Fluid Catalytic Cracking Fcc In Petroleum Refining

Petroleum Refinery Process Modeling
Fluid Catalytic Cracking
An Expert Guide to the Practical Operation, Design, and Optimization of FCC Units
Science and Technology
Concepts in Catalyst Design
Fluid Cracking Catalysts
Real-Time Optimization
Fluid Catalytic Cracking Handbook
Materials, Methods and Process Innovations
Fundamentals of Petroleum Refining
Octane-Enhancing Zeolitic FCC Catalysts
Hydroprocessing for Clean Energy
Fluid Catalytic Cracking
Modeling and Simulation of Fluid Catalytic Cracking (FCC) Riser
Integrated Optimization Tools and Applications
Fluid Catalytic Cracking Technology and Operations
Improving the Fluid Catalytic Cracking Unit in Term of Energy Consumption, a Simulation Study
Environmental Impact of Fluid Catalytic Cracking Unit in a Petroleum Refining Complex
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Model Based Approach for the Plant-wide Economic Control of Fluid Catalytic Cracking Unit
developed from a symposium ... at the 206th National Meeting of the American Chemical Society, Washington, DC, August 22 - 27, 1993
Zeolite Chemistry and Catalysis
Catalytic Cracking of Heavy Petroleum Fractions
Petroleum Catalysis in Nontechnical Language
Fundamentals and Current Applications
Advances in Fluid Catalytic Cracking
The CFD Simulation of Fluid Catalytic Cracking
Fluid Catalytic Cracking Handbook
Design, Operation, and Optimization
Fluid Catalytic Cracking VII:
Catalysis and Zeolites
An Expert Guide to the Practical Operation, Design, and Optimization of FCC Units
Zeolites for Cleaner Technologies
Chemical Catalysts for Biomass Upgrading
Fluid Catalytic Cracking VII:

COLLINS TYRONE

Petroleum Refinery Process Modeling Elsevier
Fluid catalytic cracking (FCC) process is a unit that converts heavy distillates like gas oil or residues to gasoline and middle distillates using cracking catalyst. Increased global focus on reducing energy consumption and emissions are working together to make FCC unit power recovery more attractive. The flue gas temperature from the FCC unit was about 700-750oC and it holds a lot amount of energy. The heat recovery steam generated (HRSG) was used to recover the heat of fluegas to generate a steam and electricity. Aspen HYSYS (version 7.0) software was used to calculate the energy that will be recovered. From the simulation, besides from the based case, four adjustment of the parameter was made which is the steam pressure requirement, flowrate of feedwater, outlet steam turbine pressure and the efficiency of the steam turbine. The result was obtained by all that adjustment as shown in Section 4.1. For the based case of this study, the required steam pressure, temperature and mass flow was 600psig, 500oC and 45000kg/hr meanwhile for the fluegas was 34psig, 715oC and 241800kg/hr. The electric power generated was 1.46MW. For the adjustment of parameters, it is to know the amount of the electricity at a difference condition. As a conclusion, the objective of this study was achieved by improving the FCC unit in term of energy recovery.
Fluid Catalytic Cracking Pennwell Corporation
Fluid catalytic cracking (FCC) is the dominant conversion process in petroleum refineries and the major contributor to "value added" in the refining process. Successful operation of the FCC unit is critical to the operation of the FCC unit is critical to the operating success of most refineries. This book provides a complete and in-depth view of FCC process, design and operating principles, and the current FCC technologies available to the refining industry.
An Expert Guide to the Practical Operation, Design, and Optimization of FCC Units Springer
Catalysis is literally the heart of many petroleum refining processes and therefore of ongoing interest to those in and around the refining industry. In easy-to-grasp language and format, Petroleum Catalysis in Nontechnical Language examines fluid catalytic cracking (FCC), reforming, hydrotreating, hydrocracking, isomerization, and polymerization, as well as catalysts of the future such as enzymes.
Science and Technology Editions TECHNIP
Zeolites occur in nature and have been known for almost 250 years as alumino silicate minerals. Examples are clinoptilolite, mordenite, offretite, ferrierite, erionite and chabazite. Today, most of these and many other zeolites are of great interest in heterogeneous catalysis, yet their naturally occurring forms are of limited value as catalysts because nature has not optimized their properties for catalytic applications and the naturally occurring zeolites almost always contain undesired impurity phases. It was only with the advent of synthetic zeolites in the period from about 1948 to 1959 (thanks to the pioneering work of R. M. Barrer and R. M. Milton) that this class of porous materials began to playa role in catalysis. A landmark event was the introduction of synthetic faujasites (zeolite X at first, zeolite Y slightly later) as catalysts in fluid catalytic cracking (FCC) of heavy petroleum distillates in 1962, one of the most important chemical processes with a worldwide capacity of the order of 500 million t/a. Compared to the previously used amorphous silica-alumina catalysts, the zeolites were not only orders of magnitude more active, which enabled drastic process engineering improvements to be made, but they also brought about a significant increase in the yield of the target product, viz. motor gasoline. With the huge FCC capacity worldwide, the added value of this yield enhancement is of the order of 10 billion US $ per year.
Concepts in Catalyst Design Fluid Catalytic Cracking HandbookAn Expert Guide to the Practical Operation, Design, and Optimization of FCC Units
Process flow description. FCC Feed Characterization. FCC Catalysts. Chemistry of FCC reactions. Unit monitoring and control. Products and economics. Project management and hardware design. Troubleshooting. Emerging trends in fluidized catalytic cracking. Appendixes: Total correlations. n-d-M correlations. API correlations. ASTM to TBP conversion. Definitions of fluidization terms. Glossary. Index.
Fluid Cracking Catalysts Amer Chemical Society
This practical guide provides information on the design, operation, and troubleshooting of FCC facilities. ...provides practical information covering all areas of fluid catalytic cracking... (Oil & Gas Journal)
Real-Time Optimization World Scientific
Reviews recent accomplishments in the field of fluid cracking catalysts (FCC). Discusses the development of more specialized and effective catalysts and processes as well as the modification of current technology to meet future challenges in fuel refining. Written by nearly 50 internationally recognized experts from academia and industry.
Fluid Catalytic Cracking Handbook John Wiley & Sons
To meet changing market demands that have stringent emission standards and to ensure proper performance in refinery units, evaluation of novel catalyst designs and results from material characterization and testing of catalysts are of crucial importance for refiners as well as for catalyst manufacturers. This book highlights recent developments in the application of refinery catalysts in selected units such as fluid catalytic cracking (FCC), hydrogen production for hydroprocessing units, hydrotreating, hydrocracking, and sustainable processing of biomass into biofuels.
Materials, Methods and Process Innovations Elsevier
Since 1987, the Petroleum Division of the American Chemical Society (ACS) has sponsored at 3 year intervals an international symposium on fluid cracking catalysts (FCC) technology. This volume collects the recent progress of this technology as reported in the papers presented during the 232th National Meeting of the ACS in San Francisco, September 10-14, 2006. Sixty-six years after the introduction of the fluid cracking catalyst process, it remains the main process of gasoline generation for the estimated 237 millions cars on US roads. Catalysts testing and evaluation still remains a subject of interest, debate and controversy. Lambda sweep testing, testing of SOx, NOx and combustion promoters have been discussed in details together with catalyst evaluation for atmospheric residues and metal contaminated oils cracking. Of particular interest has been the

