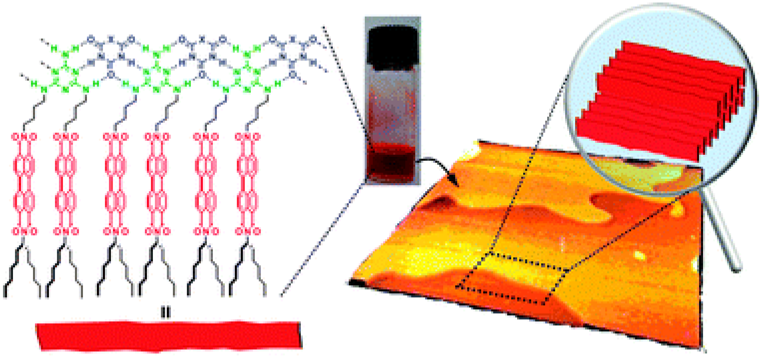
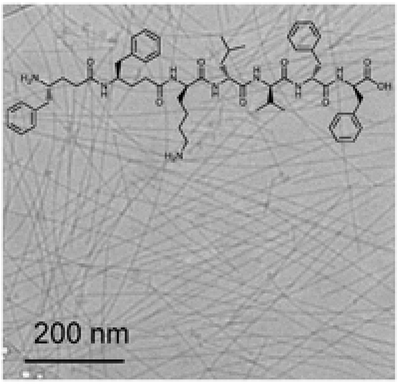
- Solution processable hydrogen-bonded perylene bisimide assemblies organizing into lamellar architectures
  Seki, T.; Maruya, Y.; Nakayama, K.; Karatsu, T.; Kitamura, A.; Yagai, S. *Chem. Commun.* **2011**, *47*, 12447-12449.
  Abstract:



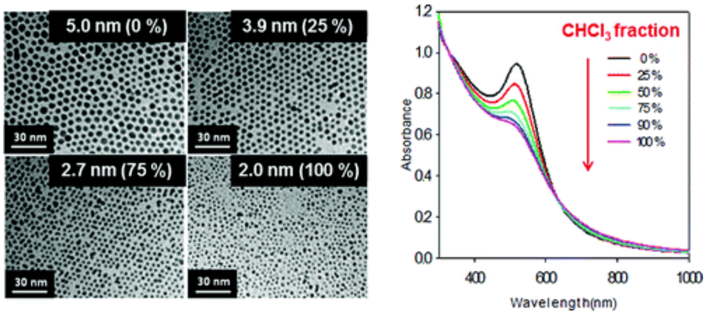
A ditopic melamine bearing perylene bisimides with swallow-tail alkyl chains can be dissolved in organic solvents by mixing with complementary hydrogen-bonding barbiturate or cyanurate, forming solution processable supramolecular assemblies. Upon spin-coating the assemblies, highly organized lamellar architectures are formed with thermal annealing, which act as electron transporting layers in organic field effect transistors.

- Amyloid peptides incorporating a core sequence from the amyloid beta peptide and gamma amino acids: relating bioactivity to self-assembly
  Castelletto, V.; Cheng, G.; Hamley, I. W. *Chem. Commun.* **2011**, *47*, 12470-12472.
  Abstract:



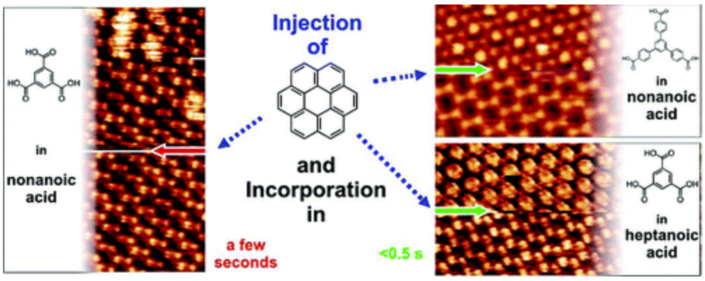
A series of heptapeptides comprising the core sequence Aβ(16–20), KLVFF, of the amyloid β peptide coupled with paired N-terminal γ-amino acids are investigated in terms of cytotoxicity reduction and binding to the full Aβ peptide, both pointing to inhibition of fibrillisation for selected compounds. This is related to the self-assembly capacity of the heptapeptides.

- Size Control in the Synthesis of 1–6 nm Gold Nanoparticles via Solvent-Controlled Nucleation
  Song, J.; Kim, D.; Lee, D. *Langmuir* **2011**, *27*, 13854-13860.
  Abstract:



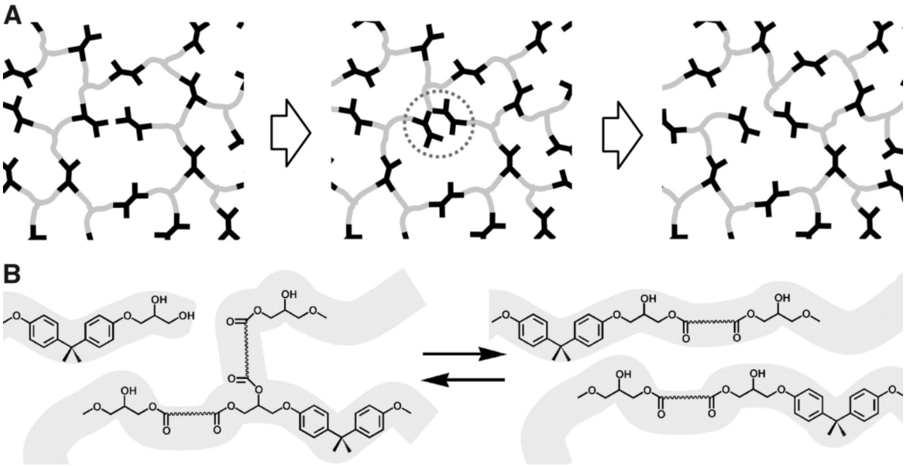
We report a facile synthetic route for size-controlled preparation of gold nanoparticles. Nearly monodisperse gold nanoparticles with core diameters of 1–6 nm were obtained by reducing AuP(Phenyl)$_3$Cl with *tert*-butylamine borane in the presence of dodecanethiol in the solvent mixture of benzene and CHCl$_3$. Mechanism studies have shown that the size control is achieved by the solvent-controlled nucleation in which the nuclei concentration increases with increasing the fraction of CHCl$_3$, leading to smaller particles. It was also found that, following the solvent-controlled nucleation, particle growth occurs via ligand replacement of PPh$_3$ on the nuclei by Au(I)thiolate generated by the digestive etching of small particles. This synthetic strategy was successfully demonstrated with other alkanethiols of different chain length with which size-controlled, monodisperse gold nanoparticles were prepared in remarkable yield without requiring any postsynthesis treatments.

- Incorporation Dynamics of Molecular Guests into Two-Dimensional Supramolecular Host Networks at the Liquid–Solid Interface
  Eder, G.; Kloft, S.; Martsinovich, N.; Mahata, K.; Schmittel, M.; Heckl, W. M.; Lackinger, M. *Langmuir* **2011**, *27*, 13563-13571.
  Abstract:



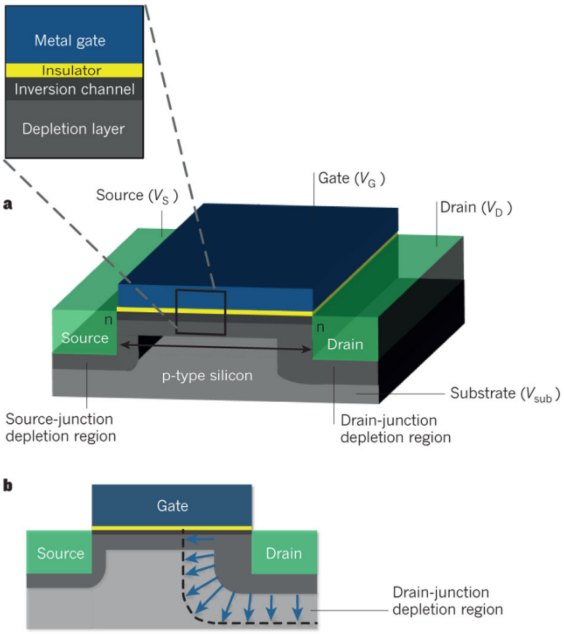
The objective of this work is to study both the dynamics and mechanisms of guest incorporation into the pores of 2D supramolecular host networks at the liquid–solid interface. This was accomplished by adding molecular guests to prefabricated self-assembled porous monolayers and the simultaneous acquisition of scanning tunneling microscopy (STM) topographs. The incorporation of the same guest molecule (coronene) into two different host networks was compared, where the pores of the networks either featured a perfect geometric match with the guest (for trimesic acid host networks) or were substantially larger than the guest species (for benzenetribenzoic acid host networks). Even the moderate temporal resolution of standard STM experiments in combination with a novel injection system was sufficient to reveal clear differences in the incorporation dynamics in the two different host networks. Further experiments were aimed at identifying a possible solvent influence. The interpretation of the results is aided by molecular mechanics (MM) and molecular dynamics (MD) simulations.

- Silica-Like Malleable Materials from Permanent Organic Networks
  Montarnal, D.; Capelot, M.; Tournilhac, F.; Leibler, L. *Science* **2011**, *334*, 965-968.
  Abstract:



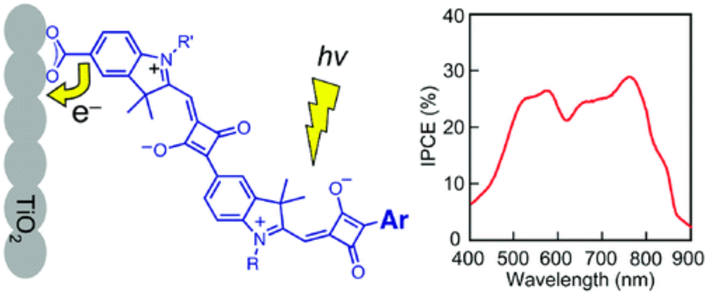
Permanently cross-linked materials have outstanding mechanical properties and solvent resistance, but they cannot be processed and reshaped once synthesized. Non–cross-linked polymers and those with reversible cross-links are processable, but they are soluble. We designed epoxy networks that can rearrange their topology by exchange reactions without depolymerization and showed that they are insoluble and processable. Unlike organic compounds and polymers whose viscosity varies abruptly near the glass transition, these networks show Arrhenius-like gradual viscosity variations like those of vitreous silica. Like silica, the materials can be wrought and welded to make complex objects by local heating without the use of molds. The concept of a glass made by reversible topology freezing in epoxy networks can be readily scaled up for applications and generalized to other chemistries.

