G

### $Phase-selectivity\ photocatalysis:\ a\ new\ approach\ in\ organic\ pollutants'\ photodecomposition\ by\ nanovoid\ core(TiO_2)/shell(SiO_2)\ nanoparticles$

Sheng Wang,\* Tao Wang, Wenxing Chen and Teruo Hori

 $Core(TiO_2)/shell(SiO_2)$  nanoparticles, with a void layer between the TiO<sub>2</sub> core and the silica layer, act as phase-selectivity photocatalysts for the photodecomposition of organic pollutants (gas phase) without any damage to their organic supports (solid phase).

### 3759

### Hydrothermal carbon spheres containing silicon nanoparticles: synthesis and lithium storage performance

Rezan Demir Cakan, Maria-Magdalena Titirici,\* Markus Antonietti, Guanglei Cui, Joachim Maier\* and Yong-Sheng Hu\*

Spherically shaped carbon/silicon nanocomposites have been obtained using hydrothermal carbonization of glucose in the presence of commercially available silicon nanoparticles and have been tested electrochemically as an anode material for lithium-ion batteries.

### 3762

### Synthesis of novel chalcogenide 'lifebelts' and their electrogenerated chemiluminescence

Jian-Jun Miao, Gui-Fen Jie, Yu-Ping Chen, Lei Zhang, Li-Ping Jiang\* and Jun-Jie Zhu\*

Novel chalcogenide lifebelts have been prepared by using a simple sacrificial template method, and their electrogenerated chemiluminescence properties were studied.

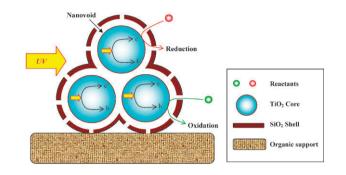
### 3765

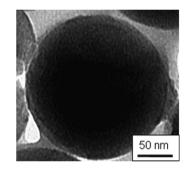
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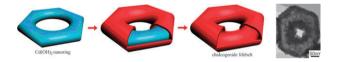
### Synthesis, and two photon absorption properties of 7,7'-(iminundecahydro-*closo*-dodecaborate)-9,9'-(dihexyl)-2,2'bifluorene

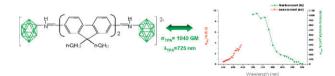
Rémy Bernard,\* Cyril Barsu, Patrice L. Baldeck, Chantal Andraud, David Cornu, Jean-Pierre Scharff and Philippe Miele

Synthesis and two photon-absorption study of the first example of a centrosymetric bifluorene derivative including a closododecaborate anion as the original electron donating group.









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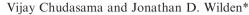


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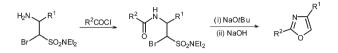
### 3768

G

### A versatile synthesis of 2,4-substituted oxazoles



A variety of five-membered ring oxazoles have been synthesised with complete regiocontrol and without the requirement for ring oxidation via a reaction sequence based on a vinyl sulfonamide template.



### 3771

G

Polymerase chain reaction-based biochemical logic gate coupled with cell-free transcription-translation of green fluorescent protein as a report gate

Takahiko Nojima,\* Takatoki Yamamoto, Hiroshi Kimura and Teruo Fujii

PCR-based biochemical logic gates were designed for AND, OR, NOT, and AND-NOT operations, whose output signal is reported by coupled cell-free transcription-translation of green fluorescent protein.

#### 3774 G

2,3-Heteroaromatic ring-fused cyclohexanones via heteroaromatic homo-Nazarov cyclization of donor-acceptor substituted cyclopropanes

Veejendra K. Yadav\* and Naganaboina Vijaya Kumar

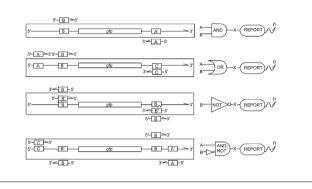
Heteroaryl 2-silylmethyl-substituted cyclopropyl ketones rearrange under Lewis acid conditions via heteroaromatic homo-Nazarov cyclization to form 2,3-heteroaromatic ring fused 4-t-butyldiphenylsilylmethyl-substituted cyclohexanones.

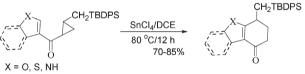
### 3777

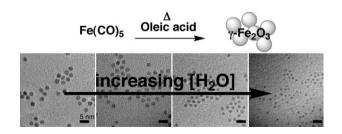
### The influence of trace water concentration on iron oxide nanoparticle size

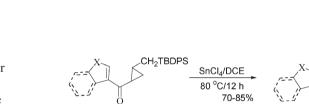
Janet E. Macdonald, Christopher J. Brooks and Jonathan G. C. Veinot\*

The size of iron oxide nanoparticles, prepared from the thermal decomposition of Fe(CO)<sub>5</sub> in a high boiling solvent in the presence of oleic acid, is affected by water concentration.











