



The following Communications have been judged by at least two referees to be “very important papers” and will be published online at www.angewandte.org soon:

P. J. Malinowski, M. Derzi, Z. Mazej, Z. Jagličić, B. Gawęł, W. Łasocha, W. Grochala*
Anomalous Strong Antiferromagnetism in Silver(II) Sulfate

R. C. Driesener, M. R. Challand, S. E. McGlynn, E. M. Shepard, E. S. Boyd, J. B. Broderick, J. W. Peters, P. L. Roach*
[FeFe]-Hydrogenase Cyanide Ligands Derived From S-Adenosylmethionine-Dependent Cleavage of Tyrosine

E. Kan, H. Xiang, C. Lee, F. Wu, J. Yang, M.-H. Whangbo*
Origin of the Ferroelectricity in Perovskites with s⁰ A-Site Cations: Toward Near-Room-Temperature Multiferroics

A. Ciesielski, S. Lena, S. Masiero, G. P. Spada,* P. Samorì*
Dynamers at the Solid–Liquid Interface: Controlling the Reversible Assembly/Reassembly Process between Two Highly Ordered Supramolecular Guanine Motifs

M. Alcarazo, T. Stork, A. Anoop, W. Thiel, A. Fürstner*
Steering the Surprisingly Modular π -Acceptor Properties of N-Heterocyclic Carbenes: Implications for Gold Catalysis

H. Braunschweig,* C.-W. Chiu, K. Radacki, T. Kupfer
Synthesis and Structure of an Carbene-Stabilized π -Boryl Anion

S. Zhang, Y. Shao, G. Yin,* Y. Lin*
Electrostatic Self-Assembly of Platinum-Around-Gold Nanocomposite with High Activity Towards Formic Acid Oxidation

D. Bojer, A. Venugopal, B. Neumann, H.-G. Stammer, N. W. Mitzel*
Lewis Base Induced Reductions in Organolanthanide Chemistry

S.-H. Kim,* Su Y. Lee, S.-M. Yang*
Janus Microspheres for Highly Flexible and Impregnable Water-Repelling Interfaces

L. Frullano, C. Catana, T. Benner, A. D. Sherry, P. Caravan*
A Bimodal MR-PET Agent for Quantitative pH Imaging



“The best advice I have ever been given is honesty is the best policy.
The worst advice I have ever been given was to give up my academic career ...”
This and more about Norbert Krause can be found on page 1354.

Author Profile

Norbert Krause _____ 1354

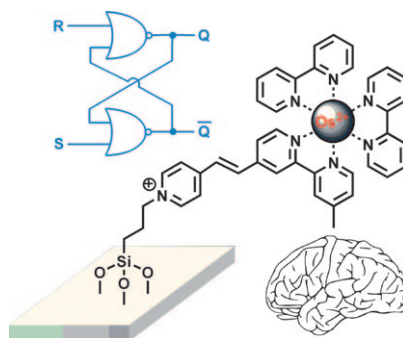
Chirality at the Nanoscale

David B. Amabilino

Books

reviewed by D. Bonifazi _____ 1355

Commit to memory: Whereas combinational logic devices are indifferent with respect to the history of input application, sequential logic is related to a memory function. A proof-of-principle of the sequential logic concept at the molecular level was demonstrated recently with a surface-confined osmium complex (see picture). This is an important conceptual advance toward molecular information processing.



Highlights

Molecular Electronics

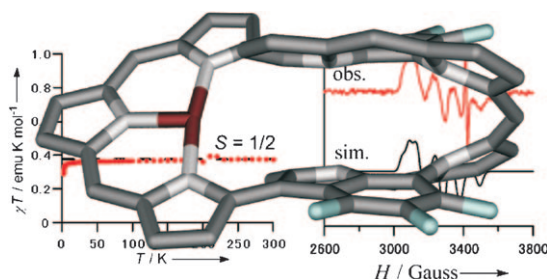
U. Pischel* _____ 1356–1358

Advanced Molecular Logic with Memory Function

Expanded Porphyrins

P. J. Chmielewski* — 1359–1361

Lucky Seven: Characterization of Stable T-Shaped Copper(II) Complexes of [32]Heptaphyrins



Luck and skill were both needed to find out that tetraaryl[32]heptaphyrin-(1.1.1.1.1.1.1) and its fourfold-fused derivative stabilize divalent copper in an

unprecedented T-shaped geometry of the coordinating environment (see picture; Cu red, F blue, N light gray, C dark gray).

