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:

*H. Jiang, P. Elsner, K. L. Jensen, A. Falcicchio, V. Marcos, K. A. Jørgensen**
Achieving Molecular Complexity by Organocatalytic One-Pot Strategies: A Fast Entry for the De Novo Synthesis of Sphingoids, Amino Sugars, and Polyhydroxylated α-Amino Acids

*T. J. Kucharski, Z. Huang, Q.-Z. Yang, Y. Tian, N. C. Rubin, C. D. Concepcion, R. Boulatov**
Kinetics of Thiol/Disulfide Exchange Correlates Weakly with the Restoring Force in the Disulfide Moiety

*W. Xu, X. Xue, T. Li, H. Zeng, X. Liu**
Ultrasensitive and Selective Colorimetric DNA Detection by Nicking Endonuclease-Assisted Nanoparticle Amplification

H. Ueda, H. Satoh, K. Matsumoto, K. Sugimoto, T. Fukuyama, H. Tokuyama**
Total Synthesis of (+)-Haplophytine

G. A. Zelada, J. Riu, A. Düzgün, F. X. Rius**
Immediate Detection of Living Bacteria at Ultra-Low Concentrations Using a Carbon-Nanotube-Based Potentiometric Aptasensor

*K. Fuchibe, T. Kaneko, K. Mori, T. Akiyama**
Expedient Synthesis of N-Fused Indoles: A C–F Activation and C–H Insertion Approach

A. Giannis, P. Heretsch, V. Sarli, A. Stößel*
Synthesis of Cyclopamine Using a Biomimetic and Diastereoselective Approach

W. A. Chalifoux, R. McDonald, M. J. Ferguson, R. R. Tykwinski
***t*-Butyl Endcapped Polyynes: Crystallographic Evidence of Reduced Bond-Length Alternation**

*F. Carniato, C. Bisio, G. Gatti, E. Boccaleri, L. Bertinetti, S. Coluccia, O. Monticelli, L. Marchese**
Titanosilsesquioxanes Embedded in Synthetic Clay as a Hybrid Material for Polymer Science

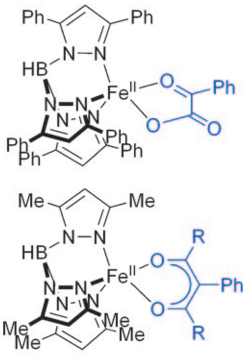
*W. Cheng, L. Ding, S. Ding, Y. Yin, H. Ju**
A Facile Electrochemical Cytosensor Array for Dynamic Analysis of Carcinoma Cell Surface Glycans

Author Profile

"My favorite subject at school was mathematics. When I wake up I take a walk in my garden to admire and enjoy nature and its fruits.. …"
This and more about K. C. Nicolaou can be found on page 5576.

Highlights

Bioinorganic Chemistry

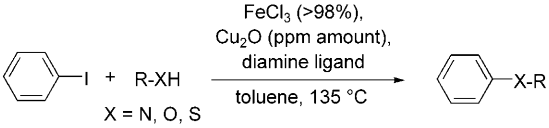


Strike while the iron's hot: Even after more than 15 years, biomimetic iron trispyrazolylborato complexes (see picture) are still good for a surprise. Recent examples of interception reactions for $\text{Fe}^{IV}{=}\text{O}$ species and the use of substrate-analogous compounds show that concepts that were long neglected in the field of biomimetic models may produce exciting results.

Contents

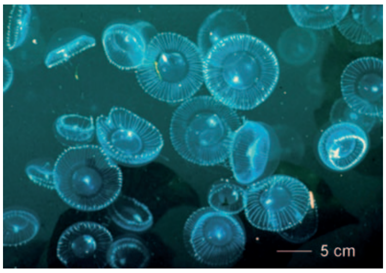
Building little bridges: Similar to the picture, researchers at Northwestern University were able to observe the chemical closing of a nanojunction. While the closing action is performed by a stepwise assembly of oligomers, the in-gap detection is achieved by surface-enhanced Raman scattering spectroscopy.

Correspondence



Warning: Catalyzed N-, O-, and C-arylation reactions ascribed to $FeCl_3$ can instead result from catalysis by trace quantities of copper salts.

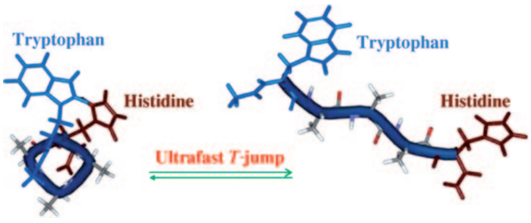
Reviews



Trip the light fantastic: The green fluorescent protein (GFP) is an invaluable tool for biochemical and medicinal research. It can make tumors, amyloid plaques from Alzheimer's disease, or pathogenic bacteria equally visible. Ground-breaking contributions in this field have resulted in the 2008 Nobel Prize for Chemistry being awarded to Osamu Shimomura, Martin Chalfie, and Roger Tsien. The Nobel Laureates describe their research firsthand.

