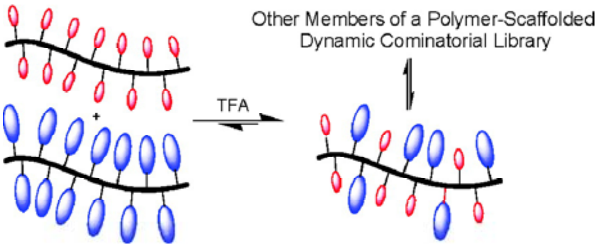
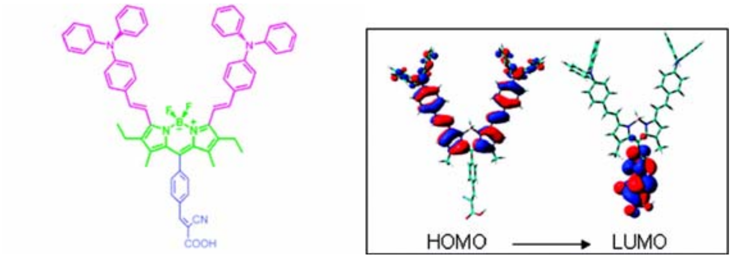
- Dynamic Combinatorial Libraries Constructed on Polymer Scaffolds
  Fulton D. A. *Org. Lett*. **2008**, *10*, 3291-3294.
  Abstract :



Functionalized polymers were prepared by grafting acylhydrazides onto a polyvinylbenzaldehyde scaffold through reversible hydrazone linkages. The dynamic nature of these linkages allows the functionalized polymers to exchange and reshuffle their appendages, and the resultant mixture of polymers can be considered as a dynamic combinatorial library constructed upon a polymer scaffold. The dynamic nature of these functionalized polymers was demonstrated.

- A Panchromatic Boradiazaindacene (BODIPY) Sensitizer for Dye-Sensitized Solar Cells
  Erten-Ela, S.; Yilmaz, M. D.; Icli, B.; Dede, Y.; Icli, S.; Akkaya, E.U. *Org. Lett*. **2008**, *10*, 3299-3302.
  Abstract :

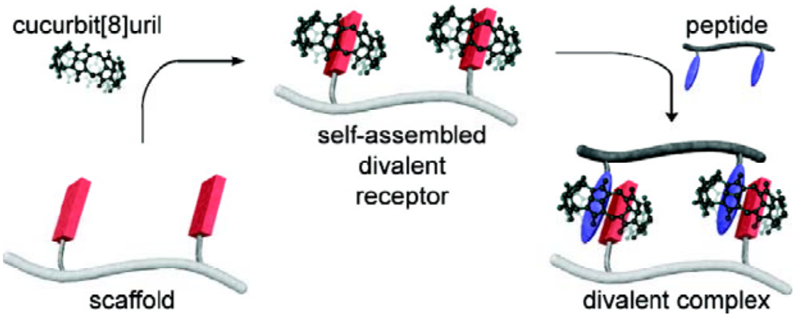


A novel distyryl-substituted boradiazaindacene (BODIPY) dye displays interesting properties as a sensitizer in DSSC systems, opening the way to further exploration of structure-efficiency correlation within this class of dyes.

- Reversible Lability by in Situ Reaction of Self-Assembled Monolayers
  Saavedra, H. M.; Thompson, C. M.; Hohman, J. N.; Crespi, V. H.; Weiss P. S. *J. Am. Chem. Soc.* **2009**, *131*, 2252–2259.
  Abstract:

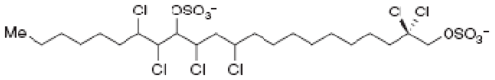
We describe a new methodology for the fabrication of controllably displaceable monolayers using a carboxyl-functionalized self-assembled monolayer and in situ Fischer esterification, a simple and reversible chemical reaction. Using an 11-mercaptoundecanoic acid monolayer as a model system, we show that in situ esterification results in the creation of subtle chemical and structural defects. These defects promote molecular exchange reactions with n-dodecanethiol molecules, leading to the complete and rapid displacement of the exposed areas. Displacement results in well-ordered crystalline n-dodecanethiolate monolayer films. We also show that the complementary hydrolysis reaction can be employed to quench the reacted monolayer, significantly hindering further displacement. The generality of reversible lability was tested by applying the in situ esterification reaction to the structurally distinct carboxyl-functionalized molecule 3-mercapto-1-adamantanecarboxylic acid. Beyond its applicability to create mixed-composition monolayers, this methodology could be combined with chemical patterning techniques, such as microdisplacement printing, to fabricate complex functional surfaces.

- Multivalent Recognition of Peptides by Modular Self-Assembled Receptors
  Reczek, J. J.; Kennedy, A. A. ; Halbert, B. T.; Urbach, A. R. *J. Am. Chem. Soc.* **2009**, *131*, 2408–2415.
  Abstract:

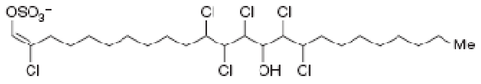


Developing nontraditional approaches to the synthesis and characterization of multivalent compounds is critical to our efforts to study and interface with biological systems and to build new noncovalent materials. This paper demonstrates a biomimetic approach to the construction of discrete, modular, multivalent receptors via molecular self-assembly in aqueous solution. Scaffolds presenting 1-3 viologen groups recruit a respective 1-3 copies of the synthetic host, cucurbit[8]uril, in a noncooperative manner and with a consistent equilibrium association constant (Ka) value of 2 × 106 M-1 per binding site. The assembled mono-, di-, and trivalent receptors bind to their cognate target peptides containing 1-3Trp residues with Ka values in the range 1.7×10^4-4.7×10^6 M^{-1} and in predetermined mono- or multivalent binding modes with 31-280-fold enhancements in affinity and additive enthalpies due to multivalency. The extent of valency was determined directly by measuring the visible charge-transfer absorptivity due to the viologen-indole pair. The predictable behavior of this system and its ease of synthesis and analysis make it well suited to serve as a model for multivalent binding and for the multivalent recognition of peptides by design.

