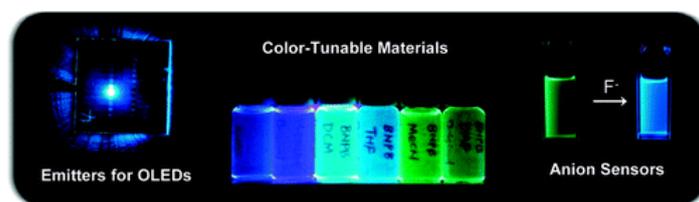


- Impact of Donor–Acceptor Geometry and Metal Chelation on Photophysical Properties and Applications of Triarylboranes

Hudson, Z. M.; Wang, S. *Acc. Chem. Res.* **2009**, *42*, 1584–1596.

Abstract:



Three-coordinate organoboron compounds have recently found a wide range of applications in materials chemistry as nonlinear optical materials, chemical sensors, and emitters for organic light-emitting diodes (OLEDs). These compounds are excellent electron acceptors due to the empty p_{π} orbital on the boron center. When accompanied by electron donors such as amines, these molecules possess large electronic dipoles, which promote donor–acceptor charge-transfer upon excitation with light. Because of this, donor–acceptor triarylboranes are often highly luminescent both in the solid state and in solution.

In this Account, we describe our research to develop donor–acceptor triarylboranes as efficient blue emitters for OLEDs. Through the use of hole-transporting donor groups such as 1-naphthylphenylamines, we have prepared multifunctional triarylboranes that can act as the emissive, electron transport, or hole transport layers in OLEDs. We have also examined donor–acceptor compounds based on 2,2′-dipyridylamine or 7-azaindolyl donors, several of which have fluorescent quantum efficiencies approaching 100%.

We are also investigating the chemistry of metal-containing triarylboranes. Our studies show that the electron-deficient boryl group can greatly facilitate metal-to-ligand charge-transfer transitions and phosphorescence. In addition, electronegative linker groups such as 2,2′-bipyridine can act in synergy with metal chelation to greatly improve the electron-accepting ability and Lewis acidity of triarylboranes.

Donor–acceptor triarylboranes developed in our laboratory can also serve as a series of “switch-on” sensors for fluoride ions. When the donor and acceptor are linked by rigid naphthyl or nonrigid silane linkers, donor–acceptor conjugation is disrupted and charge transfer occurs primarily through space. The binding of fluoride ions to the boron center disrupts this charge transfer, activating alternative $\pi \rightarrow \pi^*$ transitions in the molecule and changing the emission color of the sample.

More recently, we have used these nonconjugated linkers to prepare organometallic donor–acceptor triarylboranes in which fluorescence and phosphorescence can simultaneously be observed from two different chromophores in the same molecule at ambient temperature. These dual emissive molecules remain sensitive to fluoride ions, and give synergistic singlet–triplet emission responses when titrated with F^- . Fluoride ions can also act as valuable chemical probes, providing insight into the electronic structure of this new class of optoelectronic materials.

We have demonstrated that donor–acceptor triarylboranes are promising materials in anion sensing and electroluminescent device applications. Nonetheless, despite our work and that of other research groups, there is still much to be learned about organometallic and multiply emissive triarylboron systems.

- Aromatic compounds as synthons for 1,3-dicarbonyl derivatives
Hilt, G.; Weske, D. F. *Chem. Soc. Rev.* **2009**, *38*, 3082 – 3091.

Abstract:

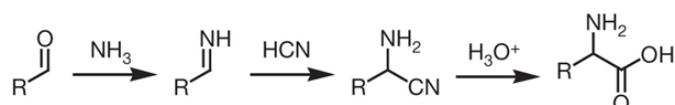
This *tutorial review* covers the applications of aromatic compounds such as anisole derivatives as synthetic equivalents (synthons) for 1,3-dicarbonyl compounds. The aromatic nucleus is first converted under reductive Birch conditions to the corresponding 1,4-cyclohexadiene compound which is then subjected to ozonolysis. The reductive work-up of the ozonides generates the 1,3-dicarbonyl compounds. The usefulness of this reaction sequence is demonstrated in several syntheses of complex molecules. A new access to 1,3-dicarbonyl compounds by an alternative approach utilising a cobalt-catalysed Diels–Alder reaction or a 1,4-hydrovinylation reaction to generate the needed 1,4-diene derivatives is briefly discussed.

- Opportunities and challenges in synthetic oligosaccharide and glycoconjugate research
Boltje, T. J.; Buskas, T.; Boons, G.-J. *Nature Chemistry* **2009**, *1*, 611-622.

