Abstract No: MR-01

Sorption studies of metal ions by formaldehyde-based ion-exchange resins derived from anthranilic acid, salicylic acid and catechol

S. Arasaretnam* and U. P. D Jayarathna

Department of Chemistry, Eastern University, Sri Lanka
s_arasaretnam@yahoo.co.uk*

Polymeric chelating ion exchange materials open a wide range of opportunities in industrial, environmental and biological applications owing to their metal ion-exchange selectivity and low cost of production and easy regeneration. Formaldehyde based two terpolymeric resins [Anthranilic acid- Catechol-Formaldehyde (ACF) and Salicylic acid- Catechol-Formaldehyde (SCF)] have been synthesized by condensing anthranilic acid with catechol and salicylic acid with catechol at 80 ± 5 ºC using Dimethylformamide (DMF) as a solvent. The main aim of this research was synthesis and comparative ion exchange study of newly synthesized formaldehyde-based ion-exchange resins, which derived from anthranilic acid, salicylic acid and catechol. The present abstract deals with synthesis and comparative ion exchange study of newly synthesized resin obtained by formaldehyde-based ion-exchange resins derived from anthranilic acid, salicylic acid and catechol. The resins were characterized by spectral analysis using Fourier-Transformed Infrared (FTIR) spectroscopy. The physico-chemical properties of the resins have been studied. Melting points of both resins were mostly high and that indicates the polymer resins under study are thermally stable up to high temperature. The exchange behavior of various metal ions viz. Cd^{2+}, Cr^{3+}, Ca^{2+} and Mg^{2+} towards synthesized resins have been studied depending on contact time and pH. Chelating properties of the two resins were pH dependent and an increase in pH value from 1 to 5 the exchange capacity of metal ions was increased. Sorption studies of ACF resins suggest that the ion exchange order of metal ions is time dependent. The order of the exchange capacity is: $Cd^{2+} > Ca^{2+} > Mg^{2+} > Cr^{3+}$. ACF is more suitable for the removal of hardness from water when compared to the SCF. SCF is a better chelating resin for the removal of heavy metal. The recovery of the metals from industrial effluents indicates the utilization potential of the synthesized resin for wastewater treatment.

Keywords: Terpolymeric resins, Exchange capacity, Chelating properties, Wastewater, Adsorbents