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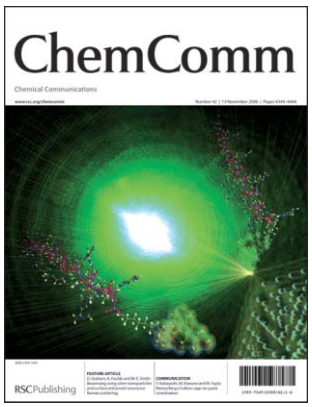
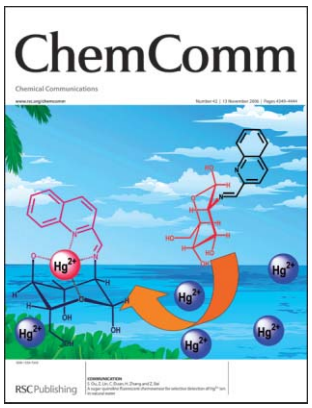
ISSN 1359-7345 CODEN CHCOFS (42) 4349–4444 (2006)



Cover

See Duncan Graham *et al.*, page 4363.

The cover shows a laser beam (green) exciting a dye labelled DNA probe that only emits SERRS (yellow) when in contact with the silver nanoparticle. Image reproduced by permission of Duncan Graham, Karen Faulds and W. Ewen Smith from *Chem. Commun.*, 2006, 4363.



Inside cover

See C. Duan *et al.*, page 4392.

A fluorescent sensor incorporating a quinoline group and a D-glucosamine group was designed for detection of Hg^{2+} in natural water.

Image reproduced by permission of S. Ou, Z. Lin, C. Duan, H. Zhang and Z. Bai from *Chem. Commun.*, 2006, 4392.

CHEMICAL TECHNOLOGY

T41

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

Chemical Technology

November 2006/Volume 3/Issue 11

www.rsc.org/chemicaltechnology

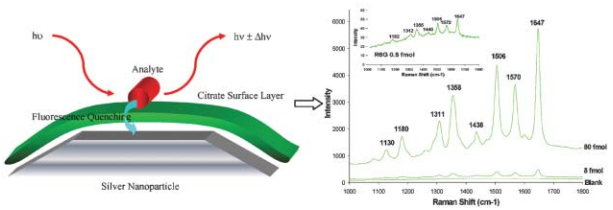
FEATURE ARTICLE

4363

Biosensing using silver nanoparticles and surface enhanced resonance Raman scattering

Duncan Graham,* Karen Faulds and W. Ewen Smith

Silver nanoparticles can be used to provide excellent surface enhanced resonance Raman scattering. Control of the surface chemistry and the use of appropriate protocols enables effective sensing of biomolecules.



Chemical Communications (print: ISSN 1359-7345; electronic: ISSN 1364-548X) is published 48 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WF. All orders, with cheques made payable to the Royal Society of Chemistry, should be sent to RSC Distribution Services, c/o Portland Customer Services, Commerce Way, Colchester, Essex, UK CO2 8HP. Tel +44 (0)1206 226050; E-mail sales@rscdistribution.org

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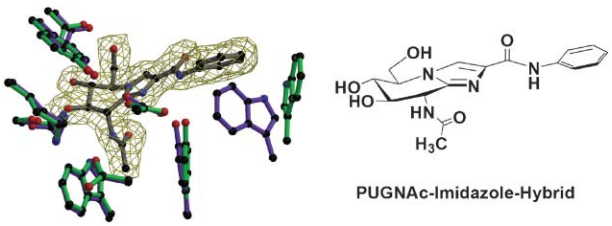
4372

Inhibition of *O*-GlcNAcase by a *gluco*-configured nagstatin and a PUGNAc–imidazole hybrid inhibitor

Bhagavathy Shanmugasundaram, Aleksandra W. Debowski, Rebecca J. Dennis, Gideon J. Davies, David J. Vocadlo and Andrea Vasella*

A PUGNAc–imidazole hybrid provides a stable competitive inhibitor of human *O*-GlcNAcase as revealed through enzyme kinetics and structural analysis of an enzyme–inhibitor complex.

