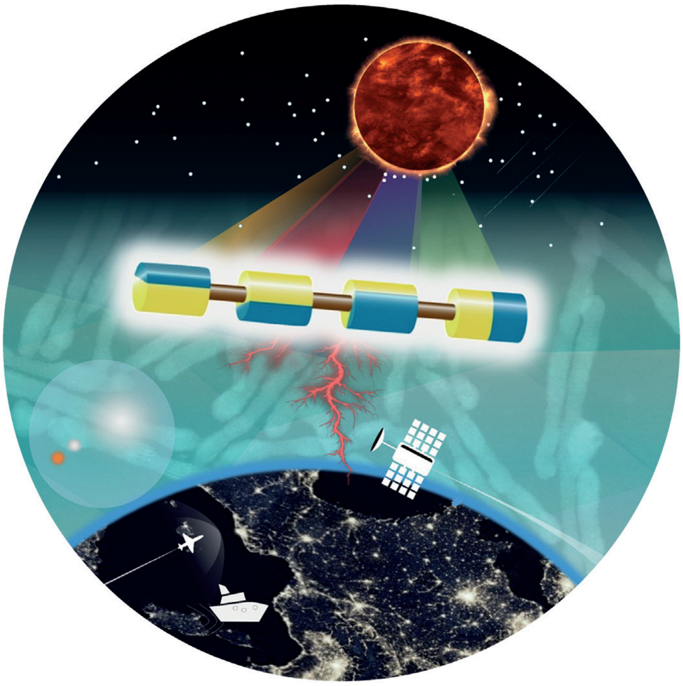
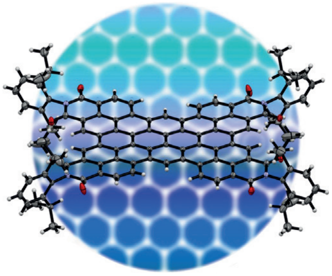
A ternary ...

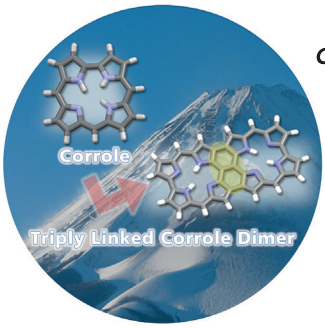


… semiconductor nanosystem, ZnS–CdS–Cu$_{2-x}$S, is described by S. H. Yu, J. Jiang, and co-workers in their Communication on page 6396 ff. These hetero-nanorods benefit from efficient charge separation and absorb across the full spectrum of solar radiation, which leads to superior solar energy conversion.



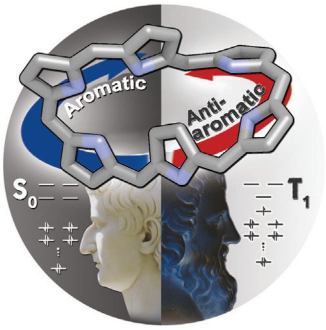
Polycyclic Aromatics

F. Würthner et al. describe in their Communication on page 6390 ff. a palladium-catalyzed cascade process to synthesize an electron-poor C$_{64}$ nanographene. Its planar geometry was revealed by single-crystal X-ray analysis.



Corroles

Fusion of corrole, a ring-contracted porphyrinoid with a trapezoid molecular shape, to the triply linked dimer to yield a non-aromatic compound is described by A. Osuka, D. Kim, T. Tanaka et al. in their Communication on page 6535 ff.



Porphyrinoids

In their Communication on page 6487 ff., D. Kim, A. Osuka, and co-workers show that metalated expanded porphyrins that are Möbius aromatic in the ground state become Möbius antiaromatic in the lowest excited triplet state.

How to contact us:

Editorial Office:
E-mail: angewandte@wiley-vch.de
Fax: (+49) 62 01–606-331
Telephone: (+49) 62 01–606-315

Reprints, E-Prints, Posters, Calendars:
Carmen Leitner
E-mail: chem-reprints@wiley-vch.de
Fax: (+49) 62 01–606-331
Telephone: (+49) 62 01–606-327

Copyright Permission:
Bettina Loycke
E-mail: rights-and-licences@wiley-vch.de
Fax: (+49) 62 01–606-332
Telephone: (+49) 62 01–606-280

Online Open:
Margitta Schmitt
E-mail: angewandte@wiley-vch.de
Fax: (+49) 62 01–606-331
Telephone: (+49) 62 01–606-315

Subscriptions:
www.wileycustomerhelp.com
Fax: (+49) 62 01–606-184
Telephone: 0800 1800536 (Germany only)
+44(0) 1865476721 (all other countries)

Advertising:
Marion Schulz
E-mail: mschulz@wiley-vch.de
Fax: (+49) 62 01–606-550
Telephone: (+49) 62 01–606-565

Courier Services:
Boschstrasse 12, 69469 Weinheim

Regular Mail:
Postfach 101161, 69451 Weinheim

Angewandte Chemie International Edition is a journal of the Gesellschaft Deutscher Chemiker (GDCh), the largest chemistry-related scientific society in continental Europe. Information on the various activities and services of the GDCh, for example, cheaper subscription to *Angewandte Chemie International Edition*, as well as applications for membership can be found at **www.gdch.de** or can be requested from GDCh, Postfach 900440, D-60444 Frankfurt am Main, Germany.

Service

Spotlight on Angewandte's Sister Journals 6362 – 6365

Author Profile

"I would have liked to have discovered solid-phase synthesis.
If I won the lottery, I would buy a huge forest …"
This and more about Oliver Seitz can be found on page 6386.