- Total synthesis of a chlorosulpholipid cytotoxin associated with seafood poisoning
  Nilewski, C.; Geisser, R. W.; Carreira, E. M. *Nature* **2009***, 457*, 573 – 576.
  Abstract :



1



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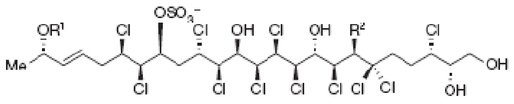
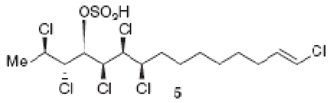


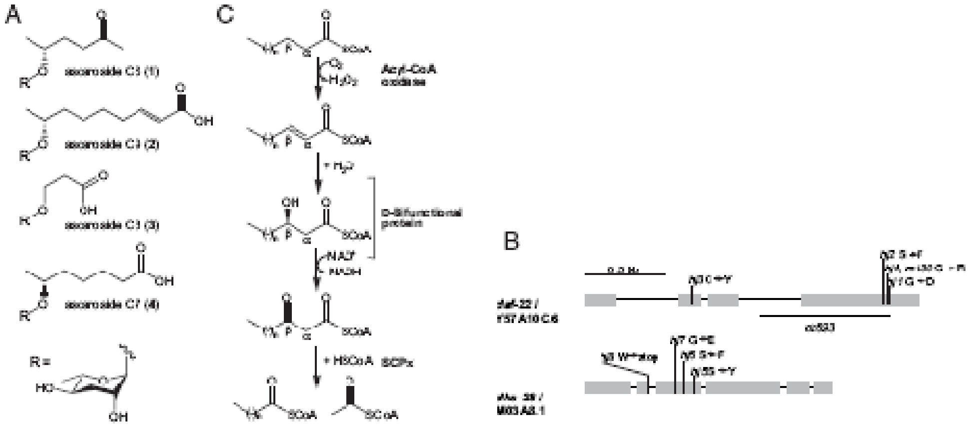
$R^1 - C(O)C_{15}H_{31}, R^2 - OH$ (3) $R^1 - C(O)C_{15}H_{31}, R^2 - H$ (4)



5

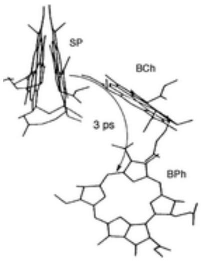
Each year, there are many cases of seafood poisoning in humans worldwide. Among the various toxins isolated that contribute to these poisonings, the chlorosulpholipids are particularly intriguing because of their structural and stereochemical complexity. The mechanism of biological activity remains unknown and, although chlorosulpholipids are associated with membranes in the organisms from which they are isolated, little is understood about their role within biological membranes. The lack of availability of the natural products has impairedmore in-depth biochemical studies. So far, none of the chlorosulpholipids have been obtained from total synthesis, and efficient routes to their synthesis would be desirable for the preparation ofmaterial for pharmacological characterization and proper evaluation of the risk to human health. Despite the notable advances in the science of organic synthesis, reliable methods for stereoselective construction of polychlorinated acyclic substrates are lacking, although some preliminary investigations have appeared. Here we report the synthesis of a chlorosulpholipid cytotoxin, leading to confirmation of the proposed structure and the discovery of unanticipated reactivity of polychlorinated hydrocarbons. The concise synthetic approach should enable the preparation of material in sufficient quantities to facilitate biological studies.

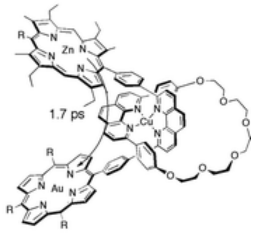
- Biosynthesis of the Caenorhabditis elegansdauer pheromone
  Butcher, R. A.; Ragains, J. R.; Li, W.; Ruvkun, G.; Clardy, J.; Yi Mak, H. *Proc. Nat. Acad. Sci.* **2009**, *106*, 1875–1879.
  Abstract:



To sense its population density and to trigger entry into the stress-resistant dauer larval stage, *Caenorhabditis elegans* uses the dauer pheromone, which consists of ascaroside derivatives with short, fatty acid-like side chains. Although the dauer pheromone has been studied for 25 years, its biosynthesis is completely uncharacterized. The *daf-22* mutant is the only known mutant defective in dauer pheromone production. Here, we show that *daf-22* encodes a homolog of human sterol carrier protein SCPx, which catalyzes the final step in peroxisomal fatty acid-oxidation. We also show that *dhs-28*, which encodes a homolog of the human D-bifunctional protein that acts just upstream of SCPx, is also required for pheromone production. Long-term *daf-22* and *dhs-28* cultures develop dauer-inducing activity by accumulating less active, long-chain fatty acid ascaroside derivatives. Thus, *daf-22* and *dhs-28* are required for the biosynthesis of the shortchain fatty acid-derived side chains of the dauer pheromone and link dauer pheromone production to metabolic state.

