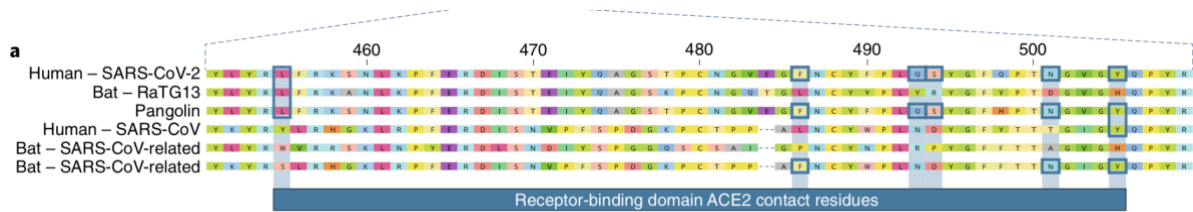


The Proximal Origin of SARS-CoV-2

Andersen, K. G.*; Rambaut, A.; Lipkin, W. I.; Holmes, E. C.; Garry, R. F. *Nat. Med.* **2020**, *26*, 450–452.



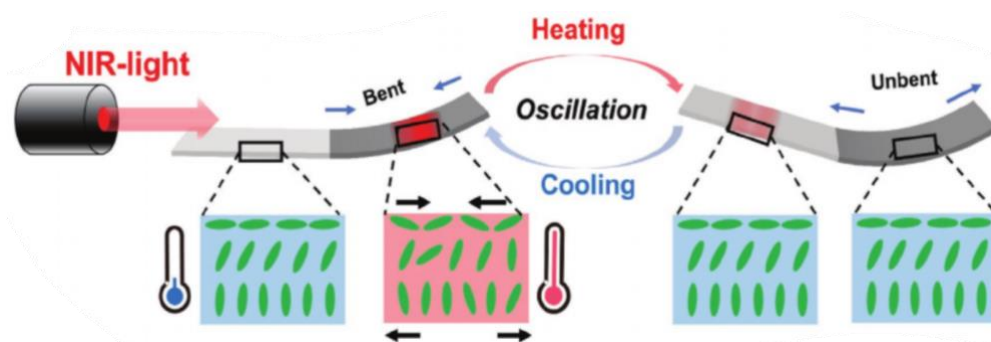
Since the first reports of novel pneumonia (COVID-19) in Wuhan, Hubei province, China, there has been considerable discussion on the origin of the causative virus, SARS-CoV-2 (also referred to as HCoV-19). Infections with SARS-CoV-2 are now widespread, and as of 11 March 2020, 121,564 cases have been confirmed in more than 110 countries, with 4,373 deaths.

SARS-CoV-2 is the seventh coronavirus known to infect humans; SARS-CoV, MERS-CoV and SARS-CoV-2 can cause severe disease, whereas HKU1, NL63, OC43 and 229E are associated with mild symptoms. Here we review what can be deduced about the origin of SARS-CoV-2 from comparative analysis of genomic data. We offer a perspective on the notable features of the SARS-CoV-2 genome and discuss scenarios by which they could have arisen. Our analyses clearly show that SARS-CoV-2 is not a laboratory construct or a purposefully manipulated virus.

Comment: I am surprised that since the confinement no one has proposed papers related to COVID-19. Hence, to encourage you and because it is interesting, I encourage you to read this very short correspondence. Spoiler alert: no, it is not born in a lab... probably.

Near-Infrared Photodriven Self-Sustained Oscillation of Liquid-Crystalline Network Film with Predesigned Polydopamine Coating

Lan, R.; Sun, J.; Shen, C.; Huang, R.; Zhang, Z.; Zhang, L.; Wang, L.; Yang, H.* *Adv. Mater.* **2020**, *32*, 1906319.



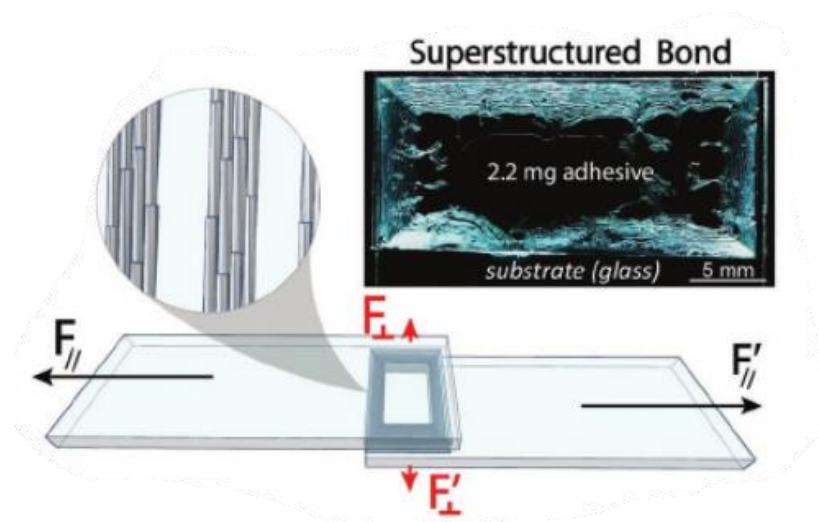
Movement is one of the vital features of living systems, and remote control of bioinspired soft robotic systems in a precise, contactless and harmless way is extremely desirable but challenging. **A near-infrared (NIR) photodriven polymeric oscillator is designed** and fabricated by selectively coating a mussel-inspired polydopamine (PDA) polymer layer on the surface of splay-aligned liquid crystalline network (LCN) film. The oscillating motions of the LCN oscillators can be facilely manipulated by tuning light intensity and film thickness. More importantly, the programmability of the PDA coating enables the oscillating behaviors of LCN film to be

pre-designated and finely adjusted by coating the film with PDA locally and repeatedly. The self-oscillating movement mechanism can be attributed to the temperature oscillation at the PDA-coated LCN film since it is alternatively exposed and sheltered to the NIR-light irradiations. Owing to over 50% NIR irradiation in solar spectrum, **PDA-coated film is found to oscillate upon exposure of focused sunlight**, presenting great potential in fabrication of solar power generation devices. This provides a versatile strategy to fabricate NIR-light-actuated polymeric oscillators, providing inspirations in the development of biological soft robots and advanced biomimetic devices.

Comment: Self-oscillating liquid-crystalline networks produce sustained motion under single external stimulus. As the authors highlighted, their material could be used for solar power generation devices because they are triggered by NIR light. At the end of the paper, they actually present a set-up where the oscillating displacement of the LCN is transferred to a copper coil in a magnetic field, thereby producing an oscillating electric field.

Exploiting Supramolecular Interactions from Polymeric Colloids for Strong Anisotropic Adhesion between Solid Surfaces

Tardy, B. L.*; Richardson, J. J.; Greca, L. G.; Guo, J.; Ejima, H.*; Rojas, O. J.* [Adv. Mater. 2020, 32, 1906886](#).



