

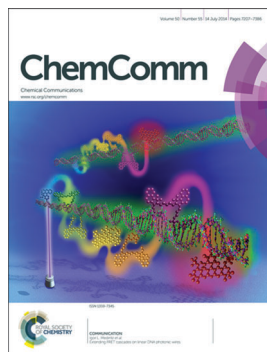
## IN THIS ISSUE

ISSN 1359-7345 CODEN CHCOFS 50(55) 7207-7386 (2014)



### Cover

See A. Stephen K. Hashmi, Douglas W. Stephan *et al.*, pp. 7243–7245. Image is a reproduction with permission of an original painting by Sascha Grusche.



### Inside cover

See Igor L. Medintz *et al.*, pp. 7246–7249. Image reproduced by permission of Igor L. Medintz from *Chem. Commun.*, 2014, 50, 7246.

## EDITORIAL

7221

### Metal-mediated transformations of small molecules

Louise A. Berben and Jason B. Love

Guest editors Louise A. Berben and Jason B. Love introduce this web collection showcasing outstanding contributions in the field of the design, development, and exploitation of metal mediated transformations of small molecules.



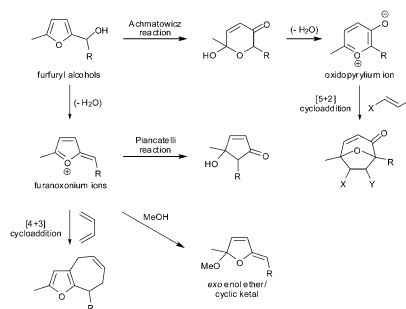
## FEATURE ARTICLE

7223

### The versatility of furfuryl alcohols and furanoxonium ions in synthesis

Matthew J. Palframan and Gerald Pattenden\*

Substituted furfuryl alcohols are extraordinarily versatile starting materials in synthesis.



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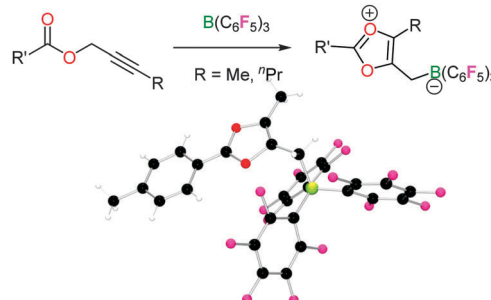
## COMMUNICATIONS

7243

**B(C<sub>6</sub>F<sub>5</sub>)<sub>3</sub> promoted cyclisation of internal propargyl esters: structural characterisation of 1,3-dioxolium compounds**

Max M. Hansmann, Rebecca L. Melen, Frank Rominger, A. Stephen K. Hashmi\* and Douglas W. Stephan\*

Internal propargyl esters react with B(C<sub>6</sub>F<sub>5</sub>)<sub>3</sub> to give zwitterionic dioxolium heterocycles; the structures and mechanism of formation are considered in the light of DFT calculations.

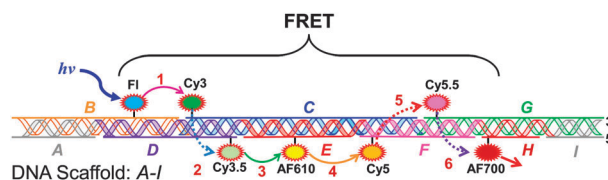


7246

**Extending FRET cascades on linear DNA photonic wires**

Christopher M. Spillmann, Susan Buckhout-White, Eunkeu Oh, Ellen R. Goldman, Mario G. Ancona and Igor L. Medintz\*

Photonic wires were constructed by sequentially arranging up to 7 fluorophores along a concatenated DNA scaffold to yield nanostructures with six energy transfer steps. The underlying photophysics show long-range interactions compensating for localized non-ideal dye behaviour.

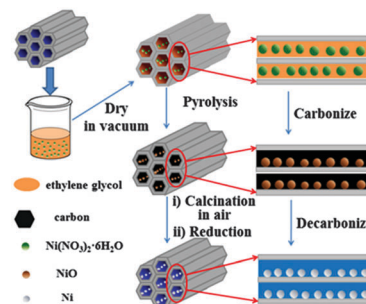


7250

**Immobilizing Ni nanoparticles to mesoporous silica with size and location control via a polyol-assisted route for coking- and sintering-resistant dry reforming of methane**

Ting Xie, Liyi Shi, Jianping Zhang and Dengsong Zhang\*

Highly dispersed Ni nanoparticles in mesoporous silica were achieved via using polyol as new delivery conveyors and removable carbon templates.