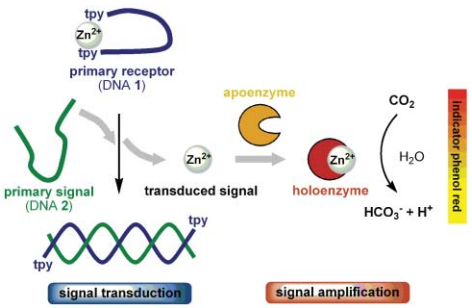


4375

Enzymatic amplification in a bioinspired, autonomous signal cascade

Nora Graf and Roland Krämer*

A two-step reaction cascade is applied to the sequence-specific detection of DNA. The molecular signal (DNA **2**) is enzymatically amplified 10 000-fold and converted into an optical signal (color change) within seconds.

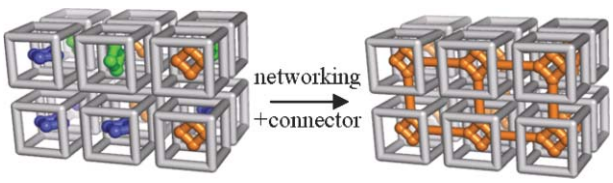


4377

Networking a hollow cage *via* guest coordination

Yasuhiro Kobayashi, Masaki Kawano* and Makoto Fujita*

A hollow coordination cage was successfully self-assembled to form a 2D-network *via* guest networking with a metal connector. Thanks to the networking, the hollow cage had a less symmetric cavity, preventing the guest site disorder problem which often hampers accurate X-ray analysis and anisotropic ordering of the guests.

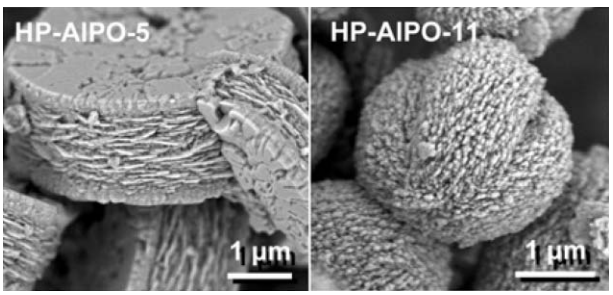


4380

Organosilane surfactant-directed synthesis of mesoporous aluminophosphates constructed with crystalline microporous frameworks

Minkee Choi, Rajendra Srivastava and Ryong Ryoo*

Mesoporous aluminophosphates that are constructed with crystalline microporous $AlPO_4$-*n* frameworks were directly synthesized by using organosilane surfactants as a mesopore director.



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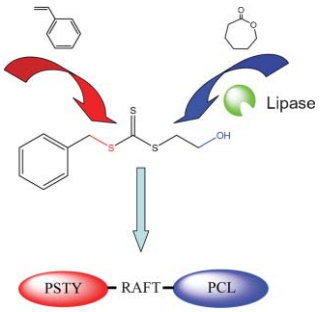
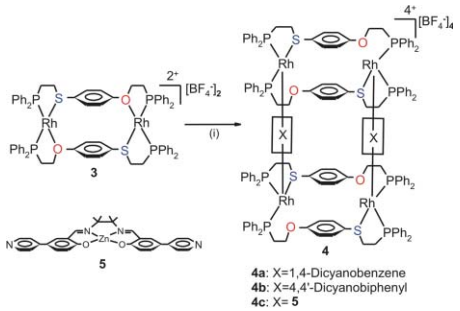


Simultaneous enzymatic ring opening polymerisation and RAFT-mediated polymerisation in supercritical CO_2

Kristofer J. Thurecht, Andrew M. Gregory, Silvia Villarroya, Jiaxiang Zhou, Andreas Heise and Steven M. Howdle*

The first simultaneous, metal-free synthesis of block copolymers through combination of enzymatic ring-opening polymerisation of ε-caprolactone with RAFT-mediated controlled radical polymerisation of styrene.

4386

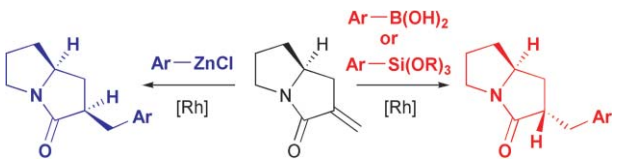


Tetrametallic rectangular box complexes assembled from heteroligated macrocycles

Aaron M. Brown, Maxim V. Ovchinnikov, Charlotte L. Stern and Chad A. Mirkin*

The reaction of a heteroligated Rh(I) bimetallic macrocycle with rigid ditopic ligands (1,4-dicyanobenzene, 4-4′-dicyanobiphenyl, or dipyridyl terminated salen ligand **5**) results in the formation of tetrametallic rectangular box complexes.

