SEPTEMBER 2025

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September 10th, 11h
Room 101, 1st Floor
Corridor 32 - 42
Campus P et M Curie
Sorbonne Université

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Hisako HASHIMOTO (Tohoku University, Sendai, Japan)
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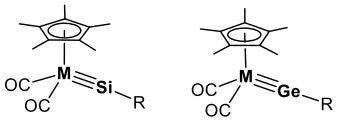
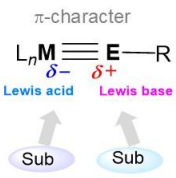
Heavier Carbyne Complexes of Group 6 Metals: From Synthesis to Catalytic Applications

Abstract. Heavier analogs of carbyne complexes, namely, tetrylyne complexes featuring M≡E bonds (E = Si–Pb), have garnered significant attention due to their potential catalytic activity, inspired by the well-established chemistry of carbyne complexes. Although significant advances have been made in this field over the past two decades, studies on reactivity remain limited, and catalytic transformations involving tetrylyne complexes have only recently been reported by our group.

In this talk, I will present our work on the silicon and germanium analogues of carbyne complexes of group 6 metals, focusing on their synthesis, structural characterization, and fundamental reactivity toward organic substrates such as carbodiimides, imines, aldehydes, and alkynes. I will also discuss their catalytic activity in the hydrosilylation of carbonyl compounds, which represents the first catalytic example involving a tetrylyne complex. The reaction mechanism is proposed based on DFT calculations and kinetic studies.



M = Group 6 transition metals



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September 15th, 11h
Auditorium Astier
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Birgit WEBER (Institute for Inorganic and Analytical Chemistry, Friedrich Schiller University Jena, Germany)
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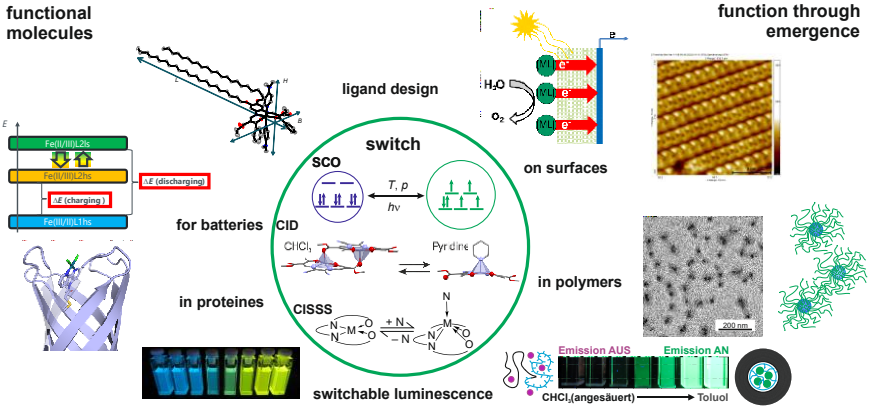
The spin state matters – from switchable complexes to catalysis

Abstract. The synthesis of multifunctional materials is generally considered an important step from basic research to more application-oriented research. One way to realize such materials is the use of switchable complexes. Here, different switching possibilities are available, such as iron(II) spin crossover (SCO) complexes, nickel(II) based coordination induced spin state switching (CISSS), or coordination induced dissociation (CID) for zinc(II) complexes. In all cases, the switching can be triggered by a wide range of physical or chemical stimuli. Structural and/or electronic changes associated with this transition can be exploited for applications, e.g., in the field of sensors.
To allow for a better readout, the combination of the switching process with a luminescence readout is desirable. Here, we will illustrate three different possibilities based on the different switching types. We will discuss which preconditions need to be fulfilled to observe luminescence for open-shell 3d metal centers and how the different sensing units can be integrated in self-assembled dBCP micelles to improve their processing.
Luminescent 3d metal complexes are not only of interest for their potential sensing application, but they might also serve as photocatalysts. Our first results on the use of the complexes as catalysts will be presented and how our experience with composite materials can be transferred to catalytic applications.



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September 22nd, 11h
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Tatiana BESSET (INSA Rouen Normandie, Univ Rouen Normandie, Univ Caen Normandie, ENSICAEN, CNRS, Institut CARMeN (UMR 6064), F-76000 Rouen, France)
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Synthetic Development To Access Fluorinated Molecules

Abstract. Organofluorine chemistry is a fascinating research field in rapid expansion. Beyond the strong interest that represents fluorinated molecules in materials science, pharmaceuticals and agrochemicals as well as modern drug design, innovation is still required to push further the boundaries of knowledge in this appealing research field and to achieve new synthetic challenges. Besides, the development of more sustainable transformations and among them, reactions based on transition metal catalyzed direct C-H bond functionalization have reshaped the field of organic chemistry over the last decade. In that context, aiming at designing new tools to access original fluorinated molecules, our group developed approaches combining organofluorine chemistry and transition metal catalyzed C-H bond functionalization. Such advances were possible thanks to the design of original reagents.

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September 29th, 11h
Auditorium Astier
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Raphaël FRÉDÉRICK (University of Louvain, Brussels, Belgium)
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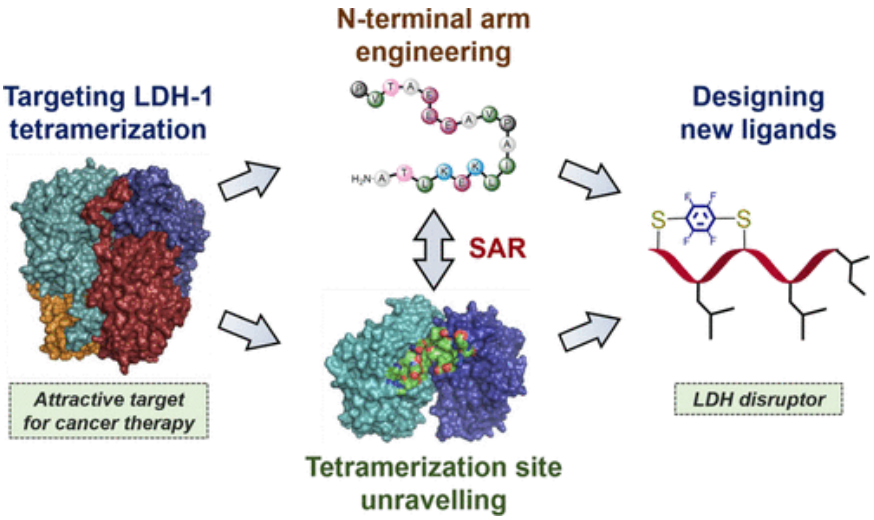
Targeting protein self-association in drug design

Abstract. The last two decades have seen the targeting of protein-protein interactions (PPIs) emerging as a new strategy of drug design. This strategy allowed to tackle challenging drug targets – sometimes called undruggable – whose active site cannot usually be drugged. From cancer therapy to anti-infectious agents, reports of successful therapeutics targeting PPIs are now numerous. Besides these therapeutic strategies, the last years witnessed the ever-growing importance of chemical biology, as well as a significant technical progress that has unlocked the study and targeting of more and more challenging protein interfaces. Among these new landscapes resides the targeting of self-assembling proteins. Indeed, so far, most molecules targeting PPIs have been designed to interact at heteromeric interfaces, ie surfaces between distinct protein chains.

The originality of our approach is to extend the methodology to homomeric interfaces, ie targeting PPIs between monomers of the same drug target in order to disrupt its quaternary structure. These numerous PPIs constitute an underexplored pool of potential targets for therapeutic interventions.

In this talk, the concept of homomeric disruption as a strategy to target challenging or previously undruggable proteins will be illustrated through our recent work. Specifically, we focus on targeting (i) the tetramerization site of lactate dehydrogenase (LDH) using (stapled) peptides and small molecules and (ii) the tetramerization site of arginase (Arg-1). The presentation will highlight our use of biophysical and chemical biology tools to investigate protein self-assembly, including NMR spectroscopy (WaterLOGSY experiments), differential scanning fluorimetry (DSF), microscale thermophoresis (MST), mass photometry (MP), size-exclusion chromatography with multi-angle light scattering (SEC-MALS), fluorescence spectroscopy, and mass spectrometry.



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culturchem

OCTOBER 2025

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October 3rd, 15h
Auditorium 55 A
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Makoto FUJITA (Institute of Advanced Studies, The University of Tokyo (UTIAS), Tokyo. Division of Advanced Molecular Science, Institute for Molecular Science (IMS), Okazaki, Aichi)
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Coordination Self-Assembly: From Origins to the Latest Advances

Abstract. Molecular self-assembly based on coordination chemistry has made an explosive development in recent years. Over the last >30 years, we have been showing that the simple combination of transition-metal's geometry (typically, a 90 degree coordination angle of Pd(II) center) with organic bridging ligands gives rise to the quantitative self-assembly of nano-sized, discrete organic frameworks. Representative examples include square molecules (1990), linked-ring molecules (1994), cages (1995), capsules (1999), and tubes (2004) that are self-assembled from simple and small components. Originated from these earlier works, current interests in our group focus on i) molecular confinement effects in coordination cages, ii) solution chemistry in crystalline porous complexes (as applied to "crystalline sponge method"),[1] and iii) and giant self-assemblies[2], as disclosed in this lecture.

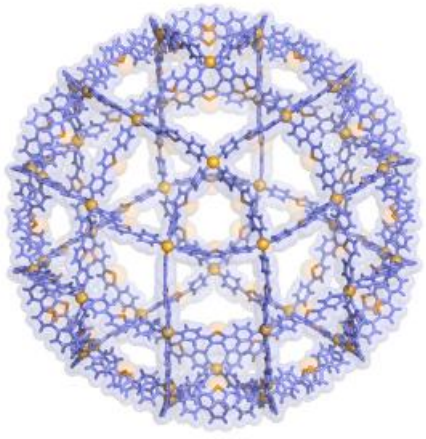

Figure 1. X-ray structure of $M_{48}L_{96}$ complex.

Reference
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[2] D. Fujita, Y. Ueda, S. Sato, N. Mizuno, T. Kumasaka, M. Fujita, *Nature* **2016**, 540, 563.

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October 6th, 11h
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Luca ROCCHIGIANI (University of Perugia)
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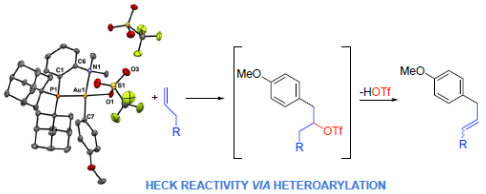
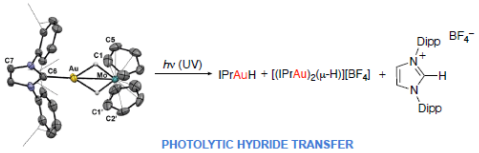
Searching for El Dorado: Mechanistic Adventures in Organogold Chemistry

Abstract. Homogeneous gold catalysis has undergone an impressive development over the past decade, both in scope and applications. These improvements have been mirrored by a giant leap in the understanding of the behaviour of organogold complexes, which moved from being a mere scientific curiosity to making a well-established class of molecular compounds with characteristic properties.1 Despite these advancements, the intimate mode of action of gold catalysts in many reactions remains obscure owing to the difficulties in stabilizing catalytically relevant intermediates and dissecting their fundamental chemical reactivity. In this talk, we will describe our mechanistic approach to elucidate the behaviour of Au(I) and Au(III) species in selected catalytically relevant reactions. Specifically, we will describe our efforts in underpinning the mechanism of i) the gold-catalyzed Heck reaction2 and ii) the photo-induced hydride transfer in Au(I)/tungstenocene and Au(I) molybocene dihydrido complexes.3 Such examples will showcase the unique reactivity of gold, as well as its reluctance to participate in reactions commonly seen with other isoelectronic transition metal complexes, and will clearly show that mechanistic assumptions made by analogy to other metallic systems are often misleading.



