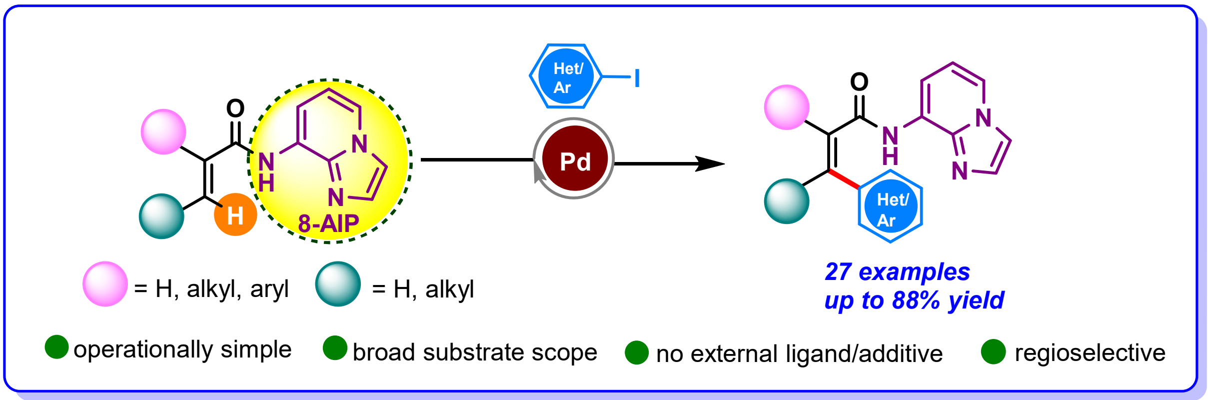
ABSTRACT

The Present Thesis entitled as **"Novel Pd-Catalyzed Carbon-Carbon and Carbon-Heteroatom Cross Coupling Reactions towards the Synthesis of Diverse Functional Molecules"** has made some efforts to synthesize the diverse functional molecules via different carbon-carbon and carbon-heteroatom cross coupling reactions. Based on different direction and contents of the work; the thesis has been divided into four chapters.

As an introduction to present work, the **Chapter I** summarize a brief review on cross coupling methodologies for carbon-carbon and carbon-heteroatom bond forming reactions

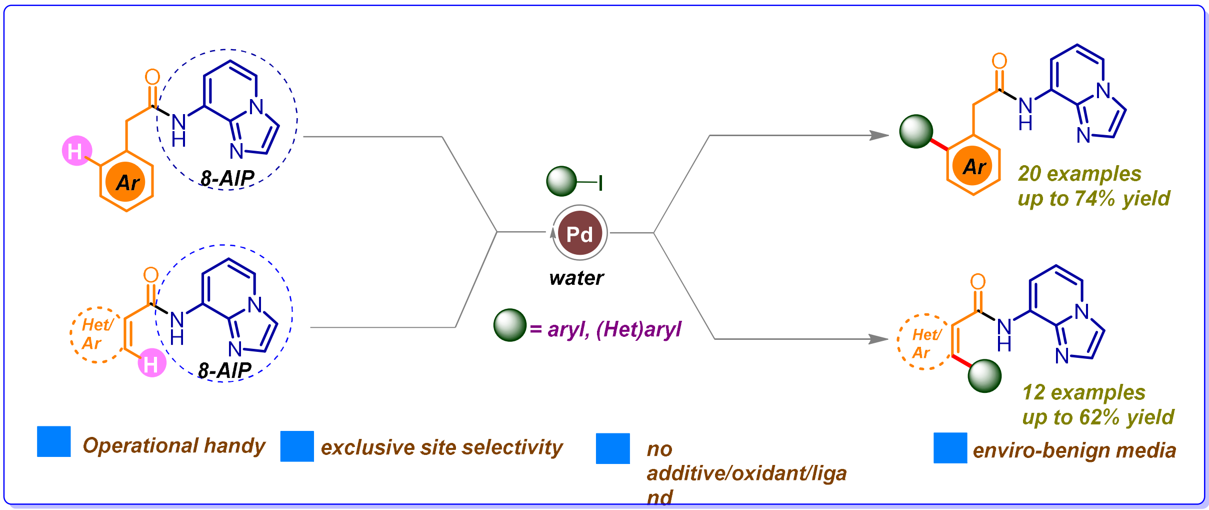
Chapter II describes our work synthesis of Pd-NHC catalyst and its application to C-H arylation and cross coupling reactions towards the synthesis of diverse functional molecules. We have demonstrated a regioselective C-H arylation of benzoxazole derivatives in the presence of a well-defined benzimidazole based N-oxide contained Pd-NHC complex. We have divulged the Pd-NHC catalyzed various cross-coupling reactions and their subsequent annulation sequence for accessing the structurally decorated biologically active 2-quinolone, 4-quinolone and coumarin derivatives

Chapter III describes Palladium catalyzed 8-aminoimidazo[1,2-*a*]pyridine directed selective β-C(sp^2)-H arylation towards the synthesis of diverse functional molecules.We have demonstrated a palladium catalyzed selective β-C(sp^2)-H arylation reaction using 8-AIP (aminoimidazo[1,2-*a*]pyridine) auxiliary as new *N,N*-bidentate directing group. The reaction protocol is operational-handy, scalable and tolerates a wide range of functional groups, dispensing diverse functionally orchestrated unsymmetrical amides in good to excellent yields.



Chapter **IV** delineates 8-aminoimidazo[1,2-*a*]pyridine (AIP) directed Pd(II) catalysis: site-selective *β*-and *γ*-C(sp^2)-H arylation in aqueous medium. We have divulged the first example of palladium (II) catalyzed direct and regioselective *ortho*-C(sp^2)-H arylation using newly developed 8-AIP (8-aminoimidazo[1,2-*a*]pyridine) as 6,5-fused bicyclic removable directing group in aqueous medium.

Most attractive feature of this transformation relies on the use of cheap and enviro-benign (sustainable) solvent water as sole reaction medium for C-H functionalization.



Impeccably, the protocol is operational-handy, scalable and compatible with broad array of common organic functional groups, furnishing structurally diversified unsymmetrical amides in good yields. Additionally, closer mechanistic underpinnings bolstered the strong chelation ability of 8-AIP as potent bidentate directing group.