

Accepted Manuscript

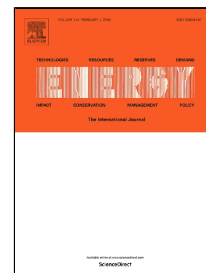
Reverse electrodialysis: modelling and performance analysis based on multi-objective optimization

Rui Long, Baode Li, Zhichun Liu, Wei Liu

PII: S0360-5442(18)30395-5
DOI: 10.1016/j.energy.2018.03.003
Reference: EGY 12461
To appear in: *Energy*
Received Date: 13 April 2017
Revised Date: 27 February 2018
Accepted Date: 01 March 2018

Please cite this article as: Rui Long, Baode Li, Zhichun Liu, Wei Liu, Reverse electrodialysis: modelling and performance analysis based on multi-objective optimization, *Energy* (2018), doi: 10.1016/j.energy.2018.03.003

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.



Reverse electrodialysis: modelling and performance analysis based on multi-objective optimization

Rui Long*, Baode Li, Zhichun Liu, and Wei Liu*

School of Energy and Power Engineering, Huazhong University of Science and Technology, 1037 Luoyu Road, Wuhan 430074, China

*Corresponding authors:

Tel: +86-27-87542618

Fax: +86-27-87540724

E-mail addresses: r_long@hust.edu.cn (R. Long), w_liu@hust.edu.cn (W. Liu)

Abstract

In this paper, we proposed a refined model to describe the RED process by considering the variation of flow rates along the flow direction, and the concentration depended density and viscosity. The model was verified by good accordance between the calculated and experimental measured data. For evaluating the performance of a RED stack for some special applications, the net power density and the energy efficiency are two main criteria. However, they could not achieve their maximum values simultaneously. To achieve such a compromise, an optimization based on Non-dominated Sorting Genetic Algorithm II (NSGA-II) was conducted. Besides, the net power output and energy efficiency under single-objective optimization methods were calculated and compared. Results revealed that compared to the results under the maximum net power density, the net power density under the multi-objective optimization is slightly less than the maximum one, meanwhile the energy efficiency was much greater. The performance under the multi-objective optimization exhibited no obvious disadvantage against that under the maximum energy efficiency, considering the significant increase of the net power density.

Keywords: Reverse electrodialysis (RED); Modeling; multi-objective optimization; Power density; Energy efficiency

Download English Version:

<https://daneshyari.com/en/article/8071733>

Download Persian Version:

<https://daneshyari.com/article/8071733>

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