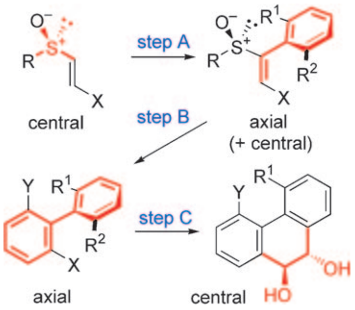
For the USA and Canada: ANGEWANDTE CHEMIE International Edition (ISSN 1433-7851) is published weekly by Wiley-VCH, PO Box 191161, 69451 Weinheim, Germany. Air freight and mailing in the USA by Publications Expediting Inc., 200 Meacham Ave., Elmont, NY 11003. Periodicals postage paid at Jamaica, NY 11431. US POSTMASTER: send address changes to *Angewandte Chemie*, Wiley-VCH, 111 River Street, Hoboken, NJ 07030. Annual subscription price for institutions: US$ 7225/6568 (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.

Ultrafast Dynamics



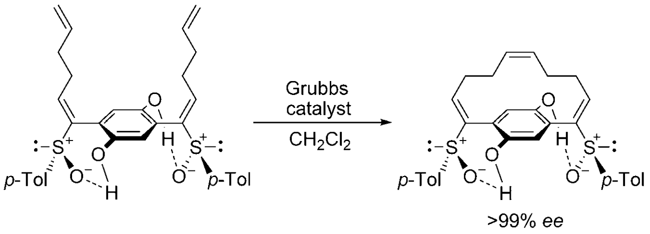
Fastest folding: An ultrafast laser temperature jump (*T*-jump) induces folding and unfolding of Wh5 (see picture), the shortest possible α-helical peptide. Using time-resolved fluorescence spectroscopy, the folding time of this peptide was found to span from less than one nanosecond to a few nanoseconds, redefining the meaning of ultrafast dynamics in protein and peptide folding.

Total Synthesis



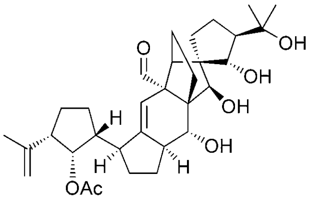
It works both ways: The transcription of two types of chirality (central⇄axial) in three chirality-transfer steps (steps A–C in the scheme; R^1 and R^2 are bulky groups) was exploited in the synthesis of TAN-1085. Induced by the central chirality of a sulfinyl group, the axial stereochemistry of a styrene derivative was transferred to the axial stereochemistry of a biaryl intermediate and finally to the two stereogenic centers in the aglycon of TAN-1085.

Chiral Cyclophanes

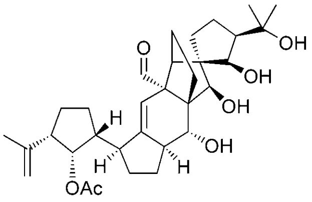


The ansa to a synthetic problem: A hydrogen bond between a phenol and a sulfinyl oxygen atom can lend axial chirality to styrene derivatives. A C_2-symmetric precursor containing two such sulfinyl styrene motifs with a shared diphenol ring enables the stereoselective formation of an ansa chain (see scheme). This approach provides access to various enantiomerically pure [10]- and [12]paracyclophanes with a benzene or naphthalene platform.

Natural Products (1)

