

# ChemComm

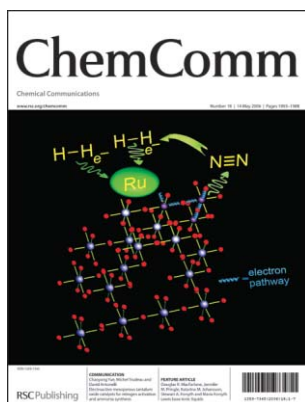
Chemical Communications

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## IN THIS ISSUE

ISSN 1359-7345 CODEN CHCOFS (18) 1893–1988 (2006)



### Cover

See David Antonelli *et al.*, page 1918.  
Ru-doped mesoporous Ta oxide converts  $N_2$  and  $H_2$  in ammonia under mild conditions through a novel mechanism involving  $N_2$  cleavage on low valent Ta sites. Image reproduced by permission of Chaoyang Yue, Michel Trudeau and David Antonelli from *Chem. Commun.*, 2006, 1918.



### Inside cover

See Piero Sozzani *et al.*, page 1921.  
Hyperpolarized xenon demonstrates the presence of nanoporosity in a layered hectorite-clay intercalated by organic pillars that sustain the architecture like columns in an ancient temple. Image reproduced by permission of Piero Sozzani, Silvia Bracco, Angiolina Comotti, Michele Mauri, Roberto Simonutti and Patrizia Valsesia from *Chem. Commun.*, 2006, 1921.

## CHEMICAL TECHNOLOGY

T17

Chemical Technology highlights the latest applications and technological aspects of research across the chemical sciences.

## Chemical Technology

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## FEATURE ARTICLE

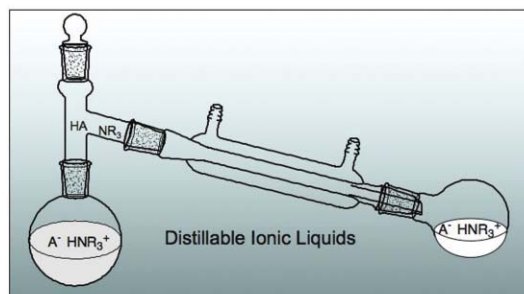
1905



### Lewis base ionic liquids

Douglas R. MacFarlane,\* Jennifer M. Pringle, Katarina M. Johansson, Stewart A. Forsyth and Maria Forsyth

Ionic liquids which are (weak) Lewis bases have a number of interesting and useful properties different to those of traditional ionic liquids, including volatility and the possibility of being distillable in some cases, a base catalysis effect in others and enhancement of the acidity of dissolved acids.



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# ChemComm

Chemical Communications

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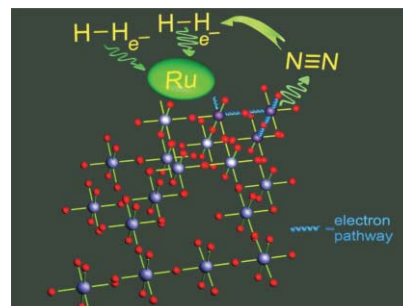
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1918

### Electroactive mesoporous tantalum oxide catalysts for nitrogen activation and ammonia synthesis

Chaoyang Yue, Michel Trudeau and David Antonelli\*

Ru-doped mesoporous Ta oxide functions as a catalyst for the conversion of  $N_2$  and  $H_2$  into  $NH_3$  over the temperature range of 298 K to 598 K. Strong evidence is presented for a new mechanism involving low valent Ta as the site for  $N_2$  cleavage.

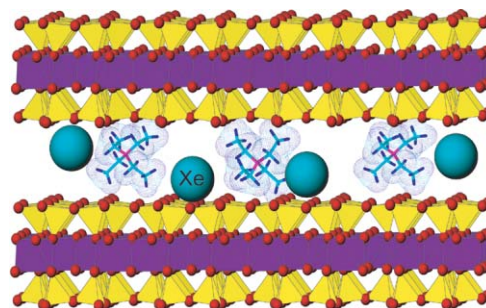


1921

### Nanoporosity of an organo-clay shown by hyperpolarized xenon and 2D NMR spectroscopy

Piero Sozzani,\* Silvia Bracco, Angiolina Comotti, Michele Mauri, Roberto Simonutti and Patrizia Valsesia

Interlayer nanoporosity of hectorite pillared by tetraethylammonium ions is explored by hyperpolarized xenon NMR and relevant gases such as carbon dioxide revealing the adsorption capacity of the open galleries.

