Preface

Werner’s Chemistry now enjoys a prominent place in the wide spectrum of natural as well as applied sciences as it is incessantly involved in the quest of exploring and unveiling newer and newer frontiers. The driving force of this development is the recognition of the interdisciplinary nature of the subject as in bioinorganic chemistry, biomimetic chemistry and so on. This thesis stems from the growing interest to understand the versatility in the coordination properties of transition metals with different ligand environments. The diversity in structures and extended delocalization exhibited by the transition metal complexes of heterodentate ligands have resulted in unravelling the modes of action of metalloenzymes, development of metallocycles, tuning of variable valency of the metal via ligand control of reduction potentials etc. Custom design of complexes with organic chelating ligand systems and comprehension of their structures have contributed much to newly emerging areas.

The work embodied in the thesis was carried out by the author in the Department of Applied Chemistry during the period 2005-2011. The work presented in this thesis describes the synthesis, structural and spectral characterization of ring incorporated thiosemicarbazones of 2,6-diacylpyridine and their transition metal complexes. Chapter 1 offers a conceptual framework of thiosemicarbazones and their transition metal complexes with an extensive literature survey relating the history, stereochemistry, applications and recent developments. Various instrumental techniques like CHN analysis, infrared, electronic spectra and X-ray diffraction studies used in the study are discussed in this chapter. Chapter 2 deals with the design, syntheses and characterization of the ligand systems. 2,6-Diacetylpyridine bis(thiosemicarbazone) and its ring incorporated derivatives at both arms were the ligand systems. A morpholine ring incorporated monothiosemicarbzone was also included in the study.
First row transition metal complexes were mainly included in this study, though some cadmium complexes also were studied. Chapter 3 describes the syntheses and characterization of manganese(II) complexes. Chapter 4 comprises of the syntheses and characterization of iron(III) complexes. Chapter 5 deals with the syntheses and characterization of nickel(II) complexes. Chapter 6 explains the syntheses, structure and characterization of copper(II) complexes. Chapter 7 delineates the syntheses, structures and characterization of zinc(II) complexes. Chapter 8 portrays syntheses and characterization of cadmium(II) complexes. Studies on fluorescence activity of one of the cadmium complexes are included in this chapter. The thesis ends with a concluding chapter which sums up the important revelations of the previous chapters.