LAURA HERNÁNDEZ LÓPEZ, PhD

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SUMMARY

I received my PhD in Chemistry from the Autonomous University of Barcelona (UAB) and the Catalan Institute of Nanoscience and Nanotechnology (ICN2) under the supervision of Prof. Daniel Maspoch and Dr. Arnau Carné (September 2023) in the field of Metal-Organic Frameworks and Cages (MOFs &MOCs). More precisely, I worked on the synthesis, post-synthetic functionalization and assembly of porous MOCs. During my PhD, I published 10 high-impact scientific publications (h-index 6), 5 of them as a first author, including *Angew. Chem. –Int. Ed* (2x), *J. Am. Chem. Soc.* (2x), *Chem. Commun.* (2x), *Adv. Sci.* (1x), *ACS Appl. Mater. Interfaces* (1x) and *Chem. Eur. J.* (2x). Also, I participated in both national (4x) and international scientific (3x) meetings, with poster (4x) and oral contributions (4x). I am currently researcher in Maspoch's group developing a new research line devoted to the combination of DNA with discrete MOPs towards obtaining new biocompatible and responsible porous materials.

My research interests are focused on controlling chemical transformations at the molecular scale and understanding how these transformations are expressed at the macroscale.

RESEARCH EXPERIENCE

2023- **Post-doctoral stage. Supramolecular Nanochemistry and materials group (ICN2/UAB)**

DNA-guided assembly of Metal-Organic Cages/Polyhedra.

2019-2023 **PhD Thesis. Supramolecular Nanochemistry and materials group (ICN2/UAB)**

Surface Chemistry of Metal-Organic Polyhedra.

Supervisors: Prof. Daniel Maspoch and Dr. Arnau Carné

2018-2019 **Master Thesis. Supramolecular Nanochemistry and materials group (ICN2/UAB)**

Phase Transfer of rhodium(II)-based Metal-Organic Polyhedral bearing coordinatively bounded cargoes.

Supervisors: Prof. Daniel Maspoch and Dr. Arnau Carné

Master research project. Severo Ochoa- CSIC Master Fellowship. Inorganic Materials & Catalysis group (ICMAB)

Synthesis and characterization of MOFs based on carborane bis-pyridylalcohol ligands.

Supervisor: Dr. José Giner

ERASMUS+ Traineeship internship. Dynamique et Adsorption dans les Matériaux Poreux group (ICGM)

Exploration of the performance of a series of hybrid materials for the selective capture of pollutants for air purification combining GDMC simulations and DFT calculations.

Supervisor: Prof. Guillaume Maurin

2013-2017 **Obtaining Bachelor Degree in Nanoscience and Nanotechnology (UAB).**

EDUCATION

2019-2023 PhD in Chemistry

Autonomous University of Barcelona (UAB)

2018-2019 Master degree in Applied Materials Chemistry

University of Barcelona (UB)

2013-2017 Bachelor degree in Nanoscience and Nanotechnology

Autonomous University of Barcelona (UAB)

LANGUAGES

- ✓ Catalan (native)
- ✓ Spanish (native)
- ✓ English (91/120, TOEFL Aug 2017)
- ✓ French (basic knowledge)

SCHOLARSHIPS

2017 ERASMUS+ Traineeship – ERASMUS+ programme framework. European Union.

2018 Master Scholarchip for research collaboration in Severo-Ochoa and María de Maeztu-CSIC excellence research centers. Economy, industry and competitivity ministery. Spanish Goverment.

2020 Spanish scholarship for pre-doctoral researchers (PRE2019). FPI-SO 2019. Science and innovation ministery. Spanish Goverment.

GUIDANCE AND SUPERVISION

1. Alba Cortés Martínez (Master student at UAB, now a PhD student in Supramolecular Nanochemistry and Materials Group).
2. Caterina Ferrer Caules (undegraduate student at UAB, now a Master student in Supramolecular Nanochemistry and Materials Group).
3. Xiang Zhang (PhD student in Supramolecular Nanochemistry and Materials Group).

PARTICIPATION IN SCIENTIFIC MEETINGS

Poster contribution

2019 "Molecular transport unsing Metal-Organic Polyhedra as stoichiometric vehicles". XV UB Conference for MSc students in Chemistry. Barcelona (Spain).

2022 "Switchable Metal-Organic Polyhedra solubility through surface chemistry: engineering molecular self-sorting systems". 8th International Conference on Metal-Organic Frameworks and Open Framework Compounds. Dresden (Germany).

2023 "Click Chemistry on Metal-Organic Polyhedra". 5th European Conference on Metal-Organic Frameworks and Porous Polymers. Granada (Spain).

2023 "Coordinative molecular recognition on Metal-Organic Polyhedral for separation, removal and sensing applications". RSC Macrocyclic and Supramolecular Chemistry Meeting. Birmingham (United Kingdom).

Oral contribution

2022 **"**Metal-Organic Polyhedra as molecular nanoparticles". 12th Symposium of Young Researchers from Catalonia. Girona (Spain).

2022 **"**Are Metal-Organic Polyhedra molecular nanoparticles? 3rd Multifunctional Materials Symposium. Granada (Spain).

2022 "Switchable Metal-Organic Polyhedra solubility through surface chemistry: engineering molecular self-sorting systems". Young Investigator Symposium MOF2022. Dresden (Germany).

