# **ChemComm**

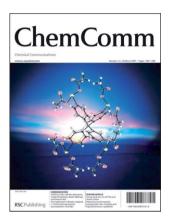
### Chemical Communications

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### IN THIS ISSUE

ISSN 1359-7345 CODEN CHCOFS (12) 1189-1288 (2007)



See Yasuyuki Kita et al., page 1224. The use of fluoroalcohols expands the concept of catalytic utilization of hypervalent iodine reagents. Image reproduced by permission of Toshifumi Dohi. Akinobu Maruyama, Yutaka Minamitsuji, Naoko Takenaga and Yasuyuki Kita, from Chem. Commun., 2007, 1224.



### Inside cover

See Arnold J. Kell and Benoit Simard, page 1227. The orientation of vancomycin on the surface of superparamagnetic nanoparticles has a drastic effect on their ability to magnetically "fish" vancomycin-antibody modified polystyrene beads from aqueous solution. Image reproduced by permission of Arnold J. Kell and Benoit Simard, from Chem. Commun., 2007, 1227.

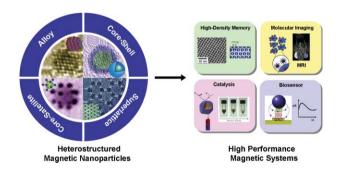
### **FEATURE ARTICLE**

1203

### Heterostructured magnetic nanoparticles: their versatility and high performance capabilities

Young-wook Jun, Jin-sil Choi and Jinwoo Cheon\*

Recent advances in the development of heterostructured nanoparticles including alloys, core-shells, and binary superlattices are discussed. Their multifunctionalities and high performance capabilities are demonstrated for applications in magnetic storages, catalysis, and biomedical diagnostics.



### **COMMUNICATIONS**

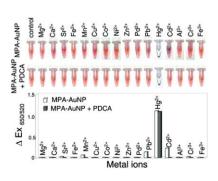
1215



### Parameters for selective colorimetric sensing of mercury(II) in aqueous solutions using mercaptopropionic acid-modified gold nanoparticles

Chih-Ching Huang and Huan-Tsung Chang\*

A new homogeneous assay—using mercaptopropionic acidmodified Au nanoparticles (MPA-AuNPs) in the presence of 2,6-pyridinedicarboxylic acid (PDCA)—for the highly selective and sensitive detection of Hg<sup>2+</sup> ions.



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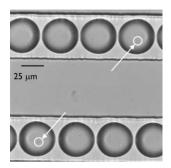
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### 1218

# Quantitative detection of protein expression in single cells using droplet microfluidics

A. Huebner, M. Srisa-Art, D. Holt, C. Abell, F. Hollfelder, A. J. deMello and J. B. Edel

We demonstrate that single cells can be controllably compartmentalized within aqueous microdroplets. Using such an approach we perform high-throughput screening by detecting the expression of a fluorescent protein in individual cells with simultaneous measurement of droplet size, fluorescence and cell occupancy.

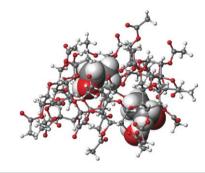


### 1221

## Effect of peracetylation on the conformation of $\gamma$ -cyclodextrin

Mino R. Caira,\* Giampiero Bettinetti, Milena Sorrenti, Laura Catenacci, Dyanne Cruickshank and Kate Davies

Peracetylation of the  $\gamma$ -cyclodextrin molecule destroys the fourfold symmetry that typifies the conformation observed in its crystalline inclusion complexes. 'Self-inclusion' of acetyl residues in the derived molecule results in the formation of two sub-cavities that accommodate guest solvent molecules.



### 1224

# First hypervalent iodine(III)-catalyzed C-N bond forming reaction: catalytic spirocyclization of amides to N-fused spirolactams

Toshifumi Dohi, Akinobu Maruyama, Yutaka Minamitsuji, Naoko Takenaga and Yasuyuki Kita\*

The authors have developed the first iodoarene-catalyzed intramolecular carbon–nitrogen bond forming reaction utilizing CF<sub>3</sub>CH<sub>2</sub>OH media in the presence of stoichiometric cooxidant, *m*-chloroperbenzoic acid (*m*CPBA).

