



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

INORGANIC CHEMISTRY AREA

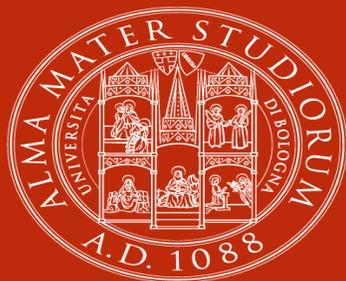
CURRENT RESEARCH TOPICS

Dipartimento di Chimica Industriale
“Toso Montanari”

Research Groups

- **CHINANOR Advanced Materials**
- **Metal Carbonyl Clusters**
- **Bioactive Ru-Complexes for Therapeutical Applications**
- **Molecular Catalysis for Sustainable Applications (MOLCAT)**
- **Photoactive Metal Complexes for Materials and Life Sciences**
- **Supramolecular Chemistry, Photochemistry and Nanoscience**
- **Hybrid Perovskite Semiconductors for Optoelectronic Applications**





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CHINANOR

Advanced Material

Dipartimento di Chimica Industriale
"Toso Montanari"

CHINANOR Advanced Material

Department of Industrial Chemistry «Toso Montanari»

web site: <https://chimica-industriale.unibo.it/it/ricerca/gruppi-di-ricerca/chinanor>



Prof. Barbara Ballarin, Analytical Chemistry
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<https://www.unibo.it/sitoweb/barbara.ballarin>

Prof. Maria Cristina Cassani, Inorganic Chemistry
maria.cassani@unibo.it
<https://www.unibo.it/sitoweb/maria.cassani>

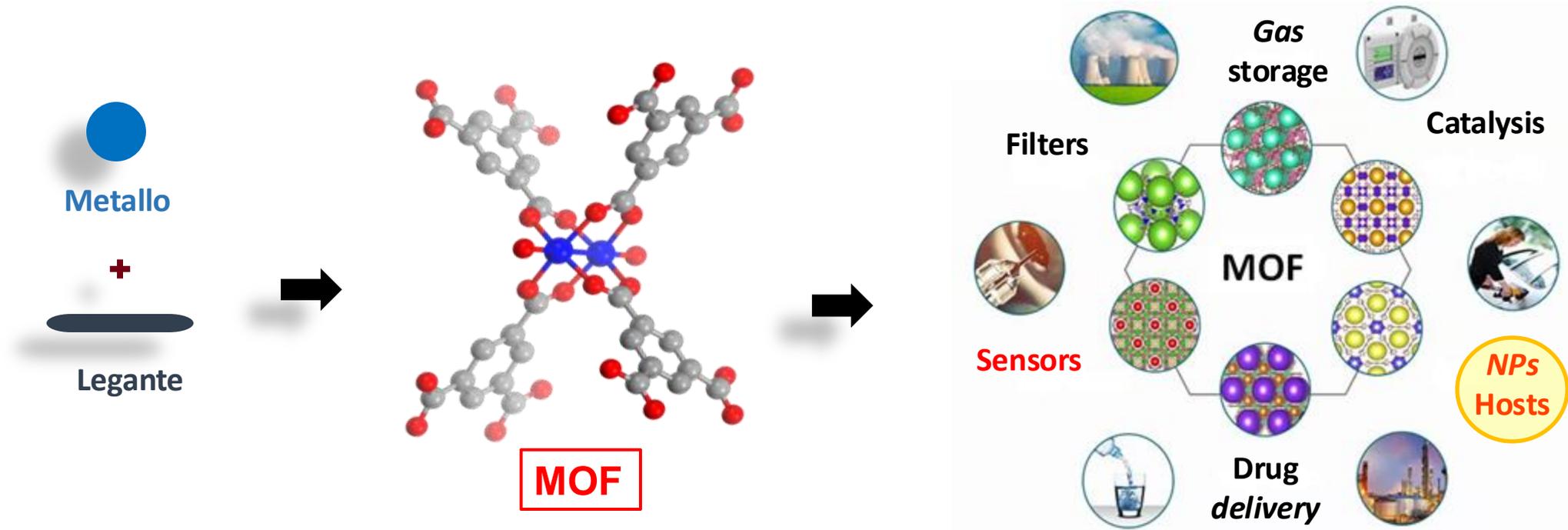
CHINANOR is a multidisciplinary group composed by researchers with expertise in the fields of Inorganic (Prof. Maria Cristina Cassani, maria.cassani@unibo.it) and Analytic Chemistry (Prof. Barbara Ballarin, barbara.ballarin@unibo.it).



MOFs: Metal Organic Frameworks

Maria Cristina Cassani

I MOFs sono una classe di materiali cristallini con alta area superficiale. Rispetto ai tradizionali adsorbenti porosi, l'unicità della struttura cristallina dei MOFs permette di progettare strutture con dimensioni e proprietà chimico-fisiche della superficie interna dei pori predeterminate, per applicazioni specifiche.



Metal Organic Frameworks (MOFs)@work: FROM BIOMEDICAL APPLICATIONS TO CULTURAL HERITAGE

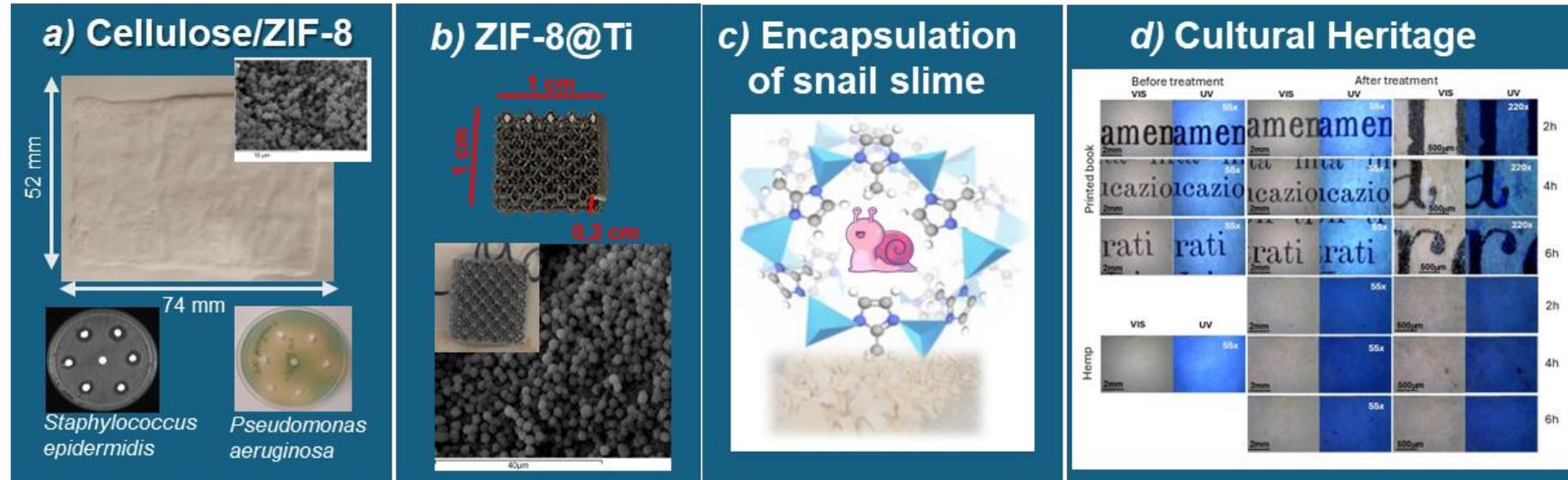


Figure 1. *a, b, c*) Biomedical applications of ZIF-8. *d*) Paper samples obtained for printed books and hemp observed via contact microscope before and after treatment with ZIF-8 solution 2h, 4h, and 6h under visible (VIS) and ultraviolet light (UV).

[*a*] "Cellulose/zeolitic imidazolate framework (ZIF-8) composites with antibacterial properties for the management of wound infections", B. Ballarin, M.C. Cassani, *J. Funct. Biomater.* **2023**, 14, 472; <https://doi.org/10.3390/jfb14090472>

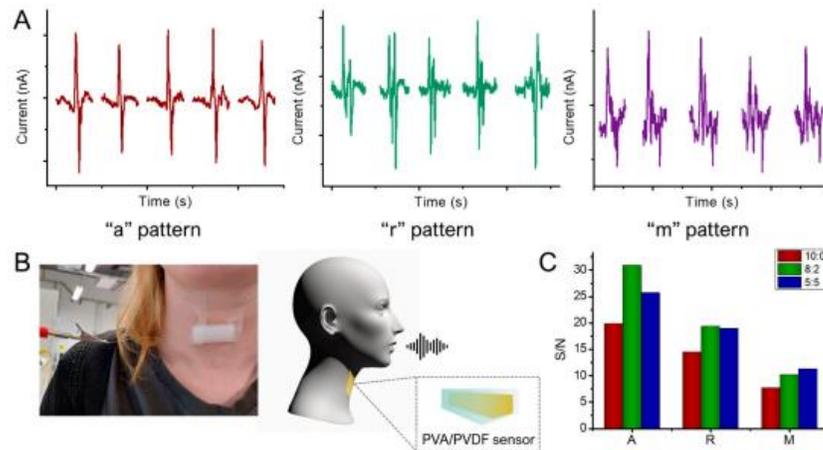
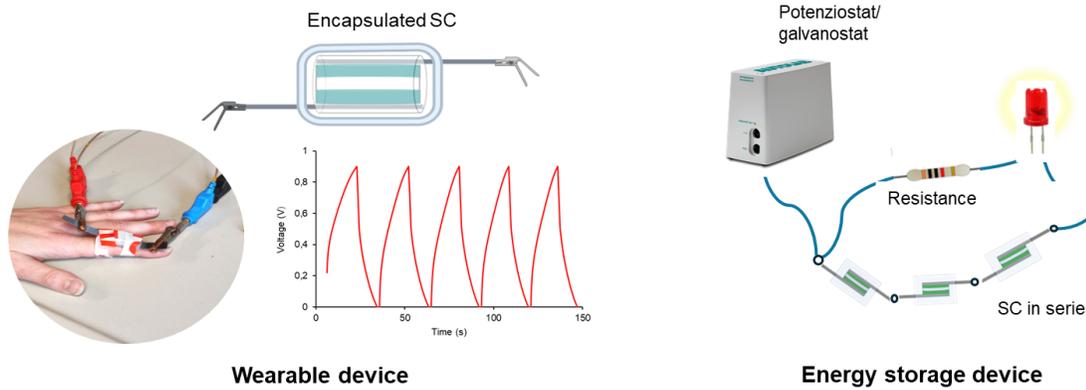
[*b*] "Porous titanium scaffolds modified with zeolitic imidazolate framework (ZIF-8) with enhanced osteogenic activity for the prevention of implant-associated infections", B. Ballarin, M.C. Cassani, *Front. Chem.* **2024**, 12:1452670. doi: 10.3389/fchem.2024.1452670.

[*c*] "Effectiveness of snail slime in the green synthesis of silver nanoparticles", B. Ballarin, M.C. Cassani, *Nanomaterials* **2022**, 12, 3447. Encapsulation of Snail Slime in Metal–Organic Framework ZIF-8", M.C. Cassani, B. Ballarin *J. Funct. Biomater.* **2025**, 16, 443. <https://doi.org/10.3390/jfb16120443>

[*d*] "Application of Zinc-Based Metal-Organic Framework ZIF-8 on Paper: A Pilot Study on Visual Appearance and Effectiveness", B. Ballarin, M.C. Cassani, *Polymers* **2025**, 17, 1369, doi.org/10.3390/polym17101369

Hydrogel: sintesi e applicazioni

Barbara Ballarin



Human voice sensor

- "Preparation and Characterization of Self-Healing PVA–H₂SO₄ Hydrogel for Flexible Energy Storage", M.C. Cassani, B. Ballarin, *ACS Omega* **2024**, 9, 6391; <https://doi.org/10.1021/acsomega.3c05392>
- "Multi-Layer PVA-PANI Conductive Hydrogel for Symmetrical Supercapacitors: Preparation and Characterization", M.C. Cassani, B. Ballarin, *Gels* **2024**, 10, 458. <https://doi.org/10.3390/gels10070458>
- "The Influence of DMSO on PVA/PVDF Hydrogel Properties: From Materials to Sensors Applications", M. C. Cassani, B. Ballarin, *Gels* **2025**, 11, 133. <https://doi.org/10.3390/gels11020133>
- "PVA-Based Hydrogels with Engineered Surface Roughness for Triboelectric Wearable Sensors", M.C. Cassani, B. Ballarin, *IEEE Sensors Journal*, **2026**, 26(2), 3147-3154. doi: 10.1109/JSEN.2025.3636267.

Gli hydrogel (o idrogel) sono materiali polimerici costituiti da una rete tridimensionale di macromolecole idrofile, cioè con affinità per l'acqua, legate tra loro tramite reticolazioni chimiche o fisiche. La loro caratteristica principale è la capacità di assorbire e trattenere grandi quantità di acqua o soluzioni acquose, arrivando a contenere dal 10-20% fino a migliaia di volte il proprio peso iniziale da asciutti, senza dissolversi nell'acqua stessa, e la capacità di rigenerarsi.

Grazie alla loro biocompatibilità, flessibilità e porosità, gli hydrogel trovano impiego in numerosi settori:

- Biomedicale: supporto per la crescita cellulare in ingegneria tissutale, medicazioni per ferite e ustioni, rilascio controllato di farmaci.
- Energia: sensori, supercapacitori e dispositivi diagnostici.
- Ambiente: assorbenti, rivestimenti.





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TRANSITION METAL CARBONYL CLUSTER COMPOUNDS

DESIGN, SYNTHESIS AND CHARACTERIZATION OF METAL
CARBONYL CLUSTERS AS MOLECULAR METAL NANOPARTICLES

Area di Chimica Inorganica

Dipartimento di Chimica Industriale "Toso Montanari"

RESEARCH GROUP



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Dott.ssa Cristiana Cesari
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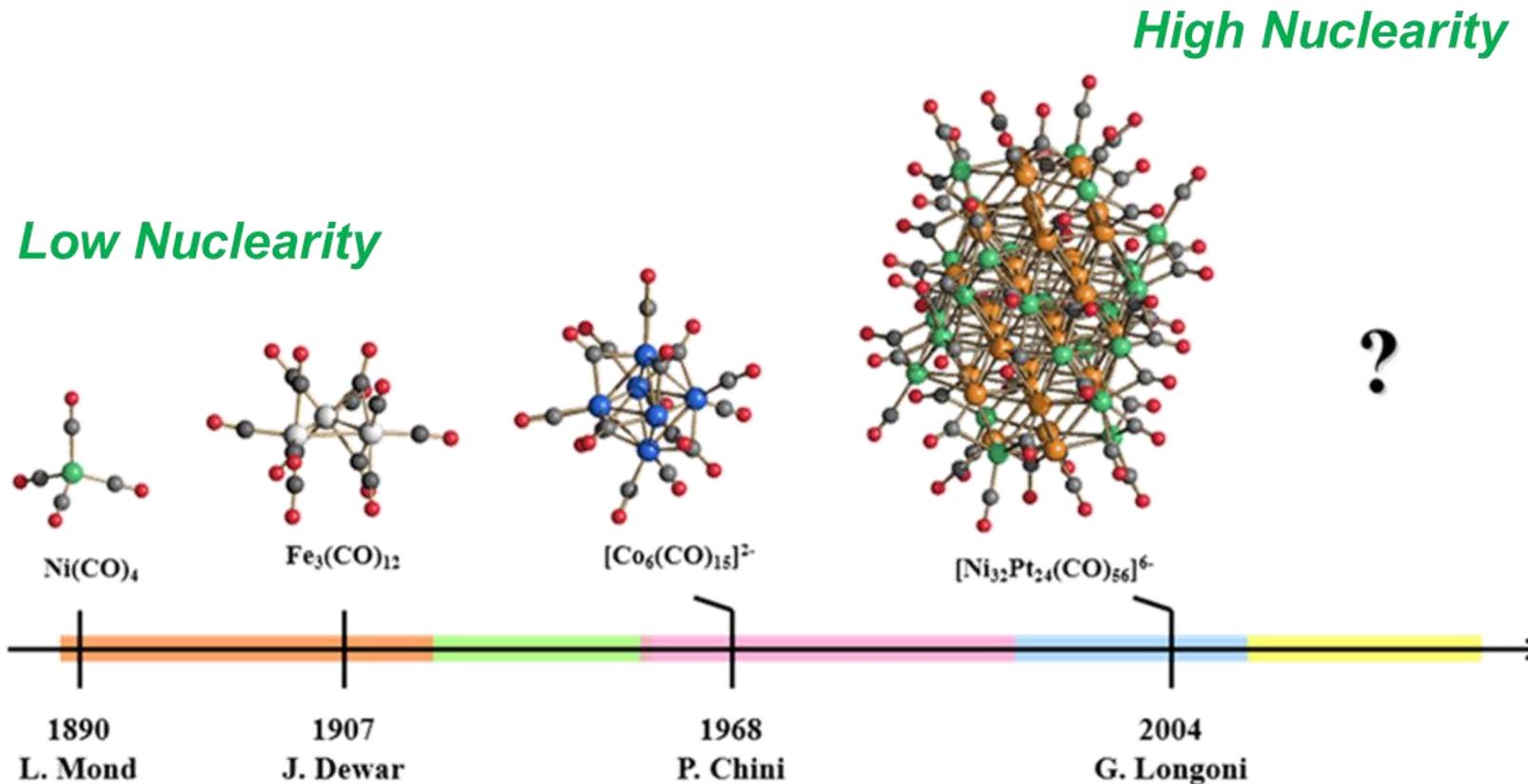


Dott.ssa Giorgia Scorzoni
giorgia.scorzoni3@unibo.it
(PhD)



What is a cluster?