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10739

### 3780

### Activation of organozinc reagents with t-Bu-P4 base for transition metal-free catalytic $S_N 2^\prime$ reaction

Koji Kobayashi, Masahiro Ueno, Hiroshi Naka and Yoshinori Kondo\*

The *t*-Bu-P4 base was used to promote  $S_N 2'$  reaction of  $\alpha,\beta$ -unsaturated esters bearing a  $\gamma$ -chloride using organozinc reagents with excellent chemo- and regioselectivity.



### Vanadium–vitamin $B_{12}$ bioconjugates as potential therapeutics for treating diabetes

Riya Mukherjee, Edward G. Donnay, Michal A. Radomski, Catherine Miller, Duane A. Redfern, Arne Gericke, Derek S. Damron and Nicola E. Brasch\*

Although vanadium(v) and (v) complexes lower blood glucose levels, their poor absorption necessitates high doses. A novel cobalamin conjugate incorporating a hydroxypyridinone type ligand binds vanadate tightly, thus transporting it into cells by efficient B<sub>12</sub> uptake mechanisms.

### 3786

### Chemoenzymatic acylation of aminoglycoside antibiotics

Nicholas M. Llewellyn\* and Jonathan B. Spencer

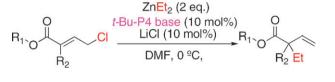
The chemoenzymatic installation of the (*S*)-4-amino-2hydroxybutyryl side chain onto 2-deoxystreptamine-containing aminoglycosides is described using the purified *Bacillus circulans* biosynthetic enzymes BtrH and BtrG in combination with a synthetic acyl-SNAC surrogate substrate.

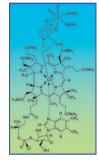
### 3789

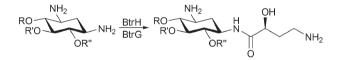
Anionic benzothiadiazole containing polyfluorene and oligofluorene as organic sensitizers for dye-sensitized solar cells

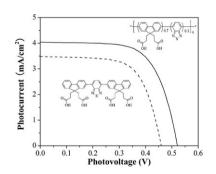
Xizhe Liu, Rui Zhu, Yong Zhang, Bin Liu\* and Seeram Ramakrishna\*

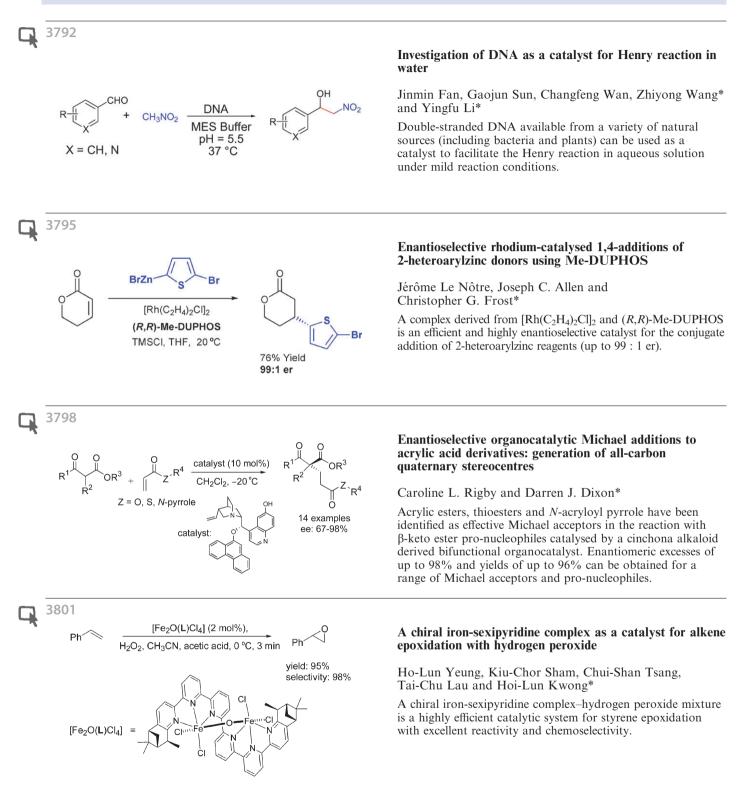
Anionic polyfluorene and oligofluorene derivatives were synthesized and utilized as organic dye sensitizers in dye sensitized solar cells to show a maximum power conversion efficiency of 1.39%.









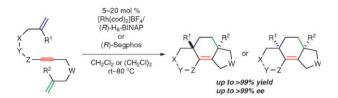


### 3804

Rhodium-catalyzed enantio- and diastereoselective intramolecular [2 + 2 + 2] cycloaddition of unsymmetrical dienynes

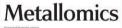
Hiromi Sagae, Keiichi Noguchi, Masao Hirano and Ken Tanaka\*

A cationic rhodium(I)/(R)-H<sub>8</sub>-BINAP or (R)-Segphos complex catalyzes an intramolecular [2 + 2 + 2] cycloaddition of unsymmetrical dienynes, leading to fused tri- and tetracyclic cyclohexenes bearing two tertiary or quaternary carbon centers in high yields with high enantio- and diastereoselectivity.



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