4389

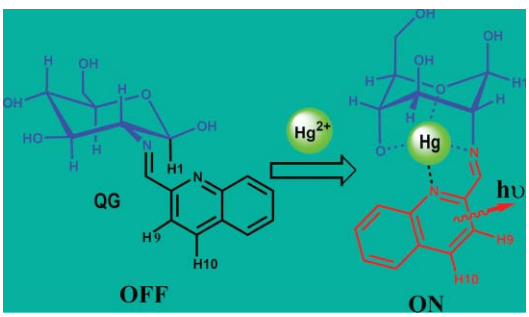


Switching stereoselectivity in rhodium-catalysed 1,4-additions: the asymmetric synthesis of 2-substituted pyrrolizidinones

Jonathan D. Hargrave, Gerwyn Bish and Christopher G. Frost*

The appropriate choice of organometallic nucleophile enables the straightforward preparation of different stereoisomers of 2-substituted pyrrolizidinones utilising the rhodium-catalysed 1,4-addition reaction.

4392



A sugar-quinoline fluorescent chemosensor for selective detection of Hg^{2+} ion in natural water

Shengju Ou, Zhihua Lin, Chunying Duan,* Haitao Zhang and Zhiping Bai*

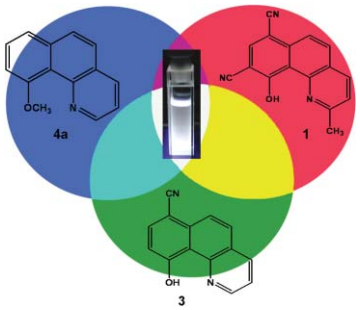
A selective and sensitive fluorescent sensor for detection of Hg^{2+} in natural water was achieved by incorporating the well-known fluorophore quinoline group and a water-soluble D-glucosamine group within one molecule.

4395

Extensive spectral tuning of the proton transfer emission from 550 to 675 nm *via* a rational derivatization of 10-hydroxybenzo[*h*]quinoline

Kew-Yu Chen, Cheng-Chih Hsieh, Yi-Ming Cheng, Chin-Hung Lai and Pi-Tai Chou*

Via mixing compounds **1**, **3** and **4a**, a qualitative white light generation can be achieved in ethyl acetate with a regular UV lamp (366 nm)

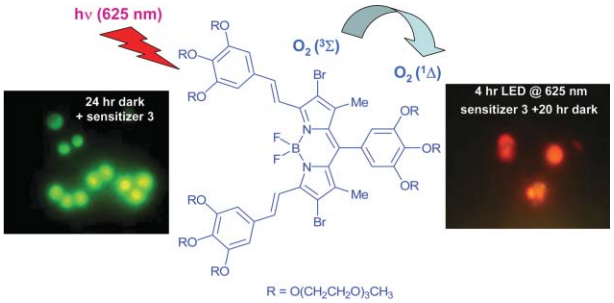


4398

Water soluble distyryl-boradiazaindacenes as efficient photosensitizers for photodynamic therapy

Serdar Atilgan, Zeynep Ekmekci, A. Lale Dogan, Dicle Guc and Engin U. Akkaya*

We introduce a novel class of water soluble, extended conjugation boradiazaindacene dyes which are efficient singlet oxygen generators and have spectacular photoinduced cytotoxicity when excited in the "therapeutic window" of the electromagnetic spectrum.

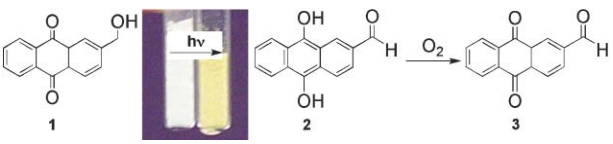


4401

A simple and smart oxygen sensor based on the intrazeolite reactions of a substituted anthraquinone

Katherine L. McGilvray, Michelle N. Chrétien, Matthew Lukeman and J. C. Scaiano*

Zeolite-incorporated 2-(hydroxymethyl)anthraquinone leads to a light-activated, reusable oxygen sensor that reports oxygen contamination events by simple visual inspection.