- Multigate transistors as the future of classical metal–oxide–semiconductor field-effect transistors
  Ferain, I.; Colinge, C. A.; Colinge, J. P. *Nature* **2011**, *479*, 310-316.
  Abstract:



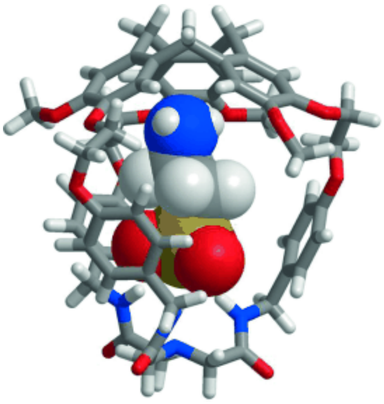
For more than four decades, transistors have been shrinking exponentially in size, and therefore the number of transistors in a single microelectronic chip has been increasing exponentially. Such an increase in packing density was made possible by continually shrinking the metal–oxide–semiconductor field-effect transistor (MOSFET). In the current generation of transistors, the transistor dimensions have shrunk to such an extent that the electrical characteristics of the device can be markedly degraded, making it unlikely that the exponential decrease in transistor size can continue. Recently, however, a new generation of MOSFETs, called multigate transistors, has emerged, and this multigate geometry will allow the continuing enhancement of computer performance into the next decade.

- Near-infrared Absorbing Squarylium Dyes with Linearly Extended π-Conjugated Structure for Dye-sensitized Solar Cell Applications
  Maeda, T.; Hamamura, Y.; Miyanaga, K.; Shima, N.; Yagi, S.; Nakazumi, H. *Org. Lett.* **2011**, *13*, 5994–5997.
  Abstract:



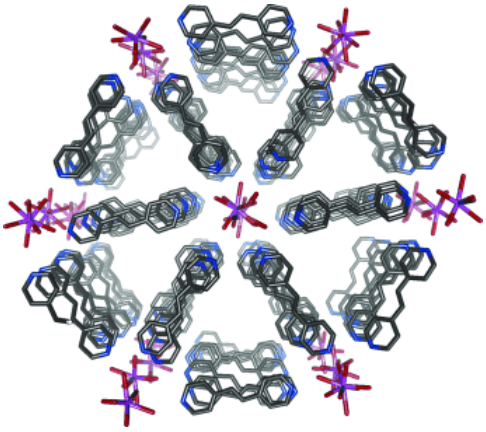
A novel class of near-infrared absorbing squarylium sensitizers with linearly extended π-conjugated structures, which were obtained by Pd-catalyzed cross-coupling reactions with stannylcyclobutenediones, has been developed for dye-sensitized solar cells. The cells based on these dyes exhibited a significant spectral response in the near-infrared region over 750 nm in addition to the visible region.

- A Designed Cavity for Zwitterionic Species: Selective Recognition of Taurine in Aqueous Media
  Perraud, O.; Robert, V.; Martinez, A.; Dutasta J.-P. *Chem. Eur. J.* **2011**, *17*, 13405-13408
  Abstract:



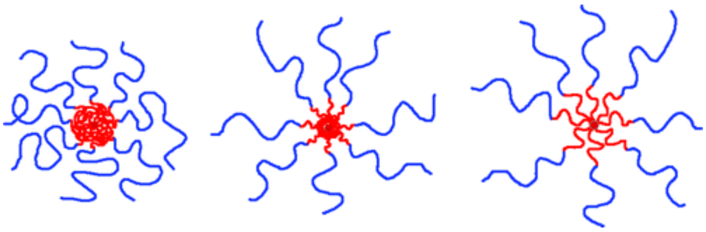
The perfect host: Hemicryptophane 1 selectively binds taurine neurotransmitters in CD3CN/D2O. Association constants determined by DOSY NMR spectroscopy demonstrate that this recognition is highly selective over other related substrates. DFT calculations emphasize that only weak intermolecular interactions stabilize the host–guest association (see figure).

- Synthesis, Structure, and Reactivity of a Supramolecular Ytterbium(III)–Aqua Complex Featuring Infinite Stacks of CC Bonds for Photocycloaddition Reactions
  Komori-Orisaku, K.; Yamashita, S.; Isozaki, T.; Sugiura, K.; Koide, Y. *Chem. Eur. J.* **2011**, *17*, 13424-13428.
  Abstract:



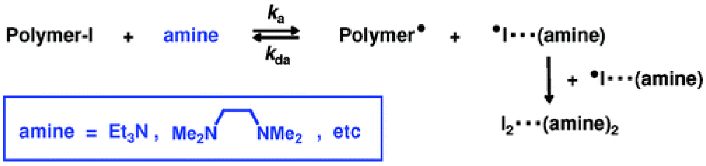
The unprecedented infinite stacks of trans-1,2-bis(4-pyridyl)ethylene (4,4′-bpe) were prepared with a supramolecular YbIII–aqua complex that exhibited the stereospecific photocycloaddition of olefins within a single-crystal-to-single-crystal process and was confirmed by crystallographic methods (see figure). The supramolecular assistance of YbIII was observed in solution, in which the reaction proceeded catalytically.