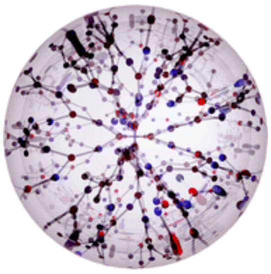
- Design and synthesis of porphyrin-containing catenanes and rotaxanes
  Faiz, J. A.; Heitz, V.; Sauvage, J.-P. *Chem. Soc. Rev.* **2009**, *38*, 422 – 442.
  <u>Abstract:</u>





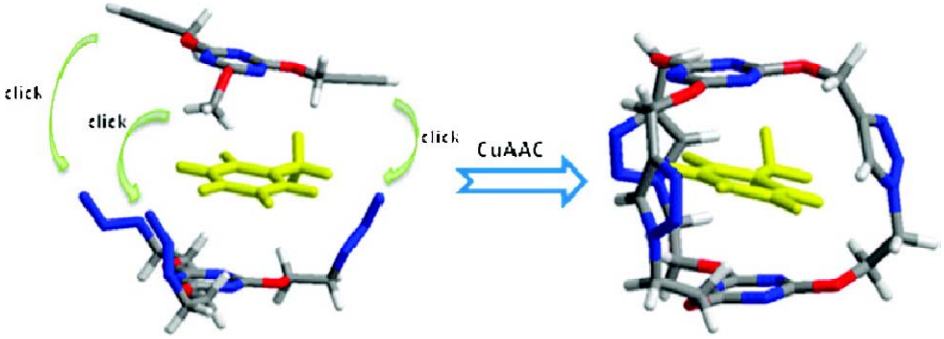
Catenanes and rotaxanes containing porphyrin subunits have become popular synthetic targets because of the large variety of available synthetic strategies including the coordination chemistry of metallated porphyrins, coupled with the many attractive physical properties of porphyrins. This *tutorial review* outlines various synthetic approaches and templating strategies that have been used to prepare a range of mechanically interlocked architectures that incorporate porphyrins as fundamental subunits either grafted onto macrocycles or as stoppers. These species are of interest in relation to recreating natural processes such as the photosynthetic apparatus or enzyme binding sites.

- New methodologies in the construction of dendritic materials
  Carlmark, A.; Hawker, C.; Hult, A.; Malkoch, M. *Chem. Soc. Rev.* **2009**, *38*, 352 – 362.
  <u>Abstract:</u>



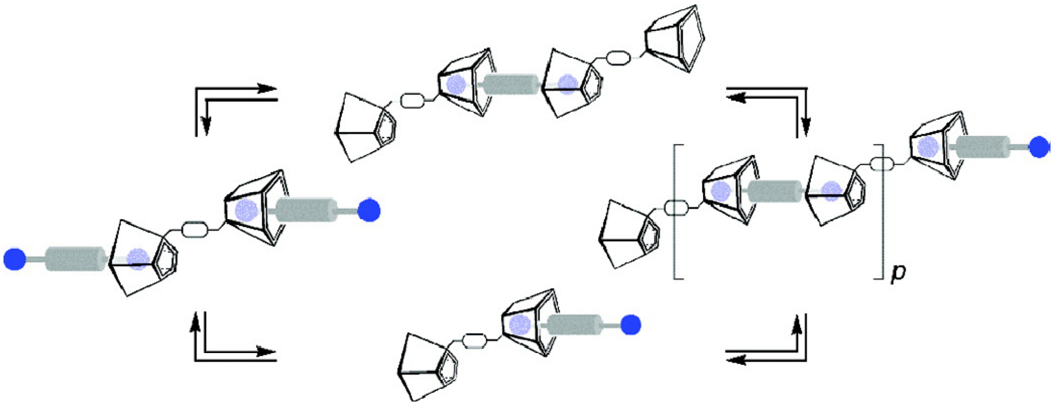
Dendritic polymers are highly branched polymer structures, with complex, secondary architectures and well-defined spatial location of functional groups. Due to their unique physical and chemical features, applications in areas such as targeted drug-delivery, macromolecular carriers, catalysis, sensors, light harvesting, surface engineering and biomimetic materials have been proposed. However, only a few dendritic materials have been exploited commercially due to time consuming syntheses and the generation of significant waste/presence of unreacted starting materials. This *tutorial review* describes traditional synthesis of dendritic materials as well as recent advances in synthetic strategies, for example the use of Click chemistry, as a tool to efficiently obtain complex, functional dendritic structures.

- Synthesis of Molecular Nanocages by Click Chemistry
  Morales-Sanfrutos, J.; Ortega-Muñoz, M.; Lopez-Jaramillo, J.; Hernandez-Mateo, F. and Santoyo-Gonzalez, F. *J. Org. Chem.* **2008**, *73*, 7772-7774.
  Abstract:



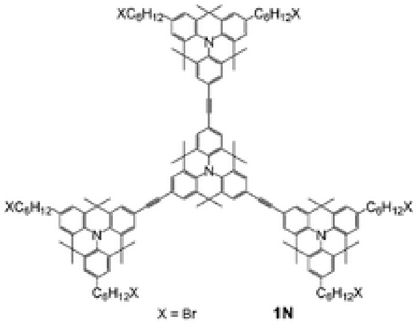
The covalent synthesis of nanosized cage compounds is easily performed in high yields using “click chemistry” methodology through the Cu(I)-catalyzed ligation of adequate polyalkyne and polyazide derivatives using EtO)3P · CuI as catalyst.