Oliver Seitz 6366 – 6367

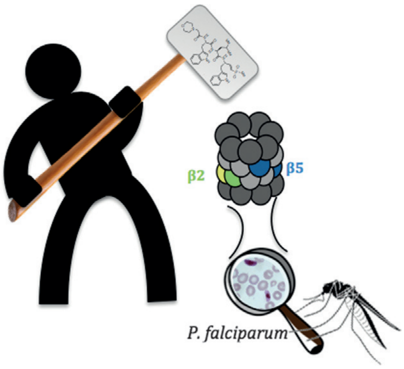
Books

Laser Experiments for Chemistry and Physics — Robert N. Compton, Michael A. Duncan — *reviewed by M. Motzkus** 6368

Highlights

Drug Design

One life, two strategies: Crucial structural differences between the human and the *Plasmodium falciparum* proteasomes were recently identified. A combination of cryo-EM and functional characterization enabled the design of a selective antimalarial proteasome inhibitor that shows low toxicity in the host. When used with artemisinin, this ligand offers a new approach for the efficient treatment of malaria at all stages of the parasite life-cycle.



C. Le Chapelain,* M. Groll* 6370 – 6372

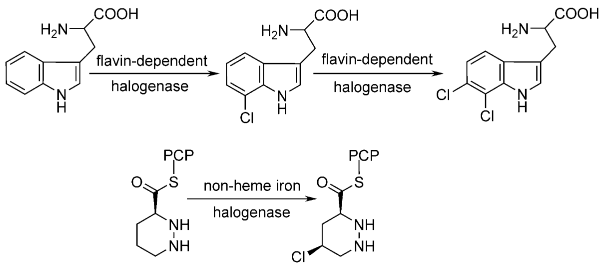
Rational Design of Proteasome Inhibitors as Antimalarial Drugs

Reviews

Enzymatic Halogenation

V. Weichold, D. Milbredt,
K.-H. van Pée* ______ 6374 – 6389

Specific Enzymatic Halogenation—From the Discovery of Halogenated Enzymes to Their Applications In Vitro and In Vivo



Coming of age: The understanding of biological halogenation has increased enormously in the last 20 years. While the first 10 years were mostly dedicated to the detection of halogenating enzymes, in the last 10 years the connection of the enzymes with biosynthetic pathways by showing in vitro activity, investigating substrate specificities, as well as applications and improvement of the enzymes came into focus.

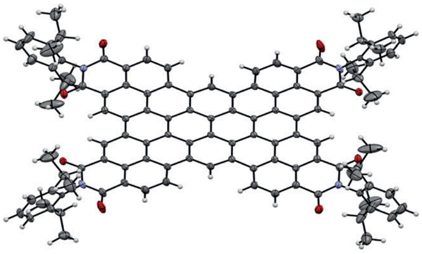
Communications

Polycyclic Aromatics

S. Seifert, K. Shoyama, D. Schmidt,
F. Würthner* ______ 6390 – 6395

An Electron-Poor C_{64} Nanographene by Palladium-Catalyzed Cascade C–C Bond Formation: One-Pot Synthesis and Single-Crystal Structure Analysis

Ten bonds in a single operation: The synthesis of an electron-poor nanographene with dicarboximide corners was accomplished by a palladium-catalyzed cascade process, with ten C–C bonds formed in a single chemical operation. The planar geometry of this novel C_{64} nanographene was revealed by single-crystal X-ray analysis.



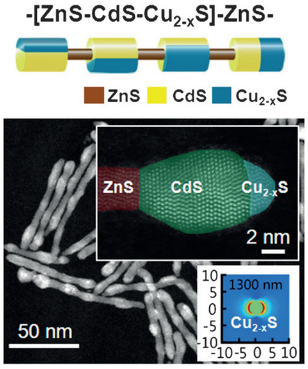
Frontispiece

Solar Energy Conversion

T. T. Zhuang, Y. Liu, Y. Li, Y. Zhao, L. Wu,
J. Jiang,* S. H. Yu* ______ 6396 – 6400

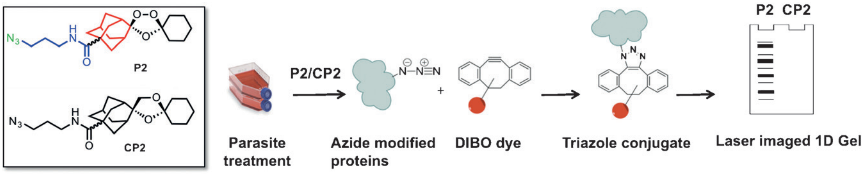
Integration of Semiconducting Sulfides for Full-Spectrum Solar Energy Absorption and Efficient Charge Separation

Three semiconducting sulfides, namely ZnS, CdS, and $Cu_{2-x}S$, were combined to obtain ternary ZnS–CdS–$Cu_{2-x}S$ heteronanorods. The pn heterojunctions between $Cu_{2-x}S$ and CdS induce staggered gaps, as confirmed by first-principles simulations. This band alignment leads to effective electron–hole separation in this ternary system and hence enables efficient solar energy conversion.



Front Cover

For the USA and Canada:
ANGEWANDTE CHEMIE International Edition (ISSN 1433-7851) is published weekly by Wiley-VCH, PO Box 101161, 69451 Weinheim, Germany. US mailing agent: SPP, PO Box 437, Emigsville, PA 17318. Periodicals postage paid at Emigsville, PA. US POSTMASTER: send address changes to *Angewandte Chemie*, John Wiley & Sons Inc., C/O The Sheridan Press, PO Box 465, Hanover, PA 17331. Annual subscription price for institutions: US$ 16.862/14.051 (valid for print and electronic / print or electronic delivery); for 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.