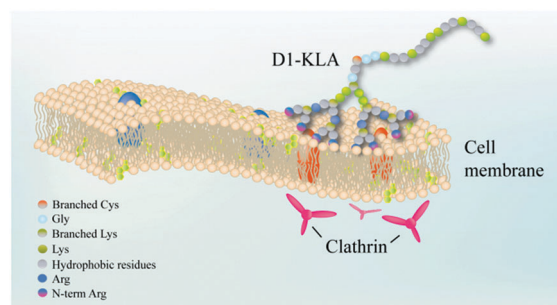


7254

**Designed cell penetrating peptide dendrimers efficiently internalize cargo into cells**

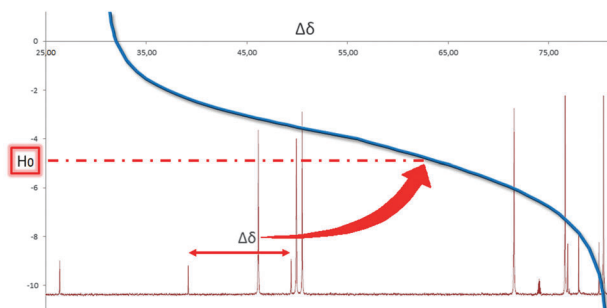
Gabriela A. Eggimann, Emilyne Blattes, Stefanie Buschor, Rasomoy Biswas, Stephan M. Kammer, Tamis Darbre\* and Jean-Louis Reymond\*

Redesigning linear cell penetrating peptides (CPPs) into a multi-branched topology with short dipeptide branches gave cell penetrating peptide dendrimers (CPPDs) with higher cell penetration, lower toxicity and hemolysis and higher serum stability than linear CPPs.



## COMMUNICATIONS

7258

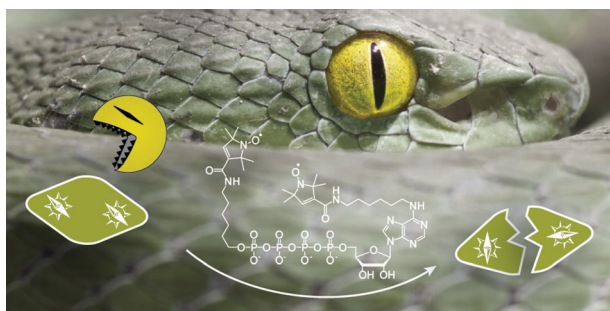


### A quick, simple, robust method to measure the acidity of ionic liquids

John Gräsvik, Jason P. Hallett, Trang Quynh To and Tom Welton\*

Introduced here is a quick, simple, robust method to measure acidity in ionic liquid (IL) systems by the use of the NMR-probe mesityl oxide.

7262

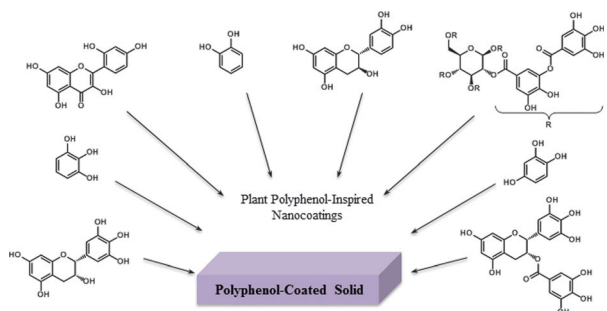


### Monitoring enzymatic ATP hydrolysis by EPR spectroscopy

Stephan M. Hacker,\* Christian Hintze, Andreas Marx\* and Malte Drescher\*

Adenosine triphosphate is modified with two nitroxide radicals and employed to demonstrate that electron paramagnetic resonance spectroscopy can be used to study the enzymatic hydrolysis of doubly labelled substrate analogues.

7265

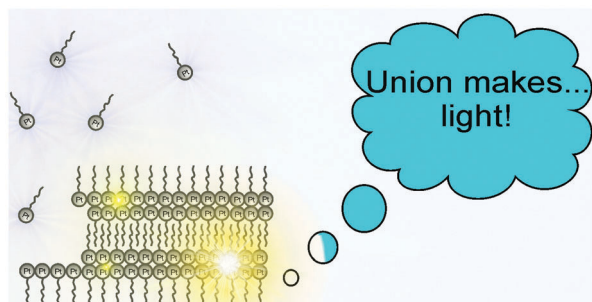


### Molecular diversity in phenolic and polyphenolic precursors of tannin-inspired nanocoatings

Devin G. Barrett, Tadas S. Sileika and Phillip B. Messersmith\*

Substrate-independent coatings inspired by plant tannins were formed from diverse phenolic starting compounds.