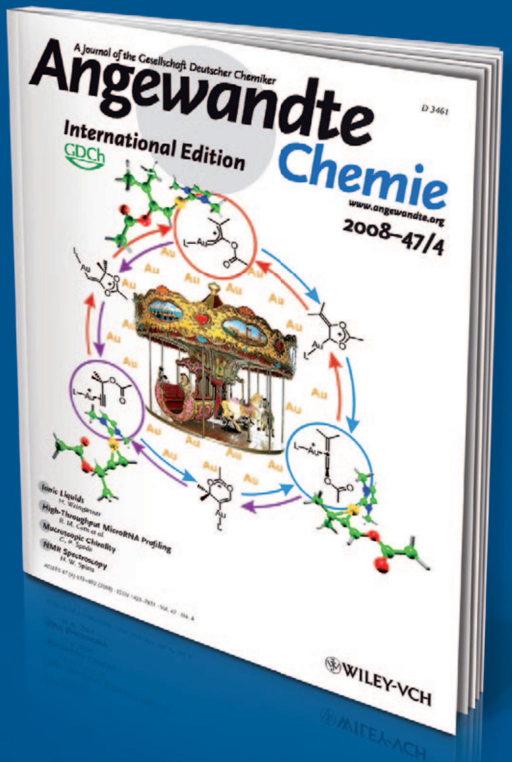


C_{21}-*epi*-**1**



C_{21}-*epi*, C_{25}-*epi*-**1**

By invalidating two more suspected structures for vannusal B (see C_{21}-*epi*-**1** and C_{21}-*epi*, C_{25}-*epi*-**1**) through their total syntheses, this fascinating study sets the stage for the demystification of the true structure of this architecturally novel marine natural product and its sibling, vannusal A.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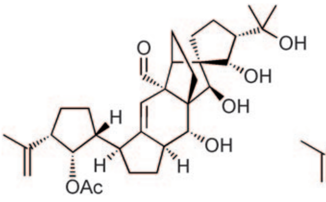
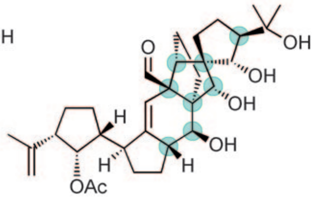
Natural Products (2)



1:vannusal B
[originally assigned structure]

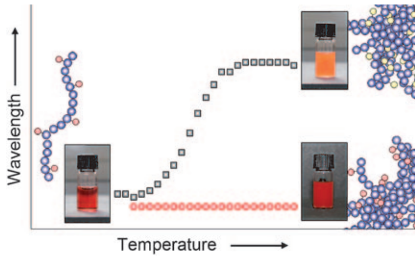


2:vannusal B
[revised structure]

The intriguing vannusal chemical detective saga based on an interplay between chemical synthesis and NMR spectroscopy finally led to the revision of the structure of vannusal B from **1** to **2** through the total synthesis of the latter.

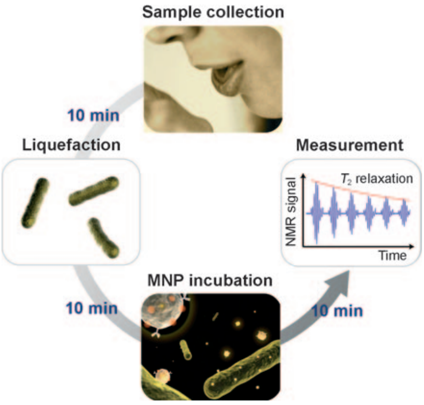
Dual-Sensing Copolymers

Two birds with one stone: A thermoresponsive copolymer (see picture, blue beads) bearing a pH-responsive solvatochromic dye (red beads) acts as the first dual sensor for temperature and pH value (black curve). When the hydrophilicity of the copolymer is increased by using a monomer with more hydrophilic side chains, the dual sensing capabilities are lost (red curve), thus providing new insights into the hydration of thermoresponsive polymers.

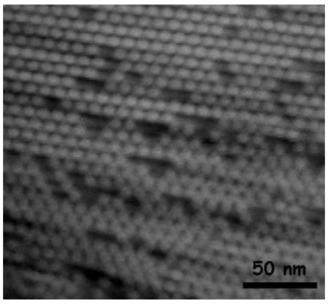


Biosensors

Catching bugs: A highly sensitive and fast detection system was developed for infectious agents. In this approach, bacteria were incubated with magnetic nanoparticles (MNPs), concentrated inside a microfluidic chamber, and detected with a miniaturized NMR chip. The method showed unprecedented sensitivity, detecting 20 bacteria in a 1 mL sample of sputum within 30 min.



Mesoporous Materials

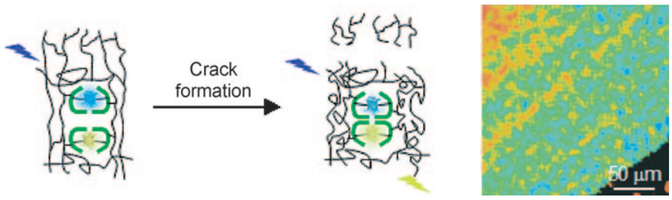


Law and order: When metal phthalocyanines are used as the carbon precursor, pseudo-solid-state in situ chemical vapor deposition on mesoporous silica yields highly graphitic mesoporous carbon materials (see TEM image) with ordered pore structure, high surface area, and high pore volume. This simple synthetic route is suitable for bulk production, and the high degree of graphitization is enhanced by the catalytic action of the metal.

