

# ChemComm

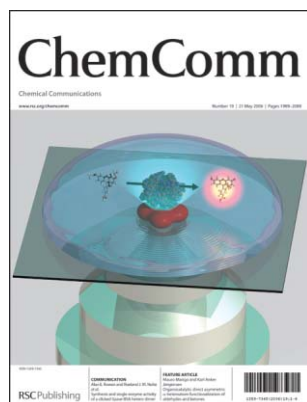
Chemical Communications

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## IN THIS ISSUE

ISSN 1359-7345 CODEN CHCOFS (19) 1989–2080 (2006)



### Cover

See Nikos S. Hatzakis, Hans Engelkamp, Kelly Velonia, Johan Hofkens, Peter C. M. Christianen, Allan Svendsen, Shamkantr A. Patkar, Jesper Vind, Jan C. Maan, Alan E. Rowan and Roeland J. M. Nolte, page 2012. Single enzyme kinetics of a TLL–BSA hetero-dimer, in which the BSA acts as a *protein foot*, was measured using confocal fluorescent microscopy. Image reproduced by permission of Alan E. Rowan and Roeland J. M. Nolte *et al.* from *Chem. Commun.*, 2006, 2012.



### Inside cover

See Kana M. Sureshan, Melanie Trusselle, Stephen C. Tovey, Colin W. Taylor and Barry V. L. Potter, page 2015. A synthetic glyconucleotide binds to a second messenger receptor core releasing  $\text{Ca}^{2+}$  more effectively than the natural ligand; cells loaded with fluorescent dye in 96-wells facilitate determination of the dose-response curve (yellow). Image reproduced by permission of Barry V. L. Potter *et al.* from *Chem. Commun.*, 2006, 2015.

## CHEMICAL SCIENCE

C33

In this issue...

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, as well as the most significant scientific advances.

# Chemical Science

May 2006/Volume 3/Issue 5

[www.rsc.org/chemicalscience](http://www.rsc.org/chemicalscience)

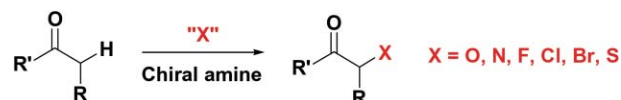
## FEATURE ARTICLE

2001

### Organocatalytic direct asymmetric $\alpha$ -heteroatom functionalization of aldehydes and ketones

Mauro Marigo and Karl Anker Jørgensen\*

The organocatalytic enantioselective amination, oxygenation, fluorination, chlorination, bromination and sulfenylation of aldehydes and ketones, using chiral amines as the catalysts, leading to optically active compounds of significant importance for *e.g.* the life-science industry are presented. Furthermore, some other transformations are also outlined, as well as their scope, potential and application.



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Chemical Communications

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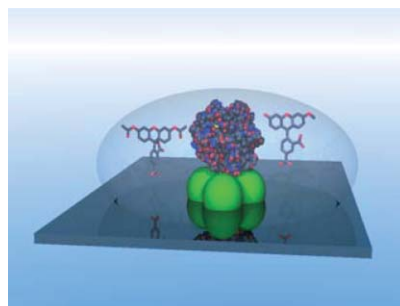
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2012

### Synthesis and single enzyme activity of a clicked lipase–BSA hetero-dimer

Nikos S. Hatzakis, Hans Engelkamp, Kelly Velonia, Johan Hofkens, Peter C. M. Christianen, Allan Svendsen, Shamkantr A. Patkar, Jesper Vind, Jan C. Maan, Alan E. Rowan\* and Roeland J. M. Nolte\*

A novel clicked TLL–BSA heterodimer is found to be more active compared to native TLL. Single molecule studies reveal that the anchored TLL remains active for more than 40 000 turnovers and slowly fluctuates between different conformations each with its own catalytic activity.