7269



### Self-assembly of a neutral platinum(II) complex into highly emitting microcrystalline fibers through metallophilic interactions

Matteo Mauro,\* Alessandro Aliprandi, Cristina Cebrián, Di Wang, Christian Kübel and Luisa De Cola\*

The solvent-assisted self-assembly of a blue-emitting neutral platinum(II) complex into micrometer-long and highly crystalline fibers has been achieved.

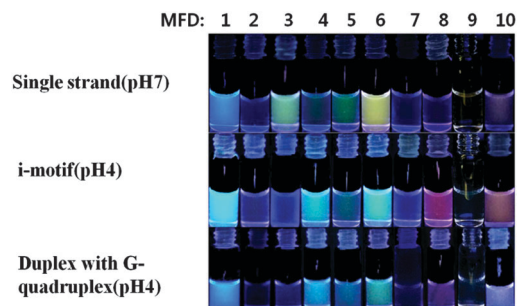


7273

### Multiplex fluorophore systems on DNA with new diverse fluorescence properties and ability to sense the hybridization dynamics

Dong Gyu Lee, In Sun Kim, Jung Woo Park and Young Jun Seo\*

We developed a multiplexed fluorophore system on a DNA scaffold (MFD) that produced new and diverse fluorescence properties and these special fluorescence properties could be controlled by the hybridization pattern and were therefore dependent on the structural changes in DNA.

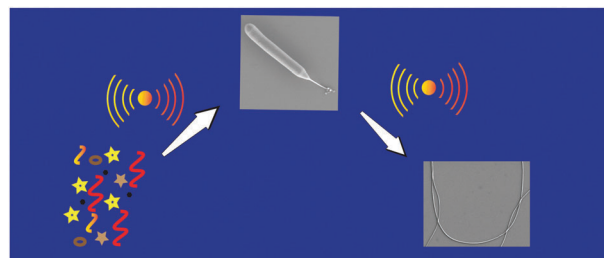


7277

### Synthesis of very small diameter silica nanofibers using sound waves

Panos Datskos, Jihua Chen and Jaswinder Sharma\*

Silica nanofibers of an average diameter of 30 nm were synthesized using sound waves.

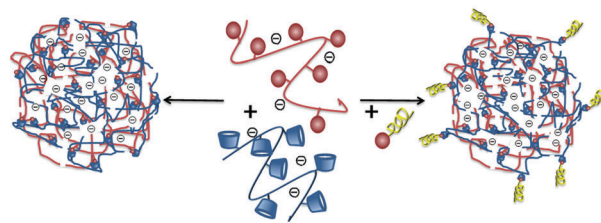


7280

### Cyclodextrin-based supramolecular nanoparticles stabilized by balancing attractive host–guest and repulsive electrostatic interactions

Laura Graña Suárez, Willem Verboom\* and Jurriaan Huskens\*

Multicomponent, negatively charged supramolecular nanoparticles were prepared without the need of a stopper. Their size and stability are controlled owing to a balance of forces between attractive supramolecular and repulsive electrostatic interactions.

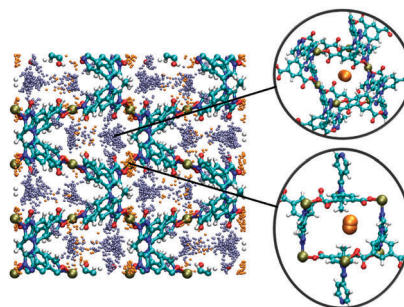


7283

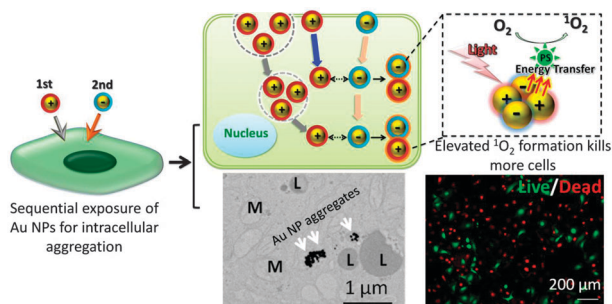
### Insights into an intriguing gas sorption mechanism in a polar metal–organic framework with open-metal sites and narrow channels

Katherine A. Forrest, Tony Pham, Keith McLaughlin, Adam Hogan and Brian Space\*

The metal–organic framework (MOF) [Cu(Me-4py-trz-ia)] exhibits an intriguing sorption mechanism for H<sub>2</sub> and CO<sub>2</sub> as discerned through molecular simulations.



