

Edited by
Peter M. Maitlis, Arno de Klerk

Greener Fischer-Tropsch Processes

for Fuels and Feedstocks



Greener Fischer Tropsch Processes For Fuels And Feedstocks

Trevor Letcher



Greener Fischer Tropsch Processes For Fuels And Feedstocks:

Greener Fischer-Tropsch Processes Peter M. Maitlis, Arno de Klerk, 2013-01-30 How can we use our carbon based resources in the most responsible manner How can we most efficiently transform natural gas coal or biomass into diesel jet fuel or gasoline to drive our machines The Big Questions today are energy related and the Fischer Tropsch process provides industrially tested solutions This book offers a comprehensive and up to date overview of the Fischer Tropsch process from the basic science and engineering to commercial issues It covers industrial economic environmental and fundamental aspects with a specific focus on green concepts such as sustainability process improvement waste reduction and environmental care The result is a practical reference for researchers engineers and financial analysts working in the energy sector who are interested in carbon conversion fuel processing or synthetic fuel technologies It is also an ideal introductory book on the Fischer Tropsch process for graduate courses in chemistry and chemical engineering Greener Fischer-Tropsch Processes Peter M. Maitlis, Arno de Klerk, 2013-03-25 Greener Fischer Tropsch Processes How can we use our carbon based resources in the most responsible manner How can we most efficiently transform natural gas coal or biomass into diesel jet fuel or gasoline to drive our machines The Big Questions today are energy related and the Fischer Tropsch process provides industrially tested solutions This book offers a comprehensive and up to date overview of the Fischer Tropsch process from the basic science and engineering to commercial issues It covers industrial economic environmental and fundamental aspects with a specific focus on green concepts such as sustainability process improvement waste reduction and environmental care The result is a practical reference for researchers engineers and financial analysts working in the energy sector who are interested in carbon conversion fuel processing or synthetic fuel technologies It is also an ideal introductory book on the Fischer Tropsch process for graduate courses in chemistry and chemical engineering Sustainable Technologies for the Oil Palm Industry Dominic C.Y. Foo, Mustafa Kamal Tun Abdul Aziz, Suzana Yusup, 2022-11-04 This book reports the latest research and successful industrial case studies on sustainable technologies in the oil palm industry ranging from plantation processing to waste handling It covers the latest developments on harvesting refining nanomaterial production aviation biofuel biomass supply chain and waste treatment and handling This book is a continuation of a previously published Springer book Green Technologies for the Oil Palm Industry and is intended for industrial practitioners and academics interested in sustainable technologies for palm oil milling processes Biorefineries Michele Aresta, Angela Dibenedetto, Franck Dumeignil, 2015-08-31 Biorefineries compiles the basic science and technologies used to convert terrestrial and aquatic biomass into essential molecular compounds and polymeric materials The book provides in depth insights into this fairly recent concept of industrial chemistry that aims to achieve optimal economic profits while minimizing the environmental impact Chapters written by renowned experts cover amongst others the application of catalysis downstream processing biomass sourced olefins lignin biorefinery techniques and biogas The authors thoroughly examine

