

## ABSTRACT

The thesis entitled as, “**Transition-Metal-Catalyzed External Oxidant Free C–C and C–N Bond Formation**” has been divided into five chapters.

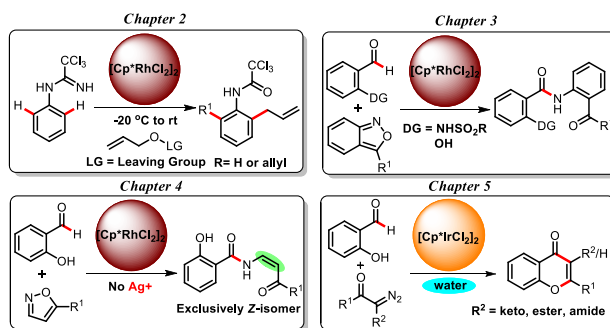
Chapter 1 portrays a brief outline about the areas which are of relevance in this thesis work, such as, C–H bond functionalization, Transition-metal catalysis, External oxidant-free approach for C–C and C–N bond formation using  $d^7$  transition metals, especially with rhodium.

Chapter 2 of the thesis deals with the C–C bond formation through a high valent  $Cp^*Rh(III)$  catalysis Under mild reaction conditions using a newly designed amidine directing group. The developed allylation strategy shows a broad substrate scope and worked even at a lower temperature ( $-20\text{ }^\circ\text{C}$ ).

Chapter 3 describes the atom and step economical approach for the construction of C–N bond through the amination of an aldehyde C–H bond. This amination protocols brought an implementation of bi-functional aminating agent anthranil for the synthesis of the amide linkage.

Chapter 4 illustrates the strategy for the stereospecific synthesis of enamides through an aldehyde C–H bond functionalization. The methodology successfully delivers the thermodynamically less stable *Z*-enamide, which has an immense impact in nature and medicinal chemistry.

Chapter 5 depicts the synthesis of biologically highly important chromone moiety through an iridium-catalyzed C–H bond functionalization. Water solvent was introduced for the time in Ir-catalysed C–H activation as a green strategy for chromone synthesis. A one-pot decarboxylative strategy has also been established based on the water-assistance.



**Keywords:** C–H Functionalization, Transition Metal, External oxidant free, Allylation, Amidation, Enamides, Chromones, Water.