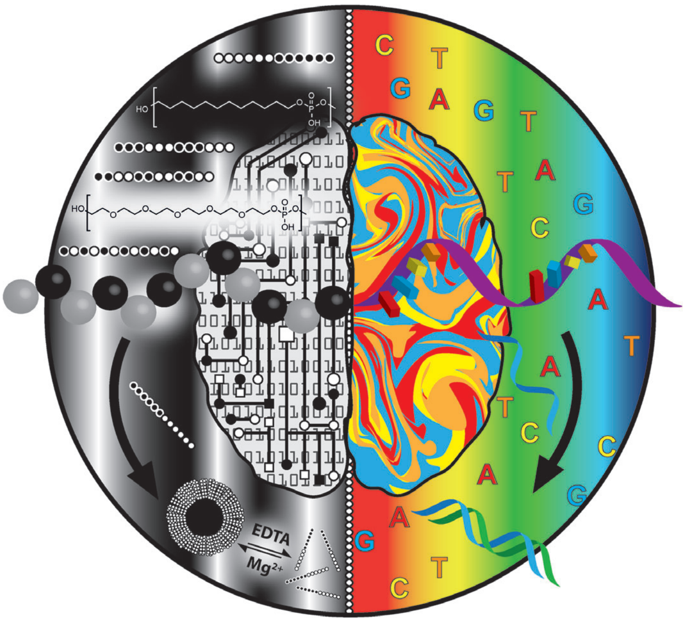
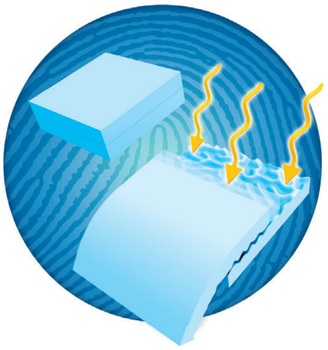
Sequence-controlled polymers attached to DNA …

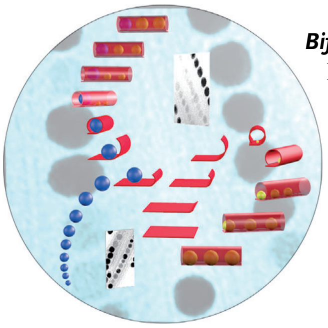


… can be prepared by solid-phase phosphoramidite coupling, as H. F. Sleiman, C. J. Serpell, and co-workers report in their Communication on page 4567 ff. Polymers with the same molecular composition but different monomer patterns exhibit different amphiphilic self-assembly. As the DNA component still retains base-pairing fidelity, these novel conjugates encode information in two distinct, and orthogonal, assembly languages.

Artificial Fingerprints

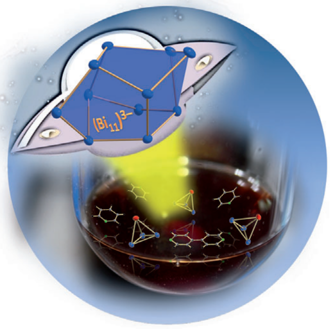
D. Liu and D. J. Broer show in their Communication on page 4542 ff. that artificial fingerprints can be switched between a flat state and a protruding state. The resulting friction changes allow use in a robot-like gripper.





Bifunctional Nanopeapods

In their Communication on page 4614 ff., J. B. Wiley et al. report the synthesis and characterization of both gold and gold–Fe_3O_4 hexaniobate nanopeapods, which show variation in their optical and magnetic properties as a function of composition.



Bismuth Polyanions

S. Dehnen and co-workers show in their Communication on page 4704 ff. that the $[Bi_{11}]^{3-}$ ion, the first polycyclic bismuth polyanion, is formed in a surprisingly simple reaction of $[K([2.2.2]crypt)]_2(GaBi_3)$ with the pyridine solvent.

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Service

Author Profile

"If I were not a scientist, I would be a fiction writer. My favorite food is fruit salad …"
This and more about Dunwei Wang can be found on page 4518.

News

H. Gröger

J. Strunk

K. C. Nicolaou

W. Dichtel

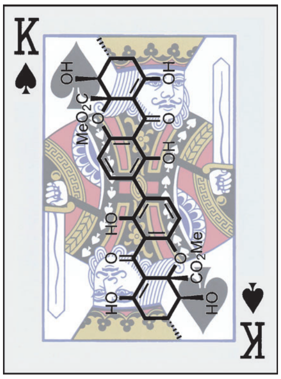
Books

Highlights

Dimeric Natural Products

T. Wezeman, K.-S. Masters,*
S. Bräse* ______________ **4524 – 4526**

Double Trouble—The Art of Synthesis of Chiral Dimeric Natural Products



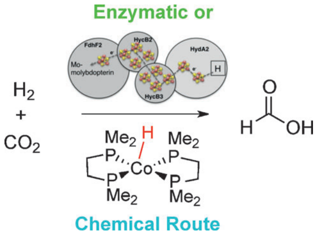
Double or nothing! Recently the total synthesis of secalonic acids A and D was reported. This work and other natural product syntheses with a dimerization step as a common feature are featured in this Highlight. The significant biological activity of the secalonic acids and the fact that their synthesis has fascinated synthetic chemists for the past forty years make this work a milestone in natural product synthesis.

Hydrogen Storage

M. Beller,*
U. T. Bornscheuer* __________ **4527 – 4528**

CO_2 Fixation through Hydrogenation by Chemical or Enzymatic Methods

Two birds with one stone: The simultaneous fixation of the greenhouse gas carbon dioxide and storage of the alternative fuel hydrogen can be accomplished with the formation of formic acid. In principle, this is now possible either with an enzymatic system based on a newly discovered bacterial hydrogen-dependent carbon dioxide reductase or by using organometallic catalysts at room temperature and ambient pressure.