F. A. Cotton (1966): a metal cluster is a molecular species consisting of "...a finite group of metal atoms held together mainly, or at least to a significant extent, by metal-metal bonds."

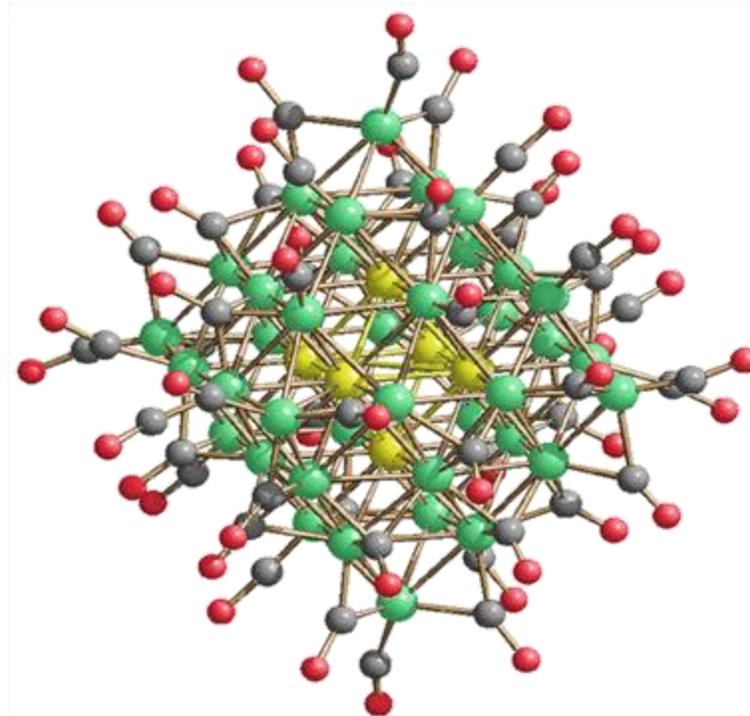
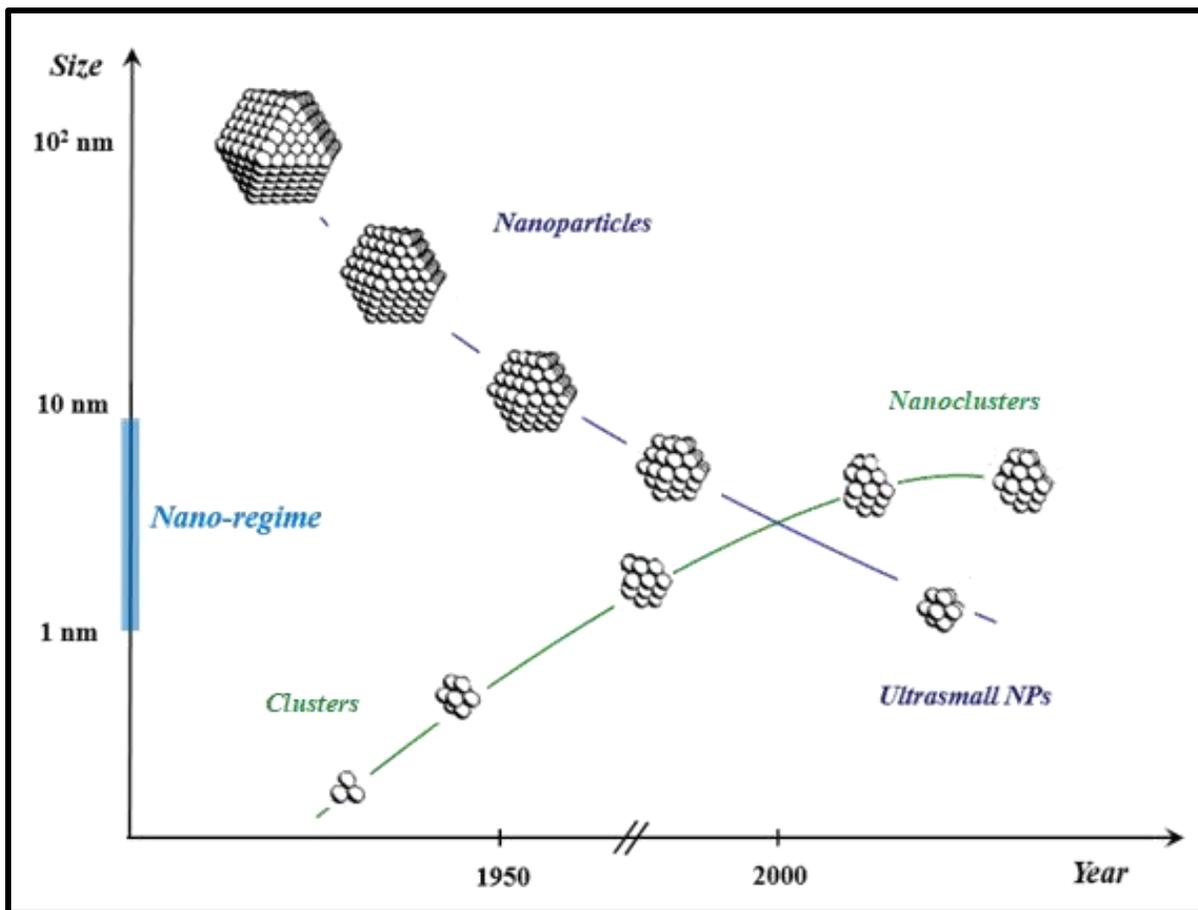


Coord. Chem. Rev., **2018**, 335, 27; *Eur. J. Inorg. Chem.*, **2018**, 3285, *Acc. Chem. Res.*, **2018**, 51, 2748; *Chem. Soc. Rev.*, **2021**, 50, 9503; *Dalton Trans.*, **2025**, 54, 2224.



Metal Carbonyl Clusters

Metal Carbonyl Clusters (**MCCs**) are low valent clusters based on late transition metals and stabilized by carbon monoxide ligands.



$[\text{HNi}_{38}\text{Pt}_6(\text{CO})_{48}]^{5-}$
diameter: 1.9 nm

Longoni et al. *Angew. Chem. Int. Ed.* **1985**, *24*, 696

High-nuclearity MCCs can be considered monodisperse, atomically precise metal nanoparticles.

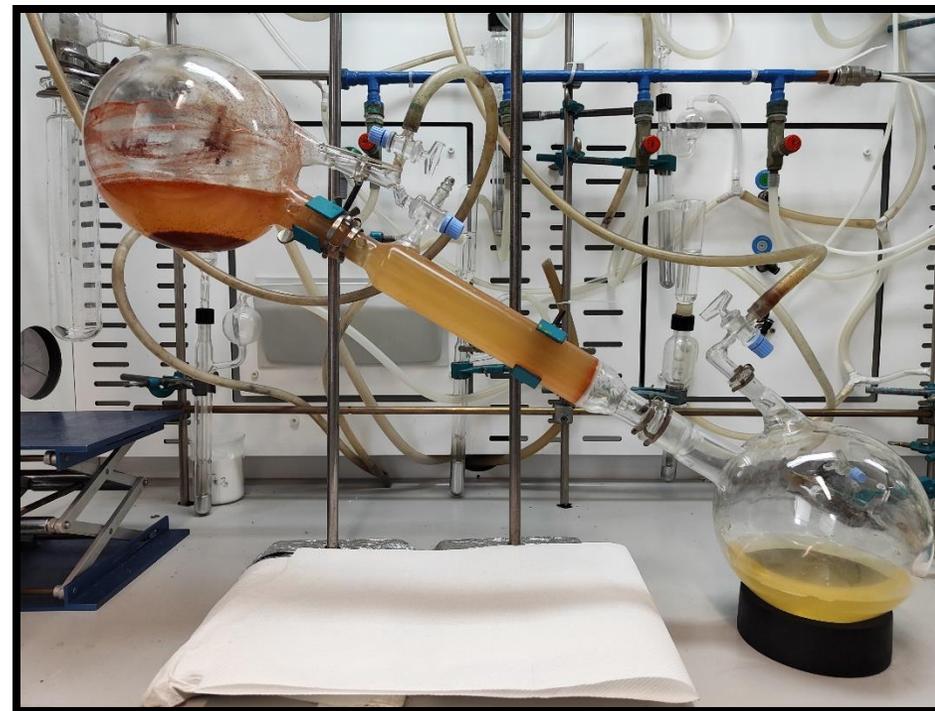


What we actually do in our lab?

- Synthesis of inorganic compounds under controlled atmosphere:



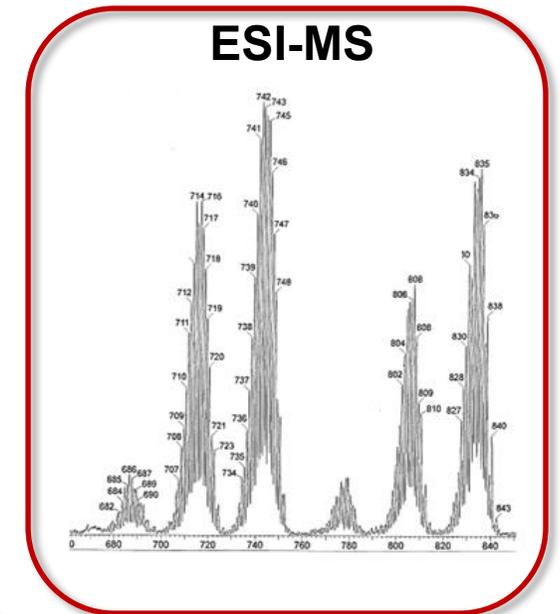
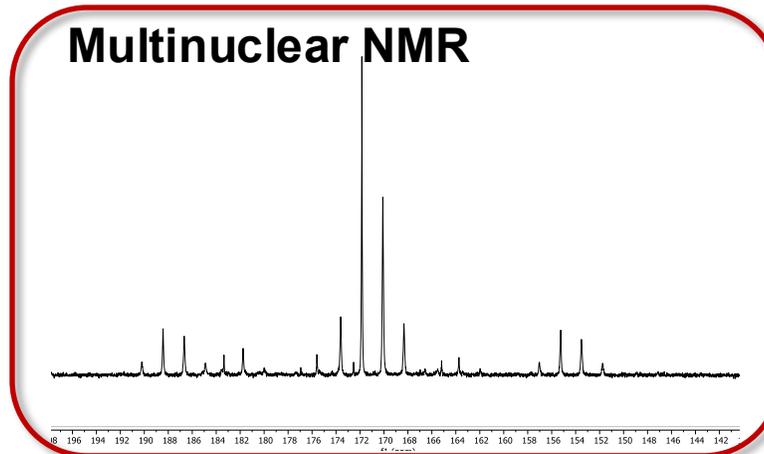
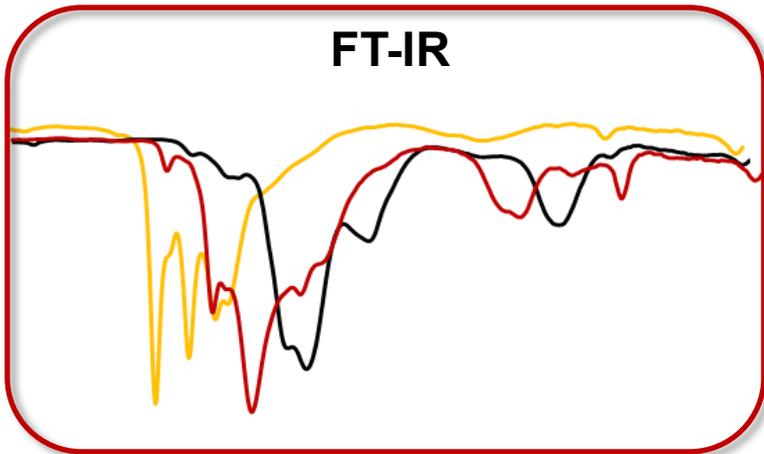
Synthesis of **Ruthenium** carbonyl precursor in an **autoclave** (high-pressure reactor).



Synthesis of **Rhodium** carbonyl precursor under CO atmosphere (**Schlenk technique**).

What we actually do in our lab?

➤ Spectroscopic and Structural Characterization:



Double layer crystallization to obtain crystals suitable for SC-XRD

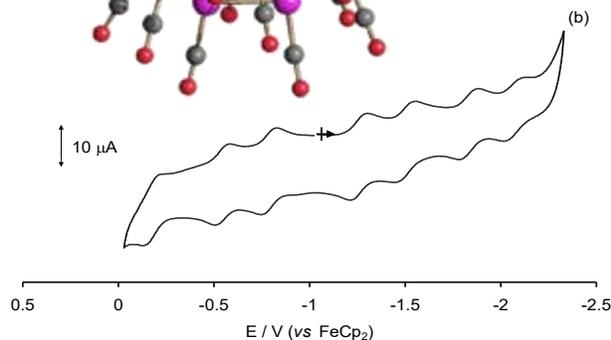
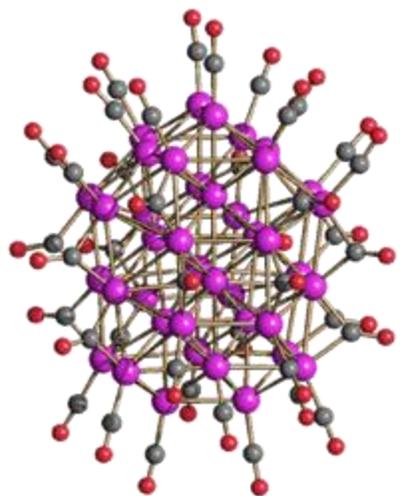
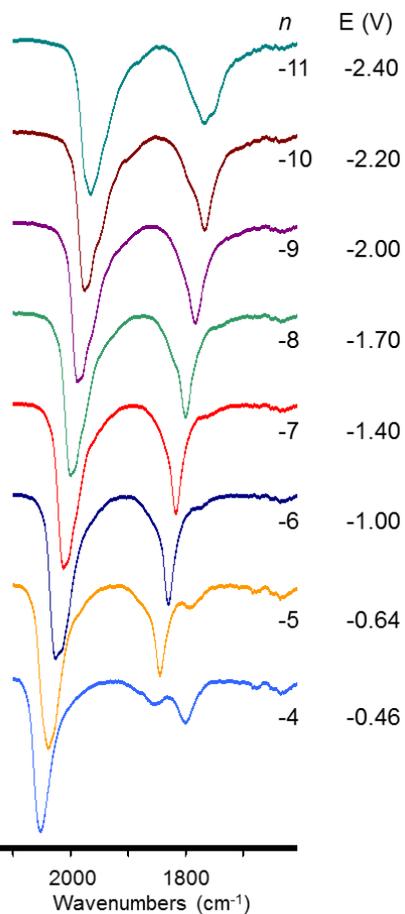
Single Crystal X-Ray Diffractometer (SC-XRD)



What we actually do in our lab?

