



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Thesis Title:

Transition Metal and Oxidant Free Sustainable Syntheses of Heterocyclic Molecules

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SHORT ABSTRACT

The thesis describes synthesis of various heterocyclic compounds without any transition metal or external oxidant. In chapter 1, importance of heterocyclic molecules and their synthesis by different strategies have been discussed. Chapter 2 highlights synthesis of heterocycles *via* aerobic oxidation of 2-hydroxyacetophenones without any need of redox catalyst system. We have been able to synthesize phthalides, quinoxalines, α -ketoamides under mild reaction condition. Catalytic amount of base/acid has been added for continuation of some reaction but has no role in the oxidation process. Chapter 3 represents an unusual aerobic hydrolysis-cascade reaction for the synthesis of *N*-formyl-2-benzoyl benzothiazolines, 2-substituted benzothiazoles and disulfides. Also, synthetic applications such as cascade formation of *N*-substituted imidazoles and 2-benzoyl benzothiazole have been demonstrated. The reaction proceeds *via* base mediated aerobic formation of iminium ion intermediate. Chapter 4 describes metal-free highly diastereoselective [3+2] cycloaddition reaction between *N*-phenacylbenzothiazolium bromides and prochiral cyclopentene-1,3-diones which results a tetracyclic product with five stereogenic centres. Interesting fused heterocyclic molecules have been synthesized from the tetracyclic product. A preliminary catalytic asymmetric approach has also been documented. Lastly, chapter 5 demonstrates base mediated denitration reactions of nitroketones. We have been able to synthesize isoxazoles in regioselective manner, isoxazoline *N*-oxides and dihydrofurans with excellent diastereomeric ratio and β,γ -unsaturated diesters.