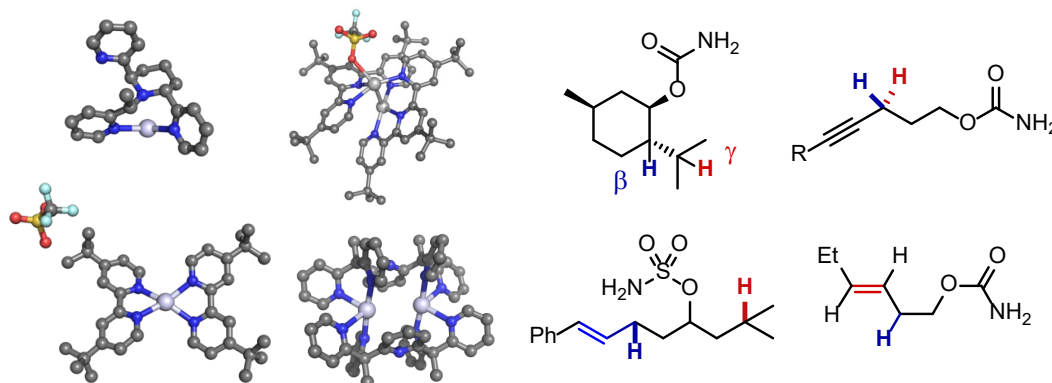


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Taming nitrene reactivity with silver catalysts

Abstract: Over 80% of the pharmaceuticals currently on the market contain at least one carbon-nitrogen (C–N) bond, as do many important biomolecules. The presence of nitrogen atoms imparts polarity to molecules and plays a key role in helping drugs bind to their biological targets, such as proteins and enzymes. Thus, methods that enable chemists to introduce nitrogen into a broad range of hydrocarbon feedstocks in an efficient, atom-economical, and environmentally friendly manner of is of intense interest. In particular, the prevalence of carbon-hydrogen (C–H) bonds in organic molecules make them ideal targets for functionalization to furnish more valuable compounds. However, there are many challenges towards achieving this goal, including the strength and relative inertness of the C–H bond, the sheer number of C–H bonds present in many convenient building blocks, and the difficulty of targeting a specific site for installation of a new C–N bond. In this talk, I describe our group’s efforts to harness unusual features of silver coordination complexes to catalyze nitrene transfer reactions capable of transforming specific C–H bonds to C–N bonds in a tunable manner. The design principles underlying the ability to alter the chemo-, site-, and stereoselectivity of C–H bond amidations will be presented and examples for the late-stage functionalization of medicinally relevant molecules highlighted.

catalysts for selective and tunable nitrene transfer



Selected References:

- Ju, M.; Zerull, E.; Roberts, J.; Huang, M.; Guzei, I.; Schomaker, J. *J. Am. Chem. Soc.* **2020**, *142*, 12930–12936.
Ju, M.; Huang, M.; Vine, L.; Roberts, J.; Dehghany, M.; Schomaker, J. *Nature Catal.* **2019**, *2*, 899–908.
Huang, M.; Yang, T.; Paretzky, J.; Berry, J.; Schomaker, J. *J. Am. Chem. Soc.* **2017**, *139*, 17376–17386.
Ju, M.; Weatherly, C.; Guzei, I.; Schomaker, J. *Angew. Chem. Int. Ed.* **2017**, *56*, 9944–9948.
Alderson, J.; Corbin, J. R.; Schomaker, J. M. *Accs. Chem. Res.* **2017**, *50*, 2147–2158.
Weatherly, C. D.; Alderson, J.; Berry, J. F.; Hein, J. E.; Schomaker, J. M. *Organometallics* **2017**, *36*, 1649–1661.
Dolan, N.; Scamp, R. J.; Yang, T.; Berry, J.; Schomaker, J. *J. Am. Chem. Soc.* **2016**, *138*, 14658.
Scamp, R.; Alderson, J.; Phelps, A. M.; Dolan, N. S.; Schomaker, J. M. *J. Am. Chem. Soc.* **2014**, *136*, 16720.
Rigoli, J. W.; Weatherly, C. D.; Alderson, J.; Vo, B. T.; Schomaker, J. M. *J. Am. Chem. Soc.* **2013**, *135*, 17238.

Bio:

Professor Schomaker began her research career at Dow Chemical in Organic Chemicals and Polymers, later moving to Agricultural Chemicals Process Research, where she participated in the route selection and scale-up campaigns for two new herbicides. She obtained her Ph.D. with Professor Babak Borhan at Michigan State University in 2006 before moving to UC-Berkeley as an NIH postdoctoral fellow in the labs of Professor Robert G. Bergman and F. Dean Toste. She began her independent career at the University of Wisconsin-Madison in 2009, where she is now a full professor.

Research in the Schomaker group encompasses method development, catalysis, and total syntheses. Oxidative allene aminations enable flexible syntheses of amine 'triads' in structurally complex molecules with intriguing bioactivities, including jogyamycin and other molecules that target the ribosome. Unified strategies to construct diverse bioactive *N*-heterocycles are another area of current interest. In the context of catalyst design, the range of coordination geometries available to Ag(I) have been harnessed for tunable, chemo-, regio- and stereoselective group transfer reactions. Applications of synthetic methods to biological problems include collaborative investigations of heterocyclic alkynes with tunable polarizability to achieve mutually exclusive, bioorthogonal labeling reagents for both in vivo and in vitro use. Awards include the NSF-CAREER, Sloan Research Fellowship, Thieme Chemistry Journal Award, ACS-WCC Rising Star Award, MSU Distinguished Alumni Award, UW-Vilas Mid-Career and Romnes Awards from UW. She was also named a Kavli Fellow, a Somojai Visiting Miller Professor at UC-Berkeley, and a Fellow of the Royal Society of Chemistry.