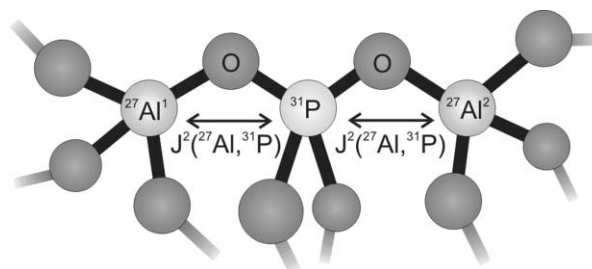


1924

### Through-bond homonuclear correlation experiments in solid-state NMR applied to quadrupolar nuclei in Al-O-P-O-Al chains

Michaël Deschamps,\* Franck Fayon, Valérie Montouillout and Dominique Massiot

Through-bond homonuclear correlation experiments can be realised in solids between  $^{27}Al$  spins, separated by four chemical bonds: central transitions of quadrupolar  $^{27}Al$  spins can be correlated *via* the  $J^2$  scalar coupling between  $^{27}Al$  and  $^{31}P$  in materials featuring Al-O-P-O-Al motifs.

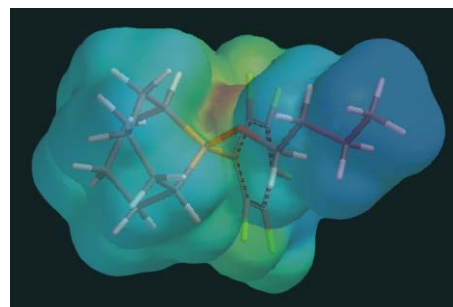


1926

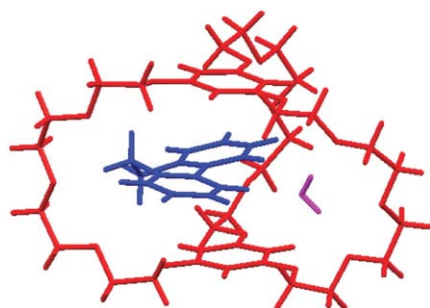
### Lithium ion conduction in an organoborate zwitterion-LiTFSI mixture

Asako Narita, Wataru Shibayama, Kenji Sakamoto, Tomonobu Mizumo, Noriyoshi Matsumi and Hiroyuki Ohno\*

An organoborate zwitterion-lithium salt mixture, prepared *via* selective borate formation of *N*-ethylimidazolium salt, exhibited ionic conductivity of  $3.0 \times 10^{-5} S cm^{-1}$  at 50 °C and a lithium transference number of 0.69.



1929

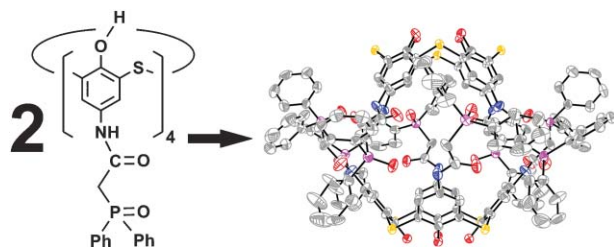


### Bis(*meta*-phenylene)-32-crown-10-based cryptand/diquat inclusion [2]complexes

Feihe Huang,\* Carla Slebodnick, Karen A. Switek and Harry W. Gibson\*

Bis(*meta*-phenylene)-32-crown-10-based cryptands have been proved to complex diquat much more strongly than bis(*meta*-phenylene)-32-crown-10 itself, and one containing a pyridyl moiety has one of the highest  $K_a$  values reported to date. They form 1 : 1 complexes with diquat in solution and the solid state.

1932

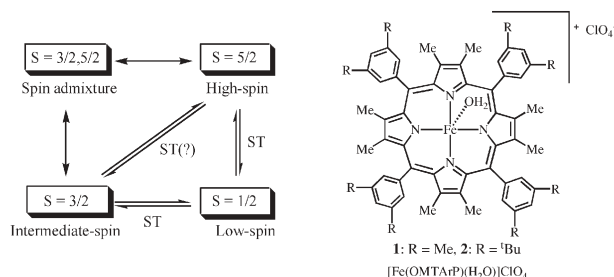


### Hydrogen-bonded dimers of a thiocalixarene substituted by carbamoylmethylphosphineoxide groups at the wide rim

Oleg Kasyan, Vitaly Kalchenko, Michael Bolte and Volker Böhmer\*

Two molecules are held together *via* eight intermolecular  $-\text{NH}\cdots\text{O}=\text{P}-$  hydrogen bonds in  $S_8$ -symmetrical capsules formed in the crystalline state and in apolar solvents, where the inclusion of organic cations could be shown by  $^1\text{H}$  NMR spectroscopy.