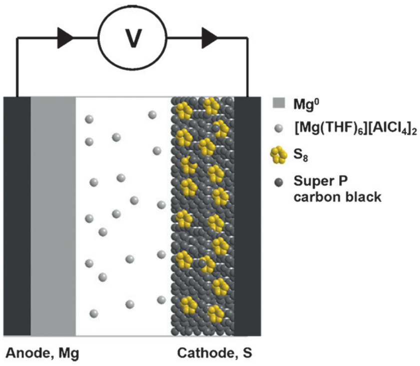
Clickable 1,2,4-trioxolane activity-based protein-profiling probes (ABPPs) were designed to retain antimalarial activity and alkylate the molecular targets of the blood stage of *Plasmodium falciparum* in situ. Comparison of the 1,2,4-trioxolane protein alkylation signature with the corresponding artemisinin ABPPs indicates that both drug classes target key proteins in the glycolytic, hemoglobin degradation, antioxidant defence and protein synthesis pathways.

Antimalarials

H. M. Ismail, V. E. Barton, M. Panchana, S. Charoensutthivarakul, G. A. Biagini, S. A. Ward, P. M. O'Neill* — **6401 – 6405**

A Click Chemistry-Based Proteomic Approach Reveals that 1,2,4-Trioxolane and Artemisinin Antimalarials Share a Common Protein Alkylation Profile

---



Simple but effective: A simple magnesium salt $[Mg(THF)_6][AlCl_4]_2$ can be used as a magnesium electrolyte that possesses a highly reversible Mg cycling efficiency, good anodic stability, and good ionic conductivity. Mg/S batteries containing the electrolyte could be cycled over 20 cycles, thus indicating electrochemically reversible conversion of sulfur into MgS.

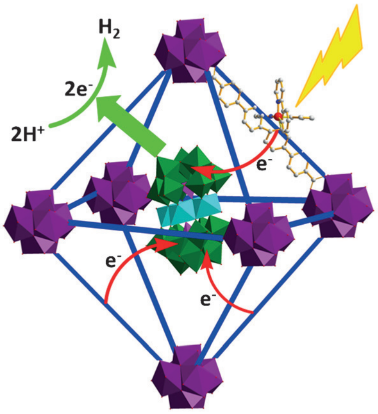
Electrochemistry

W. Li, S. Cheng, J. Wang, Y. Qiu, Z. Zheng, H. Lin, S. Nanda, Q. Ma, Y. Xu, F. Ye, M. Liu, L. Zhou, Y. Zhang* — **6406 – 6410**

Synthesis, Crystal Structure, and Electrochemical Properties of a Simple Magnesium Electrolyte for Magnesium/Sulfur Batteries

---

POM & MOF work hand in hand: A tetranickel-containing polyoxometalate (POM) was encapsulated into the pores of phosphorescent metal–organic frameworks (MOFs). The hierarchical POM@MOF assemblies effect highly efficient photocatalytic hydrogen evolution reactions through facile multielectron transfer processes.

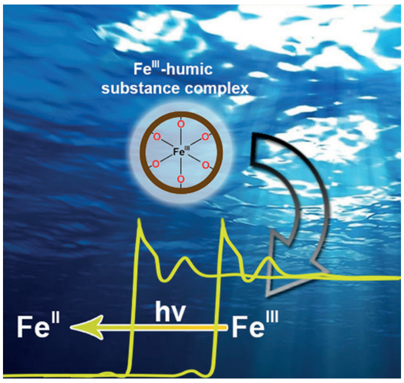


Hydrogen Evolution

X. J. Kong, Z. Lin, Z. M. Zhang, T. Zhang, W. Lin* — **6411 – 6416**

Hierarchical Integration of Photosensitizing Metal–Organic Frameworks and Nickel-Containing Polyoxometalates for Efficient Visible-Light-Driven Hydrogen Evolution

---



Let there be light: Terrigenous humic substances (THS) are a major transporter of iron from freshwater systems to coastal and deep waters. Their iron-binding properties are solely dependent on oxygen-containing functional groups. A major iron uptake mechanism by marine organisms in the upper-ocean is governed by photoreduction processes of Fe-THS complexes.

Biogeochemical Iron Transport

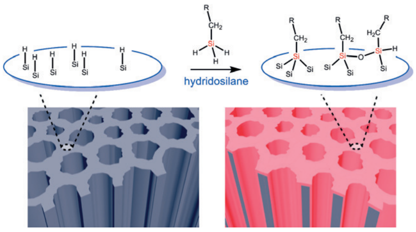
A. Blazevic, E. Orlowska, W. Kandioller, F. Jirsa, B. K. Keppler, M. Tafili-Kryeziu, W. Linert, R. F. Krachler, R. Krachler, A. Rompel* — **6417 – 6422**

Photoreduction of Terrigenous Fe-Humic Substances Leads to Bioavailable Iron in Oceans

Surface Modification

D. Kim, J. Joo, Y. Pan, A. Boarino, Y. W. Jun,
K. H. Ahn, B. Arkles,*
M. J. Sailor* ——— 6423 – 6427

Thermally Induced Silane Dehydrocoupling on Silicon Nanostructures



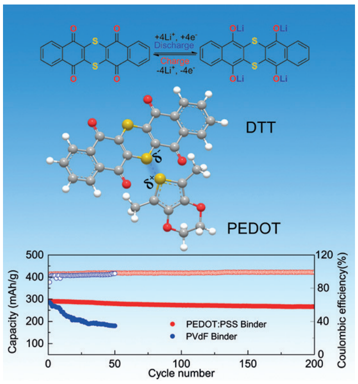
Organic trihydridosilanes were grafted to hydrogen-terminated porous Si nanostructures with no catalyst. When intrinsically photoluminescent porous Si films or nanoparticles are used, photoluminescence is retained in the grafted products, thereby indicating that the chemistry does not introduce substantial nonradiative surface traps.

