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Manju

Preface

Schiff base complexes of transition metal ions have played a significant role in coordination chemistry. The convenient route of synthesis and thermal stability of Schiff base complexes have contributed significantly for their possible applications in catalysis, biology, medicine and photonics. Significant variations in catalytic activity with structure and type are observed for these complexes.

The thesis deals with synthesis and characterization of transition metal complexes of quinoxaline based Schiff base ligands and their catalytic activity study. The Schiff bases synthesized in the present study are quinoxaline–2–carboxalidine–2–amino–5–methylphenol, 3–hydroxyquinoxaline–2–carboxalidine–2–amino–5–methylphenol, quinoxaline–2–carboxalidine–L–histidine and 3–hydroxyquinoxaline–2–carboxalidine–2–aminothiophenol. They provide great structural diversity during complexation. To the best of our knowledge, the transition metal complexes of quinoxaline based Schiff bases are poorly utilised in academic and industrial research.

The thesis is divided into seven chapters. Chapter 1 gives a general introduction to the topic of research carried out. Chapter 2 provides the details about experimental techniques used in the current study and the synthesis of the aldehydes. Chapters 3-6 deal with the synthesis and characterization of new quinoxaline based Schiff bases and their complexes. We could isolate single crystals of two complexes. The single crystal XRD of these complexes has been carried out. The results show that the molecules exhibit a two dimensional layer like structure and similar complexes are promising building blocks for supramolecular architectures. For all the other complexes, analytical and spectroscopic data have been used to arrive at the tentative structure of the complexes. We hope that similar type of layer like structures may exist for these complexes also. Chapter 7 deals with the studies on the application of the

synthesized complexes as catalyst towards few oxidation reactions. There is a current interest in developing catalysts with high activity and selectivity for the oxidation of organic compounds. We have studied the catalytic activity of the synthesized complexes in phenol hydroxylation, cyclohexane oxidation and benzyl alcohol oxidation using the environmentally friendly oxidant hydrogen peroxide. Benzyl alcohol oxidation was carried out in solvent free condition aiming at a greener reaction. We hope that the studies presented in the thesis would be useful to those working in the field of metal complex based catalysis in industries and academia.