Reviews

Nanoscience

H. Goesmann,
C. Feldmann* — 1362–1395

Nanoparticulate Functional Materials

At the very beginning was the dyeing of glass, a first application of nanoparticulate functional materials (see picture). Today diverse perspectives for the increasing complexity of technical developments are offered. To prepare high-value nanoparticles a number of influences must be considered, and evaluation of particle properties requires the expertise of different fields. This background defines both the challenge and the attraction of nanoscience.



Communications

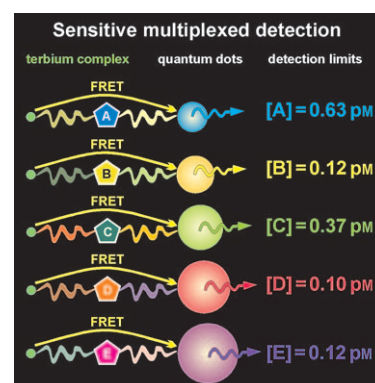
Biosensors

D. Geißler, L. J. Charbonnière,
R. F. Ziessel, N. G. Butlin,
H.-G. Löhmannsröben,
N. Hildebrandt* — 1396–1401



Quantum Dot Biosensors for Ultrasensitive Multiplexed Diagnostics

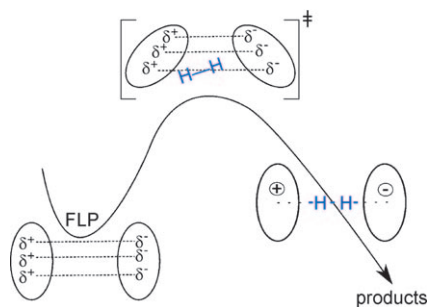
Colorful bioassays: Time- and color-resolved detection of Förster resonance energy transfer (FRET) from luminescent terbium complexes to different semiconductor quantum dots results in a fivefold multiplexed bioassay with sub-picomolar detection limits for all five bioanalytes (see picture). The detection of up to five biomarkers occurs with a sensitivity that is 40–240-fold higher than one of the best-established single-analyte reference assays.



For the USA and Canada:
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individuals who are personal members of a national chemical society prices are available on request. Postage and handling charges included. All prices are subject to local VAT/sales tax.



A new picture of H_2 activation is given by state-of-the-art quantum chemical calculations of potential energy surfaces and transition states and a thorough theoretical analysis. Key factors for activation of H_2 and other small molecules by so-called frustrated Lewis pairs (FLP) are entrance (preparation) steps and the electric field strength inside the FLP cavity.

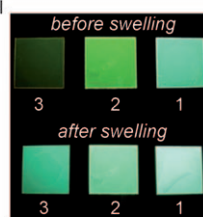
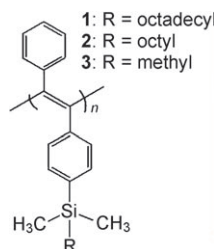
Dihydrogen Activation

S. Grimme,* H. Kruse, L. Goerigk, G. Erker* — 1402 – 1405

The Mechanism of Dihydrogen Activation by Frustrated Lewis Pairs Revisited



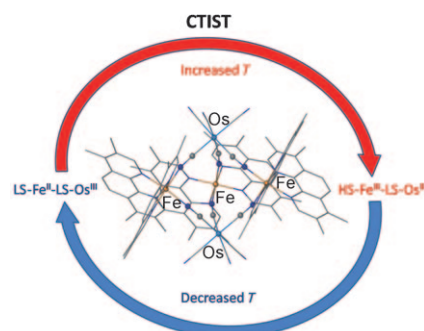
Swollen up: Poly(diphenylacetylene) derivatives with different alkyl groups show intramolecular excimer emission that arises from the phenyl–phenyl stack structure in the side chains. The excimer emission is intrinsically correlated with lamellar layer distance. Film-swelling experiments verify that the excimer emission can be modulated by changing the lamella layer distance (see picture).