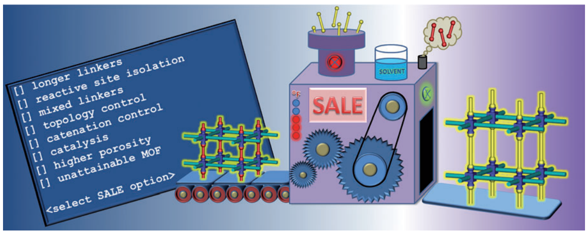


Reviews

Metal–Organic Frameworks

O. Karagiaridi, W. Bury, J. E. Mondloch,
J. T. Hupp,* O. K. Farha* ___ **4530 – 4540**

Solvent-Assisted Linker Exchange: An Alternative to the De Novo Synthesis of Unattainable Metal–Organic Frameworks



Changing pillars: Solvent-assisted linker exchange (SALE) has gained a lot of attention as a novel synthetic pathway toward metal–organic frameworks (MOFs) that are challenging to access de novo. This Review analyzes the recent advances in the application of SALE and provides a critical assessment of the studies that have facilitated our understanding of this invaluable tool for the development of new MOFs.

For the USA and Canada:
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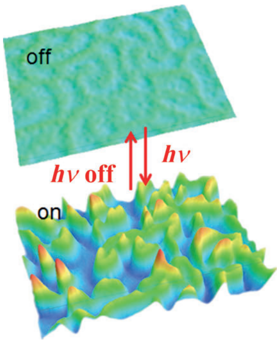
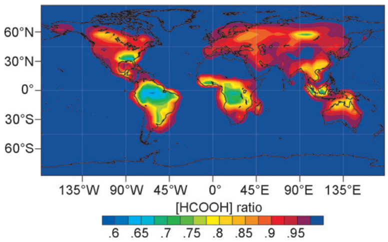
Communications



Science friction: Artificial fingerprints are switched between a flat "off" state and a protruding "on" state. The switching principle is based on a modulated change of liquid-crystal chiral-nematic order, thus creating geometric changes. When illuminated with UV light, the 3D fingerprints are activated by azobenzene and appear in the coating. The surface friction decreases when the fingerprints form and increases when they are switched off.

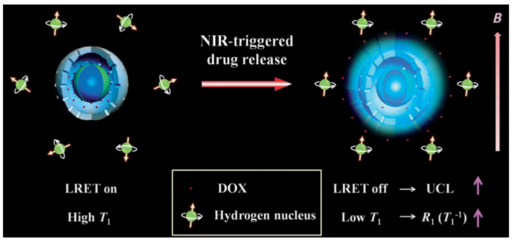
Smart Materials

Frontispiece



Gas-phase reactions: Direct measurements reveal that rate coefficients for reactions of Criegee intermediates with carboxylic acids are substantially larger than previously assumed. Using these new values, modeling suggests that these reactions can be major sinks both for Criegee intermediates and carboxylic acids in the atmosphere.

Tropospheric Chemistry



Lighting up drug delivery: Multifunctional Gd core/hollow mesoporous silica shell nanoparticles were synthesized. With doxorubicin (DOX) fully loaded inside the nanoparticles, the upconverted luminescence (UCL) signals are quenched through luminescence resonance energy transfer (LRET), and the longitudinal relaxation time magnetic resonance (T_1-MR) signals are almost undetectable. Upon drug release, both the UCL and T_1-MR signals are restored. As a result, drug release can be detected by the designed dual-mode nanosensor (see figure; R_1: longitudinal relaxivity).

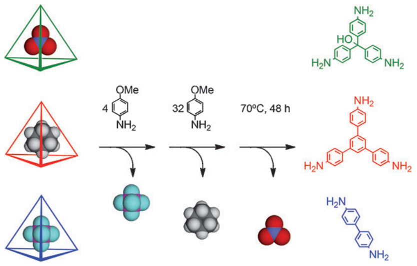
Biosensing

Systems Chemistry

A. Jiménez, R. A. Bilbeisi, T. K. Ronson, S. Zarra, C. Woodhead, J. R. Nitschke* **4556 – 4560**

Selective Encapsulation and Sequential Release of Guests Within a Self-Sorting Mixture of Three Tetrahedral Cages

Well sorted: Three discrete metal–organic cages were prepared through the one-pot reaction of five subcomponents, that is, three amines, 2-formylpyridine, and a Zn^{II} salt. Each cage selectively accommodates a single guest within a mixture of three guests, and each guest can be sequentially released following the addition of a chemical stimulus.

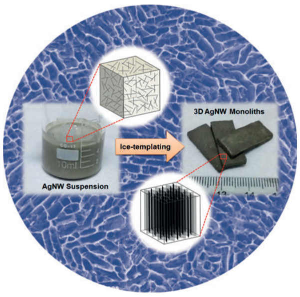


Flexible Conducting Materials

H. L. Gao, L. Xu, F. Long, Z. Pan, Y. X. Du, Y. Lu, J. Ge, S. H. Yu* **4561 – 4566**

Macroscopic Free-Standing Hierarchical 3D Architectures Assembled from Silver Nanowires by Ice Templating

Silver lining: Macroscopic free-standing hierarchical 3D architectures can be directly built from monodispersed silver nanowires (AgNW) through a general, versatile ice-template assembly technique without using any extra functionalization agents or crosslinking agents. The 3D nanowire monoliths have a binary-network microstructure which provides them with a high electrical conductivity, and, when impregnated with PDMS, great mechanical flexibility.