- Conformations of Amphiphilic Polyelectrolyte Stars with Diblock Copolymer Arms
  Polotsky, A. A.; Birshtein, T. M.; Daoud, M.; Borisov, O. V. *Macromolecules* **2011,** 44, 8999–9012.
  Abstract:



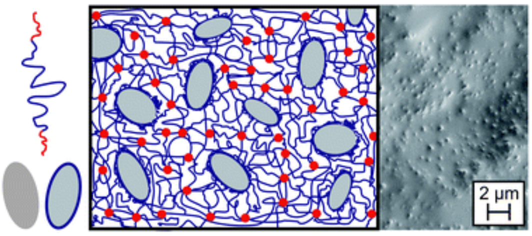
We consider conformations and intramolecular conformational transitions in amphiphilic starlike polymers formed by diblock copolymer arms with inner hydrophobic and outer polyelectrolyte blocks. A combination of an analytical mean-field theory with the assumption free numerical self-consistent field (SCF) modeling approach is applied. It is demonstrated that unimolecular micelles with collapsed hydrophobic cores and swollen polyelectrolyte coronae are formed in dilute aqueous solutions at high ionic strength or/and low degree of ionization of the outer hydrophilic block. An intramolecular conformational transition related to the unfolding of the hydrophobic core of the unimolecular micelles can be triggered by a decrease in the ionic strength of the solution or/and increase in the degree of ionization of the coronal blocks. In the stars with large number of diblock copolymer arms the transition between conformations with collapsed or stretched core-forming blocks occurs continuously by progressive unfolding of the core domain. By contrast, in the stars with relatively small number of arms the continuous unfolding of the core is interrupted by an abrupt unravelling transition. A detailed SCF analysis indicates that under both unfolding scenarios the arms of the star are extended fairly equally; i.e., no intramolecular disproportionation occurs.

- Reversible Complexation Mediated Living Radical Polymerization (RCMP) Using Organic Catalysts
  Goto, A.; Suzuki, T.; Ohfuji, H.; Tanishima, M.; Fukuda, T.; Tsujii, Y.; Kaji, M. *Macromolecules* **2011**, *44*, 8709–8715.
  Abstract:



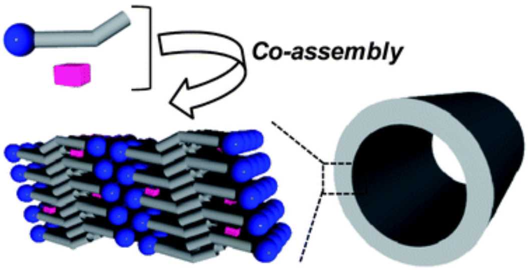
A novel class of living radical polymerization using amines as organic catalysts was developed. It is based on a new reversible activation mechanism, reversible complexation (RC). The polymer molecular weight and its distribution (Mw/Mn = 1.1–1.4) were well controlled in the polymerizations of methyl methacrylate (MMA), styrene, acrylonitrile, and some functional methacrylates with a fairly high conversion in hours in many cases. The catalysts include such common amines as triethylamine and tetramethylethylenediamine (TMEDA). Their low cost, good environmental safety, and ease of handling may be attractive for possible applications. Kinetic studies supported the RC mechanism. The activation rate constant for the MMA/TMEDA system was large enough to explain why the system provides low-polydispersity polymers from an early stage of polymerization.

- Elastic block copolymer nanocomposites with controlled interfacial interactions for artificial muscles with direct voltage control
  Stoyanov, H.; Kollosche, M.; Risse, S.; McCarthy, D.-N.; Kofod, G. *Soft Matter* **2011**, *7*, 194-202.
  Abstract:



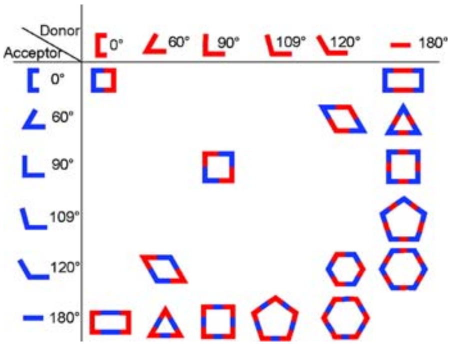
Soft, physically crosslinking, block copolymer elastomers were filled with surface-treated nanoparticles, in order to evaluate the possibility for improvement of their properties when used as soft dielectric actuators. The nanoparticles led to improvements in dielectric properties, however they also reinforced the elastomer matrix. Comparing dielectric spectra of composites with untreated and surface-treated particles showed a measurable influence of the surface on the dielectric loss behaviour for high filler amounts, strongly indicating an improved host–guest interaction for the surface-treated particles. Breakdown strength was measured using a test bench and was found to be in good agreement with the results from the actuation measurements. Actuation responses predicted by a model for prestrained actuators agreed well with measurements up to a filler amount of 20%vol. Strong improvements in actuation behaviour were observed, with an optimum near 15%vol nanoparticles, corresponding to a reduction in electrical field of 27% for identical actuation strains. The use of physically crosslinking elastomer ensured the mechanical properties of the matrix elastomer were unchanged by nanoparticles effecting the crosslinking reaction, contrary to similar experiments performed with chemically crosslinking elastomers. This allows for a firm conclusion about the positive effects of surface-treated nanoparticles on actuation behavior.

