

## PREFACE

*N*-Heterocyclic carbenes (NHCs) are certainly peculiar chemical entities. Having been considered as transient species, at the most, for many years, they are currently at the heart of the numerous advances in different chemical fields.

Phosphine ligands are tremendously used in catalysis from many decades but cost, sensitivity and oxidative degradation of this class are major hassle. Therefore the pioneering reports by Herrmann *et al.* on the first application of *N*-heterocyclic carbene(NHC)-palladium complexes as catalysts in 1995 grasped the attention of many chemist.

NHC complexes are no longer curiosities but have truly conquered research areas like cross-coupling and metathesis reaction. Palladium catalyzed cross-coupling reactions are well established. This was recognised when the 2010 Nobel Prize in chemistry was awarded for “palladium-catalyzed cross-coupling in organic synthesis”. From last two decades various palladium-NHC complexes have been prepared and successfully used as effective catalysts in organic transformations reactions.

The present dissertation depicts the development of the palladium-NHC complexes and their applications in organic synthesis. Synthesis of novel benzimidazole based palladium-NHC complexes and their excellent catalytic activity in organic transformations have been described. Various biologically significant moieties also synthesized through Pd-NHC catalyzed C-C bond formation reactions. So we hope that this work provides the opportunity to build up the library of many significant biologically active molecules through the palladium-NHC catalyzed reactions.