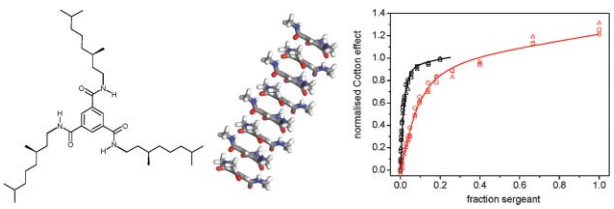


4404

Amplification of chirality in benzene tricarboxamide helical supramolecular polymers

Andrew J. Wilson, Jeroen van Gestel, Rint P. Sijbesma* and E. W. Meijer*

Self-assembled benzene tricarboxamides obey 'sergeants and soldiers' and 'majority rules' principles. A recently developed theoretical model allows estimation of the energetic parameters that govern these effects, and gives considerable insight in the process.



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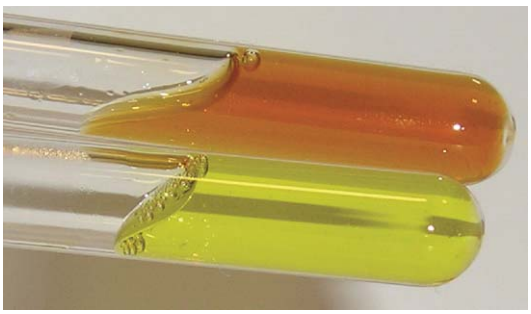
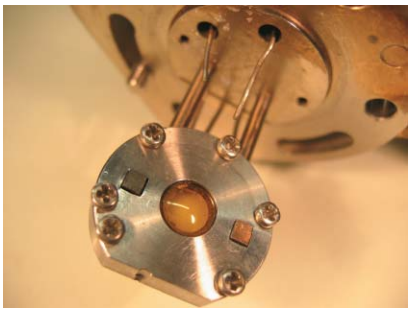


Photosensitive gelatin

Ana Vesperinas, Julian Eastoe,* Paul Wyatt, Isabelle Grillo and Richard K. Heenan

UV-induced changes in aggregation cause photo-rheological effects with aqueous complexes comprising a photodestructible surfactant and gelatin.

4410

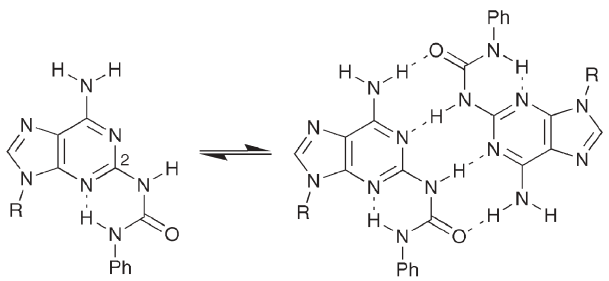


Monitoring the coordination of aluminium during microporous oxide crystallisation by *in situ* soft X-ray absorption spectroscopy

Andrew M. Beale, Ad M. J. van der Eerden, Didier Grandjean, Andrei V. Petukhov, Andy D. Smith and Bert M. Weckhuysen*

A new set-up for studying the aluminium coordination changes during microporous oxide crystallization using *in situ* soft X-ray absorption spectroscopy is described.

4413

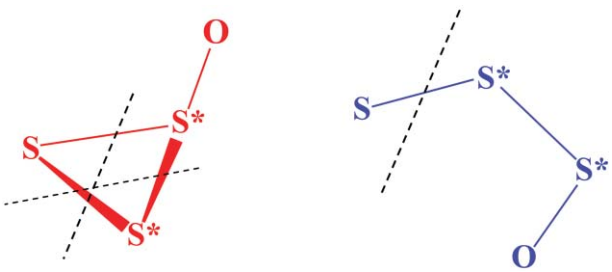


Self-complementary purines by quadruple hydrogen bonding

Alisha M. Martin, Roslyn S. Butler, Ion Ghiviriga, Rachel E. Giessert, Khalil A. Abboud and Ronald K. Castellano*

The first discrete, self-complementary, quadruply hydrogen-bonded complexes based on the 2,6-diaminopurine (DAP) scaffold have been prepared; regioselective urea formation at the C(2) amino group of the heterocycle allows intermolecular dimerization through a DADA hydrogen bonding motif.

