

Thesis Abstract

The thesis entitled as, **“Design and synthesis of nucleophilic catalysts for halofunctionalization based on alpha effect”** has been divided into three chapters.

Keywords: *Catalyst design, organo-catalysis, Hydrazide catalyst, alkoxyamide, halogenation, alpha effect, nucleophilicity, late-stage chlorination, bromination, dearomative bromocyclization, iodination, multihalogenation, peptides, drugs.*

Chapter I portrays a brief outline about the areas which are of relevance in this thesis work, such as various modes of halogen activation by nucleophilic catalysis.

Chapter II describes the development of alkoxyamide catalyst for the activation of N-bromosuccinimide to perform bromocyclization and bromination of a wide range of substrates in a lipophilic solvent. The key feature of the active site is the alkoxy group attached to the sulfonamide moiety, which facilitates the acceptance as well as the delivery of bromonium species from the bromine source to the substrates.

Chapter III presents the study of a novel hydrazide based catalyst for late-stage halogenation of peptides, drugs and aromatics characterised by high efficiency and selectivity. DFT studies indicate that the reaction likely proceeds via a cationic transition state. Also, multihalogenated compound could be readily accessed in short times. The protocol shows high functional group tolerance and provides a facile route for late-stage functionalization and intermediate for further derivatization.

