

Accepted Manuscript

Kinetics study for the oxidative dehydrogenation of ethyl lactate to ethyl pyruvate over MoVNbO_x based catalysts

Xueyuan Zhao, Chuanhui Zhang, Chen Xu, Hong Li, He Huang, Liang Song, Xuebing Li

PII: S1385-8947(16)30340-0
DOI: <http://dx.doi.org/10.1016/j.cej.2016.03.088>
Reference: CEJ 14939

To appear in: *Chemical Engineering Journal*

Received Date: 9 September 2015
Revised Date: 10 March 2016
Accepted Date: 20 March 2016

Please cite this article as: X. Zhao, C. Zhang, C. Xu, H. Li, H. Huang, L. Song, X. Li, Kinetics study for the oxidative dehydrogenation of ethyl lactate to ethyl pyruvate over MoVNbO_x based catalysts, *Chemical Engineering Journal* (2016), doi: <http://dx.doi.org/10.1016/j.cej.2016.03.088>



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.

Kinetics study for the oxidative dehydrogenation of ethyl lactate to ethyl pyruvate over MoVNbO_x based catalysts

Xueyuan Zhao^{a,b,#}, Chuanhui Zhang^{a,#}, Chen Xu^{a,b}, Hong Li^a, He Huang^{a,b}, Liang Song^{a,*}, Xuebing Li^{a,*}

^a Key Laboratory of Biofuels, Qingdao Institute of Bioenergy and Bioprocess Technology, Chinese Academy of Sciences, 189 Songling Road, Laoshan District, Qingdao, Shandong Province, P. R. China

^b University of Chinese Academy of Sciences, 19 Yuquan Road, Shijingshan District, Beijing 100049, P. R. China

[#] Xueyuan Zhao and Chuanhui Zhang contributed equally to this work as co-first authors.

^{*} Corresponding authors. E-mail addresses: lixb@qibebt.ac.cn (Xuebing Li), songliang@qibebt.ac.cn (Liang Song). Tel.: +86-532-80662757.

Abstract: Mo_{0.61}V_{0.31}Nb_{0.08}O_x and Mo_{0.61}V_{0.31}Nb_{0.08}O_x/TiO₂ catalysts were prepared for the oxidative dehydrogenation of ethyl lactate to ethyl pyruvate in a continuous fixed-bed reactor under atmospheric pressure. The transport effects and catalytic stability over Mo_{0.61}V_{0.31}Nb_{0.08}O_x/TiO₂ catalyst were investigated to ensure that the experimental results were not significantly influenced by interphase transportation and catalytic deactivation. Mo_{0.61}V_{0.31}Nb_{0.08}O_x/TiO₂ catalyst exhibited extremely higher conversion rate of ethyl lactate but relatively lower apparent activation energy in comparison with Mo_{0.61}V_{0.31}Nb_{0.08}O_x, indicating its superior catalytic activity beneficial from the good dispersion of active Mo_{0.61}V_{0.31}Nb_{0.08}O_x component on TiO₂ support. It was experimentally verified that the conversion rate of ethyl lactate was simply first-order dependence on the partial pressure of O₂ over Mo_{0.61}V_{0.31}Nb_{0.08}O_x/TiO₂. The analysis of elementary reaction steps and the derivation of reaction rate equation were performed based on typical Mars-van Krevelen (MvK) redox mechanism under the assumption that

Download English Version:

<https://daneshyari.com/en/article/6581898>

Download Persian Version:

<https://daneshyari.com/article/6581898>

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