and explain the value chain for biomass conversion into platform molecules and their transformation into final products A comprehensive thematic overview on the topic giving beginners access to fundamental concepts is presented Supplemented by numerous full color figures and tables the contents impart knowledge about the involved techniques Advanced students and experts in the field will find the summary of state of the art research and current literature of valuable interest Explores the enormous potential of biomass conversion as a future source for fuels and chemicals Focuses on both general scientific background and current innovations in the field of biorefinery Targets students and researchers in Chemistry Chemical Engineering Biotechnology and Materials Science About the Editors Prof Michele Aresta Chair of the Scientific Committee of CIRCC in Italy and holds the IMM Chair at the Department of Chemical and Biomolecular Engineering at NUS Singapore He is author of over 200 papers and Author or Editor of nine books Prof Angela Dibenedetto Associate Professor at the Department of Chemistry of the University of Bari Italy focused on carbon dioxide utilization by applying biorefinery concepts and Director of the Interuniversity Consortium on Chemical Reactivity and Catalysis CIRCC Prof Franck Dumeignil Deputy Director of the CNRS joint Unit of Catalysis and Chemistry of Solid UCCS of Lille University France project coordinator of several projects on chemistry including the EuroBioRef Project for designing next generation biorefineries Chemicals and Fuels from Biomass via Fischer-Tropsch Synthesis Joshua Gorimbo,Xinying Liu,Yali Yao,Diane Hildebrandt,2022-11-18 In an effort to reduce dependency on fossil fuel resources biomass could essentially be converted into chemicals using high capacity processes The Fischer Tropsch Synthesis FTS pathway has been chosen as the focus of this book as it is a mature area and unlike other pathways such as pyrolysis FTS is a potential way of producing fuel hydrocarbons with no sulfur no nitrogen and no heavy metals contamination making it a good choice Integrating technological development and business development rationales to highlight the key technological developments that are necessary to industrialize biofuels on a global scale this book focusses on the key challenges that still hinder the effective biomass use and the realization of zero fossil fuel use Traditional biomass to hydrocarbons pathways are covered showcasing how they are tailored to yield a specific group of chemicals with the aim of reducing downstream processes New developments are considered including process synthesis catalysts and reactors etc Providing an up to date overview of the production of specialty chemicals and fuels from biomass via the Fischer Tropsch Synthesis pathway this title makes an excellent addition to the libraries of academics and practitioners working in catalysis and chemical engineering **Fischer-Tropsch Synthesis, Catalysts, and Catalysis** Burtron H. Davis,Mario L. Occelli,2016-04-06 This book is based on a symposium held during the 248th American Chemical Society meeting that focused on use of the Fischer Tropsch process in producing synthetic fuels Its contents reflect the four dominant subjects of the meeting catalyst preparation and activation catalyst activity and reaction mechanisms catalyst characterization and related reactions and topics concerning commercializing the Fischer Tropsch process It covers recent developments related to renewable resources and green energy and provides a glimpse of the commercial potential of the

Fischer Tropsch process in synthetic fuel production **Hydrocarbon Chemistry** George A. Olah, Arpad Molnar, G. K. Surya Prakash, 2017-09-08 This book provides an unparalleled contemporary assessment of hydrocarbon chemistry presenting basic concepts current research and future applications Comprehensive and updated review and discussion of the field of hydrocarbon chemistry Includes literature coverage since the publication of the previous edition Expands or adds coverage of carboxylation sustainable hydrocarbons extraterrestrial hydrocarbons Addresses a topic of special relevance in contemporary science since hydrocarbons play a role as a possible replacement for coal petroleum oil and natural gas as well as their environmentally safe use Reviews of prior edition literature coverage is comprehensive and ideal for quickly reviewing specific topics of most value to industrial chemists Angewandte Chemie and useful for chemical engineers as well as engineers in the chemical and petrochemical industries Petroleum Science and Technology **13th International Symposium on Process Systems Engineering - PSE 2018, July 1-5 2018** Mario R. Eden, Gavin Towler, Maria Ierapetritou, 2018-07-19 Process Systems Engineering brings together the international community of researchers and engineers interested in computing based methods in process engineering This conference highlights the contributions of the PSE community towards the sustainability of modern society and is based on the 13th International Symposium on Process Systems Engineering PSE 2018 event held San Diego CA July 1 5 2018 The book contains contributions from academia and industry establishing the core products of PSE defining the new and changing scope of our results and future challenges Plenary and keynote lectures discuss real world challenges globalization energy environment and health and contribute to discussions on the widening scope of PSE versus the consolidation of the core topics of PSE Highlights how the Process Systems Engineering community contributes to the sustainability of modern society Establishes the core products of Process Systems Engineering Defines the future challenges of Process Systems Engineering **Handbook of Biofuels Production** Rafael Luque, Carol Sze Ki Lin, Karen Wilson, James Clark, 2016-05-19 Handbook of Biofuels Production Second Edition discusses advanced chemical biochemical and thermochemical biofuels production routes that are fast being developed to address the global increase in energy usage Research and development in this field is aimed at improving the quality and environmental impact of biofuels production as well as the overall efficiency and output of biofuels production plants The book provides a comprehensive and systematic reference on the range of biomass conversion processes and technology Key changes for this second edition include increased coverage of emerging feedstocks including microalgae more emphasis on by product valorization for biofuels production additional chapters on emerging biofuel production methods and discussion of the emissions associated with biofuel use in engines The editorial team is strengthened by the addition of two extra members and a number of new contributors have been invited to work with authors from the first edition to revise existing chapters thus offering fresh perspectives Provides systematic and detailed coverage of the processes and technologies being used for biofuel production Discusses advanced chemical biochemical and thermochemical biofuels production routes that are fast