Conjugated Polymers

W.-E. Lee, J.-W. Kim, C.-J. Oh, T. Sakaguchi, M. Fujiki, G. Kwak* — 1406 – 1409

Correlation of Intramolecular Excimer Emission with Lamellar Layer Distance in Liquid-Crystalline Polymers: Verification by the Film-Swelling Method



High 'n low: The novel $\{[Fe(tmphen)_2]_3-[Os(CN)_6]_2\}$ complex (see structure) is the first example of a cluster in which a high-spin Fe^{III} ion is in a coordination environment of four imine nitrogen atoms and two N-coordinated cyanides. Magnetic studies reveal an unprecedented type of reversible charge transfer induced spin transition (CTIST) between the low-spin $Fe^{II}-N\equiv C-Os^{III}$ and high-spin $Fe^{III}-N\equiv C-Os^{II}$ systems.

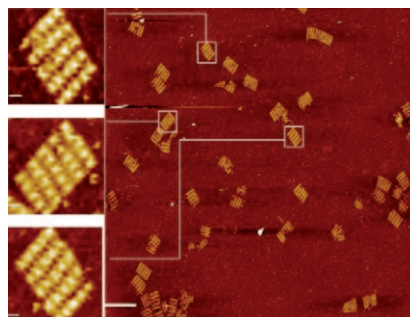
Spin Transitions

M. G. Hilfiger, M. M. Chen, T. V. Brinzari, T. M. Nocera, M. Shatruk, D. T. Petasis, J. L. Musfeldt, C. Achim,* K. R. Dunbar* — 1410 – 1413

An Unprecedented Charge Transfer Induced Spin Transition in an Fe–Os Cluster



Into the fold: A new strategy is presented to scale up DNA origami using multi-helical DNA tiles as folding staples. Atomic force microscopy images (see picture) demonstrate the two-dimensional structures formed by using this strategy.



DNA Nanotechnology

Z. Zhao, H. Yan,* Y. Liu* — 1414 – 1417

A Route to Scale Up DNA Origami Using DNA Tiles as Folding Staples



Frontiers of Chemistry: From Molecules to Systems

A One-Day Symposium

On 21st May 2010 in Paris

at the Maison de la Chimie

(near the Eiffel Tower and Les Invalides)

Speakers



Gerhard Ertl
Nobel Prize 2007



Jean-Marie Lehn
Nobel Prize 1987



Roger Y. Tsien
Nobel Prize 2008



Ada Yonath
Nobel Prize 2009



Luisa De Cola



Alan R. Fersht



Marc Fontecave



Michael Grätzel



Michel Orrit



Nicolas Winssinger

Posters will be displayed also online from 1st April

www.chembiophyschem.org

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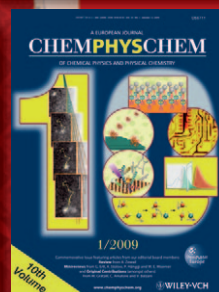


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Because health matters

Celebrating 10 Years of



Scientific committee

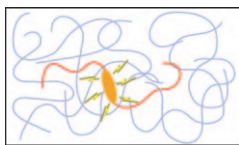
E. Amouyal, M. Che,
F. C. De Schryver,
A. R. Fersht, P. Göllitz,
J. T. Hynes, J.-M. Lehn

Topics

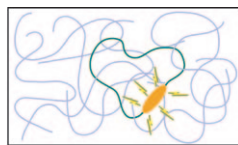
catalysis, biochemical imaging,
chemical biology, bionanotechnology,
proteomics, spectroscopy, solar cells



WILEY-VCH



linear



cyclic

Molecular twister: A single-molecule study in a semi-dilute regime on a synthetic ring polymer containing a fluorescent perylene diimide unit (see picture,

orange) reveals the heterogeneity of the system. The investigation indicates partial threading of the cyclic chains with the linear polymer matrix.

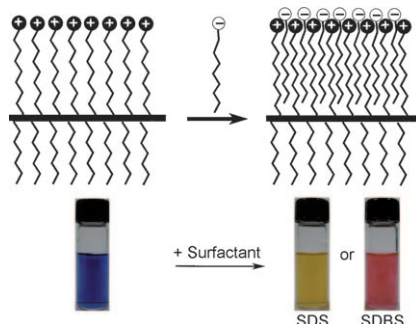
Polymers

S. Habuchi, N. Satoh, T. Yamamoto, Y. Tezuka,* M. Vacha* — 1418–1421

Multimode Diffusion of Ring Polymer Molecules Revealed by a Single-Molecule Study



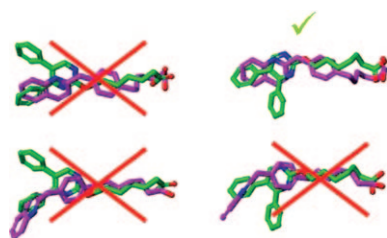
Showing their true colors: Polymers based on polydiacetylene and imidazolium show selective color response to anionic surfactants. Furthermore, this system easily distinguishes between the anionic surfactants sodium dodecyl sulfate (SDS) and sodium dodecylbenzenesulfonic acid (SDBS).