Hybrid Materials

N. Bruns, K. Pustelny,
L. M. Bergeron, T. A. Whitehead,
D. S. Clark* ______ 5666 – 5669

Mechanical Nanosensor Based on FRET within a Thermosome: Damage-Reporting Polymeric Materials

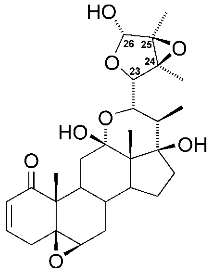


Under stress: Changes in stress of the polymer matrix in a protein–polymer hybrid material result in changes of conformation of the protein complex, thus resulting in a damage-reporting material (see picture). The reporter is an engineered chaperonin that covalently entraps a pair of fluorescent proteins. Deformation of the chaperonin leads to a change in fluorophore distance and a change in the fluorescene resonance energy transfer (FRET) signal.

Stereochemistry

M. E. García, S. Pagola,
A. Navarro-Vázquez, D. D. Phillips,
C. Gayathri, H. Krakauer, P. W. Stephens,
V. E. Nicotra,* R. R. Gil* ______ 5670 – 5674

Stereochemistry Determination by Powder X-Ray Diffraction Analysis and NMR Spectroscopy Residual Dipolar Couplings



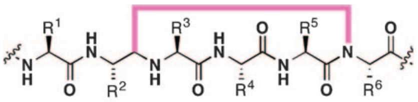
A matter of technique: For a new steroidal lactol, jaborosalactol 24 (**1**), isolated from *Jaborosa parviflora*, NMR spectroscopy residual dipolar couplings and powder X-ray diffraction analysis independently gave the same stereochemistry at C23–C26. Conventional NMR spectroscopic techniques, such as NOE and ^3J coupling-constant analysis failed to unambiguously determine this stereochemistry.

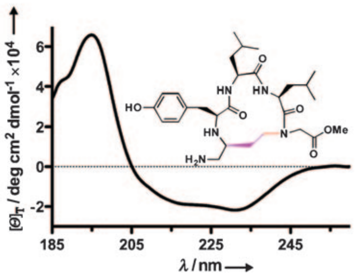
α-Helix Mimetics

A. J. Vernall, P. Cassidy,
P. F. Alewood* ______ 5675 – 5678

A Single α-Helical Turn Stabilized by Replacement of an Internal Hydrogen Bond with a Covalent Ethylene Bridge

Walking the carbon bridge to helix stabilization: α-Helix mimetics have been synthesized that contain an ethylene linkage in place of an (*i*,*i*+4) hydrogen bond (see structure). The smallest unit possible, a modified pentapeptide, shows the characteristic features of a helix (see CD spectrum). Incorporation of this carbon bridge into a peptide represents the first example of replacement of an internal backbone hydrogen bond.

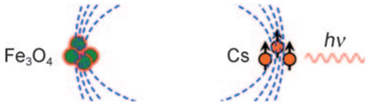




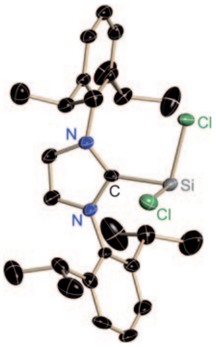
Nanotechnology

L. Yao, S. Xu* ______ 5679 – 5682

Long-Range, High-Resolution Magnetic Imaging of Nanoparticles



Seeing is believing: The magnetic field of nanoparticles can be sensed by a group of coherent cesium atoms at a long distance. The atomic coherence is generated by a near-resonance-polarized laser beam and gives off a signal in the form of polarization rotation of the light. By scanning the magnetic nanoparticles, both the distance and the absolute magnetization of the particles can be determined precisely.



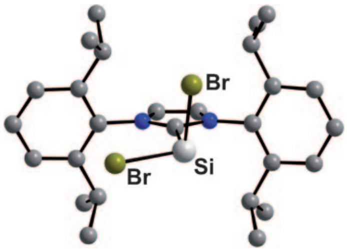
Stable? You can bottle it! The base-stabilized dichlorosilylene L^1SiCl_2 (see picture; L^1 = 1,3-bis(2,6-diisopropylphenyl)imidazol-2-ylidene) is stable at room temperature. L^1SiCl_2 can undergo a reaction with diphenylacetylene to form a trisilacyclopentene derivative. These compounds have been characterized by X-ray crystallography and computational studies.

