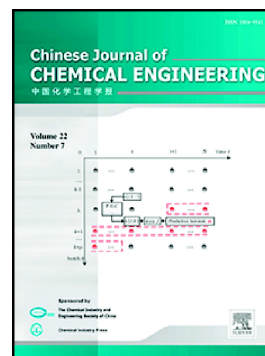


Accepted Manuscript

Experimental study of partially decoupled oxidation of ethane for producing ethylene and acetylene

Jiajia Luo, Jinfu Wang, Tiefeng Wang



PII: S1004-9541(17)31671-3
DOI: [doi:10.1016/j.cjche.2018.02.010](https://doi.org/10.1016/j.cjche.2018.02.010)
Reference: CJCHE 1050

To appear in:

Received date: 30 November 2017
Revised date: 18 February 2018
Accepted date: 26 February 2018

Please cite this article as: Jiajia Luo, Jinfu Wang, Tiefeng Wang , Experimental study of partially decoupled oxidation of ethane for producing ethylene and acetylene. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Cjche(2018), doi:[10.1016/j.cjche.2018.02.010](https://doi.org/10.1016/j.cjche.2018.02.010)

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.

Energy, Resources and Environmental Technology

Experimental study of partially decoupled oxidation of ethane for producing ethylene and acetylene

Jiajia Luo, Jinfu Wang, Tiefeng Wang*

Beijing Key Laboratory of Green Reaction Engineering and Technology

Department of Chemical Engineering, Tsinghua University, Beijing 100084, China

* Corresponding author: Tiefeng Wang. E-mail: wangtf@tsinghua.edu.cn

Abstract

With increasing amount of unconventional natural gas, the production of ethane, propane and other low alkanes continues to increase. In our previous works, a partially decoupled process (PDP) was proposed for conversion of ethane based on numerical simulations, which showed higher acetylene and ethylene selectivities than the original partial oxidation process. In the current work, the PDP of ethane for producing acetylene and ethylene was studied experimentally to verify the PDP concept. In the PDP of ethane, coke-oven gas or other cheap gas combusts with stoichiometric oxygen as heat carrier, and ethane is mixed with the heat carrier and undergoes pyrolysis at high temperatures. The jet-in-cross-flow (JICF) reactor was designed and manufactured to realize the PDP. A positioning device of 0.1 mm accuracy and a mass spectrometer were used to measure the spatial profiles of the species concentrations. The maximum combined yield (52.7%) of acetylene and ethylene was obtained even at the condition of heat loss, confirming that the PDP of ethane was advantageous over the partial oxidation process and at least comparable to the steam cracking process.

Keywords: Partial oxidation; Experimental validation; Pyrolysis; Ethane conversion; Partially decoupled process (PDP); Jet-in-cross-flow (JICF) reactor.

1. Introduction

With the successful application of horizontal well and fracturing technology, the production of shale gas continues to increase [1–3]. Different from conventional natural gas, the shale gas contains a considerable amount of hydrocarbons heavier

Download English Version:

<https://daneshyari.com/en/article/6592799>

Download Persian Version:

<https://daneshyari.com/article/6592799>

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