



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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SHORT ABSTRACT

Cross-coupling reactions are widely used in both industry and academia for the installation of functional group and untied a new gate in organic synthesis. However, now-a-days C-H functionalization strategies have received significant attention from the atom economy point of view. In this context two fundamental approaches *viz.* ligand directed C-H functionalization and cross-dehydrogenative coupling (CDC) are the most preferred synthetic protocols. The thesis work based on the development of directing group assisted site selective C-H activation protocols to generate carbon-carbon (C-C) and carbon-heteroatom (C-X) bonds. Two privileged motifs present in many naturally occurring molecules such as benzothiazoles and quinoxalines were used for *ortho*-selective arylation, carboxylation and halogenations. For *o*-arylation and *o*-carboxylation both 2,3 diarylquinoxalines and 2-arylbenzothiazoles provided mono-*o*-functionalized product whereas for *o*-halogenation of 2-arylbenzothiazoles afforded di halogenated product which is quite different from usual reports. The thesis work also consists of non activated keto amide sp^3 C-H functionalization in the presence of Pd(II)/Cu(II) combination. Apart from these work, a α,β - sp^3 C-H functionalization strategy of tertiary amines was also developed for the cycloaddition reaction.