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Technology Economics: Propylene Via Propane Dehydrogenation Technology Economics: Propylene Via Propane Dehydrogenation Propylene Production Via Propane Dehydrogenation Propylene Production Via Propane Dehydrogenation Mechanism Investigation of Propane Dehydrogenation Over Metal Cation Exchanged Zeolite Catalysts Propylene Production Cost Analysis - Overview - Propylene AA01 Propylene Production from Propane - Cost Analysis - Propylene E32A Propylene Production Cost Analysis - Overview - Propylene AA01 Technology Economics: Propylene Via Propane Dehydrogenation Characterization of Pt-Sn/Al2O3 Catalyst and Coke Formation During Propane Dehydrogenation Catalysis for Clean Energy and Environmental Sustainability

Nanostructured Catalysts Sustainable Inorganic Chemistry Technology Economics: Ethylene Production Via Ethanol Dehydration Technology Economics: Sodium Hypochlorite Chemical Production Membranes on Polyolefins Plants Vent Recovery Metal Oxides in Heterogeneous Catalysis Research Economics: Green Ethylene from Ethanol Propylene Production from Propane - Cost Analysis - Propylene E31A Catalysis by Precious Metals, Past and Future Heterogeneous Nanocatalysis for Energy and Environmental Sustainability, Volume 1 Chemical Technologies and Processes Pd-based Membranes 30th European Symposium on Computer Aided Chemical Engineering The Changing Landscape of Hydrocarbon Feedstocks for Chemical Production State-of-the-Art Materials Science in Belgium 2017 Current Trends and Future Developments on (Bio-) Membranes Comprehensive Organic Synthesis Green Catalysis and Reaction Engineering Petrochemistry The Changing Landscape of Hydrocarbon Feedstocks for Chemical Production 13th International Symposium on Process SystemsEngineering – PSE 2018, July 1-5 2018 Mesoporous Zeolites Membrane Reactors for Hydrogen Production Processes Advances in Catalysis Chemical Reaction Technology Petrochemical Catalyst Materials, Processes, and Emerging Technologies Leveraging Synergies Between Refining and Petrochemical Processes Palladium Membrane Technology for Hydrogen Production, Carbon Capture and Other Applications Advances in Neural Computation, Machine Learning, and Cognitive Research IV

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Metal Oxides in Heterogeneous Catalysis is an overview of the past, present and future of heterogeneous catalysis using metal oxides catalysts. The book presents the historical, theoretical, and practical aspects of metal oxide-based heterogeneous catalysis. Metal Oxides in Heterogeneous Catalysis deals with fundamental information on heterogeneous catalysis, including reaction mechanisms and kinetics approaches.There is also a focus on the classification of metal oxides used as catalysts, preparation methods and touches on

zeolites, mesoporous materials and Metal-organic frameworks (MOFs) in catalysis. It will touch on acid or base-type reactions, selective (partial) and total oxidation reactions, and enzymatic type reactions The book also touches heavily on the biomass applications of metal oxide catalysts and environmentally related/depollution reactions such as COVs elimination, DeNOx, and DeSOx. Finally, the book also deals with future trends and prospects in metal oxide-based heterogeneous catalysis. Presents case studies in each chapter that provide a focus on the industrial applications Includes fundamentals, key theories and practical applications of metal oxide-based heterogeneous catalysis in one comprehensive resource Edited, and contributed, by leading experts who provide perspectives on synthesis, characterization and applications A decade ago, the U.S. chemical industry was in decline. Of the more than 40 chemical manufacturing plants being built worldwide in the mid-2000s with more than $1 billion in capitalization, none were under construction in the United States. Today, as a result of abundant domestic supplies of affordable natural gas and natural gas liquids resulting from the dramatic rise in shale gas production, the U.S. chemical industry has gone from the world's highest-cost producer in 2005 to among the lowest-cost producers today. The low cost and increased supply of natural gas and natural gas liquids provides an opportunity to discover and develop new catalysts and processes to enable the direct conversion of natural gas and natural gas liquids into value-added chemicals with a lower carbon footprint. The economic implications of