- Self-assembled organic nanotubes embedding hydrophobic molecules within solid bilayer membranes
  Kameta, N.; Asakawa, M.; Masuda, M.; Shimizu, T. *Soft Matter* **2011**, *7*, 85-90.
  Abstract:



We have carried out co-assembly of N-(11-cis-octadecenoyl)-β-D-glucopyranosylamine 1 with hydrophobic molecules, 8-anilinonaphthalene-1-sulfonate (1,8-ANS) 2 or Zn-phthalocyanine 3 in a mixed solvent of organic solvents and water to form nanotubes embedding the hydrophobic molecules. Transmission electron microscopic (TEM), fluorescence microscopic observations, and X-ray diffraction (XRD) analysis revealed the formation of nanotubes where the interdigitated bilayer membranes of 1 function as an embedded matrix for the hydrophobic molecules. We have compared the release behavior of 2 embedded in the bilayer membranes with that of 2 encapsulated inside the nanotube hollow cylinder of 60-nm inner diameter. Although the encapsulated molecules 2 proved to be slowly released from both open ends of the hollow cylinder at room temperature, the embedded ones kept staying in the bilayer membranes. Similarly, the embedded molecules 3 kept staying in the interdigitated bilayer membranes at temperatures below a thermal phase transition temperature (Tg-l = 59 °C) of the nanotubes. However, when the solid-state bilayer membranes of the nanotubes converted into a fluid bilayer membrane at temperatures above the Tg-l, the molecules 3 was instantly released. Such self-assembled nanotubes embedding hydrophobic molecules are applicable to medical diagnosis systems containing deliveries of drugs, photosensitizers, fluorescence- and spin-probes.

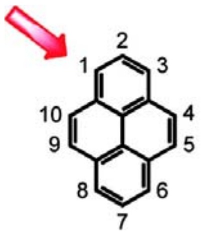
- Supramolecular Coordination: Self-Assembly of Finite Two- and Three-Dimensional Ensembles
  Chakrabarty, R.; Mukherjee, P. S.; Stang, P. J. *Chem. Rev.* **2011**, *111*, 6810–6918.
  Abstract:



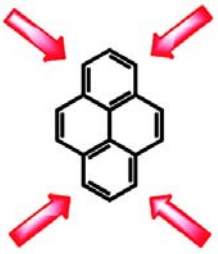
Fascination with supramolecular chemistry over the past few decades has led to the synthesis of an ever-increasing number of elegant and intricate functional structures with sizes that approach nanoscopic dimensions. Today, it has grown into a mature field of modern science whose interfaces with many disciplines have provided invaluable opportunities for crossing boundaries both inside and between the fields of chemistry, physics, and biology. This chemistry is of continuing interest for synthetic chemists, partly because of the fascinating physical and chemical properties and the complex and varied aesthetically pleasing structures that supramolecules possess. For scientists seeking to design novel molecular materials exhibiting unusual sensing, magnetic, optical, and catalytic properties, and for researchers investigating the structure and function of biomolecules, supramolecular chemistry provides limitless possibilities. Thus, it transcends the traditional divisional boundaries of science and represents a highly interdisciplinary field.

In the early 1960s, the discovery of “crown ethers”, “cryptands”, and “spherands” by Pedersen, Lehn, and Cram, respectively, led to the realization that small, complementary molecules can be made to recognize each other through noncovalent interactions such as hydrogen bonding, charge–charge, donor–acceptor, π–π, and van der Waals, etc. Such “programmed” molecules can thus be self-assembled by utilizing these interactions in a definite algorithm to form large supramolecules that have different physicochemical properties than those of the precursor building blocks. Typical systems are designed such that the self-assembly process is kinetically reversible; the individual building blocks gradually funnel toward an ensemble that represents the thermodynamic minimum of the system via numerous association and dissociation steps. By tuning various reaction parameters, the reaction equilibrium can be shifted toward the desired product. As such, self-assembly has a distinct advantage over traditional, stepwise synthetic approaches when accessing large molecules.

- Pyrene-Based Materials for Organic
  Figueira-Duarte, T. M.; Müllen, K. *Chem. Rev.* **2011**, *111*, 7260–7314.
  Abstract:



1-Substitution

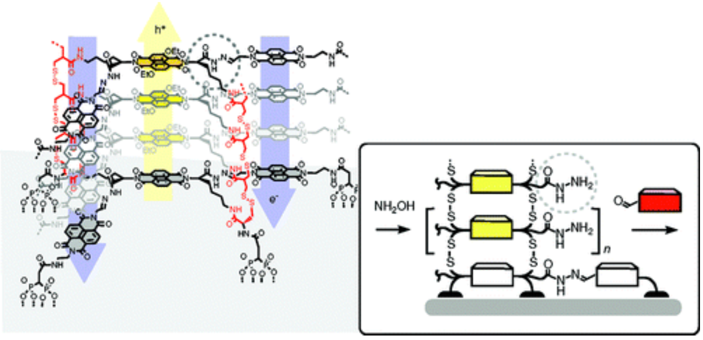


1,3,6,8-Substitution

Pyrene is the fruit fly of photochemists. Its unique properties have inspired researchers from many scientific areas, making pyrene the chromophore of choice in fundamental and applied photochemical research. Since the pioneering work of Laurent, who in 1837 discovered pyrene in the residue of the destructive distillation of coal tar, this polycyclic aromatic hydrocarbon has been the subject of tremendous investigation. The name pyrene, Greek for “fire”, was attributed since he believed that it was frequently obtained via the reaction of organic substances with fire. Later on, in 1871, Gräbe reported the isolation of pyrene via extraction with carbon disulfide, which left the accompanying chrysene undissolved. Concentration of the solution gave a crude pyrene, which was further purified via the picrate. Decomposition of the picrate yielded pyrene as yellow plates.

