Method For Converting Waste Plastic To Hydrocarbon Fuel

This book Technological Advancement in Mechanical & Automotive Engineering gathers selected papers submitted to the 6th International Conference on Mechanical Engineering Research in fields related to automotive engineering, thermal and fluid engineering, and energy. This proceeding consists of papers in aforementioned related fields presented by researchers and scientists from universities, research institutes and industry showcasing their latest findings and discussions with an emphasis on innovations and developments in embracing the new norm resulting from the COVID pandemic.

Advanced Technology for the Conversion of Waste into Fuels and Chemicals: Volume 1: Biological Processes presents advanced and combined techniques that can be used to convert waste to energy, including combustion, gasification, paralysis, anaerobic digestion and fermentation. The book focuses on solid waste conversion to fuel and energy and presents the latest advances in the design, manufacture, and application of conversion technologies. Contributors from the fields of physics, chemistry, metallurgy, engineering and manufacturing present a truly trans-disciplinary picture of the field. Chapters cover important aspects surrounding the conversion of solid waste into fuel and chemicals, describing how valuable energy can be recouped from various waste materials. As huge volumes of solid waste are produced globally while huge amounts of energy are produced from fossil fuels, the technologies described in this comprehensive book provide the information necessary to pursue clean, sustainable power from waste material. Presents the latest advances in waste to energy techniques for converting solid waste to valuable fuel and energy Brings together contributors from physics, chemistry, metallurgy, engineering and the manufacturing industry Includes advanced techniques such as combustion, gasification, paralysis, anaerobic digestion and fermentation Goes far beyond municipal waste, including discussions on recouping valuable energy from a variety of industrial waste materials Describes how waste to energy technologies present an enormous opportunity for clean, sustainable energy

The concept of sustainability is already applied in all industrial sectors. The fight against climate change therefore forces us to look for alternatives in the way we move. Different alternative fuels are discussed in this book: from liquid and gaseous biofuels to electricity. Moreover, waste to fuel processes are another option to produce a significant amount of fuels. In the spirit of this book, there is not only collecting different alternatives, but creativity is also promoted in the readers of this book, so that they take an active part of the solution necessary to reduce greenhouse gas emissions.

This book presents the latest advances in and current research perspectives on the field of urban/industrial solid waste recycling for bio-energy and bio-fuel recovery. It chiefly focuses on five main thematic areas, namely bioreactor landfills coupled with energy and nutrient recovery; microbial insights into anaerobic digestion; greenhouse emission assessment; pyrolysis techniques for special waste treatment; and industrial waste stabilization options. In addition, it compiles the results of case studies and solid waste management perspectives from different countries.

Plastic Waste and Recycling

Recent Developments in Chemistry, Physics, Materials Science and Device Applications

Recycled Polymers

Feedstock Recycling of Plastic Wastes

Chemistry, Emission Control, Radioactive Pollution and Indoor Air Quality

Carbon Nanotechnology

This volume discusses the structure and growth of the plastics industry, comprehensively displaying the complete cycle of plastics from raw materials to waste and solutions related to this waste - presenting practical cost scenarios for the collection and disposal of waste.;Examining the issue of plastics waste in a broad social and environmental context, Plastics Waste Management: considers the regulations imposed on waste disposal and aspects of pollution control acts; provides a technical overview of polymers, classificatio and properties as well as the plastics industry, polymer production, and consumption; addresses extrusion basics and polymers' compatibility in a mixture of plastic waste; describes the recycling of mixed plastics waste; and explores design considerations and produ life cycles with respect to environmentally friendly products in packaging applications.;Furnishing more than 400 bibliographic citations, Plastics Waste Management is a reference for pollution control, plastics, environmental, polymer and chemical engineers; recycling facility operators; plastics designers; and upper-level undergraduate and graduate students in these disciplines.