➤ Applications in Nanomaterials

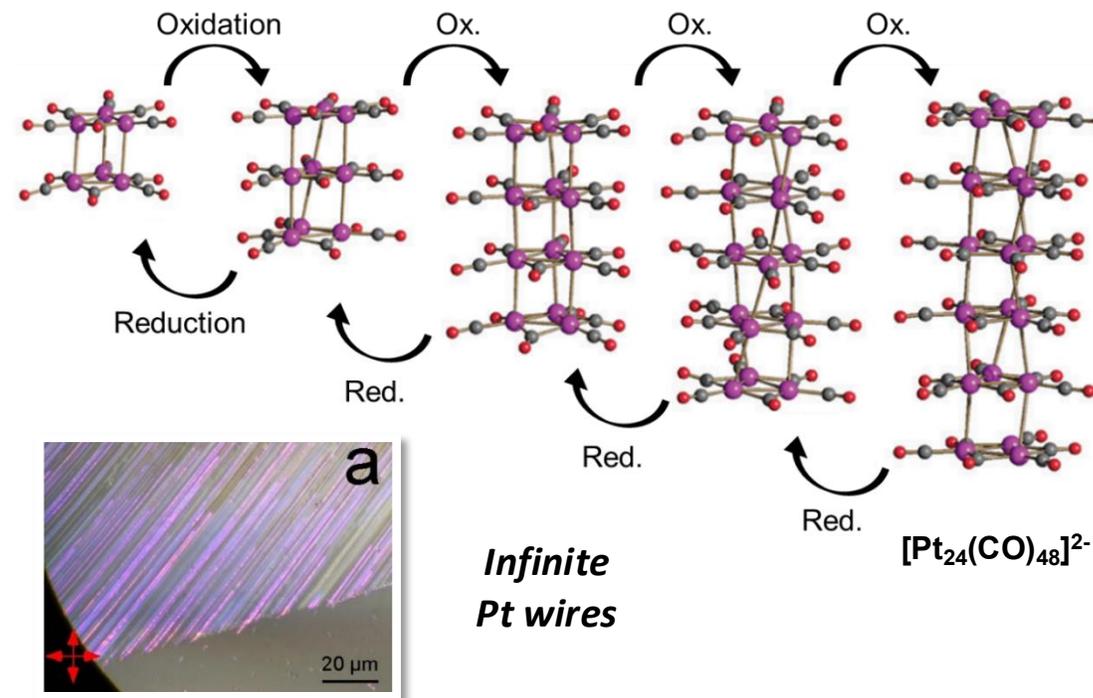
○ Possible Molecular Nanocapacitors



The cluster can accept and release electrons, functioning as an electron reservoir.

Inorg. Chem. **2016**, *55*, 6068

○ Molecular Conductive Platinum Nanowires



Oxidation induces new inter-triangular Pt-Pt bonds formation, promoting self-assembly 1D structures upon crystallization.

Angew. Chem., Int. Ed., **2006**, *45*, 2060;
Inorg. Chem., **2010**, *49*, 5992-6004.

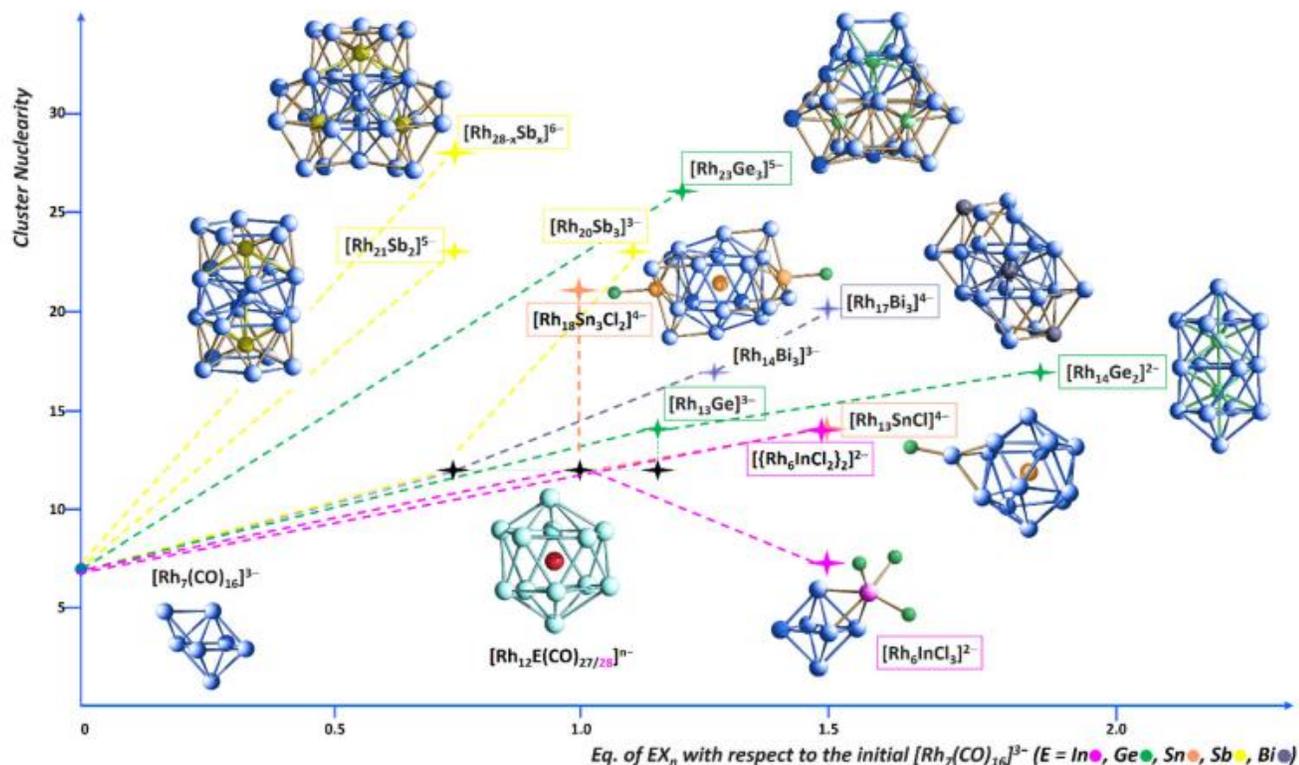


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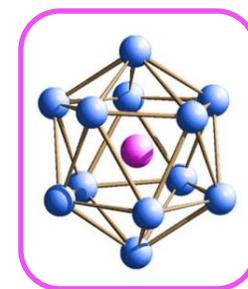
What we actually do in our lab?

➤ Applications in Nanomaterials

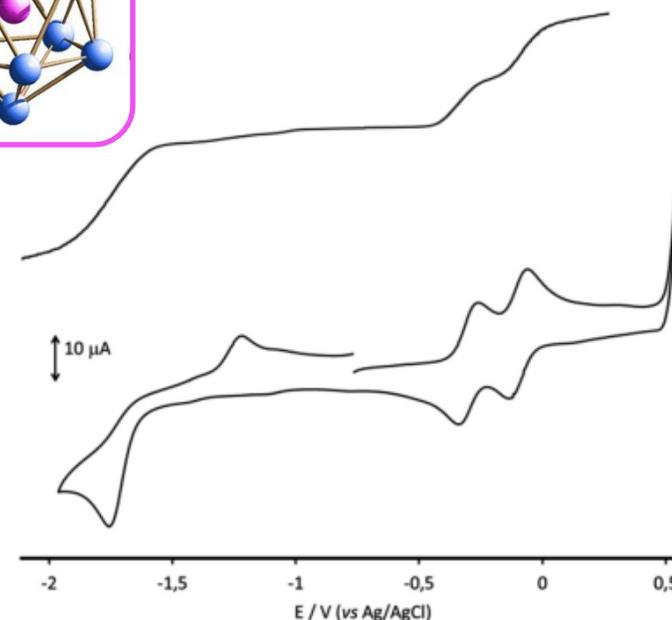
- **Atomically precise Rhodium – Indium carbonyl nanoclusters:** synthesis, characterization, crystal structure, and electron-sponge features.



Growth trend of heterometallic carbonyl clusters for the various Rh – E systems as a function of the added equivalents of EX_n ($X = Cl, Br; n = 2-4$).



Metal skeleton of $[Rh_{12}In(CO)_{28}]^{3-}$



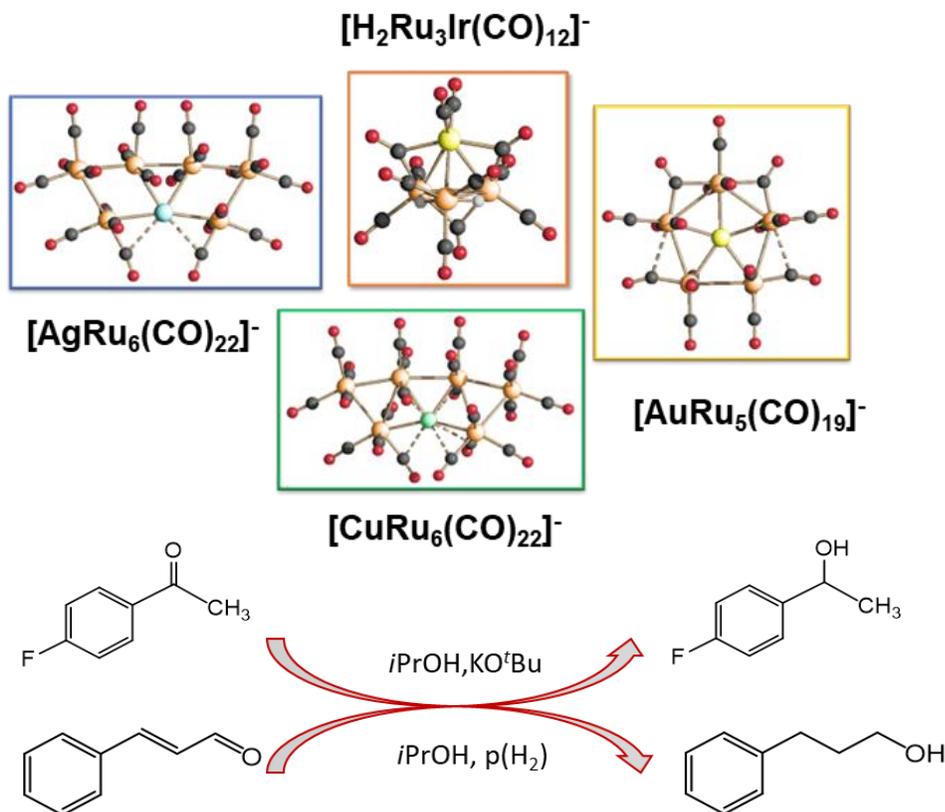
Cyclic (bottom) and hydrodynamic (top) voltammetric responses recorded at a GC electrode in a CH_3CN solution of $[Rh_{12}In(CO)_{28}]^{3-}$ under CO atmosphere.



What we actually do in our lab?

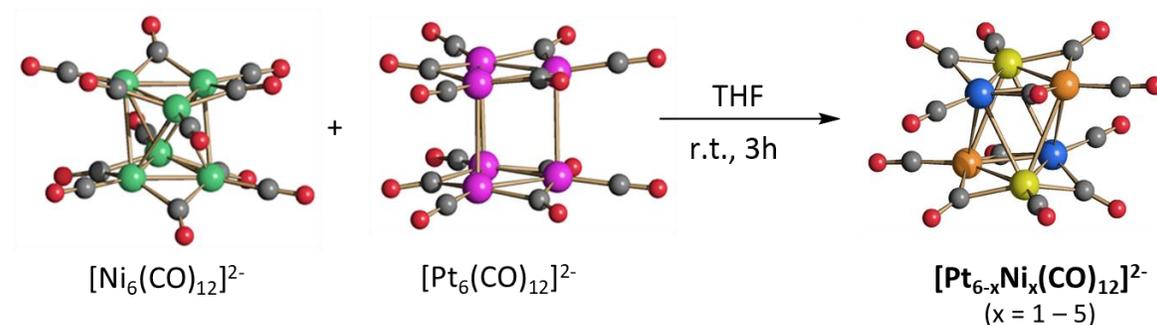
➤ Applications in Catalysis

- Heterobimetallic **Ru-M** ($M = \text{Ag}, \text{Cu}, \text{Au}, \text{Ir}$) carbonyl clusters as **homogeneous pre-catalysts** in transfer hydrogenation and hydrogenation reactions.

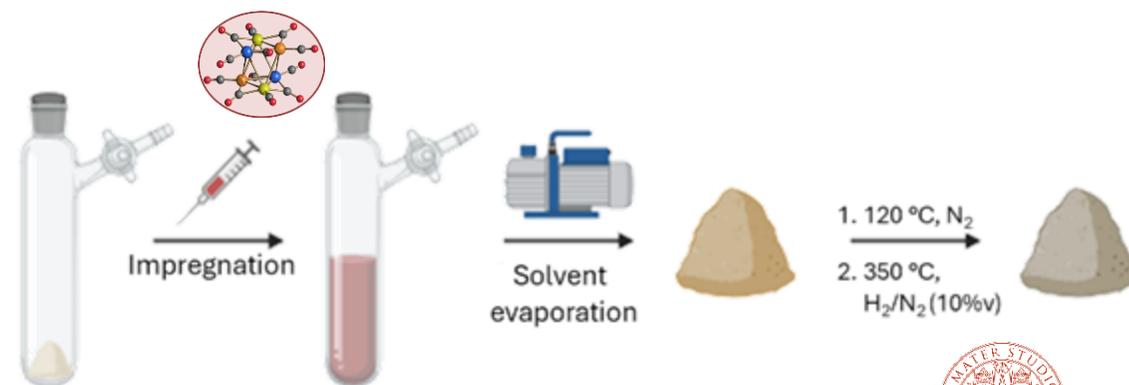


Inorg. Chem. **2022**, *61*, 14726–14741;
New J. Chem., **2023**, *47*, 19289

- Metal carbonyl clusters as precursors for the preparation of **highly dispersed nanoparticles** over different supports.

