

ChemComm

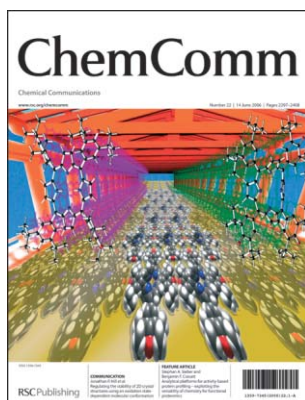
Chemical Communications

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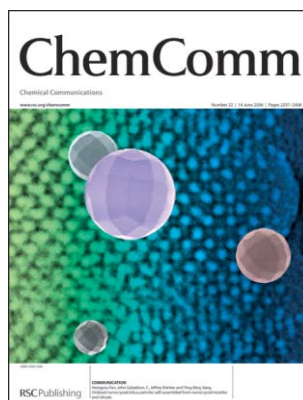
IN THIS ISSUE

ISSN 1359-7345 CODEN CHCOFS (22) 2297–2408 (2006)



Cover

See Jonathan P. Hill *et al.*, page 2320. Two oxidation states of a phenol-substituted porphyrin flank a surface-assembly of the molecules. The 'shades' of the molecules reflect their respective colours in the bulk state. All is against the background of a typical red-beamed Japanese temple passageway. Image reproduced by permission of Jonathan P. Hill, Yutaka Wakayama, Wolfgang Schmitt, Tohru Tsuruoka, Takashi Nakanishi, Melvin L. Zandler, Amy L. McCarty, Francis D'Souza, Lionel R. Milgrom and Katsuhiko Ariga, from *Chem. Commun.*, 2006, 2320.



Inside cover

See Hongyou Fan *et al.*, page 2323. Cooperative self-assembly of nanocrystal micelle building blocks with silicate under controlled kinetics leads to the formation of ordered nanocrystal/silica particles with a well-organized external topology. (Image courtesy of Mona Aragon and Hongyou Fan). Image reproduced by permission of Hongyou Fan, John Gabaldon, C. Jeffrey Brinker and Ying-Bing Jiang, from *Chem. Commun.*, 2006, 2323.

CHEMICAL TECHNOLOGY

T21

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

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June 2006/Volume 3/Issue 6

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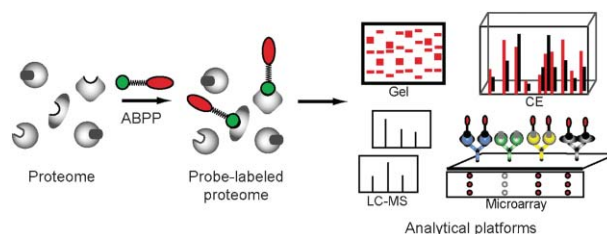
FEATURE ARTICLE

2311

Analytical platforms for activity-based protein profiling – exploiting the versatility of chemistry for functional proteomics

Stephan A. Sieber and Benjamin F. Cravatt*

The authors review new analytical platforms for activity-based protein profiling and discuss how they have exploited the versatility of chemical probes to gain unprecedented insights into the function of proteins in biological samples of high complexity.



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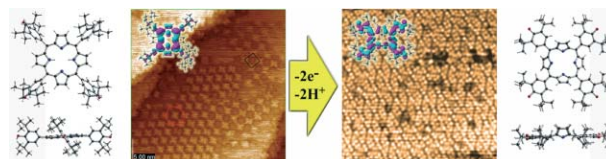
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2320

Regulating the stability of 2D crystal structures using an oxidation state-dependent molecular conformation

Jonathan P. Hill,* Yutaka Wakayama, Wolfgang Schmitt, Tohru Tsuruoka, Takashi Nakanishi, Melvin L. Zandler, Amy L. McCarty, Francis D'Souza, Lionel R. Milgrom and Katsuhiko Ariga*

Oxidative processing of a phenol-substituted porphyrin results in a puckering of the tetrapyrrole macrocycle but a net planarization of the molecule permitting stabilization of its self-assembled monolayers.