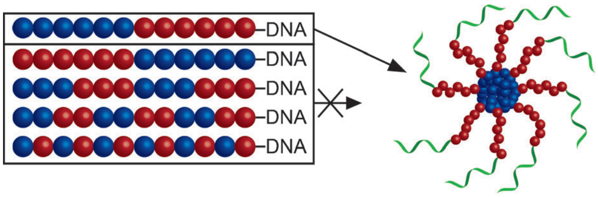
VIP

Sequence-Defined Polymers

T. G. W. Edwardson, K. M. M. Carneiro, C. J. Serpell,* H. F. Sleiman* **4567 – 4571**

An Efficient and Modular Route to Sequence-Defined Polymers Appended to DNA

Front Cover



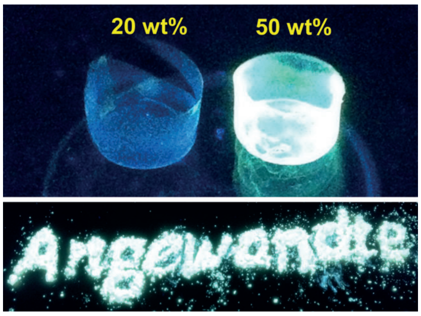
Bilingual: A stepwise solid-phase synthesis approach provides easy access to sequence-controlled polymers attached to DNA. Polymers with the same molecular composition but different monomer patterns exhibit different amphiphilic self-assembly. The DNA component still retains base-pairing fidelity, and thus one molecule "speaks" two orthogonal and programmable assembly languages.

White-Light Emission

Q. Y. Yang, J. M. Lehn* **4572 – 4577**

Bright White-Light Emission from a Single Organic Compound in the Solid Sate

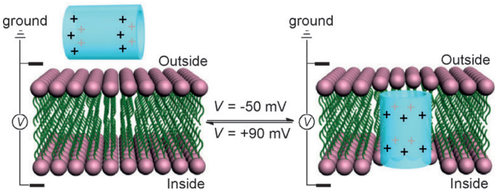
A bright idea: Remarkably simple organic molecules, based on two 4-pyridone head groups located at the termini of a polymethylene chain, emit bright white light in the solid state. The emission band, which results from excited monomer molecules and stacked excimers, is almost flat over the visible range. Incorporation into a polymeric material gives white-light-emitting films, a feature of potential applied interest.



Transmembrane Channels

W. Si, Z.-T. Li, J.-L. Hou* ___ 4578 – 4581

Voltage-Driven Reversible Insertion into and Leaving from a Lipid Bilayer: Tuning Transmembrane Transport of Artificial Channels



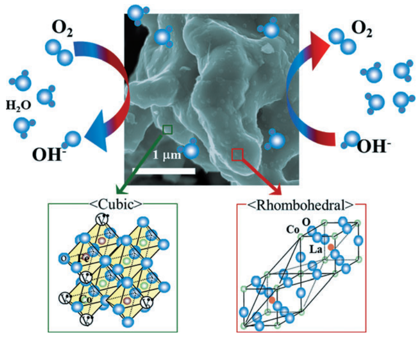
Controlling transport: A voltage can drive positively charged channel molecules to insert into or leave from a lipid bilayer (see picture), thus switching on and off the transmembrane transport of K^+ ions. The insertion and leaving processes can be tuned by adjusting the direction and strength of the voltage.

Perovskite Catalysts

J. Jung, H. Jeong, J. Lee, M. Kim,*
J. Cho* ___ 4582 – 4586

A Bifunctional Perovskite Catalyst for Oxygen Reduction and Evolution

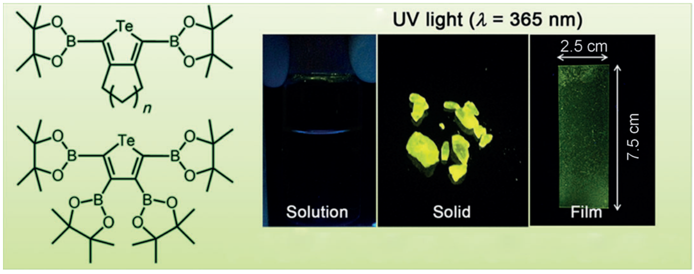
The perovskite $La_{0.3}(Ba_{0.5}Sr_{0.5})_{0.7}Co_{0.8}Fe_{0.2}O_{3-\delta}$ ($La_{0.3}$-5582) is introduced as a bifunctional catalyst to compete with precious-metal-based catalysts. The newly introduced perovskite bears rhombohedral phase $LaCoO_{3-\delta}$ particles on the surface of the grains.



Emissive Tellurophenes

G. He, W. Torres Delgado, D. J. Schatz,
C. Merten, A. Mohammadpour, L. Mayr,
M. J. Ferguson, R. McDonald, A. Brown,
K. Shankar,* E. Rivard* ___ 4587 – 4591

Coaxing Solid-State Phosphorescence from Tellurophenes

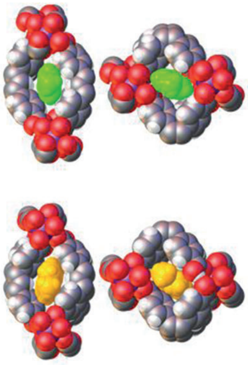


Light at the end of the tunnel: By incorporating pinacolboronate side groups, the first examples of tellurophenes that are phosphorescent in the solid state were isolated. These tellurophenes readily form phosphorescent films from solution, making them amenable to device fabrication methods.

Selective Sorption

J. E. Warren, C. G. Perkins, K. E. Jelfs,
P. Boldrin, P. A. Chater, G. J. Miller,
T. D. Manning, M. E. Briggs,
K. C. Stylianou, J. B. Claridge,
M. J. Rosseinsky* ___ 4592 – 4596

Shape Selectivity by Guest-Driven Restructuring of a Porous Material

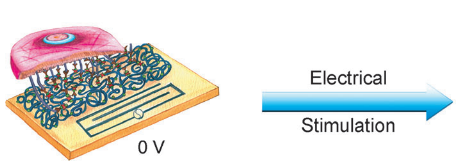


Nobody's perfect: The metal-organic framework Ce(HTCPB) is structurally mismatched to both the *para* and *meta* isomers of xylene. It restructures synergically around the *para* isomer to give a high-quality structural and functional fit, but rearrangement around the *meta* isomer requires larger host distortions and gives a poorer fit than in the *para* case. This "off-target" host thus has high selectivity for the sorption of *para*- over *meta*-xylene.