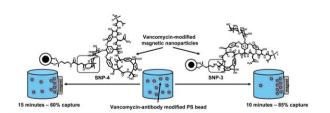
X = N-phthalimide, OMe

### 1227

# Vancomycin architecture dependence on the capture efficiency of antibody-modified microbeads by magnetic nanoparticles

Arnold J. Kell and Benoit Simard\*

We show that the ability to control the architecture/orientation of vancomycin on the surface of magnetic nanoparticles has a drastic effect on the ability of the nanoparticles to magnetically confine vancomycin-antibody modified polystyrene microbeads.





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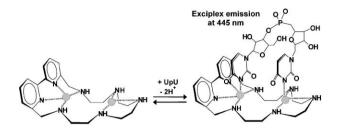
### **COMMUNICATIONS**

### 1230

### A dizinc complex for selective fluorescence sensing of uridine and uridine-containing dinucleotides

Carla Bazzicalupi, Andrea Bencini,\* Laura Bussotti, Emanuela Berni, Silvia Biagini, Enrico Faggi, Paolo Foggi,\* Claudia Giorgi, Andrea Lapini, Agnese Marcelli and Barbara Valtancoli

A dizinc complex with a polyamine macrocycle is able to selectively sense uridine as well as U(3'-5')pU and U(3'-5')pA, thanks to an exciplex emission arising from a π-stacking complex involving dipyridine and Zn(II)-bound uridine units.

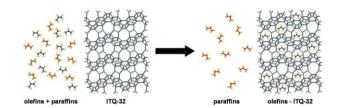


### 1233

### Pure silica ITO-32 zeolite allows separation of linear olefins from paraffins

Miguel Palomino, Angel Cantín, Avelino Corma, Sandra Leiva, Fernando Rey\* and Susana Valencia\*

Pure silica ITO-32 zeolite is a promising material for separation of light linear olefins and paraffins from their mixtures.



### 1236

### Direct-type catalytic Mannich reactions of amides with imines

Susumu Saito, Tetsu Tsubogo and Shū Kobayashi\*

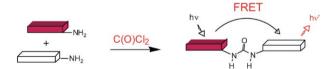
Direct-type catalytic Mannich reactions of amides with imines proceeded smoothly using barium phenoxide as a catalyst to afford the desired adducts in high yields with high anti selectivities.

### 1238

### A FRET approach to phosgene detection

Hexiang Zhang and Dmitry M. Rudkevich\*

A FRET approach towards potential detection of phosgene is presented, which is based on a selective chemical reaction between phosgene (or triphosgene as a simulant) and donor and acceptor fluorophores.



# Alternative Fuel Technologies

A series of PCCP special issues guest edited by Joachim Maier (MPI Stuttgart), Dirk Guldi (Universität Erlangen-Nürnberg), and Adriano Zecchina (University of Torino)

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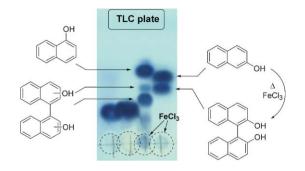
### **COMMUNICATIONS**

### 1240

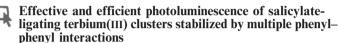
### TLC plates as a convenient platform for solvent-free reactions

Jonathan M. Stoddard,\* Lien Nguyen, Hector Mata-Chavez and Kelly Nguyen

Solvent-free oxidative couplings of naphthols have been optimized by co-spotting catalysts and substrates directly on silica TLC plates and heating, followed by chromatography, staining, and qualitative visualization.

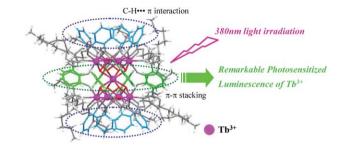


### 1242



Kazuhiro Manseki and Shozo Yanagida\*

A nonanuclear terbium(III) hydroxo cluster with wellorganized salicyl esters gives remarkable terbium(III) emission by longer wavelength photosensitization, i.e., by near-UV light excitation.

