Highly enantioselective synthesis of various heterocycles via counteranion enhanced organocatalysis

Fabian Scharinger

Sustainable Organic Synthesis and Catalysis, Technische Universität Wien
Getreidemarkt 9/163, BI-EG-G10, A-1060, Vienna, Austria
fabian.scharinger@tuwien.ac.at

Herein, we present a novel approach for various asymmetric transformations of cyclic enones. The combination of readily accessible chiral diamines and sterically demanding achiral phosphoric acids resulted in a simple and highly tunable catalyst framework. The careful optimization of the catalyst components led to the identification of a particularly powerful and multi-purpose organocatalyst, which was successfully applied for asymmetric transfer-hydrogenations, epoxidations, aziridinations, aza-Michael-initiated cyclizations, as well as for a novel Robinson-like Michael-initiated ring closure/aldol cyclization. High catalytic activities and excellent stereocontrol was observed for all four reaction types, indicating the excellent versatility of our catalytic system. Furthermore, a simple change in the diamine's configuration provided easy access to both product antipodes in all cases.

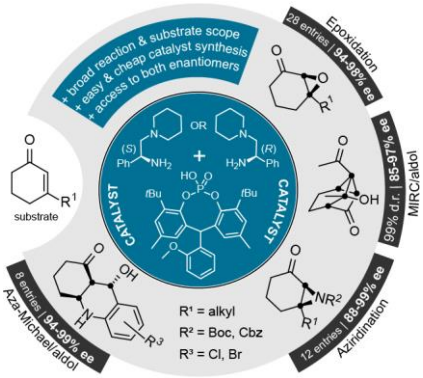

Figure 1. Graphical abstract