HECK REACTIVITY *VIA* HETEROARYLATION



PHOTOLYTIC HYDRIDE TRANSFER

References
(1) (a) Herrera, R. P.; Gimeno, M. C. *Chem. Rev*. **2021**, *121*, 8311–8363. (b) Rocchigiani, L; Bochmann, M. *Chem. Rev*. **2021**, *121*, 8364–8451.
(2) (a) Budzelaar, P. H. M.; Bochmann, M.; Landrini, M.; Rocchigiani, L. *Angew. Chem. Int. Ed*. **2024**, e202317774. (b) Budzelaar, P. H. M.; Rocchigiani, L.; Bochmann, M. *Chem. Eur. J*. **2025**, *31*, e202501645. (c) Campagnolo, F.; Armando, L.; Boccalon, E.; Cicolella, A.; Bochmann, M.; Talarico, G.; Rocchigiani, L. *ACS Org. Inorg. Au*, **2025**, in press.
(3) (a) Landrini, M.; Patel, R.; Tyrrell-Thrower, J.; Macchioni, A.; Hughes, D. L.; Tensi, L.; Hrobárik, P.; Rocchigiani, L. *Inorg. Chem*. **2024**, *63*, 13525-13545. (b) Landrini, M.; De Paolis, E.; Macchioni, A.; Tensi, L.; Hrobárik, P.; Rocchigiani, L. *Eur. J. Inorg. Chem* **2022**, e202200373. (c) Landrini, M.; Navarro, M.; Campos, J.; Rocchigiani, L. *Dalton Trans*. **2025**, *54*, 898-902.

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October 8th, 11h
Auditorium Herpin
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Mio KONDO (Institute of Science Tokyo (former Tokyo Institute of Technology – TITECH), Japan)
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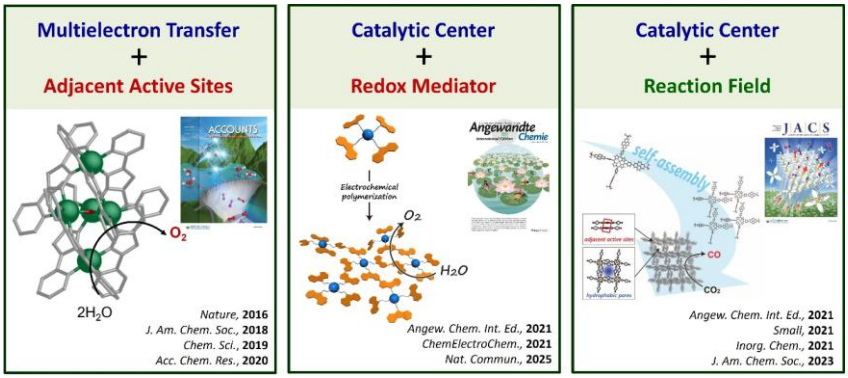
Development of catalytic systems for small molecule conversions inspired by natural photosynthesis

Abstract. Artificial photosynthesis is believed to be a viable solution to energy and environmental problems, as it can cleanly produce useful chemical energy sources from earth-abundant substances such as water and carbon dioxide. Among the two half-reactions involved in artificial photosynthesis, the oxidation half-reaction corresponds to the four-electron oxidation of water ($2H_2O \rightarrow O_2 + 4H^+ + 4e^-$), while the reduction of carbon dioxide or water. As both half-reactions are small-molecule transformations requiring catalysts, the development of highly efficient catalysts for small-molecule conversion is important. Natural photosynthesis achieves efficient small molecule conversions by the synergistic effect between (1) an active center with good reactivity, (2) charge-transporting sites close to the active center, and (3) substrate-transporting channels. Inspired by natural photosynthesis, we developed artificial catalytic systems for small molecule conversions, and obtained the highly active catalytic centers for water oxidation by the integration of multielectron transfer and bond formation ability[1]. Moreover, it was revealed that efficient catalytic systems for water oxidation can be constructed by the integration of active center and charge transfer sites[2,3]. In addition, we also demonstrated that efficient catalytic systems for carbon dioxide reduction can be obtained by the integration of adjacent active center and reaction field[4].



References

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2. H. Iwami, M. Okamura, M. Kondo, S. Masaoka, *Angew. Chem. Int. Ed*. 2021, **60**, 5965.
3. T. Matsuzaki, K. Kosugi, H. Iwami, T. Kambe, Y. Harada, D. Asakura, T. Uematsu, S. Kuwabata, Y. Saga, M. Kondo, S. Masaoka, *Nat. Commun*., 2025, **16**, 2145.
4. K. Kosugi, C. Akatsuka, H. Iwami, M. Kondo, S. Masaoka, *J. Am. Chem. Soc.*, 2023, **145**, 10451.

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October 13th, 11h
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Kenichiro ITAMI (RIKEN, Japan)
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Development of catalytic systems for small molecule conversions inspired by natural photosynthesis

Abstract. Our goal is to create one-of-a-kind molecules that combine structural beauty and unprecedented functionality, to make molecules active in the boundary areas between various fields, and to explore unexplored areas. To this end, we have focused on catalyst-enabling synthetic chemistry with broad directions, including applications in molecular nanocarbons, pharmaceuticals, and plant/animal chemical biology, and the development of rapid molecule-assembly methods using unique catalysts. In particular, we have pioneered molecular nanocarbon science by the bottom-up synthesis of structurally uniform nanocarbons of fundamental and practical importance. Representative achievements include: (1) the development of single-step aromatic π-extension (APEX) methods for the rapid and programmable synthesis of nanocarbon molecules (*Nat. Chem.* 2015, *Nat. Commun.* 2015, *Science* 2018, *Nat. Commun.* 2021); (2) the synthesis of carbon nanorings, nanobelts and pure nanotubes (*ACIE* 2009, *Nat. Chem.* 2013, *Science* 2017, *Nat. Commun.* 2018, *Nat. Commun.* 2019, *Nat. Chem.* 2021, *Nat. Synth.* 2022, *Nat. Commun.* 2025, *Science* 2025); and (3) the synthesis of topologically unique nanocarbons such as warped nanographenes, carbon nanocages, all-benzene catenanes, trefoil knots, and infinitene (*Nat. Chem.* 2013, *Science* 2019, *Nat. Catal.* 2020, *JACS* 2022).
After moving to RIKEN in 2024, we now are trying to promote integrated material creation research based on three pillars: the development of innovative molecular editing and manipulation methods (nanocarbon click chemistry), the creation of novel material functions (molecular nanocarbon materials science), and the deployment to biology and drug discovery (molecular nanocarbon biology). In this talk, brief overview of our representative molecular nanocarbons as well as our nanocarbon click chemistry will be described. In addition, our exciting yet somewhat crazy new endeavor toward molecular nanocarbon materials science and molecular nanocarbon biology will be described.

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October 20th, 11h
Auditorium Astier
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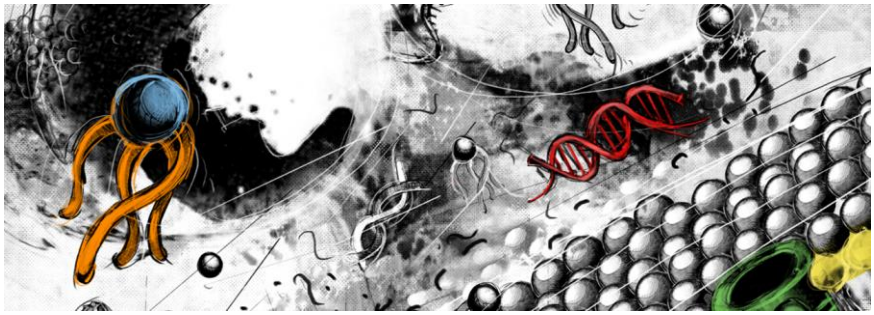
Sorbonne Université

Javier MONTENEGRO (Centro Singular de Investigación en Química Biolóxica e Materiais Moleculares (CIQUS), Universidade de Santiago de Compostela, Spain)
javier.montenegro@usc.es

Supramolecular Dynamic Chemistry for membrane transport and Biomimetic Systems

Abstract. Our research group is interested in the application of supramolecular chemistry to understand and manipulate biology. [1,2] Our work philosophy is based in the importance of weak and non-covalent forces to control the shape and the topology of biomolecules, which are governed by the principles described by supramolecular chemistry. These supramolecular lessons can then be applied to control the properties and function of biomolecules. We believe that by modulating the shape we can mimic, control and improve functional behaviour. With focus in supramolecular interactions for artificial membranes and tubular composites, we investigate the construction of synthetic systems for controlling and emulating biology and life-like soft systems. [3-4]



[1] Fuertes, A.; Juanes, M.; Granja, J.R.; Montenegro, J.; Chem. Commun. 2017, 53, 7861–7871.
[2] Lostalé-Seijo, I.; Montenegro, J.; Nat. Rev. Chem. 2018, 2, 258–277.
[3] Priegue, J.M.; Crisan, D.N.; Martínez-Costas, J.; Granja, J.R.; Fernandez-Trillo, F.; Montenegro, J.; Angew. Chem. Int. Ed. 2016, 55, 7492–7495. b) Lostalé-Seijo, I.; Louzao, I.; Juanes, M.; Montenegro, J.; Chem. Sci. 2017, 8, 7923–7931. c) Barba-Bon, A. et al. Nature, 2022, 603, 637–642.
[4] Insua, I.; Montenegro, J.; J. Am. Chem. Soc. 2020, 142, 1, 300-307, b) Méndez-Ardoy, A.; Granja, J.R.; Montenegro, J.; Nanoscale Horizons, 2018, 3, 391-396. c) Méndez-Ardoy, A. et al. Angew. Chem. Int. Ed. 2020, 59, 6902–6908. d) Booth, R., Insua, I., Ahmed, S., Rioboo, A. & Montenegro, J.; Nat Commun. 2021, 12, 6421.

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NOVEMBER 2025

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November 3rd, 11h
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Thomas BODDAERT (Université Paris-Saclay, ICMMO, Orsay)
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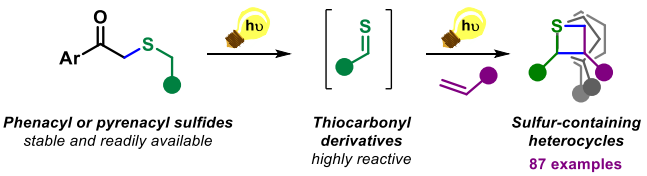
Sulfur in the Spotlight: Access to Diverse Sulfur-Containing Heterocycles

Abstract. Photochemical reactions constitute powerful tools for the creation of chemical diversity from simple and readily available starting materials. They provide access to complex molecular structures that are difficult to obtain using other methodologies. These transformations induced by light absorption are attractive in the context of sustainable development and they can address this challenge more efficiently when they are incorporated in multiple bond-forming transformation processes, such as domino reactions.
In this context, thiocarbonyl compounds have been underexploited due to their high instability and most studies involving these derivatives date from several decades ago. We have therefore recently decided to reinvestigate the photochemistry of these derivatives by generating them in situ through a Norrish-II fragmentation of phenacyl or pyrenacyl sulfides. A library of functionalized sulfur-containing heterocycles, such as thietanes, dithianes or tetrahydrothiophenes, was selectively synthesized by combining this approach with a thia-Paternò-Büchi reaction and photochemical ring enlargements of the thietane intermediates.



