ABSTRACT

The present thesis contains three main chapters. These chapters are introduction, experimental and results and discussion.

- **Chapter (I):** represents a literature survey on the materials related to the plane of research.
- **Chapter (II):** includes the methods of preparation as well as the instrumentation and techniques used.
- **Chapter (III):** contains the data obtained and their discussion.

Different types of chelating resins were synthesized and used in the removal of heavy metal ions from solutions using batch and column methods.

In this work we synthesized three aminated chelating resins derived from copolymer of glycidyl methacrylate (GMA) with the following:

a) With o-phenylene diamine (o-PhDA) to prepare chelating resin (XXXII).
b) With o-aminophenol (o-APh) to prepare chelating resin (XXXIII).
c) With 4-amino antipyrine (4aapy) to prepare chelating resin (XXXIV).

The different factors affecting the metal ions Uptake of these chelating resins such as pH, concentration of metal ions, treatment time, rate constant, ionic radius and type of chelating resins were studied.

Different metal ions (Hg^{2+}, Cd^{2+}, Pb^{2+}, Cu^{2+}, Zn^{2+}, Mn^{2+}, Co^{2+} and Ni^{2+}) were adsorbed on these chelating resins at different pH values, the data obtained showed that. Generally, the Uptake of metal ions increases with

increasing pH. The optimum pH values for Uptake of different metal ions occur in the range 4.3-6.0 depending on the metal ion used. The sorption capacity was found between 0.7 and 3.4 mmol/g resin at initial concentration of (0.005 M) and optimum pH.

The Uptake of metal ions on these chelating resins was carried out at different concentration of metal ions and the result obtained showed that the Uptake of metal ions increases with increasing concentration to reach the equilibrium state. The optimum concentration values for Uptake of different metal ions occur in the range 0.01-0.04M depending on the metal ion used. The sorption capacity was found between 0.76 and 6.0 mmol/g resin at optimum pH.

Also, we found that the Uptake of metal ions of these chelating resins increase with decrease of ionic radius of metal ions.

The Uptake of metal ions on these chelating resins was carried out at different durations, and the results obtained show that, the Uptake of metal ions increases with increasing treatment duration to reach the equilibrium state.

The chelating resins was highly effective for the Uptake of metal ions by batch and column methods, and the rate of capacity increased as the following rate:

Chelating resin XXXIV > chelating resin XXXII > chelating resin XXXIII

Removal of metals from the resins was successfully performed with 2 M HNO_3 solution and the resins could be used repeatedly. The practical applicability of the chelating resin for the final stage of waste water treatment is recommended, for use as a polishing agent.