Sensors

X. Chen, S. Kang, M. J. Kim, J. Kim, Y. S. Kim, H. Kim, B. Chi, S.-J. Kim, J. Y. Lee,* J. Yoon* — 1422–1425

Thin-Film Formation of Imidazolium-Based Conjugated Polydiacetylenes and Their Application for Sensing Anionic Surfactants

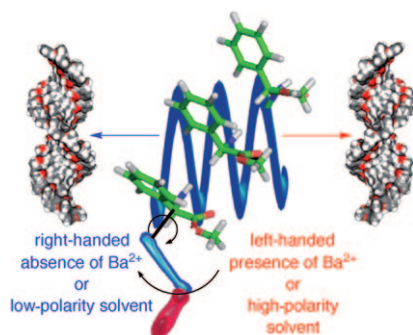


A nonradioactive binding assay relying on NMR methods has been devised for a G-protein-coupled receptor; in addition the INPHARMA methods give access to the relative orientation of multiple ligands and supports ligand-based drug design (see picture of superimposed ligands). The method is fast and does not require any structural information from protein crystal structures.

Drug Design

S. Bartoschek,* T. Klabunde, E. Defossa, V. Dietrich, S. Stengelin, C. Griesinger, T. Carlomagno, I. Focken, K. U. Wendt — 1426–1429

Drug Design for G-Protein-Coupled Receptors by a Ligand-Based NMR Method



Helix sense selection: Tuning the conformational equilibrium of the pendants of poly(phenylacetylene)s allows selection of the helicity of the polymer in a reversible way. Complexation with appropriate metal cations (e.g. Ba^{2+}) or changing the polarity of the solvent permits the reversible selection of the desired helix sense. A full picture of the mechanism explaining this phenomenon is presented.

Helicity

I. Louzao, J. M. Seco,* E. Quiñóá, R. Riguera* — 1430–1433

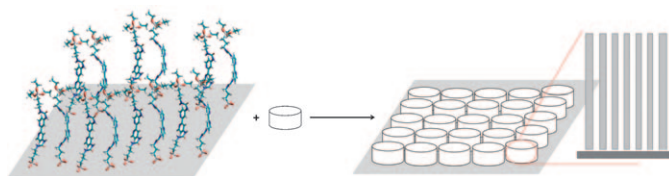
Control of the Helicity of Poly(phenylacetylene)s: From the Conformation of the Pendant to the Chirality of the Backbone



Functional Monolayers

Y. Wang, H. Li,* Y. Feng, H. Zhang,*
G. Calzaferri,* T. Ren — 1434 – 1438

Orienting Zeolite L Microcrystals with a Functional Linker



A glowing endorsement: Arranging zeolite L crystals into luminescent macroscopic structures allows preparation of dense, homogeneous, well-oriented, stable, and highly organized functional monolayers (see picture). The color of the

luminescence of the resulting layers can be fine-tuned by changing the type and number of lanthanide ions coordinated to the linker, the guest inside the channels of the zeolite host, and the excitation wavelength.

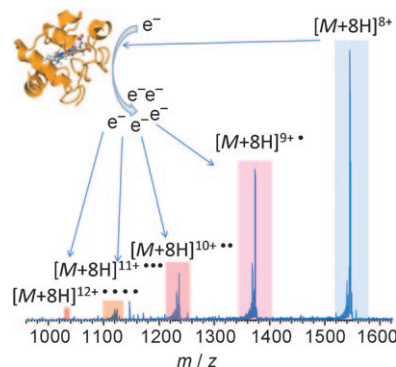
Mass Spectrometry of Proteins

R. A. Zubarev,* H. Yang — 1439 – 1441



Multiple Soft Ionization of Gas-Phase Proteins and Swift Backbone Dissociation in Collisions with ≤ 99 eV Electrons

Contrary to the dominant paradigm, electrons with an energy above 20 eV can ionize polypeptides multiple times (see picture) without destroying their primary or even elements of their tertiary structure. Concomitant electronic excitation can cause rapid backbone-bond cleavage, with weak molecule–molecule bonding remaining intact. This “soft-fragmentation” technique should enable the detailed structural characterization of protein complexes.

