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ION EXCHANGE PROPERTIES OF COPOLYMER RESIN DERIVED FROM PHTHALIC ACID, THIOSEMICARBAZIDE AND FORMALDEHYDE

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ABSTRACT:
A novel chelating terpolymer resin has been synthesized through the copolymerization of phthalic acid and thiosemicarbazide with formaldehyde in 2:1:3 mole ratio using hydrochloric acid as a reaction medium by condensation technique. The synthesized copolymer resin was characterized by UV-visible, FTIR, proton. NMR spectroscopy. On basis of the spectral studies, the structure of the copolymer resin was proposed. The physico-chemical parameters have been evaluated for the copolymer resin. Non-aqueous conductometric titration was used to determine the average molecular weight and polydispersity of the PTF-II copolymer resin and the intrinsic viscosity was also determined. The semicrystalline nature of the synthesized copolymer was established by scanning electron microscopy (SEM). Copolymer synthesized is proved to be selective chelating ion exchange copolymer resin for certain metals. chelating ion exchange properties of this polymer was studied for Fe^{3+}, Cu^{2+}, Cd^{2+}, Zn^{2+}, Ni^{2+} and Pb^{2+} ions. A batch equilibrium method was employed in the study of the selectivity of the distribution of a given metal ions between the polymer sample and a solution containing the metal ion. The study was carried out over a wide pH range and in a media of various ionic strengths.

Keywords :- Synthesis, Condensation, characterization, structure, viscosity, ion exchange.

INTRODUCTION :

Currently industrial pollution is major concern because of industrial waste includes heavy metals, often contained in the wastewater. When these metals release into the environment can cause severe damage to the human body, including accumulative poison, brain damage, and cancer [1]. Several processes were accessible for heavy metal removal, including chemical precipitation, membrane, and retention technique [2]. Ion-exchange process was found to be an effective technique to separate the selective metal ions from wastes. Ion-exchange resins are polymers that can reversibly interchange the counter ions. The resins are organized into. two main types depending upon the charge of the counter ions with which they can exchange. The cationic exchangers which interchange the positively charged ion and the anionic exchange resin interchanges the negatively charged ion due to the existence of the positively ionisable group. Polymeric resin was synthesized and reported for its ion-exchange characteristics towards selective metal ions. Ion-exchanger may be defined as the reversible exchange of ions between the substrate and medium. Many copolymers are now being synthesized with reactive groups, tested and used not only for the macromolecular properties but also for the properties of functional groups. These functional groups provide an approach to a subsequent modification of the copolymers for specific end application . The literature survey reveals that Khobragade and co-workers studied the interaction of heavy metal ions and chelating ion-exchange resin containing phthalic acid [3]. The resin has good selectivity to exchangeable adsorption of heavy metal ions indicating Cu (II), Hg (II), Pb (II) and Mg (II) at

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