Petrochemistry-2013

OMICS Group Conferences
Accelerating Scientific Discovery

World Congress on
Petrochemistry and Chemical Engineering

November 18-20, 2013 Hilton San Antonio Airport, USA

Developing a mechanistic transport model for electrodialysis reversal process

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Abstract

Technologies that were originally developed to desalinate water are widely applied to remove salt from water supplies. Of the several available desalination technologies Reverse Osmosis is most widely used in the United States. This presentation reviews the existing models of Reverse Osmosis and tries to develop a novel mechanistic transport model for electrodialysis Reversal process using the existing fundamental Reverse Osmosis model. Transport models relate fluxes through the active layers to driving forces and provide mechanistic descriptions of how material travels from one side of the membrane to the other. The assumption on the applicability of the electrodialysis Reversal has become a very popular method for water purification. The major advantage of the process is the reversal feature of this system which controls membrane scaling with no chemical addition. The non-mechanistic models are not very useful for optimizing separations based on membrane structure. Mechanistic modeling makes use of fundamental laws to build a description of processes, i.e. equations of continuity. Mechanistic transport models may be used to predict how a particular membrane will perform in a new process, or may help development of new membranes. Development of a reliable membrane transport model for describing mass transport processes in Electrodialysis Reversal is a highly desirable goal since not only does this allow the analysis of performance characteristics of a membrane, but this can also assist in the design of new membranes.

Biography

Azadeh Ghorbani is currently a PhD student at New Mexico State University in institute of Energy and Environment (IEE) working on advanced water treatment technology. As a PhD student in Chemical Engineering, she is focusing on specifics of transport through the membrane. She had a Practical experience (Internship) at Research Institute of Petroleum Industry (RIPI), Tehran, Iran, summer 2006. She has published 2 papers in Journal of Natural Gas and Engineering and 4 poster presentation in water and membrane area.