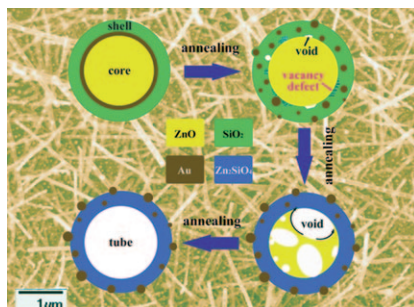


Nanotechnology

Y. Yang,* R. B. Yang, H. J. Fan, R. Scholz,
Z. Huang, A. Berger, Y. Qin, M. Knez,
U. Gösele — 1442 – 1446



Diffusion-Facilitated Fabrication of Gold-Decorated Zn_2SiO_4 Nanotubes by a One-Step Solid-State Reaction



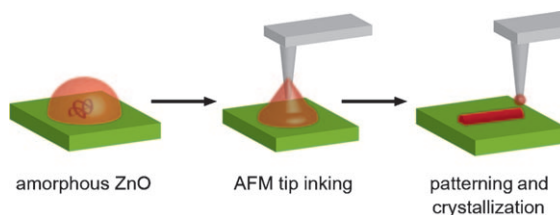
A ZnO-Au-SiO_2 sandwich nanowire structure has been used to fabricate Zn_2SiO_4 nanotubes with inlaid gold nanocrystallites on the outer surface. The thin gold interlayer not only acts as a precursor for the gold nanocrystallites, but also facilitates the Kirkendall voids at the ZnO-SiO_2 interface and then accelerates the formation of the Zn_2SiO_4 nanotubes (see picture).

Nanolithography

R. de La Rica,* K. I. Fabijanic, A. Baldi,
H. Matsui* — 1447 – 1450

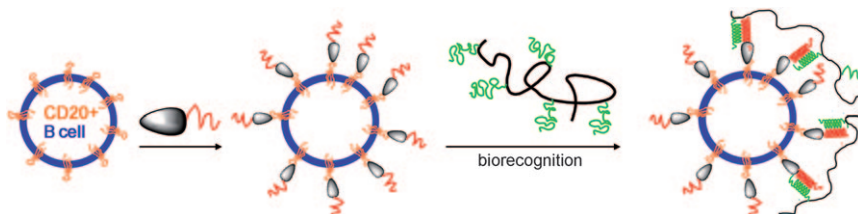


Biomimetic Crystallization
Nanolithography: Simultaneous
Nanopatterning and Crystallization



The write stuff: The title method (BCN) is demonstrated for the simultaneous fabrication and patterning of oxide semiconductors at room temperature. BCN involves the production of relatively stable amorphous inks of ZnO, which are nano-

patterned with the tip of an atomic force microscope as a pen, which also induces crystallization (see picture). The semiconducting nanostructures could be applied in nanoelectronics and nano-optics applications.



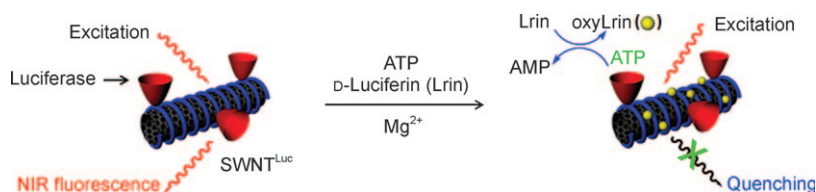
Peptide biorecognition: The heterodimerization of complementary randomly coiled peptides, one (red) bound to an antibody fragment (gray) and one (green) grafted to a copolymer (black), to form

coiled coils resulted in the cross-linking of CD20 target antigens (orange) on Raji B cells and consequently the initiation of apoptosis (see schematic representation).

Biorecognition

K. Wu, J. Liu, R. N. Johnson, J. Yang, J. Kopeček* — 1451 – 1455

Drug-Free Macromolecular Therapeutics: Induction of Apoptosis by Coiled-Coil-Mediated Cross-Linking of Antigens on the Cell Surface



Take the tube: The title conjugate provides spatiotemporal information of ATP in living cells by a two-step fluorescence quenching mechanism. OxyLrin, which is generated enzymatically in the reaction

between ATP and D-luciferin (Lrin), is adsorbed onto the nanotubes and quenches their fluorescence (see picture). The sensor is highly selective toward ATP.