4416



S_3O and S_3O^+ in the gas phase: ring and open-chain structures

Giulia de Petris,* Marzio Rosi and Anna Troiani

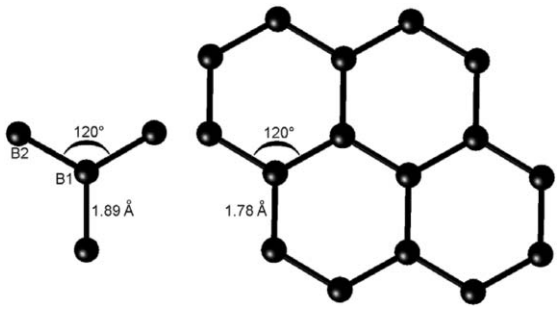
The structure of the sulfur-rich oxides S_3O and S_3O^+, detected in the gas phase by mass spectrometric techniques, is assigned by high-resolution labelling experiments. Distinct fragmentation products prove that ring and open-chain isomers are formed in neutralization–reionization (NR) experiments of the $S^{34}S_2O^+$ ion generated by S-transfer to $^{34}S_2O^+$.

4419

Synthesis of a missing structural link: the first trigonal planar B_4 units in the novel complex boride $Ti_{1+x}Os_{2-x}RuB_2$ (x = 0.6)

Boniface P. T. Fokwa, Jörg von Appen and Richard Dronskowski*

The complex solid-state boride $Ti_{1+x}Os_{2-x}RuB_2$ (x = 0.6) has been synthesized; its novel structure contains a trigonal planar, strongly bonded B_4 unit with a 1.89 Å long B–B distance.

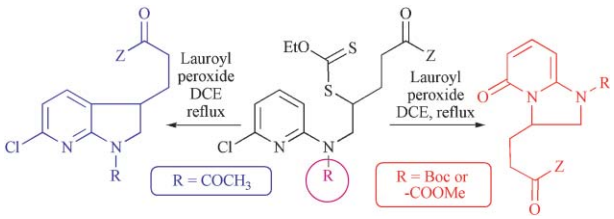


4422

An unprecedented radical ring closure on a pyridine nitrogen

Myriem El Qacemi,* Louis Ricard and Samir Z. Zard*

An unprecedented radical ring-closure onto the pyridine nitrogen was observed when certain types of substituents were present around the pyridine nucleus.

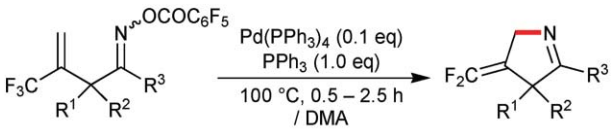


4425

5-*endo* Heck-type cyclization of 2-(trifluoromethyl)allyl ketone oximes: synthesis of 4-difluoromethylene-substituted 1-pyrrolines

Junji Ichikawa,* Ryo Nadano and Naotaka Ito

2-(Trifluoromethyl)allyl ketone *O*-pentafluorobenzoyloximes undergo a palladium-catalyzed 5-*endo* mode of alkene insertion *via* oxidative addition of the N–O bond, followed by β-fluorine elimination to produce 4-difluoromethylene-1-pyrrolines.

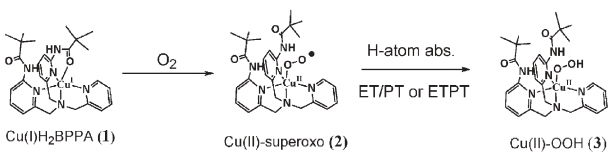


4428

Mononuclear copper(II)–hydroperoxo complex derived from reaction of copper(I) complex with dioxygen as a model of DβM and PHM

Tatsuya Fujii, Syuhei Yamaguchi, Yasuhiro Funahashi, Tomohiro Ozawa, Takehiko Tosha, Teizo Kitagawa and Hideki Masuda*

A mononuclear copper(II)–hydroperoxo species has been generated by the reaction of the Cu(I)–H_2BPPA complex with dioxygen, which is a good model to understand the enzymatic reaction process of the Cu_B site in DβM and PHM.