Electroactive Platforms

S. Jeon, J. Moon, E. Lee, Y. Kim,
Y. Cho* ——— **4597 – 4602**

An Electroactive Biotin-Doped Polypyrrole Substrate That Immobilizes and Releases EpCAM-Positive Cancer Cells

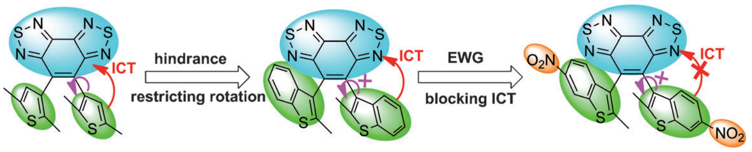


An electroactive anti-EpCAM-immobilized, biotin-doped polypyrrole (Ppy) has been developed as a unique platform for the efficient capture and release of target cancer cells. Biotin-doped Ppy is ideal for damage-free selective cell release using weak electric stimulation. This approach is promising for use in both basic and clinical cancer-related applications.

Photochromism

W. Li, C. Jiao, X. Li, Y. Xie, K. Nakatani,
H. Tian, W. Zhu* ——— **4603 – 4607**

Separation of Photoactive Conformers Based on Hindered Diarylethenes: Efficient Modulation in Photocyclization Quantum Yields

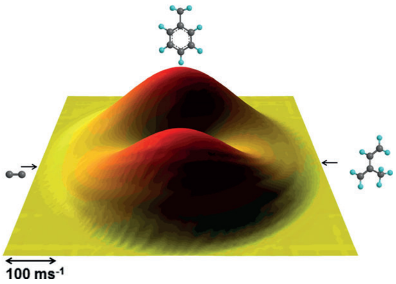


Large hindrance, high efficiency: A novel benzobis(thiadiazole)-bridged diarylethene system shows excellent thermal bistability and extremely high, solvent-independent photocyclization quantum yields ($\Phi_{\text{o-c}}$, up to 90.6%). It is characterized by a complete separation of the anti-parallel conformer and the suppression of intramolecular charge transfer (ICT). EWG = electron-withdrawing group.

Reaction Dynamics

B. B. Dangi, D. S. N. Parker, T. Yang,
R. I. Kaiser,* A. M. Mebel* — **4608 – 4613**

Gas-Phase Synthesis of the Benzyl Radical ($C_6H_5CH_2$)

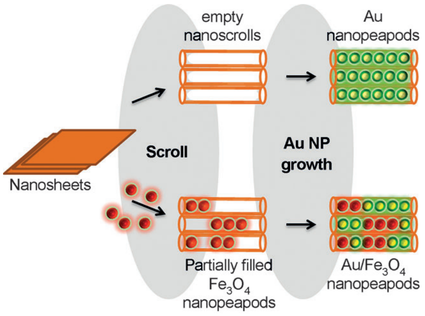


Do cross the streams! Ab initio electronic structure calculations and crossed molecular beam experiments on the reaction of dicarbon with isoprene are presented. The picture shows a flux contour map of the reaction of dicarbon with isoprene that forms the benzyl radical and atomic hydrogen at a collision energy of 43 kJ mol^{-1}.

Bifunctional Nanopeapods

S. Adireddy, C. E. Carbo, T. Rostamzadeh,
J. M. Vargas, L. Spinu,
J. B. Wiley* ——— **4614 – 4617**

Peapod-Type Nanocomposites through the In Situ Growth of Gold Nanoparticles within Preformed Hexaniobate Nanoscrolls



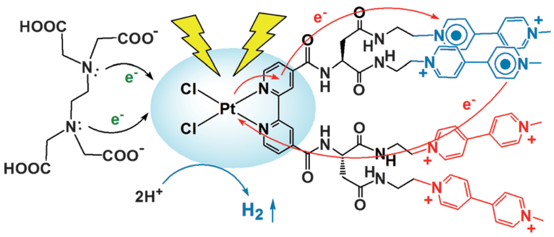
Like peas in a pod: A facile in situ method for Au nanoparticle (NP) growth in nanoscrolls is applied to the formation of plasmonic Au@hexaniobate and bifunctional plasmonic-magnetic Au-Fe_3O_4@-hexaniobate nanopeapods (NPPs). Using a solvothermal treatment, rigid multiwalled hexaniobate nanoscrolls and partially filled Fe_3O_4@hexaniobate NPPs were formed and used as templates for the Au NPs.

Inside Back Cover

Photocatalysis

K. Kitamoto, K. Sakai* ——— **4618 – 4622**

Pigment–Acceptor–Catalyst Triads for Photochemical Hydrogen Evolution

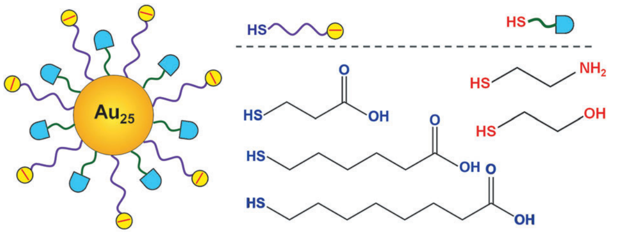


Electron harvesting: Photo-hydrogen-evolving molecular devices showing substantially improved turnover numbers have been developed by introducing multiviologen tethers into a [$PtCl_2$(2,2′-bipyridine)]-based moiety serving as a light-harvesting and H_2-evolving center (see scheme). The improved photocatalytic performance is attributed to the rapidly regenerating character of the pigment due to intramolecular electron transfer from the pigment to the electron reservoirs.