developing advanced technologies to utilize and process natural gas and natural gas liquids for chemical production could be significant, as commodity, intermediate, and fine chemicals represent a higher-economic-value use of shale gas compared with its use as a fuel. To better understand the opportunities for catalysis research in an era of shifting feedstocks for chemical production and to identify the gaps in the current research portfolio, the National Academies of Sciences, Engineering, and Medicine conducted an interactive, multidisciplinary workshop in March 2016. The goal of this workshop was to identify advances in catalysis that can enable the United States to fully realize the potential of the shale gas revolution for the U.S. chemical industry and, as a result, to help target the efforts of U.S. researchers and funding agencies on those areas of science and technology development that are most critical to achieving these advances. This publication summarizes the presentations and discussions from the workshop. Sodium hypochlorite is an excellent disinfecting agent employed in water treatment, cleaning and laundry operations. Transport and handling safety concerns have direct public opinion towards the use of sodium hypochlorite rather than chlorine gas in water treatment, which represents a significant market expansion potential. This publication reviews the technical aspects of a industrial bleach production process similar to the Solvay Chemicals. The analysis also includes estimates for both the capital investment and the operating costs of typical plants on the US Gulf Coast and in Brazil. This study follows the same pattern as all Technology

Economics studies developed by Intratec. About Technology Economics Technology Economics studies are advisory services ordered by leading chemical companies, which are disclosed to public after an agreeded upon period of time. All Technology Economics studies are based on the same rigorous methodology and well-defined structure, encompassing: Process flow diagrams and material balances Raw material and utility consumptions Major equipment sizing Inside and outside battery limits capital costs Detailed fixed and variable manufacturing expenses The future of the precious metals is shiny and resistant. Although expensive and potentially replaceable by transition metal catalysts, precious metal implementation in research and industry shows potential. These metals catalyze oxidation and hydrogenation due to their dissociative behavior toward hydrogen and oxygen, dehydrogenation, isomerization, and aromatization, etc. The precious metal catalysts, especially platinum-based catalysts, are involved in a variety of industrial processes. Examples include Pt–Rh gauze for nitric acid production, the Pt/Al2O3 catalyst for cyclohexane and propylene production, and Pd/Al2O3 catalysts for petrochemical hydropurification reactions, etc. A quick search of the number of published articles in the last five years containing a combination of corresponding “metals” (Pt, Pd, Ru, Rh and Au) and “catalysts” as keywords indicates the importance of the Pt catalysts, but also the continuous increase in the contribution of Pd and Au. This Special Issue reveals the importance of precious metals in catalysis and focuses on mono- and bi-metallic

formulations of any supported precious metals and their promotional catalytic effect of other transition metals. The application of precious metals in diverse reactions, either homogeneous or heterogeneous, and studies of the preparation, characterization, and applications of the supported precious metal catalysts, are presented. 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. The

problems faced in propane dehydrogenation, PDH process are lack of information on the commercially obtained Pt-Sn/Al2O3 catalyst and formation of coke. Therefore, this research deals with characterization of regenerated Pt-Sn/Al2O3 catalyst obtained from PDH plant and coke formation during propane dehydrogenation process at different temperature. Analyses of these characteristics were performed using nitrogen adsorption method, X-Ray Diffraction, Field Emission Scanning Electron Microscopy, X-Ray Photoelectron Spectroscopy and Fourier Transform Infrared Spectroscopy. Effect of temperatures on coke formation is identified by studying the fraction of products formed over the catalyst using Temperature Programmed Reaction. XPS was able to pick up traces of carbon in regenerated catalyst with percentage of atomic composition of 7.750%. FTIR had suggested that most of the carbon exist in the form of alkane and alkene where ethylene and methane records the highest fraction of side products formed by TPR. The regenerated Pt-Sn/Al2O3 catalyst has a surface area of 103.554 m2/g and mean pore radius of 12.695 nm with highest crystallite sizes of 20.0 nm. As for the effect of temperature towards coke formation, more carbon precursors were produced at higher temperature suggesting that more coke will be formed on the catalyst resulting in less propylene formed at higher temperatures. Spent catalyst yields a lower surface area of 78.943 m2/g and means pore radius of 10.151 nm compared to regenerated catalyst. Besides, the coke formed on the catalyst forms a crystal which was detected by XRD with its size of 25.7 nm. The increment

of carbon content in the spent catalyst was traced by XPS where the percentage of atomic concentration increased to 31.75%. Discover tools to perform Life Cycle Analysis (LCA) and develop sustainable chemical technologies in this valuable guide for chemists, engineers and practitioners. Tackling one of the key challenges of modern industrial chemical engineering, this book introduces tools to assess the environmental footprint and economics of key chemical processes that make the ingredients of everyday products such as plastics, synthetic fibers, detergents and fuels. Describing diverse industrial processes in detail, it provides process flow diagrams including raw material sourcing, catalytic reactors, separation units, process equipment and recycle streams. The book clearly explains elements of LCA and how various software tools, available in the public domain and commercially, can be used to perform LCA. Supported by real-world practical examples and case studies provided by industrial and academic chemists and chemical engineers, this is an essential tool for readers involved in implementing LCA, and developing next-generation sustainable chemical technologies. This report presents a cost analysis of Polymer Grade (PG) Propylene production from propane using a dehydrogenation process. The process examined is similar to CB&I Lummus CATOFIN process. In this process, the dehydrogenation reaction is carried out in a fixed-bed reactor. This report examines one-time costs associated with the construction of a United States-based plant and the continuing costs associated with the daily operation of such a plant. More specifically, it