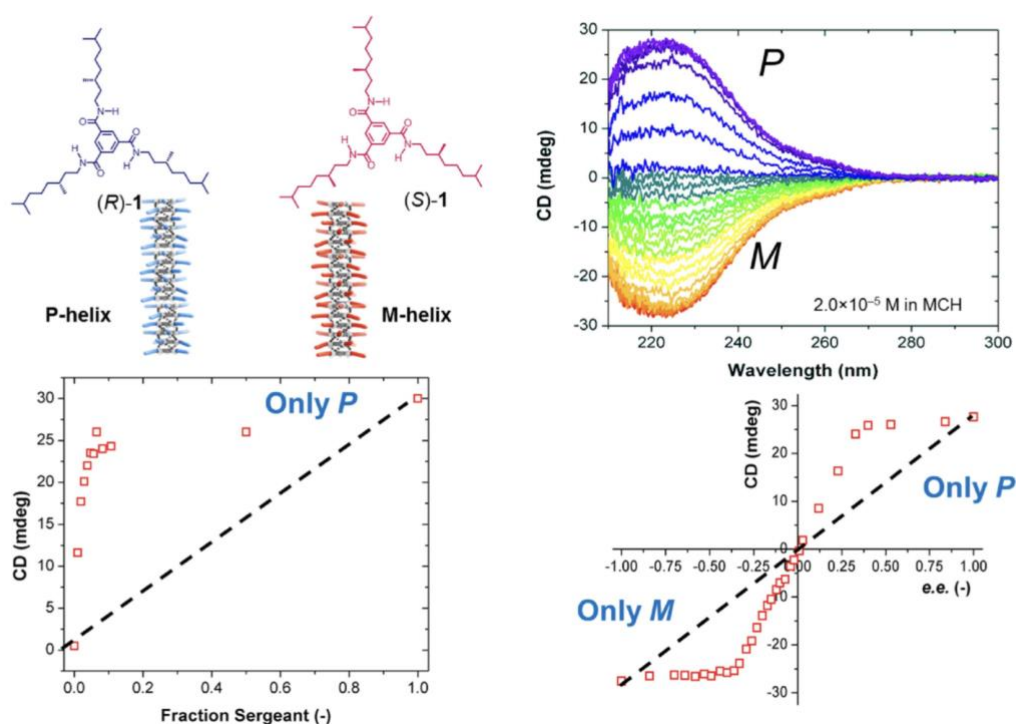
Adhesion occurs by covalent bonding, as in reactive structural adhesives, or through noncovalent interactions, which are nearly ubiquitous in nature. A classic example of the latter is gecko feet, where hierarchical features enhance friction across the contact area. Biomimicry of such structured adhesion is regularly achieved by top-down lithography, which allows for direction-dependent detachment. However, bottom-up approaches remain elusive given the scarcity of building blocks that yield strong, cohesive, self-assembly across multiple length scales. Herein, an exception is introduced, namely, **aqueous dispersions of cellulose nanocrystals (CNCs) that form superstructured, adherent layers** between solid surfaces upon confined evaporation-induced self-assembly (C-EISA). The inherently strong CNCs ($E_A > 140$ GPa) align into rigid, nematic-like ordered lamellae across multiple length scales as a result of the stresses associated with confined evaporation. This long-range order produces remarkable anisotropic adhesive strength when comparing in-plane (≈ 7 MPa) and out-of-plane (≤ 0.08 MPa) directions. These adhesive attributes, resulting from self-assembly, substantially outperform previous biomimetic adhesives obtained by top-down microfabrication (dry adhesives, friction driven), and represent a unique fluid (aqueous)-

based system with significant anisotropy of adhesion. By using C-EISA, new emergent properties will be closely tied with the nature of colloids and their hierarchical assemblies

Comment: I personally find that adhesion is an interesting topic because of the complex interplay between physicochemical properties to achieve controlled behaviours. The example presented here is particularly interesting because of the anisotropic response, similarly to gecko feet, where the adhesive can resist to strong in-plane forces but not to out-of-plane ones.

Supramolecular Polymers – we've Come Full Circle

Aida, T.*; Meijer, E. W.* *Isr. J. Chem.* **2020**, *60*, 33–47.



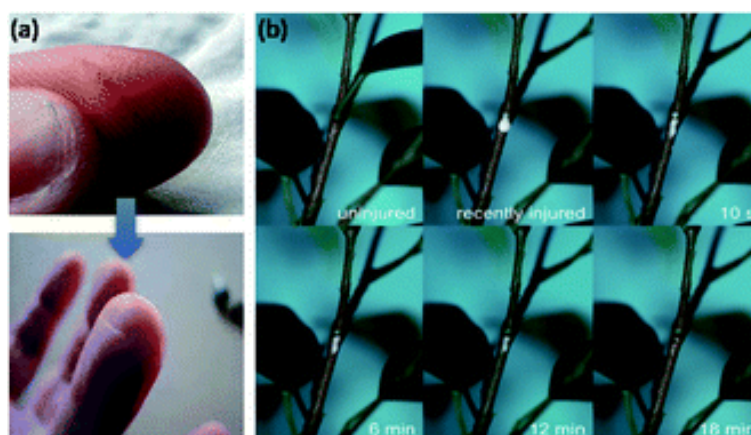
Since the first polymers were discovered, scientists have debated their structures. Before Hermann Staudinger published the brilliant concept of macromolecules, polymer properties were generally believed to be based on the colloidal aggregation of small particles or molecules. From 1920 onwards, polymers and macromolecules are synonymous with each other; i.e. materials made by many covalent bonds connecting monomers in 2 or 3 dimensions. Although supramolecular interactions between macromolecular chains are evidently important, e.g. in nylons, it was unheard of to proposing polymeric materials based on the interaction of small molecules. Breakthroughs in supramolecular chemistry, however, showed that polymer materials can be made by small molecules using strong directional secondary interactions; the field of supramolecular polymers emerged. In a way, we have come full circle. In this essay we give a personal story about the birth of supramolecular polymers, with special emphasis on their structures, way of formation, and the dynamic nature of their bonding. The adaptivity of supramolecular polymers has become a major asset for novel applications, e.g. in the direction for the sustainable use of polymers, but also in biomedicine and electronics as well as self-healing materials. The lessons learned in the past years include aspects that forecast a bright future for the use of supramolecular interactions in polymer materials in general and for supramolecular polymers in particular. **In order to give full tribute to Staudinger in the year celebrating 100 years of macromolecules, we will show that many of the**

concepts of macromolecular polymers apply to supramolecular polymers, with only one important difference with fascinating consequences: the dynamic nature of the bonds that form polymer chains.

Comment: Question for you all: how often do you think you read something actually written by ‘big professors’? Unless you read many research proposals the answer is *not very often*, which makes this essay enjoyable. I would not bet that either author has spent too many nights working on it – although I assure you it was written at night – but it is just nice to read. Of course, if you care a bit about supramolecular polymers, there is not much novelty, but still worth the time. Would you prefer not to read it, I insist in leaving here the following quote ‘*In retrospect, these fundamental aspects will underpin that, 100 years after the Staudinger’s publication, Ostwald, who supported the colloidal theory in the historic debate, turned out to be visionary to predict polymer materials without a macromolecular structure.*’

Advances in intrinsic self-healing polyurethanes and related composites

Willocq, B.; Odent, J.; Dubois, P.; Raquez, J-M;* [RSC Adv., 2020, 10, 13766](#)



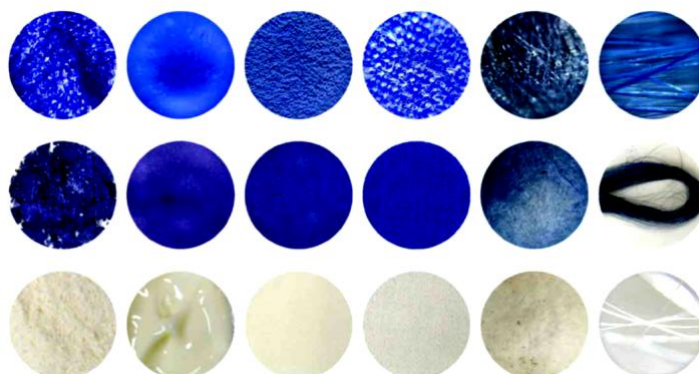
Fascinating and challenging, the development of repairable materials with long-lasting, sustainable and high-performance properties is a key-parameter to provide new advanced materials. To date, the concept of self-healing includes capsule-based healing systems, vascular healing systems, and intrinsic healing systems. Polyurethanes have emerged as a promising class of polymeric materials in this context due to their ease of synthesis and their outstanding properties. This review thereby focuses on the current research and developments in intrinsic self-healing polyurethanes and related composites. The chronological development of such advanced materials as well as the different strategies employed to confer living-like healing properties are discussed. Particular attention will be paid on chemical reactions utilized for self-healing purposes. Potential applications, challenges and future prospects in self-healing polyurethane fields are also provided.

