Materials Today: Proceedings 60 (2022) 1814–1818

Contents lists available at ScienceDirect

Materials Today: Proceedings

Journal homepage: www.elsevier.com/locate/matpr

Synthesis and chelate ion exchange properties of copolymer resin: 8-hydroxyquinoline-5-sulphonic acid-catechol-formaldehyde

Dr. Shailesh K. Mandavgade [a,*], Dr. Wasudeo B. Gurnule [b]

[a] Assistant Professor, Chemistry Department, G. H. Raisoni Institute of Engineering and Technology, Nagpur-16, MS, India
[b] Professor, Chemistry Department, Kamla Nehru Mahavidyalaya, Nagpur-09, MS, India

ARTICLE INFO

Article history:
Available online 10 January 2022

Keywords:
Spectra
Copolymer
Ion exchange
Time interval
Electrolyte
Batch equilibrium

ABSTRACT

The sample 8-hydroxyquinoline-5-sulphonic acid-catechol-formaldehyde has been organized by using the condensation of 8-HQ-5-SACF-catechol-formaldehyde in the presence of (1:1:2M) ratios and in 2M HCl. The resin become categorised by using UV-seen, IR and proton NMR spectral research to show the structure. The copolymer resin has showed to be a discerning chelate ion alternate resin for a few metals. Chelate ion trade properties of this sample were experimented for the metals as copper, cobalt, nitrate, zinc and lead in exclusive with electrolyte concentrations, time durations and wide pH variety become delivered out by means of batch equilibrium approach. The above resin displays higher selectivity for copper and nitrate metals ions than for cobalt, zinc and lead metal ions. The measurement of distribution as a pH character determines amount of metals absorption by copolymer increases with increasing local pH.

Selection and peer-review under responsibility of the scientific committee of the International Conference on Latest Developments in Materials & Manufacturing.

1. Introduction

The ion-exchange method plays an important function in the extraction of tracking metals, removal of uncommon earths, the separation of impurities, industrial segments and the process of cleaning and concentrating. Synthetic resins are widely used as ion-exchanger because their properties can be converted into specific applications such as water purification and selective removal of waste from nuclear plants [1,2].

Ion-exchange has acquired unit operating conditions in the chemical industry and significantly altered functions such as distillation extraction and other common separation methods. These resins have concerned much interest in latest years because of their versatile use especially in wastewater purification, metal healing and the identification of unique metal ions [3,4]. Manavalan and colleagues [5] developed terpolymers (salicylic acid - thiourea - trioxane), proving that they can choose ion-change resins for solid metals. Nandekar and colleagues [6] demonstrated selective ion exchange resins (salicylic acid-thiosamicrazide-formaldehyde) over specific metal ions over a wide pH range and varying ionic strengths. The resin terpolymer (ASF) from anthranilic-salicylic acid-formaldehyde with glacial acetic acid become synthesized and characterized via Abdul R Burkanudeen and coworkers [7]. Karunakaran et al. [8] turned into synthesized resin RTF-1 through the condensation of resorcinol-thiourea-formaldehyde with 2M hydrochloric acid as catalyst was studied ion exchange properties to certain metal ions like Fe^{3+}, Co^{2+}, Ni^{2+}, Cu^{2+}, Zn^{2+}, Pb^{2+}, and Cd^{2+}. Therefore ion-exchange is extensively used within the food and beverage hydrometallurgical, metals finishing, chemical substances and petrochemical, sugar, sweeteners prescription drugs, ground and drinkable water, nuclear, softening and business water, semiconductor, energy and a number of other business. The synthesized copolymer resin is located in the same area as the cation exchanger, which contains two groups (ion-exchange and chelating groups). Hence ion-exchange properties of the resin 8-HQ-5-SACF were specified by certain metals.

2. Experimental

2.1. Materials

The chemicals 8-hydroxyquinoline-5-sulphonic acid and catechol were found purified form with distilled air. HCHO (37%) was

* Corresponding author.
E-mail address: skmandavgade@gmail.com (Dr. Shailesh K. Mandavgade).

https://doi.org/10.1016/j.matpr.2021.12.494
2214-7853/
Selection and peer-review under responsibility of the scientific committee of the International Conference on Latest Developments in Materials & Manufacturing.