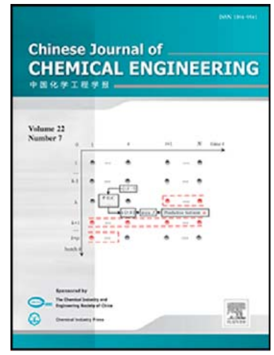
Accepted Manuscript



Improvement Potential Analysis for Integrated Fractionating and Heat Exchange Processes in Delayed Coking Units

Lei Yang, Zeng Danlin, Wang Guanghui

PII: S1004-9541(16)30349-4
DOI: doi: 10.1016/j.cjche.2016.04.038
Reference: CJCHE 540

To appear in:

Please cite this article as: Lei Yang, Zeng Danlin, Wang Guanghui, Improvement Potential Analysis for Integrated Fractionating and Heat Exchange Processes in Delayed Coking Units, (2016), doi: 10.1016/j.cjche.2016.04.038

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.

ACCEPTED MANUSCRIPT

Improvement Potential Analysis for Integrated Fractionating and Heat Exchange Processes in Delayed Coking Units*

LEI Yang, **ZENG Danlin**, **WANG Guanghui** **

School of Chemical Engineering and Technology, Wuhan University of Science and Technology, Wuhan 430081, Hubei, China

Abstract A novel diagram-based representation approach is developed to analyze the thermodynamic efficiency and identify quickly the promising energy-use improvement for integrated fractionating and heat exchange processes in delayed coking units. For considering temperature dependence of heat capacity and integrating fractionating and heat exchange processes, an advanced energy level composite curve is constructed by using the simulation results and a stepwise procedure. More accurate results of exergy analysis are obtained and the interaction between different components of the integrated system can be properly revealed in an integrated figure. Then the exergy calculation is performed to validate the performance of processes and to define the targets for improvement. The avoidable exergy destruction is also analyzed by applying the concepts of avoidable and unavoidable exergy destructions for the integrated system. In a case study for a Chinese refinery, the results reveal that the heat exchange between gas oil and deethanization gasoline is the most inefficient process with the highest retrofitting potential, and the lowest exergy efficiency of component in the integration system is only 29.4%. The improvement potential and exergy efficiency for the fractionator are 38.1% and 97.3%, respectively. It is obvious that the fractionator is not the most promising component for improvement.

Keywords energy level; exergy; avoidable exergy destruction; integrated system; distillation

ACCEPTED MANUSCRIPT

1 INTRODUCTION

Fractionating and heat exchange processes are commonly integrated system in refineries, such as complex fractionator and heat exchanger network (HEN) systems in delayed coking units (DCUs) [1]. Analysis and optimization of these energy integrated systems are mainly performed with mathematical modeling and thermodynamic analysis.

Received 2015-00-00, accepted 2015-00-00.

* Supported by the National Natural Science Foundation of China (21473126), the Specialized Research Fund for the Doctoral Program of Higher Education (20124219110002), China Postdoctoral Science Foundation (2015M582285).

** To whom correspondence should be addressed.

Download English Version:

https://daneshyari.com/en/article/4764313

Download Persian Version:

https://daneshyari.com/article/4764313

Daneshyari.com