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**Title of Thesis:** "Synthesis, Spectral, Thermal and Biological Investigations of Coordination Polymers Containing Transition Metal Ions"

### **Abstract**

This Ph.D. thesis has been divided into seven chapters.

**Chapter-1:** This chapter involves a brief introduction of Coordination polymers, its classification and historical development. Some metal containing polymers are explained in detail including historical progress and examples. Major applications of coordination are also described in this chapter. In addition the anti-microbial coordination polymers also described here.

**Chapter-2:** This chapter introduces the techniques used to identify and characterize all the newly synthesized coordination polymers. Techniques described in this chapter are: Elemental analysis, IR spectroscopy,  $^1\text{H-NMR}$  spectroscopy, Electronic spectra & magnetic moment, Thermogravimetric analysis, Antimicrobial activity.

**Chapter-3:** This chapter describes the synthesis, characterization and biological investigation of coordination polymers derived from Salicylic acid and Anthranilic acid with Mn(II), Co(II), Ni(II), Cu(II), and Zn(II) metal ions.

**Chapter-4:** This chapter concerns with the synthesis, characterization and antimicrobial activity of newly developed coordination polymers, synthesized by the reaction of polymeric Schiff bases with metal salts of Mn(II), Co(II), Ni(II), Cu(II) and Zn(II) acetates.

**Chapter-5:** In chapter five, Monomeric Schiff base derived from salicylaldehyde and o-phenylenediamine/p-phenylenediamine, which

was subjected to polycondensation reaction with formaldehyde and piperazine/barbituric acid in basic medium. The ligands were found to form polymer metal complexes readily with Mn(II), Co(II), Ni(II), Cu(II) and Zn(II) metal ions.

**Chapter-6:** This Chapter consist of a new class of polymeric Mannich base and Schiff base and its use as potential Mannich base and Schiff base in the preparation of manganese(II), cobalt(II), nickel(II), copper(II) and zinc(II) complexes.

All the synthesized compounds in chapter 3 to 6 have been characterized by the techniques as described in chapter 2. The results revealed that polymer metal complexes are much more thermally stable than their parent ligand. Similarly the antimicrobial activity results revealed that coordination of metal enhances the antimicrobial nature of the compounds.

**Chapter-6:** This chapter briefly describes the future research directions based on the work presented in chapters 3 to chapter 6.