



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Programme of Study : Ph.D.

Thesis Title: *Studies Towards C-C, C-N, and C-O Bond Formation via C-H Functionalization: Expedient Synthesis of Functionalized Heterocycles*

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SHORT ABSTRACT

The thesis contains four chapters. The first chapter describes C7-acyloxylation of indolines with versatile carboxylic acids using pyrimidine as directing group under Ru(II)-catalysis. The proficiency of aryl, alkyl and α,β -unsaturated carboxylic acids can be assessed with functional group tolerance. The second chapter deals with the Co(II)-PCy₃-catalyzed C7-arylation of indolines using arylboronic acids as arylating agents utilizing a removable pyrimidyl directing group. The broad substrate scope with functional group diversity, using of minimally-toxic and inexpensive cobalt catalyst and late-stage removal of directing group are the important features of the protocol. The third chapter focuses on the air stable Cp*Co(III)-catalyzed auxiliary assisted ring opening of *N*-sulfonyl aziridines with indolines at its C7 position, enabling site-selective C-H activation at moderate temperature. The key findings involve use of cost-effective and air-stable cobalt catalysis, detection of a Co(III) intermediate, and late-stage removal of directing group. The fourth chapter represents a Cu(II)-catalyzed aziridine ring opening reaction with benzimidazoles followed by cyclization to construct imidazobenzimidazole moiety using air as an oxidant. The use of relatively cheaper copper(II) catalyst, and air as an oxidant, regioselectivity and high enantiomeric purity are the significant practical features.