- Self-Assembly Dynamics of Modular Homoditopic Bis-calix[5]arenes and Long-Chain α,ω-Alkanediyldiammonium Components
  Gattuso, G.; Notti, A.; Pappalardo, A.; Parisi, M. F.; Pisagatti, I.; Pappalardo, S.; Garozzo, D.; Messina, A.; Cohen, J.; and Slovak, S. *J. Org. Chem.* **2008**, *73*, 7280-7289.
  Abstract:



Homoditopic building blocks **1**, featuring two π-rich cone-like calix[5]arene moieties connected at their narrow rims by a rigid *o*-, *m*-, or *p*-xylyl spacer in a centrosymmetric divergent arrangement, show aremarkable tendency to spontaneously and reversibly self-assemble with the complementary homoditopic R,*ω*-alkanediyldiammonium dipicrate guest salts **C8**-**C12** · 2Pic through iterative intermolecular inclusion events, forming supramolecular assemblies whose composition and dynamics strongly depend upon the length of the connector, the geometry of the spacer, as well as the concentration and/or molar ratios between the two components. 1H NMR spectroscopy and ESI-MS studies of **1**/**C*n*** · 2Pic modular homoditopic pairs support the formation of discrete (bis)-*endo*-cavity assemblies with the shorter **C8** and **C9** connectors, and/or (poly)capsular assemblies with the longer **C10**-**C12** components under appropriate concentrations and molar ratios (50 mM equimolar solutions). 1H NMR titration experiments and diffusion NMR studies provide clear evidence for the self-assembly dynamics of the complementary pairs here investigated.

- Bridged triphenylamine based molecules with large two-photon absorption cross sections in organic and aqueous media.
  Fang, Z. ; Zhang, X. ; Lai, Y. H. ; Liu, B. *Chem. Commun.* **2009**, 920 – 922.
  Abstract :

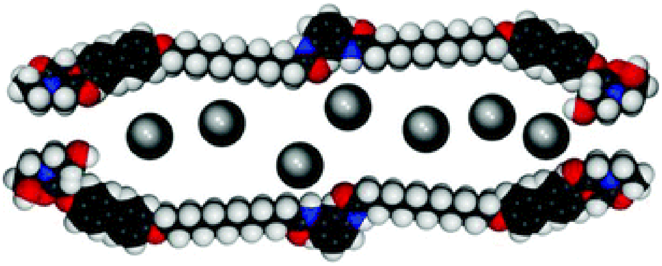


X = Br **1N**

X = N+ (CH3)3Br− **1C**

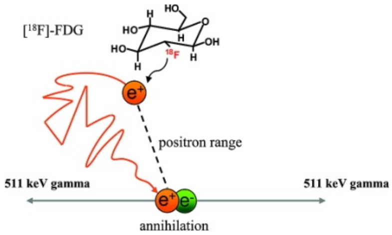
A neutral (1N) and a cationic (1C) bridged-triphenylamine tetramer with large two-photon absorption (TPA) cross sections of 4340 GM (1N in toluene) and 4150 GM (1C in methanol) were synthesized.

- Aplosspan: a bilayer-length, ion-selective ionophore that functions in phospholipid bilayers.
  Wang, W.; Li, R.; Gokel, G. W. *Chem. Commun.* **2009**, 911 – 913.
  Abstract:



A structurally simple, novel, membrane-active ionophore has been designed, prepared, characterized, and shown to conduct Na^+, Cl^-, and carboxyfluorescein anions, probably as a dimer, across liposomal bilayers.

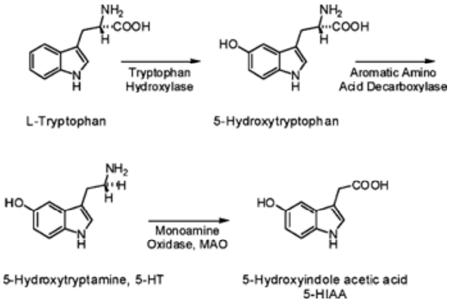
- Molecular Imaging with PET
  Ametamey, S. M.; Honer, M.; Schubiger P. A. *Chem. Rev.* **2008**, *108,* 1501-1516.
  Abstract:



Recent advances in noninvasive imaging modalities have opened endless opportunities for molecular diagnostic and therapeutic procedures. The term “molecular imaging” is broadly used in conjunction with imaging modalities that provide anatomic as well as functional information. But is anatomic imaging really molecular imaging? And do imaging studies involving blood pool, perfusion, or skeleton provide us with molecular images? Clearly, the terminology “molecular imaging” is quite often used for marketing rather than for scientific purposes, as pointed out by Haberkorn and Eisenhut in an EJNM editorial. Molecular imaging may be used for early detection, characterization, and “real time” monitoring of disease as well as investigating the efficacy of drugs. Presently, there is a consensus among experts in the field that the most sensitive molecular imaging techniques are the radionuclide-based positron emission tomography (PET) and single photon emission computed tomography (SPECT) imaging modalities.

Over the years, biologically interesting molecular probes for PET imaging have been developed and used for diagnostic clinical studies, basic human studies for understanding biochemical processes in neurobiology, and preclinical studies especially using nonhuman primates and rodents. In recent years, the PET technology has been applied in various ways to assist in drug development, whereby understanding drug action, establishing dosage regimens of central nervous system (CNS) drugs, and treatment strategies have been most crucial. Such studies eventually provide means to accomplish “personalized medicine” by monitoring individual response to drug delivery.

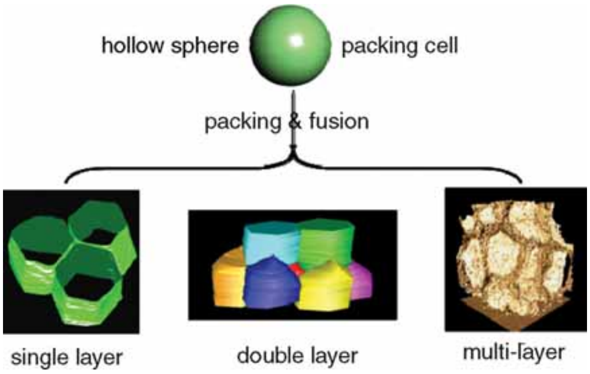
- Serotonin Receptors
  Nichols, D. E.; Nichols, C. D. *Chem. Rev.* **2008**, *108,* 1614-1641.
  Abstract:



Serotonin, 5-hydroxytryptamine (5-HT), is one of the class of monoamine neurontransmitters, all of which have a chemical template comprised of a basic amino group separated from an aromatic nucleus by a two carbon aliphatic chain. In mammals, 5-HT is biosynthetically derived by two enzymatic steps: (1) ring hydroxylation of the essential amino acid tryptophan by tryptophan hydroxylase, the rate-limiting step, and (2) side chain decarboxylation by aromatic amino acid decarboxylase. A second isoform of tryptophan hydroxylase was identified in 2003 by Walther et al. The original enzyme originally characterized, which is expressed in the gut, is now called tph1, and the isoform that is expressed exclusively within the brain is named tph2. In the brain, serotonin is produced within axon terminals, where it is released in response to an action potential and then diffuses across the synapse to activate postsynaptic receptors. The serotonin receptor family is larger than any other family of G-protein coupled (GPCR) neurotransmitter receptors: 13 distinct genes encoding for receptors of the G-protein coupled seven-transmembrane class. In addition, there is one ligand-gated ion channel, the 5-HT3 receptor.

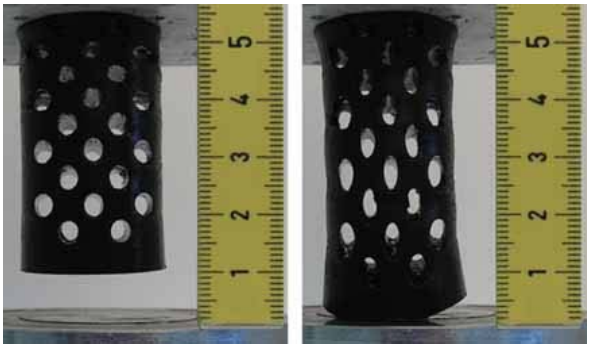
Serotonin is one of the most ancient signaling molecules. It is found in the single-celled eukaryotes paramecium and tetrahymena, where it can modulate swimming behavior and growth. Serotonin receptors that share significant orthology are found in a very diverse range of organisms up the evolutionary tree, from planaria, Caenorhabditis elegans, and Drosophila melanogaster to humans. From this diversity, it has been speculated that the primordial serotonin receptor of the rhodopsin−GPCR family may have first appeared more than 700−750 million years ago, a time that likely predates the evolution of muscarinic, dopaminergic, and adrenergic receptor systems.

- Electron-Tomography Determination of the Packing Structure of Macroporous Ordered Siliceous Foams Assembled From Vesicles
  Yuan, P.; Zhou, X.; Wang, H.; Liu, N.; Hu, Y.; Auchterlonie, G. J.; Drennan, J.; Yao, X.; Qing (Max) Lu, G.; Zou, J.; Yu, C. *Small* **2009**, *5*, 377 – 382.
  <u>Abstract:</u>



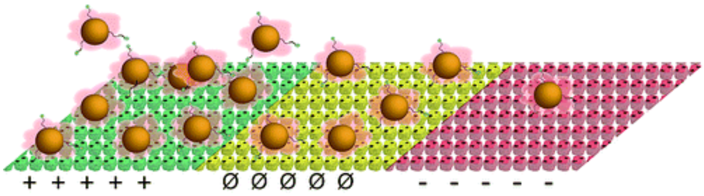
The packing structures of macroporous ordered siliceous foams (MOSFs) are systematically investigated by using a 3D electron tomography technique and the nanostructural characteristics for layered MOSFs are resolved. MOSF materials adopt an ordered 2D hexagonal arrangement in single-layered areas, regular honeycomb patterns in double-layered samples, and polyhedric cells similar to a Weaire-Phelan structure in multilayered areas, all following the principle of minimizing surface area, which is well understood in soap foams at the macroscopic scale. In surfactant-templated materials, liquid-crystal templating is generally applied, but here it is revealed that the surface-area-minimization principle can also be applied, which facilitates the design and synthesis of novel macroporous materials using surfactant molecules as templates.

- Crosslinking Metal Nanoparticles into the Polymer Backbone of Hydrogels Enables Preparation of Soft, Magnetic Field-Driven Actuators with Muscle-Like Flexibility
  Fuhrer, R.; Athanassiou, E. K.; Luechinger, N. A.; Stark, W. J. *Small* **2009**, *5*, 383 – 388.
  <u>Abstract:</u>



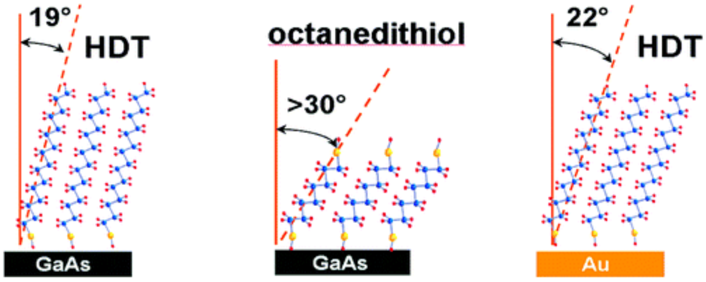
The combination of force and flexibility is at the core of biomechanics and enables virtually all body movements in living organisms. In sharp contrast, presently used machines are based on rigid, linear (cylinders) or circular (rotator in an electrical engine) geometries. As a potential bioinspired alternative, magnetic elastomers can be realized through dispersion of micro- or nanoparticles in polymer matrices and have attracted significant interest as soft actuators in artificial organs, implants, and devices for controlled drug delivery. At present, magnetic particle loss and limited actuator strength have restricted the use of such materials to niche applications. We describe the direct incorporation of metal nanoparticles into the backbone of a hydrogel and application as an ultra-flexible, yet strong magnetic actuator. Covalent bonding of the particles prevents metal loss or leaching. Since metals have a far higher saturation magnetization and higher density than oxides, the resulting increased force/volume ratio afforded significantly stronger magnetic actuators with high mechanical stability, elasticity, and shape memory effect.