Silicon Chemistry

R. S. Ghadwal, H. W. Roesky,* S. Merkel, J. Henn, D. Stalke* ——— **5683 – 5686**

Lewis Base Stabilized Dichlorosilylene

Silylene with a carbene carabiner: The synthesis, structure, and some reactions of a stable carbene adduct of dibromosilylene, $SiBr_2$(Idipp) (see picture; Idipp = 1,3-bis(2,6-diisopropylphenyl)-imidazol-2-ylidene), are described. $SiBr_2$(Idipp) was characterized by X-ray crystallography, NMR spectroscopy, and theoretical methods.



Silicon Chemistry

A. C. Filippou,* O. Chernov, G. Schnakenburg ——— **5687 – 5690**

$SiBr_2$(Idipp): A Stable N-Heterocyclic Carbene Adduct of Dibromosilylene

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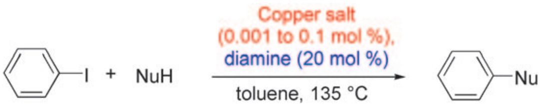

Homeopathic doses: The presence of 0.001 mol% of a copper salt can be sufficient to catalyze arylation reactions of various nucleophiles with phenyl iodide. The two most important factors governing the reaction outcome are the ligand quantity and the temperature.

Copper Catalysis

P.-F. Larsson, A. Correa, M. Carril, P.-O. Norrby,* C. Bolm* ——— **5691 – 5693**

Copper-Catalyzed Cross-Couplings with Part-per-Million Catalyst Loadings

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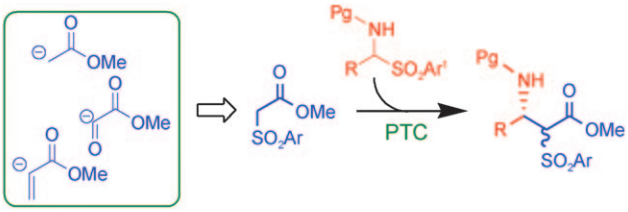


Sulfone versus sulfone: Arylsulfonylacetates can be viewed as synthetic equivalents of a variety of α-carboxylate anions. Phase-transfer catalysis (PTC) enabled their mild deprotonation and catalytic asymmetric addition to highly reactive imines generated in situ from α-amidosulfones (see scheme; Pg = protecting group). The synthetic utility of the products was demonstrated by their straightforward transformation into a range of β-amino acid derivatives.

Asymmetric Catalysis

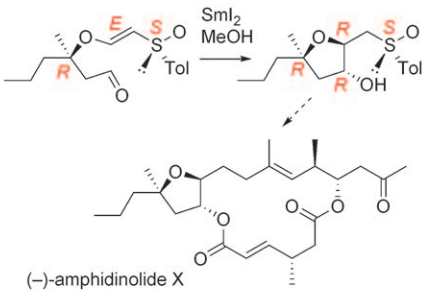
C. Cassani, L. Bernardi,* F. Fini, A. Ricci* ——— **5694 – 5697**

Catalytic Asymmetric Mannich Reactions of Sulfonylacetates

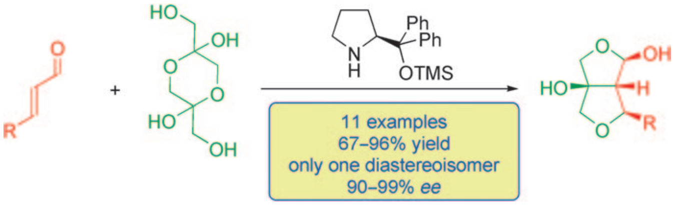
Contents

Natural Products

Specific cyclizations: The total synthesis of (−)-amphidinolide X was accomplished by employing a SmI_2-mediated 5-*exo* cyclization of an aldehydo β-alkoxyvinyl sulfoxide and a ring-closing metathesis reaction (see scheme; Tol: tolyl).



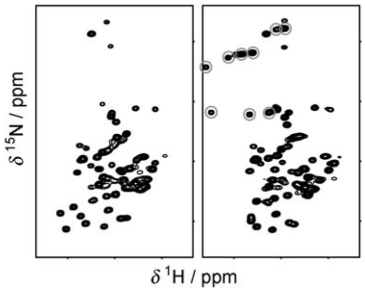
Synthetic Methods



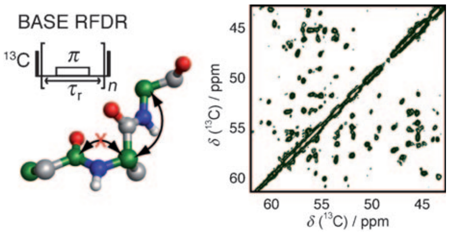
3 in 1: A triple domino reaction was developed for the preparation of the title products in a single step starting from α,β-unsaturated aldehydes and dihydroxyacetone dimer using a chiral secondary amine catalyst (see scheme, TMS = trimethylsilyl). The title reaction sequence proceeds with the generation of four stereogenic centers to deliver bicyclic compounds in good yields and excellent diastereo- and enantioselectivities.