Abstract:

Synthetic oligosaccharides and glycoconjugates are increasingly used as probes for biological research and as lead compounds for drug and vaccine discovery. These endeavours are, however, complicated by a lack of general methods for the routine preparation of these important compounds. Recent developments such as one-pot multistep protecting-group manipulations, the use of unified monosaccharide building blocks, the introduction of stereoselective glycosylation protocols, and convergent strategies for oligosaccharide assembly, are beginning to address these problems. Furthermore, oligosaccharide synthesis can be facilitated by chemo-enzymatic methods, which employ a range of glycosyl transferases to modify a synthetic oligosaccharide precursor. Glycosynthases, which are mutant glycosidases that can readily form glycosidic linkages, are addressing a lack of a wide range of glycosyltransferases. The power of carbohydrate chemistry is highlighted by an ability to synthesize glycoproteins.

- Scalable catalytic asymmetric Strecker syntheses of unnatural α -amino acids
Zuend, S. J.; Coughlin, M. P.; Lalonde, M. P.; Jacobsen, E. N. *Nature* **2009**, *461*, 968-970.

Abstract:

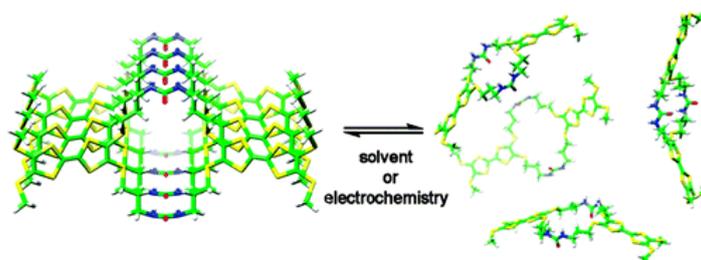
Efficient methods for the synthesis of enantioenriched α -amino acids — the building blocks of proteins — have been developed, but it remains a challenge to obtain non-natural amino acids. A new catalytic asymmetric method is now reported for the syntheses of highly enantiomerically

enriched non-natural amino acids using a simple and robust chiral amido-thiourea catalyst. The method also uses a safer source of cyanide.

- Controlled Self-Assembly of Electron Donor Nanotubes

López, J. L.; Pérez, E. M.; Viruela, P. M.; Viruela, R.; Ort, E.; Martín, N. *Org. Lett.* **2009**, *11*, 4524–4527.

Abstract:

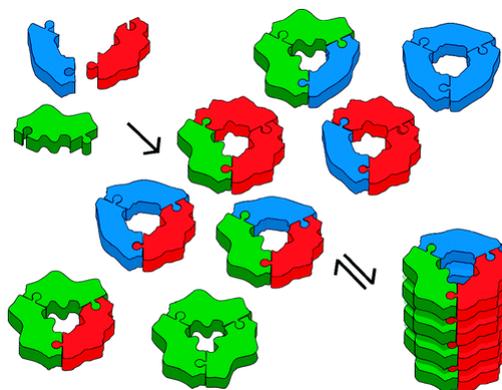


We employ a combination of urea–urea hydrogen bonds and π – π stacking interactions to obtain soluble self-assembled nanotubes decorated with electron-donor TTF derivatives on the periphery. We have investigated the structure and stability of the nanotubes with a combination of experiments and high-level DFT calculations. We also demonstrate that the association process can be controlled by changes in the hydrogen-bonding ability of the solvent and electrochemically.

- Estimating Equilibrium Constants for Aggregation from the Product Distribution of a Dynamic Combinatorial Library

Hunt, R. A. R.; Ludlow, R. F.; Otto, S. *Org. Lett.* **2009**, *11*, 5110–5113.

Abstract:

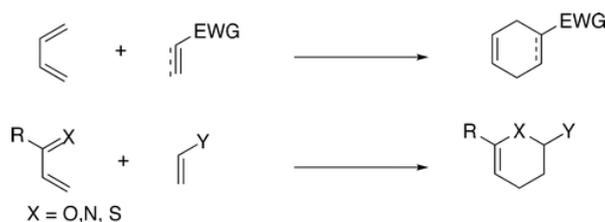


Multicomponent chemical systems that exhibit a network of covalent and intermolecular interactions may produce interesting and often unexpected chemical or physical behavior. The formation of aggregates is a well-recognized example and presents a particular analytical challenge. We now report the development of a numerical fitting method capable of estimating equilibrium constants for the formation of aggregates from the product distribution of a dynamic combinatorial library containing self-recognizing library members.

- Copper-Catalyzed Diels–Alder Reactions

Reymond, S.; Cossy, J. *Chem. Rev.* **2008**, *108*, 5359–5406.

Abstract:



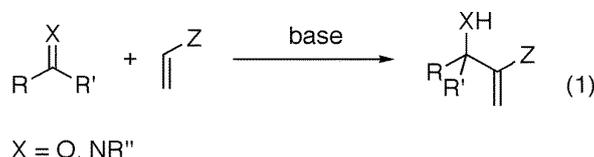
For 80 years, the Diels–Alder addition has been one of the best methods for the preparation of six-membered carbocycles with control of up to four stereogenic centers in an atom-economical way. The typical [4+2]-cycloaddition condenses a diene moiety onto an alkene or alkyne system (dienophile) to afford a cyclohexene or cyclohexadiene derivative.

