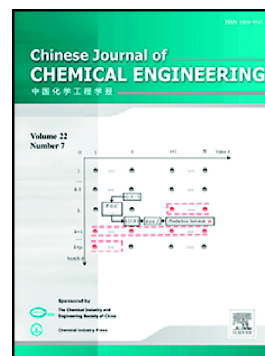


Accepted Manuscript

A sensitivity analysis and multi-objective optimization to enhance ethylene production by oxidative dehydrogenation of ethane in a membrane-assisted reactor

Ali Darvishi, Ali Bakhtyari, Mohammad Reza Rahimpour



PII: S1004-9541(17)31100-X
DOI: doi:[10.1016/j.cjche.2018.02.036](https://doi.org/10.1016/j.cjche.2018.02.036)
Reference: CJCHE 1121

To appear in:

Received date: 26 August 2017
Revised date: 11 December 2017
Accepted date: 19 February 2018

Please cite this article as: Ali Darvishi, Ali Bakhtyari, Mohammad Reza Rahimpour , A sensitivity analysis and multi-objective optimization to enhance ethylene production by oxidative dehydrogenation of ethane in a membrane-assisted reactor. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Cjche(2018), doi:[10.1016/j.cjche.2018.02.036](https://doi.org/10.1016/j.cjche.2018.02.036)

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.

Catalysis, kinetics and reaction engineering

A Sensitivity Analysis and Multi-Objective Optimization to Enhance Ethylene Production by Oxidative Dehydrogenation of Ethane in a Membrane-Assisted Reactor

Ali Darvishi, Ali Bakhtyari, Mohammad Reza Rahimpour¹

Department of Chemical Engineering, Shiraz University, Shiraz 71345, Iran

Abstract

Owing to the importance of process intensification in the natural gas associated processes, the present contribution aims to investigate the production of an important natural gas downstream product in an improved system. Accordingly, a membrane-assisted reactor for the oxidative dehydrogenation of ethane is presented. The presented system includes a membrane for axial oxygen dosing into the reaction side. Such a strategy would lead to optimum oxygen distribution along the reactor length and prevention of hot spot formation as well. A feasibility study is conducted by developing a validated mathematical model composed of mass and energy balance equations. The effects of various operating variables are investigated by a rigorous sensitivity analysis. Then, by applying the genetic algorithm, a multi-objective optimization procedure is implemented to obtain the optimum operating condition. Considerable increase in the ethane conversion and ethylene yield are the advancements of membrane-assisted oxidative dehydrogenation reactor working under the optimum condition. More than 30 % increase in the ethane conversion is obtained. Furthermore, the ethylene yield is enhanced up to 0.45.

¹ Corresponding author. E-mail address: rahimpour@shirazu.ac.ir (Prof. M. R. Rahimpour)

Download English Version:

<https://daneshyari.com/en/article/11021432>

Download Persian Version:

<https://daneshyari.com/article/11021432>

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