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November 10th, 11h
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Antoine MARUANI (Université Paris Cité – CNRS, Paris, France)
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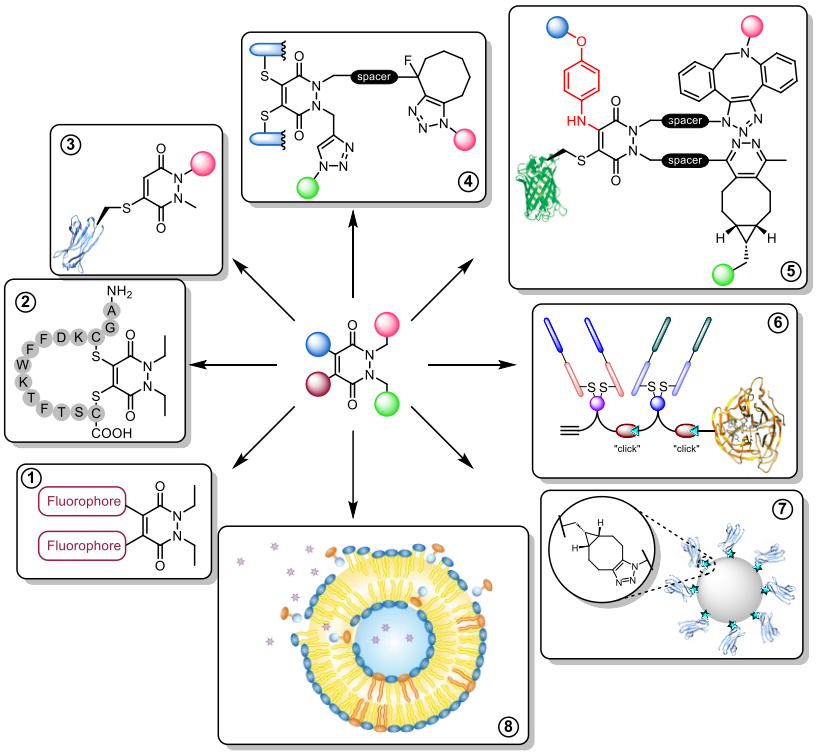
Small modular organic scaffold for large biomolecule assembly – a pyridazinedione story

Abstract. The ability to precisely and selectively modify biomolecules underpins many of the most exciting advances in chemical biology and biotherapeutics. Achieving such control, however, remains a central challenge: biological systems are complex, and most biomolecules present multiple reactive sites of similar chemical nature. *Click chemistry* and *bioorthogonal reactions* have transformed this landscape by providing highly selective and efficient tools that operate under mild conditions. These strategies enable researchers to build molecular precision into proteins, peptides, and other biopolymers, opening new avenues for targeted drug delivery, imaging, and diagnostics.

In this talk, I will focus on the development and application of a small modular organic scaffold named *pyridazinedione* as a versatile platform for site-selective bioconjugation. Particular attention will be given to antibody modification and its implications for cancer research, where fine-tuning conjugation chemistry is critical for the performance of antibody–drug conjugates and related constructs. Beyond antibodies, I will showcase how this scaffold can be extended to the assembly of diverse molecular architectures.

Ultimately, this presentation will highlight how thoughtful chemical design can offer elegant and practical solutions to pressing challenges in biology.



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November 14th, 11h
Room 101, 1st Floor
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CNRS SILVER METAL for 2024

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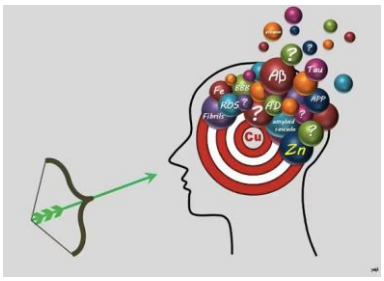
Contribution of coordination chemistry to a better understanding of Alzheimer's disease and to an improved design of drug candidates

Abstract. Alzheimer's disease (AD) is a neurodegenerative disorder characterized post-mortem by amyloid deposits consisting of aggregates of amyloid-β (Aβ) peptides and containing high levels of Cu and Zn metal ions. They have been implicated in early processes linked to the development of the disease, namely the modulation of Aβ peptide self-assembly but also the participation in oxidative stress, via the production of reactive oxygen species (ROS) induced by the Cu(Aβ) complex. These effects will be described at both molecular (ROS production) and supra-molecular levels (peptide self-assembly). Therapeutic approaches will also be illustrated, focusing on Cu-selective chelators and inorganic Aβ self-assembly modulators.



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November 14th, 16h
Room 101, 1st Floor
Corridor 32-42
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Sorbonne Université

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Robert POLLICE (University of Groningen)
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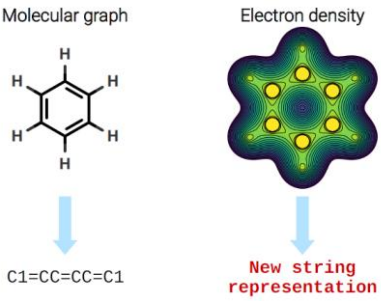
Data and Representations for Machine Learning in Chemistry

Abstract. Our research group, the Artificial Organic Chemistry Lab, lies at the interface of organic chemistry and machine learning. In this lecture, I will talk about two ongoing research projects in the realm of inverse molecular design. First, I will share a new algorithm that we developed that allows us to make existing approaches for systematic exploration of the chemical space via molecular string representations more powerful and discover substantially more molecules. Second, I will introduce our work on a quantum chemistry-based molecular string representation that allows us to generate faithful representations for structures that cannot be handled with classical string representations. We apply this representation in deep generative models that leverage the expressive power of this representation to cover the chemical structure space more comprehensively than classical approaches.



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November 17th, 11h
Auditorium Moissan
Chimie ParisTech - PSL
11, rue P.et M. Curie

Contact:
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(emmanuel.lacote
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Cathleen CRUDDEN (Queen's University, Canada)
cruddenc@chem.queensu.ca
Organometallics in Materials Chemistry: N-heterocyclic carbene-based SAMs and nanoclusters

Abstract. The use of N-heterocyclic carbenes to modify homogeneous metal catalysts is widespread since the high metal–NHC bond strength renders high oxidative and chemical stability to NHC–ligated metal complexes. Despite this fact, the use of NHCs to modify metal surfaces has received little attention until recently.
We will describe the use of NHC ligands to stabilize metal surfaces, including gold, copper, silver, platinum, ruthenium, and cobalt. Self-assembled monolayers prepared by the deposition of NHCs show molecular ordering on the surface and remarkable stability. The impact of NHCs on the chemistry of nanoclusters will also be discussed, including the preparation of chiral NHC-stabilized Au nanoclusters, the use of NHC-stabilized clusters in biological studies and in catalysis

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November 24th, 11h
Auditorium Astier
Building Esclangon
Campus P et M Curie
Sorbonne Université

Contact:
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Clément FALAISE (Institut Lavoisier de Versailles)
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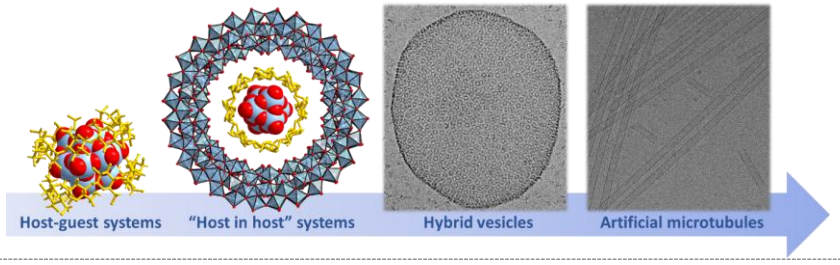
The Chaotropic Effect: From Counterintuitive Host–Guest Associations to the Design of Bioinspired Superstructures

Abstract. Ten years ago, Stoddart's group discovered that nanosized ions exhibit an unexpected yet remarkable affinity for cyclodextrins in water, opening new avenues in supramolecular chemistry. This high affinity is now recognized as a previously underestimated driving force, known as the chaotropic effect. In this presentation, I will highlight our most significant discoveries regarding the application of the chaotropic effect in the chemistry of inorganic polyanions, including polyoxometalates and other clusters.



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culturchem

DECEMBER 2025

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December 1st, 11h
Chimie ParisTech-PSL
Auditorium Friedel

Isabelle CHATAIGNER (Institut CARMeN – UMR 6064 – Université de Rouen Normandie and LCT – UMR 7616 – Sorbonne Université)
Isabelle.chataigner@univ-rouen.fr

Cycloadditions of Electron-Deficient Arenes: Exploring New Dearomatization Pathways

Abstract: Involving arenes in dearomatizing (cyclo)addition reactions is an attractive and convergent approach to construct complex 3D polycycles from easily accessible substrates. It remains challenging because of their intrinsic stability. In this context, electron-poor arenes such as nitro- or cyano- substituted aromatics are interesting substrates, easily accessible from S_EAr reactions. They allow to carry out various dearomatizing reactions when reacted with nucleophilic species in cyclodditions or annulations, under high pressure conditions, using photocatalysis or flow conditions for instance.
Different aspects of these transformations, including (4+2) and (3+2) processes, will be presented and discussed according to the proposed mechanisms.

References:
Birbaum, L. ; Ndiaye, M.; Hachem, M.; Perrio, S.; De Paolis, M.; Chataigner, I. Org. Lett. 2025, 27, 1729−1734, DOI: 10.1021/acs.orglett.5c00215.
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Faye, Y.; Rkein, B.; Bigot, A.; Lequeux, T.; Legros, J.; Chataigner, I. Chem. Eur. J. 2023, e202301567, DOI : 10.1002/chem.202301567

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December 2nd, 11h
Auditorium 15
Campus P et M Curie
Sorbonne Université

Mohamed EDDAOUDI (KAUST, 4700 King Abdullah University of Science and Technology, Saudi Arabia)
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Metal-Organic Frameworks (MOFs) as Prospect Adsorbents and Membranes for Energy-intensive Separations and Carbon Capture

Abstract. Demand for functional materials targeted for specific applications is ever increasing as societal needs and demands mount with advancing technology. Evidently, improvement of existing materials and quest for new approaches to the design of novel materials are both valuable paths worth pursuing in order to address the myriad technological challenges that face us, pertaining to energy and environmental sustainability. Metal-organic frameworks (MOFs) are a unique class of solid-state materials amenable to design and manipulation for desired function and application, thanks to advancement in reticular chemistry and the various design strategies developed for its effective practice.[1] Several design strategies have been conceived and developed to target viable MOF platforms, from the single-metal-ion molecular building block (MBB) approach to the hierarchical supermolecular building block and supermolecular building layer approaches (SBB and SBL, respectively) to the merged nets approach,[2] and centering structure-directing agents (c-SDA) strategy.[3] This inherent built-in information allows access to highly stabile and made-to-order porous materials, with controlled pore-aperture size and/or inner pore system functionality, toward applications pertaining to energy and environmental sustainability. Specifically, MOF materials addressing the energy-intensive separations and carbon capture will be highlighted, as well as insights into MOF based membranes, namely pure MOF membranes and mixed matrix membranes (MMMs), construction and their respective gas separation properties.[4]