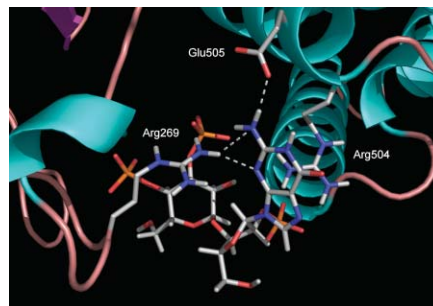


2015

### Guanophostin A: Synthesis and evaluation of a high affinity agonist of the D-myo-inositol 1,4,5-trisphosphate receptor

Kana M. Sureshan, Melanie Trusselle, Stephen C. Tovey, Colin W. Taylor and Barry V. L. Potter\*

Guanophostin A is the most potent synthetic adenophostin A-like agonist at the Ins(1,4,5)P<sub>3</sub> receptor; multiple interactions of the guanine moiety with the receptor binding core are proposed.

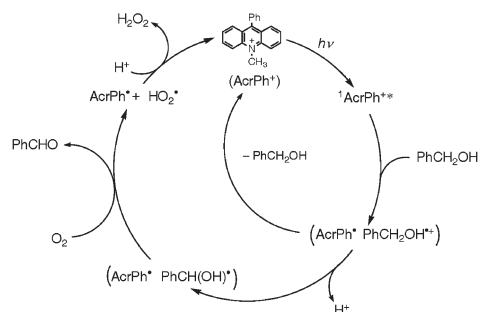


2018

### Solvent-free selective photocatalytic oxidation of benzyl alcohol to benzaldehyde by molecular oxygen using 9-phenyl-10-methylacridinium

Kei Ohkubo, Kyou Suga and Shunichi Fukuzumi\*

9-Phenyl-10-methylacridinium ion acts as an effective photocatalyst for solvent free selective photocatalytic oxidation of benzyl alcohol to benzaldehyde under visible light irradiation *via* photoinduced electron transfer.

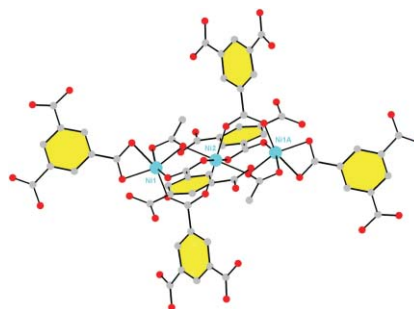


2021

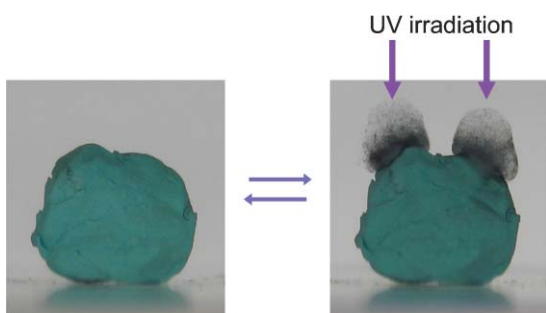
### Microwave-assisted synthesis of anionic metal–organic frameworks under ionothermal conditions

Zhuojia Lin, David S. Wragg and Russell E. Morris\*

Ionothermal synthesis—the use of an ionic liquid as both solvent and template in the synthesis of materials—has been used to prepare, in combination with microwave heating, an anionic metal–organic framework. The ionic liquid cation is occluded in the structure to balance the charge on the framework.



2024

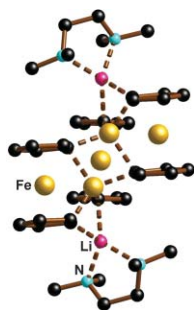


### Three-dimensional motion and transformation of a photoelectrochemical actuator

Kazutake Takada, Taichi Miyazaki, Nobutaka Tanaka and Tetsu Tatsuma\*

A new “photoelectrochemical actuator” consisting of poly(acrylic acid)/copper gel and TiO<sub>2</sub> nanoparticles has been developed, which undergoes reversible expansion/contraction upon UV light irradiation/termination, likely due to dissociation/formation of carboxylic group/Cu<sup>2+</sup> binding.