- Modulating Colloidal Adsorption on a Two-Dimensional Protein Crystal
  Shindel, M. M.; Mohraz, A.; Mumm, D. R.; Wang, S.-W. *Langmuir* **2009***, 25,* 1038–1046.
  <u>Abstract:</u>



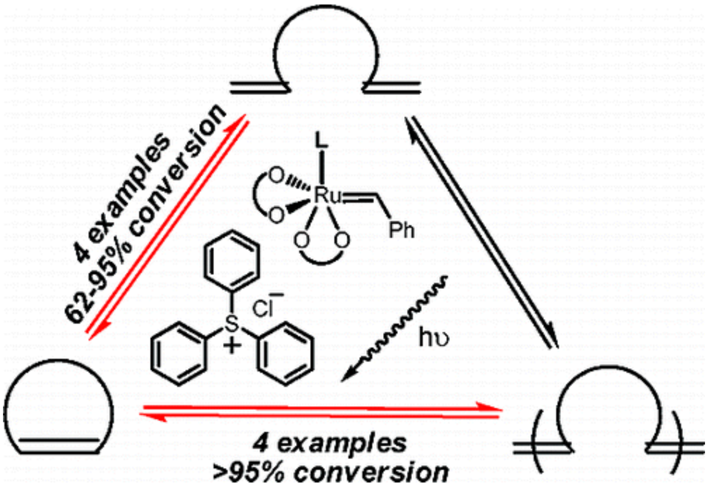
The geometric and physicochemical properties of the protein streptavidin make it a useful building block in the construction and manipulation of nanoscale structures and devices. However, one requirement in exploiting streptavidin for “bottom-up” assembly is the capability to modulate protein-nanoparticle interactions. This work examines the effects of pH and the biotin-streptavidin interaction on the adsorption of colloidal gold onto a two-dimensional streptavidin crystal. Particle deposition was carried out below (pH 6), at (pH 7), and above (pH 8) the protein’s isoelectric point with both biotinylated and nonbiotinylated nanoparticles. Particle surface coverage depends on deposition time and pH, and increases by 1.4-10 times when biotin is incorporated onto the particle surface. This coverage is highest for both particle types at pH 6 and decreases monotonically with increasing pH. Calculations of interparticle potentials based on Derjaguin-Landau-Verwey-Overbeek (DLVO) theory demonstrate that this trend in surface coverage is most likely due to alterations in particle-surface electrostatic interactions and not a result of changes in interparticle electrostatic repulsion. Furthermore, post-adsorption alterations in pH demonstrate that electrostatically adsorbed particles can be selectively desorbed from the surface. Evaluation of the nonspecifically adsorbed fraction of biotinylated particles indicates that the receptor-ligand adsorption mechanism gives a higher rate of attachment to the substrate than nonspecific, electrostatic adsorption. This results in faster adsorption kinetics and higher coverages for biotinylated particles relative to the nonbiotinylated case.

- Molecular Orientation in Octanedithiol and Hexadecanethiol Monolayers on GaAs and Au Measured by Infrared Spectroscopic Ellipsometry
  Rosu, D. M.; Jones, J. C.; Hsu, J. W. P.; Kavanagh, K. L.; Tsankov, D.; Schade, U.; Esser, N.; Hinrichs, K. *Langmuir* **2009**, *25*, 919-923.
  <u>Abstract:</u>



Infrared spectroscopic ellipsometry was used for determination of molecular orientation and for lateral homogeneity studies of organic monolayers on GaAs and Au, the organic layer being either octanedithiol or hexadecanethiol (HDT). The laterally resolved measurements were performed with the infrared mapping ellipsometer at the synchrotron storage ring BESSY II. The molecular orientation within the monolayers was determined by optical model simulations of the measured ellipsometric spectra. Different tilt angles were obtained for the monolayers of HDT and octanedithiol on GaAs: 19□□and >30□, respectively. The tilt angle of the methylene chains for HDT on Au substrate (22□) is similar to the 19□□tilt which was obtained for the HDT monolayers on GaAs, thus suggesting similar molecular ordering of the thiolates on both substrates.

- A Tandem Approach to Photoactivated Olefin Metathesis: Combining a Photoacid Generator with an Acid Activated Catalyst
  Keitz, B. K.; Grubbs, R. H. *J. Am. Chem. Soc.* **2009**, *131*, 2038–2039.
  Abstract:

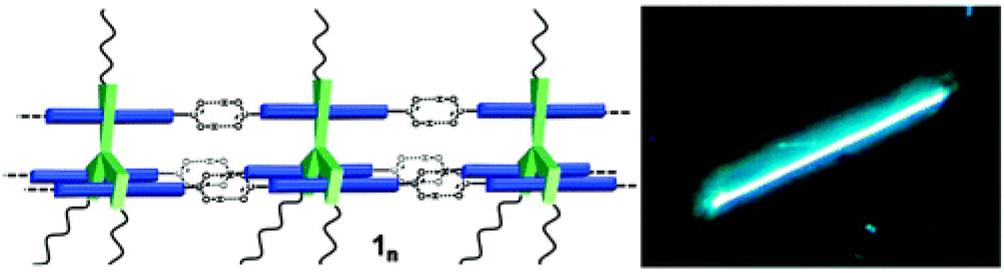


Combining an acid activated precatalyst with a photoacid generator (PAG) in the presence of ultraviolet light resulted in a highly efficient catalyst for olefin metathesis. The tandem system of precatalyst and PAG was capable of both ring closing metathesis (RCM) and ring opening metathesis polymerization (ROMP) in good to excellent conversion. Mechanistic investigations revealed that the catalytically active species is very similar to that of other well-known Ru-based catalysts.

