

Author's Accepted Manuscript

Numerical simulation of ionic transport processes through bilayer ion-exchange membranes in reverse electro dialysis stacks

A.A. Moya



PII: S0376-7388(16)31828-2
DOI: <http://dx.doi.org/10.1016/j.memsci.2016.11.051>
Reference: MEMSCI14891

To appear in: *Journal of Membrane Science*

Received date: 3 October 2016
Revised date: 15 November 2016
Accepted date: 20 November 2016

Cite this article as: A.A. Moya, Numerical simulation of ionic transport processes through bilayer ion-exchange membranes in reverse electro dialysis stacks *Journal of Membrane Science*, <http://dx.doi.org/10.1016/j.memsci.2016.11.051>

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 galley proof before it is published in its final citable 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

**Numerical simulation of ionic transport processes through bilayer ion-exchange
membranes in reverse electro dialysis stacks**

A.A. Moya

Departamento de Física, Universidad de Jaén, Spain.

aamoya@ujaen.es

Abstract

The effect of the inhomogeneity degree in the fixed-charge distribution of a bilayer ion-exchange membrane under reverse electro dialysis conditions on the voltage-current characteristic and the power transferred to the load has been numerically studied on the basis of the Nernst-Planck-Donnan equations under electrical neutrality conditions in the Teorell-Meyer-Sievers model. The open circuit voltage, the internal resistance under short circuit current and the maximum power transferred to the load have been analysed for different values of the average fixed-charge concentration inside the membrane, the inhomogeneity degree of the membrane and the thickness of the DBLs. This thickness and the fluid flow velocity inside the intermembrane channels are related by numerically solving a 2D diffusion-convection problem, using a parabolic velocity profile, in the limiting current regime. The obtained results have been also related to those characterizing the permselectivity of the membranes by means of the current efficiency.

Keywords: Reverse electro dialysis / Renewable energy / Concentration polarization / Bilayer membranes / Ion-exchange membranes

1. Introduction

Nowadays, theoretical studies on selective transport of ions through membranes are

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات