

Accepted Manuscript

Highly dispersed Rh/Ce_{0.75}Zr_{0.25}O_{2-δ}-η-Al₂O₃/FeCrAl wire mesh catalyst for autothermal n-hexadecane reforming

T.B. Shoynkhorova, V.N. Rogozhnikov, P.A. Simonov, P.V. Snytnikov, A.N. Salanov, A.V. Kulikov, E.Y. Gerasimov, V.D. Belyaev, D.I. Potemkin, V.A. Sobyenin

PII: S0167-577X(17)31775-5
DOI: <https://doi.org/10.1016/j.matlet.2017.12.017>
Reference: MLBLUE 23515

To appear in: *Materials Letters*

Received Date: 1 December 2017
Revised Date: 4 December 2017
Accepted Date: 5 December 2017

Please cite this article as: T.B. Shoynkhorova, V.N. Rogozhnikov, P.A. Simonov, P.V. Snytnikov, A.N. Salanov, A.V. Kulikov, E.Y. Gerasimov, V.D. Belyaev, D.I. Potemkin, V.A. Sobyenin, Highly dispersed Rh/Ce_{0.75}Zr_{0.25}O_{2-δ}-η-Al₂O₃/FeCrAl wire mesh catalyst for autothermal n-hexadecane reforming, *Materials Letters* (2017), doi: <https://doi.org/10.1016/j.matlet.2017.12.017>

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.



Highly dispersed Rh/Ce_{0.75}Zr_{0.25}O_{2-δ}-η-Al₂O₃/FeCrAl wire mesh catalyst for autothermal n-hexadecane reforming

T.B. Shoynkhorova^{1,2}, V.N. Rogozhnikov¹, P.A. Simonov^{1,2,3}, P.V. Snytnikov^{1,2,3},
A.N. Salanov¹, A.V. Kulikov¹, E.Y. Gerasimov^{1,2}, V.D. Belyaev^{1,2,3}, D.I. Potemkin^{1,2,*},
V.A. Sobyenin^{1,*}

¹*Boreskov Institute of Catalysis, Pr. Lavrentieva, 5, Novosibirsk, 630090, Russia*

²*Novosibirsk State University, Pirogova St., 2, Novosibirsk, 630090, Russia*

³*UNICAT Ltd, Novosibirsk, 630090, Russia*

*Corresponding authors: potema@catalysis.ru and sobyenin@catalysis.ru

ABSTRACT

Highly dispersed Rh particles supported on Ce_{0.75}Zr_{0.25}O_{2-δ} mixed with alumina were prepared by sorption-hydrolytic deposition technique. Produced catalyst exhibited high activity in autothermal reforming of n-hexadecane, but suffered from coking. Structured Rh/Ce_{0.75}Zr_{0.25}O_{2-δ}-η-Al₂O₃/FeCrAl catalyst was prepared by strongly bound catalytic coating deposition onto metallic wire mesh to provide effective heat transfer and avoid coking. Rh/Ce_{0.75}Zr_{0.25}O_{2-δ}-η-Al₂O₃/FeCrAl showed excellent performance in n-hexadecane autothermal reforming providing 100 % conversion and stable operation for at least 12 h on stream without detection of any carbon deposits.

KEY WORDS Rhodium catalysts, Autothermal reforming, N-hexadecane, Diesel, Nanoparticles, Interfaces

1. INTRODUCTION

Nowadays, steam reforming (SR), autothermal reforming (ATR) and partial oxidation (PO) of diesel fuel towards syngas for solid oxide fuel cell (SOFC) feeding application are under extensive investigation [1]. Diesel is complex blends of several hundreds of C₁₀~C₂₄ hydrocarbons, including aromatic compounds [2]. A serious problem at diesel reforming to syngas is an accompanying undesired process of coke formation resulting both from the reactions on the catalyst surface and homogeneous thermocracking reactions producing light unsaturated hydrocarbons, such as ethylene [3]. Thus, the key issue in catalyst design is to diminish undesirable coke formation process. Rh-based systems supported onto oxide carriers with high lattice oxygen mobility were concluded to be the most efficient catalysts [4,5].

Diesel reforming catalysts require high intrinsic heat conductivity to provide uniform temperature distribution in the case of highly endothermic steam reforming and effective heat redistribution in the case of autothermal reforming (ATR) and partial oxidation. This could be

Download English Version:

<https://daneshyari.com/en/article/8015179>

Download Persian Version:

<https://daneshyari.com/article/8015179>

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