Since the report that thermal dimerizations of acrolein and methyl vinyl ketone are highly regioselective giving six-membered heterocycles, the Diels–Alder additions of conjugated enols and enones to olefinic dienophiles has become a powerful method for the synthesis of 3,4-dihydro-2*H*-pyranes. This cycloaddition was then generalized to other heterobutadienes such as azadienes and thiadienes. The very first Diels–Alder reaction promoted by copper species was presented by Bota et al. In a short communication in 1961, they reported the Diels–Alder reaction of cyclopentadiene with acetylene to produce 2,5-norbornadiene by continuous flow reaction through a CuCl/NH₄Cl/activated carbon catalyst; however, the authors were not clear about the role of the catalyst. Corey et al. extended the use of copper salts as Lewis acid catalysts in the Diels–Alder reaction, and in 1982, the CuCl/NH₄Cl catalytic system was used for the second time (*vide infra*).

- *aza*-Baylis–Hillman Reaction

Declerck, V.; Martinez, J.; Lamaty, F. *Chem. Rev.* **2009**, *109*, 1-48.

Abstract:



The creation of carbon–carbon bonds remains an important challenge in organic synthesis. Numerous reactions for the formation of carbon–carbon bonds have been discovered and largely exploited. Recent progress in organic chemistry have clearly established that the development of a reaction is dependent on two main criteria: atom economy and selectivity (chemo-, regio-, stereo-). Recently, the Morita–Baylis–Hillman reaction has appeared as a performant process for the formation of carbon–carbon bonds since it combines two important requirements (atom economy and functional group generation). Ignored for a long time after its discovery in 1968 by Morita (phosphine-catalyzed reaction) and then in 1972 by Baylis and Hillman (amine-catalyzed reaction), this reaction and its applications have received growing interest since the mid 1990s. The Morita–Baylis–Hillman reaction has been applied to a wide variety of substrates and allows the preparation of various families of molecules. Another reason for interest in the Baylis–Hillman reaction is the fact that it is possible to convert cheap starting materials, under the action of an appropriate catalyst, into highly functionalized compounds, which can be used for further transformations.

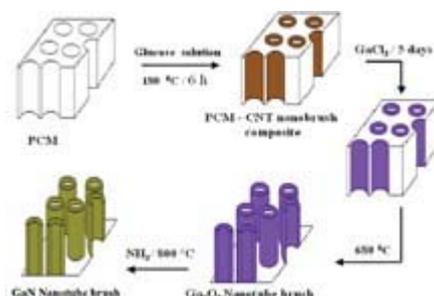
If the Morita–Baylis–Hillman reaction and its applications in synthesis have already been extensively discussed in several reviews, its *aza*-counterpart has been briefly summarized. We will detail herein the *aza*-Baylis–Hillman reaction as well as its stereoselective versions. Thereafter, we will describe alternative access routes to these α -methylene- β -amino derivatives from Baylis–Hillman products or

by other processes related to the *aza*-Baylis–Hillman reaction. Finally, we will present the use of these α -methylene- β -amino derivatives in synthesis.

- Synthesis of Inorganic Nanotubes

Rao, C. N. R.; Govindaraj, A. *Adv. Mater.* **2009**, 4208-4233.

Abstract:

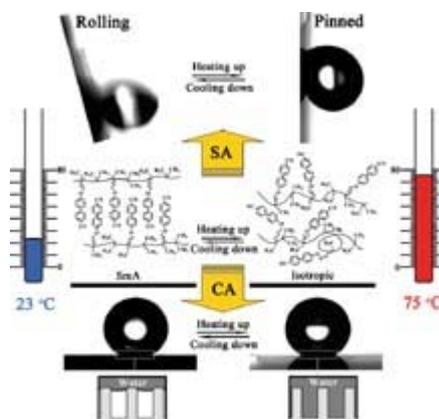


Nanotubes of a variety of inorganic materials have been synthesized in the last few years by employing several synthetic strategies such as solvothermal synthesis, use of templates, precursors, as well as some physical methods. This article presents a brief account of the present status of inorganic nanotubes synthesis.

- Reversible Switching of Water-Droplet Mobility on a Superhydrophobic Surface Based on a Phase Transition of a Side-Chain Liquid-Crystal Polymer

Li, C.; Guo, R.; Jiang, X.; Hu, S.; Li, L.; Cao, X.; Yang, H.; Song, Y.; Ma, Y.; Jiang L. *Adv. Mater.* **2009**, 4254-4258.

Abstract:

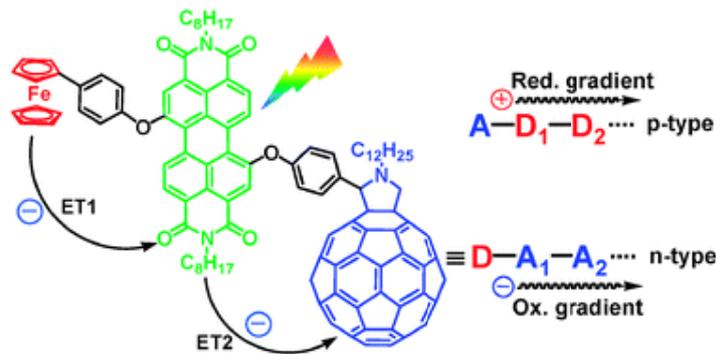


Reversible switching of the mobility of a water microdroplet between rollable and pinned simply by changing the temperature is realized by coordination of the phase transition of a side-chain liquid-crystal polymer (SCLCP) with optimized surface roughness of a superhydrophobic surface. The responsive surface has potential applications in microreactor design and microfluidic control systems.