*1- (a)- Guillerm, V., Jiang, H., Alezi, D., Alsadun, N., Eddaoudi, M. "From Elementary to Advanced Design of Functional Metal–Organic Frameworks: A User Guide to Deciphering the Reticular Chemistry Toolbox" Adv. Mater. 2414153 (**2024**). (b)- Jiang, H.; Alezi, D.; Eddaoudi, M., A reticular chemistry guide for the design of periodic solids. Nature Reviews Materials, 6 (6), 466-487 (**2021**).*
*2- Jiang, H., Benzaria, S., Alsadun, N., Jia, J., Czaban-Józwiak, J., Guillerm, V., Shkurenko, A., Thiam, Z., Bonneau, M., Maka, V.K., Chen, Z., Ameur, Z.O., O'Keeffe, M., Eddaoudi, M. "Merged-nets enumeration for the systematic design of multicomponent reticular structures" Science 386 (6722), 659–666 (**2024**).*
*3- Barsukova, M.; Sapianik, A.; Guillerm, V.; Shkurenko, A.; Shaikh, A.C.; Parvatkar, P.; Bhatt, P.; Bonneau, M.; Alhaji, A.; Shekhah, O.; Balestra, S.R.G.; Semino, R.; Maurin, G.; Eddaoudi, M. "Facedirected assembly of tailored isoreticular MOFs using centring structure-directing agents." Nat. Synth. 3, 33-46 (**2024**).*
*4- (a)- Zhou, S.; Shekhah, O.; Ramírez, A.; Lyu, P.; Abou-Hamad, E.; Jia, J.; Li, J.; Bhatt, P.; Huang, Z.; Jiang, H.; Jin, T.; Maurin, G.; Gascon, J.; Eddaoudi, M. Asymmetric pore windows in MOF membranes for natural gas valorization. Nature 606, 706–712 (**2022**). (b)-Datta, S.; Mayoral, A.; Bettahalli, S.; Bhatt, P.; Karunakaran, M.; Carja, D.; Fan, D.; Mileo, P.; Semino, R.; Maurin, G.; Terasaki, O.; Eddaoudi, M., Rational design of mixed-matrix metal-organic framework membranes for molecular separations. Science, 376 (6597) 1080-1087 (**2022**).*

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December 8th, 11h
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Campus P et M Curie
Sorbonne Université

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Jean-Yves SALPIN (Université d'Evry Paris-Saclay)
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Interactions of platinum and gold metallodrugs with nucleic acid building blocks probed in the gas phase

Abstract. Cisplatin, [cis-Pt(NH3)$_2$(Cl$_2$)]), is the first platinum-based antitumor agent, and is still widely used in chemotherapy. In spite of its clinical success, cisplatin displays severe toxic side effects and therapy resistance. This has motivated searches for structurally and/or functionally analogous alternatives. Many platinum-based agents have been synthetized during the last 30 years, leading to carboplatin and oxaliplatin as second and third-generation platinum drug, respectively. Concomitantly, other metal agents employed in therapy were tested to evaluate their potential binding to DNA. Gold(I) complexes have long been recognized as therapeutically active compounds, and the well-known anti-arthritic auranofin has been recently considered in repurposing studies of its anticancer potential. In this context, the aim of our work is to investigate the intrinsic interactions occurring between gold and platinum agents, and the various nucleobases or their corresponding nucleotides, known to be the target of this kind of drugs. Gas-phase studies may be particularly useful to provide new insights about the mechanisms occurring at the molecular level, and to determine whether the intrinsic interaction properties of these different drugs are similar in the gas phase.

10^{-3} M water/methanol mixtures of Pt- or Au-drugs with analytes (nucleobases, 5'-dGMP, 5'-dAMP) were prepared and stored at room temperature for 24 h, to allow the formation of the different complexes. Complexes were generated in the gas phase by electrospray ionization of diluted samples (10^{-5} M). Their structure was probed by combining mass spectrometry and InfraRed Multiple Photon Dissociation (IRMPD) spectroscopy to DFT calculations. Fingerprint IRMPD spectra were recorded in the 700-2000 cm-1 energy range by coupling free electron lasers to different types of mass spectrometers (FT-ICR, quadrupole ion trap). The X-H stretches frequency range (the 3100–3800 cm^{-1}) was explored by means of an OPO/OPA laser system coupled to an ion trap. DFT calculations were carried out using the hybrid B3LYP density functional. Geometry optimization was achieved using the Los Alamos effective core potential (ECP) with the LANL2TZ basis sets for Pt and Au. Remaining atoms were described by either the 6-311G** or cc-pvtz basis sets.

This combination of approaches allows operating in the gas phase, thereby avoiding any solvent or counter-ion effect, and enabling the intrinsic reactivity of these drugs to be described. Excellent agreements were generally observed between the experimental IRMPD spectra and the global minima determined by DFT calculations for the different complexes observed. In the particular case of adenine, we observed differences concerning the interaction process of carboplatin and oxaliplatin as compared to that of cisplatin.

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1. *B. Chiavarino, M. E. Crestoni, S. Fornarini, D. Scuderi, J. Y. Salpin, J. Am. Chem. Soc. 135, 1445-1455 (2013)*
2. *B. Chiavarino, M. E. Crestoni, S. Fornarini, D. Scuderi, J. Y. Salpin, Inorg. Chem. 54, 3513-3522 (2015)*
3. *B. Chiavarino, M. E. Crestoni, S. Fornarini, D. Scuderi, J. Y. Salpin, Inorg. Chem. 56, 8793-8801 (2017)*
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5. *B. Chiavarino, L. Rotari, M-E. Crestoni, D. Corinti, D. Scuderi, J. Y. Salpin, Inorg. Chem. 64, 4873-4883 (2025).*

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December 15th, 11h
Auditorium Astier
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Contact:
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Mihaela GULEA (Université de Strasbourg, Faculté de Pharmacie, Laboratoire d'Innovation Thérapeutique (LIT, UMR 7200), F-67000 Strasbourg, France)
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Expanding the Molecular Diversity of N,S-Heterocycles

Abstract. Heterocycles containing both nitrogen and sulfur atoms can be found in a broad range of drugs structures. Recent research from our laboratory focused on the development of new synthetic strategies, mainly based on transition-metal catalysis (Pd, Cu, Rh, Au) and domino reactions to access original scaffolds belonging to this category. The presentation will cover our work dealing with the synthesis of diverse *N,S*-heterocycles via intramolecular carbone-sulfur bond formation.

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JANUARY 2026

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January 12th, 11h
Corridor 42-43
Room 107, Chimie 2
Campus P et M Curie
Sorbonne Université

Contact:
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Sara CORTES-LLAMAS (Departamento de Química, Centro Universitario de Ciencias Exactas e Ingenierías, Universidad de Guadalajara. Jalisco, Mexico)
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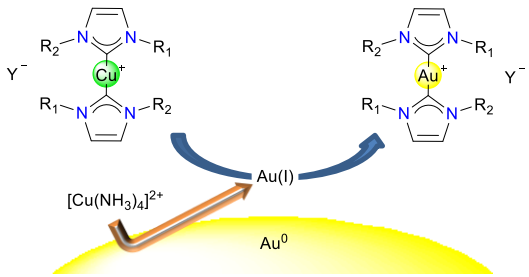
Organometallics in gold leaching: N-heterocyclic carbenes as stabilizing agents in the gold extraction process

Abstract. The extraction of precious metals, such as gold and silver, remains a highly significant economic activity in many countries, including Mexico. Unfortunately, mining processes have a substantial environmental impact, including the risk of chemical contamination, the generation of large volumes of waste and high-water consumption. Most gold and silver extraction processes use cyanide; this economical and efficient process is based on the high affinity of this ligand for these metals. In this seminar, I will present the progress made by our research group in developing environmentally friendly gold extraction systems using N-heterocyclic ligand alternatives.



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For further information, please contact:
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January 19th, 11h
Corridor 42-43
Room 107, Chimie 2
Campus P et M Curie
Sorbonne Université

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Thomas POISSON (Institut CARMeN - UMR 6064, INSA Rouen Normandie)
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Recent Progress in Silylation, Borylation and Organofluorine Chemistry

Abstract. As part of the organic chemistry, radical chemistry is an important research area as the one electron reactivity is complementary to the ones of the two electrons and polar manifolds. In this regard, electrochemistry, which enjoy a renewal, offers interesting approaches to broaden the current know-how of the synthetic chemist community. Herein, our efforts to develop electrooxidative process for the functionalization of alkenes and alkynes will be presented.[1] The electrochemical synthesis of boron and silyl containing molecules, as well as the introduction of fluorinated residues on electron-rich alkenes will be disclosed.[2]

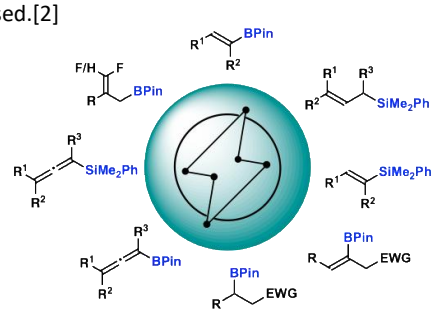

Figure 1. Recent advances in electrochemical silylation and borylation.

Finally, the recent advances from our group in organofluorine chemistry will be detailed.[3]

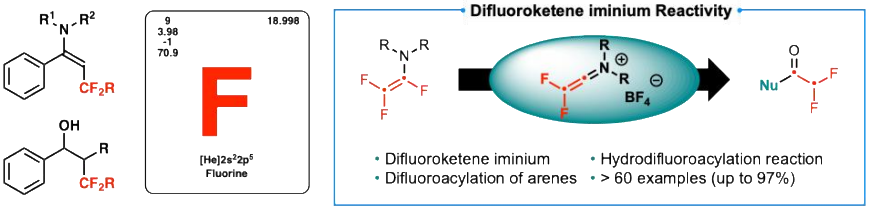

Figure 2. Recent advances in organofluorine chemistry.

Reference

[1] (a) Zhong, M.; Pannecoucke, X.; Jubault, P.; Poisson, T. *Chem. Eur. J.* **2021**, *27*, 11818. (c) Zhong, M.; Gagné, Y.; Hope, T. O.; Pannecoucke, X.; Frenette, M.; Jubault, P.; Poisson, T. *Angew. Chem. Int. Ed.* **2021**, *60*, 14498. (d) Biremond, T.; Jubault, P.; Poisson, T. *ACS Org. Inorg. Au* **2022**, *2*, 148. (e) Aelterman, M.; Sayes, M.; Jubault, P.; Poisson, T. *Chem. Eur. J.* **2021**, *27*, 8277. (f) Aelterman, M.; Jubault, P.; Poisson, T. *Eur. J. Org. Chem.* **2023**, e202300063. (g) Aelterman, M.; Biremond, T.; Jubault, P.; Poisson, T. *Chem. Eur. J.* **2022**, *28*, e2022002194. (h) Feng, T.; Biremond, T.; Jubault, P.; Poisson, T. *Nat. Commun.* **2025**, *16*, 4593 and *unpublished results*.
[2] Luan, S.; Castanheiro, T.; Poisson, T. *Org. Lett.* **2023**, *25*, 1678.
[3] Ivashkin, P.; Decaens, J.; Marchand, I.; Hedouin, M.; Oulyadi, H.; Poisson, T.; Jubault, P. *Nat. Synth.*, **2026**, *in press, and unpublished results.*

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January 23rd, 9h30
Amphi Durand
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Campus P et M Curie
Sorbonne Université

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A double CulturChem event !

Sigfried WALDVOGEL (Max Planck Institute for Chemical Energy Conversion, Mülheim. Department of Electrosynthesis, director)
siegfried.waldvogel@cec.mpg.de

Solving Long-standing Problems by Electrosynthesis

And

Julio LLORET FILLOL (*Institute of Chemical Research of Catalonia (ICIQ), The Barcelona Institute of Science and Technology,* Tarragona. *Catalan Institution for Research and Advanced Studies (ICREA)*)
jlloret@iciq.es

Bio-inspired Complexes for Redox Reactions and Artificial Photosynthesis

Abstract (Lloret). Inspired by natural photosynthesis, there is a vision to synthesize fuels and chemicals using Earth's abundant molecules (such as H_2O, CO_2, N_2) and renewable energy.[1] Understanding these processes is crucial for developing efficient small molecule transformations. [2] In this context, we will discuss our efforts to develop well-defined coordination complexes that act as efficient homogeneous catalysts for CO_2 reduction, activation of alkyl chlorides and other transformations identified during the process.[3] These transformations share that are mediated by low valent metal complexes.

