

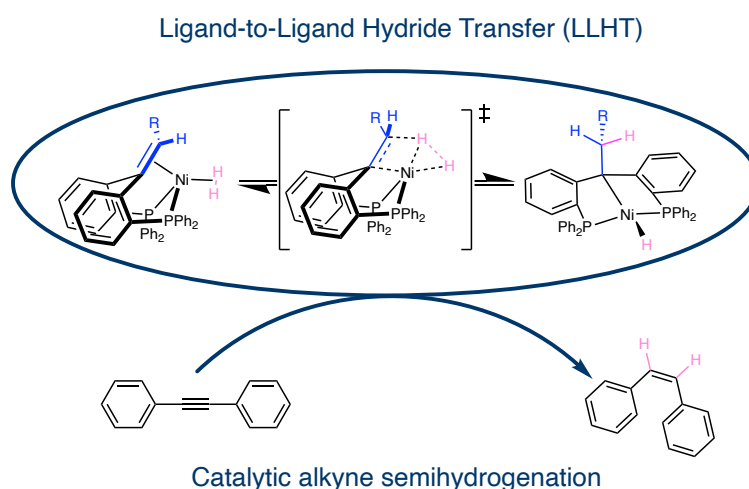
## Metal-ligand cooperativity at nickel $\pi$ -pincer compounds

Marc-Etienne Moret

Organic Chemistry & Catalysis, Institute for Sustainable and Circular Chemistry, Utrecht University,  
Universiteitsweg 99, 3584 CG, Utrecht, The Netherlands. Email: [m.moret@uu.nl](mailto:m.moret@uu.nl)  
Website: <https://www.uu.nl/staff/MMoret>

Transition-metal complexes of  $\pi$ -ligands such as ketones and olefins occupy a prominent place in homogeneous catalysis and organometallic chemistry. Binding a multiple bond to a metal atom modifies its chemical properties and unlocks new elementary reactions which are part of various catalytic cycles. In this lecture, I would like to explore a different role for  $\pi$ -ligands: instead of being part of an organic substrate to be transformed, they can also be used as an element of ligand design for catalytic reactions.

Incorporating a C=O or C=C double bond in a strongly chelating pincer ligand restricts its reactivity, which can allow for the stabilization and characterization of elusive reactive intermediates. Furthermore, the tethered moiety can act as a cooperative ligand, engaging in reversible bond-making and bond breaking events during a catalytic cycle (see figure). Both concepts are demonstrated in recent examples from our laboratories in nickel chemistry.



### References:

- [1] M. L. G. Sansores-Paredes, M. Lutz, M.-E. Moret, *Nat. Chem.* **2024**, *16*, 417–425.
- [2] M. R. Tiddens, B. T. Kappé, T. J. Smak, M. Lutz, M. Moret, *Chem. Eur. J.* **2024**, e202400666.
- [3] M. L. G. Sansores-Paredes, M. Wendel, M. Lutz, M.-E. Moret, *Organometallics* **2024**, *43*, 506–514.
- [4] M. L. G. Sansores-Paredes, S. Voort, M. Lutz, M. Moret, *Angew. Chem. Int. Ed.* **2021**, *60*, 26518–26522.
- [5] M. R. Tiddens, M.-E. Moret, *Top. Organomet. Chem.* **2020**, DOI 10.1007/3418\_2020\_70.
- [6] A. F. Orsino, M. G. del Campo, M. Lutz, M.-E. Moret, *ACS Catal.* **2019**, *9*, 2458–2481.
- [7] D. G. A. Verhoeven, A. F. Orsino, R. L. M. Bienenmann, M. Lutz, M.-E. Moret, *Organometallics* **2020**, *39*, 623–629.
- [8] D. G. A. Verhoeven, M.-E. Moret, *Dalton T* **2016**, *45*, 15762–15778.



**Marc-Etienne Moret** obtained an MSc degree in chemistry from the Ecole Polytechnique Fédérale de Lausanne (EPFL) in 2005, and a PhD degree from the Eidgenössische Technische Hochschule Zürich (ETHZ) with Prof. P. Chen in 2009. His PhD thesis describes the study of reaction mechanisms in organoplatinum chemistry by mass spectrometric methods, as well as novel platinum-copper heterobimetallic compounds and their reactions. Following his graduation, he moved to the California Institute of Technology (Caltech) for a postdoctoral stay (2010-2012) in the group of Prof. Jonas C. Peters on the activation of N<sub>2</sub> by synthetic iron complexes, for which he was awarded a fellowship for prospective researchers and a fellowship for advanced researchers from the Swiss National Science Foundation (SNF). In August 2012, he accepted a position as assistant professor in the Organic Chemistry and Catalysis group at Utrecht University. He was awarded tenure in 2018 and became associate professor in 2022. There, he leads a research program on organometallic chemistry and catalysis with earth-abundant elements. His group investigates the use of cooperative ligands for catalysis with non-noble transition metals (Ni, Co, Fe) and bond activation at geometrically constrained group 14 centers (Si, Ge). In 2017 he obtained ERC Starting Grant: "Cooperative Acceptor Ligands for Catalysis with Earth-Abundant Metals – CALCEAM" (1.5 M €). He is an author of more than 70 papers (h-index: 25, based on Scopus).



Utrecht  
University

LINK TO THE MEETING (TEAMS): [https://teams.microsoft.com/l/meetup-join/19%3ar0dbKmXvhnP\\_4kn8EB8R1jpLK\\_I94F09HQ0h4dYbjY81%40thread.tacv2/1717617220577?context=%7b%22id%22%3a%2273689ee1-b42f-4e25-a5f6-66d1f29bc092%22%2c%22oid%22%3a%22de88d48e-1b50-478d-8805-944752731ce3%22%7d](https://teams.microsoft.com/l/meetup-join/19%3ar0dbKmXvhnP_4kn8EB8R1jpLK_I94F09HQ0h4dYbjY81%40thread.tacv2/1717617220577?context=%7b%22id%22%3a%2273689ee1-b42f-4e25-a5f6-66d1f29bc092%22%2c%22oid%22%3a%22de88d48e-1b50-478d-8805-944752731ce3%22%7d)