Artem
OSYPENKO

WORK EXPERIENCE

01/08/2020 – CURRENT – Strasbourg, France

Researcher

Syndivia

R&D of novel linkers for antibody-drug conjugates used as selective anticancer therapeutics

Chemistry / Professional, scientific and technical activities / enquiry@syndivia.com / https://www.syndivia.com/ / 8 allee Gaspard Monge, ISIS-2, 67000, Strasbourg, France

10/2016 – 07/2020 – Strasbourg, France

Post-Doctoral Researcher

Institut de Science et d'Ingénierie Supramoléculaires

- Dynamic Chemistry of Imines, Adaptive Chemistry

Supervisor: Prof. Jean-Marie Lehn

Strasbourg, France

09/2014 – 06/2017 – Strasbourg, France

University Teaching Assistant

University of Strasbourg

Practical work: “Organic Chemistry” – L2.

Seminars: “Metabolic Chemistry” – L3; “Chemistry of Life” – L2

Responsible: Prof. J.-M. WEIBEL, Dr. V. BERL, Prof. J.-P. LEPOITTEVIN

09/2012 – 09/2016

Doctoral Researcher

Institut Charles Sadron (CNRS)

- Fundamental and Applied Aspects of Self-Assembling Triarylamines

Supervisor: Prof. Nicolas GIUSEPPONE

Strasbourg, France

01/2012 – 07/2012

Master Project

Laboratoire de Chimie de Coordination (CNRS)

- Polypeptides with Pendant Porphyrins

Supervisors: Dr Nathalie SOLLADIE

Toulouse, France

09/2010 – 06/2011

Technician of EPR Spectroscopy

Taras Shevchenko National University of Kyiv

Supervisor: Prof. Vira ZUB

Kyiv, Ukraine

11/2009 – 06/2012 – Kyiv, Ukraine

Scientific Consultant

LLC UkrAgroResourse

Development of microelement liquid fertilizers for folial plant nutrition

09/2008 – 06/2012 – Kyiv, Ukraine

Tutor
Lyceum of Kyiv №145

EDUCATION AND TRAINING

09/2012 – 09/2016 – 4 Rue Blaise Pascal, Strasbourg, France

PhD Degree in Organic Chemistry
University of Strasbourg
EQF level 8 | https://www.unistra.fr/

09/2011 – 06/2012 – 118 Route de Narbonne, Toulouse, France

MSc of Fundamental and Applied Chemistry
Paul Sabatier University - Toulouse III
EQF level 7 | https://www.univ-tlse3.fr/

09/2011 – 06/2013 – 60 Volodymyrska St, Kyiv, Ukraine

Master of Chemistry in Inorganic Chemistry
Taras Shevchenko National University of Kyiv
http://www.univ.kiev.ua/en/

09/2007 – 06/2011 – 60 Volodymyrska St., Kyiv, Ukraine

Bachelor of Chemistry
Taras Shevchenko National University of Kyiv
http://www.univ.kiev.ua/en/

LANGUAGE SKILLS

MOTHER TONGUE(S): Ukrainian / Russian

OTHER LANGUAGE(S):

English

Listening	Reading	Spoken production	Spoken interaction	Writing
C1	C1	B2	B2	B2

French

Listening	Reading	Spoken production	Spoken interaction	Writing
C1	C1	B2	B2	B1

Italian

Listening	Reading	Spoken production	Spoken interaction	Writing
A1	A2	A1	A1	A1

DIGITAL SKILLS

Microsoft Office / Zoom / Skype / Google Drive / MNova MestreLab / Chem Draw / SciFinder

PUBLICATIONS

Phase Transfer of Metal Cations by Induced Dynamic Carrier Agents: Biphasic Extraction Based on Dynamic Covalent Chemistry

2020 https://pubs.rsc.org/en/content/articlehtml/2020/sc/d0sc04098c
DOI: 10.1039/D0SC04098C
Phase transfer of Cu(ii) cations is achieved by component exchange in a dynamic covalent library of acylhydrazone ligands. B1 / B2 component exchange leads to the generation of a lipophilic carrier agent that extracts Cu(ii) into chloroform.