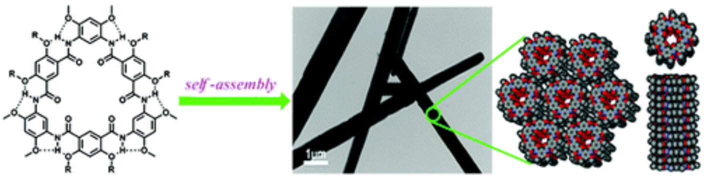
Pyrene is also formed in many pyrolytic processes, for example, in the destructive distillation of soft coal tar, by pyrolysis of acetylene and hydrogen, by the zinc-dust distillation of thebenol and thebenin, and from petroleum by the catarol process. Until 1882, an interesting source of pyrene was a special distillation of mercury ore as carried out in Idria. The byproduct, which was mixed with mercury, was called "Stupp" and contained up to 20% pyrene as well as other polycyclic hydrocarbons.

- Stack Exchange Strategies for the Synthesis of Covalent Double-Channel Photosystems by Self-Organizing Surface-Initiated Polymerization
  Sakai, N.; Matile, S. *J. Am. Chem. Soc.* **2011**, *133*, 18542–18545.
  <u>Abstract:</u>



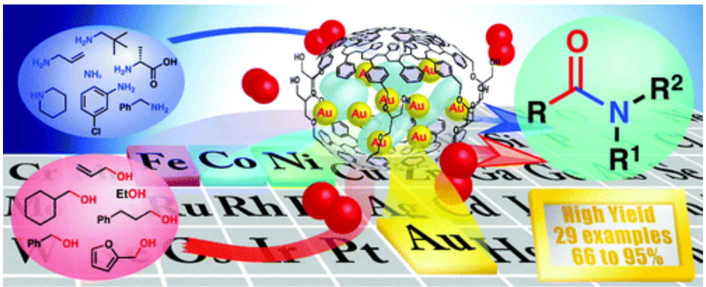
Ring-opening disulfide exchange polymerization has recently been identified as ideal for synthesizing single-channel photosystems by self-organizing surface-initiated polymerization (SOSIP). Here we introduce chemoorthogonal hydrazone exchange chemistry to engineer additional channels into single-channel photosystems. Post-SOSIP stack exchange is shown to provide facile access to complete supramolecular n/p-heterojunction architectures with high activity and freely variable composition, including oriented antiparallel redox gradients. With appropriate templation from the surface, post-SOSIP stack exchange is nearly quantitative.

- Strong Aggregation and Directional Assembly of Aromatic Oligoamide Macrocycles
  Yang, Y.; Feng, W.; Hu, J.; Zou, S.; Gao, R.; Yamato, K.; Kline, M.; Cai, Z.; Gao, Y.; Wang, Y.; Li, Y.; Yang, Y.; Yuan, L.; Zeng, X. C.; Gong, B. *J. Am. Chem. Soc.* **2011**, *133*, 18590–18593.
  <u>Abstract:</u>



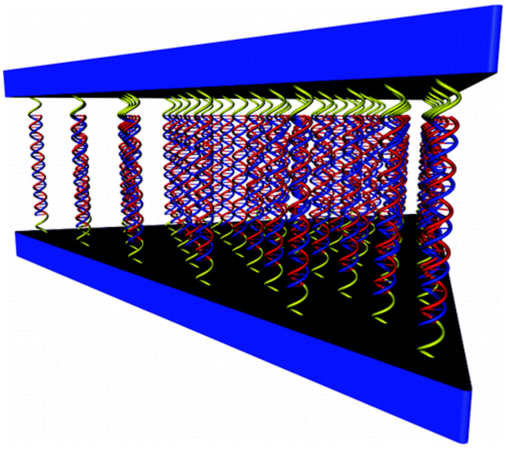
Aromatic oligoamide macrocycles exhibit strong preference for highly directional association. Aggregation happens in both nonpolar and polar solvents but is weakened as solvent polarity increases. The strong, directional assembly is rationalized by the cooperative action of dipole–dipole and π–π stacking interactions, leading to long nanotubular assemblies that are confirmed by SEM, TEM, AFM, and XRD. The persistent nanotubular assemblies contain non-collapsible hydrophilic internal pores that mediate highly efficient ion transport observed with these macrocycles and serve as cylindrical sites for accommodating guests such as metal ions.

- Powerful Amide Synthesis from Alcohols and Amines under Aerobic Conditions Catalyzed by Gold or Gold/Iron, -Nickel or -Cobalt Nanoparticles
  Soulé, J.-F.; Miyamura H.; Kobayashi S. *J. Am. Chem. Soc.* **2011,** *133*, 18550-18553.
  <u>Abstract:</u>



Considering the importance of the development of powerful green catalysts and the omnipresence of amide bonds in natural and synthetic compounds, we report here on reactions between alcohols and amines for amide bond formation in which heterogeneous gold and gold/iron, -nickel, or -cobalt nanoparticles are used as catalysts and molecular oxygen is used as terminal oxidant. Two catalysts show excellent activity and selectivity, depending on the type of alcohols used. A wide variety of alcohols and amines, including aqueous ammonia and amino acids, can be used for the amide synthesis. Furthermore, the catalysts can be recovered and reused several times without loss of activity.