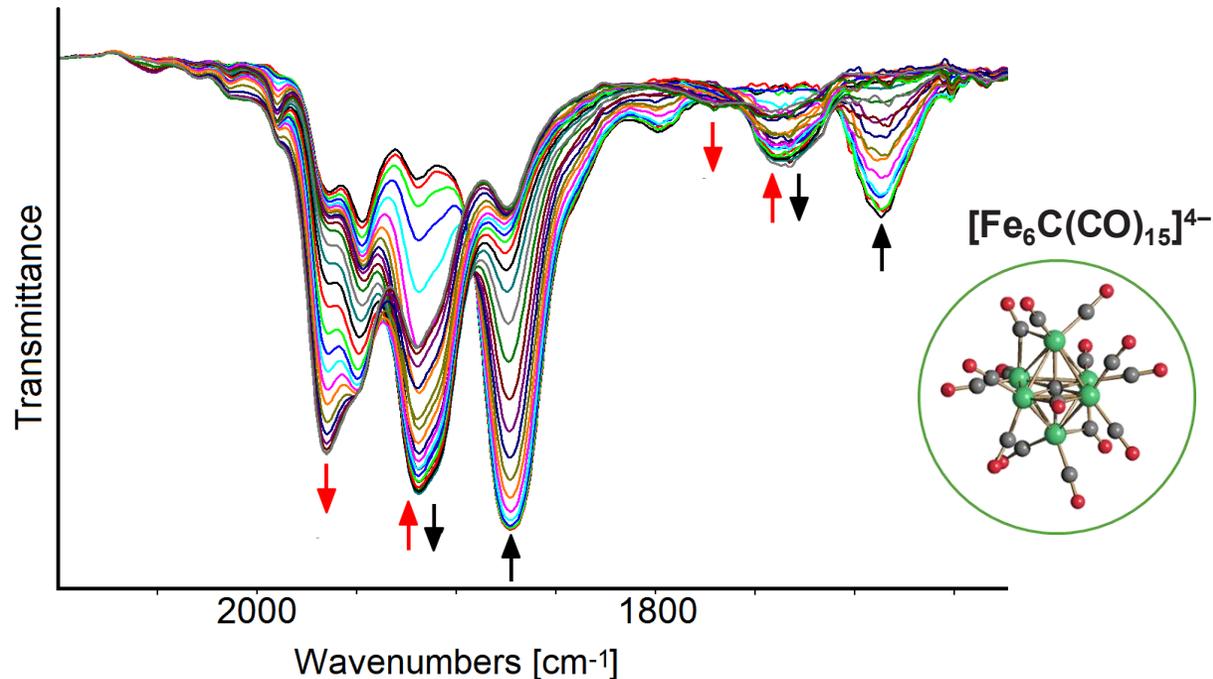


Inorg. Chem. **2021**, *60*, 8811; *Dalton Trans.*, **2023**, 52, 3623



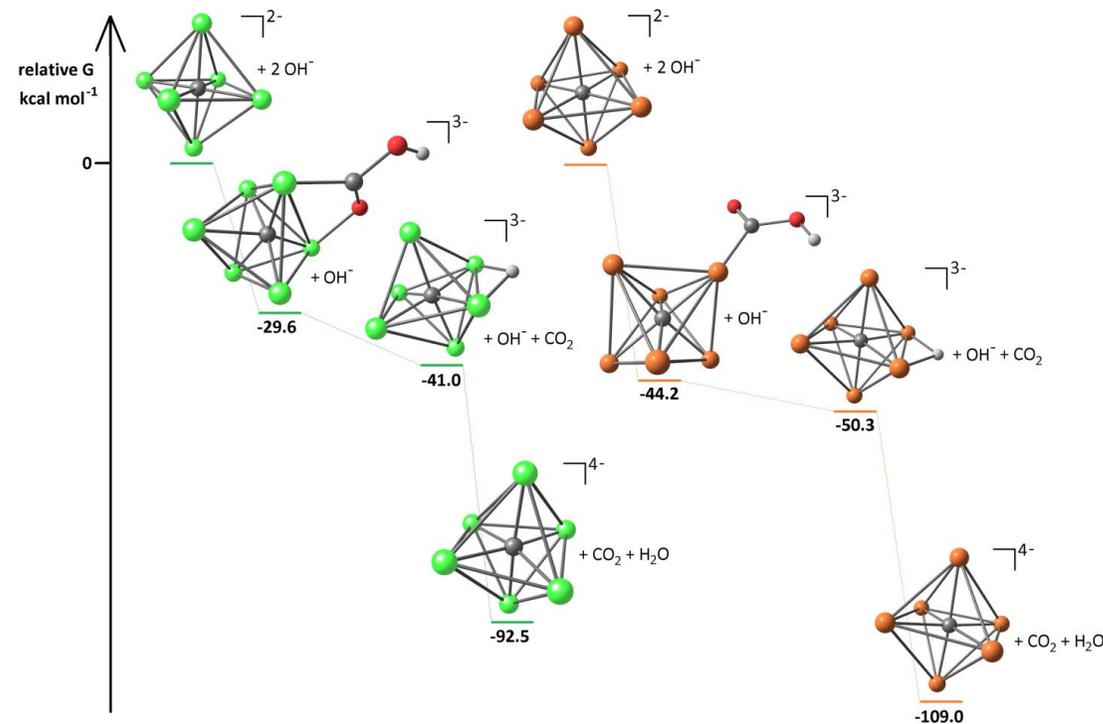
Who do we collaborate with?

- **Electrochemical and spectrochemical studies** (Prof. Tiziana Funaioli, Università di Pisa).



The oxidation processes of $[\text{Fe}_6\text{C}(\text{CO})_{15}]^{4-}$ were investigated by in situ IR-SEC in an optically transparent thin-layer electrochemical (OTTLE) cell

- **Computational studies and DFT calculations** (Prof. Marco Bortoluzzi, Università di Venezia).

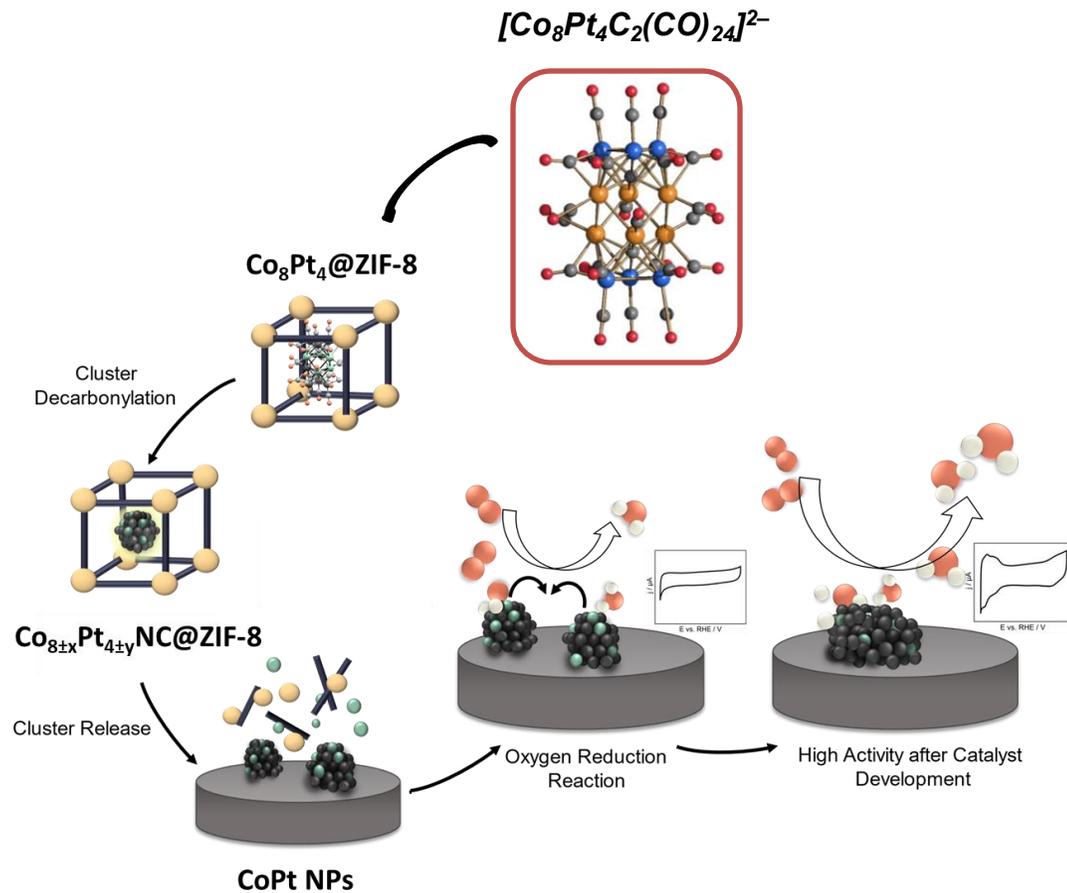


DFT-optimized geometries and relative Gibbs energy values of $[\text{M}_6\text{C}(\text{CO})_{16}]^{2-}$, $[\text{M}_6\text{C}(\text{COOH})(\text{CO})_{15}]^{3-}$, $[\text{HM}_6\text{C}(\text{CO})_{15}]^{3-}$ and $[\text{M}_6\text{C}(\text{CO})_{15}]^{4-}$ ($M = \text{Fe}, \text{Ru}$)



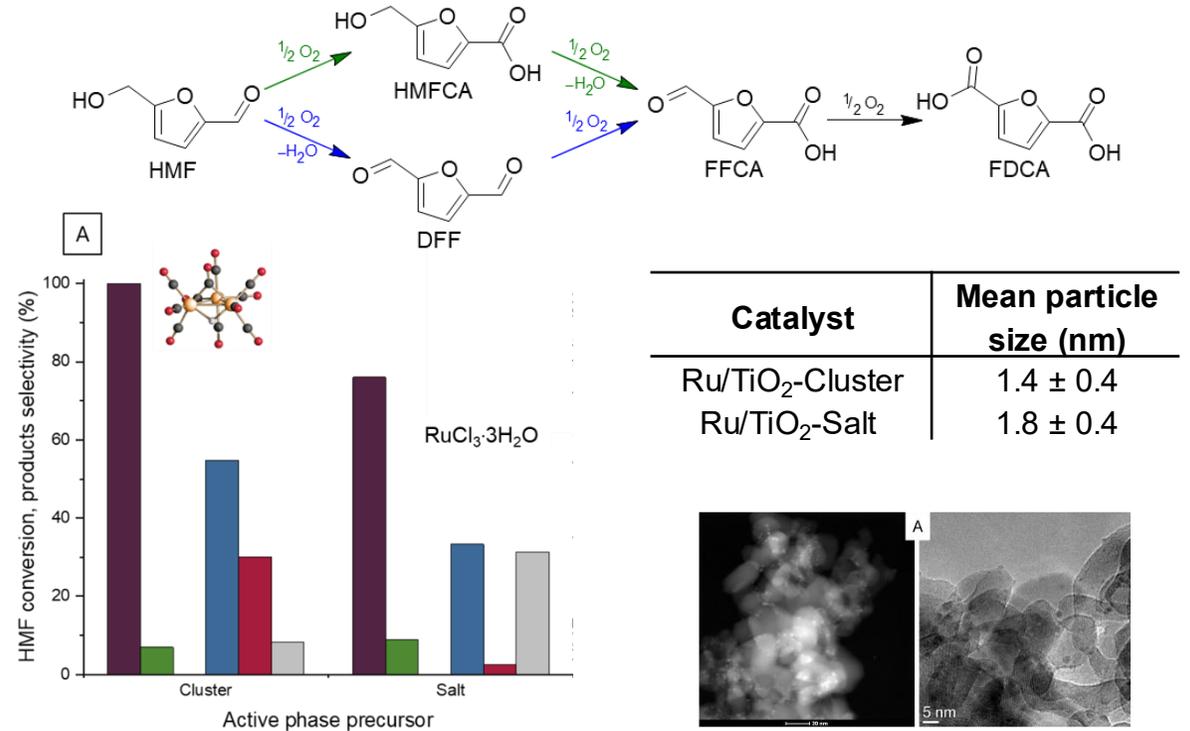
Who do we collaborate with?

- Use of atom-precise nanoclusters **encapsulated in MOFs for Electrochemical applications** (**Prof. Roland A. Fischer, Technical University Munich**).

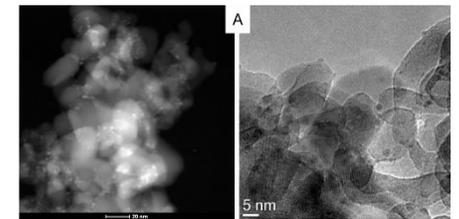


ChemElectroChem, 2024, 11, e202300476

- Use of molecular clusters as precursors of nanostructured catalytic materials (**Prof.ssa S. Albonetti and F. Basile, Università di Bologna**).



Comparison of the catalytic activity of Ru/TiO₂ NPs prepared by cluster $[HRu_3(CO)_{11}]^-$ decomposition or salt ($RuCl_3 \cdot 3H_2O$) impregnation in the HMF oxidation reaction.



TEM/HAADF images of Ru/TiO₂ catalyst

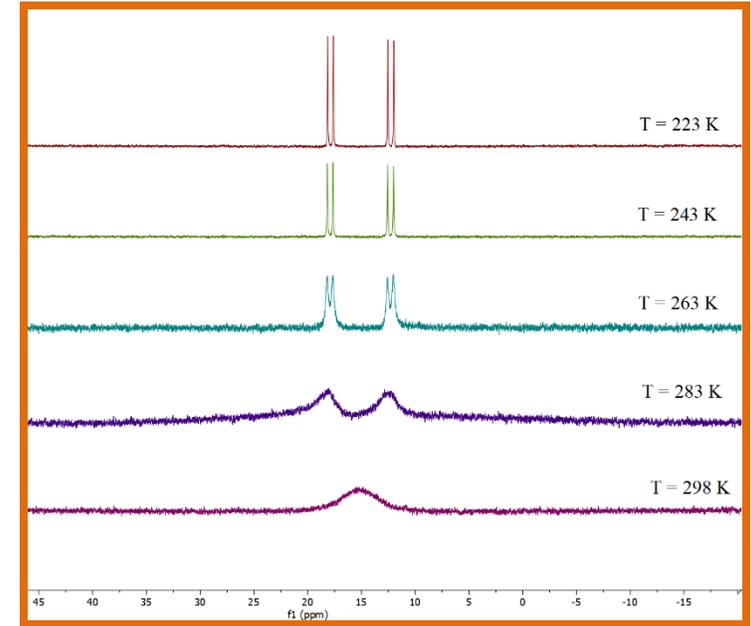
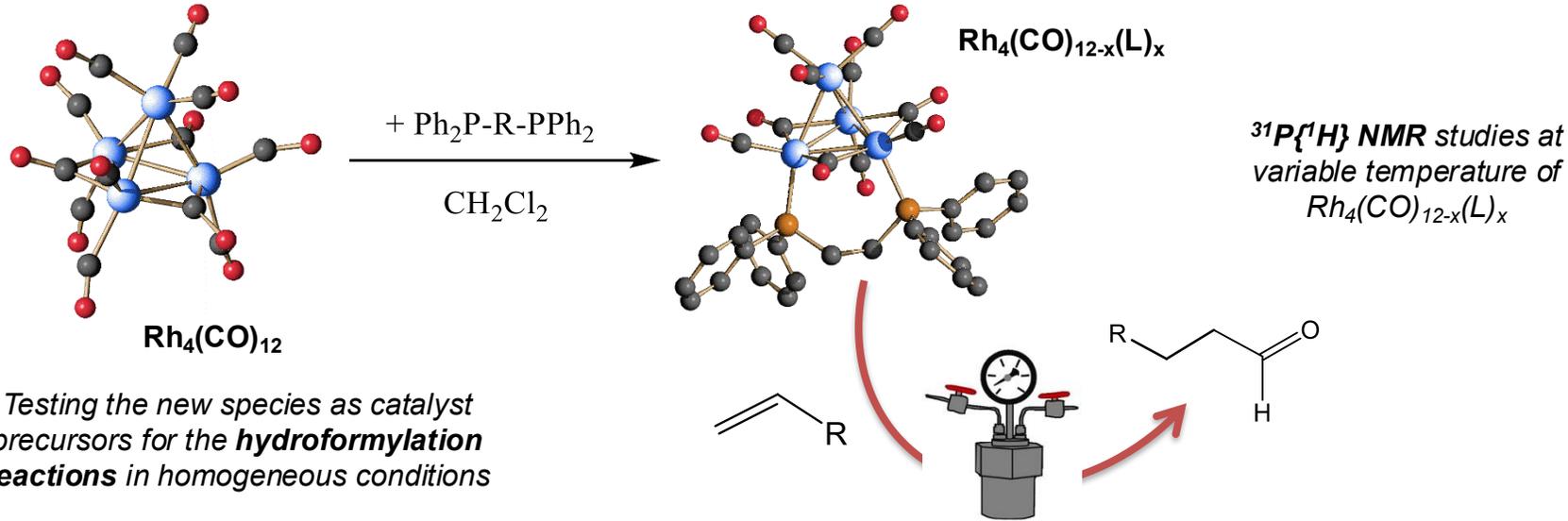