Amyloid Fibrils

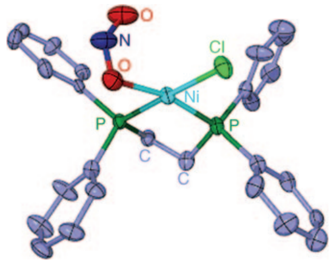
Twist and shout: Dynamics within amyloid fibrils are probed using solution NMR spectroscopy (see ^1H–^{15}N HSQC NMR spectra of wild-type β_2-microglobulin and a variant with an extended N-terminal region). A novel method is employed to ensure the origin of NMR signals and to take molecular recycling from fibrils into account.



Solid-State NMR Spectroscopy



Highly efficient polarization transfer can be achieved in the magic-angle spinning NMR analysis of proteins by the combination of ^{13}C labeling at alternating positions and band-selective radio-frequency-driven recoupling (BASE RFDR), a pulse scheme aimed at exploiting the bandwidth selectivity and favorable effects of weak ^{13}C radio-frequency irradiation to reintroduce the homonuclear dipolar interactions between distant nuclei.



Nitrites of passage: Raman and single-crystal photocrystallographic studies on [Ni(dppe)(η^1-*N*O$_2$)Cl] have, for the first time, identified a system which undergoes a reversible 100% conversion into the metastable isomer in the solid state, in this case the [Ni(dppe)(η^1-*O*NO)Cl] isomer.

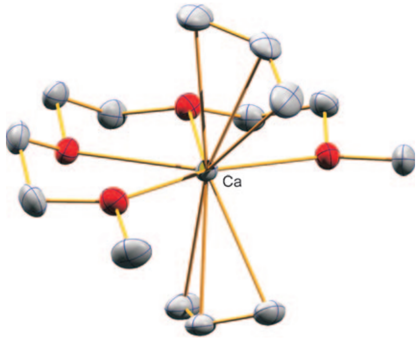
Photocrystallography

M. R. Warren, S. K. Brayshaw,
A. L. Johnson, S. Schiffers, P. R. Raithby,*
T. L. Easun, M. W. George,* J. E. Warren,
S. J. Teat ——— **5711 – 5714**

Reversible 100% Linkage Isomerization in a Single-Crystal to Single-Crystal Transformation: Photocrystallographic Identification of the Metastable [Ni(dppe)(η^1-*O*NO)Cl] Isomer

---

Bis(allyl)calcium is surprisingly stable and has good solubility in THF. The compound crystallizes as a triglyme adduct (see picture; C gray, O red). Selective C–C coupling to give 1,5-hexadiene is observed upon reaction with iodine.

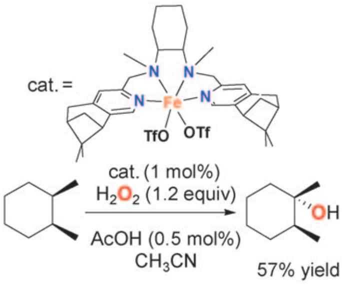


Organocalcium Chemistry

P. Jochmann, T. S. Dols, T. P. Spaniol,
L. Perrin, L. Maron,*
J. Okuda* ——— **5715 – 5719**

Bis(allyl)calcium

Check for cavities: An exceptionally active nonheme iron catalyst employs H_2O_2 as an oxidant for the stereospecific hydroxylation of alkanes (see scheme). The iron site is located in a chemically robust cavity made up by the ligands.



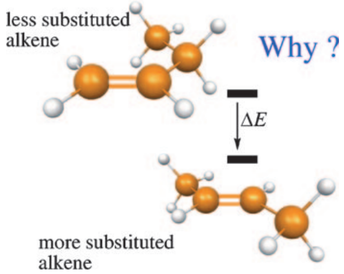
Bioinspired Oxidation Catalysis

L. Gómez, I. Garcia-Bosch, A. Company,
J. Benet-Buchholz, A. Polo, X. Sala,
X. Ribas,* M. Costas* ——— **5720 – 5723**

Stereospecific C–H Oxidation with H_2O_2 Catalyzed by a Chemically Robust Site-Isolated Iron Catalyst

---

Hyperconjugation, hybridization, or what? The hyperconjugative effects in primary, secondary, and tertiary alkenes were estimated using ab initio valence bond methods to trace the origin of the empirical Saytzeff rule, which states that the formation of the more substituted alkene is preferred. Hyperconjugation between the π bond and the π-donating substituents governs Saytzeff's rule, whereas all other factors support an anti-Saytzeff pathway.