Lithium-Ion Batteries

T. Ma, Q. Zhao, J. Wang, Z. Pan,
J. Chen* ——— 6428 – 6432

A Sulfur Heterocyclic Quinone Cathode and a Multifunctional Binder for a High-Performance Rechargeable Lithium-Ion Battery

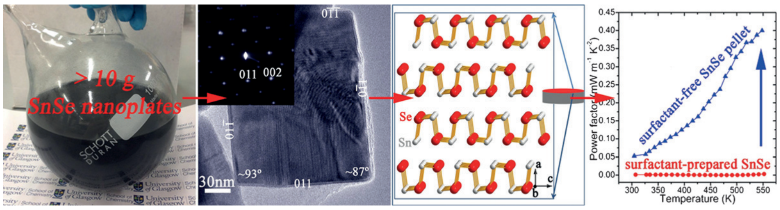
A noncovalent interaction: A sulfur heterocyclic quinone compound (DTT) and a multifunctional binder (PEDOT:PSS) were prepared and used together as a high-performance cathode in a rechargeable lithium-ion battery (see picture). Through a noncovalent interaction between DTT and PEDOT:PSS the dissolution of DTT into an electrolyte was reduced and the conductivity of DTT was enhanced.



Thermoelectrics

G. Han, S. R. Popuri, H. F. Greer,
J.-W. G. Bos, W. Z. Zhou, A. R. Knox,
A. Montecucco, J. Siviter, E. A. Man,
M. Macauley, D. J. Paul, W.-g. Li,
M. C. Paul, M. Gao, T. Sweet, R. Freer,
F. Azough, H. Baig, N. Sellami,
T. K. Mallick,
D. H. Gregory* ——— 6433 – 6437

Facile Surfactant-Free Synthesis of p-Type SnSe Nanoplates with Exceptional Thermoelectric Power Factors

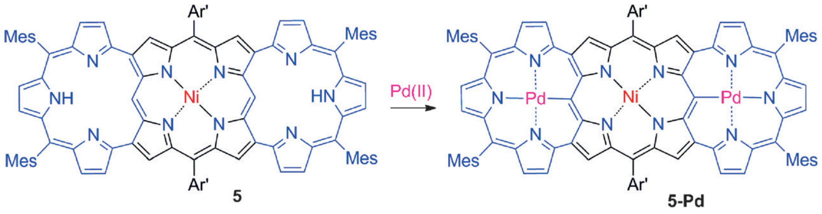


A surfactant-free aqueous solution methodology has been developed for the straightforward synthesis of SnSe nanoplates in gram quantities. These nanoplates can be hot-pressed into nanostructured compacts with much higher thermoelectric power factors than surfactant-prepared products and comparable values to bulk polycrystalline counterparts.

Porphyrinoids

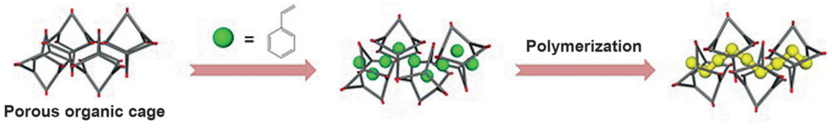
Y. Rao, T. Kim, K. H. Park, F. Peng, L. Liu,
Y. Liu, B. Wen, S. Liu, S. R. Kirk, L. Wu,
B. Chen, M. Ma, M. Zhou, B. Yin,
Y. Zhang, D. Kim,* J. Song* 6438 – 6442

π-Extended "Earring" Porphyrins with Multiple Cavities and Near-Infrared Absorption



Porphyrins with ears: β,β-Tripyrrin-bridged "earring" porphyrins were synthesized by Suzuki–Miyaura cross coupling reactions. These compounds have multiple cavities that can complex up to three metal ions. The porphyrin structures feature curved π planes, and their electronic spectra show near-infrared (NIR) absorptions. Metal insertion leads to red-shifted and intensified near-infrared absorption features.

Inside Cover



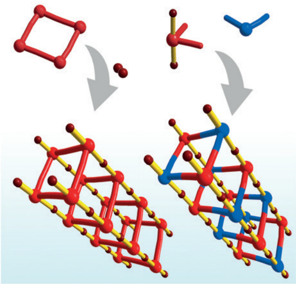
The radical polymerization of vinyl monomers was performed in a porous organic cage. The polymerization reaction depended strongly on the crystallinity of the cage, and the adsorption of styrene triggered a change in the overall assembly that enabled polymerization within the host matrix. Such changes were not induced by polar monomers, such as methyl methacrylate and acrylonitrile, which thus did not undergo polymerization within the cage.

Host–Guest Systems

T. Uemura,* R. Nakanishi, S. Mochizuki, S. Kitagawa, M. Mizuno ____ **6443 – 6447**

Radical Polymerization of Vinyl Monomers in Porous Organic Cages

---

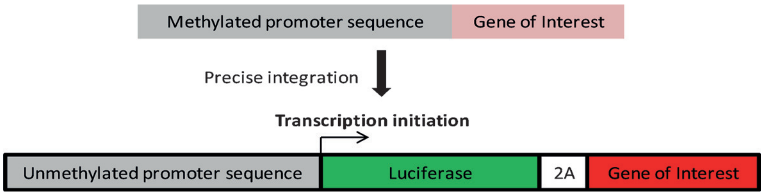


A homometallic platinum nanowire was obtained through oxidative polymerization of square units. Three kinds of isostructral Pd/Pt heterometallic nanowires were also obtained by coordination-driven self-assembly of two mononuclear units. The electronic state of these nanowires can be widely controlled by substitution of metal and halide species.

Coordination Chemistry

K.-i. Otake, K. Otsubo,* K. Sugimoto, A. Fujiwara, H. Kitagawa* __ **6448 – 6451**

Ultrafine Metal–Organic Right Square Prism Shaped Nanowires



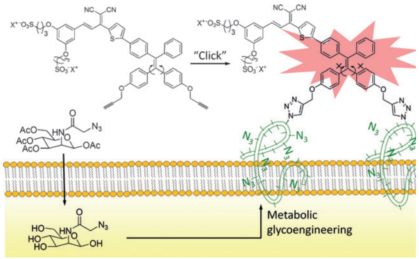
Epigenome editing: A novel CRISPR/Cas9-based method for transcriptional activation through microhomology-mediated end-joining (MMEJ) was developed. CRISPR/Cas9 was used to specifically replace the methylated promotor region of a target gene with an unmethylated copy, thereby leading to efficient gene activation at levels sufficient to bring about changes in cell fate.

