



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI  
SHORT ABSTRACT OF THESIS

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Programme of Study : Ph.D.

Thesis Title: Copper Catalyzed Synthesis of Five and Six Membered Nitrogen Containing Heterocycles

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Thesis Submitted to the Department/ Center : Chemistry

Date of completion of Thesis Viva-Voce Exam : 24-05-2016

Key words for description of Thesis Work : Copper catalysis, N-heterocycles

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**SHORT ABSTRACT**

The contents of this thesis have been divided into five chapters based on the results of experimental works performed during the complete course of the research period. Chapter I of the thesis describes the importance of various nitrogen heterocyclic scaffolds and different copper catalyzed strategies for their synthesis. All the other chapters deals with copper catalyzed C–C, C–N and C–O bond forming reactions leading to various nitrogenous heterocycles. Chapter II A demonstrates a copper catalyzed method for the synthesis of 3-aryloindoles via  $sp^3$  C–H bond functionalization of *o*-alknylated amine through C–C and C–O bond formation. Chapter II B describes a metal free cascade synthesis of 3-aryloindoles from *o*-alkynyl amine precursors via  $sp^3$  C–H bond functionalization. Chapter III illustrates a Cu catalyzed route to indoloquinoxaline-6-ones starting from *o*-indolyl-*N,N*-dimethylarylamines through an intramolecular oxidative coupling pathway. Chapter IV portrays the synthesis of 3-methyleneisoindolin-1-ones from aryl alkynyl acids and 2-halobenzamides which proceeds via decarboxylative cross-coupling / *5-exo-dig* heteroannulation process. Chapter V describes a copper catalyzed protocol for the syntheses of 4,5-disubstituted-1,2,4-triazole-3-thiones and 4,5-disubstituted-1,2,4-triazoles from *N*-arylidenearylthiosemicarbazides via an intramolecular C–N bond formation at the imine C–H bond followed by a desulfurization.