introduction of novel concept in process design aimed at improving cracked product selectivity such as two-stage risers for better gasoline and olefins production and downer technology for high severity processes . The importance of solid state nuclear magnetic resonance (NMR) in the study of crude oils, catalysts and reaction products are illustrated by several examples. Two contributions describe the use of predictive methods to understand FCC aging and deactivation and personal overviews of the development of SOx and combustion promoters technology are presented. * Presents findings from the tri-annual international symposium on fluid cracking catalysts (FCC) technology, sponsored by the Petroleum Division of the American Chemical Society (ACS) * Two contributions describe the use of predictive methods to understand FCC aging and deactivation * Personal overviews by the authors of the development of SOx and combustion promoters technology

Fundamentals of Petroleum Refining CRC Press

This extensively updated second edition of the already valuable reference targets research chemists and engineers who have chosen a career in the complex and essential petroleum industry, as well as other professionals just entering the industry who seek a comprehensive and accessible resource on petroleum processing. The handbook describes and discusses the key components and processes that make up the petroleum refining industry. Beginning with the basics of crude oils and their nature, it continues with the commercial products derived from refining and with related issues concerning their environmental impact. More in depth coverage of many topics previously covered in the first edition, such as hydraulic fracturing or fracking as it is often termed, help ensure this reference remains a relevant and up-to-date resource. At its core is a complete overview of the processes that make up a modern refinery, plus a brief history of the development of processes. Also described in detail are design techniques, operations and in the case of catalytic units, the chemistry of the reaction routes. These discussions are supported by calculation procedures and examples, which enable readers to use today’s simulation-software packages. The handbook also covers off-sites and utilities, as well as environmental and safety aspects relevant to the industry. The chapter on refinery planning covers both operational planning and the decision making procedures for new or revamped processes. Major equipment used in the industry is reviewed along with details and examples of the process specifications for each. An extensive glossary and dictionary of the terms and expressions used in petroleum refining, plus appendices supplying data such as converging factors and selected crude oil assays, as well as an example of optimizing a refinery configuration using linear programming are all included to aid the reader. The 2nd edition of the Handbook of Petroleum Processing is an indispensable desk reference for chemists and engineers as well as an essential part of the libraries of universities with a chemical engineering faculty and oil refineries and engineering firms performing support functions or construction.