discusses: * Capital Investment, broken down by: - Total fixed capital required, divided in production unit (ISBL); infrastructure (OSBL) and contingency - Alternative perspective on the total fixed capital, divided in direct costs, indirect costs and contingency - Working capital and costs incurred during industrial plant commissioning and start-up * Production cost, broken down by: - Manufacturing variable costs (raw materials, utilities) - Manufacturing fixed costs (maintenance costs, operating charges, plant overhead, local taxes and insurance) - Depreciation and corporate overhead costs * Raw materials consumption, products generation and labor requirements * Process block flow diagram and description of industrial site installations (production unit and infrastructure) This report was developed based essentially on the following reference(s): (1) US Patent 20120014846, issued to Lummus Technology in 2012; (2) US Patent 8101541, issued to Sud-Chemie in 2012 Keywords: PG Propylene, Clariant, Sud-Chemie, Propene, PDH, On-Purpose Propylene Production Gas separation by membranes has acquired increasing importance in the petrochemical industry and is now a relatively well-established unit operation, especially in the monomer recovery of polymer production processes. Considering the current tight monomers market, polymer degassing steps present potential improvement opportunities, through the recovery of vent streams containing monomers. The economic analysis presented in this report is based upon the installation of a membrane-based propylene recovery unit in a polypropylene plant, a unit similar to MTR VaporSep(r). Such

measure was demonstrated to be attractive in the US Gulf Coast, due to propylene scarcity, which has recently raised its market value. The alternative of using such vent streams as fuel showed to be less interesting, since fuel prices are low, due to natural gas growing offerings. About the Publication Program The Improvement Economics Program is a program that provides, by way of periodic reports, insightful and unbiased reviews on process improvement opportunities, from both a technical and economic perspective. Each report presents the following topics: opportunity description schematics, such as flow diagrams technical details, such as heat and material balances, key performance indicators environmental impact analysis capital and operating costs breakdown alternative solutions overview This is a free full sample report offered by Intratec Solutions to demonstrate, in advance, the type of information you will get when you buy one of our reports, offering the same standard and structure (types of graphs, tables and descriptions) that you will find in all of our Cost Analysis Overview reports. This report presents alternatives for producing PG Propylene from different feedstocks and a cost comparison of these alternatives, across different countries. More specifically, the report compares the costs of PG Propylene production through the following pathways: * Pathway 1: Propylene Production from Light Naphtha * Pathway 2: Propylene Production from Ethylene and Butenes * Pathway 3: Propylene Production from Propane (with Hydrogen Generation) Pathway 1 corresponds to a steam cracker for Propylene production (ethylene as co-product). In Pathway 2, Propylene

is produced via metathesis reaction of ethylene with 2-butene (present in raffinate-2 feedstock). In Pathway 3, propane is dehydrogenated to Propylene with hydrogen generated being valued as fuel. The analysis presented in this report includes: * A comparison of the economic potential of the pathways listed above in several countries, comprising: - Comparative analysis of capital costs - Comparative analysis of production costs * Comparison between product price and raw materials costs of each pathway - An overview of each production pathway, including: - Raw material(s) consumption figures and product(s) generated - Related technology licensors and block flow diagram of representative industrial processes Keywords: Propene, Ethene, Steam Cracking, PDH, Propane Dehydrogenation, Olefins Conversion Technology, OCT This book is a printed edition of the Special Issue "State-of-the-Art Materials Science in Belgium 2017" that was published in Materials This book is essential reading for scientists and students interested in both organic and inorganic chemical technology. The authors cover the production of chemical reagents as well as trends from adjacent fields including biotechnology and process simulation. Chemical Technologies and Processes is of interest to chemical engineers, materials scientists, as well as chemists in both academia and industry. The Earth's natural resources are finite and easily compromised by contamination from industrial chemicals and byproducts from the degradation of consumer products. The growing field of green and sustainable chemistry seeks to address this through the