- N-type cascade electron transfer along an oxidative gradient

Wu, Y.; Li, Y.; Li, H.; Shi, Q.; Fu, H.; Yao J. *Chem. Commun.* **2009**, 6955 – 6957.

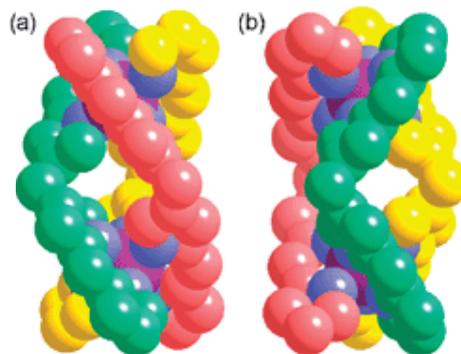
Abstract:



N-type cascade electron transfer was achieved for the first time along an oxidative gradient in the triad of ferrocene–perylene tetracarboxylic bisimide–[60]fullerene, providing a promising new strategy of supramolecular architecture for solar energy conversion.

- A triple-stranded helicate and mesocate from the same metal and ligand
Zhang, Z.; Dolphin, D. *Chem. Commun.* **2009**, 6931 – 6933.

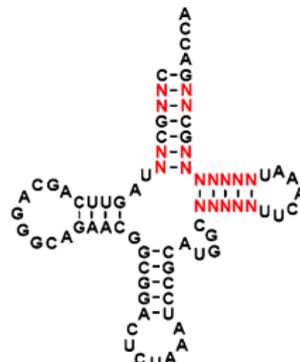
Abstract:



A pair of triple-stranded helicates and mesocates were, for the first time, isolated from the same reaction of a novel -free bis(dipyrromethene) ligand with either Co^{3+} or Fe^{3+} .

- Evolution of Amber Suppressor tRNAs for Efficient Bacterial Production of Proteins Containing Nonnatural Amino Acids
Guo, J.; Melançon III, C. E.; Lee, H. S.; Groff, D.; Schultz, P. G. *Angew. Chem. Int. Ed.* **2009**, *48*, 9148 –9151.

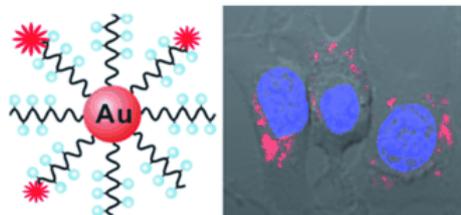
Abstract:



Applied evolution: Regions of the *M. jannaschii* tyrosyl tRNA_{CUA} thought to interact with elongation factor Tu were randomized, and the resulting tRNA libraries were subjected to in vitro evolution. The tRNAs identified resulted in significantly improved yields of proteins containing nonnatural amino acids. In some cases, the degree of improvement varied in an amino acid dependent manner.

- Multimodal Gadolinium-Enriched DNA-Gold Nanoparticle Conjugates for Cellular Imaging
Song, Y.; Xu, X.; MacRenaris, K. W.; Mirkin, C. A.; Meade, T. J. *Angew. Chem. Int. Ed.* **2009**, *48*, 9143–9147.

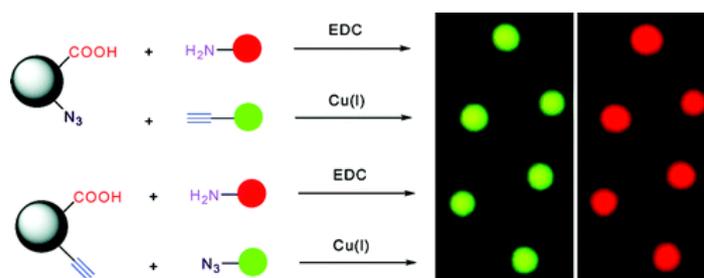
Abstract:



Conjugate agent: A Gd^{III} enriched DNA-AuNP conjugate for intracellular magnetic resonance and fluorescence imaging is reported. The agent exhibits high relaxivity per particle and high cell uptake properties that provide a means to image and map small cell populations.

- Simultaneous Orthogonal Chemoligations on Multiresponsive Microgels
Meng, Z.; Hendrickson, G. R.; Lyon, L. A. *Macromolecules* **2009**, *42*, 7664–7669.