For the activation of alkyl chlorides, amino-pyridine Co and Ni complexes can activate them as bio-inspired complexes, functioning similarly to B12 and F430, yielding productive transformations.[4]

For CO_2 reduction, we will present highly active manganese-based catalysts that operate effectively at very low CO_2 concentrations and demonstrate how the selectivity of CO_2 reduction can be tuned using covalent organic frameworks from CO to HCO_2H. The development of stable and selective catalysts for CO_2 reduction has needed a deep insight of the CO_2 reduction mechanisms by metal complexes, which has been instrumental in designing more efficient catalysts and find reaction conditions to shift the selectivity to yield formate. We will show how CO_2 can act as a surrogate for carbon monoxide in electrocatalytic carbonylation reactions, mediated by a dual catalytic system.

References

1 (a) N. S. Lewis, D. G. Nocera, *Proc. Natl. Acad. Sci. USA.* **2006**, *103*, 15729. (b) H. Wang, Y.-M. Tian, B. König, *Nat. Rev. Chem.* **2022**, *6*, 745.
2 (a) I Gamba, Z Codolà, J Lloret-Fillol, M Costas *Coord. Chem. Rev.* **2017**, *334*, 2. (b) F. Franco, S. Fernández, J. Lloret-Fillol, *Curr. Opin. Electrochem.* **2019**, *15*, 109
3 (a) F. Franco, M. Pinto, B. Royo, J. Lloret-Fillol, *Angew. Chem., Int. Ed.* **2018**, *57*, 4603. (b) S. Fernández, F. Franco, M. Martínez Belmonte, S. Friães, B. Royo, J. M. Luis, J. Lloret-Fillol, *ACS Catal.* **2023**, *13*, 10375.
5 (a) M. Claros, F. Ungeheuer, F. Franco, V. Martin-Diaconescu, A. Casitas, J. Lloret-Fillol, *Angew. Chem., Int. Ed.* **2019**, *58*, 4869. (b) J. Aragón, S. Sun, D. Pascual, S. Jaworski, J. Lloret-Fillol, *Angew. Chem., Int. Ed.* **2022**, *e202114365.* (c) J. Aragón, S. Sun, S. Fernández, J. Lloret-Fillol *Angew. Chem., Int. Ed.* **2024**, e202405580.
4 A. M. Sheta, S. Fernández, C. Liu, G. C. Dubed-Bandomo, J. Lloret-Fillol *Angew. Chem., Int. Ed.* **2024**, 4603e202403674

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January 26th, 11h
Corridor 42-43
Room 107, Chimie 2
Campus P et M Curie
Sorbonne Université

Arnaud VOITURIEZ (Institut de Chimie des Substances Naturelles; CNRS; Université Paris-Saclay); 1, av. de la Terrasse, 91198 Gif-sur-Yvette, France.
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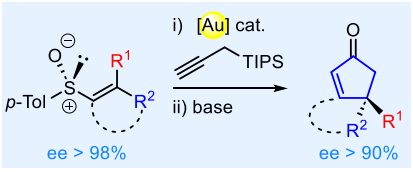
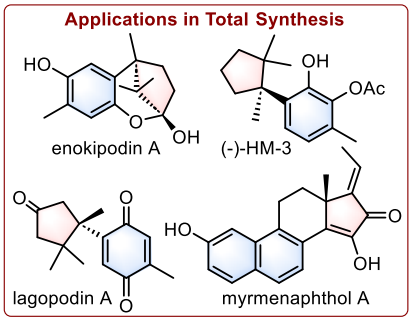
Gold(I)-Catalyzed [3,3]-Sigmatropic Rearrangements: Building Quaternary Stereocenters for Natural Product Synthesis

Abstract. Homogeneous gold catalysis has emerged as a powerful tool in organic synthesis, due to the unique ability of cationic gold complexes to activate unsaturated bonds. Gold(I)-catalyzed reactions are now widely used to access complex molecular frameworks, including in natural products synthesis. Recently, we have developed the synthesis of cyclopentenones with C4-quaternary stereocenters through a stereospecific gold-catalyzed sulfonium [3,3]-sigmatropic rearrangement of vinyl sulfoxides. This simple asymmetric methodology allowed the total synthesis of seven sesquiterpenoids, including hitoyopodin A, lagopodin A and enokipodin A and B.[1] This methodology has also been extended to allenyl ketones and allenoates.[2]
We also developed a methodology converting cyclic vinyl sulfoxides into chiral polycylic cyclopentenones, enabling the synthesis of benz[*e*]inden-2-one derivatives bearing quaternary centers in good yields and excellent enantiomeric excesses (90-99% ee). This transformation enabled the total synthesis of myrmenaphthol A, a natural product isolated from a Hawaiian sponge of the genus *myrmekioderma*.[3]



- *[3,3]-Sigmatropic rearrangement of sulfoniums*
- *Formation of quaternary stereocenters*
- *Stereospecific rearrangement*
- *Broad substrate scope (>40 examples)*



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FEBRUARY 2026

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February 2nd, 11h
Auditorium ASTIER
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Campus P et M Curie
Sorbonne Université

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David LEBOEUF (Laboratoire d'Innovation Moléculaire et Applications, LIMA UMR 7042, Université de Strasbourg)
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Hexafluoroisopropanol (HFIP) as a Powerful Asset in the Creation of New C–C and C–N Bonds

Abstract. In recent years, fluorinated alcohol solvents such as hexafluoroisopropanol (HFIP) have become enabling technologies in organic synthesis, owing to their remarkable intrinsic properties. HFIP, for instance, can stabilize cationic and radical species. It strongly donates hydrogen bonds (HBs) and possesses low nucleophilicity, mild acidity and high redox stability. These different facets make it an attractive solvent in all areas of modern catalysis, including transition metal, Lewis and Brønsted acid catalysis as well as photoredox and electrochemical processes, organocatalysis and hypervalent iodinepromoted reactions. As a result, it is now routinely used for the design of new transformations. Over the past eight years, my group has exploited the unique properties of HFIP to push the limits of Lewis and Brønsted acid- and iron-catalyzed reactions that did not take place in traditional solvents. These reactions are highly user-friendly by being air- and moisture-tolerant. Based on in-depth mechanistic studies, we demonstrated that the acidity of HFIP self-assembled H-bond clusters is amplified by coordination to the Lewis acid, while the acidity of a Brønsted acid is in turn harnessed by HFIP clusters, both promoting reactions of highly deactivated substrates, which will be at the heart of this talk.

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February 9th, 11h
Auditorium ASTIER
Esclangon building
Campus P et M Curie
Sorbonne Université

Contact:
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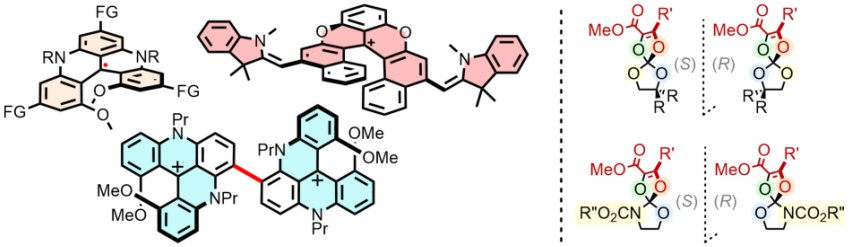
Jérôme LACOUR (Department of Organic Chemistry, University of Geneva), Geneva, Switzerland.
jerome.lacour@unige.ch

Stereochemical journey among carbocations and precursors

Abstract. Charged molecules and intermediates display unique reactivity and properties. In this context, studies on original cationic [4] and [6]helicenes will be presented. These compounds display original chemical and electronic properties thanks to the extended delocalization provided by the triarylcarbenium framework.[1] Molecular engineering towards novel reactivities and properties, electronic and chiroptical in particular, will be reported.[2]
Also, a focus will be given on metal-catalyzed decompositions of a-diazocarbonyls – and those involving CpRu complexes in particular.[3] An attention will be given to routes affording ylide intermediates and then functionally rich heterocyclic derivatives. A large variety of stereoselective and enantiospecific transformations are available through these metal carbene reactions and subsequent ylide transformations. Mechanistic investigations will be detailed during the lecture.



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February 16th, 11h
Auditorium 55A
Campus P et M Curie
Sorbonne Université

Lucile ANTHORE-DALION (LCMCE/NIMBE, CEA, CNRS, Université Paris-Saclay, 91191 Gif-sur-Yvette, France)
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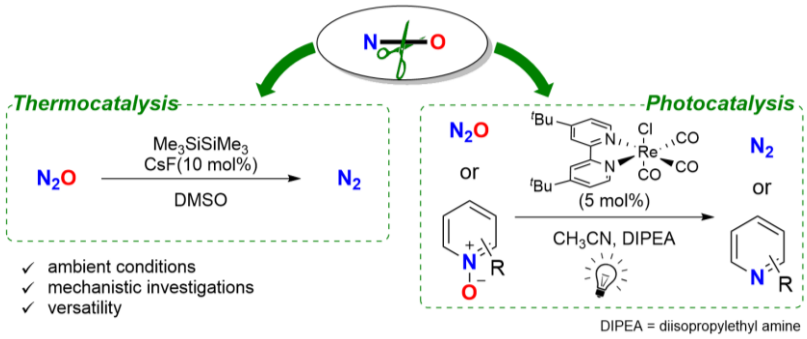
Deoxygenation of N–O bonds: from the Reduction to the Synthetic Applications

Abstract. Key for our modern world, the anthropogenic nitrogen fixation through the Haber-Bosch process leads to a massive production of nitrogen oxides (N_2O, NO_2, NO_2^-, NO_3^-…). Their reduction back to atmospheric N_2 is mostly performed by the natural nitrogen cycle, overwhelmed by the amount of nitrogen wastes and leading to a detrimental accumulation of these oxides in Nature. This calls for efficient chemical interconversions between the different oxidation states of organic and inorganic nitrogen, and especially the development of innovative reduction pathways towards more sustainable syntheses of valuable nitrogen-containing compounds.
Chemically speaking, this raises the question of breaking N–O bonds selectively. To gain a deep understanding of this process, we started our investigations with the reduction of nitrous oxide N_2O and pyridine *N*-oxides, exploring new thermo- and photocatalytic pathways. We showed that nitrous oxide, reputed to be kinetically inert, can be easily deoxygenated at 1 bar and at room temperature either under metal-free conditions with a catalytic amount of fluorides and disilanes as reducing agents, or using visible-light irradiation with a rhenium-based photocatalyst. The versatility of the photocatalytic system for N–O bond reduction was then demonstrated by applying it to functionalized pyridine *N*-oxides. Experimental and computational studies (DFT) shed light on the mechanisms at play. Recently, the methodology also proved robust enough to be applicable to the photodeoxygenation of sulfoxides.



