

XXVI European Conference on Organometallic Chemistry (EuCOMC) 2025

Conference Booklet

Day 1: Sunday July 6, 2025

General Sponsors and main supporters



Organizers



^b
UNIVERSITÄT
BERN

Talks

Session 1

Hydroaminoalkylation Not Hydroamination. The Catalytic Addition of Amines to Alkenes

L. L. Schafer¹

¹Department of Chemistry, The University of British Columbia, Vancouver, CANADA schafer@chem.ubc.ca

1,3-N,O-Chelated early transition metal complexes show unique reactivity for the direct catalytic addition of amines to alkenes. Hydroaminoalkylation enables the addition of aryl- and alkylamines, as well as N-heterocycles, to add directly to terminal and internal unactivated alkenes to access diverse small molecule and materials products.¹ State-of-the-art catalysts feature N,O-chelating ureate ligands, with tuneable steric and electronic features and flexible bonding modes, to enable efficient C-H bond activation and Csp³-Csp³ bond formation. Hydroaminoalkylation addresses the fundamental thermodynamic challenge of hydroamination by making a C-C bond rather than a C-N bond. With this alternative disconnection, early transition metal catalyzed hydroaminoalkylation is a Green Chemistry approach for the synthesis of a range of selectively substituted amines. This 100% atom-economic reaction can be carried out on large scale using neat reaction conditions and could be transformative for the synthesis of nitrogen containing compounds in the pharmaceutical, agrochemical and functional materials industries. This regio- and diastereoselective catalytic technology offers a new disconnection for generating complex small molecule amines and N-heterocycles² or it can be used on large scale to access amine-containing, self-healing and adhesive materials with tuneable properties for application as underwater adhesives, anti-corrosion coatings and more.³

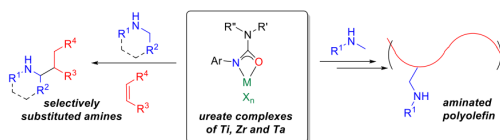


Figure 1. Ureate early-transition metal hydroaminoalkylation catalysts for the synthesis of small molecules and materials.

[1] DiPucchio, R. C.; Rosca, S.-C.; Schafer, L. L. *Am. Chem. Soc.* **2022**, *144*, 11459.

[2] Zheng, C. H. M.; Balatsky, D. A.; DiPucchio, R. C.; Schafer, L. L. *Org Lett.* **2022**, 6571.

[3] a) Gilmour, D. J.; Tomkovic, T.; Kuanr, N.; Perry, M. R.; Gildenast, H.; Hatzikiriakos, S. G.; Schafer, L. L. *ACS Appl. Polym. Mater.* **2021**, *3*, 2330. b) Scott, S. S.; Kaur, B.; Zheng, C. H. M.; Brant, P.; Gilmour, D. J.; Schafer, L. L. *Am. Chem. Soc.* **2023**, *145*, 22871.

Are Two better than One? A Journey in Bimetallic Organometallic Chemistry and Catalysis

D. Broere¹

¹Organic Chemistry and Catalysis, Institute for Sustainable and Circular Chemistry, Utrecht University Universiteitsweg 99, 3584 CG, Utrecht, The Netherlands. Email: d.l.j.broere@uu.nl

Various metalloenzyme active sites feature complex architectures that enable multiple metals and ligands to work together to facilitate bond activation processes that are essential to enzyme function.¹ Drawing inspiration from nature, various research groups have developed synthetic systems where metals and ligands cooperatively activate chemical bonds.² Another avenue in cooperative bond activation involves complexes wherein multiple metal centers are positioned in close proximity and work together to make/break chemical bonds.³ However, whereas nature often uses both strategies simultaneously, synthetic chemists have some catching up to do. On the bright side, we can explore chemical space that is beyond the reach of nature.

In my group we have developed so called ‘expanded pincer’ ligands that bind two metals in close proximity and feature design elements for metal-ligand cooperativity.⁴ In this presentation, I will highlight how combining metal-metal and metal-ligand cooperativity can flatten the potential energy surfaces of catalytic reactions. I will also share recent insights into a new organometallic pathway for C–H functionalization.

References

[1] a) Armstrong, F.A.; Ragsdale, S.W. *Chem. Rev.* **2014**, *114*, 4149; b) Wodrich, M. D.; Hu, X. *Nat. Rev. Chem.* **2017**, *2*, 0099.

[2] a) Alig, L.; Fritz, M.; Schneider, S. *Chem. Rev.* **2019**, *119*, 2681; b) Khusnutdinova, J. R.; Milstein, D. *Angew. Chem. Int. Ed.* **2015**, *54*, 12236.

[3] Iglesias, M.; Sola, E.; Oro, L. A. *Homo- and Heterobimetallic Complexes in Catalysis: Cooperative Catalysis*; Springer International Publishing: Cham, Switzerland, 2016.

[4] www.broerelab.com/publications