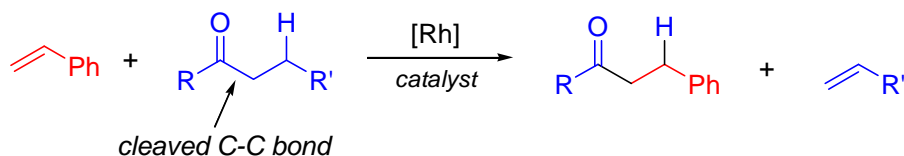


Johnson Group Research

Transition metal catalysis continually revolutionizes the synthesis of complex natural products and potential drug candidates by revealing reaction pathways inaccessible via traditional organic transformations. One area of current interest is the development of methodology for the cleavage and functionalization of carbon-carbon bonds. While carbon-carbon single bonds are inert under a vast majority of standard reaction conditions, certain transition metal complexes promote the activation of these bonds. Research in the Johnson group will follow several avenues of study, including:

1) *Understanding Current Methodology* The most current activation methodology utilizes rhodium complexes to catalyze the cleavage of Csp²-Csp³ single bonds adjacent to ketones, ultimately allowing for the exchange of ketone substituents. This reaction can also be viewed as alkene ‘hydroacylation’, the addition of a hydrogen and an acyl group across a double bond. Our initial research in this area will focus upon understanding the reaction mechanism. Findings from this work will guide the rational development of more active catalysts while providing the foundation for extension of the methodology. Such extensions will include the use of more complex ketones and alkenes for the simultaneous generation and control of multiple stereocenters.



2) *Development of New Methodology* Studies will also focus upon the development of new methodology utilizing carbon-carbon bond activation. Reactions capable of the cleavage of carbon-carbon bonds with transition metal complexes will be coupled with other reaction manifolds for the development of new methodology. These reactions, including ‘carboacylation’ and the formation of amides, promise to provide new bond disconnections amenable to the rapid formation of complex natural products and biologically active molecules.