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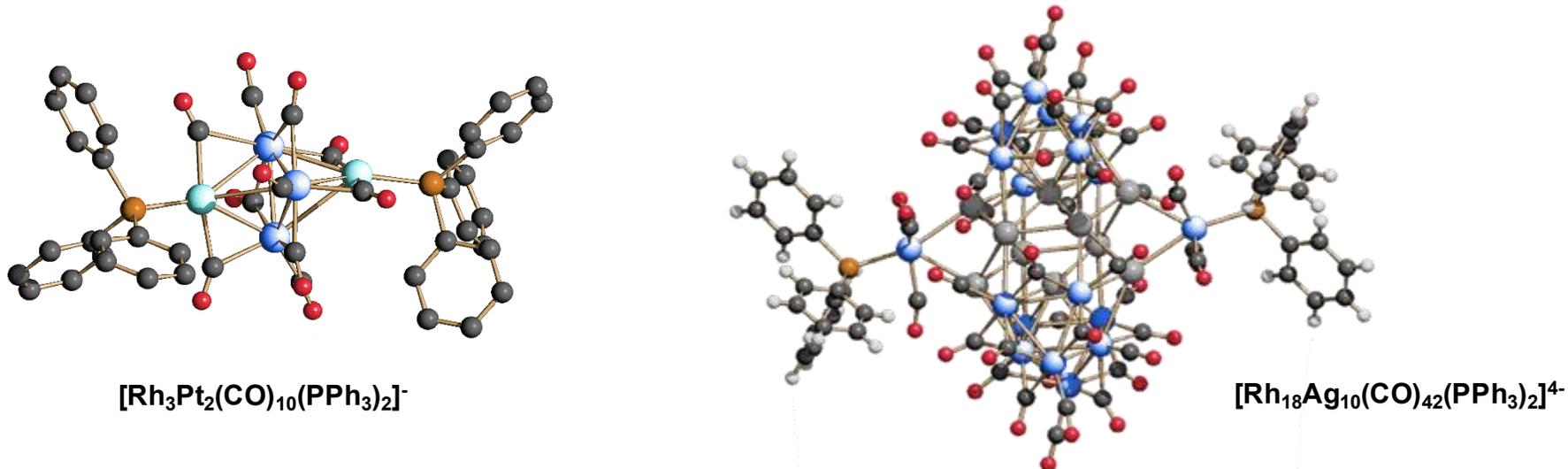
Molecules, 2025, 30, 2120

Some ongoing projects

- Rhodium heteroleptic clusters as Homogeneous pre-Catalyst



- Synthesis and characterization of new Rh-M carbonyl clusters



and more...





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BIOACTIVE Ru-COMPLEXES FOR THERAPEUTICAL APPLICATIONS

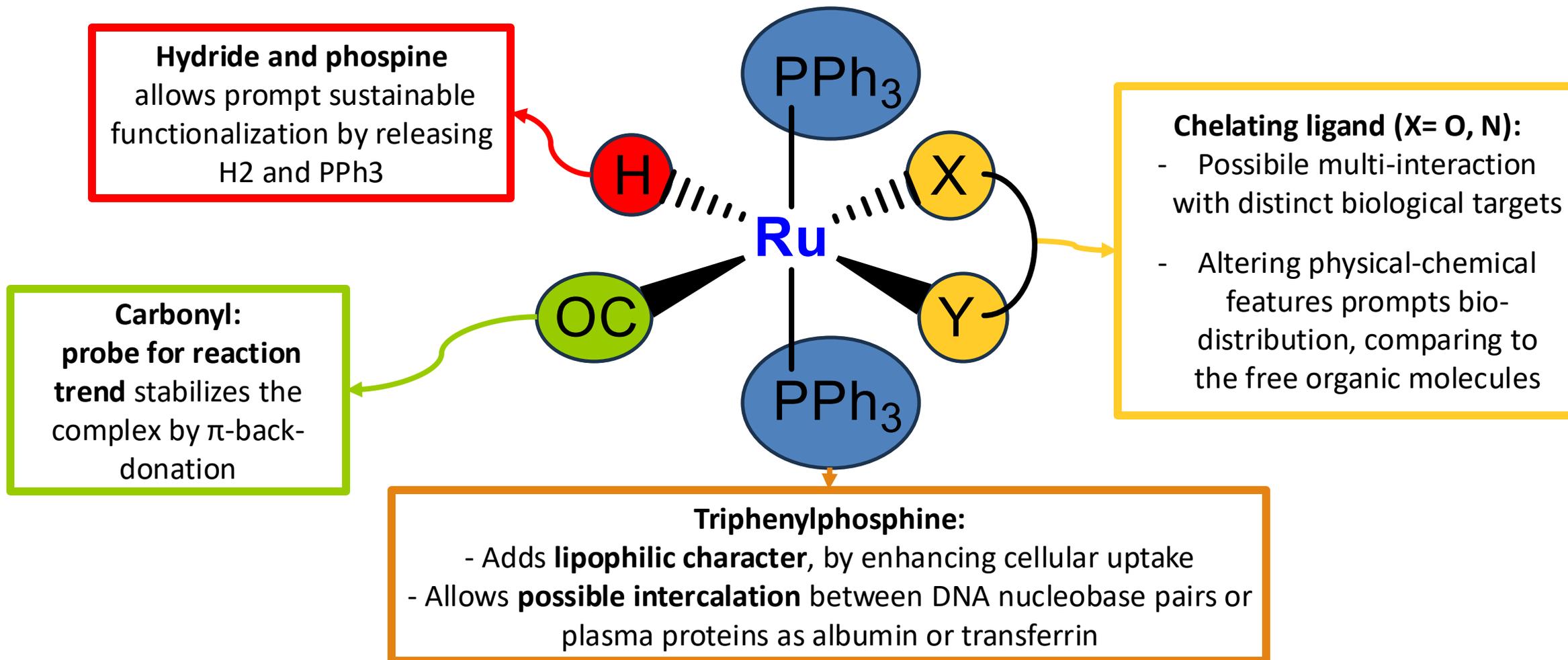
Prof. Silvia Bordoni

E-mail: silvia.bordoni@unibo.it

Dipartimento di Chimica Industriale "Toso Montanari"

Design of a new class of Ruthenium complexes

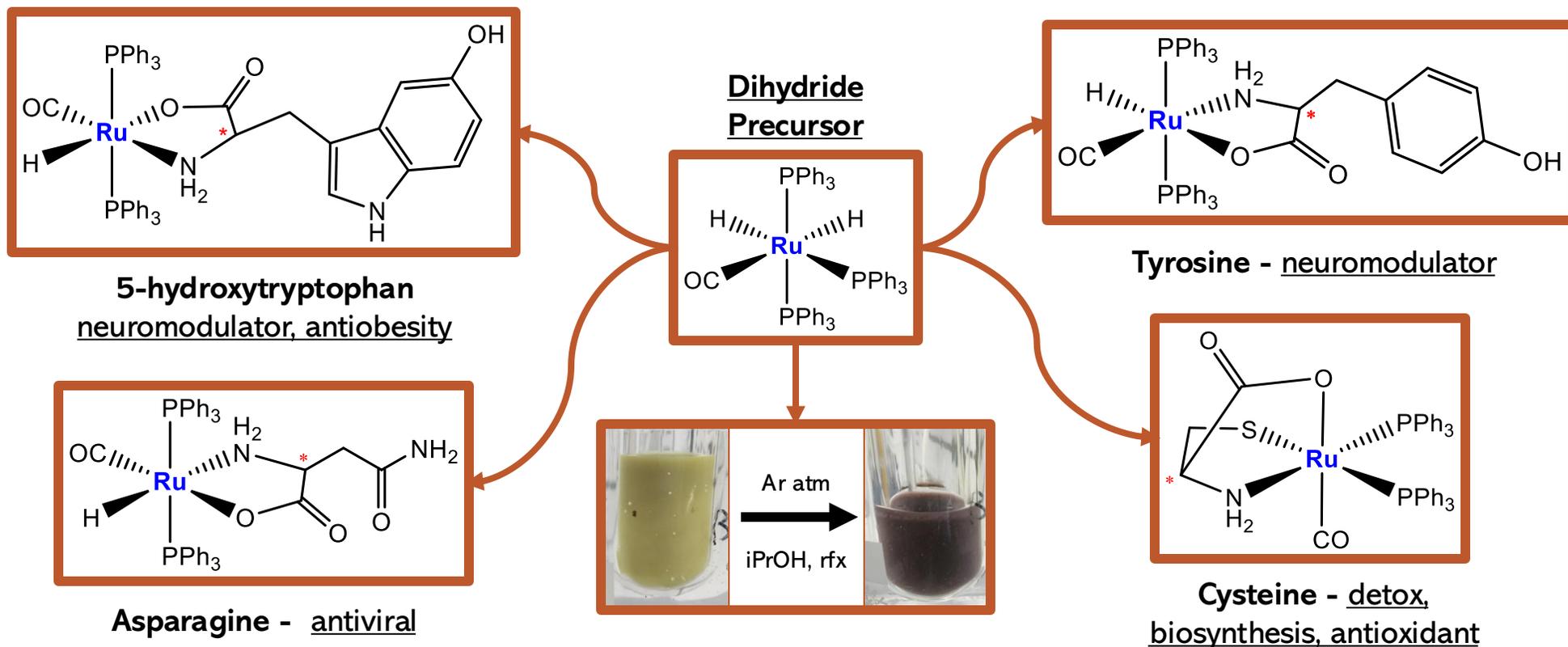
The general idea:



What's next?

Proposed thesis by Prof. Silvia Bordoni

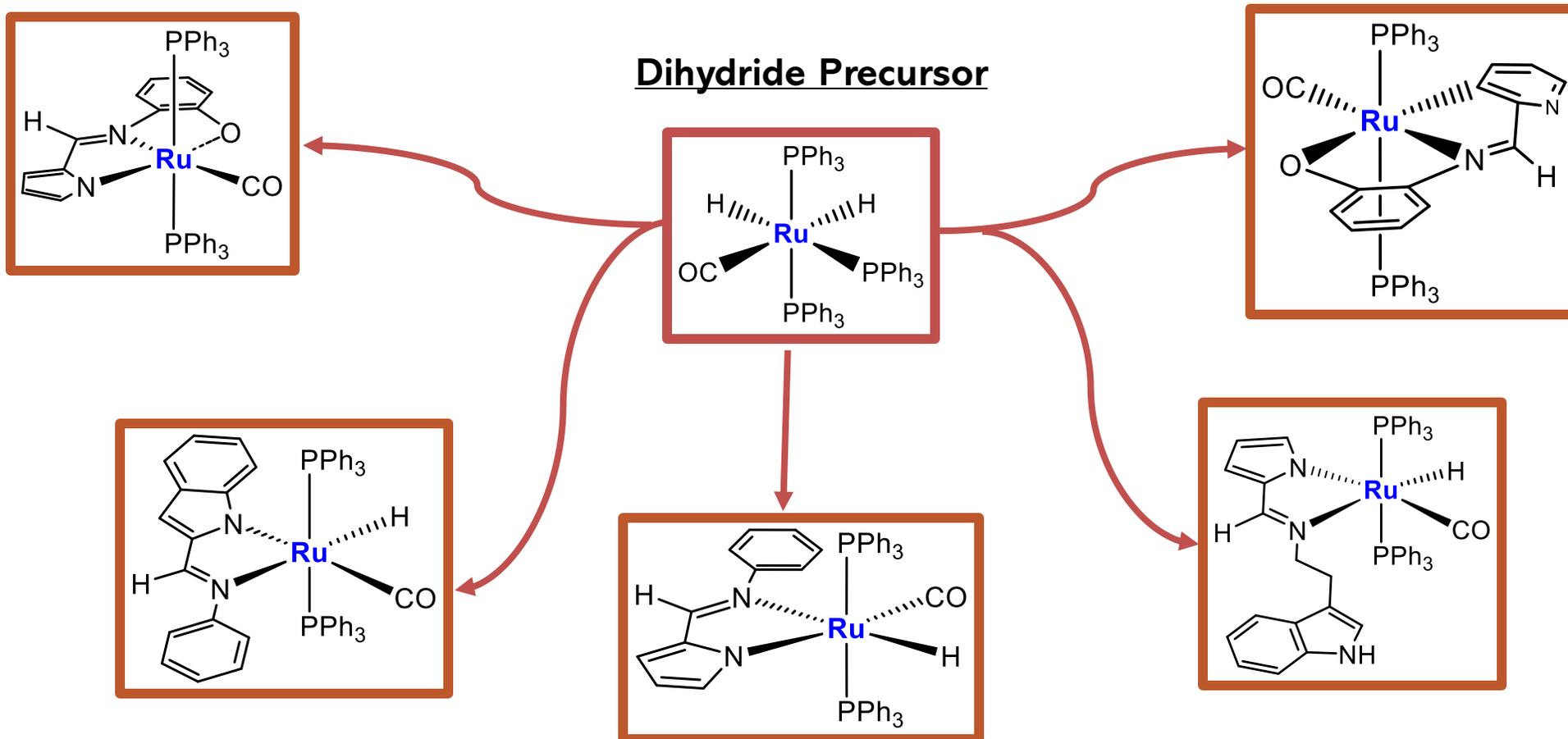
Synthesis and characterization of Ruthenium complexes bearing essential or non-essential **aminoacid ligands**, seeking novel therapeutic applications



What's next?



Synthesis and characterization of Ruthenium complexes with conjugated Schiff-base ligands

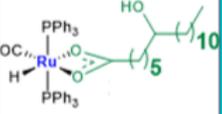
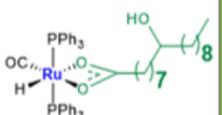
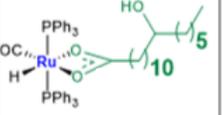
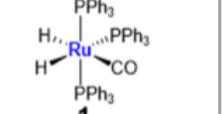


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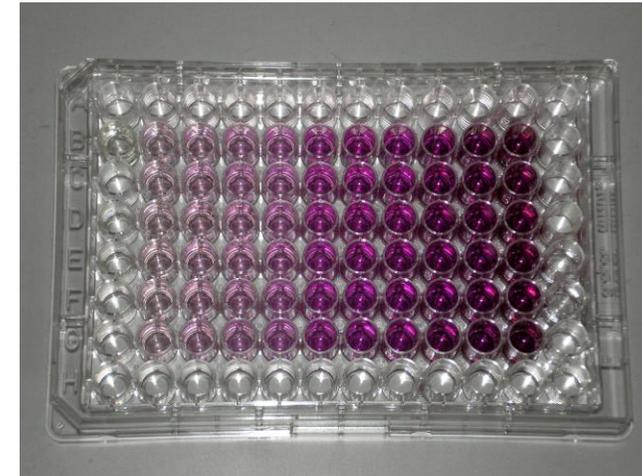
What comes next the syntheses? – some of our applications

Antiproliferative studies through MTT Assays

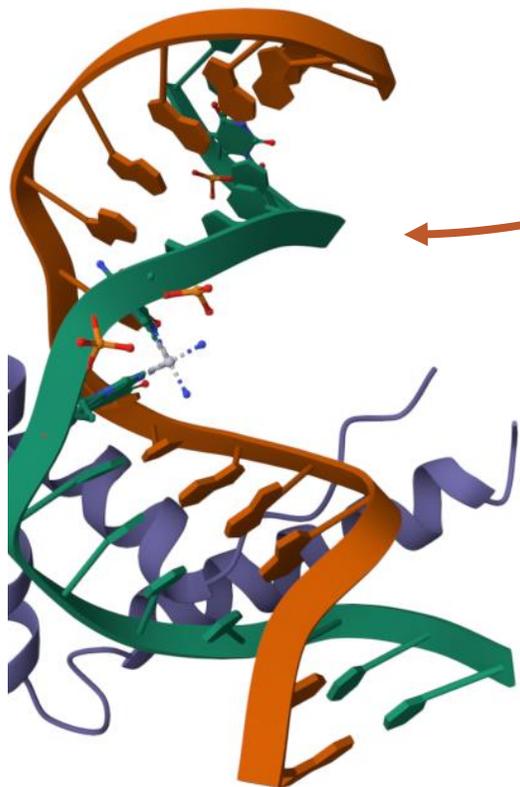
Compound	HT29 (Colon)	Hela (Cervical)	IGROV1 (Ovarian)	HdFA (Human Dermal Fibroblast)
	2.43 ± 0.01	> 10	>10	>10
	0.17 ± 0.02	10.43 ± 0.05	8.55 ± 0.01	>10
	>10	>10	>10	>10
	>10	>10	>10	>10
Cisplatin	>10	>10	>10	>10

We evaluate antiproliferative activity by determining its IC_{50} – the concentration reducing cell growth by 50%.

