ABSTRACT

Title	**Synthesis, characterization and biological activity of polymeric chelates of some transition metal ions**
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Subject/ Area	**Chemistry /Material Science**

Nothing is immortal except words and for making myself in unison with immortality; I present a thesis to the world entitled **"Synthesis, characterization and biological activity of polymeric chelates of some transition metal ions**" and contain eight chapters.

Chapter-1 involves a general introduction of coordination polymers and their classification on the basis of their preparation. This chapter also includes the possible applications of coordination polymers such as catalytic activity, porosity and zeolitic-like behavior, chirality, conductivity, luminescence, magnetism, spin-transition behavior, non-linear optics (NLO) and ion exchanger. In addition, biodegradable and antimicrobial activity of coordination polymers also described here. From chapter-2 to chapter-7 we have discussed the synthesis of polymeric ligands and polymeric Schiff bases by using different monomer units having reactive functional groups. The polymeric ligands and polymeric Schiff bases were found to form polymer metal complexes readily with

Mn(II), Co(II), Ni(II), Cu(II) and Zn(II) metal ions. All the synthesized materials were characterized by elemental analysis, spectral studies (IR, ^{1}H-NMR, ^{13}C-NMR and UV-visible), magnetic moment measurements and thermal analysis. Electronic spectra and magnetic moment values reveal that the polymer metal complexes of Mn(II), Co(II), and Ni(II) are octahedral due to the coordination of two water molecules while polymer metal complexes Cu(II) and Zn(II) were square planar and tetrahedral respectively. The ligand field parameters (10 Dq), the interelectronic repulsion parameter (B) and nephelauxetric parameter (β), have been calculated for polymer metal complexes of Mn(II), Co(II) and Ni(II). The thermogravimetric analysis data indicated that all the polymer metal complexes were more thermally stable than the corresponding polymeric ligands and polymeric Schiff bases. The antibacterial activities of all the synthesized polymers were investigated against various selected microorganisms by using agar diffusion method and shaking flask method where a 100mg/mL concentration is used in agar diffusion method and 30mg/mL concentrations of each compound were tested against 10^{5} CFU/mL bacteria solutions in shaking flask method. The number of viable bacteria was calculated by using the spread plate method on agar plates and the number of viable bacteria was counted after 24 h of incubation period at 37^{0}C. The results of antimicrobial activity revealed that all the polymer metal complexes show good antimicrobial activity than their parent ligands and polymer complex of Cu(II) show excellent antimicrobial activity than other polymer metal complexes due to its high stability constant.

Chapter-8 briefly describes the future research directions based on the work presented in chapters 3 to chapter 7.