development of products and processes that are environmentally benign while remaining economically viable. Inorganic chemistry plays a critical role in this endeavor in areas such as resource extraction and isolation, renewable energy, catalytic processes, waste minimization and avoidance, and renewable industrial feedstocks. Sustainable Inorganic Chemistry presents a comprehensive overview of the many new developments taking place in this rapidly expanding field, in articles that discuss fundamental concepts alongside cutting-edge developments and applications. The volume includes educational reviews from leading scientists on a broad range of topics including: inorganic resources, sustainable synthetic methods, alternative reaction conditions, heterogeneous catalysis, photocatalysis, sustainable nanomaterials, renewable and clean fuels, water treatment and remediation, waste valorization and life cycle sustainability assessment. The content from this book will be added online to the Encyclopedia of Inorganic and Bioinorganic Chemistry. The growing exploitation of shale gas in the United States raised the propane availability, reducing its prices. This, coupled with growing demand for propylene, made of the propane dehydrogenation (PDH) a promising alternative for on-purpose propylene production. The technical aspects of a PDH process similar to the Lummus CATOFIN technology are reviewed. The analysis also includes estimates for both the capital investment and the operating costs of typical plants on the US Gulf Coast and in China. This study follows the same pattern as all Technology Economics studies developed by Intratec. About

Technology Economics Technology Economics studies are advisory services ordered by leading chemical companies, which are disclosed to public after an agreeded upon period of time. All Technology Economics studies are based on the same rigorous methodology and well-defined structure, encompassing: Process flow diagrams and material balances Raw material and utility consumptions Major equipment sizing Inside and outside battery limits capital costs Detailed fixed and variable manufacturing expenses
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This report presents a cost analysis of Polymer Grade (PG) Propylene production from propane using a dehydrogenation process The process examined is similar to UOP Oleflex process. In this process, the dehydrogenation reaction is carried out in a moving-bed reactor. This report was developed based essentially on the following reference(s): (1) US Patent 20120108877, issued to UOP in 2012 (2) US Patent 5457256, issued to UOP in 1995 Keywords: PG Propylene, Continuous Catalyst Regeneration, CCR, Propene, PDH, On-Purpose Propylene Production 30th European Symposium on Computer Aided Chemical Engineering, Volume 47 contains the papers presented at the 30th European Symposium of Computer Aided Process Engineering (ESCAPE) event held in Milan, Italy, May 24-27, 2020. It is a valuable resource for chemical engineers, chemical process engineers, researchers in industry and academia, students, and consultants for chemical industries. Presents findings and discussions from the 30th European Symposium of Computer Aided

Process Engineering (ESCAPE) event Offers a valuable resource for chemical engineers, chemical process engineers, researchers in industry and academia, students, and consultants for chemical industries The second edition of Comprehensive Organic Synthesis—winner of the 2015 PROSE Award for Multivolume Reference/Science from the Association of American Publishers—builds upon the highly respected first edition in drawing together the new common themes that underlie the many disparate areas of organic chemistry. These themes support effective and efficient synthetic strategies, thus providing a comprehensive overview of this important discipline. Fully revised and updated, this new set forms an essential reference work for all those seeking information on the solution of synthetic problems, whether they are experienced practitioners or chemists whose major interests lie outside organic synthesis. In addition, synthetic chemists requiring the essential facts in new areas, as well as students completely new to the field, will find Comprehensive Organic Synthesis, Second Edition an invaluable source, providing an authoritative overview of core concepts. Winner of the 2015 PROSE Award for Multivolume Reference/Science from the Association of American Publishers Contains more than170 articles across nine volumes, including detailed analysis of core topics such as bonds, oxidation, and reduction Includes more than10,000 schemes and images Fully revised and updated; important growth areas—including combinatorial chemistry, new technological, industrial, and green chemistry developments—are covered extensively Authored by a top-level team of both

academic and industrial researchers in the field, this is an up-to-date review of mesoporous zeolites. The leading experts cover novel preparation methods that allow for a purpose-oriented fine-tuning of zeolite properties, as well as the related materials, discussing the specific characterization methods and the applications in close relation to each individual preparation approach. The result is a self-contained treatment of the different classes of mesoporous zeolites. With its academic insights and practical relevance this is a comprehensive handbook for researchers in the field and related areas, as well as for developers from the chemical industry. An essential companion for catalysis researchers and professionals studying economically viable and eco-friendly catalytic strategies for energy conversion In the two-volume Heterogeneous Nanocatalysis for Energy and Environmental Sustainability, a team of distinguished researchers deliver a comprehensive discussion of fundamental concepts in, and practical applications of, heterogeneous nanocatalysis for alternative energy production, biomass conversion, solar energy, green fuels, H2 production, fuel cells, electrochemical energy conversion processes, CO2 conversion, clean water, and environmental protection. The volumes cover the design and catalytic performance of various nanocatalysts, including nanosized metals and metal oxides, supported metal nanoparticles, inverse oxide-metal nanocatalysts, core-shell nanocatalysts, nanoporous zeolites, nanocarbon composites, and metal oxides in confined spaces. Each chapter contains a critical discussion of the opportunities and challenges posed