being developed to address the global increase in energy usage Reviews the production of both first and second generation biofuels Addresses integrated biofuel production in biorefineries and the use of waste materials as feedstocks **Future Energy** Trevor Letcher,2013-11-12 As the demand for global energy increases fact based evaluations of alternative energy sources are needed in order to address the growing interest in how energy is produced provided and transported in sustainable ways Future Energy Second Edition provides scientists and decision makers with the knowledge they need to understand the relative importance and magnitude of various energy production methods in order to make the energy decisions needed for sustaining development and dealing with climate change The second edition of Future Energy looks at the present energy situation and extrapolates to future scenarios related to global warming and the increase of carbon dioxide and other greenhouse gases in the atmosphere This thoroughly revised and updated edition contains over 30 chapters on all aspects of future energy each chapter updated and expanded by expert scientists and engineers in their respective fields providing an unbiased and balanced view of the future of energy Provides readers with an up to date overview of available energy options both traditional and renewable as well as the necessary tools to make informed decisions regarding selection use and environmental impacts Covers a wide spectrum of future energy resources presented in a single book with chapters written by experts of the particular field Eleven new chapters including chapters on solar heating energy resources in developing nations and frontiers in oil and gas Arctic drilling and unconventional oil and gas sources thorium in nuclear fission ethanol and other options for future transport fuel fracking smart grids new batteries environmental issues and the energy options for China **Catalysis for Clean Energy and Environmental Sustainability** K. K. Pant,Sanjay Kumar Gupta,Ejaz Ahmad,2021-04-01 This book is part of a two volume work that offers a unique blend of information on realistic evaluations of catalyst based synthesis processes using green chemistry principles and the environmental sustainability applications of such processes for biomass conversion refining and petrochemical production The volumes provide a comprehensive resource of state of the art technologies and green chemistry methodologies from researchers academics and chemical and manufacturing industrial scientists The work will be of interest to professors researchers and practitioners in clean energy catalysis green chemistry chemical engineering and manufacturing and environmental sustainability This volume focuses on catalyst synthesis and green chemistry applications for petrochemical and refining processes While most books on the subject focus on catalyst use for conventional crude fuel oriented refineries this book emphasizes recent transitions to petrochemical refineries with the goal of evaluating how green chemistry applications can produce clean energy through petrochemical industrial means The majority of the chapters are contributed by industrial researchers and technicians and address various petrochemical processes including hydrotreating hydrocracking flue gas treatment and isomerization catalysts *Biofuels for Aviation* Christopher Chuck,2016-06-02 Biofuels for Aviation Feedstocks Technology and Implementation presents the issues surrounding the research and use of