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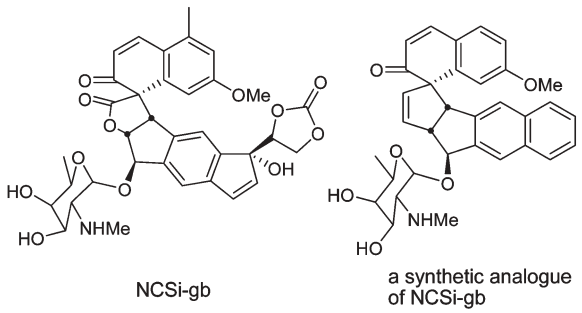


Spirocyclic helical compounds as binding agents for bulged RNA, including HIV-2 TAR

Ziwei Xiao, Na Zhang, Yiqing Lin, Graham B. Jones and Irving H. Goldberg*

Based on fluorescence binding studies and 1D ^{1}H NMR studies, designed synthetic analogues of NCSi-gb bind specifically with two-base bulged RNA, including HIV-2 TAR RNA, making them potential lead compounds for antiviral drug development.

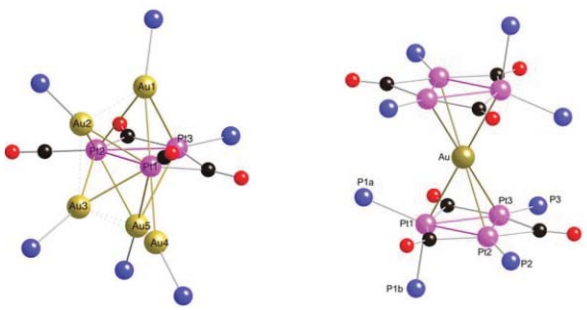
4434

$BF_3{\cdot}OEt_2$ and TMSOTf: A synergistic combination of Lewis acids

Eddie L. Myers, Craig P. Butts and Varinder K. Aggarwal*

The combination of $BF_3{\cdot}OEt_2$ and TMSOTf gives $BF_2OTf{\cdot}OEt_2$, which is a more powerful Lewis acid than its components and especially effective in CH_3CN solvent. The complex formed has been characterised by ^{1}H, ^{19}F, ^{11}B and ^{31}P (using Et_3PO as an additive) NMR spectroscopy.

4437

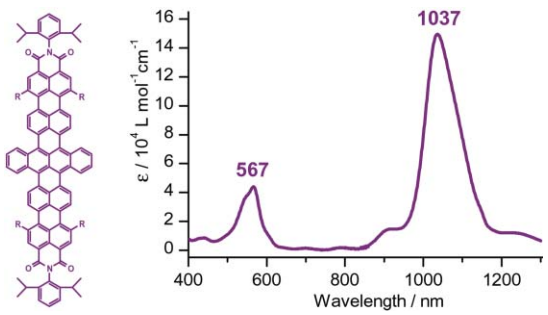


Structural/bonding insights from new geometrical varieties of two Pt–Au carbonyl/phosphine clusters, $[Pt_3(AuPPh_3)_5(\mu_2\text{-}CO)_2L_3]^+$ ($L_3 = (CO)_2PPh_3$) and $[(\mu_6\text{-}Au)\{Pt_3(\mu_2\text{-}CO)_3L_4\}_2]^+$ ($L = PMe_3$)

Namal de Silva, Jeffrey W. Laufenberg and Lawrence F. Dahl*

Pt_3Au_5 cluster featuring 44-eln. Pt_3 triangle with five $AuPPh_3$ ligands and 'full' $(\mu_6\text{-}Au)(Pt_3)_2$ sandwich with two 44-eln. $Pt_3(\mu_2\text{-}CO)_3L_4$ ($L = PMe_3$) asymmetrically encapsulating electrophilic Au(I).

4440



Dibenzopentarylenebis(dicarboximide)s: Novel near-infrared absorbing dyes

Yuri Avlasevich and Klaus Müllen*

The facile synthesis of the new class of core-extended rylene chromophores, dibenzopentarylenebis(dicarboximide)s, having an intense absorption at 1020–1040 nm, is presented.

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