7287

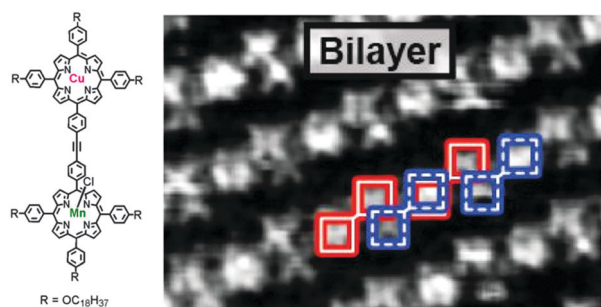


### Intracellular gold nanoparticle aggregation and their potential applications in photodynamic therapy

Yamin Yang, Yue Hu, Henry Du and Hongjun Wang\*

Intracellular formation of Au NP aggregates based on the electrostatic interaction between oppositely charged Au NPs, which can further promote singlet oxygen generation upon light irradiation to improve the therapeutic efficiency of Au NP-enhanced photodynamic therapy of cancer (M: mitochondria; L: lysosome).

7291

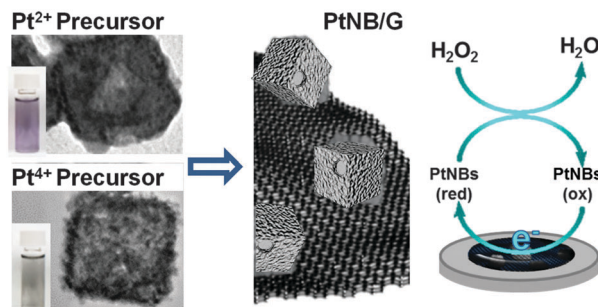


### Dynamic rearrangement of bilayers of porphyrin hetero-dimers at a solid/liquid interface

Dennis Lensen, Thomas Habets and Johannes A. A. W. Elemans\*

Porphyrin hetero-dimers self-assemble into bilayers that dynamically rearrange at a solid/liquid interface.

7295

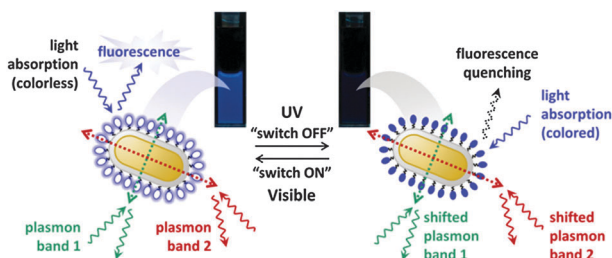


### Effect of metal precursor on the growth and electrochemical sensing properties of Pt–Ag nanoboxes

Adriana Popa and Anna Cristina S. Samia\*

The use of different metal ion precursors in the synthesis of platinum nanoboxes has a dramatic effect on the morphology and electrochemical properties of the nanomaterial.

7299



### Photochromic–fluorescent–plasmonic nanomaterials: towards integrated three-component photoactive hybrid nanosystems

K. Ouhenia-Ouadahi, R. Yasukuni, P. Yu, G. Laurent, C. Pavageau, J. Grand, J. Guérin, A. Léaustic, N. Félidj, J. Aubard, K. Nakatani and R. Métivier\*

Silica-coated gold nanorods functionalized with grafted fluorescent and photochromic derivatives were synthesized and cross-coupled interactions between plasmonic, photochromic, and fluorescence properties have been demonstrated.

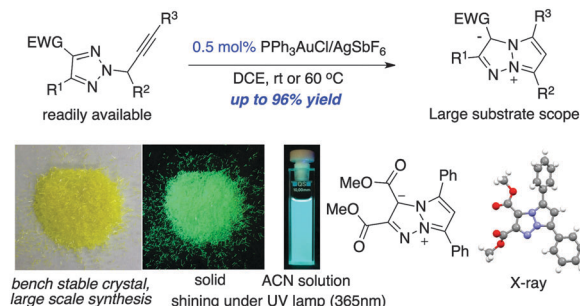
## COMMUNICATIONS

7303

### Facile synthesis of fluorescent active triazapentalenes through gold-catalyzed triazole–alkyne cyclization

Rong Cai, Dawei Wang, Yunfeng Chen, Wuming Yan, Natalie R. Geise, Sripadh Sharma, Huiyuan Li, Jeffrey L. Petersen, Minyong Li\* and Xiaodong Shi\*

Fluorescent active triazapentalene zwitterions (TAPZs) were prepared through Au(I) catalyzed triazole–alkyne 5-*endo-dig* cyclization.