Protected Noble Metal Clusters

X. Yuan, B. Zhang, Z. Luo, Q. Yao,
D. T. Leong, N. Yan,* J. Xie* **4623 – 4627**

Balancing the Rate of Cluster Growth and Etching for Gram-Scale Synthesis of Thiolate-Protected Au_{25} Nanoclusters with Atomic Precision

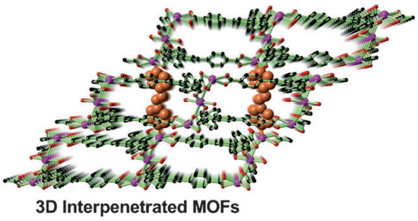


One, two ... many: A novel NaOH-mediated $NaBH_4$ reduction method was developed for the synthesis of mono-, bi-, and tri-thiolate-protected Au_{25} nanoclusters. Both the Au core and thiolate ligand surface can be precisely controlled.

Metal–Organic Frameworks

Z. X. Zhang, N. N. Ding, W. H. Zhang,*
J. X. Chen,* D. J. Young,*
T. S. A. Hor* ——— **4628 – 4632**

Stitching 2D Polymeric Layers into Flexible Interpenetrated Metal–Organic Frameworks within Single Crystals

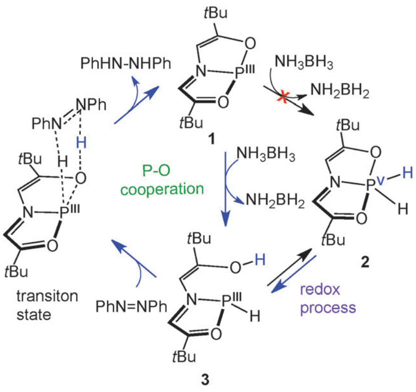


All stitched up: Dipyridyl ligands were found to diffuse into the channels in the crystal lattice of a two-dimensional polymeric complex. The absorbed dipyridyls thread through the pores of one layer and substitute the surface solvent molecules on the neighboring layers to stitch alternate layers to form flexible interpenetrated metal–organic frameworks (see picture).

Main-Group Elements

G. Zeng, S. Maeda, T. Taketsugu,
S. Sakaki* ——— **4633 – 4637**

Catalytic Transfer Hydrogenation by a Trivalent Phosphorus Compound: Phosphorus-Ligand Cooperation Pathway or P^{III}/P^{V} Redox Pathway?

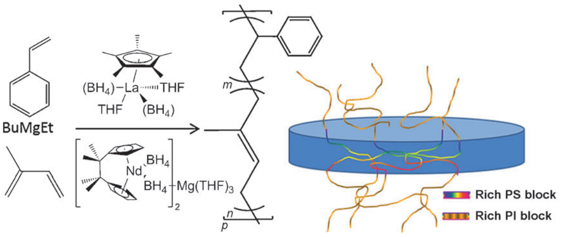


Team work: The title reaction of azobenzene with ammonia–borane using **1** occurs through a P-O cooperation mechanism, where the active species is **3**. This mechanism is new for main-group-element compounds, and resembles the metal-ligand cooperation observed in transition-metal complexes. When azobenzene is absent, the P^{III}/P^{V} redox process occurs during the isomerization of **3** into **2**, but it is not involved in the catalytic transfer hydrogenation.

Block Copolymerization

A. Valente, G. Stoclet, F. Bonnet,
A. Mortreux, M. Visseaux,
P. Zinck* ———————— **4638 – 4641**

Isoprene–Styrene Chain Shuttling Copolymerization Mediated by a Lanthanide Half-Sandwich Complex and a Lanthanidocene: Straightforward Access to a New Type of Thermoplastic Elastomers

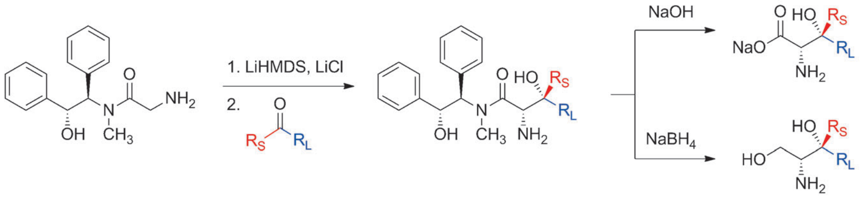


Chain shuttling copolymerization of isoprene and styrene using a borohydrido lanthane half-sandwich complex, a borohydrido *ansa*-neodymocene, and a magnesium dialkyl affords direct access to new amorphous thermoplastic elastomers. The resulting multiblock microstructure of soft and hard statistical copolymeric segments self-assembles at the nanoscale.

Synthetic Methods

I. B. Seiple, J. A. M. Mercer, R. J. Sussman,
Z. Zhang, A. G. Myers* —— **4642 – 4647**

Stereocontrolled Synthesis of *syn*-β-Hydroxy-α-Amino Acids by Direct Aldolization of Pseudoephenamine Glycinamide

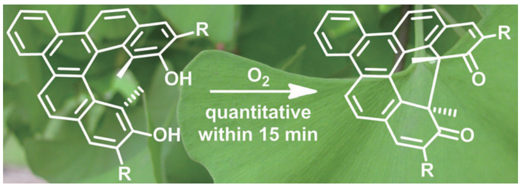


On aldol: Enolization of (*R*,*R*)- or (*S*,*S*)-pseudoephenamine glycinamide with lithium hexamethyldisilazide (LiHMDS) in the presence of LiCl followed by addition of either an aldehyde or ketone substrate affords aldol addition products which are stereochemically homologous with L- or D-threonine, respectively. These products can be obtained in stereoisomerically pure form in yields of 55–98 %, and are readily transformed into β-hydroxy-α-amino acids by mild hydrolysis or into 2-amino-1,3-diols by reduction.

Synthetic Methods

Y. Shen, H.-Y. Lu,
C.-F. Chen* ———————— **4648 – 4651**

Dioxygen-Triggered Transannular Dearomatization of Benzo[5]helicene Diols: Highly Efficient Synthesis of Chiral π-Extended Diones



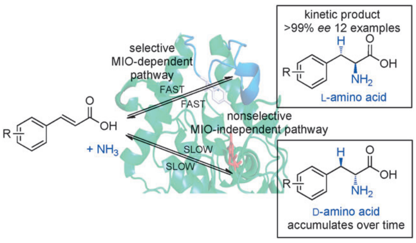
A bigger slice of π: In the title reaction, the helicity was successfully transferred into two quaternary all-carbon stereocenters of the π-extended diones. The optical resolution was easily achieved by column chromatography, and the absolute configurations were determined by X-ray analysis.