Comment: If someone is not used to read about polyurethanes, please have a look at the most recent bibliography about self-healing polyurethanes, this review will be so helpful. It goes from the most important parameters to consider for modulating polyurethane properties, and the influence of each component to the PUs properties, to the type of strategies to obtain self-healing PUs.

This review states clearly the challenges to be solved in the field and also points out that “**No example of polyurethanes healable with pH change are reported in the literature**”

A metal-free blue chromophore derived from plant pigments

Freitas-Dörr, B. C.; Machado, C. O.; Pinheiro, A. C.; Fernandes, A. B.; Dörr, F. A.; Pinto, E.; Lopes-Ferreira, M.; Abdellah, M.; Sá, J.; Russo, L. C.; Forti, F. L.; Goncalves, L. C. P.; Bastos, E. L.* *Sci. Adv.* **2020**, *6*(14), ASAP

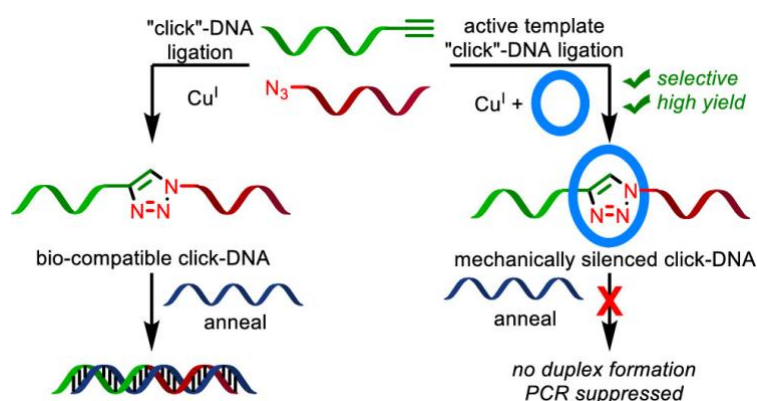


Blue natural pigments are rare, especially among plants. However, flowering species that evolved to attract Hymenoptera pollinators are colored by blue anthocyanin-metal complexes. Plants lacking anthocyanins are pigmented by betalains but are unable to produce blue hues. By extending the π -system of betalains, we designed a photostable and metal-free blue dye named BeetBlue that did not show toxicity to human hepatic and retinal pigment epithelial cells and does not affect zebrafish embryonal development. This chiral dye can be conveniently synthesized from betalamic acid obtained from hydrolyzed red beetroot juice or by enzymatic oxidation of l-dopa. BeetBlue is blue in the solid form and in solution of acidified polar molecular solvents, including water. Its capacity to dye natural matrices makes BeetBlue the prototype of a new class of low-cost bioinspired chromophores suitable for a myriad of applications requiring a blue hue.

Comment: Blue pigments are extremely rare in Nature, and those that we have observed in birds are produced by light scattering. On the other side, some of the blue colorants contains toxic metal cations that limit the applications of the pigment. In this article, the authors were able to obtain a non-toxic and metal-free blue pigment from a natural source, beets, with a potential wide range of applications.

AT-CuAAC Synthesis of Mechanically Interlocked Oligonucleotides

Acevedo-Jake, A.; Ball, A. T.; Galli, M.; Kukwikila, M.; Denis, M.; Singleton, D. G.; Tavassoli, A.*; Goldup, S. M.* *J. Am. Chem. Soc.* **2020**, *142*, 5985-5990.

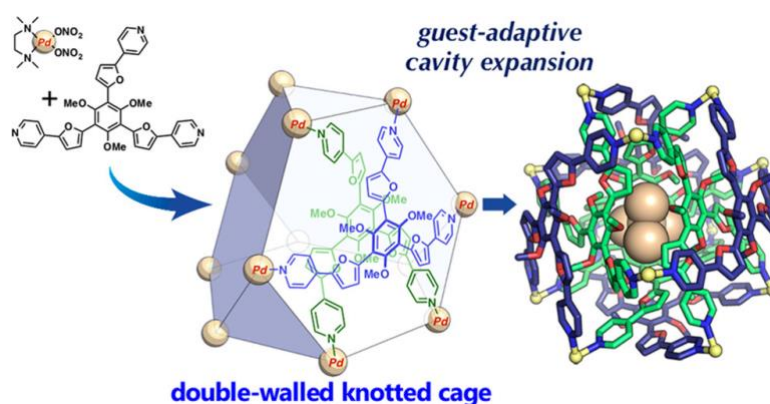


We present a simple strategy for the synthesis of main chain oligonucleotide rotaxanes with precise control over the position of the macrocycle. The novel DNA-based rotaxanes were analyzed to assess the effect of the mechanical bond on their properties.

Comment: In order to synthesis a novel DNA-rotaxane with a non-nucleotide macrocycle, the authors combined the “click-DNA ligation” to Leigh’s active template Cu-mediated alkyne/azide cycloaddition while using Goldup’s small macrocycle. The application of the latter synthetic strategy was studied on substituted nucleotides and high yields were obtained. Results shows that the mechanical bond alters the supramolecular and biological properties of the oligonucleotide. For example, the rotaxane does not form duplexes with their complementary strands due to the presence of the macrocycle acting like a ‘caging’ agent for the oligonucleotide.

A Double-Walled Knotted Cage for Guest-Adaptive Molecular Recognition

Tamura, Y.; Takezawa, H.; Fujita, M.* *J. Am. Chem. soc.* **2020**, *142*, 5504-5508.



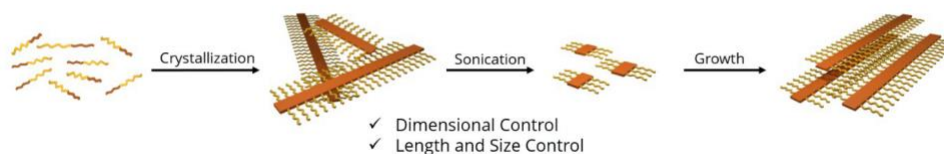
We synthesized a double-walled knotted cage from a flexible tripodal ligand. The characteristic double-walled structure provided a unique adaptive behavior of the cavity upon inclusion of organic molecules, which was evidenced by NMR and X-ray measurements. The semiflexible host framework, restricted by the knotted topology, enabled kinetic molecular recognition revealing the sequential binding of two different guests from their mixture.

Comment: Check the unique structure of this new self-assembled coordination cage, you will find beautiful crystallographic structures. A semi-flexible double-walled knotted cage was formed from a flexible tripodal ligand and Pd(II) 90° block. This cavity with dynamic guest behavior shows adaptative cavity expansion upon guest bonding and a unique kinetic selection of guests from a mixture. The double walled feature prevents the collapse of the structure.