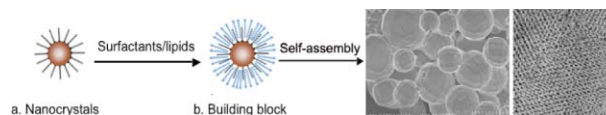


2323

Ordered nanocrystal/silica particles self-assembled from nanocrystal micelles and silicate

Hongyou Fan,* John Gabaldon, C. Jeffrey Brinker and Ying-Bing Jiang

Cooperative self-assembly of nanocrystal micelle building blocks with silicate leads to the formation of ordered nanocrystal/silica particles with a well-organized external topology.

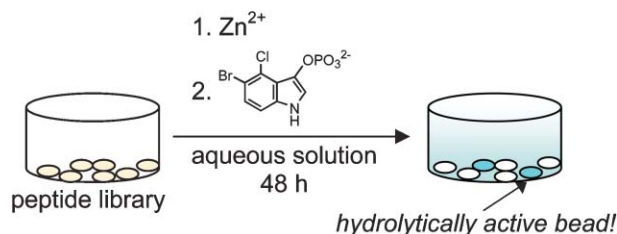


2326

A combinatorial approach to minimal peptide models of a metalloprotein active site

Frances Namuswe and David P. Goldberg*

Screening of a “one-bead-one-compound” peptide library containing biomimetic His/Cys ligands has led to the discovery of sequences that hydrolyze ester substrates in combination with Zn^{2+} .

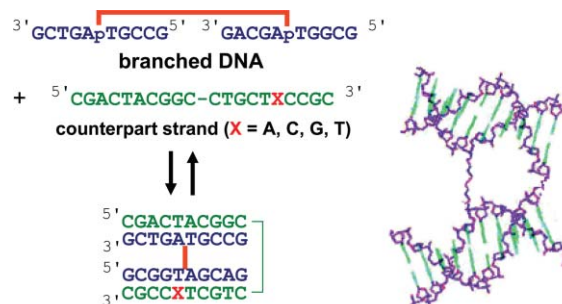


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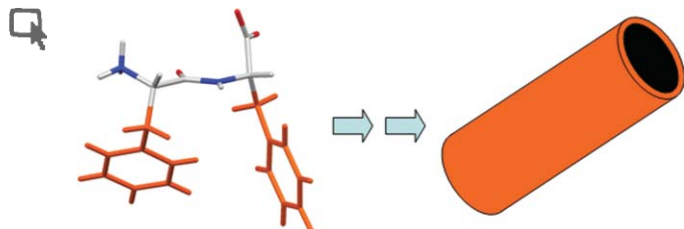
Thermodynamic properties of branched DNA complexes with full-matched and mismatched DNA strands

Masayuki Endo* and Tetsuro Majima*

Complexes consisting of a branched DNA with full-matched and mismatched DNA strands were prepared, and the cross-linking of the DNA strands and their diastereochemistry affected the stability of the complexes and the thermodynamics of the complex formation.



2332

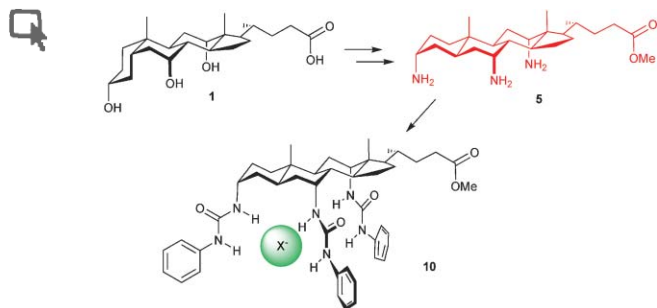


The structure of nanotubes formed by diphenylalanine, the core recognition motif of Alzheimer's β -amyloid polypeptide

Carl Henrik Görbitz*

The X-ray powder diffraction pattern of the nanotubes formed by self-assembly of diphenylalanine is identical to the simulated pattern for the single crystal structure.