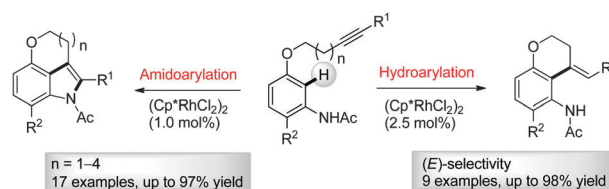


7306

### Rhodium(III)-catalyzed intramolecular amidoarylation and hydroarylation of alkyne via C–H activation: switchable synthesis of 3,4-fused tricyclic indoles and chromans

Xue Zhang, Yifei Li, Hui Shi, Lunan Zhang, Shanshan Zhang, Xianxiu Xu\* and Qun Liu\*

An intramolecular amidoarylation and hydroarylation of alkyne via rhodium(III)-catalyzed C–H activation was developed for the switchable synthesis of 3,4-fused indoles and chromans.

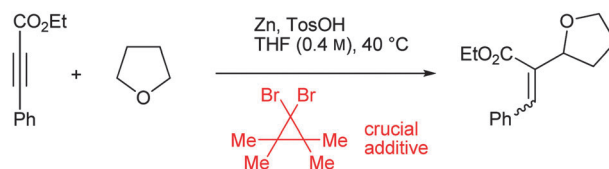


7310

### Zinc-mediated CH-activation of tetrahydrofuran under mild conditions for the regioselective addition to aryl-propiolates

Florian Pünner and Gerhard Hilt\*

The CH-activation of THF is realised in a zinc-mediated process using a dibromocyclopropane as a crucial additive for the highly regioselective addition to aryl-substituted propiolates and diynes.

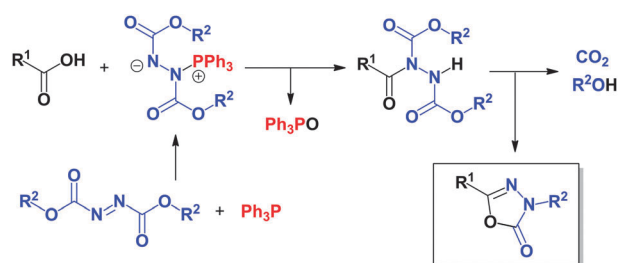


7314

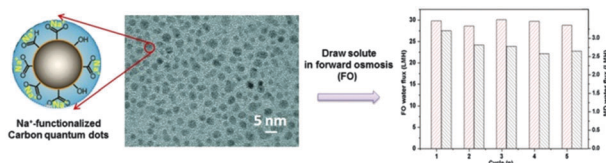
### The use of a Mitsunobu reagent for the formation of heterocycles: a simple method for the preparation of 3-alkyl-5-aryl-1,3,4-oxadiazol-2(3H)-ones from carboxylic acids

Osamu Sugimoto,\* Tomoyo Arakaki, Hiroka Kamio and Ken-ichi Tanji\*

3-Alkyl-1,3,4-oxadiazol-2(3H)-ones were prepared in a one-pot reaction using carboxylic acids and a Mitsunobu reagent.



7318

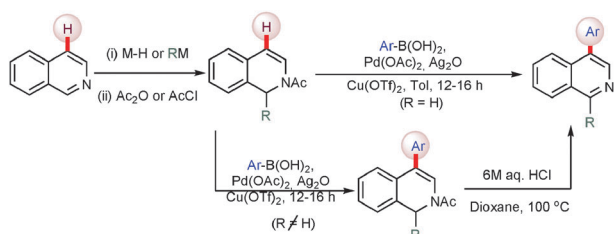


### Na<sup>+</sup>-functionalized carbon quantum dots: a new draw solute in forward osmosis for seawater desalination

Chun Xian Guo, Dieling Zhao, Qipeng Zhao, Peng Wang and Xianmao Lu\*

A new type of draw solute is developed, demonstrating a high forward osmosis water flux and negligible reverse solute permeation.

7322

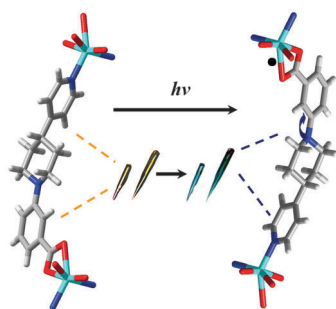


### Palladium catalyzed, heteroatom-guided C–H functionalization in the synthesis of substituted isoquinolines and dihydroisoquinolines

Virendra Kumar Tiwari, Govind Goroba Pawar, Himanshu Sekhar Jena and Manmohan Kapur\*

A new approach for the functionalization of C-4 of isoquinolines is reported which utilizes palladium catalyzed, hetero-atom guided (or electrophilic metalation) direct arylation via regioselective C–H functionalization of dihydroisoquinolines.