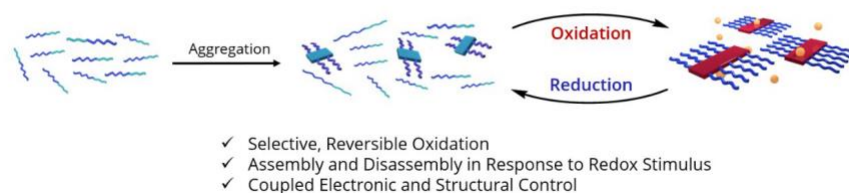
Oxidation Promoted Self-Assembly of π -Conjugated Polymers

Hicks, G. E. J.; Jarrett-Wilkins, C. N.; Panchuk, J. R.; Manion, J. G.; Seferos, D. S.* *Chem. Sci.* **2020**, ASAP

Previous Work: Crystallization-Driven Self-Assembly (CDSA)



This Work: Oxidation-Promoted Self-Assembly (OPSA)

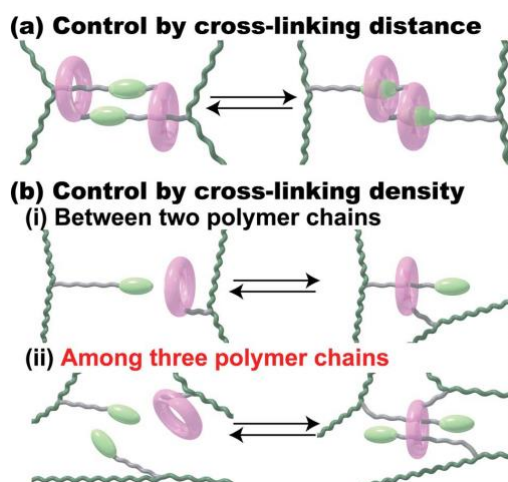


Self-assembly is an attractive strategy for organizing molecules into ordered structures that can span multiple length scales. Crystallization Driven Self-Assembly (CDSA) involves a block copolymer with a crystallizable core-forming block and an amorphous corona-forming block that aggregate into micelles with a crystalline core in solvents that are selective for the corona block. CDSA requires core- and corona-forming blocks with very different solubilities. This hinders its use for the self-assembly of purely π -conjugated block copolymers since blocks with desirable optoelectronic properties tend to have similarly solubility. Further, this approach is not readily reversible, precluding stimuli-responsive assembly and disassembly. Here, we demonstrate that selective oxidative doping of one block of a fully π -conjugated block copolymer promotes the self-assembly of redox-responsive micelles. Heteroatom substitution in polychalcogenophenes enables the modulation of the intrinsic polymer oxidation potential. We show that oxidized micelles with a narrow size distribution form spontaneously and disassemble in response to a chemical reductant. This method expands the scope of π -conjugated polymers that can undergo controlled self-assembly and introduces reversible, redox-responsive self-assembly to π -conjugated polymers.

Comment: It is an interesting system, which uses a redox strategy to achieve the controlled assembly and disassembly of π -conjugated polymers.

Redox-responsive supramolecular polymeric networks having double-threaded inclusion complexes

Aramoto, H.; Osaki, M.; Konishi, S.; Ueda, C.; Kobayashi, Y.; Takashima, Y.*; Harada, A.*; Yamaguchi, H.* [Chem. Sci. 2020, ASAP](#)

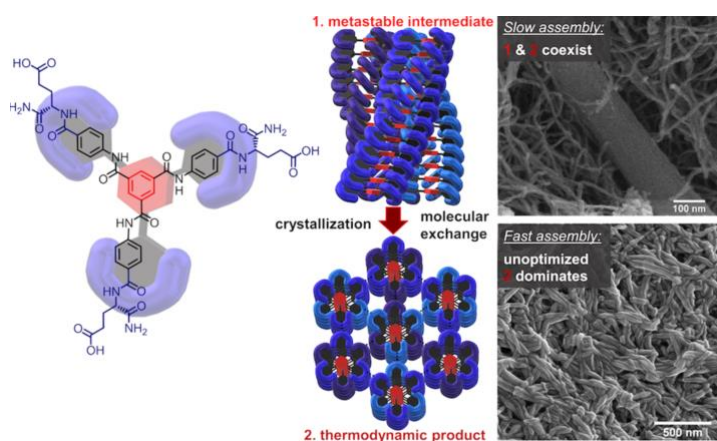


Stimuli-responsive hydrogels have attracted attention as soft actuators that act similarly to muscles. In this work, hydrogel actuators controlled by host-guest interactions have been developed. The introduction of a 1:1 inclusion complex into a hydrogel is a popular design for achieving a change in cross-linking density. To realize faster and larger deformation properties, the introduction of a 1:2 inclusion complex is effective because the alteration in cross-linking density in a hydrogel with 1:2 complexes is larger than that in a hydrogel with 1:1 complexes. A redox-responsive hydrogel actuator cross-linked with 1:2 inclusion complexes is designed, where γ -cyclodextrin (γ CD) and viologens modified with an alkyl chain derivative (VC11) were employed as the host and guest units, respectively. γ CD includes two VC11 molecules in its cavity. The obtained γ CD-VC11 hydrogel cross-linked with the 1:2 complex showed faster and larger deformation behaviour than the α CD-VC11 and the β CD-VC11 hydrogels cross-linked with a 1:1 complex. The deformation ratio and response speed of the γ CD-VC11 hydrogel, which forms a supramolecular cross-linking structure by stimuli, are 3 and 11 times larger, respectively, than those of our previous hydrogel consisting of a β CD/ferrocene 1:1 inclusion complex.

Comment: The idea of deformation of this type of materials fabricated by host-guest interaction strategies is not novel, but they optimize the design, resulting in the formation of well-performing hydrogels. If you are interested in stimuli-responsive, especially deforming materials, I suggest you to read it.

Divergent Self-Assembly Pathways to Hierarchically Organized Networks of Isopeptide-Modified Discotics under Kinetic Control

Van den Berg, M. A.; Sahoo, J. K.; Zou, L.; McCarthy, W.; Webber, M. J. *ACS Nano* **2020**, ASAP.

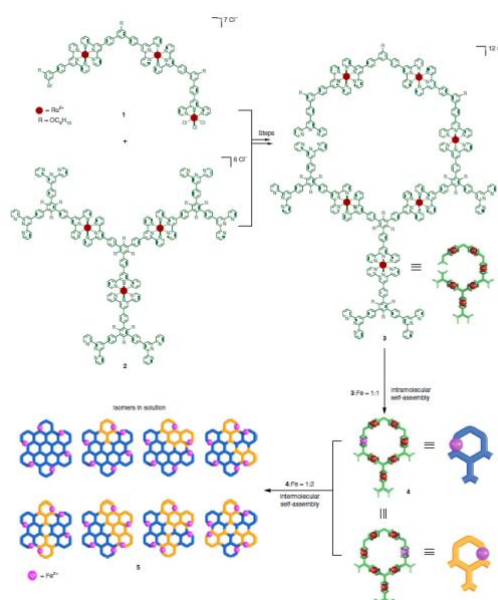


Natural proteins traverse complex free energy landscapes to assemble into hierarchically organized structures, often through stimuli-directed kinetic pathways in response to relevant biological cues. Bioinspired strategies have sought to emulate the complexity, dynamicity, and modularity exhibited in these natural processes with synthetic analogues. However, these efforts are limited by many factors that complicate the rational design and predictable assembly of synthetic constructs, especially in aqueous environments. Herein, a model discotic amphiphile gelator is described that undergoes pathway-dependent structural maturation when exposed to varying application rates of a pH stimulus, investigated by electron microscopy, spectroscopy, and X-ray scattering techniques. Under the direction of a slowly changing pH stimulus, complex hierarchical assemblies result, characterized by mesoscale elongated “superstructure” bundles embedded in a percolated mesh of narrow nanofibers. In contrast, the assembly under a rapidly applied pH stimulus is characterized by homogeneous structures that are reminiscent of the superstructures arising from the more deliberate path, except with significantly reduced scale and concomitantly large increases in bulk rheological properties. This synthetic system bears resemblance to the pathway complexity and hierarchical ordering observed for native structures, such as collagen, and points to fundamental design principles that might be applied toward enhanced control of the properties of supramolecular self-assembly across length scales.