2335

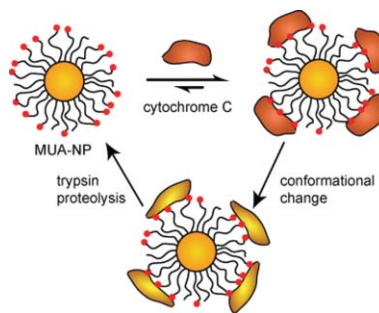


The “triamino-analogue” of methyl allocholate; a rigid, functionalised scaffold for supramolecular chemistry

Khadga M. Bhattarai, Vicente del Amo, Germinal Magro, Adam L. Sisson, Jean-Baptiste Joos, Jonathan P. H. Charmant, Anob Kantacha and Anthony P. Davis*

Scaffolds based on the AB-*cis* steroidal skeleton, as in cholic acid **1**, have already proved their usefulness. Now **1** has been converted into the AB-*trans* triamine **5**. Elaboration of the axial amino groups gives highly preorganised structures such as anion receptor **10**.

2338

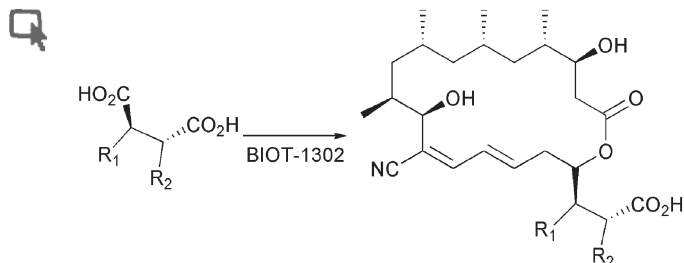


“Cleaning” of nanoparticle inhibitors via proteolysis of adsorbed proteins

Joseph W. E. Worrall, Ayush Verma, Haoheng Yan and Vincent M. Rotello*

Proteolytic “cleaning” of nanoparticles was demonstrated through selective trypsin digestion of cytochrome *c* adsorbed to gold nanoparticles.

2341



Biosynthesis of the angiogenesis inhibitor borrelidin: directed biosynthesis of novel analogues

Steven J. Moss, Isabelle Carletti, Carlos Olano, Rose M. Sheridan, Michael Ward, Vidya Math, Mohammad Nur-E-Alam, Alfredo F. Braña, Ming Qiang Zhang, Peter F. Leadlay, Carmen Méndez, José A. Salas and Barrie Wilkinson*

Analogues of the angiogenesis inhibitor borrelidin were produced by precursor directed biosynthesis using a mutant of *Streptomyces parvulus* Tü4055 (BIOT-1302).

2344

Direct evidence for the availability of reactive, water soluble phosphorus on the early Earth. H-Phosphinic acid from the Nantan meteorite

David E. Bryant and Terence P. Kee*

Anoxic irradiation of a type III CD iron meteorite (Nantan) known to contain the phosphide mineral schreibersite ($(\text{Fe,Ni})_3\text{P}$) in the presence of ethanol/water affords the reactive oxyacid H-phosphinic acid (H_3PO_2) as the dominant phosphorus product.

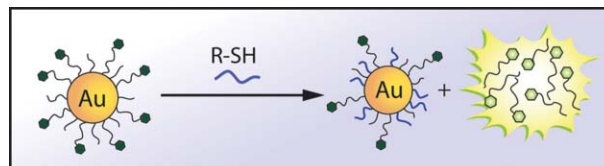


2347

In situ observation of place exchange reactions of gold nanoparticles. Correlation of monolayer structure and stability

Rui Hong, Joseph M. Fernández, Hiroshi Nakade, Rochelle Arvizo, Todd Emrick and Vincent M. Rotello*

Place exchange reactions of gold nanoparticles were studied using dye displacement, with subtle changes in ligand structure dramatically influencing displacement rate and particle stability.

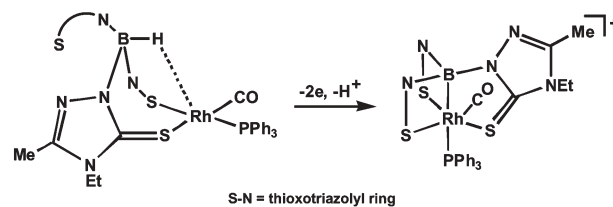


2350

Redox activation of a B–H bond: a new route to metallaboratrane complexes

Robin J. Blagg, Jonathan P. H. Charmant, Neil G. Connelly,* Mairi F. Haddow and A. Guy Orpen

Oxidative activation of a B–H bond of a coordinated scorpionate ligand provides an unprecedented route to rhodaboratrane complexes.