Octane-Enhancing Zeolitic FCC Catalysts Springer Science & Business Media

This volume looks at the recent progress of this technology as reported in the 21 papers presented during the 219th National Meeting of the ACS in New York, September 5-11, 2003. In addition, the volume focuses on the use of modern spectroscopic techniques for the generation of detailed structural analysis required for the advancement of the science of FCC design. Other chapters look at the use and importance of solid state nuclear magnetic resonance (NMR), microcalorimetry and atomic force microscopy (AFM) to the study of FCCs and discussing strategies to control pollutant emissions from a refinery FCCU and looking at advances in FCC preparation.

Hydroprocessing for Clean Energy Elsevier

Refiners' efforts to conform to increasingly stringent laws and a preference for fuels derived from renewable sources have mandated changes in fluid cracking catalyst technology. Advances in Fluid Catalytic Cracking: Testing, Characterization, and Environmental Regulations explores recent advances and innovations in this important component of petr

Fluid Catalytic Cracking Elsevier

Fluid Catalytic Cracking (FCC) is known to be one of the most profitable processes in oil refineries. However, during FCC, two inevitable and undesirable phenomena occur: coking (which deactivates the catalyst) and resistance to mass transfer.Computational techniques can be employed to simulate the FCC reactor with a view to predicting the optimum operating conditions of the process. Process operation within the optimum conditions increases profitability. A number of mathematical models have been developed for the FCC riser. However, two major set backs were observed in the models. Some of the previous models were oversimplified as a result of the negligence of mass transfer resistance and the assumption of one dimensional (1D) plug flow. On the other hand, the models were made unwieldy by the use of 3D geometry and the incorporation of large numbers of lumped species. In this book, a 2D model was used to simulate the FCC riser. Mass transfer resistance and coking were considered. This book will be beneficial to oil refineries. It will also make an excellent reference and teaching material for students, lecturers and researchers in Chemical Engineering, Mathematics and Chemistry

Modeling and Simulation of Fluid Catalytic Cracking (FCC) Riser Elsevier Science Limited

This book is devoted to the new development of zeolitic catalysts with an emphasis on new strategies for the preparation of zeolites, novel techniques for their characterization and emerging applications of zeolites as catalysts for sustainable chemistry, especially in the fields of energy, biomass conversion and environmental protection. Over the years, energy and the environment have become the most important global issues, while zeolitic catalysts play important roles in addressing them. With individual chapters written by leading experts, this book offers an essential reference work for researchers and professionals in both academia and industry. Feng-Shou Xiao is a Professor at the Department of Chemistry, Zhejiang University, China. Xiangju Meng is an Associate Professor at the Department of Chemistry, Zhejiang University, China.

Integrated Optimization Tools and Applications Elsevier

These proceedings reflect recent developments in the field of zeolite chemistry and catalysis with an emphasis on the role of a modifying component on the properties of the molecular sieve material. The plenary lectures and contributed papers concentrate on the problem of isomorphous substitution in a zeolitic framework; on the occlusion and the structure of metal, metal oxide, and metal sulphide clusters and complexes in the intracrystalline void volume of molecular sieves and zeolites as well as in the interlaminar space of layered compounds. Catalytic applications are discussed, not only in regard to traditional hydrocarbon transformation, but also in such areas as: reduction of SO2, decomposition of NO, reactions of sulphur containing

compounds and conversion of CO, CO2 to hydrocarbons or of alcohols to oxygenated products. Because the book provides valuable data and information on new achievements in the zeolite material science and application, it will be of considerable interest to all research groups involved in zeolite science.

