

Accepted Manuscript

Transport hindrances with electrodialytic recovery of citric acid from solution of strong electrolytes

Anusha Chandra, Jogi Ganesh Dattatreya Tadimetri, Sujay Chattopadhyay

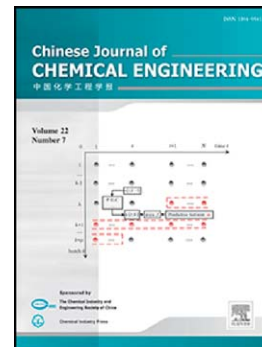
PII: S1004-9541(17)30287-2
DOI: doi:[10.1016/j.cjche.2017.05.010](https://doi.org/10.1016/j.cjche.2017.05.010)
Reference: CJCHE 831

To appear in:

Received date: 6 March 2017
Revised date: 9 May 2017
Accepted date: 24 May 2017

Please cite this article as: Anusha Chandra, Jogi Ganesh Dattatreya Tadimetri, Sujay Chattopadhyay, Transport hindrances with electrodialytic recovery of citric acid from solution of strong electrolytes, (2017), doi:[10.1016/j.cjche.2017.05.010](https://doi.org/10.1016/j.cjche.2017.05.010)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Separation Science and Engineering

Transport hindrances with electrodialytic recovery of citric acid from solution of strong electrolytes

Anusha Chandra, Jogi Ganesh Dattatreya Tadimeti, Sujay Chattopadhyay*

Department of Polymer and Process Engineering, IIT Roorkee Saharanpur Campus, Saharanpur-247001, India

* Sujay Chattopadhyay: sujayfpt@iitr.ac.in; sujay1999@gmail.com;

Abstract:

Electrodialytic (ED) recovery of citric acid (CA) in presence/absence of strong electrolytes (NaCl, CaCl₂ and FeCl₃) was separately analyzed under different process conditions. Recovery effectiveness was quantitatively estimated from current efficiency values. Efficiency attained optimum value with both flow rate and potential applied, while a monotonic rise was noted with temperature which got lowered beyond 0.1 mol·L⁻¹ feed concentration. 40% drop in efficiency was recorded in presence of strong electrolytes (NaCl, CaCl₂ and FeCl₃) in feed relative to their presence in concentrate. Severe transport hindrance and efficiency loss were attributed to adsorption and allied physicochemical changes occurred with anion/cation exchange membranes (AEM/CEM) and these were confirmed through contact angle/Chronopotentiometry/AFM/EDX. Sluggish potential rise (Galvanostatic mode) in Chronopotentiometric analysis indicated diffusion limiting transport of organic acids influenced AEM resistance. XRD and EDX analysis indicated the presence of salt hydrates/ions (Ca²⁺/Fe³⁺) over CEM justifying the resistance buildup due to adsorption of multivalent metal ion(s) and salts.

Keywords: Electrodialysis, Adsorption, Electrolytes, Recovery, Chronopotentiometry, AFM

Download English Version:

<https://daneshyari.com/en/article/6593109>

Download Persian Version:

<https://daneshyari.com/article/6593109>

[Daneshyari.com](https://daneshyari.com)