

PREFACE

I started the research work presented in this thesis entitled “**Novel Transition Metal Complexes of Some β -cyclodextrin based Polydentate Ligands : Synthesis and Physico-Chemical Characterization**” in the year 2014 under the supervision of Prof. Biswajit Sinha in the Department of Chemistry, University of North Bengal, India. It is well known that transition metal ions play vital roles in a number of biological processes. The metal ions with biologically active ligands are a subject of considerable interest due to their numerous applications as antitumor, antibacterial and antifungal agents and functionalized β -cyclodextrins have been studied extensively over the years due to their selectivity towards various transition metal ions and for their water solubility. They may act as polydentate ligands for complexation with different transition metal ions like Mn(II), Ni(II), Cu(II), Co(II), Fe(III), Zn(II) and Pd(II), *etc.*

Of late, functionalized β -cyclodextrins have drawn much interest in the context of green synthesis and catalysis, *etc.* Their merit lies in the ease with which their properties can be tuned by varying coordination sites through substitutions of the hydroxyl group of β -cyclodextrin. Catalytic utilization of the transition metal complexes prepared by these tunable ligands is very promising. Suitable changes of the steric or electronic environment about the metal complexes can have a dramatic influence on their physico-chemical properties. Metal complexes of β -cyclodextrin based polydentate ligands are favorite catalysts for their easy recovery process in a series of chemical transformations such as olefin metathesis, hydrogenation, hydroformylation, Negishi cross-coupling reaction, Heck reaction, Suzuki coupling reactions, *etc.* Therefore studies on the β -cyclodextrin based polydentate ligands and their transition metal complexes is quite interesting from the point of view: their stability, geometry, biological activity and potential applications in many fields.

The present dissertation focused on the synthesis, physico-chemical characterization and their potential applications of water soluble metal complexes of β -cyclodextrin based polydentate ligands.