Comment: To emulate some of the comments often given: No, there is nothing new here. Nevertheless, enough attention is given to the details and the story is told following a good narrative. Lesson to learn: that is what it takes.

Intra- and intermolecular self-assembly of a 20-nm-wide supramolecular hexagonal grid

Zhang, Z.; Li, Y.*; Song, B.; Zhang, Y.*; Jiang, X.; Wang, M.; Trumbleson, R.; Liu, C.; Wang, P.; Hao, X.; Rojas, T.; Ngo, A.; Sessler, J.*; Newkome, G.; Hla, S.*; Li, X.* *Nat. Chem.* 2020, *ASAP*.



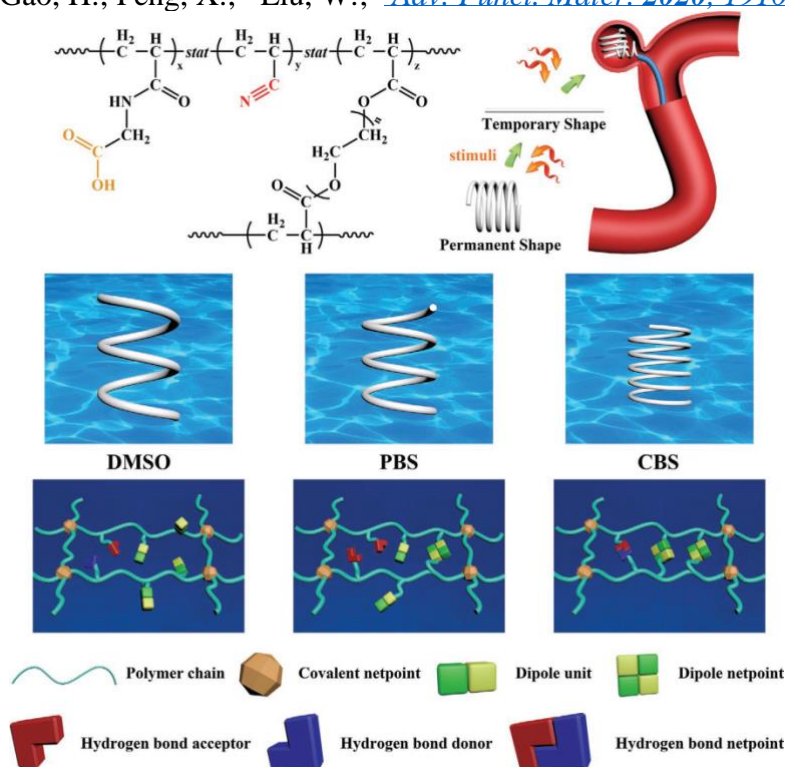
For the past three decades, the coordination-driven self-assembly of three-dimensional structures has undergone rapid progress; however, parallel efforts to create large discrete two-dimensional architectures—as opposed to polymers—have met with limited success. The synthesis of metallo-supramolecular systems with well-defined shapes and sizes in the range of 10–100 nm remains challenging. Here we report the construction of a series of giant supramolecular

grids, with diameters on the order of 20 nm and molecular weights greater than 65 kDa, through a combination of intra- and intermolecular metal-mediated self-assembly steps. The hexagonal intermediates and the resulting self-assembled grid architectures were imaged at submolecular resolution by scanning tunnelling microscopy. Characterization (including by scanning tunnelling spectroscopy) enabled the unambiguous atomic-scale determination of fourteen hexagonal grid isomers.

Comment: The design strategy shown in this paper led to the construction of many structural isomers both in solution and on a supporting metal surface. This bottom-up preparation strategy can achieve 20-nm-sized molecules with precisely controlled shapes and structures. Notice the **five** corresponding authors!

Stiffness Self-Tuned Shape Memory Hydrogels for Embolization of Aneurysm

Liu, B.; Xu, Z.; Gao, H.; Feng, X.;* Liu, W.;* *Adv. Funct. Mater.* 2020, 1910197.

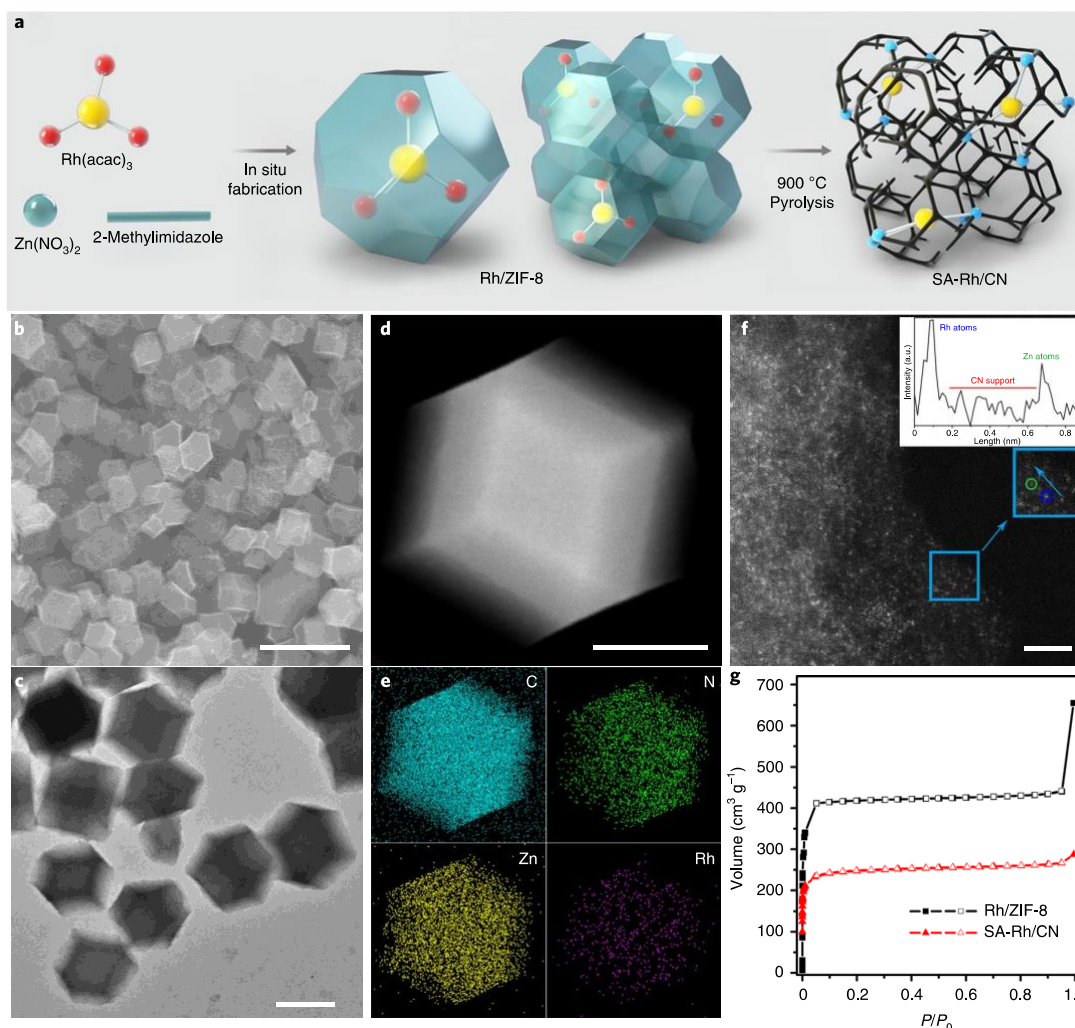


An aneurysm is a life-threatening vascular disease. Embolization with shape memory (SM) hydrogel coils is promising for the treatment of the intractable aneurysms. However, single temperature-triggered SM is softened in a catheter, and delivery of multiple coils is required, which may clog the catheter and complicate operation procedure. Here, a radiopaque temperature/pH dual responsive shape memory hydrogel with self-tuned stiffness is fabricated by copolymerizing acrylonitrile (AN, dipole–dipole interaction monomer), N-acryloyl 2-glycine (ACG, pH-sensitive H-bonding monomer), and polyethylene glycol diacrylate. Under slightly acidic conditions without eliciting cytotoxicity, additional supramolecular PACG hydrogen bonds combined with cyano dipole–dipole pairings contribute to the body temperature-triggered SM effect with an unprecedented high 430 MPa (10 °C) and 16 MPa (37 °C) Young's modulus. A carotid aneurysm is created in a dog to test the embolization of this SM hydrogel. At 37 °C, the hydrogel's high stiffness ensures its smooth delivery through a catheter. After being transported into the aneurysm sac, secondary swelling occurs concurrent with appropriate decrease of stiffness upon contacting neutral blood, thus enhancing the packing density and reducing recanalization rate and delivery times. This stiffness adaptive SM hydrogel holds its great potential as permanent embolic agents for treating a variety of aneurysms.