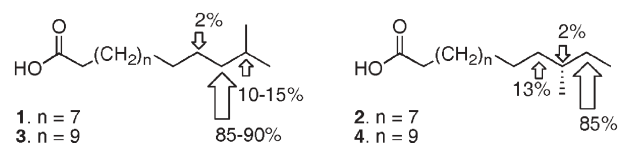


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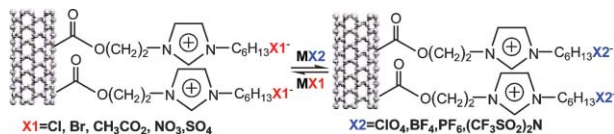
Are branched chain fatty acids the natural substrates for P450_{BM3}?

Max J. Cryle, Rocio D. Espinoza, Sarah J. Smith, Nicholas J. Matovic and James J. De Voss*

Branched chain fatty acids are shown to be excellent substrates for P450_{BM3} from *Bacillus megaterium*. The high natural abundance of such fatty acids in *B. megaterium* suggests that they may be substrates for P450_{BM3} *in vivo*.



2356

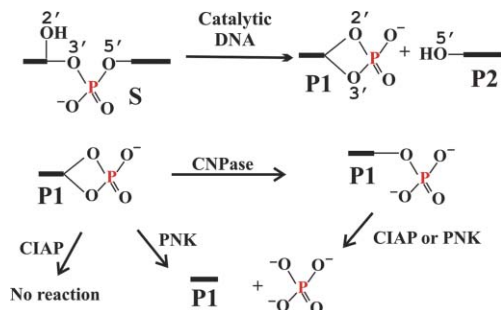


The electrolyte switchable solubility of multi-walled carbon nanotube/ionic liquid (MWCNT/IL) hybrids

Bo Yu, Feng Zhou, Gang Liu, Yongmin Liang, Wilhelm T. S. Huck and Weimin Liu*

Ionic liquid-modified carbon nanotubes exhibit reversibly switchable solubility between aqueous and organic solvents, induced by anion exchange.

2359

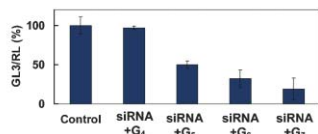
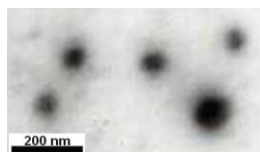


Phosphoester-transfer mechanism of an RNA-cleaving acidic deoxyribozyme revealed by radioactivity tracking and enzymatic digestion

Srinivas A. Kandadai, William Chiuman and Yingfu Li*

The nature of the phosphate termini within the cleavage fragments (P1 and P2) produced by a catalytic DNA from an RNA substrate (S) containing a radioactive phosphorus (P) is conveniently analyzed by radioactivity tracing and enzymatic digestion using CIAP, PNK and CNPase.

2362

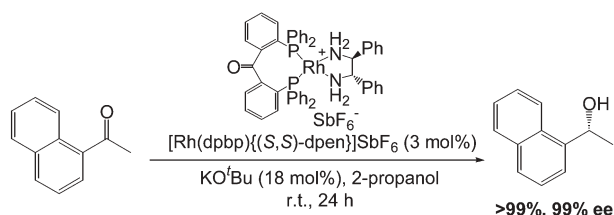


PAMAM dendrimers for efficient siRNA delivery and potent gene silencing

Jiehua Zhou, Jiangyu Wu, Nadia Hafdi, Jean-Paul Behr, Patrick Erbacher and Ling Peng*

Genuine, nondegraded PAMAM dendrimers self-assemble with siRNA into nanosized particles that are efficient vectors for siRNA delivery and induce potent endogenous gene silencing.

2365



Achiral benzophenone ligand–rhodium complex with chiral diamine activator for high enantiocontrol in asymmetric transfer hydrogenation

Koichi Mikami,* Kazuki Wakabayashi, Yukinori Yusa and Kohsuke Aikawa

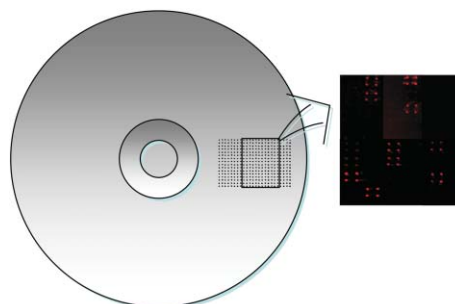
The chirality of an achiral benzophenone-based complex can be controlled by chiral diamines to afford high enantioselectivity in the catalytic asymmetric transfer hydrogenation of ketones (up to 99% ee, 99% yield).

