

Accepted Manuscript

Title: Fischer-Tropsch Synthesis: Effect of CO Conversion on CH₄ and Oxygenate Selectivities over Precipitated Fe-K Catalysts

Authors: Wenping Ma, Wilson D. Shafer, Gary Jacobs, Jia Yang, Dennis E. Sparks, Hussein H. Hamdeh, Burtron H. Davis



PII: S0926-860X(18)30214-X
DOI: <https://doi.org/10.1016/j.apcata.2018.04.042>
Reference: APCATA 16648

To appear in: *Applied Catalysis A: General*

Received date: 29-11-2017
Revised date: 27-4-2018
Accepted date: 28-4-2018

Please cite this article as: Ma W, Shafer WD, Jacobs G, Yang J, Sparks DE, Hamdeh HH, Davis BH, Fischer-Tropsch Synthesis: Effect of CO Conversion on CH₄ and Oxygenate Selectivities over Precipitated Fe-K Catalysts, *Applied Catalysis A, General* (2018), <https://doi.org/10.1016/j.apcata.2018.04.042>

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.

Fischer-Tropsch Synthesis: Effect of CO Conversion on CH₄ and Oxygenate Selectivities over Precipitated Fe-K Catalysts

Wenping Ma,¹ Wilson D. Shafer,^{1,2} Gary Jacobs,^{1,3} Jia Yang,^{1,4} Dennis E. Sparks,¹ Hussein H. Hamdeh,⁵ and Burtron H. Davis^{1,*}

¹University of Kentucky, Center for Applied Energy Research, Lexington, KY 40511, USA.

²Health and Science Department, Asbury University, Wilmore, KY 40390

³Chemical Engineering Program – Department of Biomedical Engineering & Department of Mechanical Engineering, University of San Antonio, San Antonio, TX 78249

⁴ Department of Chemical Engineering, Norwegian University of Science and Technology, Trondheim, Norway

⁵ Department of Physics, Wichita State University, Wichita, KS 67260

* Corresponding author: tel: +1 (859) 257-0251; email: burtron.davis@uky.edu

Highlights

- CH₄ selectivity displayed an asymmetric “V” trend with CO conversion
- Adding K (x = 2+) suppressed the CO conversion effect on CH₄ formation
- Oxygenate selectivity was < 3% and was enhanced for K loadings up to x= 3
- K promoted CO adsorption and inhibited H adsorption

Abstract

The explanation for CH₄ selectivity for iron based Fischer-Tropsch catalysts in the low conversion region (i.e., < 50%) remains elusive. In this contribution, the CO conversion effect was carefully examined over four K promoted Fe catalysts (100 Fe/5.1Si/2Cu/ x K, where x = 1 – 5) over a wide range of CO conversion (i.e., 4 - 85%). Moreover, the effect of CO conversion on oxygenate selectivity of the Fe-K catalysts was carefully studied as well. The change in CH₄ selectivity with CO conversion was found to resemble asymmetric “V” shaped curves, with the minimum values occurring at approximately 50% CO conversion. Adding greater than x = 2 K significantly

Download English Version:

<https://daneshyari.com/en/article/6496660>

Download Persian Version:

<https://daneshyari.com/article/6496660>

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