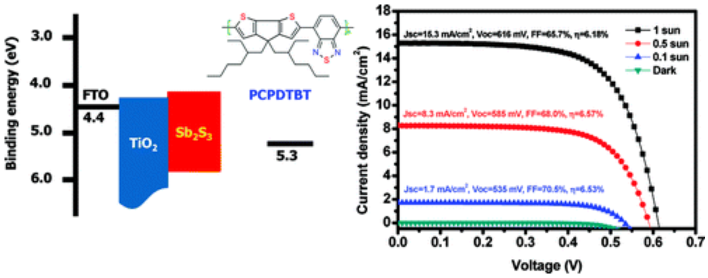
- Nanoparticle Shape Anisotropy Dictates the Collective Behavior of Surface-Bound Ligands
  Jones M.-R.; Macfarlane R.-J.; Prigodich A.-E.; Patel P.-C.; Mirkin C.-A. *J. Am. Chem. Soc.* **2011,** *133*, 18865-18869.
  <u>Abstract:</u>



We report on the modification of the properties of surface-confined ligands in nanoparticle systems through the introduction of shape anisotropy. Specifically, triangular gold nanoprisms, densely functionalized with oligonucleotide ligands, hybridize to complementary particles with an affinity that is several million times higher than that of spherical nanoparticle conjugates functionalized with the same amount of DNA. In addition, they exhibit association rates that are 2 orders of magnitude greater than those of their spherical counterparts. This phenomenon stems from the ability of the flat, extended facets of nonspherical nanoparticles to (1) support more numerous ligand interactions through greater surface contact with complementary particles, (2) increase the effective local concentration of terminal DNA nucleotides that mediate hybridization, and (3) relieve the conformational stresses imposed on nanoparticle-bound ligands participating in interactions

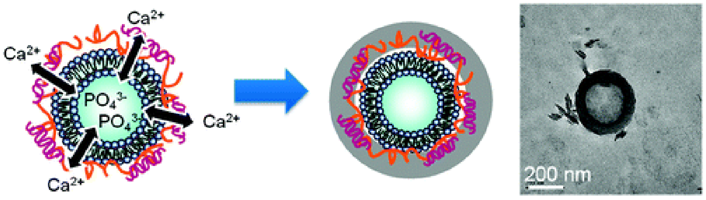
between curved surfaces. Finally, these same trends are observed for the pH-mediated association of nanoparticles functionalized with carboxylate ligands, demonstrating the generality of these findings.

- Toward Interaction of Sensitizer and Functional Moieties in Hole-Transporting Materials for Efficient Semiconductor-Sensitized Solar Cells
  Im, S.-H.; Lim, C.-S.; Chang, J.-A.; Lee, Y.-H.; Maiti, N.; Kim, H.-J.; Nazeeruddin, Md.-K.; Grätzel, M.; Seok, S.-I. *Nano Lett.* **2011**, *11*, 4789–4793.
  Abstract:



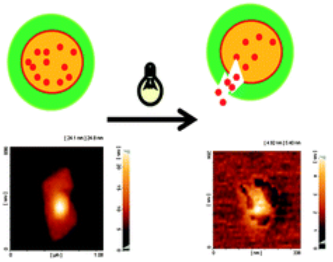
Sb_2S_3-sensitized mesoporous-TiO_2 solar cells using several conjugated polymers as hole-transporting materials (HTMs) are fabricated. We found that the cell performance was strongly correlated with the chemical interaction at the interface of Sb_2S_3 as sensitizer and the HTMs through the thiophene moieties, which led to a higher fill factor (FF), open-circuit voltage (V_{oc}), and short-circuit current density (J_{sc}). With the application of PCPDTBT (poly(2,6-(4,4-bis-(2-ethylhexyl)-4*H*-cyclopenta[2,1-*b*;3,4-*b*′]dithiophene)-*alt*-4,7(2,1,3-benzothiadiazole)) as a HTM in a Sb_2S_3-sensitized solar cell, overall power conversion efficiencies of 6.18, 6.57, and 6.53% at 100, 50, and 10% solar irradiation, respectively, were achieved with a metal mask.

- Control in Mineralization by the Polysaccharide-Coated Liposome via the Counter-Diffusion of Ions
  Fukui, Y. Fujimoto, K. *Chem. Mater.* **2011**, *23*, 4701-4708.
  Abstract:



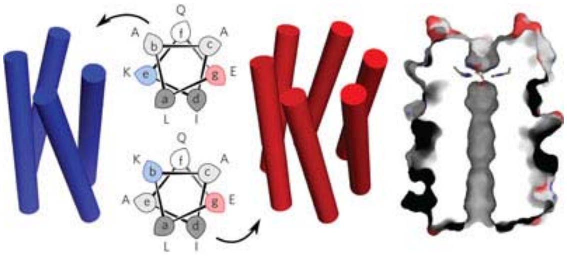
We created an organic–inorganic hybrid nanocapsule by utilizing polysaccharide-coated liposomes as a reaction site for the deposition of calcium phosphate (CaP). Phosphate ions were encapsulated in a liposome, followed by the layer-by-layer deposition of chitosan (CHI), dextran sulfate (DXS), or DNA onto the liposome surface. Calcium ions were added to an aqueous suspension of the phosphate ion-incorporated nanocapsules to prepare the nanocapsules that provide a variety of walls for the counter-diffusion of ions and the surface for CaP deposition. As a result, control in biomineralization, such as thickness and crystal properties, over the nanocapsules was achieved by tuning the counter-diffusion of the calcium ions and the phosphate ions through the capsule wall and the surface chemical composition of nanocapsules. Furthermore, we carried out DNA adsorption onto CaP-coated liposomes. DNA was releasable from the nanocapsules because of the dissolution of CaP under acidic conditions.