7326

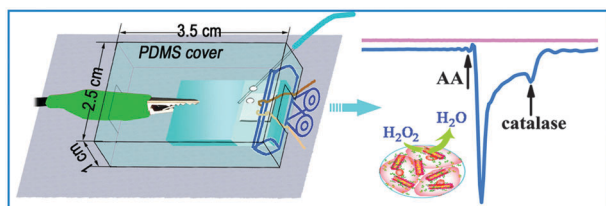


### Highly stable photoresponsive complex framework formation involves unusual selective hydrogenation of a pyridine derivative

Jie Zhang, Jianming Geng, Guiming Zheng, Jingcao Dai and Zhiyong Fu\*

The self-assembly of the zinc ion with the ligand PYPDB *in-situ* generated from an unusual selective hydrogenation process produces a highly stable photoactive complex Zn(PYPDB)<sub>2</sub> displaying interesting long range electron transfer behavior in the conjugated ring system.

7329



### A disposable indium-tin-oxide sensor modified by gold nanorod–chitosan nanocomposites for the detection of H<sub>2</sub>O<sub>2</sub> in cancer cells

Chunmei Yu, Zhenkun Zhu, Qihong Wang, Wei Gu, Ning Bao and Haiying Gu\*

A paper-based electroanalytical device integrated with a disposable ITO electrode was developed for the real-time detection of cellular H<sub>2</sub>O<sub>2</sub>.



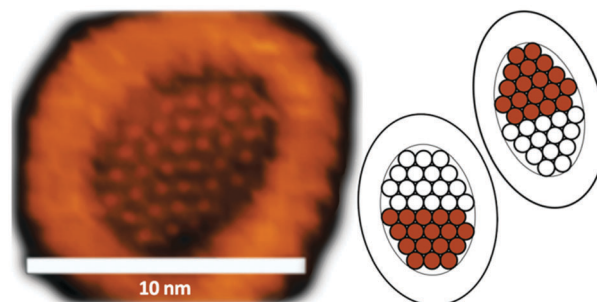
## COMMUNICATIONS

7332

**Height dependent molecular trapping in stacked cyclic porphyrin nanorings**

Maria B. Wieland, Luis M. A. Perdigão,  
Dmitry V. Kondratuk, James N. O'Shea,  
Harry L. Anderson and Peter H. Beton\*

Stacked cyclic porphyrin nanorings function as traps for fullerene molecules dependent on stack height and diameter of the nanoring.

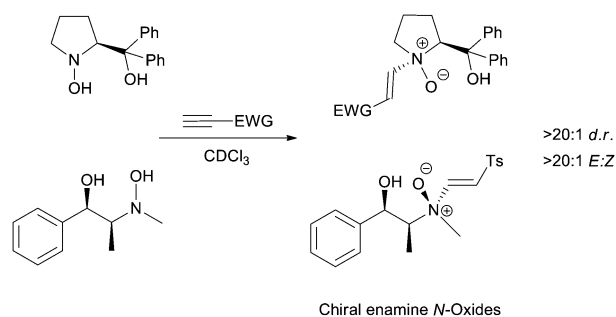


7336

**The synthesis and structure of chiral enamine N-oxides**

I. A. O'Neil,\* M. McConville, K. Zhou, C. Brooke,  
C. M. Robertson and N. G. Berry

Chiral enamine N-oxides have been synthesised by a diastereoselective intermolecular reverse-Cope cycloaddition reaction between chiral hydroxylamines and activated acetylenes.

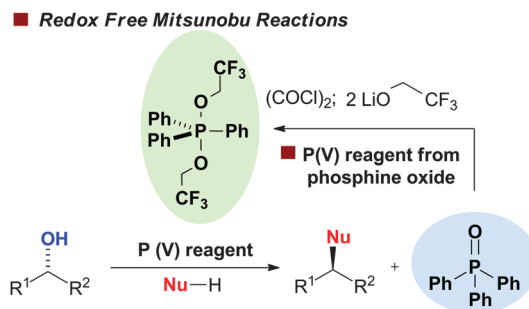


7340

**Development of a redox-free Mitsunobu reaction exploiting phosphine oxides as precursors to dioxiphosphanes**

Xiaoping Tang, Charlotte Chapman, Matthew Whiting  
and Ross Denton\*

The development of a redox-free protocol for Mitsunobu inversion is described.

