

HEAVY CRUDE OILS

From Geology to Upgrading
An Overview

Alain-Yves Huc, Ed.



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Heavy Oils Production And Upgrading From Geology To Upgrading An Overview Ifp Publications

Ali Ismet Kanlı, Tye Ching Thian



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Heavy Crude Oils Alain-Yves Huc, 2011 Heavy oils extra heavy oils and tar sands are major players for the future of energy They represent a massive world resource at least the size of conventional oils They are found all over the world but Canada and Venezuela together account by themselves for more than half of world deposits They share the same origin as the lighter conventional oils but their geological fate drove them into thick viscous tar like crude oils Most of them result from alteration processes mediated by microbial degradation They are characterized by a low content of lighter cuts and a high content of impurities such as sulfur and nitrogen compounds and metals so their production is difficult and deployment of specific processes is required in order to enhance their transportability and to upgrade them into valuable products meeting market needs and honouring environmental requirements Although these resources are increasingly becoming commercially producible less than 1% of total heavy crude oil deposits worldwide are under active development The voluntarily wide scope of this volume encompasses geology production transportation upgrading economics and environmental issues of heavy oils It does not pretend to be exhaustive but to provide an authoritative view of this very important energy resource

Topics on Oil and Gas Ali Ismet Kanlı, Tye Ching Thian, 2023-12-20 Reservoir characterization is the model that characterizes reservoirs based on their ability to store and produce hydrocarbons Reservoir modeling is the process of creating a three dimensional representation of a given reservoir based on its petrophysical geological and geophysical properties Reservoir engineering is the formulation of development and production plans that will result in maximum recovery for a given set of economic environmental and technical constraints It is not a one time activity but needs continual updating throughout the production life of a reservoir Reservoir management is often defined as the allocation of resources to optimize hydrocarbon recovery from a reservoir while minimizing capital investments and operating expenses The oil and gas industry is divided into upstream and downstream sectors In general the upstream sector involves activities carried out at a reservoir while the downstream sector involves all petroleum processing activities carried out in a refinery Petroleum processing engineering involves all downstream crude oil processing operations from crude oil as the feedstock to final products such as gasoline kerosene diesel gas oil and lubricating oil Petroleum processing technology continues to develop in consideration of all types of sustainability related challenges This book provides a comprehensive overview of the oil and gas industry presenting the most recent research in the field

Global Change, Energy Issues and Regulation Policies Jean Bernard Saulnier, Marcelo D. Varela, 2013-06-18 This book analyses the deep interaction between the world's environmental crises energy production conversion and use and global regulation policies Bringing together experts from a wide range of scientific fields it offers the reader a broad scope of knowledge on such topics as climate change and exhaustion of resources the relationship between basic science and the development of sustainable energy technologies the relationship between global and local environmental policies the possible competition

between foodstuff production and that of agro fuels urban adaptation negotiations at the international level financial rules This book invites the reader to consider the multidisciplinary aspects of these urgent energy environmental issues

Handbook of Petrochemical Processes James G. Speight, 2019-06-13 The petrochemical industry is a scientific and engineering field that encompasses the production of a wide range of chemicals and polymers The purpose of this book is not only to provide a follow on to form the later chapters of the highly successful Chemistry and Technology of Petroleum 5th Edition but also provides a simplified approach to a very diverse chemical subject dealing with the chemistry and technology of various petroleum and petrochemical process Following from the introductory chapters this book provides the readers with a valuable source of information containing insights into petrochemical reactions and products process technology and polymer synthesis Provides readers with a valuable source of information containing insights into petrochemical reactions and products process technology and polymer synthesis Introduces the reader to the various petrochemical intermediates are generally produced by chemical conversion of primary petrochemicals to form more complicated derivative products The reactions and processes involved in transforming petroleum based hydrocarbons into the chemicals that form the basis of the multi billion dollar petrochemical industry are reviewed and described The book includes information on new process developments for the production of raw materials and intermediates for petrochemicals Includes a description of the origin of the raw materials for the petrochemicals industry including an overview of the coal chemicals industry **The Geopolitics of Energy** ,2015 **Catalysis by Transition Metal Sulphides** RAYBAUD Pascal, TOULHOAT Hervé, 2013-03-01 The main application of Transition Metal Sulphides TMS as solid catalysts is for production of clean fuels in petroleum refineries The various feedstocks to be processed all contain more or less sulphur included in highly stable heteroaromatic molecules In order to meet the stringent specifications imposed worldwide nowadays on transportation fuels to reduce their environmental impact catalytic hydroprocessing remains essential In this process sulphur is removed as H₂S following the reaction between molecular hydrogen and the heteroaromatics The reaction conditions and reaction medium composition are such that only TMS provide stable catalysts generally supported on alumina Both for their fundamental and applied interest these fascinating systems are still the subject of a very significant research effort while major advances have been made over the past 30 years involving innovative preparation routes sophisticated surface science experiments for characterisation detailed kinetic and mechanistic studies and state of the art DFT simulations giving unprecedented insight into the local structure as well as elementary steps at microscopic level This book aims at providing a complete comprehensive and updated survey of the field useful for anyone involved the student starting a research project the academic researcher or the refinery engineer willing to deepen their knowledge on the catalytic as well as on the process aspects 37 specialists from IFP Energies nouvelles CNRS or French universities have contributed reporting a unique synthesis of the last 15 years of research The preface written by Mich le Breysse a well known leading scientist who devoted most of her fruitful career to