by the use of nanosized catalysts for practical applications. Volume 1 – Energy Applications focuses on the conversion of renewable energy (biomass/solar) into green fuels and chemicals, ammonia synthesis, clean hydrogen production, and electrochemical energy conversion processes using a variety of nanosized catalysts. It also offers: A thorough introduction to heterogeneous catalysis and nanocatalysis, as well as a discussion of catalytic active sites at nano-scale range Comprehensive explorations of the methods for control and activation of nanosized catalysts Practical discussions of C3N4-based nanohybrid catalysts for solar hydrogen production via water splitting Nanosized catalysts in visible light photocatalysis for sustainable organic synthesis Applications of MXenes in electrocatalysis Perfect for researchers, postgraduate students, chemists, and engineers interested in heterogeneous catalysis and nanocatalysis, Heterogeneous Nanocatalysis for Energy and Environmental Sustainability will also earn a place in the libraries of professionals working in alternative energy production, biomass conversion, solar energy, green fuels, H2 production, fuel cells, electrochemical energy conversion processes, CO2 conversion, clean water, and environmental protection. The tight propylene market contributed to the rising of new and novel lower-cost chemical processes for on-purpose propylene production technologies, like the Propane Dehydrogenation (PDH) technology. This report analyzes a PDH process similar to the licensed by Lummus CATOFIN(r). It is presented a technical and economic evaluation of a unit located in the US Gulf Coast, China

and Brazil. While China presented the lowest CAPEX, the USA presented the most advantageous operational margins, due to the rise of shale gas and reduction in propane prices. Although China still depends on imported propane from Middle East, being subjected to shortages of supply, the historical operational margins are high enough to explain the number of PDH planned projects in the country. About the Publication Program The Technology Economics Program is a program that provides, by way of periodic reports, in-depth techno-economic assessments covering mature process technologies used by the chemical, polymer, refining and allied industries. Each report presents the following topics: process flow diagrams and description heat and material balances major equipment list equipment cost estimates bulk material and installation costs inside and outside battery limits capital costs process yields, raw material and utility consumptions fixed costs contributions process profitability by location With the recent advent of nanotechnology, research and development in the area of nanostructured materials has gained unprecedented prominence. Novel materials with potentially exciting new applications are being discovered at a much higher rate than ever before. Innovative tools to fabricate, manipulate, characterize and evaluate such materials are being developed and expanded. To keep pace with this extremely rapid growth, it is necessary to take a breath from time to time, to critically assess the current knowledge and provide thoughts for future developments. This book represents one of these moments, as a number of prominent scientists in

nanostructured materials join forces to provide insightful reviews of their areas of expertise, thus offering an overall picture of the state-- the art of the field. Nanostructured materials designate an increasing number of materials with designed shapes, surfaces, structures, pore systems, etc. Nanostructured materials with modified surfaces include those whose surfaces have been altered via such techniques as grafting and tethering of organic or organometallic species, or through various deposition procedures including electro, electroless and vapor deposition, or simple adsorption. These materials find important applications in catalysis, separation and environmental remediation. Materials with patterned surfaces, which are essential for the optoelectronics industry, constitute another important class of surface-modified nanostructured materials. Other materials are considered nanostructured because of their composition and internal organization. A decade ago, the U.S. chemical industry was in decline. Of the more than 40 chemical manufacturing plants being built worldwide in the mid-2000s with more than $1 billion in capitalization, none were under construction in the United States. Today, as a result of abundant domestic supplies of affordable natural gas and natural gas liquids resulting from the dramatic rise in shale gas production, the U.S. chemical industry has gone from the world's highest-cost producer in 2005 to among the lowest-cost producers today. The low cost and increased supply of natural gas and natural gas liquids provides an opportunity to discover and develop new catalysts and processes to enable the direct conversion of natural gas and natural gas liquids into value-added