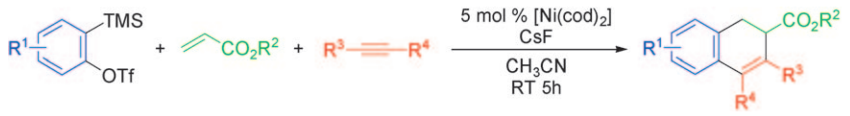


Alkenes

B. Braida,* V. Prana,
P. C. Hiberty* ——— **5724 – 5728**

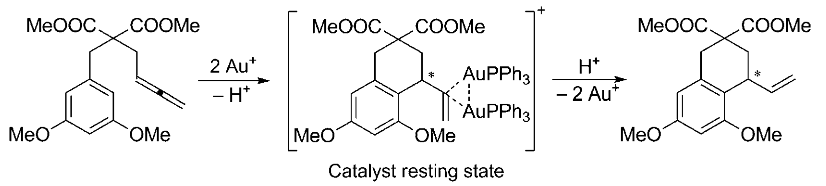
The Physical Origin of Saytzeff's Rule

Multicomponent Reactions



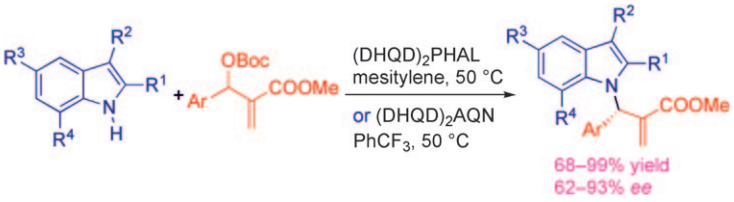
Three in one: Nickel-catalyzed three-component cycloaddition reactions of readily available arynes, activated alkenes, and alkynes gave a series of substituted 1,2-dihydronaphthalenes in moderate to very good yields with excellent chemo- and regioselectivity (see scheme, TMS = trimethylsilyl, cod = 1,5-cyclooctadiene).

Homogeneous Catalysis



Two for the show: Mechanistic studies on the cyclization of allenic arenes indicated that the catalyst rests at a dinuclear bridging vinyl structure, which was isolated and its reactivity examined.

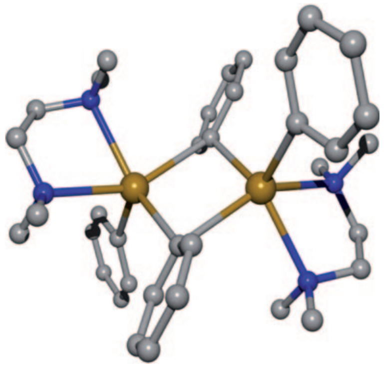
Asymmetric Catalysis



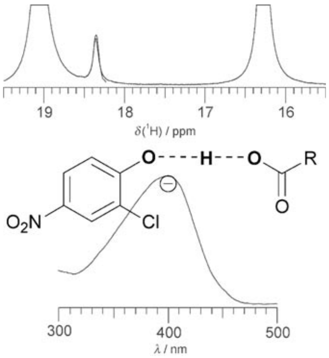
Give me convenience: The title transformation has been developed by employing metal-free catalysis of modified cinchona alkaloids. Moderate to excellent enantioselectivities have been achieved for a broad array of substrates (see scheme). This reaction also provides a convenient method to prepare multiply functionalized pyrrolo[1,2-*a*]indole and pyrrolo[3,2,1-*ij*]quinoline derivatives.

Diarylcalcium

The Schlenk equilibrium of Ca(Ar)I can be shifted quantitatively in favor of soluble $CaAr_2$ by the addition of stoichiometric amounts of K(O*t*Bu). The crystallization of $CaPh_2$ can be achieved by formation of a dinuclear 1,2-bis(dimethylamino)ethane complex (see structure; Ca brown, N blue, C gray). The transmetalation resembles no alternative—complete metal–metal exchange does not occur in the reaction of $MnPh_2$ with calcium powder.