this topic puts this collective work into a meaningful historical perspective

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Conclusion

Chemical Enhanced Oil Recovery Patrizio Raffa, Pablo Druetta, 2019-07-22

This book aims at presenting describing and summarizing the latest advances in polymer flooding regarding the chemical synthesis of the EOR agents and the numerical simulation of compositional models in porous media including a description of the possible applications of nanotechnology acting as a booster of traditional chemical EOR processes

A large part of the world economy depends nowadays on non renewable energy sources most of them of fossil origin

Though the search for and the development of newer greener and more sustainable sources have been going on for the last decades humanity is still fossil fuel dependent

Primary and secondary oil recovery techniques merely produce up to a half of the Original Oil In Place

Enhanced Oil Recovery EOR processes are aimed at further increasing this value

Among these chemical EOR techniques including polymer flooding present a great potential in low and medium viscosity oilfields

Describes recent advances in chemical enhanced oil recovery

Contains detailed description of polymer flooding and nanotechnology as promising boosting tools for EOR

Includes both experimental and theoretical studies

About the Authors Patrizio Raffa is Assistant Professor at the University of Groningen

He focuses on design and synthesis of new polymeric materials optimized for industrial applications such as EOR coatings and smart materials

He co authored about 40 articles in peer reviewed journals

Pablo Druetta works as lecturer at the University of Groningen RUG and as engineering consultant

He received his Ph D from RUG in 2018 and has been teaching at a graduate level for 15 years

His research focus lies on computational fluid dynamics CFD

Heavy Crude Oils Alain Yves Huc, 2011

Heavy and Extra-heavy Oil Upgrading Technologies James G. Speight, 2013-04-12

Unconventional reservoirs of oil and gas represent a huge additional global source of fossil fuels

However there is much still to be done to improve techniques for their processing to make recovery and refining of these particular energy sources more cost effective

Brief but readable

Heavy and Extra heavy Oil Upgrading Technologies provide readers with a strategy for future production the up stream and upgrading the down stream

The book provides the reader with an understandable overview of the chemistry and engineering behind the latest developments and technologies in the

industry as well as the various environmental regulations Clear and rigorous Heavy and Extra heavy Oil Upgrading Technologies will prove tool for those scientists and engineers already engaged in fossil fuel science and technology as well as scientists non scientists engineers and non engineers who wish to gain a general overview or update of the science and technology of unconventional fossil fuels in general and upgrading technologies in particular The use of microorganisms and a number of physical methods such as ultrasound median microwave cold plasma electrokinetic and monocrystalline intermetallics etc will be discussed for the first time Overview of the chemistry engineering and technology of oil sands Microorganisms and a number of physical methods such as ultrasound median microwave cold plasma electrokinetic and monocrystalline intermetallics Evolving and new environmental regulations regarding oil sands production processes

Upgrading Petroleum Residues and Heavy Oils R. Murray Gray, 1994-04-19 This useful reference offers in depth coverage of current techniques for converting heavy oils and residues into more valuable distillates Examines the chemistry of heavy hydrocarbon feeds and their properties important to engineering design including phase behavior reaction kinetics and thermodynamic and transport characteristics

Subsurface Upgrading of Heavy Crude Oils and Bitumen Cesar Ovalles, 2019-07-24 Heavy crude oils and bitumen represent more than 50% of all hydrocarbons available on the planet These feedstocks have a low amount of distillable material and high level of contaminants that make their production transportation and refining difficult and costly by conventional technologies Subsurface Upgrading of Heavy Crude Oils and Bitumen is of interest to the petroleum industry mainly because of the advantages compared to aboveground counterparts The author presents an in depth account and a critical review of the progress of industry and academia in underground or In Situ upgrading of heavy extra heavy oils and bitumen as reported in the patent and open literature This work is aimed to be a standalone monograph so three chapters are dedicated to the composition of petroleum and fundamentals of crude oil production and refining Key Features Offers a multidisciplinary scope that will appeal to chemists geologists biologists chemical engineers and petroleum engineers Presents the advantages and disadvantages of the technologies considered Discusses economic and environmental considerations for all the routes evaluated and offers perspectives from experts in the field working with highlighted technologies