2368

**DNA microarraying on compact disc surfaces.
Application to the analysis of single nucleotide
polymorphisms in Plum pox virus**

Sergi Morais, Raquel Marco-Molés, Rosa Puchades* and Ángel Maquieira*

The potential of using compact discs as high throughput screening platforms for DNA microarraying is discussed and applied to discriminate genetic variations of Plum pox virus.



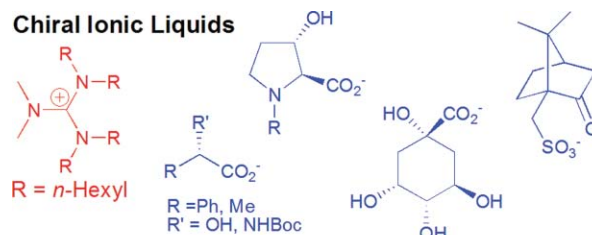
2371

**Simple transformation of crystalline chiral natural anions
to liquid medium and their use to induce chirality**

Luís C. Branco, Pedro M. P. Gois, Nuno M. T. Lourenço, Vanya B. Kurteva and Carlos A. M. Afonso*

Asymmetric inducing agent in catalytic Rh(II) carbenoid C–H insertion and Sharpless dihydroxylation.

Chiral Ionic Liquids



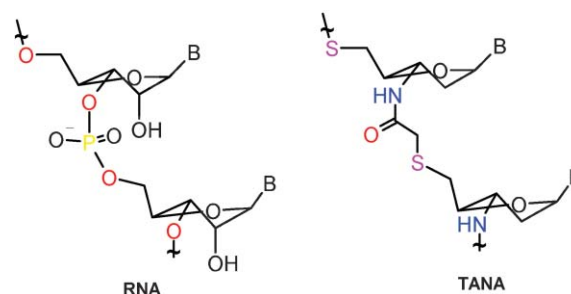
⇒ Asymmetric inducing agent in catalytic Rh(II) carbenoid C–H insertion and Sharpless dihydroxylation

2373

**Sugar–thioacetamide backbone in
oligodeoxyribonucleosides for specific recognition of
nucleic acids**

Khirud Gogoi, Anita D. Gunjal and Vaijayanti A. Kumar*

Replacement of the six-atom sugar–phosphate backbone in DNA by a seven-atom sugar–thioacetamide backbone (TANA) carrying the nucleobase sequence favours specific RNA recognition *via* triplex formation.

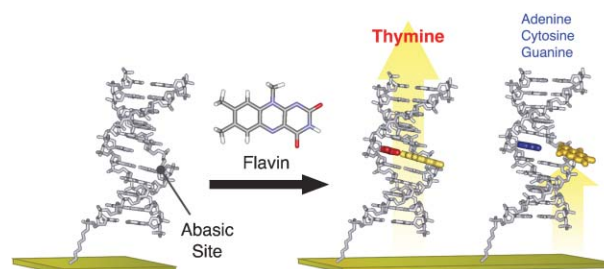


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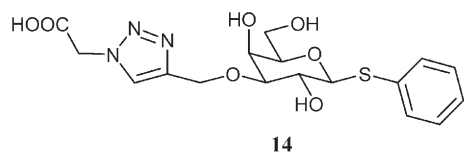
**Electrochemical SNPs detection using an abasic
site-containing DNA on a gold electrode**

Kotaro Morita, N. B. Sankaran, Weimin Huang, Takehiro Seino, Yusuke Sato, Seiichi Nishizawa and Norio Teramae*

Combining hydrogen bond mediated nucleobase recognition and electrochemical measurement allows a simple detection of single nucleotide polymorphism by using abasic sites as a molecular recognition field.