biofuels for aviation such as policy markets certification and performance requirements life cycle assessment and the economic and technical barriers to their full implementation Readers involved in bioenergy and aviation sectors research planning or policy making activities will benefit from this thorough overview The aviation industry s commitment to reducing GHG emissions along with increasing oil prices have sparked the need for renewable and affordable energy sources tailored to this sector s very specific needs As jet engines cannot be readily electrified turning to biofuels is the most viable option However aviation is a type of transportation for which traditional biofuels such as bioethanol and biodiesel do not fulfill key fuel requirements Therefore different solutions to this situation are being researched and tested around the globe which makes navigating this scenario particularly challenging This book guides readers through this intricate subject bringing them up to speed with its current status and future prospects both from the academic and the industry point of view Science and technology chapters delve into the technical aspects of the currently tested and the most promising technology in development as well as their respective feedstocks and the use of additives as a way of adapting them to meet certain specifications Conversion processes such as hydrotreatment synthetic biology pyrolysis hydrothermal liquefaction and Fisher Tropsch are explored and their results are assessed for current and future viability Presents the current status of biofuels for the aviation sector including technologies that are currently in use and the most promising future technologies their production processes and viability Explains the requirements for certification and performance of aviation fuels and how that can be achieved by biofuels Explores the economic and policy issues as well as life cycle assessment a comparative techno economic analysis of promising technologies and a roadmap to the future Explores conversion processes such as hydrotreatment synthetic biology pyrolysis hydrothermal liquefaction and Fisher Tropsch

The ^AChanging Energy Mix

Paul Meier,2020-09-21 The Changing Energy Mix compares twelve renewable and nonrenewable energy types using twelve common technical criteria After reading this book readers will be well informed enough to draw their own conclusions and make their own decisions about next steps in the world of energy

Clean Energy and Fuel (Hydrogen) Storage Sesha S. Srinivasan,Elias K. Stefanakos,2019-10-16 Clean energy and fuel storage are often required for both stationary and automotive applications Some of these clean energy and fuel storage technologies currently under extensive research and development include hydrogen storage direct electric storage mechanical energy storage solar thermal energy storage electrochemical batteries and supercapacitors and thermochemical storage The gravimetric and volumetric storage capacity energy storage density power output operating temperature and pressure cycle life recyclability and cost of clean energy or fuel storage are some of the factors that govern efficient energy and fuel storage technologies for potential deployment in energy harvesting solar and wind farms stations and onboard vehicular transportation This Special Issue thus serves the need for promoting exploratory research and development on clean energy and fuel storage technologies while addressing their challenges to practical and sustainable infrastructures

Mathematical Modeling of Complex Reaction Systems in the

Oil and Gas Industry Jorge Ancheyta, Andrey Zagoruiko, Andrey Elyshev, 2024-09-30 Master the fundamentals of reaction systems modeling for the age of decarbonization Reactor design is one of the most important parts of the oil and gas industry with reactor processes and the accompanying technologies constantly evolving to meet industry needs A crucial component of effective reactor design is modelling complex reaction systems which can help predict commercial performance shape safety procedures and more At a time when decarbonization and clean energy transition are among the fundamental global technological challenges it has never been more important for engineers to grasp the cutting edge of reaction system modelling Mathematical Modeling of Complex Reaction Systems in the Oil and Gas Industry provides a systematic introduction to this timely subject Each chapter provides a step by step description of the kinetic and reactor models for a particular kind of process and its accompanying systems Backed by voluminous experimental data and incorporating extensive simulation results the book constitutes an indispensable contribution to the global search for clean energy solutions Mathematical Modeling of Complex Reaction Systems in the Oil and Gas Industry readers will also find All the required tools for developing new reactor models for different reaction scales Detailed discussion of topics including hydrocracking of heavy oils catalyst deactivation oxidative regeneration of catalysts and many more Extensive treatment of both steady state and dynamic simulations Mathematical Modeling of Complex Reaction Systems in the Oil and Gas Industry is ideal for chemical and process engineers computational chemists and modelers catalysis researchers and any other researchers or professionals in petrochemical engineering and the oil and gas industry