2027

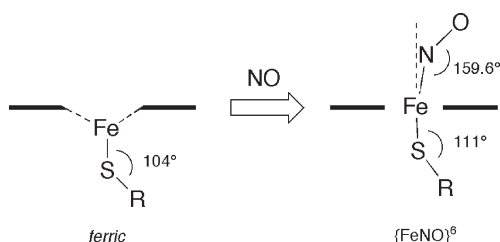


### The pentanuclear Fe<sup>II</sup> cluster [(C<sub>5</sub>H<sub>4</sub>)<sub>6</sub>Fe<sub>5</sub>]<sup>2-</sup>: bringing together ferrocene sandwiches and homoleptic Fe<sup>II</sup>-cyclopentadienyl σ-complexes

Ingeborg Sanger, Julia B. Heilmann, Michael Bolte, Hans-Wolfram Lerner and Matthias Wagner\*

Reaction of 1,1'-dilithioferrocene with FeCl<sub>2</sub> gives the first example of a ferra[1]ferrocenophane. Two such moieties, bridged by a 1,1'-ferrocenediyl unit, are present in the pentanuclear complex [(fc)<sub>3</sub>(Fe)<sub>2</sub>(Li)<sub>2</sub>·(TMEDA)<sub>2</sub>].

2030

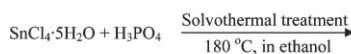


### The first structurally characterized nitrosyl heme thiolate model complex

Nan Xu, Douglas R. Powell, Lin Cheng and George B. Richter-Addo\*

Reaction of nitric oxide with crystals of [Fe(oep){S-2,6-(CF<sub>3</sub>CONH)<sub>2</sub>C<sub>6</sub>H<sub>3</sub>}] gives [Fe(oep)(NO){S-2,6-(CF<sub>3</sub>CONH)<sub>2</sub>C<sub>6</sub>H<sub>3</sub>}]; the structure reveals a bent FeNO moiety in this formally “ferric” {FeNO}<sup>6</sup> derivative.

2033



### One-pot synthesis of spring-like superstructures consisting of layered tin(IV) hydrogen phosphate nanodisks

Hui Qiao, Falong Jia, Zhihui Ai, Zhaosheng Li and Lizhi Zhang\*

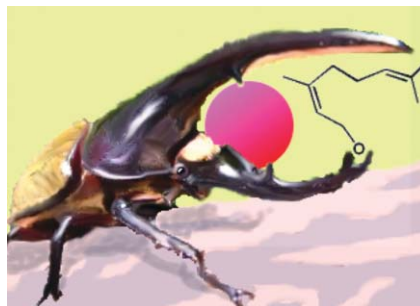
One-pot solvothermal treatment of tin tetrachloride and phosphoric acid in ethanol produced spring-like superstructures consisting of layered tin(IV) hydrogen phosphate nanodisks.

2036

### Hybrid bidentate ligand for functional recognition: an application to regioselective C=C double bond hydrogenation

Frédéric Goettmann, Pascal Le Floch\* and Clément Sanchez\*

High regioselectivities can be obtained in heterogeneously catalysed hydrogenation by using the supporting material as a functional recognition agent.

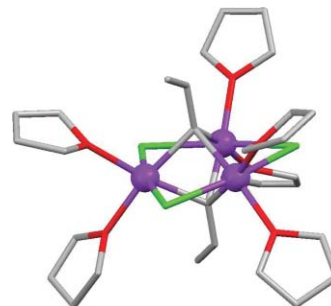


2039

### The cationic cluster Grignard $[\{\text{MgCl}(\text{thf})_2\}_3(\mu_3\text{-C}_3\text{H}_5)_2]^+$

Richard A. Layfield,\* Thomas H. Bullock, Felipe García, Simon M. Humphrey and Peter Schüler

The reaction of allylmagnesium chloride with methylaluminium dichloride in thf solvent unexpectedly affords the ion-separated complex  $[\{\text{MgCl}(\text{thf})_2\}_3(\mu_3\text{-C}_3\text{H}_5)_2][\text{Mg}(\text{C}_3\text{H}_5)_4]$ , which contains both a cluster Grignard and a tetraorganomagnesiolate dianion.