chemicals with a lower carbon footprint. The economic implications of developing advanced technologies to utilize and process natural gas and natural gas liquids for chemical production could be significant, as commodity, intermediate, and fine chemicals represent a higher-economic-value use of shale gas compared with its use as a fuel. To better understand the opportunities for catalysis research in an era of shifting feedstocks for chemical production and to identify the gaps in the current research portfolio, the National Academies of Sciences, Engineering, and Medicine conducted an interactive, multidisciplinary workshop in March 2016. The goal of this workshop was to identify advances in catalysis that can enable the United States to fully realize the potential of the shale gas revolution for the U.S. chemical industry and, as a result, to help target the efforts of U.S. researchers and funding agencies on those areas of science and technology development that are most critical to achieving these advances. This publication summarizes the presentations and discussions from the workshop. This book describes new theories and applications of artificial neural networks, with a special focus on answering questions in neuroscience, biology and biophysics and cognitive research. It covers a wide range of methods and technologies, including deep neural networks, large scale neural models, brain computer interface, signal processing methods, as well as models of perception, studies on emotion recognition, self-organization and many more. The book includes both selected and invited papers presented at the XXII International Conference on

Neuroinformatics, held on October 12-16, 2020, Moscow, Russia. Ethylene is most frequently produced from petroleum-based feedstock. However, rising oil prices coupled with global concerns about sustainability and global warming have motivated research into ethylene manufacture from renewable sources. Fermentation-derived ethanol has been increasingly used as raw material for renewable ethylene production, presenting the primary advantage of being made from CO2 removed from the atmosphere. The technical aspects of a process to produce ethylene via ethanol dehydration are reviewed, as well as the key economic parameters for the profitability of an ethanol dehydration plant. This study follows the same pattern as all Technology Economics studies developed by Intratec. About Technology Economics Technology Economics studies are advisory services ordered by leading chemical companies, which are disclosed to public if they allow so. All Technology Economics studies are based on the same rigorous methodology and well-defined structure, encompassing: Process flow diagrams and material balances Raw material and utility consumptions Major equipment sizing Inside and outside battery limits capital costs Detailed fixed and variable manufacturing expenses The rise of shale gas and the consequent reduction in propane prices added to the interest about Propane Dehydrogenation (PDH) processes - one of on-purpose propylene production technologies. This publication reviews the technical aspects of a PDH technology similar to the Uhde STAR process(r), which employs an oxydehydrogenation step. The analysis also includes

estimates for both the capital investment and the operating costs of typical plants on the US Gulf Coast and in China. This study follows the same pattern as all Technology Economics studies developed by Intratec. About Technology Economics Technology Economics studies are advisory services ordered by leading chemical companies, which are disclosed to public after an agreeded upon period of time. All Technology Economics studies are based on the same rigorous methodology and well-defined structure, encompassing: Process flow diagrams and material balances Raw material and utility consumptions Major equipment sizing Inside and outside battery limits capital costs Detailed fixed and variable manufacturing expenses 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 The book discusses the sciences of operations, converting raw materials into desired products on an industrial scale by applying chemical transformations and other industrial technologies. Basics of chemical technology combining chemistry, physical transport, unit operations and chemical reactors are thoroughly prepared for an easy understanding. The tight propylene market contributed to the rising of new and novel lower-cost chemical processes for on-purpose propylene production technologies. Propane Dehydrogenation (PDH) technology is one of the promising processes that arises to fulfill this need. This report analyzes a PDH process similar to UOP Oleflex. It is presented a detailed technical and economic evaluation of a unit located in the US Gulf Coast. Also, the evaluation is conducted for a plant constructed in Brazil and China. Although China presented the lowest CAPEX, the USA presented the most attractive return of investment, due to the availability of low price propane, obtained from shale gas. The rising number of planned plants for both regions confirms such trends. About the Technology Economics Program It is a program that provides, by way of periodic reports, in-depth techno-economic assessments covering mature process technologies used by the chemical, polymer, refining and allied industries. Each report presents the following topics: process flow diagrams and description heat and material balances major equipment list equipment cost estimates bulk material and installation costs inside and outside battery limits capital costs process yields, raw material