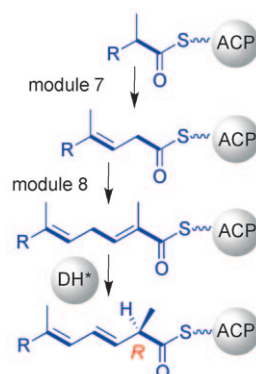
ATP Detection

J.-H. Kim, J.-H. Ahn, P. W. Barone, H. Jin, J. Zhang, D. A. Heller, M. S. Strano* — 1456 – 1459

A Luciferase/Single-Walled Carbon Nanotube Conjugate for Near-Infrared Fluorescent Detection of Cellular ATP



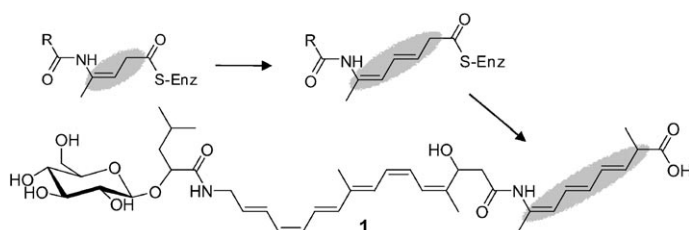
Shift work: Biochemical analysis of the rhizoxin pathway revealed that the diene moiety is not shifted all at once, but through distinct enzymatic operations. The first shift occurs by a formal β,γ -dehydration in module 7, while the second double bond is first generated by module 8 and then shifted by an unprecedented “shift module” with a novel type of DH* domain (see scheme). ACP = acyl carrier protein, DH* = dehydratase-like shift domain.



Polyketide Biosynthesis

B. Kusebauch, B. Busch, K. Scherlach, M. Roth, C. Hertweck* — 1460 – 1464

Functionally Distinct Modules Operate Two Consecutive $\alpha,\beta \rightarrow \beta,\gamma$ Double-Bond Shifts in the Rhizoxin Polyketide Assembly Line



Caught in the act: Genetic pathway engineering in conjunction with HPLC–NMR spectroscopy of highly labile intermediates provided direct evidence for the installation of β,γ double bonds during

polyketide elongation to form the antibiotic bacillaene. The novel congener bacillaene B (1) was also discovered as an elusive true end product of the pathway in *Bacillus amyloliquefaciens*.

Polyketide Biosynthesis

J. Moldenhauer, D. C. G. Götz, C. R. Albert, S. K. Bischof, K. Schneider, R. D. Süssmuth, M. Engeser, H. Gross, G. Bringmann,* J. Piel* — 1465 – 1467

The Final Steps of Bacillaene Biosynthesis in *Bacillus amyloliquefaciens* FZB42: Direct Evidence for β,γ Dehydration by a *trans*-Acyltransferase Polyketide Synthase

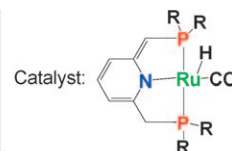


Homogeneous Catalysis

B. Gnanaprakasam, J. Zhang,
D. Milstein* 1468 – 1471



Direct Synthesis of Imines from Alcohols and Amines with Liberation of H₂



A clean sweep: Aryl and aliphatic imines can be synthesized directly and efficiently from alcohols and amines under mild, neutral conditions with the liberation of only molecular hydrogen and water (see scheme; R = isopropyl, *tert*-butyl). This

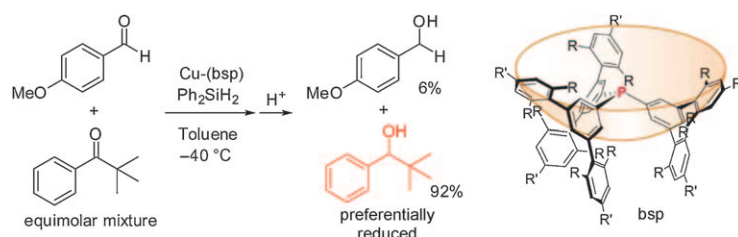
general, environmentally benign reaction is catalyzed by a de-aromatized ruthenium PNP pincer complex (0.2 mol%), and can proceed in toluene under an inert atmosphere or under air.

