William D. Wulff

Synthetic Organic Chemistry

Professor

(b. 1949)

B.S., 1971,
Univ. of Wisconsin-Eau Claire;

Ph.D., 1979,
Iowa State Univ.;

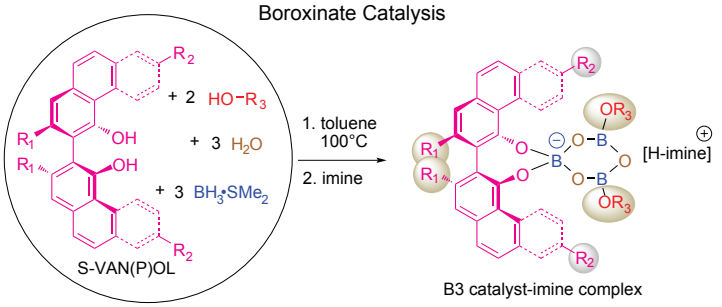
NIH Postdoctoral Fellow, 1979-80,
Princeton Univ.

517-353-0503

Wulff Group Research is concentrated in the area of organic synthesis and catalysis. We are motivated by the pursuit of novel approaches in synthetic organic chemistry involving design and development of new asymmetric organocatalysis, organometallic chemistry, mechanistic studies and total synthesis of natural products.

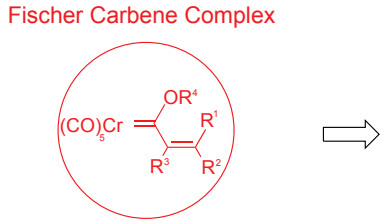
Research Field Highlights

1) New Enantioselective Organocatalysis



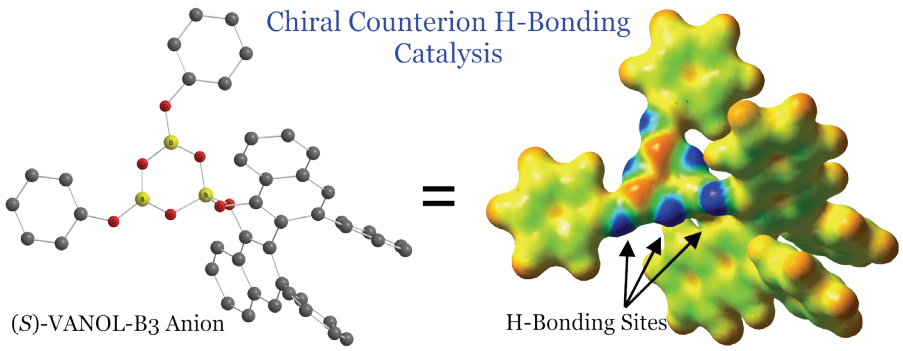
Representative Transformations
Heteroatom Diels-Alder reaction
cis-Aziridination
trans-Aziridination
Aminoallylation

2) Fischer Carbene Chemistry

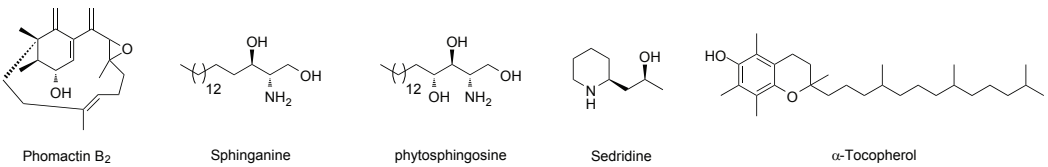


Representative Transformations
Benzannulation Reaction
Cyclohexadienone Annulation
Tautomer Arrested Annulation
Biaryl Synthesis
Macrocycles

3) Mechanistic Investigations on Organocatalysis



4) Total Synthesis of Natural Products



Selected Publications

Self-Assembly of a Library of Polyborate Chiral Anions for Asymmetric Catalysis, Desai, A. A.; Vetticatt, M. J.; Guan, Y.; Odom, A. L.; Majumder, S.; Wulff, W. D. *Tetrahedron Lett.* **2015,** *56*, 3481.

Catalytic Synthesis of 2H-Chromenes, Majumder, N.; Paul, N. D.; Mandal, S.; de Bruin, B.; Wulff, W. D., *ACS Catalysis* **2015**, *5*, 2329-2366.

The Nature of Meso- *and* Pyro-*borate Pre-catalysts to the VANOL and VAPOL BOROX catalysts*, Zhao, W.; Yin, X.; Gupta, A. K.; Zhang, X.; Wulff, W. D., *Synlett* **2015**, *26*, 1606-1614.

Catalyst Controlled Multi-Component Aziridinatons of Chiral Aldehydes, Mukherjee, M.; Zhou, Y.; Dai, Y.; Gupta, A. K.; Reddy, V. R.; Staples, R. J.; Wulff, W. D., *Chem. Eur. J.* **2017**, *23*, 2552-2556.

Enantioselective Palladium-Catalyzed Carbonylative Carbocyclization of Enallenes via Cross-Dehydrogenative coupling (CDC) with Terminal Alkynes: An Efficient Construction of α-Chirality of Ketones, Yang, B.; Qiu, Y.; Jiang, T.; Wulff, W. D.; Yin, X.; Zhu, C.; Backvall, J.-E., *Angew. Chem. Int. Ed.* **2017**, *56*, 4535-4539.

Multi-Component Cis- *and* Trans-*Aziridinations in the Syntheses of all Four Stereoisomers of Sphinganine*, Zhou, Y.; Mukherjee, M.; Gupta, A. K.; Wulff, W. D., *Org. Lett.* **2017**, *19*, 2230-2233.

Pyro-borates, Spiro-borates and Borox-inates of BINOL – Assembly, Structures and Reactivity, Hu, G.; Gupta, A. K.; Huang, L.; Zhao, W.; Yin, X.; Osminski, W. E. G.; Huang, R. H.; Wulff, W. D; Izzo, J. A.; Vetticatt, M. J., *J. Am. Chem. Soc.* **2017**, *139*, 10267-10285.

Multi-Component Catalytic Asymmetric Synthesis of Trans-*Aziridines*, Zhou, Y.; Gupta, A. K.; Mukherjee, M.; Zheng, L.; Wulff, W. D. *J. Org. Chem.* **2017**, *82*, 13121-13140.

Catalytic Asymmetric Epoxidation of Aldehydes with Two VANOL-Derived Chiral Borate Catalysts, Gupta, A.K.; Yin, X.; Mukherjee, M.; Desai, A.A.; Mohammadlou, A.; Jurewicz, K.; Wulff, W.D., *Angew. Chem. Int. Ed.* **2019**, *58*, 3361.