- Polyrotaxane/gold nanoparticle hybrid nanomaterials as anticancer drug delivery systems. Adeli, M.; Sarabi, R.-S.; Farsi, R.-Y.; Mahmoudi, M.; Kalantari, M. *J. Mater. Chem.* **2011,** *21*, 18686-18695.
  Abstract:



Gold nanoparticles (Au NPs) have been widely used in various biomedical applications, including photothermal therapy, imaging and drug delivery. This study deals with the synthesis of new hybrid nanostructure-based drug delivery systems (DDSs), consisting of Au NP cores and polyrotaxane shells (Au NPs@PR). In order to prepare the polyrotaxanes (PRs), cyclodextrin rings were threaded onto poly(ethyleneglycol) (PEG) axes and, then, the pseudopolyrotaxanes were capped by Au NPs. The electrostatic interactions between the Au NPs and the polyrotaxane backbone led to the Au NPs@PR hybrid nanomaterials. Anticancer drugs, such as cisplatin (diamminedichloroplatinum, CDDP) and doxorubicin (DOX) were conjugated to Au NPs@PRs and their controlled release, through the photothermal properties of the Au NP cores, was investigated. To prove the efficacy of the DDSs, they were endocytosed by cancer cells (mouse tissue connective fibroblast adhesive cell line, L929) and the anticancer drugs were released by a photothermal explosion of the Au NPs@PR hybrid nanomaterials. It was found that these systems are able to release drugs and kill cancer cells controllably.

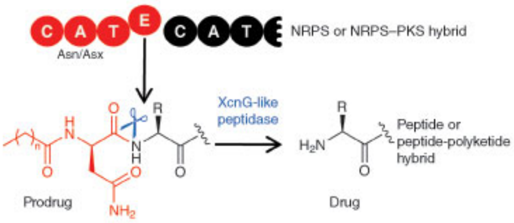
- A de novo peptide hexamer with a mutable channel
  Zaccai, N. R.; Chi, B.; Thomson, A. R.; Boyle, A. L.; Bartlett, G. J.; Bruning, M.; Linden, N.; Sessions, R. B.; Booth, P. J.; Brady, R. L.; Woolfson, D. N. *Nat. Chem. Biol.* **2011**, *7*, 935-941.
  Abstract:



The design of new proteins that expand the repertoire of natural protein structures represents a formidable challenge. Success in this area would increase understanding of protein structure and present new scaffolds that could be exploited in biotechnology and synthetic biology. Here we describe the design, characterization and X-ray crystal structure of a new coiled-coil protein. The *de novo* sequence forms a stand-alone, parallel, six-helix bundle with a channel running through it. Although lined exclusively by hydrophobic leucine and isoleucine side chains, the 6-Å channel is permeable to water. One layer of leucine residues within the channel is mutable, accepting polar aspartic acid and histidine side chains, which leads to subdivision and organization of solvent within the lumen. Moreover, these mutants can be combined to form a stable and unique (Asp-His)$_3$

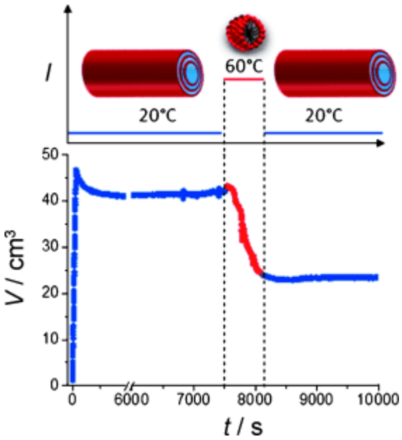
heterohexamer. These new structures provide a basis for engineering de novo proteins with new functions.

- A natural prodrug activation mechanism in nonribosomal peptide synthesis
  Reimer, D.; Pos, K. M.; Thines, M.; Grün, P.; Bode, H. B. *Nat. Chem. Biol.* **2011**, *7*, 888-890.
  Abstract:



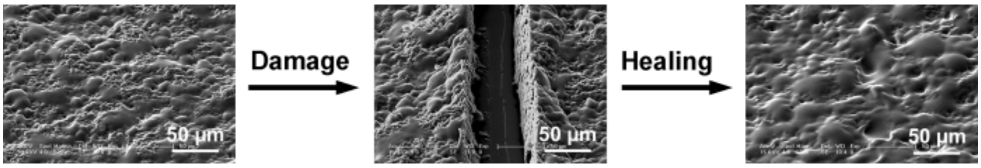
We have identified a new mechanism for the cleavage and activation of nonribosomally made peptides and peptide-polyketide hybrids that are apparently operational in several different bacteria. This process includes the cleavage of a precursor molecule by a membrane-bound and D-asparagine–specific peptidase, as shown here in the biosynthesis of the antibiotic xenocoumacin from *Xenorhabdus nematophila*.

- Smart Foams: New Perspectives Towards Responsive Composite Materials
  Carl, D. C. A.; Klitzing, R. *Angew. Chem. Int. Ed.* **2011**, *50,* 11290–11292.
  Abstract:



Hold the foam! Smart foams with a tunable surface-to-volume ratio have numerous potential applications, including decontamination. Recently fatty acid aggregates, the stability of which can be tuned by an external stimulus, were described. The picture shows a plot of the foam volume of a temperature-dependent foam which undergoes supramolecular reorganization.

- Water-Enabled Self-Healing of Polyelectrolyte Multilayer Coatings
  Wang, X.; Liu, F.; Zheng, X.; Sun, J. *Angew. Chem. Int. Ed.* **2011**, *50,* 11378–11381.
  Abstract:



Heal thyself! Exponentially grown layer-by-layer-assembled polyelectrolyte multilayer coatings, which are mechanically robust under ambient conditions, can autonomically repair cuts several tens of micrometers deep and wide when they are simply immersed in water or when water is sprayed on the coatings. The self-healing ability originates from the high flowability of these coatings in water.