From the reduction of N_2O to the synthetic applications

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February 23rd, 11h
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Nathalie BRIDONNEAU (ICMMO laboratory, University Paris Saclay/CNRS, Team *"Magnetism and Molecular Switching"* (SysMMI axis))
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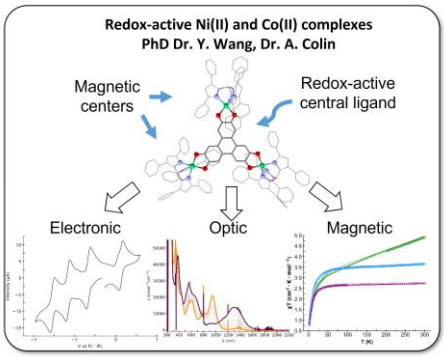
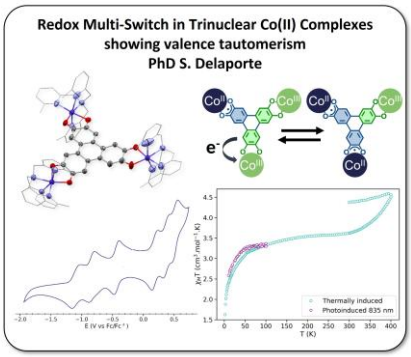
Redox-Active Molecules: Magnetic, Electronic, Structural and Optical Tuning

Abstract. The design of polynuclear magnetic complexes whose magnetic behavior can be remotely controlled using various stimuli is relevant for both classical and quantum information storage. Our work focuses on the use of redox-active bridging ligands to tune magnetic and electronic coupling, electronic delocalization, and the nature of the magnetic ground state in polynuclear complexes. Tris-dioxolene-type redox-active ligands are stable in up to seven oxidation states, offering a wide range of electronic, optical, and magnetic behaviors. Depending on the nature of the peripheral magnetic ions (Ni(II), Co(II), etc.), intramolecular electron transfers can occur, leading to a valence tautomerism that can be modulated by the nature of the auxiliary ligands.





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culturchem

MARCH 2026

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March 2nd, 11h
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Stéphane PETOUD (Centre de Biophysique Moléculaire, CNRS UPR 4301, F-45071 Orléans, France)
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Near-infrared Emitting Lanthanide Compounds for Optical Biological Imaging: from Small Molecules to nanoMOFs

Abstract. Optical imaging is attracting an exponentially growing attention in the fields of biological research and medical diagnostic. Emission in the near-infrared (NIR) is of strong interest as it allows improved detection sensitivity due to the absence of native NIR luminescence from tissues and cells (autofluorescence), non-invasive detection and higher resolution of the collected images from deeper tissues. The luminescence of lanthanide(III) cations is attractive as they exhibit sharp emission bands, the wavelengths of which are not affected by experimental conditions. The key requirement to generate their signals is to sensitize them with a chromophore that absorbs excitation light and transfers the resulting energy to the lanthanide(III) emissive center. In respect to biological imaging, lanthanide(III) compounds need to be designed with biocompatibility in mind. We will present different approaches to create such imaging agents that includes molecular systems such as metallacrowns (MCs)[1-6] and nanoscale metal-organic frameworks (nanoMOFs)[7-10]. This presentation will include the design fundamentals, the rationalization of the NIR luminescence properties in respect to the structure of MCs and nanoMOFs through advanced spectroscopic characterization, and their tests as NIR imaging agents in living cells or using tissue-mimicking phantoms.

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March 9th, 11h
Herpin Lecture Hall
Building Esclangon
Campus P et M Curie
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Franck DENAT (Université Bourgogne Europe)
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Chemistry plays a pivotal role in the development of radiopharmaceuticals for nuclear medicine

Abstract. Nuclear medicine has become a powerful tool in the area of personalized care, especially in oncology. Labeling molecules with or positron emitters allows the visualization of tumors with nuclear imaging techniques (respectively SPECT and PET) while the same molecules labeled with β- or α emitting radionuclides can be used for targeted radiotherapy. "See what you treat and treat what you see" is made possible through the use of radiotheranostics. Indeed, imaging agents can be used to detect the disease, select patients likely to respond to the treatment with a therapeutic analog, and then monitor the efficacy of this treatment. The recent success of two radiopharmaceuticals, Lutathera® and Pluvicto®, both ^{177}Lu radiolabeled molecules, for the treatment of neuroendocrine tumors and prostate cancer respectively, has revolutionized the field of nuclear medicine. These therapeutic compounds were developed alongside their PET imaging companions, labeled with ^{68}Ga. Another growing field of research is the combination of nuclear imaging with another imaging modality, such as optical imaging for fluorescence-guided surgery.
In this highly interdisciplinary research field, chemistry plays a crucial role. The synthesis of radiometal chelators,1 fluorophores,2 multivalent platforms,3 targeting vectors, as well as the implementation of innovative strategies, including click chemistry or supramolecular chemistry, to assemble the different components of a radiopharmaceutical compound,4 are of major importance for the development of radiotheranostics or multimodal imaging agents with optimal pharmacokinetics and imaging and/or therapeutic efficacy.

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March 16th, 11h
Lecture Hall 55A
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Emmanuel NICOLAS (CEA Saclay)
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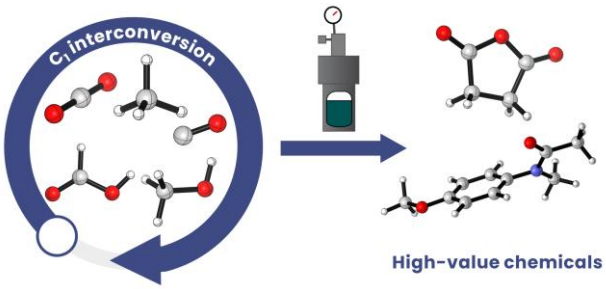
From CO_2 to High-Value Chemicals: C1 Molecules as Intermediates for a Low-Carbon Chemistry

Abstract. The formation of high-value chemicals from CO_2 is a necessary step to defossilize the carbon sources in the chemical industry. The direct conversion of CO_2 is however suffering from reactivity, selectivity, separation, and energy efficiency issues. In this talk, I will showcase the approach developed in my group that involves the interconversion of C_1 molecules, to access reactive synthons such as CO or HCO_2H, that can be converted further to high-value chemicals such as methanol, monomers, or specialty chemicals.



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MONDAY, MARCH 23rd SEMINAR CANCELLED

For further information, please contact:
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March 30th, 11h
Lecture Hall 55A
Campus P et M Curie
Sorbonne Université

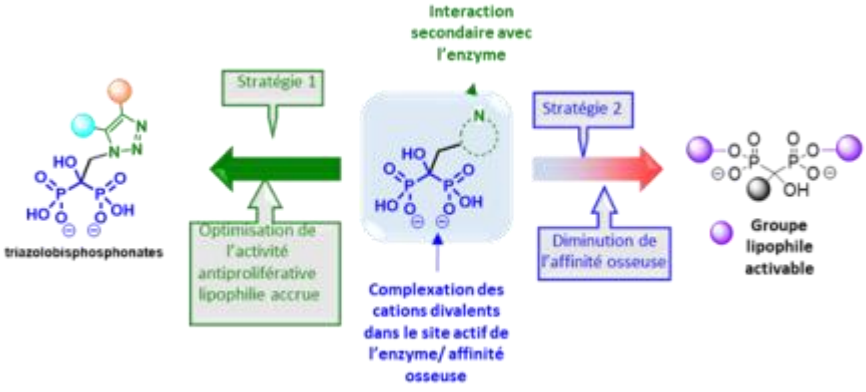
Marc LECOUVEY (CB3S USPN 74, Rue Marcel Cachin F-93017 Bobigny, FRANCE)
marc.lecouvey@univ-paris13.fr

Conception, synthèse et optimisation d'inhibiteurs phosphorés de la biosynthèse des isoprénoïdes dans les thérapies anti-tumorales

Contact:
Virginie MOURIES-MANSUY (virginie.mansuy@sorbonne-universite.fr)

SEMINAR IN FRENCH

Abstract. Malgré les nombreux progrès thérapeutiques, le cancer reste la première cause de mortalité en France. Le développement de nouvelles molécules ayant des modes d'action originaux représente un intérêt majeur pour la chimiothérapie, dont l'efficacité se retrouve limitée face aux phénomènes de résistance rapidement mis en place par les cellules cancéreuses. Les bisphosphonates azotés (N-BPs) sont des inhibiteurs de la biosynthèse des isoprénoïdes, substrats essentiels à l'activité des protéines GTPases impliquées dans la prolifération et la survie cellulaire. Ces N-BPs démontrent des activités antitumorales prometteuses sur plusieurs lignées de cellules non osseuses mais leur efficacité in vivo est limitée par leurs propriétés physico-chimiques défavorables. Nos travaux consistent à optimiser l'activité anticancéreuse des N-BPs à travers deux grandes approches. D'une part, une étude de relation structure-activité basée sur un motif 1,2,3-triazole substitué à diverse position par une chaîne alkyle ou un noyau phényle nous a permis de déterminer plusieurs triazolo-BPs présentant une activité antiproliférative bien supérieure au zolédronate sur trois lignées de cellules cancéreuses. D'autre part, des prodrogues de l'alendronate dont les fonctions phosphonates sont masquées par des gâchettes activables en milieu intracellulaire ont été conçues. Une prodrogue masquant le N-BP par deux motifs acyloxybenzyles a démontré une affinité réduite pour l'os et libère rapidement l'alendronate en présence d'estérases. Deux autres prodrogues comprenant un ou deux motifs nitrovératryles présentent également une meilleure biodisponibilité et l'activité antiproliférative de l'alendronate est restaurée sur une lignée de cellules tumorales du sein après exposition à un rayonnement de 365 nm. Ces deux approches présentent donc un intérêt prometteur pour cibler les tumeurs non-osseuses in vivo.



Réferences

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APRIL 2026

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April 13th, 11h
Amphithéâtre Moissan
Chimie ParisTech

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Didier BOURISSOU (Laboratoire Hétérochimie Fondamentale et Appliquée (UMR5069), CNRS/Université de Toulouse)
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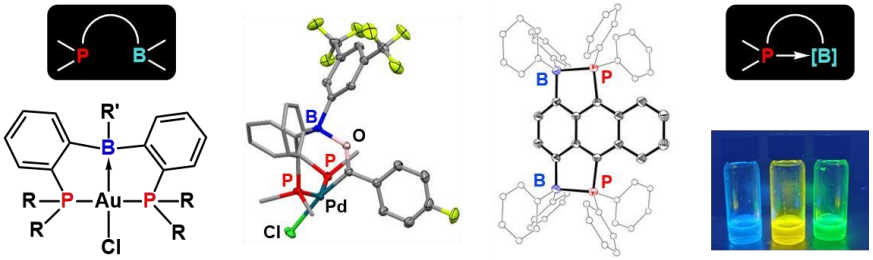
Phosphine–Boranes in Action: From Ambiphilic Ligands to Functional Materials

Abstract. Our group has introduced phosphine-borane and related ambiphilic ligands. The combination of donor and acceptor sites results in versatile coordination properties and opens new avenues in reactivity, in particular via TM/Lewis acid cooperativity. Our recent discoveries in this field will be presented.[1]
P-Directed C–H borylation will also be introduced as a new straightforward route to phosphine-boranes. Its application to the functionalization of polyaromatic hydrocarbons (PAHs) will be discussed with special focus on the impact the appended P→B moieties have on electronic and photophysical properties.[2]



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April 27th, 11h
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Exploration of Gas-Phase Molecular Spectroscopy by Developing Cryogenic Ion Traps

Abstract. Laser spectroscopy under cryogenic gas-phase conditions offers an ideal platform for probing intrinsic molecular properties with high precision by minimizing perturbations from external environments such as impurities, solvents, and counterions. Particularly, recently developed cryogenic ion-trap spectroscopy (**Figure 1**) afford a distinct advantage in their broad applicability to a wide range of molecular systems. This approach is expected to enable the discovery of "latent molecular functions" that are otherwise masked by complex environments, as well as provide molecular-level insight into the stability and functions, thereby offering rational guiding principles for the "Structural Re-Programming" of molecules [1]. In this lecture, I highlight our recent studies that has further extended the scope of this powerful techniques to variety of novel targets including host-guest complexes [2], cyanine dye molecules [3], hypervalent compounds [4,5], reaction intermediates formed in solution [6,7], and metal/molecular clusters [8,9] (**Figure 1**).