Catalytic In-Situ Upgrading of Heavy and Extra-Heavy Crude Oils Mikhail A. Varfolomeev, Chengdong Yuan, Jorge Ancheyta, 2023-06-06 Catalytic In Situ Upgrading of Heavy and Extra Heavy Crude Oils A comprehensive guide to a cutting edge and cost effective refinement process for heavy oil Oil sufficiently viscous that it cannot flow normally from production wells is called heavy oil and constitutes as much as 70% of global oil reserves Extracting and refining this oil can pose significant challenges including very high transportation costs As a result processes which produce and partially refine heavy oil in situ known as catalytic upgrading are an increasingly important part of the heavy oil extraction process and the reduced carbon footprint associated with these methods promises to make them even more significant in the coming years Catalytic In Situ Upgrading of Heavy and Extra Heavy Crude Oils provides a

comprehensive introduction to these processes It introduces the properties and characteristics of heavy and extra heavy oil before discussing different catalysts and catalyzing processes their mechanisms and underlying physics and more It offers the full sweep of description and analysis required for petroleum and chemical engineers to understand this vital aspect of the modern oil industry Readers will also find Detailed discussion of subjects including electron paramagnetic resonance spectroscopy nuclear magnetic resonance spectroscopy and more Analysis of both liquid catalysts and nanoparticle catalysts A numerical simulation of the catalytic in situ oil upgrading process Catalytic In Situ Upgrading of Heavy and Extra Heavy Crude Oils is a valuable reference for petroleum and chemical engineers as well as advanced undergraduate and graduate students in related fields *Heavy Oil Recovery and Upgrading* James G. Speight, 2019-02-28 Heavy Oil Recovery and Upgrading covers properties factors methods and all current and upcoming processes giving engineers new and experienced the full spectrum of recovery choices including SAGD horizontal well technology and hybrid approaches Moving on to the upgrading and refining of the product the book also includes information on in situ upgrading refining options and hydrogen production Rounding out with environmental effects management methods on refinery waste and the possible future configurations within the refinery this book provides engineers with a single source to make decisions and manage the full range of challenges Presents the properties mechanisms screening criteria and field applications for heavy oil enhanced recovery projects Includes current upgrading options and future methods for refining heavy oil development Fills in the gaps between literature and practical application for everyday industry reference *An Overview of Commercially Proven Technology for Upgrading Heavy Oils* D. B. Black, S. G. Dunn, Associated-Pullman Kellogg Ltd, 1979 **Processing of Heavy Crude Oils** Ramasamy Marappa Gounder, 2019 Unconventional heavy crude oils are replacing the conventional light crude oils slowly but steadily as a major energy source Heavy crude oils are cheaper and present an opportunity to the refiners to process them with higher profit margins However the unfavourable characteristics of heavy crude oils such as high viscosity low API gravity low H C ratio chemical complexity with high asphaltenes content high acidity high sulfur and increased level of metal and heteroatom impurities impede extraction pumping transportation and processing Very poor mobility of the heavy oils due to very high viscosities significantly affects production and transportation Techniques for viscosity reduction drag reduction and in situ upgrading of the crude oil to improve the flow characteristics in pipelines are presented in this book The heavier and complex molecules of asphaltenes with low H C ratios present many technological challenges during the refining of the crude oil such as heavy coking on catalysts Hydrogen addition and carbon removal are the two approaches used to improve the recovery of value added products such as gasoline and diesel In addition the heavy crude oil needs pre treatment to remove the high levels of impurities before the crude oil can be refined This book introduces the major challenges and some of the methods to overcome them Heavy Oil Production Processes James G. Speight, 2013-03-05 As conventional oil resources are depleted worldwide vast heavy oil reserves available in various parts of the world become

increasingly important as a secure future energy source Brief but readable Heavy Oil Production Processes discusses the latest improvements in production processes including thermal methods steam floods cyclic steam stimulation SAGD as well as non thermal methods cold flow with sand production cyclic solvent process VAPEX The book begins with an overview of the chemistry engineering and technology of heavy oil as they evolve into the twenty first century The preceding chapters are written to provide a basic understanding of each technology evolving processes and new processes as well as the various environmental regulations Clear and rigorous Heavy Oil Production Processes will prove useful for those scientists and engineers already engaged in fossil fuel science and technology as well as scientists non scientists engineers and non engineers who wish to gain a general overview or update of the science and technology of fossil fuels The not only does the book discuss the production processes but also provides methods which should reduce environmental footprint and improve profitability Overview of the chemistry engineering and technology of oil sands Updates on the evolving processes and new processes Evolving and new environmental regulations regarding oil sands production *Upgrading of Heavy Oils and Resids, 30 Years Progress Since the First Oil Crisis* P. O'Connor,2003 Upgrading Heavy Crude Oils and Residues to Transportation Fuels : Technology, Economics and Outlook - ,1999 *Upgrading Heavy Crude Oils and Residues to Transportation Fuels : Technology, Economics and Outlook* - ,1987 *Upgrading Heavy Crude Oils and Residues to Transportation Fuels: Technology, Economics and Outlook. PHASE 7* ,2003

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