



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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SHORT ABSTRACT

The thesis consists of five chapters. First chapter presents the cycloaddition of oxiranes with isoselenocyanates using $\text{BF}_3 \cdot \text{Et}_2\text{O}$. This procedure allows to access 2-imino-1,3-oxaselenolanes and 2-oxazolidinones in good to high yields with wide variety of substrate scope. In chapter 2, Fe-catalyzed synthesis of azolidines are described by the cycloaddition of aziridines with isocyanates, isothiocyanates, isoselenocyanates and carbodiimides is demonstrated using $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$ in aqueous suspension. The cycloaddition of aziridines with isothiocyanates, isoselenocyanates and carbon disulfide has been described in chapter 3. The reaction is performed using pyrrolidine as the catalyst and on water at moderate temperature under air. In chapter 4, the stereospecific cycloaddition of enantioenriched aziridines with isothiocyanates using $\text{Al}(\text{salen})\text{Cl}$ as the catalyst at room temperature under air has been demonstrated. The reaction provides the target enantioenriched iminothiazolidines in excellent yields and high optical purities. Chapter 5 describes, the Cu-catalyzed domino synthesis of substituted imidazolidines from N-alkyl anilines and aziridines using THBP as the oxidant. This process involves a ring opening followed by C-N bond formation via $\text{C}(\text{sp}^3)\text{-H}$ functionalization. These reactions are efficient, general and selective to provide the corresponding azolidines in moderate to high yields.