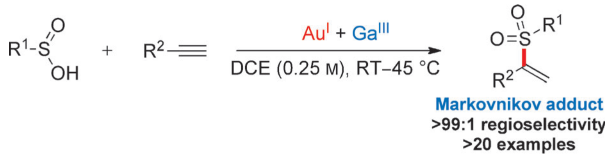
Reaction Mechanisms

S. L. Lovelock, R. C. Lloyd,
N. J. Turner* ———————— **4652 – 4656**

Phenylalanine Ammonia Lyase Catalyzed Synthesis of Amino Acids by an MIO-Cofactor Independent Pathway

All manner of things: A competing MIO-independent (MIO = 4-methylideneimidazole-5-one) reaction pathway has been identified for phenylalanine ammonia lyases (PALs), which proceeds in a non-stereoselective manner, resulting in the generation of D-phenylalanine derivatives. The mechanism of D-amino acid formation is explored through isotopic-labeling studies and mutagenesis of key active-site residues.





Less basic, less hindered: The gold-catalyzed intermolecular Markovnikov addition of sulfinic acids to terminal alkynes has been achieved through the use of a bimetallic gold/gallium catalyst system. Various α-substituted vinyl sulfones were efficiently synthesized. A one-pot synthesis that starts from the bench-stable sodium sulfinates was also developed (DCE = 1,2-dichloroethane).

C–S Bond Formation

Y. Xi, B. Dong, E. J. McClain, Q. Wang, T. L. Gregg, N. G. Akhmedov, J. L. Petersen, X. Shi* ______ **4657 – 4661**

Gold-Catalyzed Intermolecular C–S Bond Formation: Efficient Synthesis of α-Substituted Vinyl Sulfones

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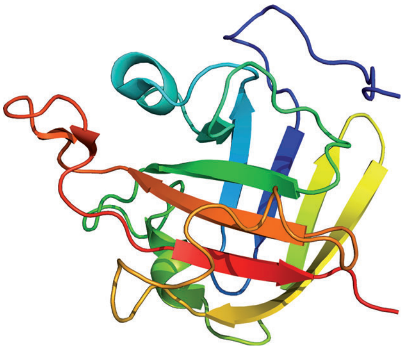

Just like the original: A fully convergent total synthesis of the enzyme sortase A from four unprotected peptide segments was established by using modern chemical ligation methods. The synthetic protein was of high purity, had correct mass, and had full enzymatic activity in a typical transpeptidation assay.

Chemical Protein Synthesis

F. K. Deng, L. Zhang, Y. T. Wang, O. Schneewind, S. B. H. Kent* ______ **4662 – 4666**

Total Chemical Synthesis of the Enzyme Sortase $A_{\Delta N59}$ with Full Catalytic Activity

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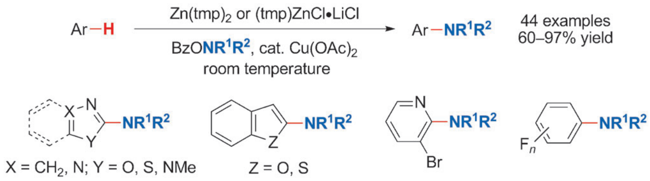

Direct amination of heteroarenes and arenes has been achieved in a one-pot zincation/Cu(OAc)$_2$-catalyzed amination sequence using *O*-acylhydroxylamines. The method provides a rapid and efficient approach to a range of aromatic and heteroaromatic amines, including those which were previously inaccessible by using C–H amination methods. tmp = 2,2,6,6-tetramethylpiperidide.

Synthetic Methods

S. L. McDonald, C. E. Hendrick, Q. Wang* ______ **4667 – 4670**

Copper-Catalyzed Electrophilic Amination of Heteroarenes and Arenes by C–H Zincation

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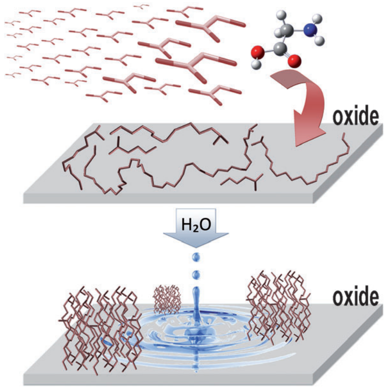
Prebiotic peptides: The catalytic formation from unactivated glycine vapor of poly-Gly up to 16 units long on a surface of SiO$_2$ or TiO$_2$ and the subsequent self-assembly of the polypeptides into closely packed aggregates upon contact with water has been observed. Both aspects can provide useful insights into the general problem of the surface reactivity of amino acids, and in particular, the prebiotic formation of biopolymers and their subsequent self-organization.



Amino Acid Chemistry

G. Martra,* C. Deiana, Y. Sakhno, I. Barberis, M. Fabbiani, M. Pazzi, M. Vincenti ______ **4671 – 4674**

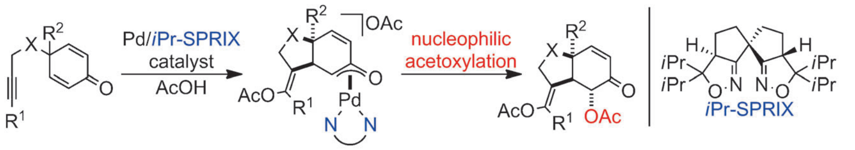
The Formation and Self-Assembly of Long Prebiotic Oligomers Produced by the Condensation of Unactivated Amino Acids on Oxide Surfaces

