HIGHLANDS IN CHEMISTRY SEMINAR SERIES

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"The Simmons-Smith Reaction in the Age of Catalysis"

FEBRUARY 19, 2021

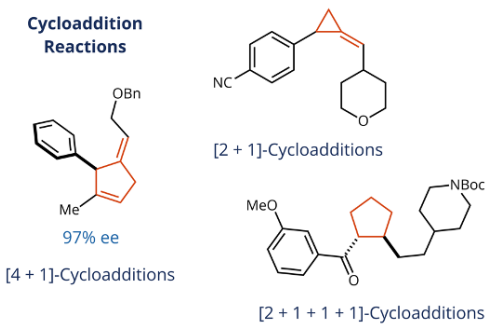
2:30PM ET

ZOOM

FACULTY HOST:
DIANA IOVAN

Carbenes are versatile reactive intermediates that display orthogonal reactivity to common nucleophilic and electrophilic functional groups. Homogeneously catalyzed carbene transfer reactions were first discovered over a half century ago, and numerous examples of [n + 1]-cycloaddition reactions have now been developed, often with control over diastereo- and enanatioselectivity. Nearly all of these reactions rely on the controlled decomposition of diazoalkane precursors as a central strategy for accessing reactive carbene equivalents.

Despite the utility of diazoalkanes in organic synthesis, they are inherently limited by the need for stabilizing substituents such as aryl or carbonyl groups. In order to develop transfer reactions of non-stabilized carbenes, such as methylene, isopropylidene, and vinylidene, it would be necessary to identify an alternative set of precursors. Our group has shown that nickel and cobalt catalysts can promote reductive [n + 1]-cycloaddition reactions using readily available and indefinitely stable 1,1-dichloroalkanes and 1,1-dichloroalkenes as carbene precursors. In this seminar, I will describe our development of new cycloaddition methods and our current hypotheses about the mechanisms of these reactions.



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