Investigation on the application of polysulfone-based bipolar membrane for desalination of water

Krishnaveni Venugopal, Sangeetha Dharmalingam*

Department of Mechanical Engineering, Anna University, Guindy, Chennai 600025, Tamil Nadu, India
Tel. +91 44 2235 7763; email: sangeetha@annauniv.edu

Received 19 August 2013; Accepted 31 December 2013

ABSTRACT

The present paper focuses on the application of a novel and green separation technology, (i.e.) bipolar membrane (BPM) electrodialysis process, in a laboratory scale for seawater treatment using polysulfone (PSu) based synthesized membranes and a commercial membrane based on polystyrene divinyl benzene. All the experiments performed for both the groups were under similar conditions. This study was designed to evaluate the efficiency of the synthesized BPMs using pH, TDS, and conductivity changes in the acid and base compartments. From the stack performance, it was observed that the synthesized membranes showed a greater current efficiency (21.5%) and transport number of ions (0.143) than commercial membranes (10.7% and 0.0714). Analysis of the experimental results suggested that the PSu-based system exhibited higher performance efficiency than the commercial-based systems. This was further confirmed by the analysis of acid/base production, water dissociation flux, and other associated parameters.

Keywords: Acid/base production; Bipolar membrane electrodialysis; Conductivity change; Water dissociation efficiency

*Corresponding author.

1944-3994/1944-3986 © 2014 Balaban Desalination Publications. All rights reserved.