The lower the number, the more effective the prodrug appears

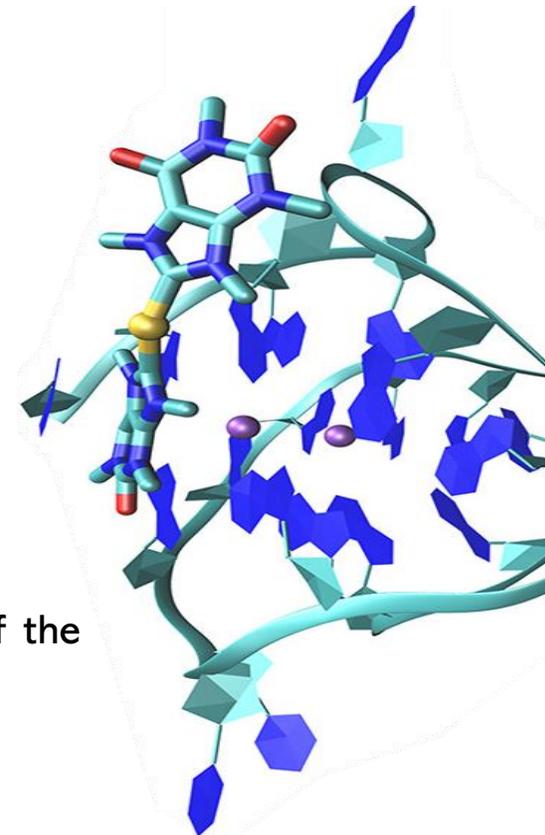


Organometallic Complex



DNA helix

Protein chains



The question is:

Which receptor may interact with the Ru-organometallic bioactive species?
DNA or protein amino acids?

It is fundamental to study the MECHANISM (by DFT) and by isolating intermediates (X-ray)

Challenge: Ru-coordination of peculiar amino acids as proline or threonine

Reaction profile investigations on Ru-species bearing Schiff bases of the type $R-C=N-R'$ with push-pull substituents ($R = \text{pyridine}$; $R' = \text{PhOH}$)

In collaboration with

Carola Parolin (FABIT) - Biological essays
Magda Monari (Unibo-Ciam) - Crystallographic analyses

Carla Boga - Organic consultant
Riccardo Tarroni - DFT calculations





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Laboratory of Molecular Catalysis for Sustainable Applications (MOLCAT)

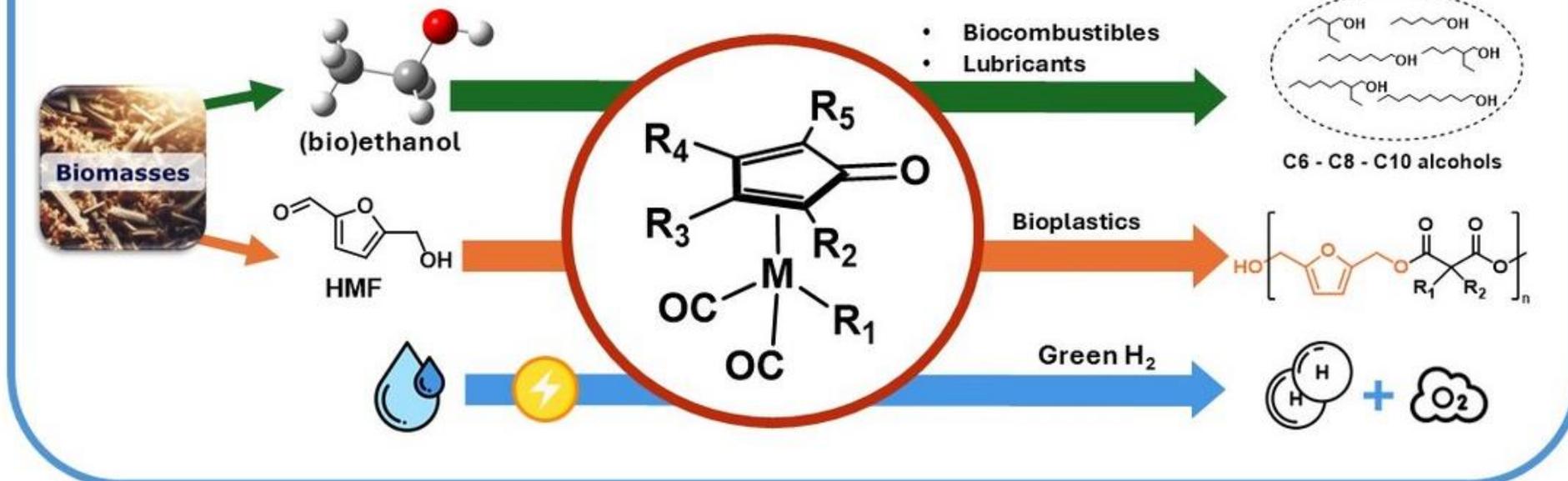
Prof.ssa Rita Mazzoni

Dipartimento di Chimica Industriale «Toso
Montanari»

Overview

Molecular Catalysis (MOLCAT)

Organometallic Catalysis for Sustainable Chemistry: our research group focuses on the valorization of bio-derived and renewable substances, transforming them into chemical compounds that can be used in various sectors, including biofuels, lubricants, and bioplastics.

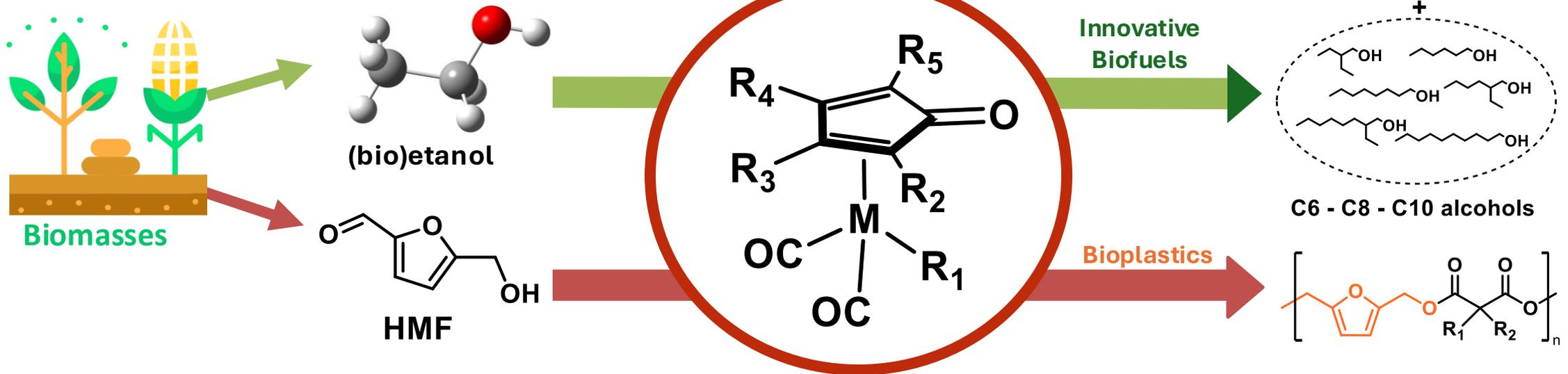


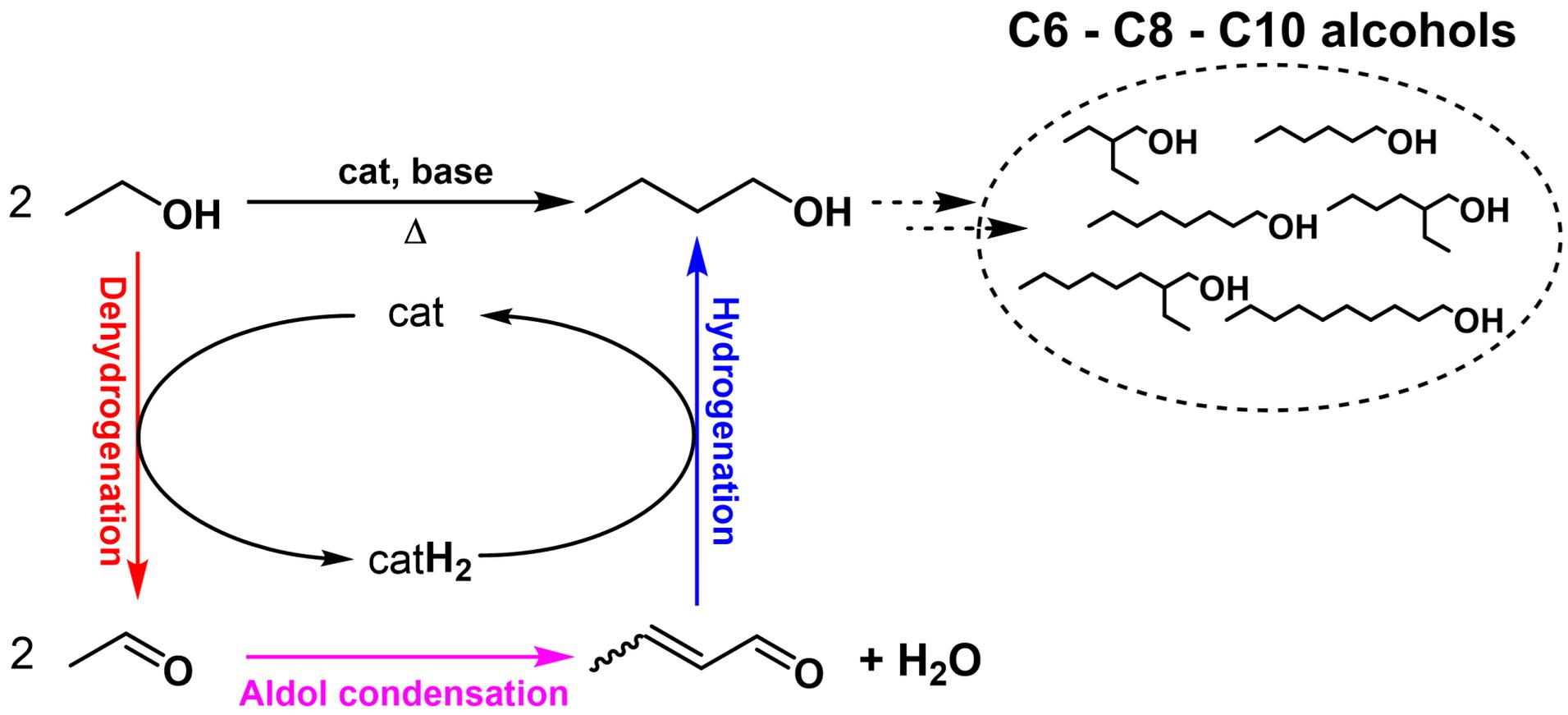
- Rational design of **homogeneous ruthenium based catalytic systems** for the development of innovative processes toward the **conversion of bio-based platform chemicals** (e.g. 2,5-hydroxymethyl furfural (HMF), 2,5-bis-hydroxymethylfurfural (BHMF), bio-ethanol from waste) to building blocks for green and energy transition (**second generation bio-fuel**) and for sustainable materials such as **bio-based polymers**.

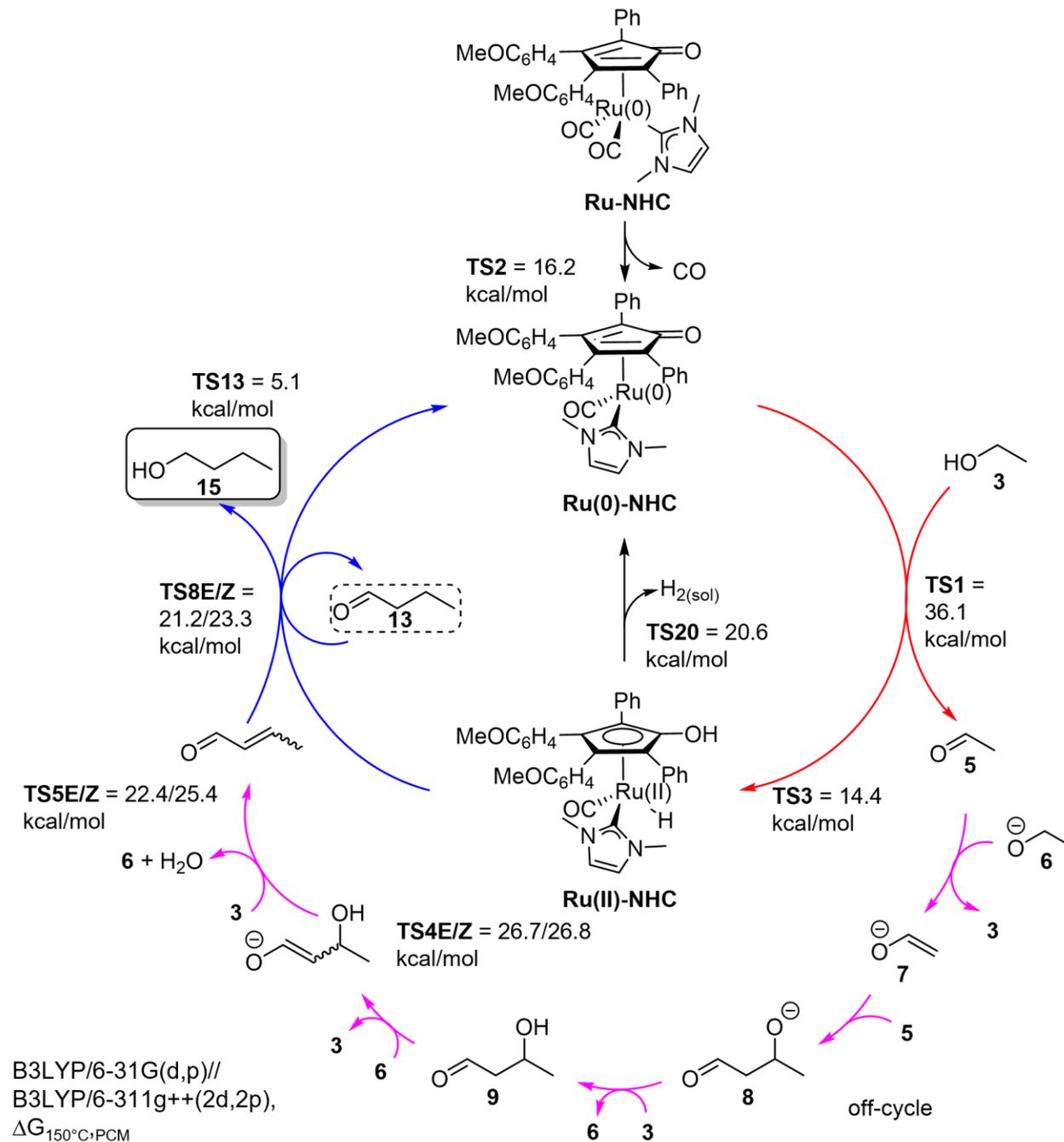
- Design, synthesis and application of **Earth-abundant transition metal complexes** (e.g. Fe and Mn) which combine cyclopentadienone and N-heterocyclic carbene ligands for energy transition (**water oxidation, hydrogen production, aqueous phase reforming**).