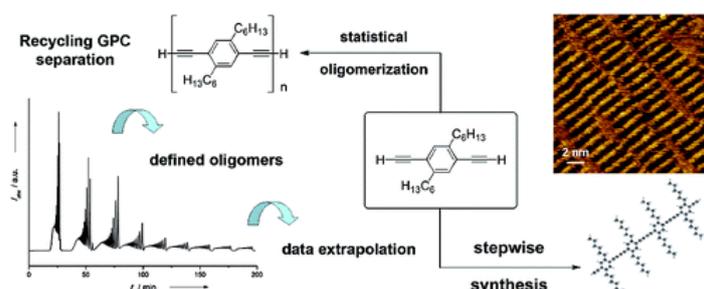
Abstract:



We describe the straightforward synthesis of “clickable” multiresponsive microgels containing both carboxylic acid groups and azidohydrin or terminal alkyne groups, via a one-pot multistage polymerization approach. The clickable functional groups on the microgels were confirmed by FTIR. Additionally, we simultaneously performed “click” and acid–amine coupling reactions on microgels with fluorescent dyes containing complementary functional groups. Epifluorescence microscopy was employed to confirm the coupling of those dyes to the microgels. The orthogonality of the click reaction to other functional groups such as hydroxyl, carboxylic acid, and amino groups was confirmed, suggesting the potential utility of such microgels in applications where multifunctional colloidal particles are required.

- Defined Oligo(*p*-phenylene–butadiynylene) Rods
Mössinger, D.; Jester, S.-S.; Sigmund, E.; Müller, U.; Höger, S. *Macromolecules* **2009**, *42*, 7974–7978.

Abstract:

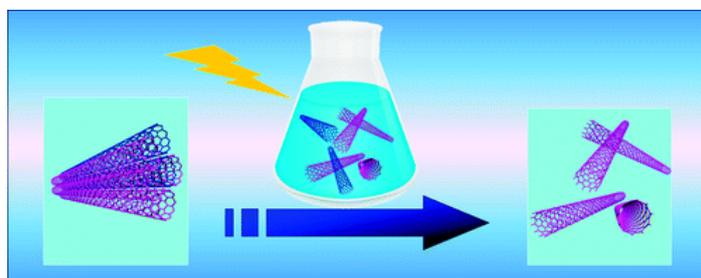


We presented an efficient stepwise route toward defined oligo(*p*-phenylene–butadiynylene)s up to the tetramer starting from 1,4-diethynyl-2,5-dihexylbenzene. We used the polar (3-cyanopropyl)dimethylsilyl (CPDMS) protective group for the construction of defined linear rods. In a comparative approach we separated the respective statistical oligomer by recycling GPC in semipreparative quantities. The separated homologues of known molar mass could be used to determine a nonlinear set of conversion factors for an OPB-specific GPC calibration. Extrapolation of defined oligomer properties permits conclusions regarding the maximum effective conjugation lengths of dialkyl-substituted OPBs and PPBs. Self-assembled monolayers of the tetramer **1** have been prepared and investigated by STM at the solid/liquid interface. The smooth syntheses of defined rigid rods such as **2**, **10**, and **1** allow them to be used as building blocks for complex superstructures.

- Facile and Scalable Route for Highly Efficient Enrichment of Semiconducting Single-Walled Carbon Nanotubes

Qiu, H.; Maeda, Y.; Akasaka, T. *J. Am. Chem. Soc.* **2009**, *131*, 16529–16533.

Abstract:

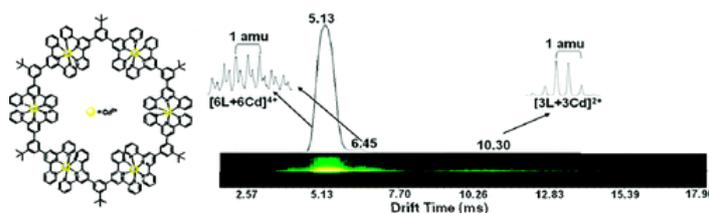


Purely semiconducting single-walled carbon nanotubes (s-SWNTs) with a narrow diameter distribution have been produced for HiPco SWNTs. A facile technique combining microwave irradiation with mixed-acid-assisted dispersion has proven efficient for enrichment of s-SWNTs. Using this process, both electronic type-dependent (metallic versus semiconducting) and diameter-dependent separation of SWNTs were simultaneously realized. By mildly controlling experimental conditions, metallic single-walled carbon nanotubes (m-SWNTs) and smaller s-SWNTs were preferentially removed, yielding purely diameter distribution-narrowed semiconducting nanotubes. Furthermore, the chemical structure of carbon nanotubes was restored after thermal annealing, as indicated by Raman and UV absorption investigations. The dual effects of semiconducting enrichment and diameter distribution narrowing, along with facile procedures, make this method promising for large-scale separation of SWNTs and therefore for industrial fabrication of nanotube-based electronics.

- Self-Assembly and Traveling Wave Ion Mobility Mass Spectrometry Analysis of Hexacadmium Macrocycles

Chan, Y.; Li, X.; Soler, M.; Wang, J.; Wesdemiotis, C.; Newkome, G. R. *J. Am. Chem. Soc.* **2009**, *131*, 16395–16397.