Self-Assembly of Supramolecular Polymers of N-Centered Triarylamine Trisamides in the Light of Circular Dichroism: Reaching Consensus between Electrons and Nuclei

2020 https://pubs.acs.org/doi/abs/10.1021/jacs.9b11306
DOI: 10.1021/jacs.9b11306
The self-assembly of chiral supramolecular polymers is an intricate process that spans a wide range of length scales. Circular dichroism techniques are ideal to study this process as they provide information on the molecular scale but are at the same time also sensitive probes of the long-range interactions that control the growth and morphology of these polymers. As yet, Electronic Circular Dichroism that uses electronic transitions as a probe has by far been the method of choice while Vibrational Circular Dichroism, which uses vibrational transitions to probe structure, is much less employed. Here, we report experimental and theoretical studies of the self-assembly of helical supramolecular polymers of (S)-triarylamine tris-amides ((S)-TATA) in which both techniques are applied in concert. Theoretical studies based on quantum chemical calculations and on simplified models that allow for extrapolation to “infinitely” long polymers provide a solid basis for interpreting results from each of the two techniques that on their own would appear to be contradictory. In the particular case of (S)-TATA it is shown that upon equilibration the initially formed fibers undergo a conformational transition that becomes only “visible” by the combination of the two techniques. Our studies thus show that combining electronic and vibrational domains offers a unique and complementary means to probe these polymers, precisely because they are sensitive to different aspects of molecular and polymeric structure.

Pattern Generation and Information Transfer through a Liquid/Liquid Interface in 3D Constitutional Dynamic Networks of Imine Ligands in Response to Metal Cation Effectors

2019 https://pubs.acs.org/doi/abs/10.1021/jacs.9b05438
DOI: 10.1021/jacs.9b05438
The immense discriminative capacity of the human olfactory chemosensory systems relies on the generation of a combinatorial signal in response to the interaction of a particular odorant molecule with many different olfactory receptors. In this work, we report the generation of distributional signals by the action of particular effectors, here metal cations, on dynamic covalent libraries (DCLs) of receptor molecules, here ligands for metal cations. Different effectors are discriminated by the formation of different constitutional distributions, which result from the adaptation of the DCL to the action of a particular cation effector through the selection and exchange of components. Compartmentalization by operation in a system of immiscible solvents (here water and chloroform) results in a 3D constitutional dynamic network (CDN), effecting distributional signal and information transfer between two domains, through the interface from the “writing” input phase (the IN-phase) and the “reading” output phase (the OUT-phase). Here, it is not the selectivity of a specific recognition process between a particular DCL member and a given effector that is key to the information processing, but the change in the distribution of the components and constituents, a dynamic pattern or fingerprint, induced in one phase in response to interaction with a given effector binding and transmitted to the other phase by component and constituent exchange across the phase boundary. Finally, the pattern recognition techniques such as hierarchical cluster analysis (HCA) and principal component analysis (PCA) were successfully applied to analyze the output generated by the action of different effectors on the higher order [5 × 5] DCL. Discrimination between different effectors was characterized by specific domains. Such data processing also opens the way toward extension to much larger DCLs.

Temperature Control of Sequential Nucleation-Growth Mechanisms in Hierarchical Supramolecular Polymers

2019 https://chemistry-europe.onlinelibrary.wiley.com/doi/abs/10.1002/chem.201902898

DOI: 10.1002/chem.201902898

Upon cooling in solution, chiral triarylamine tris-amide unimers produce organogels by stacking into helical supramolecular polymers, which subsequently bundle into larger fibers. Interestingly, circular dichroism, vibrational circular dichroism, and AFM imaging of the chiral self-assemblies revealed that monocolumnar P-helical fibrils formed upon fast cooling, whereas bundled M-superhelical fibers formed upon slow cooling. The mechanistic study of this structural bifurcation reveals the presence of a strong memory effect, reminiscent of a complex stepwise combination of primary and secondary nucleation-growth processes. These results highlight the instrumental role of sequential self-assembly processes to control supramolecular architectures of multiple hierarchical order.