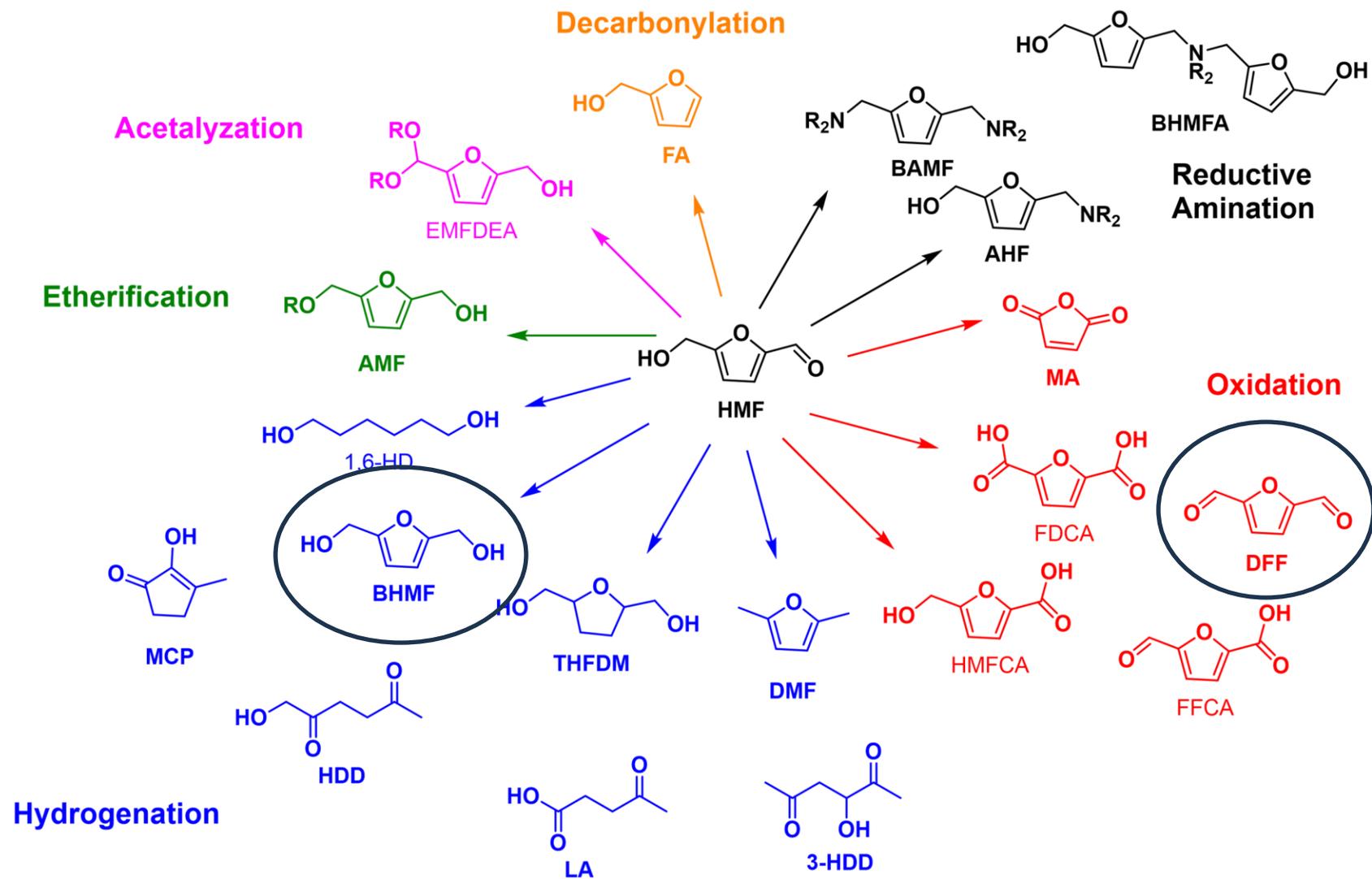
Analysis techniques: NMR, FT-IR, GC, HPLC;
Lab techniques: Schlenk chemistry, Autoclave Reactors, MW reactions.

Molecular Catalysis

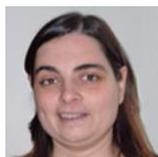








People:



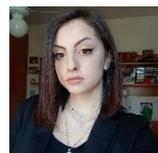
Prof.ssa Rita Mazzoni
Supervisor



Andrea Masetti
Ph.D Student



Andrea Piazza
Ph.D Student



Chiara Lenzi
Ph.D Student



Stefano Baratti
Research Fellow



rita.mazzoni@unibo.it

Internal and External Collaborations:



Department of Industrial Chemistry - UNIBO

Department of Chemistry - UNIBO

Department of Pharmacy and Biotechnology - UNIBO

University of Calabria

Instituto de Tecnologia Quimica e Biologica da Universidade Nova de **Lisboa**

Department of Organic Chemistry of **Stockholm** University

Dept. of Chemistry and Biomolecular Sciences, **Ottawa**

Laboratorium für Anorganische Chemie of ETH **Zurich**

Department of Chemistry & Biochemistry of University of **Bern**

School of Chemistry of **Cardiff** University

Department of Pharmaceutical Sciences of **Tokushima** University

Department of Civil, Chemical, Environmental and Materials Engineering -

UNIBO

University of Modena and Reggio Emilia (UNIMORE)



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Photocative Metal Complexes for Materials and Life Sciences

Prof. Stefano Stagni

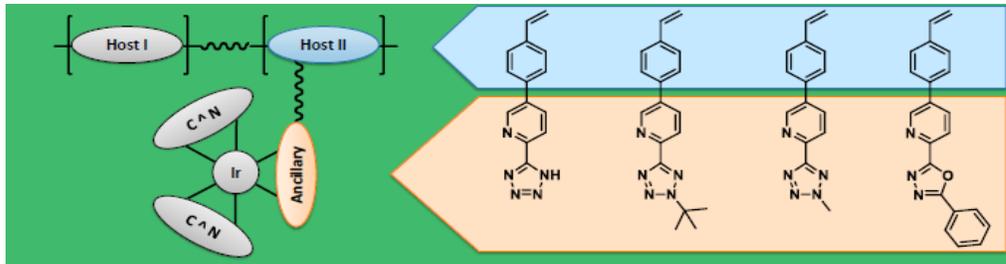
E-mail: stefano.stagni@unibo.it

Dipartimento di Chimica Industriale "Toso Montanari"

Photoactive Metal Complexes for Materials Science

Organic molecules are combined with transition metal ions such as Ir(III), Re(I), Ru(II), Cu(I), Pt(II), to prepare coordination/organometallic complexes that can efficiently absorb visible light, can display bright luminescence, are able to transfer electrons or, possibly, can do all these things together.

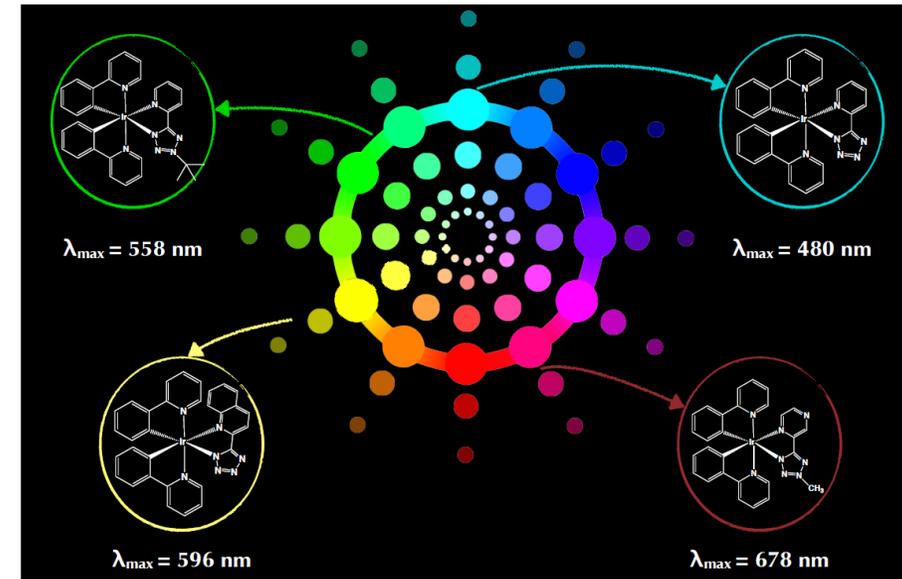
Luminescent Metal Complexes are designed for obtaining a full-coloured palette of emissive molecules and Phosphorescent Metalla polymers to be used in photocatalysis, light emitting devices (OLEDs, LEECs) and luminescent solar concentrators.



Phosphorescent Metalla polymers



with Prof. Andrea Pucci@UniPI



20 years (and counting) collaboration with with Prof. Max Massi@Curtin University (AUS)



OLEDs..

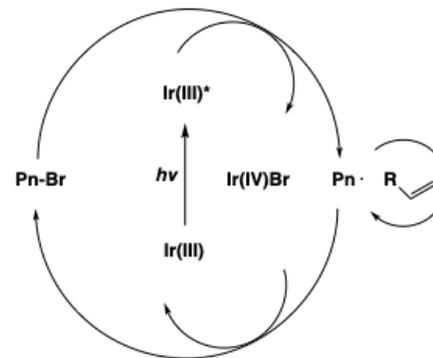
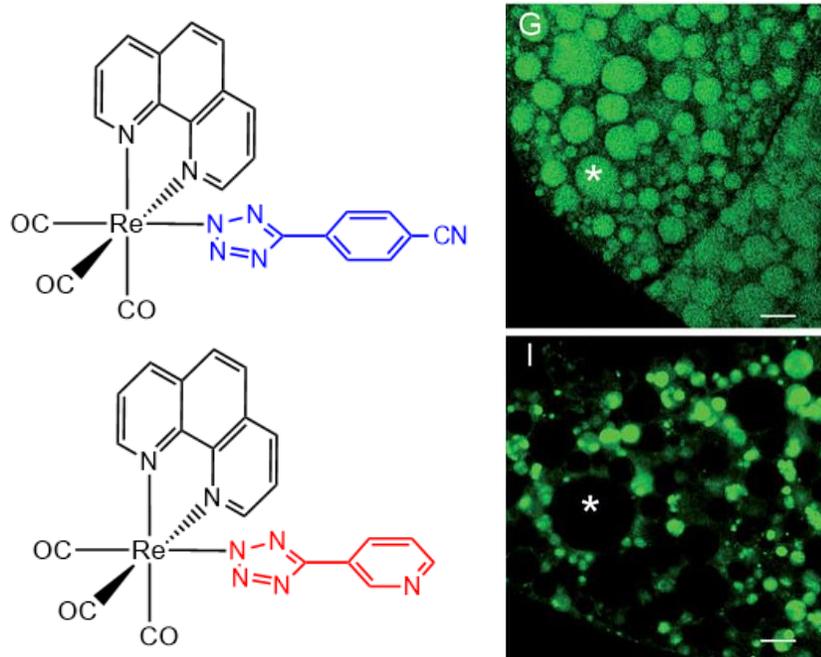


Photo-ATRP
Atom Transfer Radical Polymerization
with Prof. Loris Giorgini @UniBO

Crew:
Eleonora Previati PhD
Anna De Carlonis (M.Sc. Student)

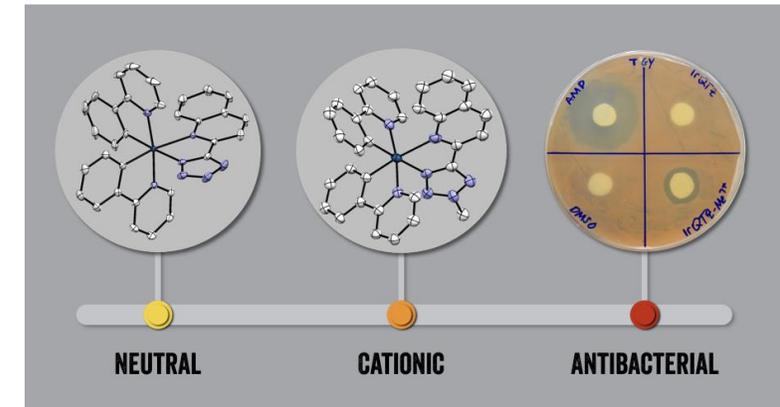
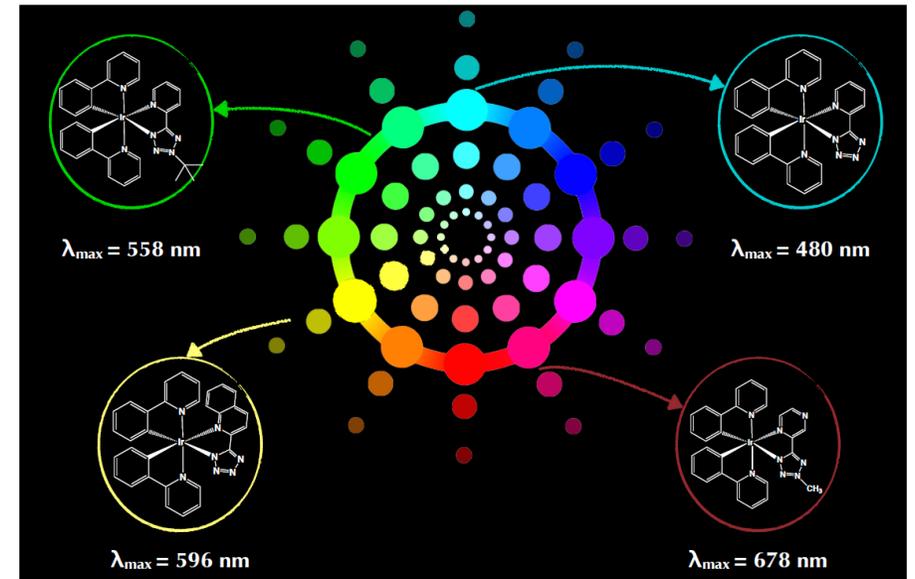


Photoactive Metal Complexes for Life Science Luminescent metal complexes of Ir(III), Re(I), and Ru(II), are designed and synthesized for obtaining new optical markers for live cells and new classes of selective antibacterials.



**Luminescent Imaging
of Live Eukaryotic Cells and Live Bacteria**
with Prof. **Max Massi** @Curtin Uni. Australia

Crew:
Eleonora Previati PhD
Anna De Carlonis (M.Sc. Student)

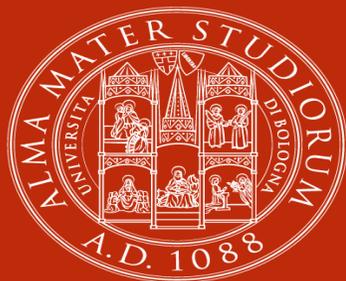


Metal complexes as new ANTIBACTERIALS

with Dr. **Alessandra Stefan** @UniBO
alessandra.stefan@unibo.it



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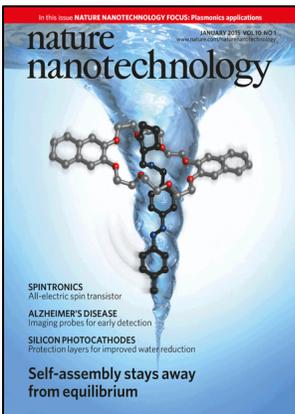
SUPRAMOLECULAR CHEMISTRY, PHOTOCHEMISTRY AND NANOSCIENCE

DESIGNING, MAKING AND OPERATING NANOSCALE
DEVICES,
MACHINES AND MATERIALS

Area di Chimica Inorganica

Dipartimento di Chimica Industriale "Toso Montanari"

1. Artificial molecular machines and motors



CONTEXT

The realization of mechanical machines and motors of nanoscale size is a stimulating scientific challenge and a primary objective of nanotechnology, as demonstrated by the award of the Nobel Prize in Chemistry in 2016.