Gene Editing

S. Katayama,* T. Moriguchi, N. Ohtsu, T. Kondo* ____________ **6452 – 6456**

A Powerful CRISPR/Cas9-Based Method for Targeted Transcriptional Activation

---



Fast and specific: A bioorthogonal turn-on probe based on a red-emissive fluorogen with aggregation-induced emission characteristics (AIEgen) was developed for cancer cell imaging and photodynamic ablation. The fluorescence is immediately turned on upon click reaction with azide-functionalized glycans on a cancer cell surface.

Cancer Imaging

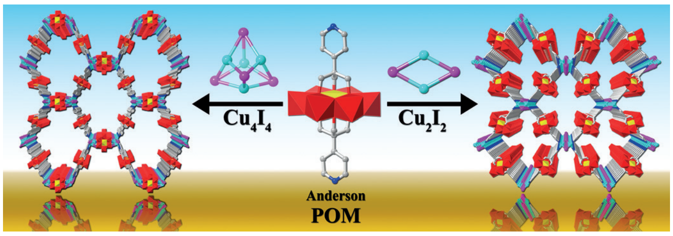
Y. Yuan, S. Xu, X. Cheng, X. Cai, B. Liu* ____________ **6457 – 6461**

Bioorthogonal Turn-On Probe Based on Aggregation-Induced Emission Characteristics for Cancer Cell Imaging and Ablation

Cluster Organic Frameworks

X.-X. Li, Y.-X. Wang, R.-H. Wang,* C.-Y. Cui, C.-B. Tian, G.-Y. Yang* ______ **6462 – 6466**

Designed Assembly of Heterometallic Cluster Organic Frameworks Based on Anderson-Type Polyoxometalate Clusters

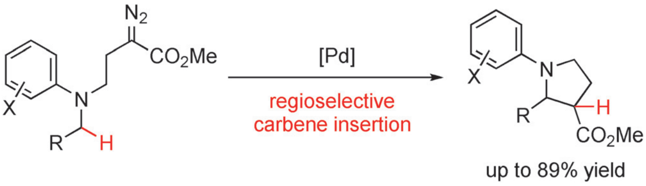


All linked up: Two unprecedented heterometallic cluster organic frameworks were constructed through directly linking Anderson-type polyoxometalate (POM) clusters with different cuprous iodide clusters by using a rigid bifunctional tris(alkoxo) ligand under solvothermal conditions.

Palladium Catalysis

D. Solé,* F. Mariani, M.-L. Bennasar, I. Fernández* ______ **6467 – 6470**

Palladium-Catalyzed Intramolecular Carbene Insertion into C(sp^3)—H Bonds

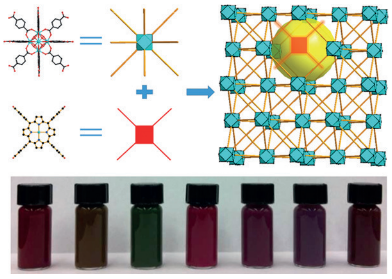


Pd in action: Palladium has been used to catalyze the C(sp^3)—H insertion of metal carbenoids derived from α-diazoesters to form pyrrolidines through intramolecular assembly of C(sp^3)—C(sp^3) bonds. A reaction mechanism involving a metalation–deprotonation step instead of the usual concerted but asynchronous process is proposed.

Metal–Organic Frameworks

Y. Sun, L. Sun, D. Feng,* H.-C. Zhou* ______ **6471 – 6475**

An In Situ One-Pot Synthetic Approach towards Multivariate Zirconium MOFs



Mix and match MOFs: Porphyrinic ligands are incorporated into UiO-66 through a one-pot, thermodynamically controlled synthesis from mixed ligands (ditopic 1,4-benzenedicarboxylate or its derivatives and tetratopic tetrakis(4-carboxyphenyl)porphyrin ligands). This strategy provides a facile route to introduce multiple functionalities into stable Zr-MOFs for an extensive variety of potential applications.

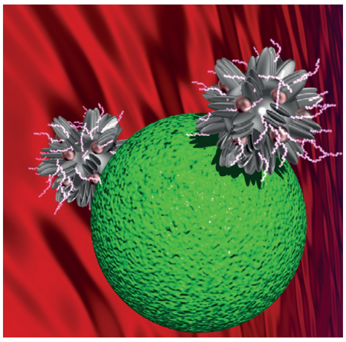
VIP

Drug Delivery

S. A. Chechetka, E. Yuba, K. Kono, M. Yudasaka, A. Bianco, E. Miyako* ______ **6476 – 6481**

Magnetically and Near-Infrared Light-Powered Supramolecular Nanotransporters for the Remote Control of Enzymatic Reactions

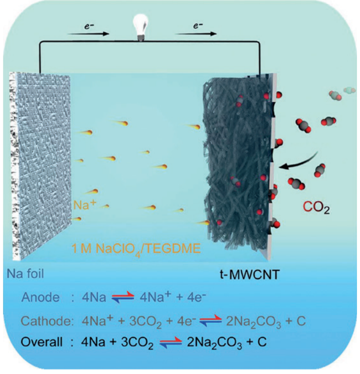
Nanorobots: Magnetic nanoparticle–carbon nanohorn–liposome supramolecular nanotransporters were developed. The remotely controlled release of functional molecules contained in the nanotransporters was achieved by applying a magnetic field and near-infrared laser light. The nanotransporters enabled enzymatic reactions at target sites in cells and mice.