Comment: A dual stimuli-responsive shape memory hydrogel with self-tuned stiffness was constructed by a simple one-step polymerization. This hydrogel can be used to treat disease such as aneurysm. I think it would be important to find some realistic applications for the constructed material.

Single-atom Rh/N-doped carbon electrocatalyst for formic acid oxidation

Y. Xiong, J. Dong, Z.-. Huang, P. Xin, W. Chen, Y. Wang, Z. Li, Z. Jin, W. Xing, Z. Zhuang, J. Ye, X. Wei, R. Cao, L. Gu, S. Sun, L. Zhuang, X. Chen, H. Yang, C. Che, Q. Peng, C.-R. Chang, D. Wang* and Y. Li* *Nat. Nanotechnol.*, 2020, ASAP.

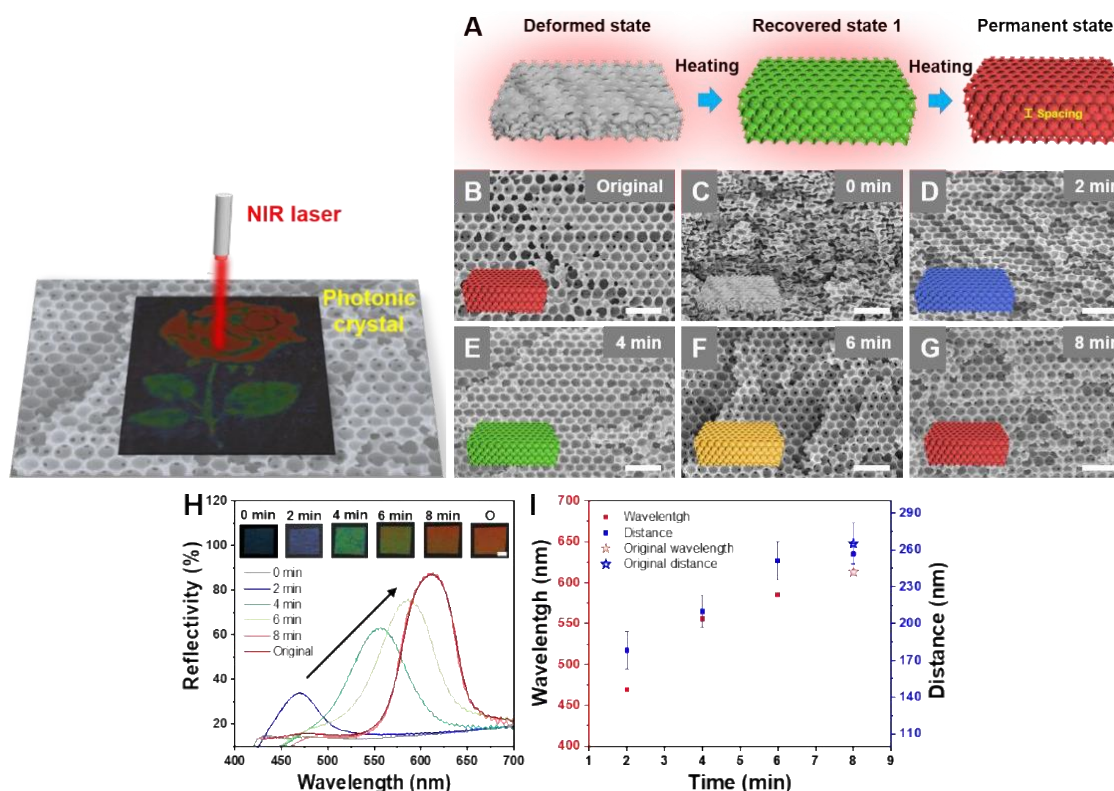


To meet the requirements of potential applications, it is of great importance to explore new catalysts for formic acid oxidation that have both ultra-high mass activity and CO resistance. Here, we successfully synthesize atomically dispersed Rh on N-doped carbon (SA-Rh/CN) and discover that SA-Rh/CN exhibits promising electrocatalytic properties for formic acid oxidation. The mass activity shows 28- and 67-fold enhancements compared with state-of-the-art Pd/C and Pt/C, respectively, despite the low activity of Rh/C. Interestingly, SA-Rh/CN exhibits greatly enhanced tolerance to CO poisoning, and Rh atoms in SA-Rh/CN resist sintering after long-term testing, resulting in excellent catalytic stability. Density functional theory calculations suggest that the formate route is more favourable on SA-Rh/CN. According to calculations, the high barrier to produce CO, together with the relatively unfavourable binding with CO, contribute to its CO tolerance.

Comment: Single-atom catalysts (SACs) which contain isolated metal atoms that are singly dispersed or anchored on a substrate are very promising materials because of their simple structure and modifiability. The author achieved to use SA-Rh/CN as an anodic electrocatalyst in direct formic acid fuel cells and the performance and stability are also very high compared with state-of-the-art Pd/C and Pt/C.

Inkless Multi-Color Writing and Copying of Laser-Programmable Photonic Crystals

Y. Wang, Q. Zhao and X. Du* *Mater. Horiz.* 2020, *ASAP*.



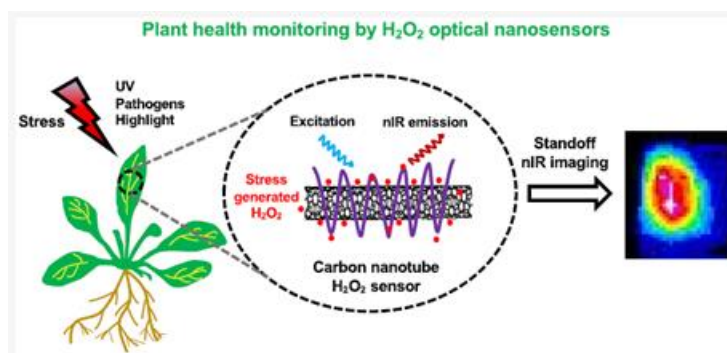
Rewritable papers, as an environmentally friendly alternative for information delivery, hold great promise to reduce the abundant uses of ordinary papers that cause severe environmental problems. In recent decades, photonic crystals (PCs) have shown great potential in developing rewritable papers. However, existing PC papers still confront many challenges, including poor storage stability, short-cycle lifetime, monotonous colors, and absence of copying capability. Herein, we report the fabrication of a rewritable PC paper based on programmable configurations of a synthesized shape memory polymer (SMP). The resulting SMP-based PC paper does not need additional inks and can be facily written by near infrared (NIR) light with assistance from a pre-printed black paper as a photothermal layer. Heating from the black paper induces various stable configurations of the PCs, thus creating multiple colors in the irradiated areas. Moreover, the PC paper possesses excellent colorful copying capability that can transform information from a paper with pre-printed black letters or complex images via scanning with NIR light. These images can be stably stored for more than 6 months at ambient conditions, which can be even erased and rewritten over 50 times without significant loss in color quality. This environment- friendly SMP-based PC paper with extraordinary properties holds great promise in the fields of next-generation office papers, smart price tags, and anti-counterfeiting labels.