2023 "Coordinative molecular recognition on Metal-Organic Polyhedra for separation, removal and sensing applications". RSC Macrocyclic and Supramolecular Chemistry Meeting. Birmingham (United Kingdom).

SCIENTIFIC AWARDS

2023 Women Talent Award. Best publication (***Chem. Eur. J.*** **2022**, e202200357). Catalan Institute of Nanoscience and Nanotechnology (ICN2).

SCIENTIFIC PUBLICATIONS

1. **Laura Hernández-López**, Cornelia von Baeckmann, Jordi Martínez-Esaín, Alba Cortés-Martínez, Jordi Faraudo, Caterina Caules, Teodor Parella, Daniel Maspoch, Arnau Carné-Sánchez. "(Bio)Functionalisation of Metal-Organic Polyhedra by Using Click Chemistry", ***Chem. Eur. J.*** **2023**, 29, e202301945.

2. **Laura Hernández-López**, Olalla Calvo-Lozano, Leyre Gomez, Arnau Carné-Sánchez, Cornelia von Baeckmann, Laura M. Lechuga, Daniel Maspoch. "Integration of Metal-Organic Polyhedra onto a Nanophotonic Sensor for Real-Time Detection of Nitrogenous Organic Pollutants in Water", ***ACS Appl. Mater. Interfaces*** **2023**, 15, 33, 39523-39529.

3. Akim Khobotov-Bakishev, Cornelia von Baeckmann, Borja Ortín-Rubio, **Laura Hernández-López**, Alba Cortés-Martínez, Jordi Martínez-Esaín, Felipe Gándara, Judith Juanhuix, Ana E. Platero-Prats, Jordi Faraudo, Arnau Carné-Sánchez, Daniel Maspoch. "Multicomponent, Functionalized HKUST-1 Analogues Assembled via Reticulation of Prefabricated Metal-Organic Polyhedral Cavities", ***J. Am. Chem. Soc.*** **2022**, 144, 34, 15745-15753.

4. Jorge Albalad, **Laura Hernández-López**, Arnau Carné-Sánchez, Daniel Maspoch. "Surface chemistry of metal-organic polyhedra", ***Chem. Commun.*** **2022**, 58, 2443-2454.

5. **Laura Hernández-López**, Akim Khobotov Bakishev, Cornelia von Baeckmann, Jorge Albalad, Arnau Carné-Sánchez and Daniel Maspoch. "Metal-Organic Polyhedra as Building Blocks for Porous Extended Networks", ***Adv. Sci.*** **2022**, 9, 2104753.

6. **Laura Hernández-López**, Alba Cortés Martínez, Teodor Parella, Arnau Carné-Sánchez, Daniel Maspoch. "pH-Triggered Removal of Nitrogenous Organic Micropollutants from Water by Using Metal-Organic Polyhedra", ***Chem. Eur. J.*** **2022**, e202200357.

7. **Laura Hernández-López**, Jordi Martínez-Esaín, Arnau Carné-Sánchez, Thais Grancha, Jordi Faraudo, Daniel Maspoch. "Steric Hindrance in Metal Coordination Drives the Separation of Pyridine Regioisomers Using Rhodium(II)-Based Metal–Organic Polyhedra", ***Angew. Chem. Int. Ed.*** **2021**, 60,11406 –11413.

8. Thais Grancha, Arnau Carné-Sánchez, Farnoosh Zarekarizi, **Laura Hernández-López**, Jorge Albalad, Akim Khobotov, Vincent Guillerm, Ali Morsali, Judith Juanhuix, Felipe Gándara, Inhar Imaz and Daniel Maspoch."Synthesis of Polycarboxylate Rhodium(II) Metal–Organic Polyhedra (MOPs) and their use as Building Blocks for Highly Connected Metal–Organic Frameworks (MOFs)", ***Angew. Chem. Int. Ed.*** **2021**, 60, 5729–5733.

9. Thais Grancha, Arnau Carné-Sánchez, **Laura Hernández-López**, Jorge Albalad, Inhar Imaz, Judith Juanhuix and Daniel Maspoch. "Phase Transfer of Rhodium(II)-Based Metal Organic Polyhedra bearing Coordinatively bounded Cargoes", ***J. Am. Chem. Soc.*** **2019**, 141, 45, 18349–18355.

10. Jorge Albalad, Arnau Carné-Sánchez, Thais Grancha, **Laura Hernández-López**, Daniel Maspoch. "Protection strategies for directionally-controlled synthesis of previously inaccessible Metal-Organic Polyhedral (MOPs): the cases of carboxylate- and amino-functionalised Rh(II)-MOPs", ***Chem. Commun.*** **2019**, 55, 12785-12788.

REFERENCES

Prof. Dr. Daniel Maspoch

ICREA Professor. Head of the Supramolecular nanochemistry and materials group. at Institut Català de Nanociència i Nanotecnologia. Universitat Autònoma de Barcelona. Barcelona (Spain).

PhD supervisor

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Prof. Dr. Guillaume Maurin

Head of Dynamics and Adsoprtion in Materials with Porosity Group. Institut Charles Gerhardt Montpellier. Université de Montpellier. Montpellier (France).

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Dr. José Giner Planas

Teanured scientist at Inorganic Materials and Catalysis Laboratory. ICMAB- CSIC. Universitat Autònoma de Barcelona. Barcelona (Spain).

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