Na–CO_2 batteries

X. F. Hu, J. C. Sun, Z. F. Li, Q. Zhao, C. C. Chen, J. Chen* ______ **6482 – 6486**

Rechargeable Room-Temperature Na–CO_2 Batteries



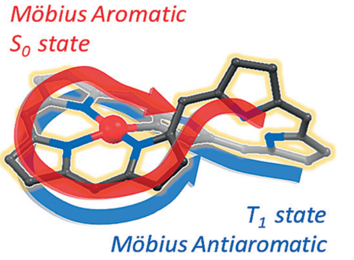
Building a better battery: Developing rechargeable metal–CO_2 batteries represents a "clean" strategy for advanced energy storage/conversion systems. A rechargeable room-temperature Na–CO_2 battery with superior performance is reported that undergoes the reaction $4\,Na + 3\,CO_2 \rightleftarrows 2\,Na_2CO_3 + C$.

Porphyrinoids

J. Oh, Y. M. Sung, W. Kim, S. Mori, A. Osuka,* D. Kim* ______ **6487 – 6491**

Aromaticity Reversal in the Lowest Excited Triplet State of Archetypical Möbius Heteroannulenic Systems

Back Cover

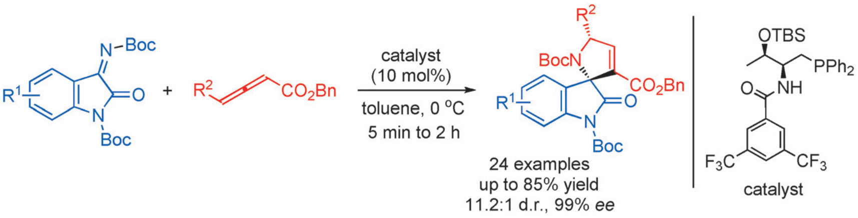


Aromaticity reversal: Optical spectroscopy and quantum calculations reveal that metalated expanded porphyrins that are Möbius aromatic in the S_0 state become Möbius antiaromatic in the lowest triplet (T_1) state. The Möbius antiaromatic nature is indicated by characteristically weak, broad, and ill-defined spectral features in the T_1 absorption spectra.

Cycloaddition

X. Han,* W.-L. Chan, W. Yao, Y. Wang, Y. Lu* ______ **6492 – 6496**

Phosphine-mediated Highly Enantioselective Spirocyclization with Ketimines as Substrates

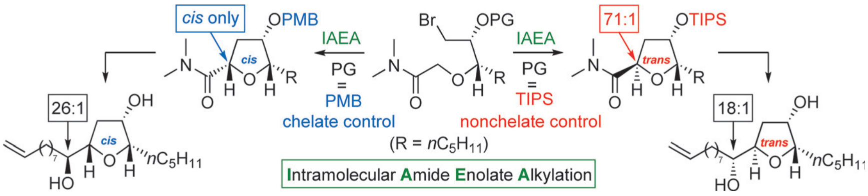


Like a circle in a spiral: A highly enantioselective [3+2] cycloaddition reaction that makes use of isatin-derived ketimines as reaction partners has been developed. Both simple and γ-substituted allenoates could be utilized, and various 3,2′-pyrrolidinyl spirooxindoles with a tetrasubstituted stereocenter were obtained in excellent yields and with nearly perfect enantioselectivity (> 98 % *ee* in all cases).

Total Synthesis

H. Jang, I. Shin, D. Lee, H. Kim,* D. Kim ______ **6497 – 6501**

Stereoselective Substrate-Controlled Asymmetric Syntheses of both 2,5-*cis*- and 2,5-*trans*-Tetrahydrofuranoid Oxylipids: Stereodivergent Intramolecular Amide Enolate Alkylation

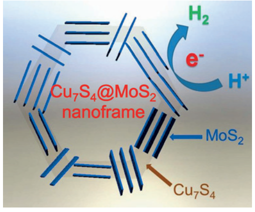


Two from one: The title reaction leads to both isomers of the tetrahydrofuranoid nematocidal oxylipids in a stereodivergent fashion from a common intermediate. Each of the stereoisomers results from exploiting either chelate or nonchelate control in the reaction. PMB = *para*-methoxybenzyl, TIPS = triisopropylsilyl.

Hydrogen-Evolution Reaction

J. Xu, J. B. Cui, C. Guo, Z. P. Zhao, R. Jiang, S. Y. Xu, Z. B. Zhuang, Y. Huang, L. Y. Wang,* Y. D. Li ______ **6502 – 6505**

Ultrasmall Cu_7S_4@MoS_2 Hetero-Nanoframes with Abundant Active Edge Sites for Ultrahigh-Performance Hydrogen Evolution

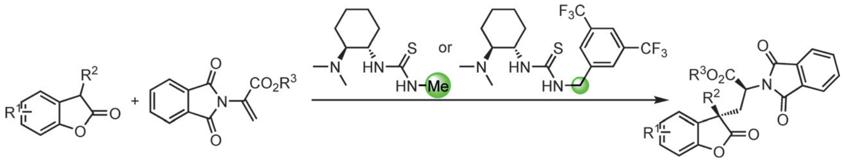


HER donuts: Ultrasmall donut-shaped Cu_7S_4@MoS_2 hetero-nanoframes were fabricated. These served as highly efficient and stable catalysts for the hydrogen-evolution reaction (HER) because of their good crystallinity and abundant MoS_2 active edge sites.