1935

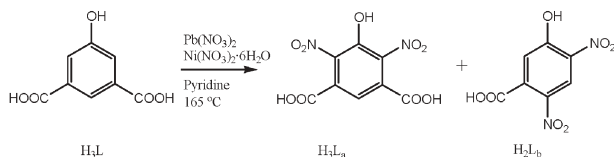


### Novel spin transition between $S = 5/2$ and $S = 3/2$ in highly saddled iron(III) porphyrin complexes at extremely low temperatures

Yoshiki Ohgo,\* Yuya Chiba, Daisuke Hashizume, Hidehiro Uekusa, Tomoji Ozeki and Mikio Nakamura\*

A novel spin transition between high-spin ( $S = 5/2$ ) and intermediate-spin ( $S = 3/2$ ) states is observed for the first time in the highly saddled iron(III) porphyrinate by EPR spectroscopy and SQUID magnetometry.

1938



### Hydroxyl-directed dinitration of carboxylate ligands mediated by lead and nickel nitrates and preparation of Pb/Ni heterometallic complexes under hydrothermal conditions

Xiaoju Li, Rong Cao,\* Zhengang Guo and Jian Lü

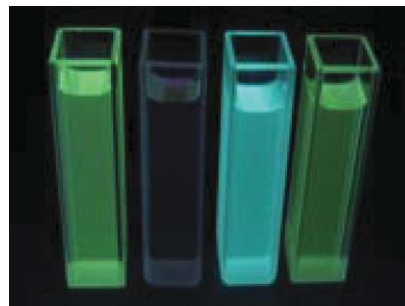
Hydroxyl-directed dinitration of 5-hydroxyisophthalic acid ( $\text{H}_3\text{L}$ ) was observed in the hydrothermal reaction of  $\text{H}_3\text{L}$  and lead and nickel nitrates

1941

### Fluorinated Alq<sub>3</sub> derivatives with tunable optical properties

Yue-Wen Shi, Min-Min Shi,\* Jia-Chi Huang, Hong-Zheng Chen,\* Mang Wang, Xiao-Dong Liu, Yu-Guang Ma, Hai Xu and Bing Yang

Both the emission colour and photoluminescence quantum yield of Alq<sub>3</sub> can be tuned by introducing fluorine atoms at different positions.

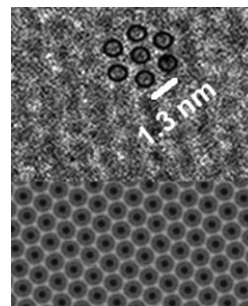


1944

### Atomic-molecular superlattices

Andrew A. R. Watt,\* Mark R. Sambrook, Kyriakos Porfyrakis, Brendon W. Lovett, Hassane El Mkami, Graham M. Smith and G. Andrew D. Briggs

In this communication we demonstrate a directly-bonded crystalline fullerene superlattice and show that the incorporation of spin-active N@C<sub>60</sub> endohedral fullerenes is readily achieved to give an atomic-molecular hybrid spin-active superlattice material.

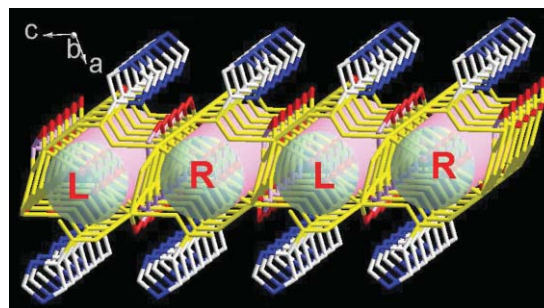


1947

### Two novel luminescent lanthanide sulfate-carboxylates with an unusual 2-D bamboo-raft-like structure based on the linkages of left- and right-handed helical tubes involving *in situ* decarboxylation

Yan-Qiong Sun, Jie Zhang and Guo-Yu Yang\*

Two novel 2D bamboo-raft-like lanthanide-organic polymers [Ln(Himc)(SO<sub>4</sub>)(H<sub>2</sub>O)] made from helical tubes were synthesized. Interestingly, hydrothermal decarboxylation of 4,5-imidazoledicarboxylic acid occurred in the presence of Cu(II) ions to give H<sub>2</sub>imc.