Homogeneous Catalysis

T. Fujihara, K. Semba, J. Terao,
Y. Tsuji* 1472 – 1476



Copper-Catalyzed Hydrosilylation with a Bowl-Shaped Phosphane Ligand: Preferential Reduction of a Bulky Ketone in the Presence of an Aldehyde



Hollywood bowl: A highly active copper catalyst with a bowl-shaped phosphane (bsp) ligand was used in the hydrosilylation reaction of bulky ketones. The

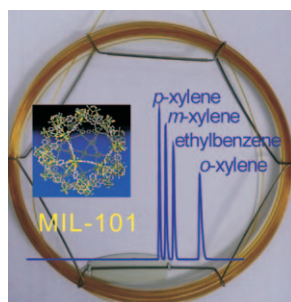
preferential reduction of a bulky ketone in the presence of an unprotected aldehyde is unprecedented.

Metal–Organic Frameworks

Z.-Y. Gu, X.-P. Yan* 1477 – 1480



Metal–Organic Framework MIL-101 for High-Resolution Gas-Chromatographic Separation of Xylene Isomers and Ethylbenzene



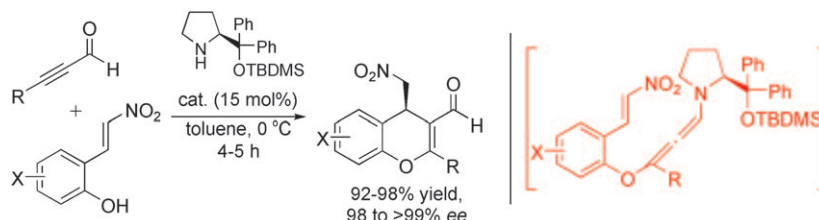
It's time for application: Chromium terephthalate MIL-101, a metal–organic framework (MOF) with coordinatively unsaturated sites, was utilized as the stationary phase to fabricate the first MOF-coated capillary column for high-resolution gas-chromatographic separation of xylene isomers and ethylbenzene with excellent selectivity.

Cascade Reactions

X.-S. Zhang, S.-L. Zhang,
W. Wang* 1481 – 1484

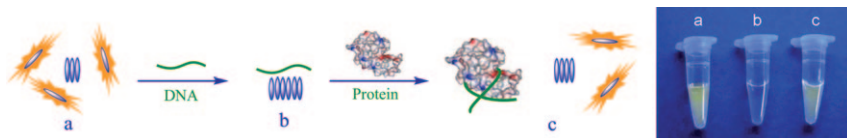


Iminium–Allenamine Cascade Catalysis: One-Pot Access to Chiral 4*H*-Chromenes by a Highly Enantioselective Michael–Michael Sequence



Taking the Michael–Michael: A cascade Michael–Michael reaction of aryl or alkyl alkynals, involving an unprecedented iminium–allenamine sequence, is efficiently

catalyzed by a chiral diphenylprolinol TBDMS ether, and affords highly functionalized 4*H*-chromenes in high yields. TBDMS = *tert*-butyldimethylsilyl.



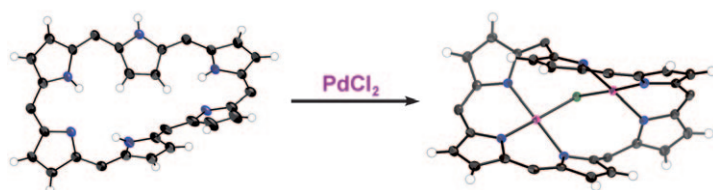
Sensitivity that won't break the bank: The addition of an anti-lysozyme DNA aptamer (a polyanion) to a cationic perylene probe that exists in aqueous solution as a mixture of the fluorescent free monomer and aggregate forms shifted the equilib-

rium and resulted in fluorescence quenching (see schematic representation). The subsequent introduction of lysozyme weakened DNA binding to the perylene aggregates and led to fluorescence recovery.

Biosensors

B. Wang, C. Yu* — 1485 – 1488

Fluorescence Turn-On Detection of a Protein through the Reduced Aggregation of a Perylene Probe



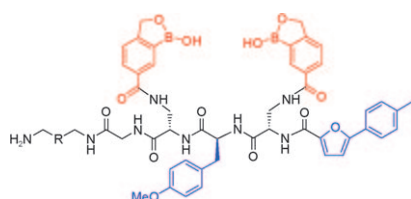
One more twist of a Möbius strip: Metalation of Möbius-aromatic hexakis(pentafluorophenyl)[28]hexaphyrin (see picture; Pd red, Cl green, N blue, phenyl rings omitted) provides a highly stable

organic radical that is delocalized over a doubly twisted π -conjugation system. The two-photon absorption cross-section is distinctly larger than that of non-aromatic expanded porphyrins.