Inside Cover

Synthetic Methods

K. Takenaka, S. C. Mohanta,
H. Sasai* ______ **4675 – 4679**

Palladium Enolate Umpolung: Cyclative Diacetoxylation of Alkynyl Cyclohexadienones Promoted by a Pd/SPRIX Catalyst

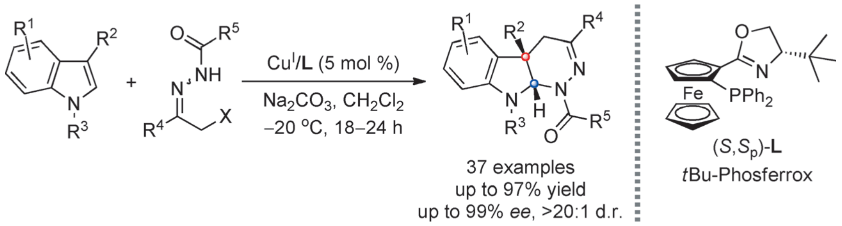


In a SPRIX: A new palladium-catalyzed reaction involving an unusual nucleophilic attack on a palladium enolate was developed using the SPRIX ligand. Treatment of alkynyl cyclohexadienone substrates with Pd/SPRIX in acetic acid under an oxygen atmosphere furnished diacetoxylated benzofuranone derivatives in good yields and with high enantioselectivity.

Asymmetric Catalysis

M.-C. Tong, X. Chen, J. Li, R. Huang,
H. Tao, C.-J. Wang* ______ **4680 – 4684**

Catalytic Asymmetric Synthesis of [2,3]-Fused Indoline Heterocycles through Inverse-Electron-Demand Aza-Diels–Alder Reaction of Indoles with Azoalkenes

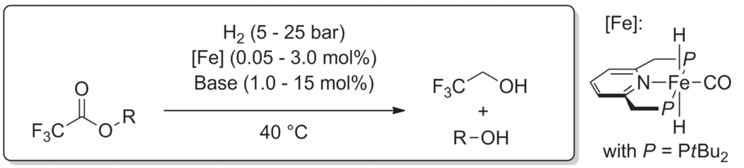


In(verse) demand: The unprecedented catalytic asymmetric inverse-electron-demand aza-Diels–Alder reaction of indoles with in situ formed azoalkenes is reported. A diverse set of [2,3]-fused indoline heterocycles were produced in generally good yields with high regioselectivity and diastereoselectivity, and with excellent enantioselectivity.

Iron Catalysis

T. Zell, Y. Ben-David,
D. Milstein* ______ **4685 – 4689**

Unprecedented Iron-Catalyzed Ester Hydrogenation. Mild, Selective, and Efficient Hydrogenation of Trifluoroacetic Esters to Alcohols Catalyzed by an Iron Pincer Complex

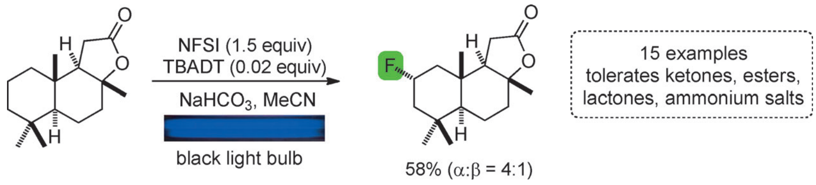


The replacement of precious-metal catalysts by an iron complex was accomplished for the synthetically important, environmentally benign hydrogenation of esters to alcohols under mild conditions. The iron pincer complex (see scheme) selectively and efficiently catalyzes the hydrogenation of trifluoroacetates under remarkably mild conditions (5–25 bar and 40 °C).

C–H Activation

S. D. Halperin, H. Fan, S. Chang,
R. E. Martin, R. Britton* ______ **4690 – 4693**

A Convenient Photocatalytic Fluorination of Unactivated C–H Bonds

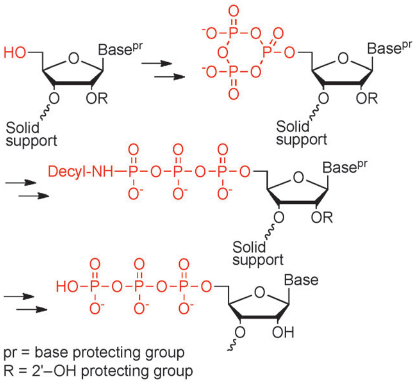


The direct fluorination of unactivated $C(sp^3)$–H bonds is catalyzed by the inexpensive photocatalyst tetrabutylammonium decatungstate (TBADT). This convenient reaction provides direct access to a wide range of fluorinated organic molecules, including structurally complex natural products, acyl fluorides, and fluorinated amino acids.

Oligonucleotides

M. Goldeck, T. Tuschl, G. Hartmann,
J. Ludwig* ______ **4694 – 4698**

Efficient Solid-Phase Synthesis of pppRNA by Using Product-Specific Labeling



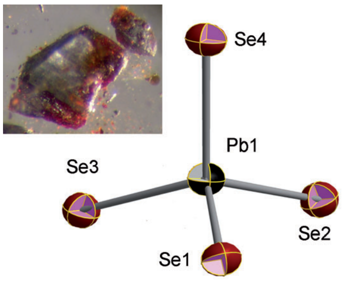
Simple and straightforward: A strategy for the solid-phase synthesis and purification of 5′-triphosphate oligonucleotides through lipophilic tagging of the triphosphate moiety is reported. This method enables the efficient synthesis of 5′-triphosphorylated RNA derivatives and their gamma-phosphate-substituted analogues and will facilitate the advancement of therapeutic approaches that make use of 5′-triphosphate oligonucleotides as activators of the immune sensor RIG-I.

