

"Oxygen Driven Fragment Coupling for the Synthesis of Natural Products and Antibacterials"

Abstract:

Nature uses oxidative couplings to construct carbon-carbon, carbon-oxygen, and carbon-nitrogen bonds with a high degree of efficiency. Surprisingly, few laboratory equivalents are as selective or as efficient as the biological versions. The use of parallel microscale screening to discover selective and efficient catalysts for such processes using oxygen as the terminal oxidant will be discussed. The unexpected outcomes obtained highlight the value of interrogating large numbers of rationally selected variables under the umbrella of general hypothesis. The development of selective oxidative catalytic processes for phenol coupling, enol coupling, and alkyl C–H activation will be discussed. Applications in total synthesis of hypocrellin, honokiol, chaetoglobulin, and pyrolaside B will be presented. Finally, studies on the mechanisms of these transformations will be described with the goal of understanding the governing principles and how they might be used to discover further new transformations.

Biography:

Marisa Kozlowski received an A. B. in Chemistry from Cornell University and a Ph.D. from the University of California at Berkeley for work on the rational design of enzyme inhibitors under the direction of Paul Bartlett. After studying asymmetric catalysis in the laboratories of David A. Evans at Harvard University as a National Science Foundation postdoctoral fellow, she joined the faculty at the University of Pennsylvania and currently holds the rank of Professor of Chemistry. The major focus of Professor Kozlowski's research is the development of new catalytic methods for efficient organic synthesis using computation and high throughput screening. Professor Kozlowski's contributions have been recognized by a DuPont Young Investigator Award, an NSF CAREER Award, an Alfred P. Sloan Research Fellowship, the Kahn Award for Distinguished Teaching at the University of Pennsylvania, an American Cancer Society Beginning Research Scholar Award, the Philadelphia Organic Chemists' Club Award in 2010, election as a Fellow of the American Association for the Advancement of Science in 2012, the Philadelphia ACS Section Award in 2012, election as an American Chemical Society Fellow in 2013, the Charles Ludwig Distinguished Teaching Award in 2020, the Dennis DeTurck Award for Innovation in Teaching in 2021, an ACS Cope Scholar Award in 2022, the Provost's Award for PhD Teaching and Mentoring, and the Leete Award in 2023. In addition to over 180 independent publications, Professor Kozlowski coauthored with Professor Patrick Walsh the book "Fundamentals of Asymmetric Catalysis", available from University Science Books. She has served in several leadership roles for the Organic Division of the American Chemical Society and on numerous study sections including a term as

Chair of the American Cancer Society CDD Study Section. She is currently Editor-In-Chief of *Organic Letters*.