Proceedings of the International Conference on Innovations for Sustainable and Responsible Mining Xuan-Nam Bui, Changwoo Lee, Carsten Drebenstedt, 2020-10-25 This volume gathers the latest advances innovations and applications in the field of mining geology and geo spatial technologies as presented by leading researchers and engineers at the International Conference on Innovations for Sustainable and Responsible Mining ISRM held in Hanoi Vietnam on October 15 17 2020 The contributions cover a diverse range of topics including mining technology drilling and blasting engineering tunneling and geotechnical applications mineral processing mine management and economy environmental risk assessment and management mining and local development mined land rehabilitation water management and hydrogeology regional Geology and tectonics spatial engineering for monitoring natural resources and environment change GIS and remote sensing for natural disaster monitoring risk mapping and revisualization natural resources monitoring and management mine occupational safety and health Selected by means of a rigorous peer review process they will spur novel research directions and foster future multidisciplinary collaborations

Solid Waste Management Garima Chauhan, Surajbhan Sevda, 2023-12-01 Waste is generally identified as goods or material that are perceived to be mostly valueless However objects that are perceived to be waste based on consumers object valuation can be redefined to create value This requires a multitude of efforts using different strategies in waste prevention and management This book is an edited collection of

various chemical approaches used for valorization of solid wastes particularly waste electrical and electronic equipment plastic waste and agro residue waste that provide research insights into the concept waste to energy Covering a variety of interdisciplinary topics on waste treatment and resource recovery makes the book one for all that serves as an excellent reading material for engineers science scholars entrepreneurs and organizations who are working in the field of waste management

Encyclopedia of Sustainable Technologies Martin Abraham,2017-07-04 Encyclopedia of Sustainable Technologies Eight Volume Set provides an authoritative assessment of the sustainable technologies that are currently available or in development Sustainable technology includes the scientific understanding development and application of a wide range of technologies and processes and their environmental implications Systems and lifecycle analyses of energy systems environmental management agriculture manufacturing and digital technologies provide a comprehensive method for understanding the full sustainability of processes In addition the development of clean processes through green chemistry and engineering techniques are also described The book is the first multi volume reference work to employ both Life Cycle Analysis LCA and Triple Bottom Line TBL approaches to assessing the wide range of technologies available and their impact upon the world Both approaches are long established and widely recognized playing a key role in the organizing principles of this valuable work Provides readers with a one stop guide to the most current research in the field Presents a grounding of the fundamentals of the field of sustainable technologies Written by international leaders in the field offering comprehensive coverage of the field and a consistent high quality scientific standard Includes the Life Cycle Analysis and Triple Bottom Line approaches to help users understand and assess sustainable technologies

Waste Biorefinery Thallada Bhaskar,Sunita Varjani,Ashok Pandey,Eldon R. Rene,2021-02-24 Waste Biorefinery Value Addition through Resources Utilization provides scientific and technical information surrounding the most advanced and innovative processing technologies used for the conversion of biogenic waste to biofuels energy products and biochemicals The book covers recent developments and achievements in the field of biochemical thermo chemical and hybrid methods and the necessities and potentials generated by different kinds of residual streams including biomass in presumably more decentralized biorefineries An assortment of case studies from developing and developed countries illustrate the topics presented covering energy chemicals fuels food for animal recovery from different waste matrices and more Finally the advantages and limitations of different technologies are discussed considering local energy demand government policies environmental impacts and education in bioenergy This book will serve as an excellent resource for science graduates chemical engineers environmental engineers biotechnologists and industrial experts in these areas Provides information on the most advanced and innovative processes for biomass conversion Covers information on biochemical and thermochemical processes and product developments surrounding the principles of biorefining Presents information on the integration of processes and technologies for the production of biofuels energy products and biochemicals

Coal Production and Processing Technology M.R. Riazi,Rajender Gupta,2015-11-05 Coal

Production and Processing Technology provides uniquely comprehensive coverage of the latest coal technologies used in everything from mining to greenhouse gas mitigation. Featuring contributions from experts in industry and academia, this book discusses coal geology, characterization, beneficiation, combustion, coking, gasification, and liquefaction.

Unveiling the Power of Verbal Artistry: An Emotional Sojourn through **Greener Fischer Tropsch Processes For Fuels And Feedstocks**

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