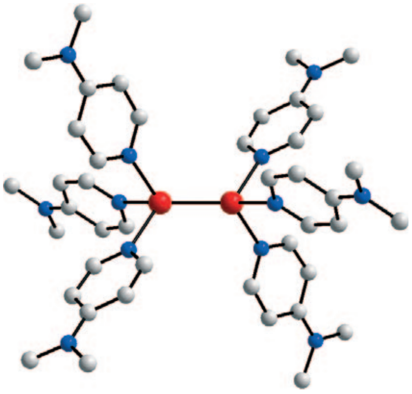
A head of the game: A new probe head for simultaneous NMR and UV/Vis spectroscopic measurements is designed. ^{1}H NMR and UV/Vis spectra of an intermolecular hydrogen-bonded complex (see scheme) are measured simultaneously in CD_2Cl_2 at 175 K. Aided by the ^{1}H NMR spectra, the sample concentration can be adjusted so that the desired complex is the exclusive form of the phenol present. The UV/Vis spectra allow the approximate position of the bridging proton to be found.



Spectroscopic Methods

P. M. Tolstoy,* B. Koeppe, G. S. Denisov, H.-H. Limbach ______ **5745 – 5747**

Combined NMR and UV/Vis Spectroscopy in the Solution State: Study of the Geometries of Strong OHO Hydrogen Bonds of Phenols with Carboxylic Acids

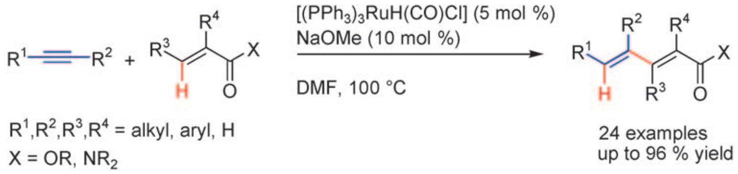


Something to zinc about: A base-stabilized $[Zn_2]^{2+}$ dication, obtained from the reaction of $[Cp^*{}_2Zn_2(dmap)_2]$ ($Cp^* = C_5Me_5$, dmap = 4-dimethylaminopyridine) with two equivalents of $[H(OEt_2)_2][Al\{OC(CF_3)_3\}_4]$, is structurally characterized for the first time (see structure; red Zn, blue N, gray C; Zn–Zn 2.419(1) Å).

Zinc–Zinc Bonds

S. Schulz,* D. Schuchmann, I. Krossing,* D. Himmel, D. Bläser, R. Boese ______ **5748 – 5751**

Structural Characterization of a Base-Stabilized $[Zn_2]^{2+}$ Cation

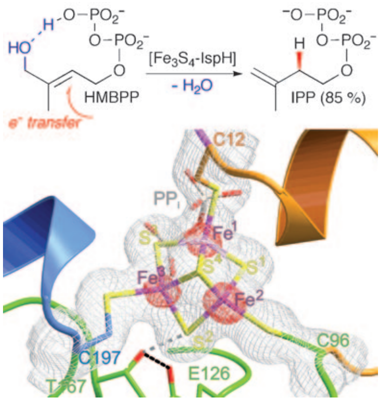


Atom economy made easy: After in situ activation, a simple air- and moisture-stable complex derived from $RuCl_3$ and PPh_3, catalyzes the hydrovinylation of a variety of terminal and internal alkynes with substituted acrylates in good to excellent yields and regioselectivities (see scheme).

C–H Activation

N. M. Neisius, B. Plietker* _ **5752 – 5755**

The Ruthenium-Catalyzed Hydrovinylation of Internal Alkynes by Acrylates: An Atom Economic Approach to Highly Substituted 1,3-Dienes



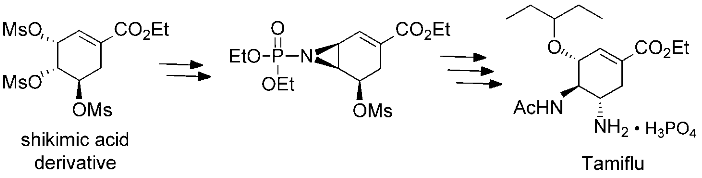
The terminal step of the non-mevalonate pathway of terpene biosynthesis is catalyzed by IspH (see scheme). In the crystal structure of IspH from *E. coli*, a bound inorganic diphosphate ligand occupies the position of the diphosphate residue of the substrate. Together with mutation studies and theoretical calculations, these data support a mechanism which is analogous to the Birch reduction of allylic alcohols.

[3Fe-4S] Clusters

T. Gräwert,* F. Rohdich, I. Span, A. Bacher, W. Eisenreich, J. Eppinger,* M. Groll* ______ **5756 – 5759**

Structure of Active IspH Enzyme from *Escherichia coli* Provides Mechanistic Insights into Substrate Reduction

Drug Synthesis



The same azide intermediate as that used in the current technical synthesis of Tamiflu can be prepared in only eight steps and with only three workups; protecting group manipulations and chromatographic purification are not required. This approach includes a new protocol for aziridine formation to avoid competitive aromatization.

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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