Inorganic Lead(IV) Compound

G. Thiele, T. Krüger,
S. Dehnen* ______ **4699 – 4703**

K$_4$[PbSe$_4$]·en·NH$_3$: A Non-Oxide, Non-Halide Inorganic Lead(IV) Compound

Against all odds: The first inorganic lead(IV) compound without oxygen, nitrogen, or halogen ligands attached to the lead atom was obtained upon solvothermal reaction of a phase with the nominal composition “K$_2$PbSe$_2$” in ethane-1,2-diamine (en). It contains the *ortho*-selenidoplumbate(IV) anion [Pb^{IV}Se$_4$]$^{4-}$, which, for reasons of relativistic effects on lead, is not intuitive; until now, tetrahedral [TE$_4$]$^{4-}$ units (E = S, Se, Te) were only known for the lighter homologues T = Si, Ge, Sn.

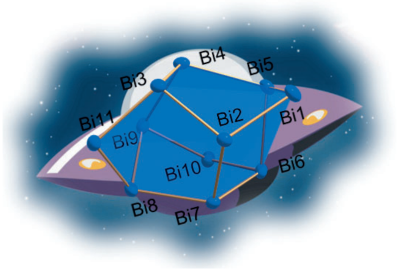


Polycyclic Bismuth Polyanion

B. Weinert, A. R. Eulenstein, R. Ababei,
S. Dehnen* ______ **4704 – 4708**

Formation of [Bi$_{11}$]$^{3-}$, A Homoatomic, Polycyclic Bismuth Polyanion, by Pyridine-Assisted Decomposition of [GaBi$_3$]$^{2-}$

Back Cover

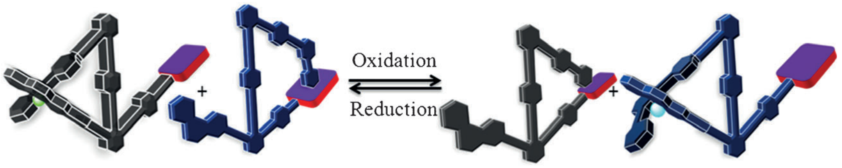


A bismuth “ufosan” sighted: Upon activation of [K([2.2.2]crypt)]$_2$(GaBi$_3$)·en by the solvent pyridine, [K([2.2.2]crypt)]$_3$(Bi$_{11}$)·2 py·tol was obtained as the first structurally characterized homoatomic, polycyclic bismuth polyanion. It has the [P$_{11}$]$^{3-}$ “ufosan” structure. Spectroscopy, spectrometry, and DFT studies were employed to understand the unprecedented reaction and its (by-)products.

Nanoswitches

S. Pramanik, S. De,
M. Schmittel* ______ **4709 – 4713**

Bidirectional Chemical Communication between Nanomechanical Switches

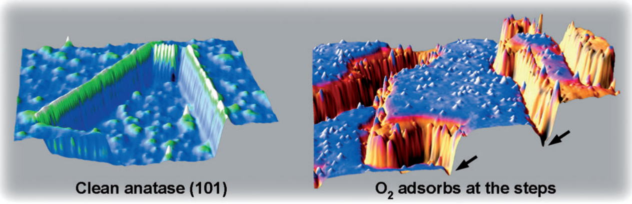


Life depends critically on information transfer, because ON-OFF regulation of biological machines requires error-free procedures for intra- and intercellular data exchange. Bidirectional molecular communication for the first time leads to a two-way information exchange between two nanomechanical switches within few minutes.

Titanium Dioxide

M. Setvin, X. Hao, B. Daniel, J. Pavelec,
Z. Novotny, G. S. Parkinson, M. Schmid,
G. Kresse, C. Franchini,
U. Diebold* 4714–4716

Charge Trapping at the Step Edges of TiO_2 Anatase (101)



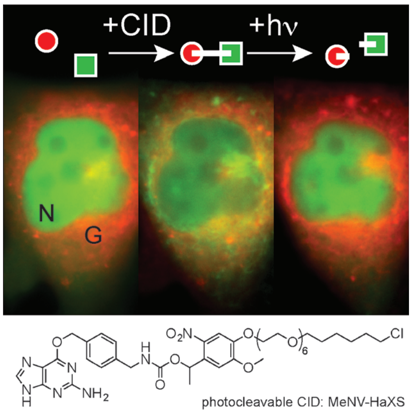
In step: Step edges on the TiO_2 anatase (101) surface act as exclusive charge trapping centers. While the electron trapping is not favorable at (101) terraces, it is possible at the steps. It results in a higher reactivity of the steps towards some adsorbates, as illustrated for the example of O_2 adsorption.

Protein–Protein Interactions

M. Zimmermann, R. Cal, E. Janett,
V. Hoffmann, C. G. Bochet, E. Constable,
F. Beaufils,*
M. P. Wymann* 4717–4720

Cell-Permeant and Photocleavable Chemical Inducer of Dimerization

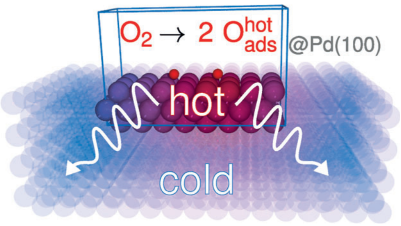
Effective transportation: The photocleavable chemical inducer of dimerization (CID) MeNV-HaXS allows the dynamic control of protein localization with high spatiotemporal and subcellular precision. MeNV-HaXS covalently links HaloTag- and SNAP-tag fusion proteins, making it possible to target selected intracellular organelles. Subsequent illumination cleaves MeNV-HaXS to liberate target proteins. Subcellular enzyme activities can be manipulated in this way.



QM/MM for Metals

J. Meyer,* K. Reuter 4721–4724

Modeling Heat Dissipation at the Nanoscale: An Embedding Approach for Chemical Reaction Dynamics on Metal Surfaces



Hot or not: An embedding technique for metallic systems makes it possible to model energy dissipation into substrate phonons during surface chemical reactions from first principles. Application to O_2 dissociation at Pd(100) predicts translationally "hot" oxygen adsorbates as a consequence of the released adsorption energy (ca. 2.6 eV). This calls into question the instant thermalization of reaction enthalpies generally assumed in heterogeneous catalysis modeling.

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).

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