Abstract:

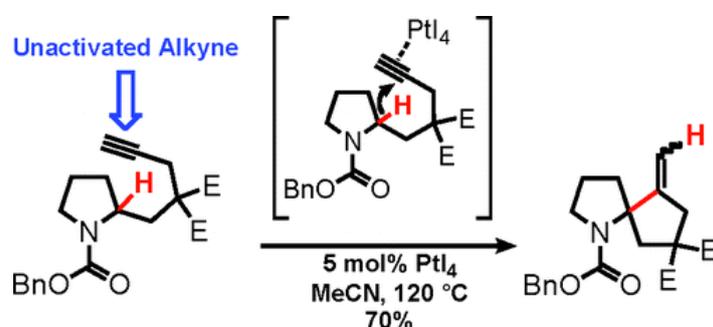


Self-assembly of 1,3-di(4'-terpyridinyl)arenes by using the labile tpy-Cd(II)-tpy (where tpy = 2,2':6',2''-terpyridine) connectivity afforded access to hexacadmium macrocycles in high yield. These supramolecular assemblies were characterized by traveling wave ion mobility mass spectrometry (TWIM-MS).

- C–H Bond Functionalization via Hydride Transfer: Direct Coupling of Unactivated Alkynes and sp^3 C–H Bonds Catalyzed by Platinum Tetraiodide

Vadola, P. A.; Sames, D. J. *Am. Chem. Soc.* **2009**, *131*, 16525–16528.

Abstract:

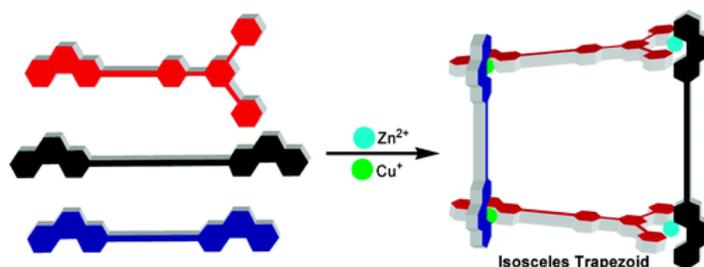


We report a catalytic intramolecular coupling between terminal unactivated alkynes and sp^3 C–H bonds via through-space hydride transfer (HT-cyclization of alkynes). This method enables one-step preparation of complex heterocyclic compounds by α -alkenylation of readily available cyclic ethers and amines. We show that PtI_4 is an effective Lewis acid catalyst for the activation of terminal alkynes for hydride attack and subsequent C–C bond formation. In addition, we have shown that the activity of neutral platinum salts (PtX_n) can be modulated by the halide ligands. This modulation in turn allows for fine-tuning of the platinum center reactivity to match the reactivity and stability of selected substrates and products.

- From 2-Fold Complete to Integrative Self-Sorting: A Five-Component Supramolecular Trapezoid

Mahata, K.; Schmittel, M. J. *Am. Chem. Soc.* **2009**, *131*, 16544–16554.

Abstract:

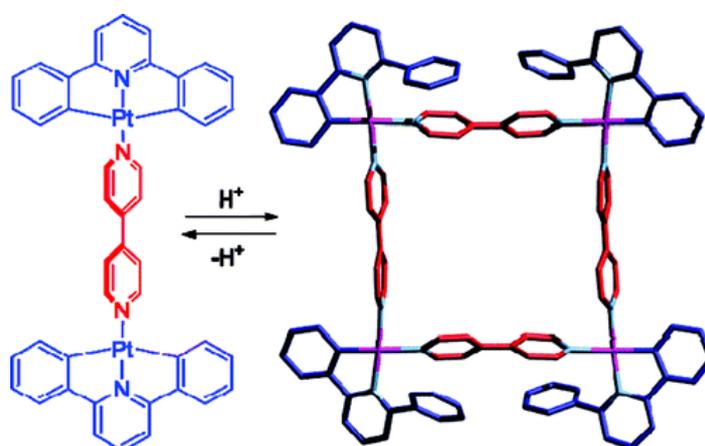


The amalgamation of two *incomplete* self-sorting processes into a process that makes quantitative use of all members of the library is described by *2-fold complete* self-sorting. Toward this goal, individual metal–ligand binding scenarios were optimized for high thermodynamic stability and best selectivity, by screening a variety of factors, such as steric and electronic effects, π – π interactions,

and metal-ion specifics. Using optimized, heteroleptic metal–ligand binding motifs, a library of four different ligands (**1**, **2**, **3**, **4**) and two different metal ions (Zn^{2+} , Cu^+) was set up to assess 2-fold complete self-sorting. Out of 20 different combinations, the self-sorting library ended up with only two metal–ligand complexes in basically quantitative yield. To demonstrate the value of 2-fold complete self-sorting for the formation of nanostructures, the optimized, highly selective binding motifs were implemented into three polyfunctional ligands. Their integrative self-sorting in the presence of Zn^{2+} and Cu^+ led to the clean formation of the supramolecular trapezoid **T**, a simple but still unknown supramolecular architecture. The dynamic trapezoid **T** consists of three different ligands with four different donor–acceptor interactions. Its structure was established by ^1H NMR spectroscopy, electrospray ionization mass spectroscopy, and differential pulse voltammetry (DPV) and by exclusion of alternative structures.