- Highly Fluorescent Rigid Supramolecular Polymeric Nanowires Constructed Through Multiple Hydrogen Bonds

Luo, J.; Lei, T.; Wang, L.; Ma, Y.; Cao, Y.; Wang, J.; Pei, J. *J. Am. Chem. Soc.* **2009**, *131*, 2076–2077.

<u>Abstract:</u>

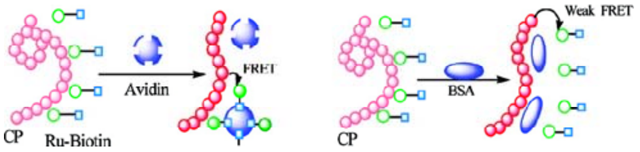


Supramolecular polymeric nanowires 1_n constructed by a 3D shape-persistent hexaacid 1 through multiple hydrogen bonding interactions was developed. Single molecular nanoires were also obtained from its highly dilute solution.Hexaacid 1 containing π-conjugated chromophores successfully self-assembled to afford these nanofibers with high solid quantum efficiency (22%), which provides us a pathway to fabricate optoelectronic devices using these highly fluorescent nanofibers.

- A Quencher-Tether-Ligand Probe and Its Application in Biosensor Based on Conjugated Polymer.

  Zhao, D.; Du, J.; Chen, Y.; Ji, X.; He, Z.; Chan, W. H. *Macromolecules* **2008**, *41*, 5373-5378.

  <u>Abstract:</u>

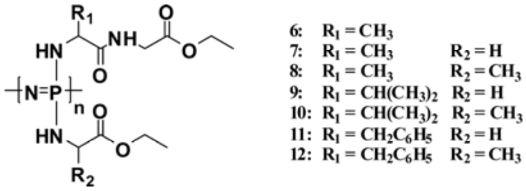


Water-soluble conjugated polymers (CPs) are a versatile class of advanced organic materials with excellent photochemistry properties. Using a biotin-modified fluorescence quencher (quencher-tether-ligand, QTL) to specifically sense the presence of avidin based on CP is of great importance. However, the nonspecific interactions between various proteins and CPs greatly baffle the studies of the mechanism and applications of CP-based biosensors. We selected luminescent ruthenium(II) polypyridine biotin complex (Ru-biotin) as a proper probe, which can not only work as a fluorescent quencher but also produces fluorescence resonance energy transfer (FRET) with anionic water-soluble CP (poly[5-methoxy-2-(3-sulfopropoxy)-1,4-phenylenecinylene] (MPS-PPV)). As the emission peak of Ru-biotin produced by FRET cannot be infected by nonspecific proteins, we discussed the MPS-PPV/Ru-biotin/avidin biosensing mechanism based on the fluorescence spectra changes of polymer and Ru-biotin and consequently realized the rapid and specific detection of avidin.

- Polyphosphazenes That Contain Dipeptide Side Groups: Synthesis, Characterization, and Sensitivity to Hydrolysis.

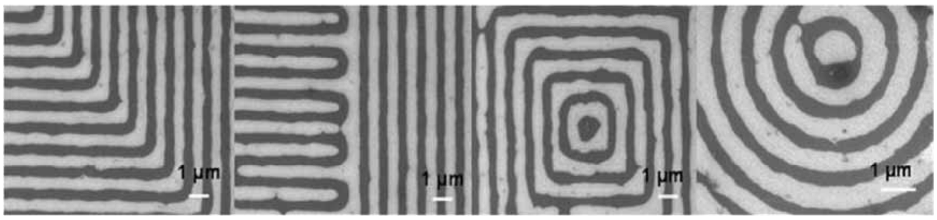
  Weikel, A. L.; Krogman, N. R.; Nguyen, N. Q.; Nair, L. S.; Laurencin, C. T.; Allcock, H. R. *Macromolecules* **2009**, *42*, 636-639.

  <u>Abstract:</u>



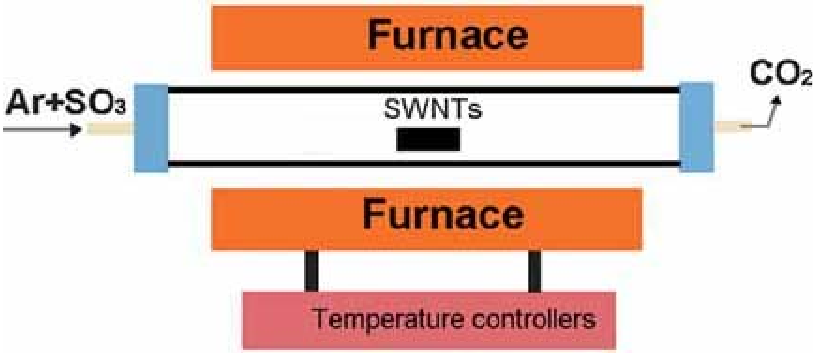
The dipeptides alanyl-glycine ethyl ester, valinyl-glycine ethyl ester, and phenylalanyl-glycine ethyl ester were synthesized by mixed anhydride solution-phase peptide reactions. The free N-terminus was used as a reactive site for nucleophilic replacement of the chlorine atoms in poly(dichlorophosphazene). The C-terminus was protected with an ethyl ester to prevent side reactions and cross-linking. The alanyl-glycine ethyl ester replaced all the chlorine atoms in poly(dichlorophosphazene). However, replacement of all the chlorine atoms in poly(dichlorophosphazene) by valinyl-glycine ethyl ester or phenylalanyl-glycine ethyl ester polyphosphazenes was prevented by the insolubility of the partially substituted intermediates. To circumvent this problem, cosubstitution was carried out using the valinyl- or phenylalanyl esters with glycine ethyl ester or alanine ethyl ester in a 1:1 ratio. Cosubstituted polyphosphazenes with alanyl glycine ethyl ester and glycine ethyl ester or alanine ethyl ester were also synthesized with a side group ratio of 1:1. The polymer structures and physical properties were studied using multinuclear NMR, DSC, and GPC techniques. Heterophase hydrolysis experiments in aqueous media at different pH values were carried out to estimate the hydrolytic sensitivity of these polymers. All the polymers were less sensitive to hydrolysis under neutral or basic (pH, 10.0) conditions than at pH 4.0, where rapid hydrolysis occurred.