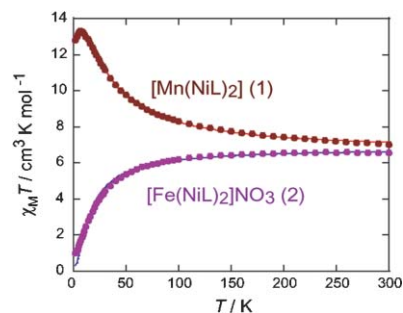


1950

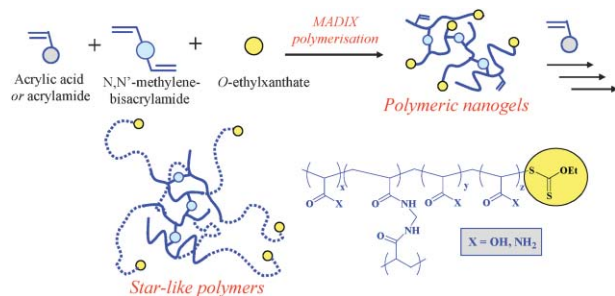
### Ferro- and antiferromagnetic interactions in face-sharing trioctahedral Ni<sup>II</sup>Mn<sup>II</sup>Ni<sup>II</sup> and Ni<sup>II</sup>Fe<sup>III</sup>Ni<sup>II</sup> complexes with the same 1-5/2-1 spin system

Tamami Kobayashi, Tomoka Yamaguchi, Hiromi Ohta, Yukinari Sunatsuki, Masaaki Kojima,\* Nazzareno Re, Matsuo Nonoyama and Naohide Matsumoto

Two heterotrinnuclear complexes, [Mn<sup>II</sup>(Ni<sup>II</sup>L)<sub>2</sub>] and [Fe<sup>III</sup>(Ni<sup>II</sup>L)<sub>2</sub>]NO<sub>3</sub>, consisting of three face-sharing octahedra with the same 1-5/2-1 spin system show completely different magnetic interactions between the adjacent metal ions: ferromagnetic (Ni<sup>II</sup>-Mn<sup>II</sup>) and antiferromagnetic (Ni<sup>II</sup>-Fe<sup>III</sup>).



1953

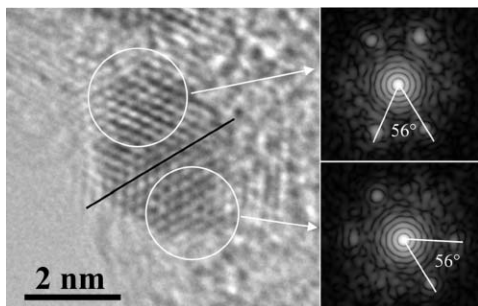


### Water soluble polymeric nanogels by xanthate-mediated radical crosslinking copolymerisation

Daniel Taton,\* Jean-François Baussard, Ludovic Dupayage, Julien Poly, Yves Gnanou, Virginie Ponsinet, Mathias Destarac, Catherine Mignaud and Claire Pitois

Branched water-soluble copolymers were obtained by direct radical crosslinking copolymerisation of acrylic acid or acrylamide and  $N,N'$ -methylenebisacrylamide at high solid content in the presence of an  $O$ -ethylxanthate as a reversible chain transfer agent.

1956

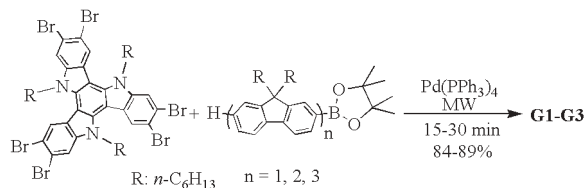


### Single-phase bimetallic system for the selective oxidation of glycerol to glycerate

Di Wang, Alberto Villa, Francesca Porta, Dangsheng Su and Laura Prati\*

Single phase bimetallic Au/Pd catalyst was prepared and characterised by TEM techniques. The observations on the morphology and the microstructures concerning both the phase and the composition of the nanoparticles offer direct evidence of its “single phase” property. The high activity in the selective liquid phase oxidation of glycerol towards glycerate is unambiguously attributable to the synergistic effect of alloy.