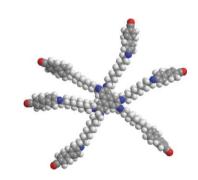


### 1245

### Oligomeric rod-disc nematic liquid crystals

Corrie T. Imrie,\* Zhibao Lu, Stephen J. Picken and Zeynep Yildirim

Liquid crystals consisting of molecules having a triphenylene core attached to which are six 4-cyanobiphenyl units via flexible spacers are described; the molecular symmetry is disc-like and discotic nematic phases are observed.



### 1248

### Polymeric model systems for flavoenzyme activity: towards synthetic flavoenzymes

Brian J. Jordan, Graeme Cooke,\* James F. Garety, Michael A. Pollier, Nadiya Kryvokhyzha, Ali Bayir, Gouher Rabani and Vincent M. Rotello

The authors report the synthesis of a water soluble flavin polymer using ATRP, whereby the oligoethylene glycol backbone provides both a local hydrophobic environment and redox tuning of the flavin moiety typical of flavoenzyme prototypes.

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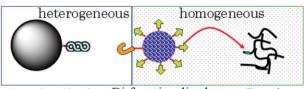
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1251

### A novel quantitative proteomics reagent based on soluble nanopolymers

Minjie Guo, Jacob Galan and W. Andy Tao\*

A new strategy, termed Soluble Polymer-based Isotopic Labeling (SoPIL), was presented for quantitative proteomics. Bi-functionalized dendrimers leads to highly efficient quantitation and the determination of protease activities in snake venoms.



Functionalized resin

Bi-functionalized soluble nanopolymer

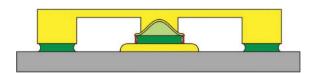
Proteins /Peptides

1254

### Molecular electronics: connection across nano-sized electrode gaps

Geoffrey J. Ashwell,\* Piotr Wierzchowiec, Catherine J. Bartlett and Philip D. Buckle

Prefabricated nano-scale structures in which gold electrodes are separated by an insulating core permit self-assembly of a single string "molecular necklace" around the circumference and such devices require no further invasive metal deposition following molecular insertion.

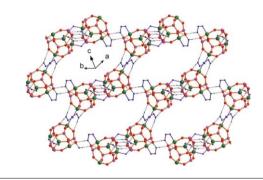


1257

### Seeking tetrameric transition metal phosphonate with a D4R core and organising it into a 3-D supramolecular assembly

Ramaswamy Murugavel\* and Swaminathan Shanmugan

The first example of a transition metal phosphonate whose core resembles the D4R SBU of zeolites has been synthesised; this compound forms an interesting 3-D supramolecular framework.



1260

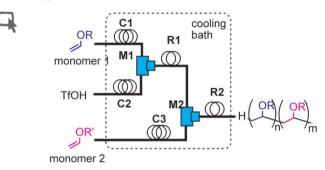
### Metal-catalyzed radical polyaddition as a novel polymer synthetic route

Kotaro Satoh, Masato Mizutani and Masami Kamigaito\*

A new class of polymerizations was developed *via* metal-catalyzed C–C bond forming radical polyaddition. The monomers were designed to have a reactive C-Cl bond along with a C=C bond, to which the carbon radical generated from another molecule adds to form a C-C backbone polymer with an inactive C-Cl pendant.

### **COMMUNICATIONS**

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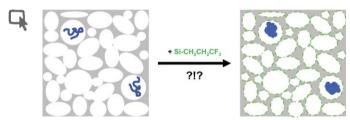


# Microsystem controlled cationic polymerization of vinyl ethers initiated by CF<sub>3</sub>SO<sub>3</sub>H

Takeshi Iwasaki, Aiichiro Nagaki and Jun-ichi Yoshida\*

Practical cationic polymerization and block-copolymerization of vinyl ethers have been achieved at −25 °C by using CF<sub>3</sub>SO<sub>3</sub>H initiator in microsystems with high level of molecular weight distribution control.