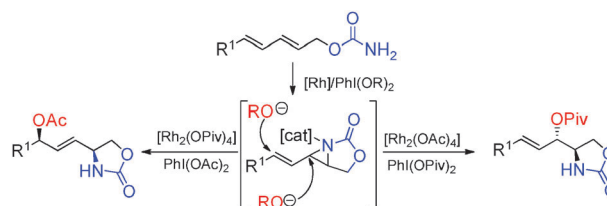


7344

**Rhodium-catalyzed regio- and stereoselective oxyamination of dienes via tandem aziridination/ring-opening of dienyl carbamates**

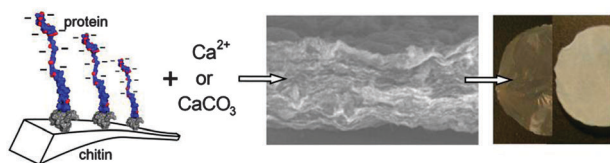
Joan Guasch, Yolanda Díaz, M. Isabel Matheu\* and  
Sergio Castellón\*

The dual role of a Rh(II) catalyst both as a nitrene transfer agent and as a Lewis acid in the aziridine ring opening allows the regio- and stereoselective oxyamination of dienyl carbamates.



## COMMUNICATIONS

7348

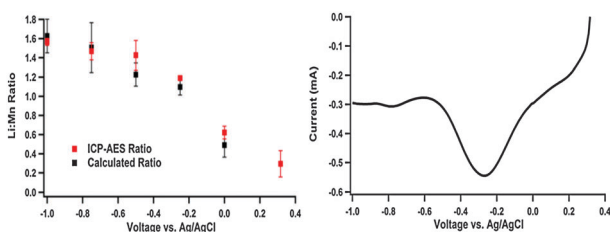


### Formation of ceramophilic chitin and biohybrid materials enabled by a genetically engineered bifunctional protein

Jani-Markus Malho, Hanna Heinonen, Inkeri Kontro, Ngesa E. Mushi, Ritva Serimaa, Hans-Peter Hentze, Markus B. Linder\* and Géza R. Szilvay\*

An engineered bifunctional protein from an oyster shell protein and a chitin-binding domain enables the formation of mineralized biohybrid materials.

7352

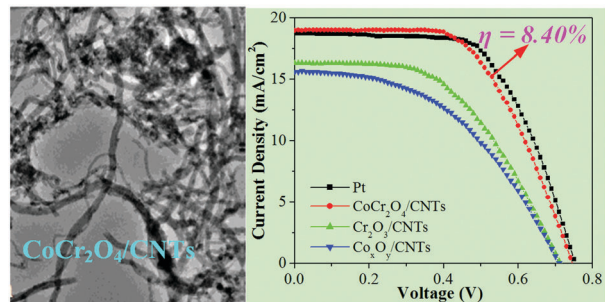


### The reversible anomalous high lithium capacity of MnO<sub>2</sub> nanowires

Jaehee Song, Jonathon Duay, Eleanor Gillette and Sang Bok Lee\*

MnO<sub>2</sub>'s lithium capacity in an organic electrolyte is larger than previously thought; while in an aqueous electrolyte, the insertion ion is shown to be a combination of protons and lithium ions.

7356

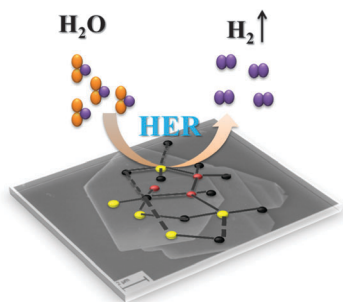


### A high efficiency CoCr<sub>2</sub>O<sub>4</sub>/carbon nanotubes nanocomposite electrocatalyst for dye-sensitised solar cells

Mingxing Guo,\* Beibei Tang, Haimin Zhang,\* Shuhui Yin,\* Wei Jiang, Yiming Zhang, Mengying Li, Hui Wang and Liqi Jiao

A novel CoCr<sub>2</sub>O<sub>4</sub>/CNTs nanocomposite was used as a counter electrode material for dye-sensitised solar cells, exhibiting superior electrocatalytic activity and promising power conversion efficiency.

7359



### Equiatomic ternary chalcogenide: PdPS and its reduced graphene oxide composite for efficient electrocatalytic hydrogen evolution

Sujoy Sarkar and Srinivasan Sampath\*

The PdPS-rGO composite is an excellent catalyst for HER.

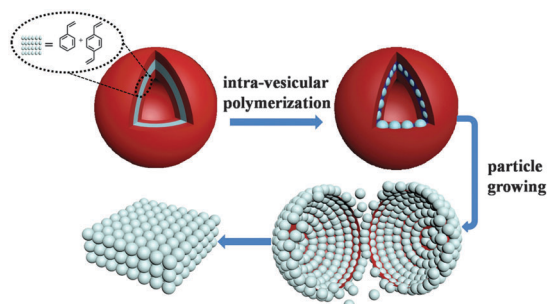
## COMMUNICATIONS

7363

### Synthesis of monodisperse nanocolloidal microspheres with controlled size by vesicle bilayer templating

Tong Huang, Xiaohua Huang, Xiaoyi Sun, Yongfeng Zhou,\* Yongping Bai\* and Deyue Yan\*

Uniform PS colloidal particles with controllable size ranging from 60 to 150 nm were prepared on a mass scale by using the bilayers of hyperbranched polymer vesicles as templates.

