Accepted Manuscript

Bifurcation Analysis of Methane Oxidative Coupling without Catalyst

Zhe Sun, Arun Kota, Sagar Sarsani, David H. West, Vemuri Balakotaiah

PII:	\$1385-8947(18)30185-2
DOI:	https://doi.org/10.1016/j.cej.2018.02.004
Reference:	CEJ 18483

To appear in: Chemical Engineering Journal

Received Date:25 November 2017Revised Date:31 January 2018Accepted Date:1 February 2018



Please cite this article as: Z. Sun, A. Kota, S. Sarsani, D.H. West, V. Balakotaiah, Bifurcation Analysis of Methane Oxidative Coupling without Catalyst, *Chemical Engineering Journal* (2018), doi: https://doi.org/10.1016/j.cej. 2018.02.004

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.

Bifurcation Analysis of Methane Oxidative Coupling without Catalyst

Zhe Sun¹, Arun Kota¹, Sagar Sarsani², David H. West²

and Vemuri Balakotaiah¹*

¹University of Houston, Houston, TX-77204, USA

²SABIC Technology Center, Sugarland, TX-77478, USA

January 29, 2018

Abstract

We present a detailed bifurcation analysis of methane oxidative coupling in the gas phase using a global kinetic model for the various oxidation, reforming and dehydrogenation reactions. The kinetic model satisfies the thermodynamic constraints and is validated with literature data as well as new data obtained under near isothermal conditions. It is used to determine the methane conversion and C_2 -products selectivity under various feed and operating conditions in large scale ideal adiabatic reactors. It is found that at higher CH_4/O_2 ratios (e.g. > 4), ignition and extinction points exist only at either high feed temperatures and/or space times, which may not be of practical interest. Autothermal operation on the ignited branch with feed at near ambient conditions (~ 300K and 1 bar) is feasible for practical range of space times (1 ms to 1 s) only for

^{*}Corresponding author: email: bala@uh.edu

Download English Version:

https://daneshyari.com/en/article/6579820

Download Persian Version:

https://daneshyari.com/article/6579820

Daneshyari.com