- Stimuli-Responsive Reversible Assembly of 2D and 3D Metallosupramolecular Architectures
Lusby, P. J.; Müller, P.; Pike, S. J.; Slawin, A. M. Z. *J. Am. Chem. Soc.* **2009**, *131*, 16398–16400.

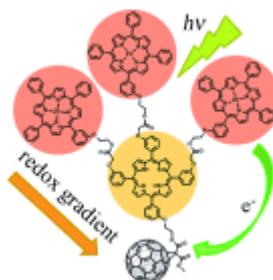
Abstract:



The discovery of interconvertible platinum coordination modes, which reveals and masks cis coordinating groups upon addition of acid and base, respectively, has been exploited to facilitate stimuli-responsive assembly and disassembly of both two- and three-dimensional metallosupramolecular architectures. Treatment of a binuclear platinum complex with acid along with ditopic and tritopic donor ligands generated a molecular square and a trigonal prism, respectively, in good to high yield. These complexes were unambiguously identified using electrospray mass spectrometry, ^1H NMR spectroscopy, and X-ray crystallography. Both assemblies can be disassembled into their constituent parts simply by treatment with base, and the prism can be cycled between the assembled and disassembled states by the alternate addition of acid and base.

- Dendritic Porphyrin–Fullerene Conjugates: Efficient Light-Harvesting and Charge-Transfer Events
Schlundt, S.; Kuzmanich, G.; Spänig, F.; de Miguel Rojas, G.; Kovacs, C.; Garcia-Garibay, M. A.; Guldi, D. M.; Hirsch, A. *Chem. Eur. J.* **2009**, *15*, 12223–12233.

Abstract:

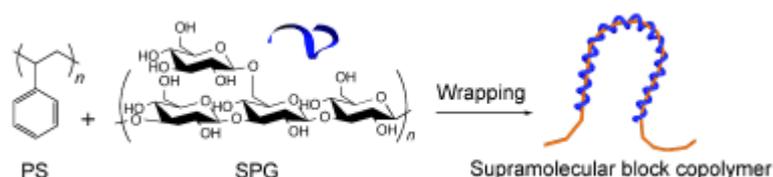


A novel dendritic C_{60} - H_2P -(ZnP) $_3$ (P =porphyrin) conjugate gives rise to the successful mimicry of the primary events in photosynthesis, that is, light harvesting, unidirectional energy transfer, charge transfer, and charge-shift reactions. Owing, however, to the flexibility of the linkers that connect the C_{60} , H_2P , and ZnP units, the outcome depends strongly on the rigidity/viscosity of the environment. In an agar matrix or Triton X-100, time-resolved transient absorption spectroscopic analysis and fluorescence-lifetime measurements confirm the following sequence. Initially, light harvesting is seen by the peripheral C_{60} - H_2P -*(ZnP) $_3$ conjugate. Once photoexcited, a unidirectional energy transfer funnels the singlet excited-state energy to H_2P to form C_{60} -*(H_2P)-(ZnP) $_3$, which powers an intramolecular charge transfer that oxidizes the photoexcited H_2P and reduces the adjacent C_{60} species. In the correspondingly formed $(C_{60})^-$ -(H_2P) $^+$ -(ZnP) $_3$ conjugate, an intramolecular charge-shift reaction generates $(C_{60})^-$ - H_2P -(ZnP) $_3$ $^+$, in which the radical cation resides on one of the three ZnP moieties, and for which lifetimes of up to 460 ns are found. On the other hand, investigations in organic media (i.e., toluene, THF, and benzonitrile) reveal a short cut, that is, the peripheral ZnP unit reacts directly with C_{60} to form $(C_{60})^-$ - H_2P -(ZnP) $_3$ $^+$. Substantial configurational rearrangements - placing ZnP and C_{60} in proximity to each other- are, however, necessary to ensure the required through space interactions (i.e., close approach). Consequently, the lifetime of $(C_{60})^-$ - H_2P -(ZnP) $_3$ $^+$ is as short as 100 ps in benzonitrile.

- “Supramolecular” Amphiphiles Created by Wrapping Poly(styrene) with the Helix-Forming β -1,3-Glucan Polysaccharide

Numata, M.; Kaneko, K.; Tamiaki, H.; Shinkai, S. *Chem. Eur. J.* **2009**, *15*, 12338-12345.