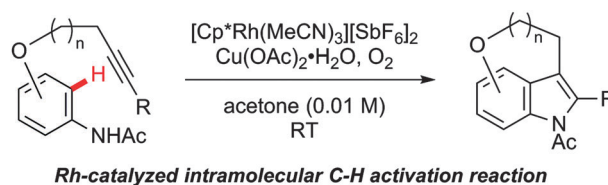


7367

### Rhodium-catalyzed intramolecular annulation via C–H activation leading to fused tricyclic indole scaffolds

Pengyu Tao and Yanxing Jia\*

A new method for the synthesis of fused tricyclic indoles via a rhodium catalyzed intramolecular C–H activation reaction is described.

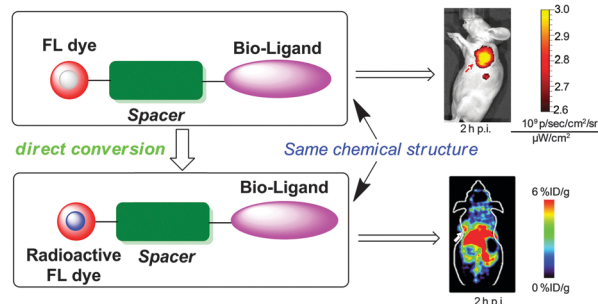


7371

### Efficient synthesis of fluorescent-PET probes based on [<sup>18</sup>F]BODIPY dye

Shuanglong Liu, Dan Li, Zhe Zhang, G. K. Surya Prakash, Peter S. Conti and Zibo Li\*

We report the direct conversion of fluorescent probes to PET/fluorescent probes after efficient [<sup>19</sup>F]/[<sup>18</sup>F] exchange at the BODIPY motif.

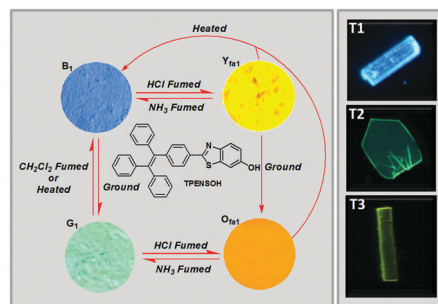


7374

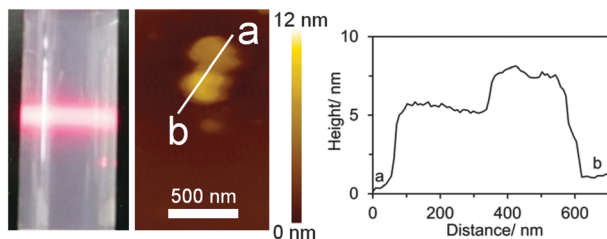
### An AIE-active luminophore with tunable and remarkable fluorescence switching based on the piezo and protonation–deprotonation control

Chunping Ma, Bingjia Xu, Gaoyi Xie, Jiajun He, Xie Zhou, Bangyin Peng, Long Jiang, Bin Xu, Wenjing Tian, Zhenguo Chi,\* Siwei Liu, Yi Zhang\* and Jiarui Xu\*

An AIE-active luminophore with tunable and remarkable fluorescence switching based on the piezo and protonation–deprotonation control was prepared and investigated.



7378

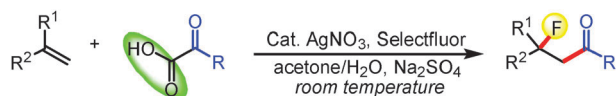


### The aqueous colloidal suspension of ultrathin 2D MCM-22P crystallites

Tosapol Maluangnont, Yusuke Yamauchi, Takayoshi Sasaki,\* Wieslaw J. Roth,\* Jiří Čejka and Martin Kubu

The aqueous colloid containing ultrathin 2D crystallites of MCM-22P, including 2.5 nm thick (*i.e.*, monolayers) ones.

7382



### Silver-catalyzed decarboxylative acylfluorination of styrenes in aqueous media

Hua Wang, Li-Na Guo and Xin-Hua Duan\*

A mild catalytic decarboxylative acylfluorination of styrenes with  $\alpha$ -oxocarboxylic acids and Selectfluor is reported. This operationally simple and efficient method provides a fundamentally novel approach toward the synthesis of  $\beta$ -fluorinated 3-aryl ketones with a wide range of substrate scope.