Plastic Waste and RecyclingEnvironmental Impact, Societal Issues, Prevention, and SolutionsAcademic Press

Energy recovery from waste resources holds a significant role in the sustainable waste management hierarchy to support the concept of circular economies and to mitigate the challenges of waste originated problems of sanitation, environment, and public health. Today, waste disposal to landfills is the most widely used methodology, particularly in developing countries, because of limited budgets and lack of efficient infrastructure and facilities to maintain efficient and practical global standards. As a consequence, the dump-sites or non-sanitary landfills have become the significant sources of greenhouse gases emissions, soil and water contamination, unpleasant odors, leachate, and disease spreading vectors, flies, and rodents. However, waste can be utilized to produce a range of po products such as energy, fuels and value-added products under waste biorefineries. A holistic and quantitative view, such as waste biorefinery, on waste management must be linked to the actual country, taking into account its socio-economic situation, local waste sources, and composition, as well as the available markets for the recovered energy and products. Therefore, it is critical to understand that solutions cannot be just copied from one region to the others. In fact, all waste handling, transportation, and treatment can represent a burden to the cities' environment and macro and micro economics, except for the benefits obtained from recovered materials and energy. Equally significant is a clear and quantitative understanding of the industrial, and public potential of utilizing recovered materials and energy in the markets as these can be reached without exacerbating the environmental issues using excessive transport. The book explores new advancements and discoveries on the development of emerging waste-to-energy technologies practical implementation, and lessons learned from sustainable wastemanagement practices under waste biorefinery concept, which will accelerate the growth of circular economies in the world. The articles presented in this book have been written by expert researchers and academics working in institutions at different countries across the world including Germany, Greece, Japan, South Korea, China, Saudi Arabia, Pakistan, Indonesia, Malaysia, Iran, and India. The research articles have been arranged into three main subject categories; 1) Resource recovery from waste, 2) Waste to energy technologies and 3) Waste biorefineries. This book will serve as an important resource for research students, academics, industry, policy makers, and government agencies working in the field integrated waste management, energy and resource recovery, waste to energy technologies, waste biorefineries etc. The editorial team of this book is very grateful to all the authors for their excellent contributions and making the book successful.

Recycling of waste PE plastic converts them from one form to other which remains in environment and creates the environmental pollution . Major attention of this work is given for the conversion of waste PE plastic to other products, which will not create pollution in the environment. The conversion is done with eco-friendly method. Pyrolysis (thermal cracking) of plastic waste is possible to obtain a mixture of hydrocarbons, working at atmospheric pressure and moderate temperatures.Pyrolysis by Chemical Vapour Deposition (CVD) yields relatively narrow molecular weight distribution of hydrocarbons and can improve the selectivity in products obtained. Thus, the CVD pyrolysis is an environmentally friendly process, which is economically viable too.

Zero Waste Home

Plastics Process Analysis, Instrumentation, and Control

Gasification for Practical Applications

Energy Recovery Processes from Wastes

Select Proceedings of TIME 2021

Waste Biorefineries: Future Energy, Green Products and Waste Treatment

Seminar paper from the year 2018 in the subject Business economics - Economic Policy, grade: A, University of Dhaka (Institute of Business Administration), course: Entrepreneurship, language: English, abstract: This work analyzes an alternative to traditional recycling. It focuses on the conversion of plastics, a non-biodegradable material. There is a huge amount of plastic wastes lying around and no systematic process present in order to recycle them. The primary reason why the rising pile of plastic is concerning for Bangladesh is its 'Non-Biodegradability'. When being thrown on land, it destroys the fertility of the soil. Similarly, for the same reason, it is harming the sea, river and oceans‘ lives when thrown on it.
Through this business plan, I want to bring insight to an alternative energy production mean, that is the plastic waste to crude oil conversion. With superior efficiency level, industrial waste will also reduce by a huge extent as plastic waste constitutes most of these wastes. Plastic is a non-biodegradable product, which means it cannot be dumped into the ground. Plastic recycling has now become a very key element to protect the nature. Whether in Asia or in Europe, a number of countries are involved in plastic waste recycling. However, that is not quite observed in our country. As a result of which, the pile of plastic is perpetually rising. With superior efficiency level, industrial waste will also be reduced by a huge extent as plastic waste constitutes most of these wastes. Plastic pollution is an ever-concerning issue. We should not only look for steps to reduce it, but also to re-use the ones that are being wasted.
Through this social business plan, the primary goal is to help reduce industrial wastes by a large extent. The need for crude oil is massive for most industries. If plastic wastes generated in those industries and factories were in fact converted into oil, that would reduce the operational expenses by a sharp margin and, more importantly, will reduce a big chunk of their waste.