Asymmetric Catalysis

C. Yang, E.-G. Zhang, X. Li,* J.-P. Cheng* ______ **6506 – 6510**

Asymmetric Conjugate Addition of Benzofuran-2-ones to Alkyl 2-Phthalimidoacrylates: Modeling Structure–Stereoselectivity Relationships with Steric and Electronic Parameters

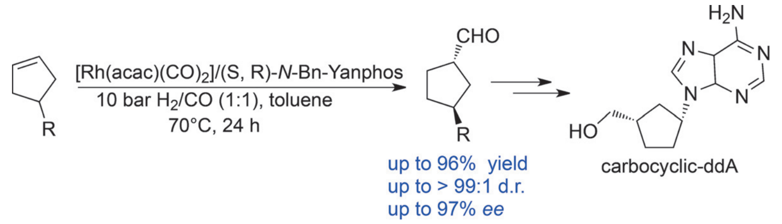


A predictive model to correlate the steric and electronic parameters of tertiary amine thiourea catalysts with the stereoselectivity of the title reaction is described. As predicted, 3,5-bis(trifluoromethyl)benzyl- and methyl-substituted tertiary amine thioureas turned out to be highly suitable catalysts.

Hydroformylation

C. You, B. Wei, X. Li, Y. Yang, Y. Liu, H. Lv,* X. Zhang* ______ **6511 – 6514**

Rhodium-Catalyzed Desymmetrization by Hydroformylation of Cyclopentenes: Synthesis of Chiral Carbocyclic Nucleosides

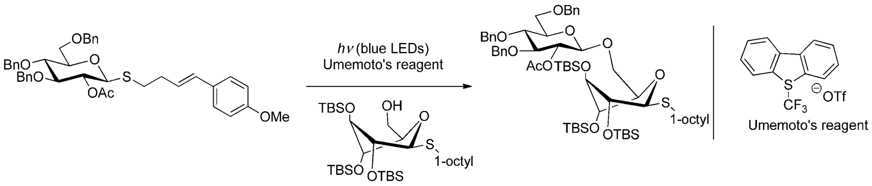


Efficient access: A Rh/Yanphos complex catalyzed the desymmetrization of cyclopentenes through hydroformylation, thus giving cyclopentane carboxaldehydes with good yields and excellent diastereo- and enantioselectivities. This procedure provides efficient access to chiral carbocyclic nucleosides and exhibits good application prospects in organic synthesis.

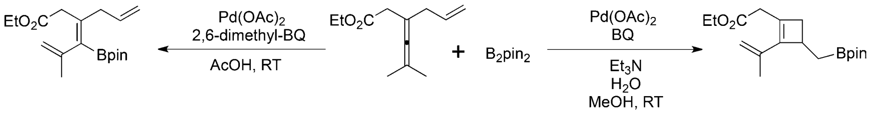
Photochemistry

M. L. Spell, K. Deveaux, C. G. Bresnahan, B. L. Bernard, W. Sheffield, R. Kumar, J. R. Ragains* ______ **6515 – 6519**

A Visible-Light-Promoted *O*-Glycosylation with a Thioglycoside Donor



Visible-light irradiation of 4-*p*-methoxyphenyl-3-butenylthioglucoside donors in the presence of Umemoto's reagent serves as an exceptionally mild and orthogonal approach to *O*-glycosylation. Alkyl- and arylthioglycosides not containing the *p*-methoxystyrene moiety are inert under these conditions, and evidence suggests that an intervening electron donor–acceptor complex is necessary for reactivity.



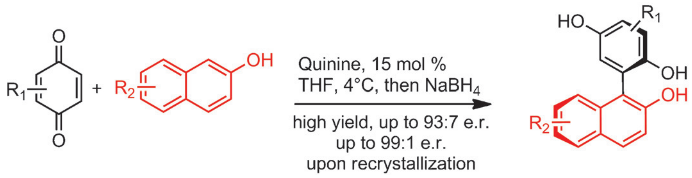
Fair and square: An efficient palladium-catalyzed oxidative borylating carbocyclization of enallenes to cyclobutene derivatives was developed. Cyclobutenes are produced as the exclusive products in MeOH in the presence of H_2O with a catalytic amount of Et_3N, whereas the formation of alkenylboron compounds is favored in AcOH. Broad substrate scope and good tolerance for various functional groups could be achieved in both reactions.

Borylation

Y. Qiu, B. Yang, C. Zhu,*
J.-E. Bäckvall* ________ **6520 – 6524**

Palladium-Catalyzed Oxidative Carbocyclization–Borylation of Enallenes to Cyclobutenes

---



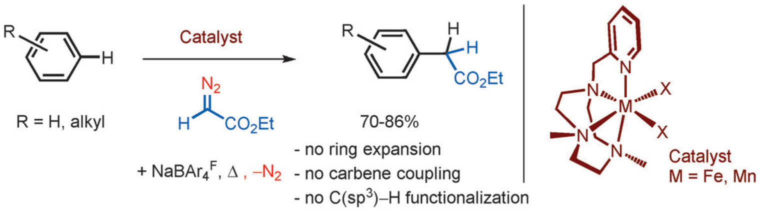
Simple is better: Commercially available reagents such as quinones and naphthols are combined under mild reaction conditions in the presence of quinine to afford halogenated 2,2′-binaphthol-like biaryls in gram quantities. The products are isolated in good yield and stereoselectivity.

Organocatalysis

M. Moliterno, R. Cari, A. Puglisi,
A. Antenucci, C. Sperandio, E. Moretti,
A. Di Sabato, R. Salvio,*
M. Bella* ________ **6525 – 6529**

Quinine-Catalyzed Asymmetric Synthesis of 2,2′-Binaphthol-Type Biaryls under Mild Reaction Conditions

---



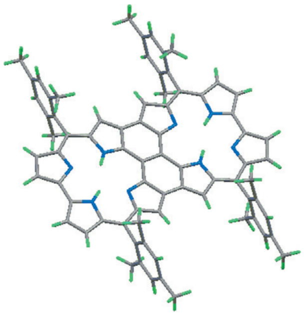
Exclusive catalysis: Iron-and-manganese-based catalysts selectively functionalize the C(sp^2)–H bonds of benzene or alkylbenzenes through the formal insertion of the $CHCO_2Et$ group from N_2CHCO_2Et (see scheme). When using alkylbenzenes, the alkylic C(sp^3)–H bonds of the substituents remain unmodified.