1266

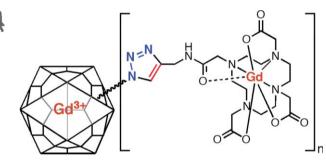


Hydrophobic, organically-modified silica gels enhance the secondary structure of encapsulated apomyoglobin

Veronica A. Rocha and Daryl K. Eggers\*

Insertion of hydrophobic groups in a silica matrix, by addition of propyl- or trifluoropropyltrimethoxysilane, leads to a surprising increase in the helical content of apomyoglobin following encapsulation by the sol–gel technique.

1269

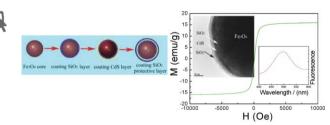


Viral MRI contrast agents: coordination of Gd by native virions and attachment of Gd complexes by azide-alkyne cycloaddition

Duane E. Prasuhn, Jr., Robert M. Yeh, Andre Obenaus, Marianne Manchester and M. G. Finn\*

Icosahedral virions were rendered active for MRI by attachment of Gd(III) ions to the interior and exterior surfaces of virus particles using complementary coordination and covalent methods.

1272



# Fabrication of well-defined water-soluble core/shell heteronanostructures through the SiO<sub>2</sub> spacer

Minghai Chen, Lian Gao,\* Songwang Yang and Jing Sun

An approach to the fabrication of core/shell heteronanostructures through a chemical bath deposition method assisted by the bridging of  $\mathrm{SiO}_2$  spacer has been developed including a slow heterogeneous nucleation mechanism.

### 1275

### Highly unusual conversion of 1-alkyl-2-(bromomethyl)aziridines into 1-alkyl-2-(N-alkyl-N-ethylaminomethyl)aziridines using methyllithium

Matthias D'hooghe and Norbert De Kimpe\*

1-Alkyl-2-(bromomethyl)aziridines were transformed into 1-alkyl-2-(*N*-alkyl-*N*-ethylaminomethyl)aziridines upon treatment with methyllithium through a highly unusual reaction course with a novel  $S_N2'$ -type substitution at the aziridine moiety and liberation of acetylene from an intermediate vinylamine as the key reaction steps.

### 1278

### Fine tuning of the orifice size of an open-cage fullerene by placing selenium in the rim: insertion/release of molecular hydrogen

Shih-Ching Chuang, Yasujiro Murata,\* Michihisa Murata, Sadayuki Mori, Shuhei Maeda, Fumiyuki Tanabe and Koichi Komatsu\*

A newly synthesized open-cage fullerene containing selenium in the rim of the 13-membered-ring orifice allows milder conditions for hydrogen insertion, and the rate for hydrogen release is ca. 3-times faster than its sulfur analogue.

### 1281

### Reaction of imines with N-iodosuccinimide (NIS): unexpected formation of stable 1:1 complexes

Isabel Castellote, María Morón, Carolina Burgos,\* Julio Alvarez-Builla, Avelino Martin, Pilar Gómez-Sal and Juan J. Vaquero\*

Substituted cyclic imines and some ketimines react with NIS to afford unexpected stable 1:1 complexes based on a halogen bonding between the iminic nitrogen and the iodine of NIS. The structure of one of the complexes was determined by single-crystal X-ray diffraction.

$$\begin{array}{c|c}
R & R^1 & NIS \\
R & N & CH_2CI_2, r.t.
\end{array}$$

$$\begin{array}{c|c}
R & R' & O \\
R & N & O \\
\end{array}$$

$$\begin{array}{c|c}
R & R' & O \\
\end{array}$$

$$\begin{array}{c|c}
R & O \\
\end{array}$$

### 1284

### Dynamic kinetic resolution of 2-oxo-3-aryl-succinates by organocatalyzed aldolization

Yajun Wang, Zongxuan Shen, Bin Li, Yong Zhang and Yawen Zhang\*

The dynamic kinetic resolution of 2-oxo-3-arylsuccinates was achieved via L-proline-catalyzed addition of acetone in acetonitrile at room temperature, providing the desired adduct in good yield with up to 87: 13 dr and high ee up to 99%.

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