1959

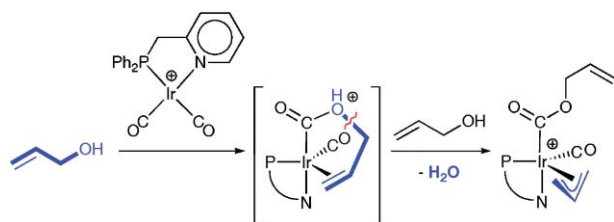


### Microwave-enhanced multiple Suzuki couplings toward highly luminescent starburst monodisperse macromolecules

Wen-Yong Lai, Qing-Quan Chen, Qi-Yuan He, Qu-Li Fan and Wei Huang\*

A facile and powerful microwave-enhanced multiple Suzuki coupling methodology has been developed and a novel series of highly luminescent six-arm monodisperse macromolecules have thus been prepared with high yield and purity.

1962



### A new method for the conversion of allyl alcohol into $\pi$ -allyl species promoted by nucleophilic interaction with a CO ligand

Christian Dubs, Toshiki Yamamoto, Akiko Inagaki and Munetaka Akita\*

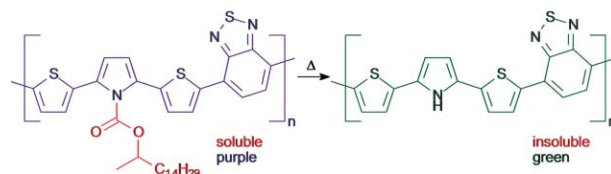
Upon treatment with an iridium carbonyl complex,  $[(\text{PN})\text{Ir}(\text{CO})_2]^+$ , allyl alcohol can be smoothly converted into  $\pi$ -allyliridium species at ambient temperature *via* nucleophilic interaction of the alcohol with a CO ligand followed by C(allyl)-O bond cleavage in the resultant protonated allyloxycarbonyl intermediate.

1965

**Benzothiadiazole- and pyrrole-based polymers bearing thermally cleavable solubilizing groups as precursors for low bandgap polymers**

Carine Edder, Paul B. Armstrong, Kris B. Prado and Jean M. J. Fréchet\*

We report the design, synthesis and characterization of new benzothiadiazole- and pyrrole-based copolymers whose solubility and bandgap drastically change after thermal treatment of their thin films.

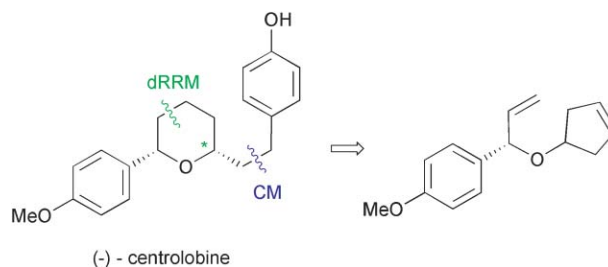


1968

**A concise synthesis of (–)-centrolobine via a diastereoselective ring rearrangement metathesis–isomerisation sequence**

Verena Böhrsch and Siegfried Blechert\*

A total synthesis of (–)-centrolobine based on a diastereoselective ring rearrangement metathesis (dRRM)–chemoselective double bond isomerisation sequence and a one-pot cross metathesis (CM)–hydrogenation procedure is described.

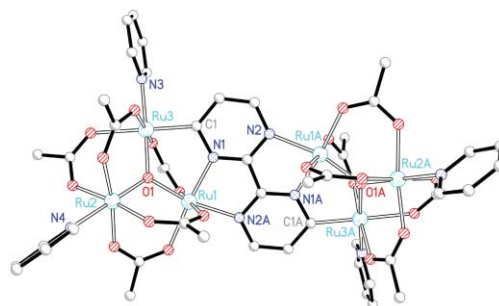


1971

**Dimers of delocalized Ru<sub>3</sub>O clusters linked by *ortho*-metallated 2,2′-bipyrimidine in  $\mu_4$ - $\eta^1(\text{C}), \eta^1(\text{C}), \eta^2(\text{N}, \text{N}), \eta^2(\text{N}, \text{N})$  mode**

Heng-Yun Ye, Li-Yi Zhang, Jing-Lin Chen and Zhong-Ning Chen\*

A remarkable cluster–cluster interaction is operative in dimers of delocalized Ru<sub>3</sub>O(OAc)<sub>5</sub>(py)<sub>2</sub> clusters with the bridging 2,2′-bipyrimidine (bpym) adopting an unprecedented  $\mu_4$ - $\eta^1(\text{C}), \eta^1(\text{C}), \eta^2(\text{N}, \text{N}), \eta^2(\text{N}, \text{N})$  bonding mode through double *ortho*-metallation.