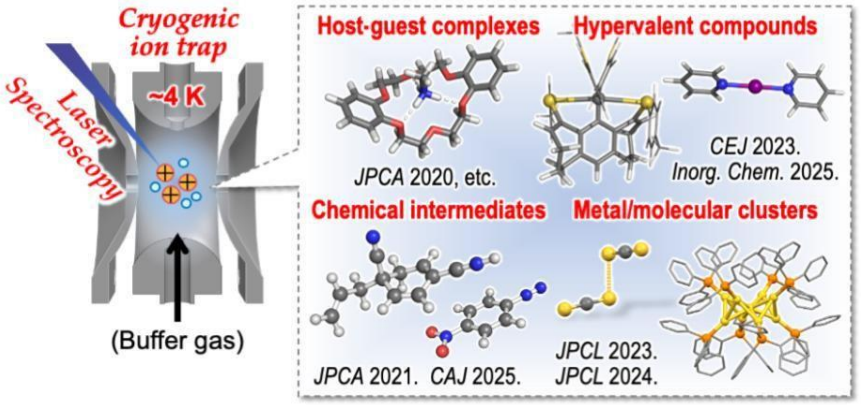

Figure 1. Schematic image of cryogenic ion trap spectroscopy and target compounds.

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MAY 2026

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May 4th, 11h
Auditorium Astier
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Thomas DEVIC (Institut des Matériaux de Nantes J. Rouxel)
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Metal Organic Frameworks (MOFs): why leaving carboxylates for other complexing groups?

Abstract. MOFs are constructed from inorganic oxoclusters linked together by polytopic organic ligands to form pores of various sizes and shapes. The field is largely dominated by carboxylate ligands, but the use of alternative complexing groups is a way to broaden the range of compositions and properties. Focusing on phenolate and thiolate ligands, we will show how their physicochemical characteristics affect the synthesis and the crystallochemistry of the derived MOFs, and present the relationships between their structures and properties in the field of gas capture and electrochemical energy storage.

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May 11th, 11h
Auditorium Astier
Building Esclangon
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Giulio RAGAZZON (University of Strasbourg & CNRS
Institut de Science et d'Ingénierie Supramoléculaires – ISIS)
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Enabling Endergonic Processes Through Catalysis

Abstract. Energy conversion is a pillar of our society, which is heavily based on chemical-to-thermal energy conversion, with massive efforts dedicated to light-to-electrical energy conversion using solar panels. Biology is different: it is grounded into chemical-to-chemical energy conversion, thanks to catalytic processes. A significant biological parallel is the synthesis of adenosine triphosphate in our body, which occurs under energetically unfavored conditions, thanks to the energy provided by a proton gradient.
In this talk, I will present the recent contributes of my group in enabling chemical-to-chemical energy conversion in fully artificial systems, thanks to catalytic processes involving small molecules. Our latest experimental efforts will serve as a basis to discuss how energy can be exploited to drive chemical reactions, adaptation phenomena, and active transport, revealing common underlying principles.
A unique feature shared by these catalytic systems is that the focus is not on the product obtained (e.g., transformation achieved, yield, e.e.); the focus is instead on how the catalyst itself is modified during the catalytic cycle. I hope that this uncommon perspective will stimulate practitioners working in catalysis to consider the systems they are working on under a different light.
Overall, these studies tackle the general problem of realizing endergonic reactions (ΔG > 0). Mastering these reactions has far-reaching implications in energy harvesting, transduction, and exploitation, in both biological and technological settings.

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May 18th, 11h
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Sorbonne Université

Zacharias AMARA (Conservatoire National des Arts et Métiers)
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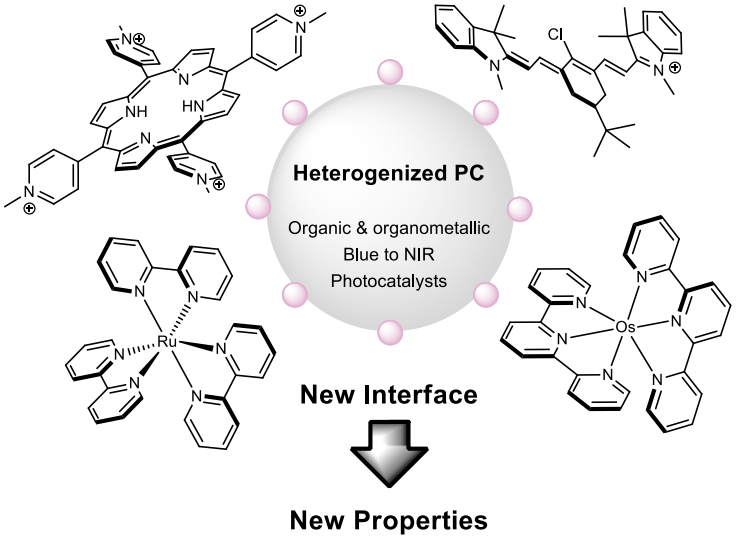
From Interface Engineering to Wavelength Control: Selective Photocatalytic Oxidations

Abstract. In this research seminar, we present our group's recent advances in the development of heterogenized photocatalytic systems for selective oxidation reactions. Central to our approach is the creation of well-defined catalytic interfaces through simple and scalable heterogenization strategies, enabling the use of green solvents while simultaneously enhancing catalyst reactivity, robustness, and long-term stability. These engineered interfaces provide a versatile platform for efficient photo-oxidation under mild and sustainable reaction conditions.

Beyond catalyst design, control over interfacial phenomena is extended to the reactor level through the implementation of continuous-flow processing. Flow photoreactors offer precise control over mass and heat transfer, as well as improved photon management, allowing these heterogenized systems to operate at significantly higher space–time yields. As a result, photo-oxidation reactions can be performed with unprecedented productivity, reproducibility, and scalability.

Finally, an additional level of control is achieved by tuning the excitation wavelength across the visible spectrum and toward lower-energy photons in the near-infrared (NIR) region. Access to wavelength-selective photoactivation enables new photo-oxygenation pathways and unlocks levels of chemoselectivity that are inaccessible under conventional high-energy irradiation. Together, the combined control of catalytic interfaces, reactor architecture, and light energy establishes a unified strategy for highly selective and efficient photocatalytic oxidation processes.



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JUNE 2026

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June 1st, 10h
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Itaru OSAKA (Graduate School of Advanced Science and Engineering, Hiroshima University)
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Design and Synthesis of π-Conjugated Polymers for Efficient Organic Photovoltaics

Abstract. Bulk-heterojunction organic solar cells based on π-conjugated polymers as the p-type semiconductor (electron donor) have been intensively investigated in the last few decades since they can enable lightweight, flexible, semi-transparent, low-cost, and low-energy fabrication in contrast to the conventional silicon solar cells. A key to improving the power conversion efficiency is to control the polymer order, such as backbone planarity, π–π stacking, and backbone orientation, and the morphology (phase separation) of donor/acceptor blends that determine the charge separation and charge transport processes. Therefore, careful molecular design of π-conjugated polymers to manage the backbone coplanarity and intermolecular interactions is imperative. We have been studying a number of π-conjugated polymers by incorporating various fused-ring heteroaromatics into the polymer backbone.[1-8] In this presentation, I will show the design and synthesis of π-conjugated polymers and discuss how the molecular structure affects the polymer order in the thin film and, thereby, OPV performances.

References.

1) V. Vohra et al., *Nat. Photon.*, **2015**, *9*, 403.
2) K. Kawashima et al. *Nat. Commun.*, **2015**, *6*, 10085.
3) K. Kawashima et al., *J. Am. Chem. Soc.*, **2016**, *138*, 10265.
4) M. Saito, et al., *Adv. Energy Mater.*, **2020**, *10*, 1903278.
5) N. Nakao, et al., *Adv. Sci.*, **2022**, 2205682.
6) K. Yamanaka, et al., *Adv. Energy Mater.*, **2023**, *13*, 2203443.
7) S. Kamimura, et al., *Chem. Sci.*, **2024**, *15*, 6349.
8) T. Mikie, et al., *Chem. Sci.*, **2024**, *15*, 19991.

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June 1st, 11h
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Pierre D. HARVEY (Département de chimie, Faculté des sciences, Université de Sherbrooke, Canada)
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Singlet oxygen ($^1O_2(^1\Delta_g)$): At the service of society

Abstract. The discovery of singlet oxygen is attributed to Hans Kautsky (Naturwissenschaften 1931, 19, 1043), and the first observation in space was made by Nobel laureate Gerhard Herzberg (Nature 1934, 133, 759). Its direct formation, $O_2(g) + h\nu \rightarrow {}^1O_2(^1\Delta_g)$, is inefficient due to its negligible molar absorption, necessitating the use of a photosensitizer (PS): PS + hν → PS*; PS* + $O_2(g)$ → $^1O_2(^1\Delta_g)$. Nowadays, one notable application is photodynamic therapy used to treat certain types of cancers. This field has led to intense research on the design of more efficient, but also specialized PSs; a field that is, in fact, dominated by nitrogen-based pigments. This seminar will be divided into five parts: 1) what is $^1O_2(^1\Delta_g)$ and what can it do, 2) how to improve its photogeneration, 3) photodegradation of antibiotics in hospital wastewater,[1] 4) replacement of pesticides with non-toxic and affordable pesticides for sustainable agriculture,[2] 5) design of photo-sanitary composite materials.[3]

1) https://doi-org.ezproxy.usherbrooke.ca/10.1021/acsaom.5c00068, *ACS Applied Optical Materials* (2025), 3(6), 1254-1267
2) https://doi-org.ezproxy.usherbrooke.ca/10.1021/acsagscitech.5c00347 *ACS Agricultural Science & Tech.* (2026), 6(1), 92-102
3) https://doi.org/10.1002/adfm.202404111 *Advanced Functional Materials*, (2024), 2404111

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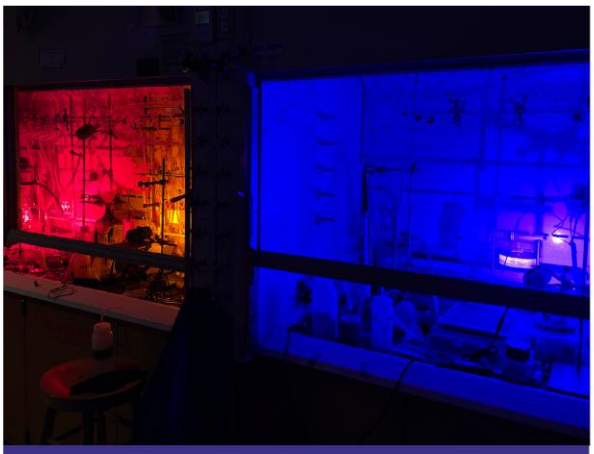

Invité par l'assemblée du Collège de France
sur proposition du Pr Louis FENSTERBANK

Tomislav ROVIS

UNIVERSITÉ DE COLUMBIA, USA

CONFÉRENCES

4 > 25 juin 2026

Catalytic Methods to Address Problems in Organic Synthesis

Amphithéâtre Guillaume Budé, de 11 h à 12 h 00
Conférences en anglais

Jeudi 4 juin 2026
Redshifting Photoredox Catalysis

Jeudi 11 juin 2026
Amine Feedstocks
as Cross-Coupling Partners

Jeudi 18 juin 2026
Rh-Catalyzed C-H Activation
for N-Heterocycle Construction

Jeudi 25 juin 2026
Catalytic Stereospecific Alkene
Carboamination

Illustration : *Chemistry under Blue, Orange or Red Light* © Rovis Lab

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Année académique 2025/2026

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Invité par l'assemblée du Collège de France
sur proposition du Pr Louis FENSTERBANK

Nitin T. PATIL

DEPARTMENT OF CHEMISTRY,
INDIAN INSTITUTE OF SCIENCE EDUCATION
AND RESEARCH, BHOPAL, INDIA

Vendredi 5 juin 2026

Ligand-Enabled Gold Redox Catalysis

Salle 2 à 10h30 - Conférence en anglais

Traditionally, gold complexes have served as Lewis acid catalysts for the activation of C–C multiple bonds (Scheme, LHS). Over the years, gold catalysis has evolved beyond this classical role to encompass Au(I)/Au(III) redox catalysis (Scheme, RHS). The pioneering work by Zhang and Toste group revealed the role of external oxidants to overcome the high redox potential of Au(I)/Au(III) couple (E^0 = +1.41 V) and to facilitate two-electron redox cycle. Later, the Glorius group introduced the merged gold/photoredox strategy to circumvent the need for a stoichiometric oxidant. Recently, the Waser's group demonstrated that ethynylbenziodoxolones (EBXs) are powerful reagents for redox gold catalysis.