Comment: It is difficult to understand what is the new in this work because similar concept was already achieved by using photonic crystals and cholesteric liquid crystals. In this paper, to change

the color of photonic crystal it is necessary to heat by NIR laser, but to keep the changed color it is necessary not only the temperature but also mechanical stress (compression). Therefore, two external stimuli (temperature and mechanical force) are necessary for driving this material.

Monitoring Plant Health with Near-Infrared Fluorescent H₂O₂ Nanosensors

Wu, H.; Nißler, R.; Morris, V.; Herrmann, N.; Hu, P.; Jeon, S.-J.; Kruss, S.; Giraldo, J. P. *Nano Lett.* **2020**

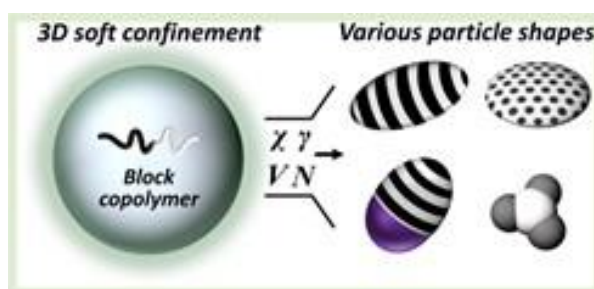


Near-infrared (nIR) fluorescent single-walled carbon nanotubes (SWCNTs) were designed and interfaced with leaves of *Arabidopsis thaliana* plants to report hydrogen peroxide (H₂O₂), a key signaling molecule associated with the onset of plant stress. The sensor nIR fluorescence response (>900 nm) is quenched by H₂O₂ with selectivity against other stress-associated signaling molecules and within the plant physiological range (10–100 H₂O₂ μM). In vivo remote nIR imaging of H₂O₂ sensors enabled optical monitoring of plant health in response to stresses including UV-B light (–11%), high light (–6%), and a pathogen-related peptide (flg22) (–10%), but not mechanical leaf wounding (<3%). The sensor's high biocompatibility was reflected on similar leaf cell death (<5%) and photosynthetic rates to controls without SWCNT. These optical nanosensors report early signs of stress and will improve our understanding of plant stress communication, provide novel tools for precision agriculture, and optimize the use of agrochemicals in the environment.

Comment: This isn't really related with the group concerns. However, it made me wonder (probably too much) about the stress of plant. Authors describe a nice method to record it meaning plants can actually be stressed, thus, can they suffer?

100th Anniversary of Macromolecular Science Viewpoint: Block Copolymer Particles: Tuning Shape, Interfaces, and Morphology

Shin, J. J.; Kim, E. J.; Ku, K. H.; Lee, Y. J.; Hawker, C. J.; Kim, B. J. 100th *ACS Macro Lett.* **2020**, *9*, 306–317.

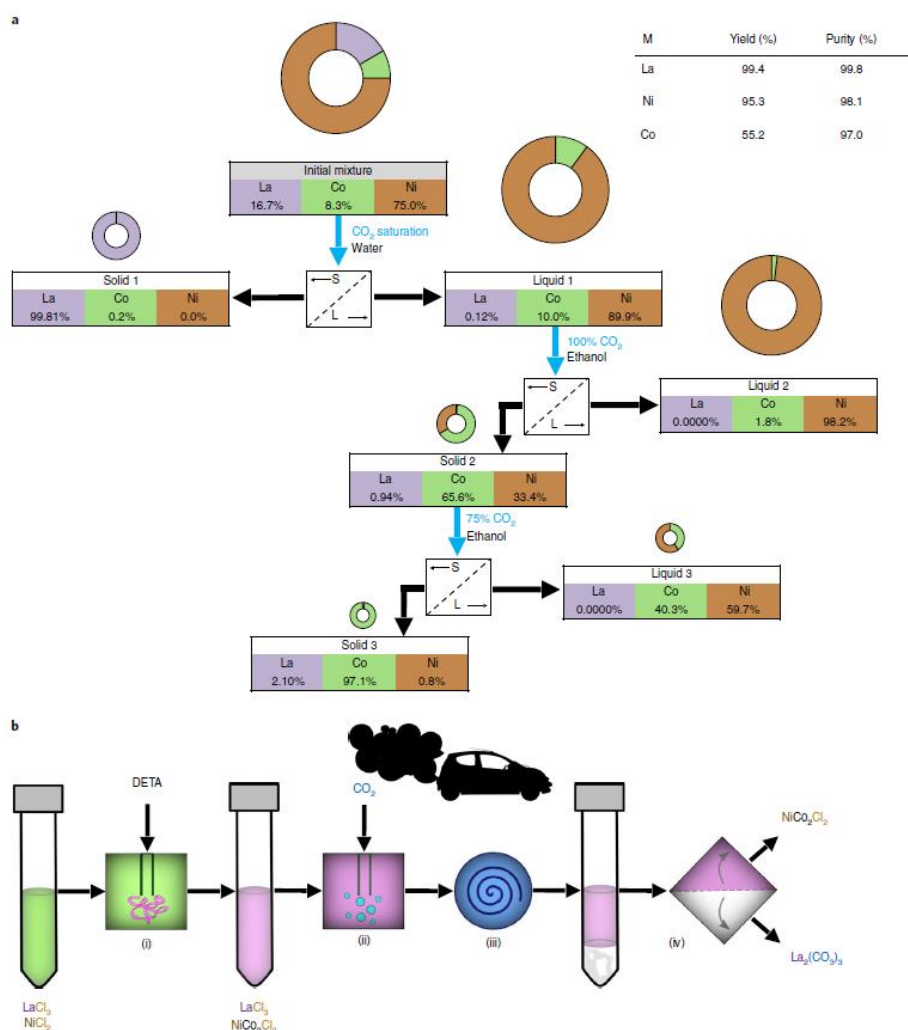


Confined assembly of block copolymers (BCPs) is receiving increasing attention due to the ability to create unconventional morphologies that cannot be observed in the corresponding bulk systems. This effect is further driven by the simplicity and versatility of these procedures for controlling the shape of particles prepared by 3D soft confinement of BCPs in emulsions. By taking advantage of a mobile emulsion interface, the one-step formation of nonspherical BCP particles through spontaneous deformation is possible with design principles and theoretical models for controlling shape/ nanostructure now being established. This Viewpoint highlights strategies for shape tuning of BCP particles, currently accessible shapes, their controllability, and potential application. The emergence of 3D soft confinement of BCPs and related theory is overviewed with a focus on current strategies, types of nonspherical shapes achieved, and structure–property relationships for nonspherical BCP particles. Finally, the applications and future perspectives for these materials are discussed.

Comment: A quite comprehensive, nicely written review on diblock copolymers architectures. I am still surprised by the number of morphologies accessible by self-organization of diblock copolymers.

Simultaneous CO₂ Capture and Metal Purification from Waste Streams Using Triple-Level Dynamic Combinatorial Chemistry

Septavaux, J.; Tosi, C.; Jame, P.; Nervi, C.; Gobetto, R.; Leclaire, J.* *Nat. Chem.* **2020**.