Supramolecular Electropolymerization

2018 https://onlinelibrary.wiley.com/doi/abs/10.1002/anie.201809756

DOI: 10.1002/anie.201809756

Gaining control over supramolecular polymerization mechanisms is of high fundamental interest to understand self-assembly and self-organization processes at the nanoscale. It is also expected to significantly impact the design and improve the efficiency of advanced materials and devices. Up to now, supramolecular polymerization has been shown to take place from unimers in solution, mainly by variations of temperature or of concentration. Reported here is that supramolecular nucleation-growth of triarylamine monomers can be triggered by electrochemistry in various solvents. The involved mechanism offers new opportunities to precisely address in space and time the nucleation of supramolecular polymers at an electrode. To illustrate the potential of this methodology, supramolecular nanowires are grown an oriented over several tens of micrometers between different types of commercially available electrodes submitted to a single DC electric field, reaching a precision unprecedented in the literature.

Anisotropic Self-Assembly of Supramolecular Polymers and Plasmonic Nanoparticles at the Liquid–Liquid Interface

2017 https://pubs.acs.org/doi/abs/10.1021/jacs.6b11179

DOI: 10.1021/jacs.6b11179

The study of supramolecular polymers in the bulk, in diluted solution, and at the solid–liquid interface has recently become a major topic of interest, going from fundamental aspects to applications in materials science. However, examples of supramolecular polymers at the liquid–liquid interface are mostly unexplored. Here, we describe the supramolecular polymerization of triarylamine molecules and their light-triggered organization at a chloroform–water interface. The resulting interfacial nematic layer of these 1D supramolecular polymers is further used as a template for the precise alignment of spherical gold nanoparticles coming from the water phase. These hybrid thin films are spontaneously formed in a single process, without chemical prefunctionalization of the metallic nanoparticles, and their ordering is improved by centrifugation. The resulting polymer chains and strings of nanoparticles can be co-aligned with high anisotropy over very large distances. By using a combination of experimental and theoretical investigations, we decipher the full sequence of this oriented self-assembly process. In such a highly anisotropic configuration, electron energy loss spectroscopy reveals that the self-assembled nanoparticles behave as plasmonic waveguides.

Self-Assembly of Benzene-Tris(Bis(p-Benzyloxy)Triphenylamine)Carboxamide

2016 https://www.sciencedirect.com/science/article/pii/S1631074815001265

DOI: 10.1016/j.crci.2015.05.010

A dendritic unit based on a benzenetricarboxamide core and three triarylamine arms has been synthesized and characterized. Self-assembled micrometric crystalline fibers can be formed in various organic solvents. This derivative has also been studied in chlorinated solvents upon visible light stimulation, giving rise to self-assembled fibers with triarylammonium cations trapped in their supramolecular structure. Overall, this work enlarges the scope of chemical modifications that can be made on triarylamine cores to produce doped supramolecular architectures with potential interests for optoelectronic materials.

HONOURS AND AWARDS

2012
Marie Curie Fellowship – European Commission

2011
Scholarship of the French Government – French Government

2011
Scholarship of the President of Ukraine – Office of the President of Ukraine

2010
Gold medal – Ist International Student Tournament in Chemistry - Saint-Petersburg, Russian Federation

2007
Silver medal – International Mendeleev Chemistry Olympiad - Minsk, Belarus

2006
Scholarship of the President of Ukraine – Office of the President of Ukraine

2006
Bronze medal – International Mendeleev Chemistry Olympiad - Erevan, Armenia
http://www.chem.msu.su/rus/olimpiad/olimp2006/welcome.html

VOLUNTEERING

20/07/2019 – 31/07/2019

Member of the Organization Committee at the International Chemistry Olympiad in Paris

Paris, France
https://icho2019.paris/en/

01/01/2017 – 31/12/2018

Member of the Council of the Institute

Supramolecular Science and Engineering Institute, Strasbourg, France

19/04/2017 – 21/04/2017

Jury Member for the Scholarship of French Government

Embassy of France in Kyiv, Ukraine

24/02/2021

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