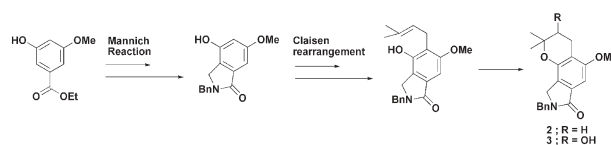


1974

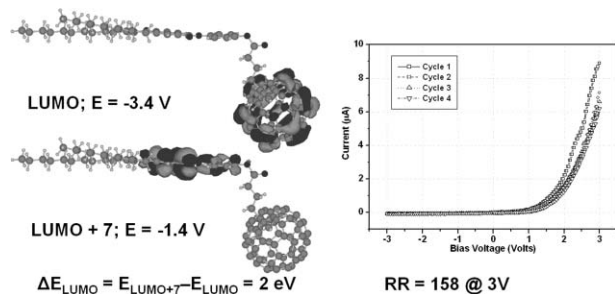
**Synthesis of tricyclic pyrano[2,3-*e*]isoindolin-3-ones as the core structure of stachybotrin A, B, and C**

Seiichi Inoue,\* Ryoung Kim, Yujiro Hoshino and Kiyoshi Honda

The core structure of stachybotrin A, B, and C (2 and 3) have been regioselectively synthesized for the first time by a short route which involved Mannich reaction and Claisen rearrangement.



1977

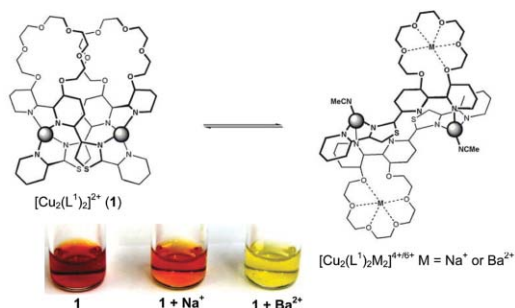


### Electrical rectification from a fullerene[60]-dyad based metal–organic–metal junction

S. Shankara Gayathri and Archita Patnaik\*

Langmuir–Blodgett monolayer films of  $C_{60}$ -didodecyloxybenzene dyad, with a  $C_{60}$  acceptor and didodecyloxybenzene donor, exhibit rectification with high rectification ratios of 87–158 at 3 V.

1980

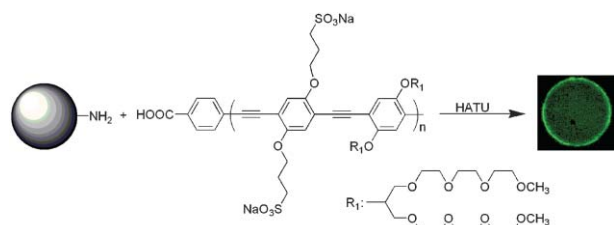


### This facile interconversion of dinuclear double helicates and side-by-side species: a reprogrammable ligand with potential sensor applications

Georgios Bokolinis, T. Riis-Johannessen, Lindsay P. Harding, John. C. Jeffery, Neil McLay and Craig R. Rice\*

Ligand  $L^1$  forms a dinuclear double helicate with  $Cu^+$  but upon addition of  $Ba^{2+}$  a side-by-side species is formed. Addition of  $Na^+$  results in an equal amount of both species.

1983



### Synthesis and functionalization of a highly fluorescent and completely water-soluble poly(*para*-phenyleneethynylene) copolymer for bioconjugation

Kangwon Lee, Jae Cheol Cho, Jennifer DeHeck and Jinsang Kim\*

Bioconjugation of a highly fluorescent water-soluble poly(*para*-phenyleneethynylene) (PPE) copolymer with ionic and non-ionic side chains is achieved by means of chain-end modification, providing a design principle for biosensor development.

## ADDITION AND CORRECTION

1986

Andrew A. R. Watt, Mark R. Sambrook, Kyriakos Porfyrikis, Brendon W. Lovett, Hassane El Mkami, Graham M. Smith and G. Andrew D. Briggs

### Atomic–molecular superlattices



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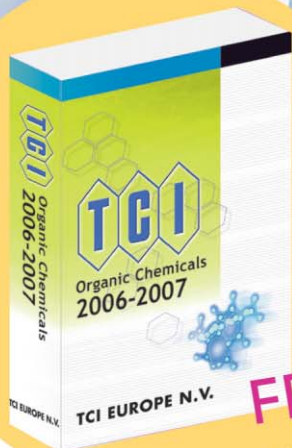
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