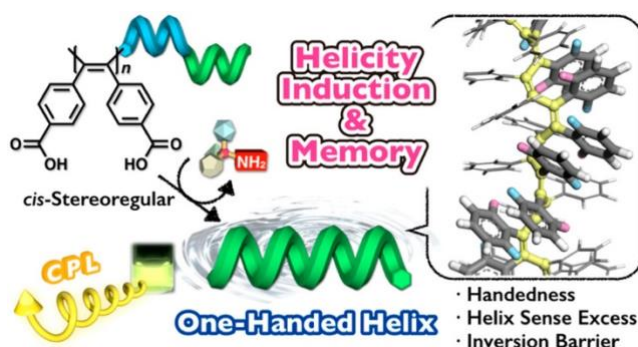


A reduction in CO₂ emissions is required to mitigate global warming. Post-combustion carbon capture is one of the most developed technologies that has the potential to meet this goal, but its cost prevents its widespread use. A different approach would be to use CO₂ directly as it is captured, before it is stored. Here we explore spontaneous CO₂ fixation by industrial polyamines as a strategy to generate dynamic libraries of ligands for metal separation and recovery. We identify the CO₂ loadings and solvents promoting the optimal precipitation of each metal from the dynamic libraries of complexes. We demonstrate the separation of lanthanum and nickel using the exhaust gas of an internal combustion engine vehicle, and show that the three metal constituents of the La₂Ni₉Co alloys used to manufacture the batteries of electric vehicles can be separated and recovered by successive CO₂-induced selective precipitations. Beyond the concept of CO₂-sourced multi-level dynamic coordination chemistry, this study provides a potential framework for integrated CO₂ capture and use through sustainable processes.

Comment: To be honest, I could not 100% understand how this complex system works. But, considering the academic level of nature chemistry, I still recommend this paper to you. Enjoy!

Helix-Sense-Selective Synthesis of Right- and Left-Handed Helical Luminescent Poly(diphenylacetylene)s with Memory of the Macromolecular Helicity and Their Helical Structures

Maeda, K.; Nozaki, M.; Hashimoto, K.; Shimomura, K.; Hirose, D.; Nishimura, T.; Yashima, E. * *J. Am. Chem. Soc.*, 2020.

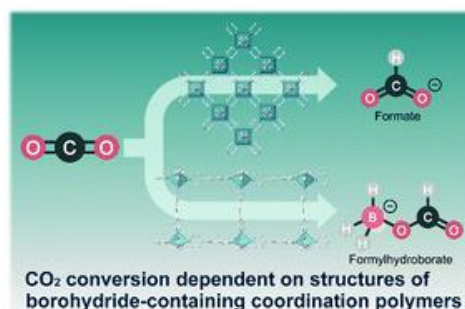


Symmetrically substituted poly(diphenylacetylene) (PDPA) bearing carboxy pendants was found to fold into a one-handed helix upon thermal annealing with nonracemic amines in water accompanied by chiral amplification of the helicity. The induced right- or left-handed helical PDPA was retained (memorized) after complete removal of the chiral amines, thus producing a one-handed helical circularly polarized luminescent PDPA in a helix-sense-selective manner. The helical PDPA with static helicity memory is tolerant toward modification of carboxy pendants, providing functional PDPAs with an optical activity solely due to macromolecular helicity. The PDPA and its derivatives before and after the one-handed helicity induction and its subsequent memory of the helicity exhibited well-resolved very simple ¹H and ¹³C NMR and Raman spectra whose spectral patterns are virtually identical independent of the helical sense bias. On the basis of the ¹H and ¹³C NMR, IR, Raman, and vibrational and electronic circular dichroism spectral measurement results combined with theoretical calculations, the key structural features (*cis* or *trans* and *cisoid* or *transoid*) of the PDPA as well as its helix inversion barrier and absolute handedness (right- or left-handed helix) and helix-sense excess of the one-handed helical PDPA and its derivatives with static helicity memory were determined. As a result, almost complete right- and left-handed helical *cis-transoid* PDPAs with 98% helix-sense excess were successfully obtained using noncovalent helicity induction and memory strategy.

Comment: The highlight on this paper is more lying on the organic synthetic routes. This versatile method in water in a helix-sense-selective manner is also very interesting.

Reactivity of Borohydride Incorporated in Coordination Polymers toward Carbon Dioxide

Kadota, K.; Sivaniah, E.; Horike, S.* *Chem. Commun.* 2020

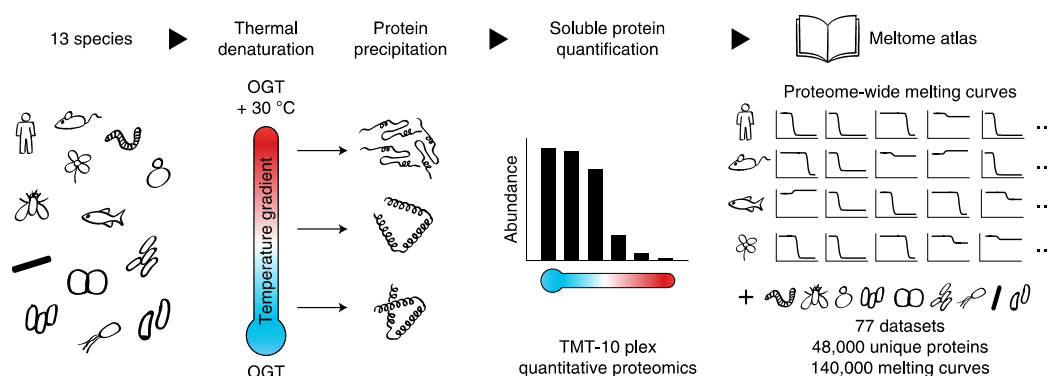


Borohydride (BH₄⁻)-containing coordination polymers converted CO₂ into HCO₂⁻ or [BH₃(OCHO)]⁻, whose reaction routes were affected by the electronegativity of metal ions and the coordination mode of BH₄⁻. The reactions were investigated using thermal gravimetric analysis under CO₂ gas flow, infrared spectroscopy, and NMR experiments.

Comment: This short article focuses on the reduction of CO₂ inside of MOFs using borohydride. I think that the authors manage to explore efficiently the feasibility of this approach as they remained quite cautious in their claiming. However, I have to admit that it may be difficult to fully understand the different problematics encountered in this paper as it is clearly not addressed to neophytes.

Meltome Atlas—Thermal Proteome Stability across the Tree of Life

Jarzab, A.; Kurzawa, N.; Hopf, T.; Moerch, M.; Zecha, J.; Leijten, N.; Bian, Y.; Musiol, E.; Maschberger, M.; Stoehr, G.; et al. *Nat. Methods* 2020



We have used a mass spectrometry-based proteomic approach to compile an atlas of the thermal stability of 48,000 proteins across 13 species ranging from archaea to humans and covering melting temperatures of 30–90 °C. Protein sequence, composition and size affect thermal stability in prokaryotes and eukaryotic proteins show a nonlinear relationship between the

degree of disordered protein structure and thermal stability. The data indicate that evolutionary conservation of protein complexes is reflected by similar thermal stability of their proteins, and we show examples in which genomic alterations can affect thermal stability. Proteins of the respiratory chain were found to be very stable in many organisms, and human mitochondria showed close to normal respiration at 46 °C. We also noted cell-type-specific effects that can affect protein stability or the efficacy of drugs. This meltome atlas broadly defines the proteome amenable to thermal profiling in biology and drug discovery and can be explored online at <http://meltomeatlas.proteomics.wzw.tum.de:5003/> and <http://www.proteomicsdb.org>.

Comment: I expected a complete paper and all I can say is that I am not disappointed. This article is massive and is surprisingly understandable. The authors really made tremendous efforts in this aspect. The study is interesting although the results are not too surprising. Cold bacterium like cold environment and the thermophile ones can withstand really high temperatures. What a surprise! Anyway, I would still recommend to check this paper, it is worth it.