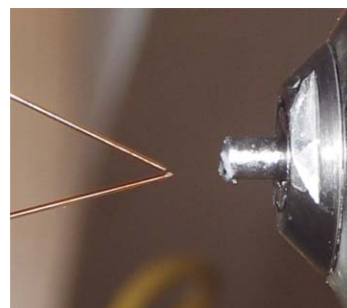


2042

### Extractive electrospray ionization for direct analysis of undiluted urine, milk and other complex mixtures without sample preparation

Huanwen Chen, Andre Venter and R. Graham Cooks\*

On-line droplet-droplet extraction and electrospray ionization for direct, continual analysis by mass spectrometry of trace components in complex samples such as raw undiluted urine.

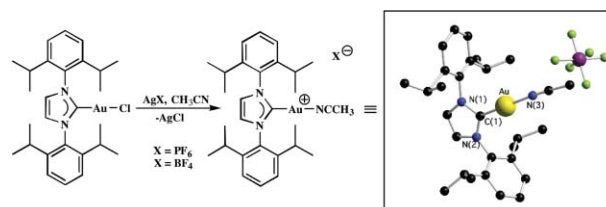


2045

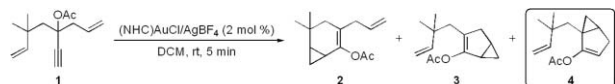
### Synthesis, isolation and characterization of cationic gold(I) *N*-heterocyclic carbene (NHC) complexes

Pierre de Frémont, Edwin D. Stevens, Manuel R. Fructos, M. Mar Díaz-Requejo, Pedro J. Pérez and Steven P. Nolan\*

A number of cationic gold(I) complexes have been synthesized and found to be stabilized by the use of *N*-heterocyclic carbene ligands.



2048

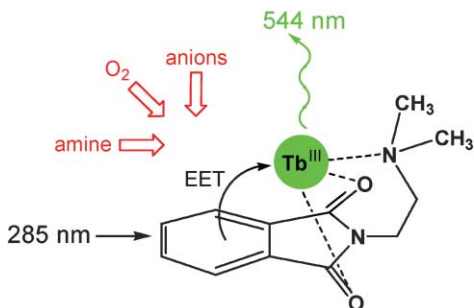


### Au<sup>I</sup>-catalyzed cycloisomerization of 1,5-enynes bearing a propargylic acetate: formation of unexpected bicyclo[3.1.0]hexene

Nicolas Marion, Pierre de Frémont, Gilles Lemière, Edwin D. Stevens, Louis Fensterbank, Max Malacria and Steven P. Nolan\*

The use of *N*-heterocyclic carbene (NHC) as a ligand in the gold(I)-catalyzed cycloisomerization of enyne results in the assembly of a new carbocyclic product.

2051

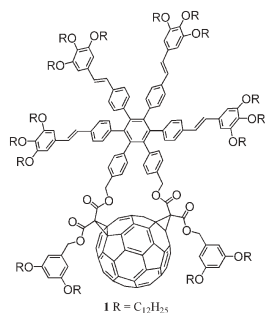


### A molecular tool kit for the variable design of logic operations (*NOR*, *INH*, *EnNOR*)

Miguel de Sousa, Baltazar de Castro, Sergio Abad, Miguel A. Miranda and Uwe Pischel\*

A phthalimide–terbium(III)-based system for the variable design of optical molecular logic gates (*NOR*, *INH*, *EnNOR*) is described.