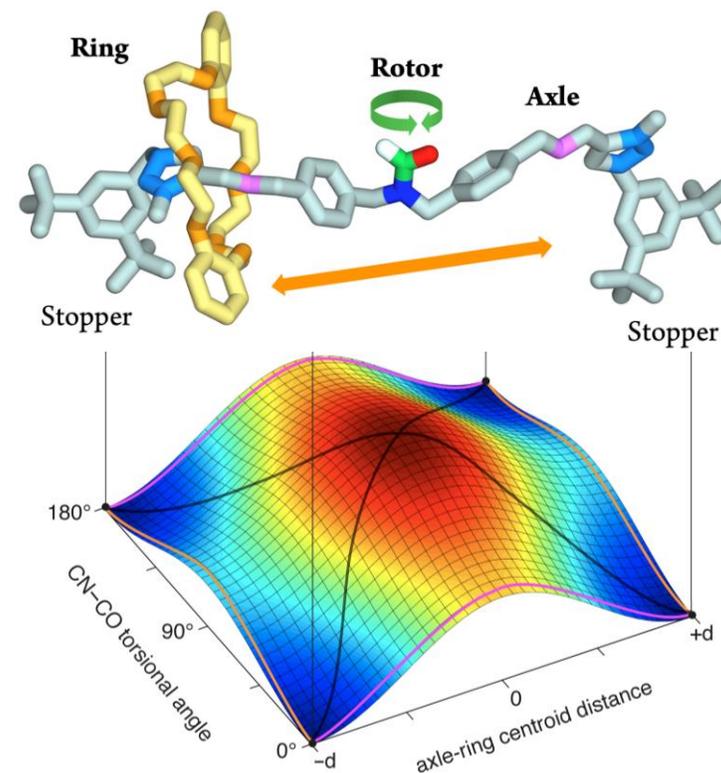
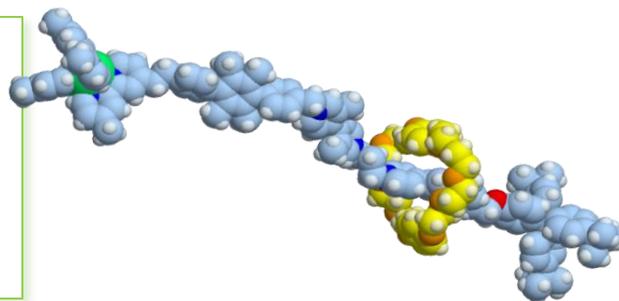


ACTIVITIES

Construction and investigation of **supramolecular complexes** and topologically nontrivial molecules (**rotaxanes**, **catenanes** and related species) that can perform controlled movements in response to light stimulation or other types of chemical or physical signals. Problems include the design of directed motion, its use to carry out tasks, autonomous operation away from equilibrium, and incorporation in complex matrices such as vesicles and polymers.

OBJECTIVES

Realization of innovative systems and intelligent materials for *catalysis, robotics, medicine, information technology and solar energy conversion*.



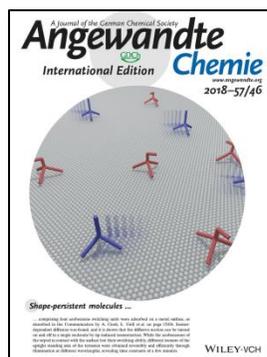
REFERENCES

Molecular machines. Available at www.1088press.it
Nature Nanotech. **2015**, *10*, 70
Chem. Rev. **2020**, *120*, 200
Chem **2021**, *7*, 2137
Nature Nanotech. **2022**, *17*, 746
Chem **2025**, *11*, 102375
Nature Chemistry **2026**, 10.1038/s41557-025-02045-x

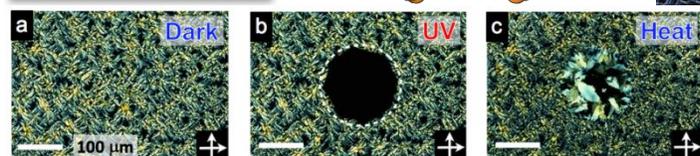
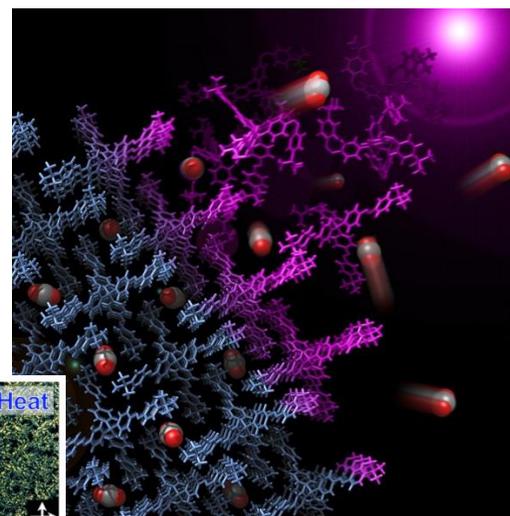
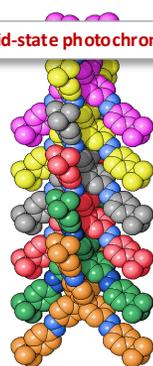
2. Stimuli-responsive molecules and materials

CONTEXT

(Supra)molecular-based systems and materials that can perform predetermined functions in response to light or electrical stimulation are highly interesting for the inherent scientific value related to a bottom-up approach to functional nanostructures, and for the prospective applications in diverse fields of technology and medicine.



Solid-state photochromism



ACTIVITIES

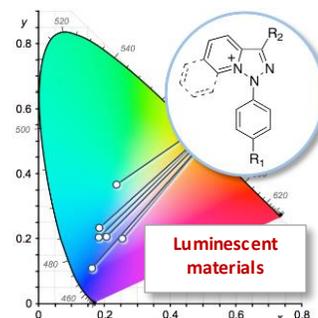
Synthesis and characterization of **luminescent** and/or **photoreactive** species and related phenomena, including: molecular photoswitches, photochromism in solution and in the solid state, luminescent molecules and nanocrystal quantum dots, solid-state emission.

OBJECTIVES

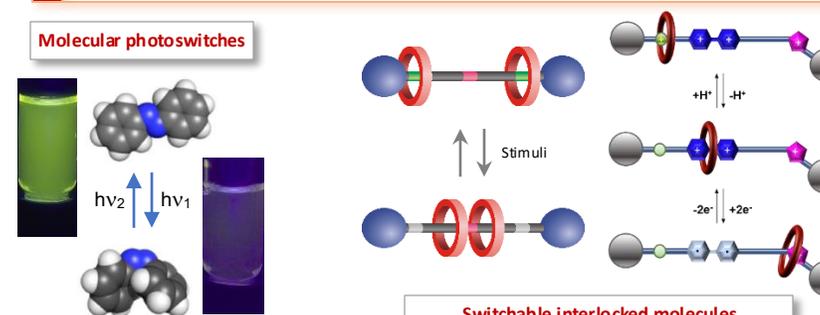
Development of molecules and nanostructured materials suitable for applications in *analytical sciences, bioimaging, mechanical actuation, photopharmacology, gas adsorption, modification of surfaces, photocatalysis and solar energy conversion*.

REFERENCES

Nature Chem. **2015**, *7*, 634
J. Am. Chem. Soc. **2019**, *141*, 9129
J. Am. Chem. Soc. **2021**, *143*, 7046
Chem. Commun. **2022**, *58*, 11236
Chem. Eur. J. **2023**, *29*, e202203472
Angew. Chem. Int. Ed. **2025**, *64*, e202414609



Molecular photoswitches



The research team, laboratories and equipment



PI | *Prof Alberto Credi* Dipartimento di Chimica Industriale “Toso Montanari”

Staff | *Prof Serena Silvi* Dipartimento di Chimica “G. Ciamician”

Prof Massimo Baroncini Dipartimento di Scienze e Tecnologie Agro-alimentari

Dr Jessica Groppi ISOF-CNR | *Prof Stefano Corrà*, *Prof Massimiliano Curcio*

Dipartimento di Chimica Industriale “Toso Montanari”

Post-doc | *Dr Leonardo Andreoni*, *Dr Chiara Taticchi*, *Dr Brian Sachini*

Collaborations | Luigi Cavallo *Kaust-Saudi Arabia* | Stefan Diez *Technische Universitaat Dresden-Germany* | Massimiliano Esposito *Université de Luxembourg* | Ettore Fois *Università dell’Insubria* | Antonella Fontana *Università di Chieti* | Marco Garavelli *Università di Bologna* | Nicolas Giuseppone *CNRS, Université de Strasbourg-France* | Leonhard Grill *Universitaat Graz-Austria* | Marco Lucarini *Università di Bologna* | Giulio Ragazzon *Université de Strasbourg-France* | Andrea Secchi *Università di Parma*



All activities are carried out in the Center for Light Activated Nanostructures (Clan), a joint laboratory between the University of Bologna and Cnr, located in the Bologna campus of Cnr – just across the street to the new ChimInd building. The laboratory has cutting-edge skills and equipment, and is funded by European and national grants.



centri.unibo.it/clan



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ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

Hybrid perovskite semiconductors for optoelectronic applications

Area di Chimica Inorganica

Dipartimento di Chimica Industriale "Toso Montanari"

CHYMERA Group

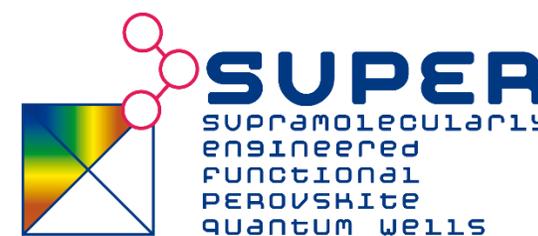
funCtional Hybrid MatERiAls



We develop advanced **metal halide perovskite semiconductors** for the next generation of **optoelectronic devices**, with applications ranging from photovoltaic to light-emitting diodes, photodetectors and scintillators.

*We are currently running the ambitious European project (ERC) **SUPER**, Supramolecularly Engineered perovskite quantum wells.*

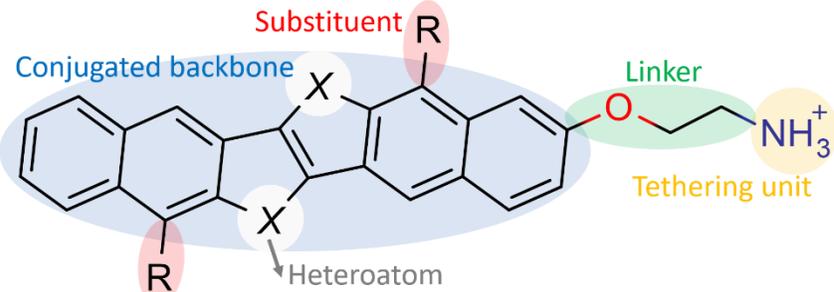
(<https://cordis.europa.eu/project/id/101040681>)



European Research Council
Established by the European Commission

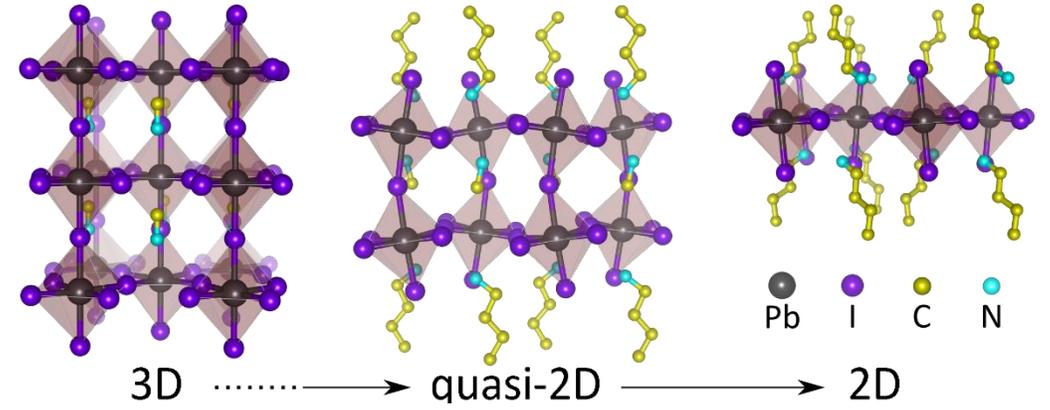
Research Activities

Development of functional organic semiconductors for integration in low-dimensional perovskites.

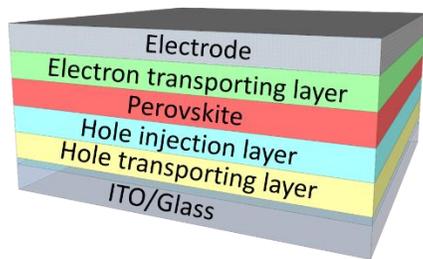


Molecular rod semiconductors

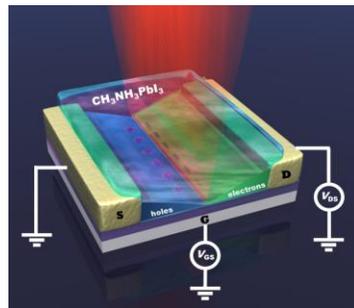
Perovskite self-assembly and investigation of local coordination environments via solid state NMR (ssNMR).



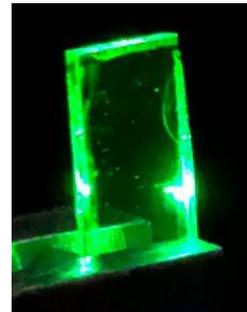
Fabrication and characterization of perovskite-based light-emitting devices.



Light emitting diodes

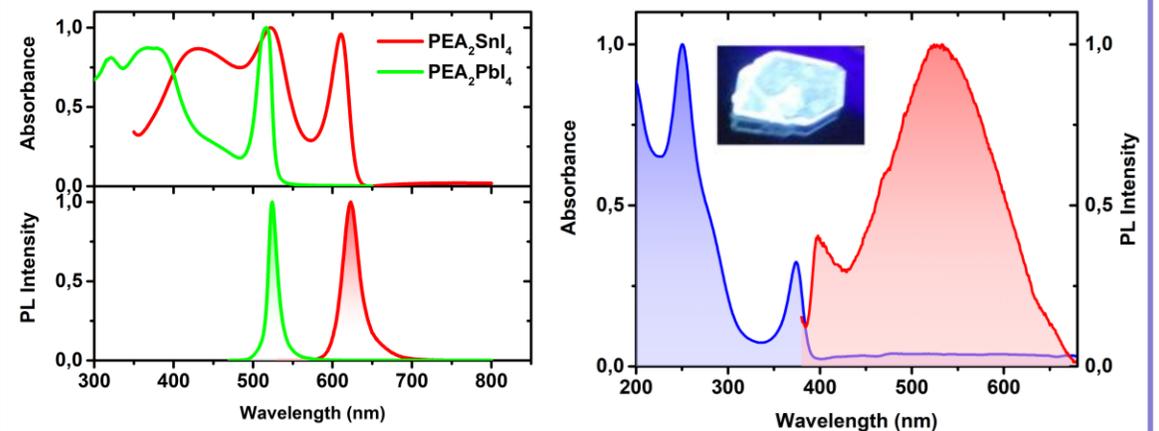


Light emitting FETs



Lasers

Photophysical characterization.



CHYMERA Group and Labs

The Team – CHYMERA Group



Team Leader

Prof. Daniele Cortecchia

(<https://www.unibo.it/sitoweb/daniele.cortecchia2>)

Team Members

Ranita Samanta (Post Doc)

Giulia Luovisi (PhD Student)

Nurgul Sarsembekova (PhD Student)

Francesca Canestra (Research Assistant)

Undergraduate students (current): Martina Santarelli,
Andreas Mercenier, Irene Carnevali, Alice Rizzoli

Synthesis and Fabrication Lab



Solid State NMR Lab