and utility consumptions fixed costs contributions process profitability by location A comprehensive textbook on petrochemical conversion processes for petroleum and natural gas fractions as produced by refinery operations This innovative textbook provides essential links between the chemical sciences and chemical technology, between petrochemistry and hydrocarbon technology. The book brings alive key concepts forming the basis of chemical technology and presents a solid background for innovative process development. In all chapters, the processes described are accompanied by simplified flow schemes, encouraging students to think in terms of conceptual process designs. Petrochemistry: Petrochemical Processing, Hydrocarbon Technology and Green Engineering introduces students to a variety of topics related to the petrochemical industry, hydrocarbon processing, fossil fuel resources, as well as fuels and chemicals conversion. The first chapter covers the fundamentals and principals for designing several of the processes in the book, including discussions on thermodynamics, chemical kinetics, reactor calculations, and industrial catalysts. The following chapters address recent advances in hydrocarbon technology, energy technology, and sources of hydrocarbons. The book then goes on to discuss the petrochemical industry based on four basic pillars, all derived from petroleum and natural gas: Production of lower alkenes; other sources of lower alkenes; petrochemicals from C2-C3 alkenes Production of BTX aromatics; chemicals from BTX aromatics C1 technology Diversification of petrochemicals The growing importance of sustainable technology,

process intensification and addressing greenhouse gas emissions is reflected throughout the book. Written for advanced students working in the areas of petrochemistry, hydrocarbon technology, natural gas, energy materials and technologies, alternative fuels, and recycling technologies the book is also a valuable reference for industrial practitioners in the oil and gas industry. A comprehensive study about on-purpose propylene production via propane dehydrogenation (PDH), a promising alternative that arises from the growing availability of low-cost propane in the United States, due to the exploitation of shale gas in the country. The technical aspects of a PDH process similar to the UOP Oleflex technology are reviewed. The analysis also includes estimates for both the capital investment and the operating costs of typical plants on the US Gulf Coast and in China. This study follows the same pattern as all Technology Economics studies developed by Intratec. About Technology Economics Technology Economics studies are advisory services ordered by leading chemical companies, which are disclosed to public after an agreeded upon period of time. All Technology Economics studies are based on the same rigorous methodology and well-defined structure, encompassing: Process flow diagrams and material balances Raw material and utility consumptions Major equipment sizing Inside and outside battery limits capital costs Detailed fixed and variable manufacturing expenses Propane dehydrogenation (PDH) has recently received extensive attention by the scientific community due to the growing gap between propylene demand and supply and the large availability of propane

derived from shale gas. Pt- and Cr-based catalysts have been commercialized in the Oleflex process and Catofin process, respectively, as two on-purpose propylene synthesis processes. The high price of Pt and the environmental concerns of Cr have led to the search for other candidates for propane dehydrogenation. Metal cations exchanged inside zeolite have been shown to be efficient catalysts for propane dehydrogenation. However, identifying the active site in the zeolite remains an unresolved and important issue for new catalyst development. This report presents alternatives for producing PG Propylene from different feedstocks and a cost comparison of these alternatives, across different countries. More specifically, the report compares the costs of PG Propylene production through the following pathways:* Pathway 1: Propylene Production from Light Naphtha* Pathway 2: Propylene Production from Ethylene and Butenes* Pathway 3: Propylene Production from Propane (with Hydrogen Generation)Pathway 1 corresponds to a steam cracker for Propylene production (ethylene as co-product). In Pathway 2, Propylene is produced via metathesis reaction of ethylene with 2-butene (present in raffinate-2 feedstock). In Pathway 3, propane is dehydrogenated to Propylene with hydrogen generated being valued as fuel. The analysis presented in this report includes:* A comparison of the economic potential of the pathways listed above in several countries, comprising: * Comparative analysis of capital costs * Comparative analysis of production costs * Comparison between product price and raw materials costs of each pathway * An overview of each production pathway,

including: * Raw material(s) consumption figures and product(s) generated * Related technology licensors and block flow diagram of representative industrial processes Keywords: Propene, Ethene, Steam Cracking, PDH, Propane Dehydrogenation, Olefins Conversion Technology, OCT Thanks to their outstanding hydrogen selectivity, palladium membranes have attracted extensive R&D interest. They are a potential breakthrough technology for hydrogen production and also have promising applications in the areas of thermochemical biorefining. This book summarises key research in palladium membrane technologies, with particular focus on the scale-up challenges. After an introductory chapter, Part one reviews the fabrication of palladium membranes. Part two then focuses on palladium membrane module and reactor design. The final part of the book reviews the operation of palladium membranes for synthesis gas/hydrogen production, carbon capture and other applications. Review of manufacture and design issues for palladium membranes Discussion of the applications of palladium membrane technology, including solar steam reforming, IGCC plants, NGCC plants, CHP plants and hydrogen production Examples of the technology in operation Membrane Reactors for Hydrogen Production Processes deals with technological and economic aspects of hydrogen selective membranes application in hydrogen production chemical processes. Membrane Reactors for Hydrogen Production Processes starts with an overview of membrane integration in the chemical reaction environment, formulating the thermodynamics and kinetics of membrane reactors and