2379

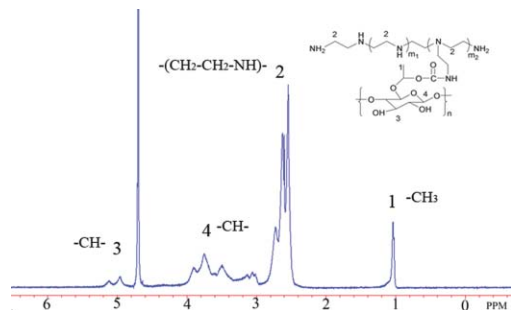


Carbohydrate triazoles and isoxazoles as inhibitors of galectins-1 and -3

Denis Giguère, Ramesh Patnam, Marc-André Bellefleur, Christian St-Pierre, Sachiko Sato and René Roy*

Galactosides and lactosides bearing triazoles or isoxazoles, regioselectively prepared from [1,3]-dipolar cycloadditions between alkynes, azides or nitrile oxides, provided specific galectin-1 and -3 inhibitors. The best monovalent inhibitors had modification at the anomeric (18) and 3-position (14) with potencies of 1250 μM and trivalent inhibitor (20) had potencies as low as 20 μM .

2382

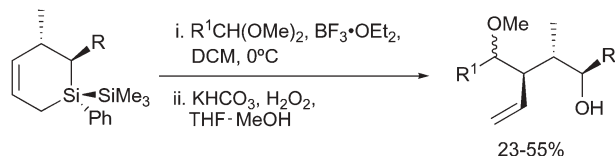


Two novel non-viral gene delivery vectors: low molecular weight polyethylenimine cross-linked by (2-hydroxypropyl)- β -cyclodextrin or (2-hydroxypropyl)- γ -cyclodextrin

Hongliang Huang, Guping Tang, Qingqing Wang,* Da Li, Fenping Shen, Jun Zhou and Hai Yu*

Two novel polymers of low molecular weight polyethylenimine cross-linked by (2-hydroxypropyl)- β -cyclodextrin or (2-hydroxypropyl)- γ -cyclodextrin showed lower cytotoxicity and higher transfection efficiency for the delivery of plasmid DNA compared with those of polyethylenimine (PEI, 25 kDa).

2385



Hosomi-Sakurai reactions of silacyclic allyl silanes

Jonathan D. Sellars, Patrick G. Steel* and Michael J. Turner

Provided that they can adopt a suitable conformation, silacyclic allyl silanes are viable partners for the Hosomi-Sakurai reaction with both aryl and alkyl acetals.

2388



Rapid stereocontrolled assembly of the fully substituted C-aryl glycoside of kendomycin with a Prins cyclization: a formal synthesis

Kevin B. Bahnck and Scott D. Rychnovsky*

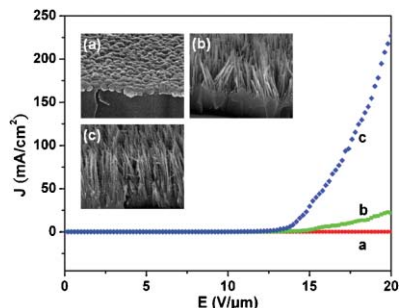
The C-aryl glycoside core of kendomycin was prepared by a Prins cyclization between a substituted benzaldehyde and a homoallylic alcohol, itself prepared in 4 steps from (*S*)-citronellol. The elaboration of our Prins adduct to Smith's intermediate completes a formal total synthesis of kendomycin.

2391

Non-catalytic and template-free growth of aligned CdS nanowires exhibiting high field emission current densities

Yi-Feng Lin, Yung-Jung Hsu, Shih-Yuan Lu* and Sheng-Chin Kung

Various CdS nanostructures, including nanoparticle film, bundles of quasi-aligned and well-aligned nanowires, were fabricated with a non-catalytic and template-free MOCVD process. The well-aligned CdS nanowire bundles produced unusually high field emission current densities.