Abstract:

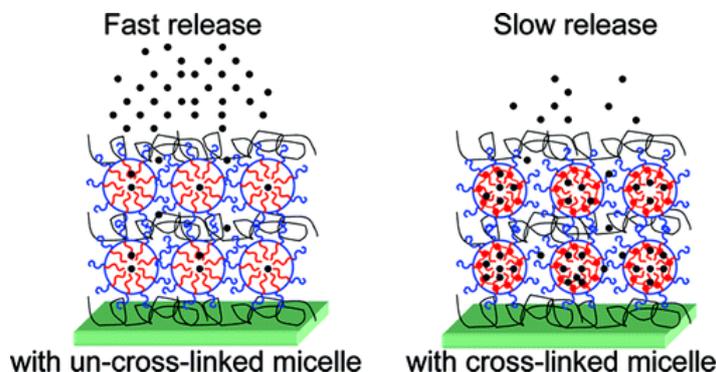


We have demonstrated that giant polymer micelles with a uniform diameter (ca. 200 nm) can be fabricated by “supramolecular wrapping” of poly(styrene) (PS) with the β -1,3-glucan polysaccharide, with the β -1,3-glucan fastening the PS chains together in a noncovalent fashion to facilitate the formation of a supramolecular polymer network on the O/W emulsion surface. Various spectroscopic and microscopic investigations have revealed that the inner cores of the micelles are comprised of a hydrophobic PS network, whereas the surfaces consist of a hydrophilic β -1,3-glucan layer. Accordingly, functional guest molecules can easily be encapsulated inside the cavity through hydrophobic interactions. The encapsulated molecules can simply be released from the micelle cores by peeling off the β -1,3-glucan shell in a supramolecular manner. As functional groups can be introduced into the glucose side-chain unit in a straightforward manner by chemical modification, the micellar surface can acquire further functions useful for molecular recognition. These results show that the micelles obtained could have applications as novel soft nanoparticles, which would be

indispensable not only for nanotechnologies, but also for biotechnologies aimed at gene or drug delivery systems.

- Photo-Cross-Linkable Polymer Micelles in Hydrogen-Bonding-Built Layer-by-Layer Films
Zhao, Y.; Bertrand, J.; Tong, X.; Zhao, Y. *Langmuir* **2009**, *25*, 13151–13157.

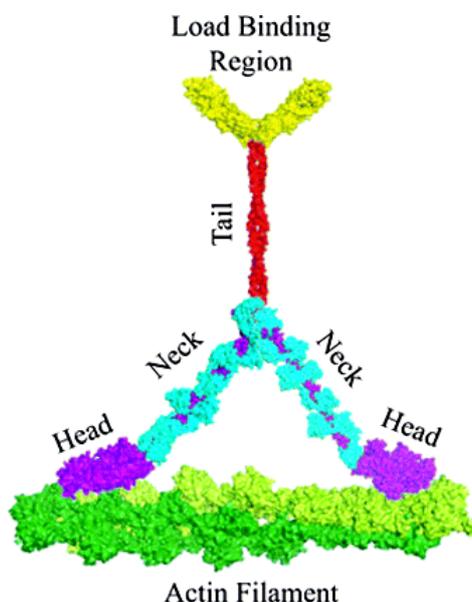
Abstract:



Photoactive micelles of a diblock copolymer composed of poly(ethylene oxide) and poly(7-(2-methacryloyloxyethoxy)-4-methylcoumarin) (PEO-*b*-PCMA) were layer-by-layer assembled with poly(acrylic acid) (PAA) using hydrogen-bonding between the PEO corona of the micelles and the PAA chains ($\text{pH} < 3$). In addition to characterizing the assembly process using a number of techniques, the tunable photo-cross-linking of polymer micelles through dimerization of the coumarin groups was used to generate interesting functions for the multilayer film. On the one hand, the easy tuning of the photo-cross-linking density could be used to control the release rate of hydrophobic guest molecules loaded in the film. On the other hand, after chemical cross-linking of PAA to stabilize the film, the photo-cross-linking of the micelles could be used to restrict the dissolution of PEO-*b*-PCMA chains in a good organic solvent; this cross-linking-dependent extraction of polymer micelles was utilized to vary the porosity of the film

- Contact and Impact in the Multibody Dynamics of Motor Protein Locomotion
Bowling, A. P.; Palmer, A. F.; Wilhelm, L. *Langmuir* **2009**, *25*, 12974–12981.

Abstract:



This paper presents the development of a rigid multibody dynamics approach to modeling, simulation, and analysis of motor proteins. A key element of this new model is that it retains the mass properties, in contrast to many commonly used models that do not. The mass properties are usually omitted because their inclusion yields a model with multiple time scales whose simulation requires a significant amount of time. However, the proposed model can be numerically integrated in a reasonable amount of time. Thus this approach represents a new method for treating multiple scale models. In addition, retaining the mass properties allows a detailed study of contact and impact between the protein and substrate, which is critical for protein processivity. The new model also provides insights into the characteristics of the protein and its environment, specifically, the effective damping experienced by the protein moving through its fluid environment may be quite small yielding under or critically damped motion. This conclusion runs contrary to the widely accepted notion that the protein's motion is strictly over damped. Herein, the differences between the motion predicted by the old and new modeling approaches are compared using a simplified model of Myosin V.