Expanded Porphyrins

H. Rath, S. Tokuji, N. Aratani, K. Furukawa, J. M. Lim, D. Kim,* H. Shinokubo,* A. Osuka* — 1489 – 1491

A Stable Organic Radical Delocalized on a Highly Twisted π System Formed Upon Palladium Metalation of a Möbius Aromatic Hexaphyrin

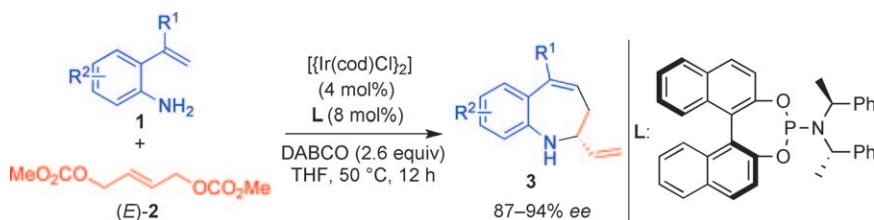


Mini lectins: A new class of oligosaccharide receptors (see example) was designed by exploiting several modes of molecular recognition, including the unique ability of benzoboroxoles to complex hexopyranosides. The synthesis is modular, thus well suited to targeting specific oligosaccharides using combinatorial libraries.

Carbohydrate Recognition

A. Pal, M. Bérubé, D. G. Hall* — 1492 – 1495

Design, Synthesis, and Screening of a Library of Peptidyl Bis(Boroxoles) as Oligosaccharide Receptors in Water: Identification of a Receptor for the Tumor Marker TF-Antigen Disaccharide



Making azacycles: The $[\{\text{Ir}(\text{cod})\text{Cl}\}_2]/\text{L}$ complex efficiently catalyzes the tandem allylic vinylation and asymmetric allylic amination of (E)-2 with *ortho*-amino

styrene derivatives **1** to afford the title compounds **3** with excellent enantioselectivity. cod = 1,5-cyclooctadiene, DABCO = 1,4-diazabicyclo[2.2.2]octane.

Homogeneous Catalysis

H. He, W.-B. Liu, L.-X. Dai, S.-L. You* — 1496 – 1499

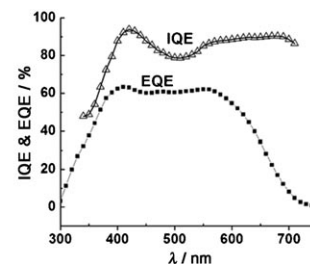
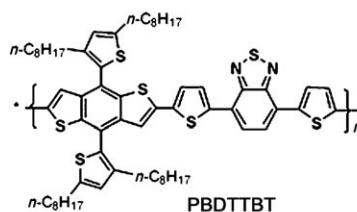
Enantioselective Synthesis of 2,3-Dihydro-1*H*-benzo[*b*]azepines: Iridium-Catalyzed Tandem Allylic Vinylation/Amination Reaction



Solar Cells

L. Huo, J. Hou,* S. Zhang, H. Chen,
Y. Yang* 1500–1503

A Polybenzo[1,2-*b*:4,5-*b'*]dithiophene
Derivative with Deep HOMO Level and Its
Application in High-Performance Polymer
Solar Cells



Sun catcher: The new benzo[1,2-*b*:4,5-*b'*]-
dithiophene-containing polymer
PBDTTBT exhibits a power conversion
efficiency of up to 5.66%. The high open-
circuit voltage (0.92 V) originates from the

low HOMO level of the polymer and the
high internal and external quantum effi-
ciencies over a wide spectral range.
PBDTTBT is a promising donor material
for application in polymer solar cells.



Supporting information is available on www.angewandte.org
(see article for access details).



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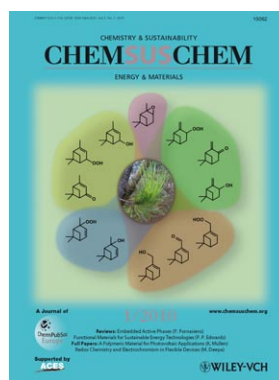
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