All the above strategies were not amenable to the use of aryl halides, and thus their use in gold-catalyzed cross-coupling reactions remained forbidden. Building on Bourissou's pioneering discovery that P,N-ligated gold complexes facilitate oxidative addition to aryl halides, ligand-enabled gold redox catalysis has emerged as an important topic. This talk will highlight our recent efforts in ligand-enabled gold redox catalysis with aryl halides, with a particular focus on enantioselective gold redox catalysis.

Illustration : *Le grand stūpa de Sânchî © Nitin T. Patil*

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June 8th, 11h
Auditorium Friedel
Chimie ParisTech - PSL

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Jean RAYNAUD (CNRS, laboratoire CP2M – UMR5128 : CNRS/Univ. Lyon 1/CPE Lyon, Villeurbanne)
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Chemical Recycling of Polymers: 2 case studies, Polyolefins & Silicones

Abstract. Polyolefins and Silicones are ubiquitous materials, owing to their versatile properties than can be finely adjusted throughout the course of their respective synthetic processes. They display high performances in many everyday life applications (infrastructure, packaging, transport, energy, health…) under many forms (pipes, containers, coatings, elastomers, foams…). Advantageously utilizing catalysis for the tailored synthesis/construction of Polyolefin & Silicone materials has been a workhorse of the corresponding industries of these versatile polymers. By appropriately selecting the catalyst or catalyst combination, one can now also deconstruct such polymer materials, going back to valuable molecules or macromolecules of their industrial cascade of processes. Different solutions are necessary for the recycling of such polymers, depending on the considered polyolefin or silicone waste and corresponding stage of their lifespan.

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June 15th, 11h
Auditorium Astier
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Sébastien BONTEMPS (LCC-CNRS, Université de Toulouse)
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Cell-free synthesis of carbohydrates from sustainable C_1 source

Abstract. Photosynthesis is a major process enabling living organisms to use CO_2 as an energy carrier and a source of carbon. In this natural process, CO_2 is transformed into glyceraldehyde-3-phosphate, a C3 carbohydrate. For chemists, such transformation is a great synthetic challenge, implying the unprecedented formation of polyol chain and of asymmetric carbon atom from CO_2 as the only source of carbon.
Few years ago, we started to study the hydroboration of CO_2 and notably reported its controlled 4 electron reduction to synthesize a large variety of products featuring new C-N, C-O and C-C bonds in using CO_2 as a C_1 source.[3]
We report now that the selective 4e- reduction of CO_2 is a key step toward the use of CO_2 as a C_n source and notably for the de novo synthesis of carbohydrates.

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June 22nd, 11h
Auditorium Astier
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Contact:
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Kacper BŁAZIAK (Faculty of Chemistry, University of Warsaw and Biological and Chemical Research Center, University of Warsaw, Poland)
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A New Perspective on How Carbon Monoxide Becomes a Source of Hydrogen Energy: Molecular Insights into the Water-Gas Shift Reaction

Abstract. (CO_2), is a cornerstone of modern chemical industry and a key step in the production of hydrogen, ammonia, and methanol. Despite its large-scale industrial importance, the detailed molecular mechanisms governing this reaction remain only partially understood, making it an exciting focus of contemporary research.
This lecture explores how cutting-edge approaches combining experimental techniques, such as mass spectrometry, with computational chemistry methods based on Density Functional Theory (DFT), enables to investigate chemical reactions at the atomic level. Using iron-based complexes, particularly $[Fe(OH)_2]^+$, as model systems, we will examine how CO is transformed into CO_2 and what pathways are energetically accessible.
We will present how theoretical calculations align with experimental observations in determining key energetic parameters, such as dehydration and dehydroxylation energies.
Special attention will be given to the role of electronic structure, including spin states and spin crossover phenomena, which significantly influence reaction dynamics. The lecture aims to provide an accessible yet insightful perspective on how modern chemistry bridges theory and experiment to unravel processes essential for sustainable energy and industrial innovation.

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June 29th, 11h
Auditorium Astier
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Gonzalo RAMIREZ GARCIA (Applied Physics and Advanced Technologies (CFATA), Universidad Nacional Autonoma de Mexico (UNAM)
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Photonic nanosensors: From fundamental design to field-ready environmental applications

Abstract. Photonic nanosensors are an emerging class of analytical tools capable of detecting and quantifying biologically and environmentally relevant molecules with outstanding sensitivity and selectivity. This seminar will highlight recent advances in luminescent and nanophotonic sensing platforms, with emphasis on their underlying mechanisms, architectures, and practical deployment in biomedical and environmental contexts. By rationally engineering nanostructured materials, these systems harness light–matter interactions to generate quantifiable optical signals directly correlated with analyte concentration. Selected case studies will illustrate the detection of phytohormones, plant nutrients, and key contaminants in the water–soil–plant continuum, including heavy metals and agrochemicals, underscoring their relevance to sustainable agriculture and environmental monitoring. The seminar will also present a portable optoelectronic platform for in-field detection of organophosphate pesticides, integrating neural networks for real-time data analysis and decision-making. Overall, this work demonstrates the convergence of nanophotonics, advanced materials, and intelligent instrumentation toward next-generation sensing technologies for health and environmental applications.

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JULY 2026

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July 6th, 11h
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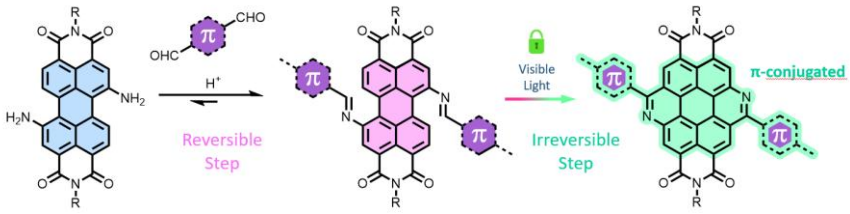
Dynamic Assembly of Supramolecular Organic (Semi)Conductors and Emerging Properties

Abstract. The development of electron-deficient organic semiconductors remains a bottleneck in the progress of organic and molecular electronics. This is largely due to the limited diversity of intrinsically electron-deficient building blocks and the difficulty of efficiently and selectively fusing and installing electron-withdrawing groups onto polyaromatic hydrocarbon (PAH) derivatives.
Diimide-based materials represent a cost-effective and highly tunable class of scaffolds for the development of electron-transporting materials, owing to their low LUMO energy levels, strong light absorption, and their ability to form a wide range of self-assembled structures.
We focus on underexplored amino-PDI derivatives, which can be converted into dynamic covalent imine-based materials through reaction with electronically active aldehydes. This dynamic equilibrium can be "frozen" or "locked" upon exposure to visible light, triggering an irreversible cyclization that fuses the system. This strategy has been exploited to prepare conjugated architectures under thermodynamic control, such as conjugated polymers and nitrogen-doped coronene diimide-based macrocycles, in high yields. These extended conjugated systems also reveal a fundamental and intriguing phenomenon: the ability to self-assemble into mixed-valence complexes upon electrochemical reduction. By pushing these systems to their limit, a single electron can be delocalized on larger self-assembled structure, in usually highly dissociative chlorinated solvent, as assessed by real-time spectro-electrochemistry in thin volume.



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July 8th, 11h
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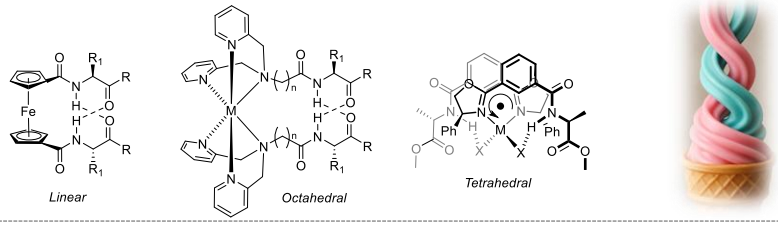
Helically Chiral Transition Metal Complexes

Abstract. Chirality plays a fundamental role in in chemical as well as biological environments. The efficient transfer of chirality in supramolecular assemblies is essential for progress in asymmetric catalysis, medicinal and materials chemistry. Metal complexes with chiral ligands have a crucial role in this context, particularly helical chirality. Amino acids are a cheap source of chirality with clear biological and medicinal relevance often used in the design of functional systems. Herein, the synthesis of selected late transition metal complexes with chiral amino acid substituents prepared in our laboratory will be discussed. The variety of structural motifs includes linear, octahedral and tetrahedral geometries. The characterization of these complexes by spectroscopy and crystallography as well as DFT calculations will be shown and their potential applications will be highlighted.



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July 9th, 11h
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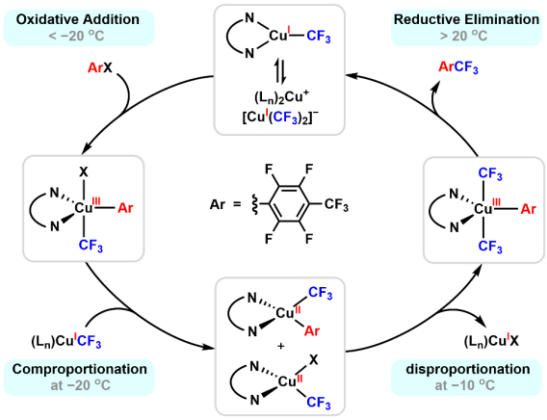
Mechanistic studies on copper-mediated trifluoromethylation

Abstract. Copper-mediated fluoroalkylation of (hetero)aryl halides is one of the most classic synthetic methods for preparing novel fluoroalkyl-substituted (hetero)arenes. A simplified mechanistic proposal suggests that the reaction proceeds via an oxidative addition/reductive elimination process involving a Cu(III) intermediate, with the oxidative addition (OA) step being rate-limiting. Over the past ten years, our group has systematically investigated the mechanism of this transformation, including the isolation and characterization of key Cu(III) intermediates, as well as the elucidation of fundamental steps such as the oxidative addition of alkyl/aryl halides to well-defined Cu(I) complexes and reductive elimination from Cu(III) species. Furthermore, mechanistic insights have been successfully translated into efficient trifluoromethylation methodologies.



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July 15th, 11h
Auditorium Astier
Building Esclangon
Campus P et M Curie
Sorbonne Université

Thomas SNADDON (Department of Chemistry, Indiana University, Bloomington, IN 47401, USA)
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Enantioselective Chemical Synthesis Methods via Cooperative Catalysis: Alkylation Reactions Spanning One and Two Electron Chemistry

Abstract. Our laboratory has embraced cooperative catalysis as a general framework for the design of new enantioselective reactions. Within this regime we have exploited two catalyst cooperativity as an effective means to control and direct both reaction partners during bond construction in a manner that is typically beyond the capability of either catalyst alone. Key to this versatile approach is that the role and function of the metal center can be modified and tuned without compromising enantioselectivity, which (1) enables access to reactivity that can be elusive, and (2) can provide a general template for chemo- regio- and stereochemical control. This seminar will describe our most recent efforts in asymmetric carbon–carbon bond formation, which will span both one and two electron chemistries.

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