2054

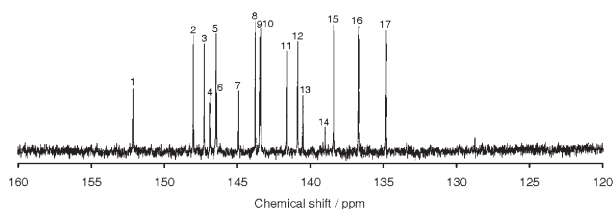


### Synthesis and excited state properties of a [60]fullerene derivative bearing a star-shaped multi-photon absorption chromophore

Teresa M. Figueira-Duarte, John Clifford, Vincenzo Amendola, Aline Gégout, Jean Olivier, François Cardinali, Moreno Meneghetti,\* Nicola Armaroli\* and Jean-François Nierengarten\*

The synthesis and excited state properties of a compound assembling C<sub>60</sub> with a new multi-photon absorption chromophore are reported.

2057



### <sup>13</sup>C NMR spectroscopic study of scandium dimetallofullerene, Sc<sub>2</sub>@C<sub>84</sub> vs. Sc<sub>2</sub>C<sub>2</sub>@C<sub>82</sub>

Yuko Iiduka, Takatsugu Wakahara, Koji Nakajima, Takahiro Tsuchiya, Tsukasa Nakahodo, Yutaka Maeda, Takeshi Akasaka,\* Naomi Mizorogi and Shigeru Nagase

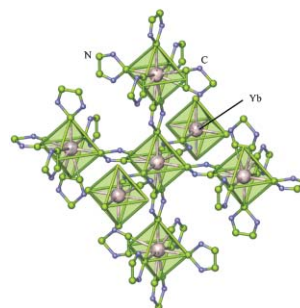
Although Sc<sub>2</sub>C<sub>84</sub> has been widely believed to have the form Sc<sub>2</sub>@C<sub>84</sub>, the present <sup>13</sup>C NMR study reveals that it is a scandium carbide metallofullerene, Sc<sub>2</sub>C<sub>2</sub>@C<sub>82</sub>, which has a C<sub>82</sub>(C<sub>3v</sub>) cage.

2060

**Three-dimensional networks of lanthanide 1,2,4-triazolates:  ${}^3_{\infty}[\text{Yb}(\text{Tz})_3]$  and  ${}^3_{\infty}[\text{Eu}_2(\text{Tz})_5(\text{TzH})_2]$ , the first 4f networks with complete nitrogen coordination**

Klaus Müller-Buschbaum\* and Yassin Mokaddem

The solvent-free melt reaction of Eu and Yb metals with the N-heterocycle 1,2,4-triazole gives the first three-dimensional networks of the lanthanides with complete nitrogen coordination spheres.

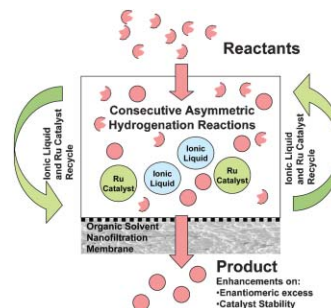


2063

**Organic solvent nanofiltration in asymmetric hydrogenation: enhancement of enantioselectivity and catalyst stability by ionic liquids**

Hau-To Wong, Yoong Hsiang See-Toh, Frederico Castelo Ferreira, Robert Crook and Andrew G. Livingston\*

Ionic liquids demonstrate enhancements on enantiomeric excess and catalyst stability in asymmetric hydrogenation reactions; nanofiltration demonstrates a straightforward method for separating and recycling ionic liquid and catalyst.