Fluid Catalytic Cracking Technology and Operations Elsevier Science

Fluid catalytic cracking (FCC) is the refinery process used for the conversion of high molecular-weight hydrocarbons to produce higher valuable products such as gasoline. This research was especially concerned and motivated by the complex hydrodynamic and kinetic problems relating to the operation of FCC riser reactors, which affect both the design and optimization strategies. The catalytic cracking of hydrocarbons is a complex process due to the many reactions and chemical species involved. Therefore, the complexities of the reactions have been investigated by lumping together several chemical compounds. In this thesis, the Eulerian-Eulerian multiphase flow and the 3-lump kinetic model were assumed, in order to simulate three-dimensional hydrodynamics and cracking reactions occurring in the FCC riser reactors. The commercial CFD software, FLUENT version 6.2, was used for the modelling of these flow systems. Computational fluid dynamics (CFD) is a powerful computer-based design technique that is used to optimize the industrial processes that incorporate complex reacting multiphase flows. CFD involves the numerical solution of the conservation equations for mass, momentum and energy in the flow geometry of interest, along with subsidiary sets of equations. The CFD model predicted the flow pattern of the solid and gas and many important aspects of a riser, such as the velocity profiles of the phases, solids hold-up, temperature and enthalpy distribution, yield distribution and feed injector geometry. It has also been used to describe how the FCC parameters such as catalyst-to-oil ratio (CTO) affect the final product distribution. It was found that the reliability of the estimated parameters and the predicted results were significantly improved when compared to those obtained by other studies, especially for gasoline yield.

Improving the Fluid Catalytic Cracking Unit in Term of Energy Consumption, a Simulation Study John Wiley & Sons

Since 1987, the Petroleum Division of the American Chemical Society (ACS) has sponsored at 3 year intervals an international symposium on fluid cracking catalysts (FCC) technology. This volume collects the recent progress of this technology as reported in the papers presented during the 232th National Meeting of the ACS in San Francisco, September 10-14, 2006. Sixty-six years after the introduction of the fluid cracking catalyst process, it remains the main process of gasoline generation for the estimated 237 millions cars on US roads. Catalysts testing and evaluation still remains a subject of interest, debate and controversy. Lambda sweep testing, testing of SOx, NOx and combustion promoters have been discussed in details together with catalyst evaluation for atmospheric residues and metal contaminated oils cracking. Of particular interest has been the introduction of novel concept in process design aimed at improving cracked product selectivity such as two-stage risers for better gasoline and olefins production and downer technology for high severity processes . The importance of solid state nuclear magnetic resonance (NMR) in the study of crude oils, catalysts and reaction products are illustrated by several examples. Two contributions describe the use of predictive methods to understand FCC aging and deactivation and personal overviews of the development of SOx and combustion promoters technology are presented. * Presents findings from the tri-annual international symposium on fluid cracking catalysts (FCC) technology, sponsored by the Petroleum Division of the American Chemical Society (ACS) * Two contributions describe the use of predictive methods to understand FCC aging and deactivation * Personal overviews by the authors of the development of SOx and combustion promoters technology

Environmental Impact of Fluid Catalytic Cracking Unit in a Petroleum Refining Complex Pennwell Corporation

The primary focus of this book as a whole is on performance - performance of the catalyst, of its surface, of the FCC unit, of the feedstocks employed, of the analytical methods used to characterize the catalysts, and of environmentally directed regulations that govern the production of transportation fuels from petroleum. The emphasis on catalyst performance, particularly commercial performance, essentially dictated that the chapter authors be experienced industrial catalytic chemists and engineers. However, each author approached the task with a clear-cut obligation to connect the roots of the science of FCC catalysis with the technology. Fluid Catalytic Cracking: Science and Technology has been written for workers in industrial catalysis and academia, including graduate students in chemistry or chemical engineering who are interested in acquiring an overall knowledge of one of the world's most important areas of catalysis. The book is concise, each topic is treated briefly; complete, all aspects of FCC catalysis are covered; and clear, anyone involved in this field will find topics of interest.

Synthesis, Characterization and Catalytic Applications Elsevier

Since the late 1970s there has been an explosion of industrial and academic interest in circulating fluidized beds. In part, the attention has arisen due to the environmental advantages associated with CFB (circulating . fluidized bed) combustion systems, the incorporation of riser reactors employing cir culating fluidized bed technology in petroleum refineries for fluid catalytic cracking and, to a lesser extent, the successes of CFB technology for calcina tion reactions and Fischer-Tropsch synthesis. In part, it was also the case that too much attention had been devoted to bubbling fluidized beds and it was time to move on to more complex and more advantageous regime,S of operation. Since 1980 a number of CFB processes have been commercialized. There have been five successful International Circulating Fluidized Bed Confer ences beginning in 1985, the most recent taking place in Beijing in May 1996. In addition, we have witnessed a host of other papers on CFB funda mentals and applications in journals and other archival publications. There have also been several review papers and books on specific CFB topics. However, there has been no comprehensive book reviewing the field and attempting to provide an overview of both fundamentals and applications. The purpose of this book is to fill this vacuum.

Testing, Characterization, and Environmental Regulations Elsevier

A review of the recent literature on a method of oomphing gasoline that has become important because of the phase-down of lead in gasoline. The treatment is comprehensive rather than specific, but details of a few selected catalysts and zeolites are provided. The classifications of high-silica Y zeo