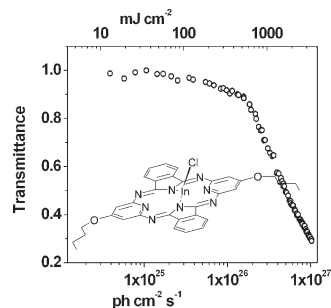


2394

Demonstration of the optical limiting effect for an hemiporphyrzine

Danilo Dini, Mario J. F. Calvete, Michael Hanack,* Vincenzo Amendola and Moreno Meneghetti*

Indium chloride hemiporphyrzine displays the nonlinear optical effect of reverse saturable absorption in the visible when irradiated with nanosecond laser pulses

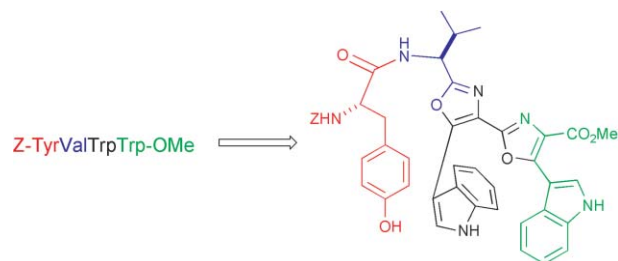


2397

Biomimetic approaches to diazomide A. Direct synthesis of the indole bis-oxazole fragment by oxidation of a TyrValTrpTrp tetrapeptide

Jonathan Sperry and Christopher J. Moody*

Oxidation of a protected TyrValTrpTrp tetrapeptide results in direct formation of the indole bis-oxazole core of diazomide A.

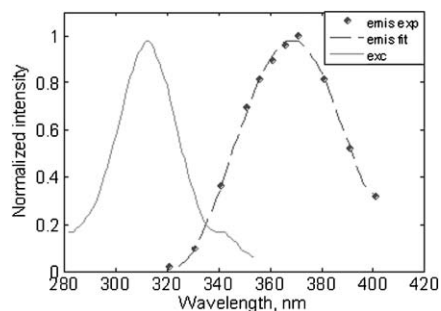


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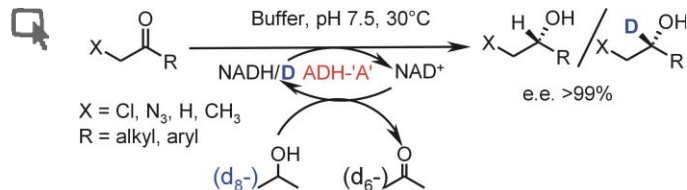
Synthesis and spectroscopic observation of dendrimer-encapsulated gold nanoclusters

M. Linh Tran,* Andrei V. Zvyagin* and Taras Plakhotnik

Observation of the excitation and emission spectra of a dendrimer-encapsulated gold nanocluster.



2402



Biocatalytic deuterium- and hydrogen-transfer using over-expressed ADH-‘A’: enhanced stereoselectivity and ^2H -labeled chiral alcohols

Klaus Edegger, Christian C. Gruber, Tina M. Poessl, Sabine R. Wallner, Iván Lavandera, Kurt Faber, Frank Niehaus, Juergen Eck, Reinhold Oehrlein, Andreas Hafner and Wolfgang Kroutil*

Employing d_8 -2-propanol as deuterium source, stereoselective biocatalytic deuterium transfer was achieved employing over-expressed alcohol dehydrogenase ADH-‘A’ from *Rhodococcus ruber*.

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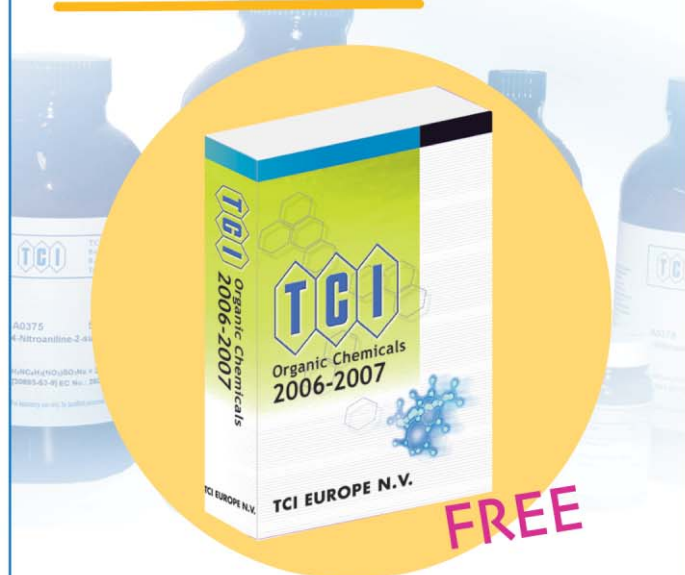
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