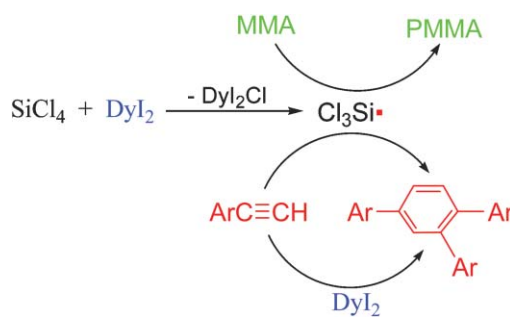


2066

**DyI<sub>2</sub> initiated mild and highly selective silyl radical-catalyzed cyclotrimerization of terminal alkynes and polymerization of MMA**

Zhenyu Zhu, Chuanfeng Wang, Xu Xiang, Chengfu Pi and Xigeng Zhou\*

An efficient method for the formation of silyl radicals by the reaction of chlorosilanes with DyI<sub>2</sub> has been established, demonstrating for the first time the potential of DyI<sub>2</sub> as a catalytic and initiating reagent in organic synthesis and suggesting that the presence of lanthanide ions can improve the selectivity of some silyl radical-catalyzed reactions.

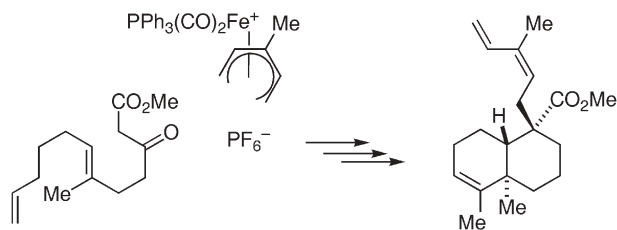


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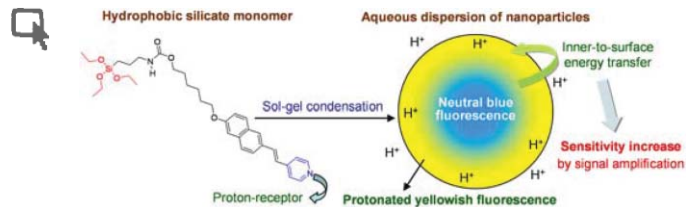
**Synthetic studies directed toward the proposed structure for heteroscyphic acid A**

Subhabrata Chaudhury, Shukun Li and William A. Donaldson\*

A route to the carbon skeleton of the proposed structure for heteroscyphic acid A was developed utilizing a Mn(III)/Cu(II) mediated oxidative free-radical cyclization and nucleophilic addition to (3-methylpentadienyl)iron(I+) cation.



2071

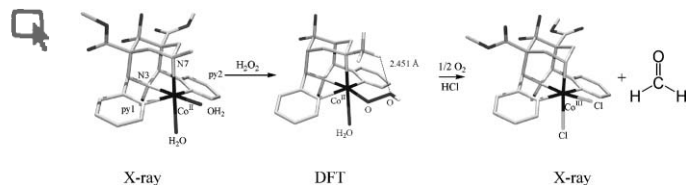


### Dye-concentrated organically modified silica nanoparticles as a ratiometric fluorescent pH probe by one- and two-photon excitation

Sehoon Kim, Haridas E. Pudavar and Paras N. Prasad\*

Basic dye-concentrated nanoparticles ( $\sim 33$  nm in diameter) show fluorescence-based ratiometric pH response, by one- and two-photon excitations, with improved proton sensing ability ( $pK_a \sim 6.4$ ) through nanoscopic intraparticle energy transfer.

2074



### Oxidative N-dealkylation in cobalt-bispidine- $H_2O_2$ systems

Peter Comba,\* Shigemasa Kuwata, Gerald Linti, Hans Pritzkow, Máté Tarnai and Hubert Wadepohl

The reaction of the  $Co^{II}$  complex with the rigid bispidine ligand  $L^1$  with two tertiary amine and two pyridine donors,  $[Co^{II}(L^1)(OH_2)_2]^{2+}$ , with  $H_2O_2$  and  $O_2$  produces  $[Co^{II}(L^2)(OH_2)_2]^{3+}$ , where  $L^2$  is demethylated at one of the amine donors, and  $CH_2O$ .

2077

Zhimou Yang, Gaolin Liang and Bing Xu

### Supramolecular hydrogels based on $\beta$ -amino acid derivatives




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