PREFACE

The development of solvent-free alternative processes in organic syntheses has picked up a rapid pace since the advent of Green Chemistry. This work is directed towards fulfilling our sole objective of optimizing green chemical reaction conditions to generate a rationale, which will help to design a predictive way of planning reaction conditions. The rationale will improve the efficacy of the chemical transformations both in respect to time and money in addition to the greener aspects. To this end, we observed that the study of thermal analysis before going for the actual reaction is of immense help while designing reaction conditions.

Major development of catalysts like Sharpless to Jacobsen's epoxidation catalysts took place during the last few decades when synthesis of small scale high value chemicals has been the major focus. Of late, the objective has shifted towards development of easily accessible catalysts for the synthesis of industrial chemicals. In this context, the Salen-based catalysts have been found to be in high demand viz., in polycarbonate synthesis.[21] There are some other metal complexes like the metallo-nitrones which have not been thoroughly explored. one reason being the lack of easy accessibility. There are still others which have attracted interest like the metal complexes of hydroxy benzylidene glycinate with their potency for showing anticancer activity. Moreover, due to the rich chemistry and biology of nitrogen-containing compounds, the synthesis of N-heterocycles, like the Imidazole and its derivatives has been a central and important theme within organic chemistry. This illustrates the need for easy availability of such compounds, and therefore, the demand of synthetic methodologies for obtaining them by faster, cheaper and environmentally safer routes.

The present work deals mainly with the development of a solvent-free methodology for the synthesis of metal complexes of Schiff base and Schiff base type compounds via a multicomponent strategy. Further attempts have been made to extend the solvent-free protocol towards the synthesis of tri-and tetra-substituted Imidazole, the Imidazole N-oxides, the 1-hydroxyImidazole-3-oxides and Imidazole metal complexes. While considerable attention has been focused on drawing a rationale for the mechanism, special emphasis has been given to keep this dissertation as concise as possible.