C–H Bond Functionalization

A. Conde, G. Sabenya, M. Rodríguez,
V. Postils, J. M. Luis,
M. M. Díaz-Requejo,* M. Costas,*
P. J. Pérez* ________ **6530 – 6534**

Iron and Manganese Catalysts for the Selective Functionalization of Arene C(sp^2)–H Bonds by Carbene Insertion

---



The oxidation of singly 10,10′-linked corrole dimers with DDQ at low concentration in $CHCl_3$ afforded stable triply linked 2*H*-corrole dimers. These dimers were shown to be non-aromatic on the basis of ^1H NMR spectroscopy and DFT calculations, and were reduced with $NaBH_4$ to aromatic 3*H*-corrole dimers, which were unstable and easily reoxidized to the 2*H*-corrole dimers upon exposure to air.

Corroles

S. Ooi, T. Tanaka,* K. H. Park, D. Kim,*
A. Osuka* ________ **6535 – 6539**

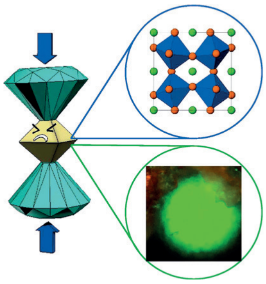
Triply Linked Corrole Dimers

Inside Back Cover

Halide Perovskites

S. Jiang, Y. Fang, R. Li, H. Xiao, J. Crowley, C. Wang, T. J. White, W. A. Goddard, III,* Z. Wang, T. Baikie,* J. Fang* **6540 – 6544**

Pressure-Dependent Polymorphism and Band-Gap Tuning of Methylammonium Lead Iodide Perovskite



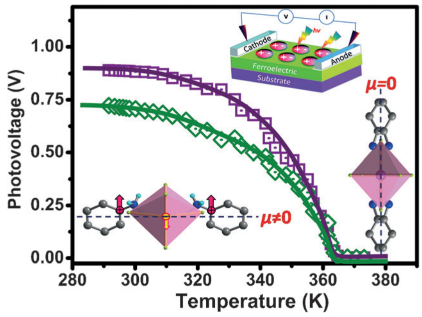
Band aid: Through the determination of methylammonium lead iodide perovskite crystallographic transitions under pressure, in situ laser-excited photoluminescence suggests a reduction in band gap in the tetragonal phase on increasing the pressure up to about 0.3 GPa and then an increase in band gap in ReO_3-type cubic phase up to a pressure of 2.7 GPa, a result that is supported by DFT calculations.

Organometallic Halides

Z. Sun, X. Liu, T. Khan, C. Ji, M. A. Asghar, S. Zhao, L. Li, M. Hong, J. Luo* **6545 – 6550**

A Photoferroelectric Perovskite-Type Organometallic Halide with Exceptional Anisotropy of Bulk Photovoltaic Effects

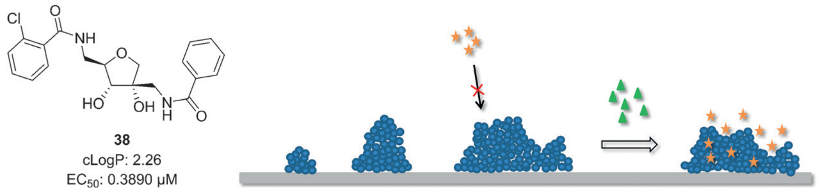
Photoferroelectric crystals of a perovskite-type organometallic halide show highly anisotropic photovoltaic activities, including a large photocurrent and remarkable photoconductivity. The critical contribution of electric polarization is confirmed by temperature-dependent photovoltage for the first time.



Biofilms

A. Vermote, G. Brackman, M. D. P. Risseeuw, B. Vanhoutte, P. Cos, K. Van Hecke, K. Breyne, E. Meyer, T. Coenye, S. Van Calenbergh* **6551 – 6555**

Hamamelitannin Analogues that Modulate Quorum Sensing as Potentiators of Antibiotics against *Staphylococcus aureus*

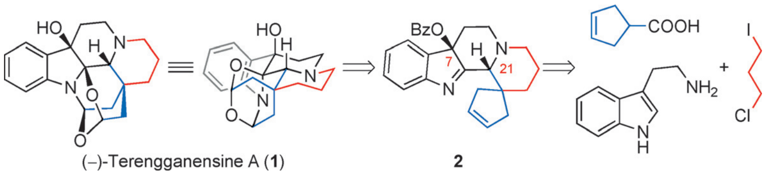


Don't let the bad bugs bite: *Staphylococcus aureus* (blue) is notorious for causing antibiotic (yellow) resistant biofilm-related infections. The discovery of hamamelitannin as an antimicrobial potentiator led to an investigation of its structure–activity relationship. A potent and metabolically stable analogue (see structure, green) was identified that shows improved activity and drug-like properties.

Total Synthesis

C. Piemontesi, Q. Wang, J. Zhu* **6556 – 6560**

Enantioselective Total Synthesis of (−)-Terengganensine A



Simplifying complexity: A seven-step synthesis of (−)-terengganensine A was achieved featuring a) Noyori's catalytic enantioselective transfer hydrogenation of an iminium salt, b) a highly diastereoselective C7 benzoyloxylation, and c) an integrated oxidative cleavage of cyclopentene/triple cyclization/hydrolysis that converts compound **2** in one pot into the natural product **1**.

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

A video clip is available as Supporting Information on www.angewandte.org (see article for access details).

This article is available online free of charge (Open Access).

This article is accompanied by a cover picture (front or back cover, and inside or outside).

The Very Important Papers, marked VIP, have been rated unanimously as very important by the referees.

The Hot Papers are articles that the Editors have chosen on the basis of the referee reports to be of particular importance for an intensely studied area of research.