- Directed Assembly of Polymer Blends Using Nanopatterned Templates
  Wei, M.; Fang, L.; Lee, J.; Somu, S.; Xiong, X.; Barry, C.; Busnaina, A.; Mead, J. *Adv. Mater*. **2009**, 21, 794-798.
  Abstract:



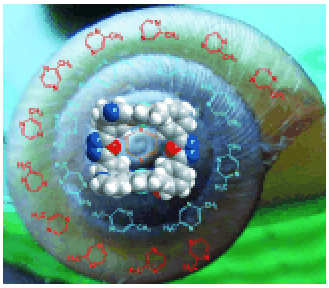
The direct assembly of polymer blends on chemically functionalized surfaces is shown to produce a variety of nonuniform complex patterns. This method provides a powerful tool for easily producing nonuniform patterns in a rapid (30 s), one-step process with high specificity and selectivity for a variety of applications, such as nanolithography, polymeric optoelectronic devices, integrated circuits, and biosensors.

- A Facile, Low-Cost, and Scalable Method of Selective Etching of Semiconducting Single-Walled Carbon Nanotubes by a Gas Reaction
  Zhang, H.; Liu, Y.; Cao, L.; Wei, D.; Wang, Y.; Kajiura, H.; Li, Y.; Noda, K.; Luo, G.; Wang, L.; Zhou, J.; Lu, J.; Gao, Z. *Adv. Mater*. **2009**, 21, 813-816.
  Abstract:



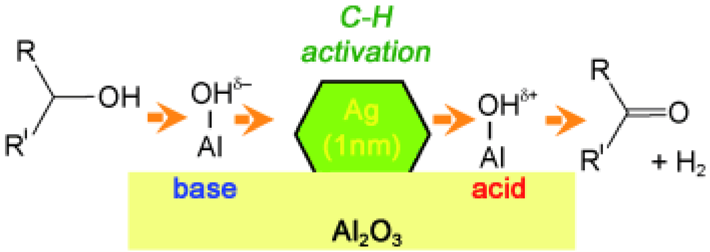
A facile, scalable, and low-cost gas-treatment method for selectively etching semiconductor single-walled carbon nanotubes (SWNTs) is developed. Using SO3 gas as the etchant at a temperature of 400 °C, semiconductor SWNTs can be selectively and efficiently removed, and after this gas treatment samples enriched with metallic SWNTs can be obtained.

- A Binuclear Cu^{II} Metallacycle Capable of Discerning between Pyrazine and Its Different Methyl-Substituted Derivatives Based on Reversible Intracage Metal-Ligand Binding
  Hou, G.-G.; Ma, J.-P.; Sun, T.; Dong, Y.-B.; Huang, R.-Q. *Chem,. Eur. J.* **2009**, *15*, 2261-2265.
  Abstract:



Squashy cage: A flexible, spongelike, and reversible metal-binding Cu_2L_2 cage that can adjust its internal space in response to pyrazine and its derivatives based on a recognition sequence of pyrazine, 2,5-dimethylpyrazine, and 2-methylpyrazine (see figure) is described

- Oxidant-Free Dehydrogenation of Alcohols Heterogeneously Catalyzed by Cooperation of Silver Clusters and Acid-Base Sites on Alumina
  Shimizu, K.; Sugino, K.; Sawabe, K.; Satsuma, A. *Chem,. Eur. J.* **2009**, *15*, 2341-2351.
  Abstract:



A ɣ-alumina-supported silver cluster catalyst - Ag/Al_2O_3 - has been shown to act as an efficient heterogeneous catalyst for oxidant-free alcohol dehydrogenation to carbonyl compounds at 373 K. The catalyst shows higher activity than conventional heterogeneous catalysts based on platinum group metals (PGMs) and can be recycled. A systematic study on the influence of the particle size and oxidation state of silver species, combined with characterization by Ag K-edge XAFS (X-ray absorption fine structure) has established that silver clusters of sizes below 1 nm are responsible for the higher specific rate. The reaction mechanism has been investigated by kinetic studies (Hammett correlation, kinetic isotope effect) and by in situ FTIR (kinetic isotope effect for hydride elimination reaction from surface alkoxide species), and the following mechanism is proposed: 1) reaction between the alcohol and a basic OH group on the alumina to yield alkoxide on alumina and an adsorbed water molecule, 2) C—H activation of the alkoxide species by the silver cluster to form a silver hydride species and a carbonyl compound, and 3) H_2 desorption promoted by an acid site in the alumina. The proposed mechanism provides fundamental reasons for the higher activities of silver clusters on acid-base bifunctional support (Al_2O_3) than on basic (MgO and CeO_2) and acidic to neutral (SiO_2) ones. This example demonstrates that catalysts analogous to those based on of platinum group metals can be designed with use of a less expensive d^{10} element - silver - through optimization of metal particle size and the acid-base natures of inorganic supports.