assessing the performance of different process architectures. Then, the state of the art of hydrogen selective membranes, membrane manufacturing processes and the mathematical modeling of membrane reactors are discussed. A review of the most useful applications from an industrial point of view is given. These applications include: natural gas steam reforming, autothermal reforming, water gas shift reaction, decomposition of hydrogen sulphide, and alkanes dehydrogenation. The final part is dedicated to the description of a pilot plant where the novel configuration was implemented at a semi-industrial scale. Plant engineers, researchers and postgraduate students will find Membrane Reactors for Hydrogen Production Processes a comprehensive guide to the state of the art of membrane reactor technology. Advances in Catalysis fills the gap between the journal papers and textbooks across the diverse areas of catalysis research. For more than 60 years, this series has been dedicated to recording progress in the field of catalysis, providing the scientific community with comprehensive and authoritative reviews. This series is an invaluable and comprehensive resource for chemical engineers and chemists working in the field of catalysis in both academia and industry. Authoritative reviews written by experts in the field Topics selected reflect progress in the field and include catalyst synthesis, catalyst characterization, catalytic chemistry, reaction engineering, computational chemistry, and physics Insightful and critical articles, fully edited to suit various backgrounds Leveraging Synergies Between Refining and Petrochemical Processes provides a detailed description of

the interfaces and connections between crude oil refining and petrochemicals. It offers a view of global and regional markets and economic opportunities for synergies between these sectors. Features: Shows a global and regional market outlook for crude oil refining and petrochemical sectors Explores economic and market opportunities for taking advantage of the synergies between both sectors Analyzes the technical challenges and opportunities that come with these synergies Gives an outlook and prediction of what companies will be able to achieve in the mid-term future Provides introductory and explanatory material as well as in-depth insight into future technology and market developments This book serves as a reference for professionals in chemical engineering, oil and gas engineering, and industrial chemistry. It aims to help engineers and industry professionals understand the challenges and the potential benefits of developing expansion or optimization projects that may bridge the gap between refining and petrochemicals. Current Trends and Future Developments in (Bio-) Membranes: Recent Advances in Metallic Membranes presents recent developments in metallic membranes used in membrane reactors to save energy. It also offers a comprehensive review of the present state-of-the-art on the fabrication and design of metallic membranes and membrane reactors, considering various applications. This book focuses on the structure, preparation, characterization and applications of metallic membranes and membrane reactors, as well as transport mechanisms and simulation aspects. As recent research has focused on the

development of metallic membranes and their applications, this book is an ideal reference on different production procedures and their use. Reviews metallic membranes research and applications Outlines the mechanisms of metallic membrane based processes Includes structure, preparation, characterization and properties of metallic membranes Highlights various applications of metallic membranes in energy production Rising oil prices and global concerns about sustainability and global warming have motivated research into ethylene manufacture from renewable sources. This report reviews the production of ethylene from ethanol dehydration in a process based on the patent published by BP Chemicals. It is presented a technical and economic evaluation of a unit located in the US Gulf Coast. In addition, a sensitivity analysis was performed in which the effects of variations in prices and technical parameters on the investment and the operating costs were studied. Green ethylene must be sold with an increased premium over fossil-based ethylene of about 50% in order to make the investment attractive. This study follows the same pattern as all Research Potential studies developed by Intratec. About Research Potential Research Potential studies are advisory services ordered by leading chemical companies, which are disclosed to public after an agreeded upon period of time. All Research Potential studies are based on the same rigorous methodology and well-defined structure, encompassing: Process flow diagrams and material balances Raw material and utility consumptions Major equipment sizing Inside and outside battery limits capital costs

Detailed fixed and variable manufacturing expenses Sensitivity analysis Palladium (Pd)-based membranes have received a great deal of attention from both academia and industry thanks to their ability to selectively separate hydrogen from gas streams. The integration of such membranes with appropriate catalysts in membrane reactors allows for hydrogen production with CO2 capture that can be applied in smaller bioenergy or combined heat and power (CHP) plants, as well as in large-scale power plants. Pd-based membranes are therefore regarded as a Key Enabling Technology (KET) to facilitate the transition towards a knowledge-based, low-carbon, and resource-efficient economy. This Special Issue of the journal Membranes on “Pd-based Membranes: Overview and Perspectives” contains nine peer-reviewed articles. Topics include manufacturing techniques, understanding of material phenomena, module and reactor design, novel applications, and demonstration efforts and industrial exploitation.

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