The use of plastic materials has seen a massive increase in recent years, and generation of plastic wastes has grown proportionately. Recycling of these wastes to reduce landfill disposal is problematic due to the wide variation in properties and chemical composition among the different types of plastics. Feedstock recycling is one of the alternatives available for consideration, and Feedstock Recycling of Plastic Wastes looks at the conversion of plastic wastes into valuable chemicals useful as fuels or raw materials. Looking at both scientific and technical aspects of the recycling developments, this book describes the alternatives available. Areas include chemical depolymerization, thermal processes, oxidation and hydrogenation. Besides conventional treatments, new technological approaches for the degradation of plastics, such as conversion under supercritical conditions and coprocessing with coal are discussed. This book is essential reading for those involved in plastic recycling, whether from an academic or industrial perspective. Consultants and government agencies will also find it immensely useful.

This book discusses the recent advances in the wastes recycling technologies to provide low-cost and alternative ways for nanomaterials production. It shows how carbon nanomaterials can be synthesized from different waste sources such as banana fibers, argan (Argania spinosa) seed shells, corn grains, camellia oleifera shell, sugar cane bagasse, oil palm (empty fruit bunches and leaves) and palm kernel shells. Several nanostructured metal oxides (MnO2, Co3O4,....) can be synthesized via recycling of spent batteries. The recovered nanomaterials can be applied in many applications including: Energy (supercapacitors, solar cells, etc.) water treatments (heavy metal ions and dyes removal) and other applications. Spent battery and agriculture waste are rich precursors for metals and carbon, respectively. The book also explores the various recycling techniques, agriculture waste recycling, batteries recycling, and different applications of the recycled materials.

This book presents advanced knowledge and techniques to improve food quality, such as organic farming, fertilization using waste, reducing arsenic in food, soil restoration, forage production in arid regions and weed control. Agriculture is actually facing two major challenges, feeding an ever-growing population and providing safe food in the context of pollution, climate change and the future circular economy.

The Combustion of Organic Polymers

Select Proceedings of ICAIASM 2019

Polymer Waste Management

A Social Business Plan for an Alternative to Traditional Recycling

Waste Recycling Technologies for Nanomaterials Manufacturing

The Ultimate Guide to Simplifying Your Life by Reducing Your Waste

“Tells a story that could inspire everyday behavior change for all of us. Small steps, leading to one big milestone: a planet free of plastic pollution.” —Daniella Dimitrova Russo, CEO and founder of Think Beyond PlasticTM Like many people, Beth Terry didn’t think an individual could have much impact on the environment. But while laid up after surgery, she read an article about the staggering amount of plastic polluting the oceans, and decided then and there to kick her plastic habit. In Plastic-Free, she shows you how you can too, providing personal anecdotes, stats about the environmental and health problems related to plastic, and individual solutions and tips on how to limit your plastic footprint. Presenting both beginner and advanced steps, Terry includes handy checklists and tables for easy reference, ways to get involved in larger community actions, and profiles of individuals—Plastic-Free Heroes—who have gone beyond personal solutions to create change on a larger scale. Fully updated, Plastic-Free also includes sections on letting go of eco-guilt, strategies for coping with overwhelming problems, and ways to relate to other people who aren’t as far along on the plastic-free path. Both a practical guide and the story of a personal journey from helplessness to empowerment, Plastic-Free is a must-read for those concerned about the ongoing health and happiness of themselves, their children, and the planet. “This is the tool that we’ve all been waiting for to ease the transition to going plastic-free. Time to wake up. Peace.” —Rosanna Arquette, actor, Plastic Pollution Coalition member “Practical and hopeful, with a kind of cheerleading charm.” —The Washington Post

This report examines the issue of converting plastics waste into energy and/or useful chemicals. Much plastic material is discarded as waste, such as packaging and end-of-life vehicle components. This report introduces the different waste management options. It discusses the methods available for treating mixed plastics waste and PVC-rich plastics waste. The emphasis in this report is on technologies which are already being used or assessed for use on a commercial scale. Comparisons are made between the different types of recycling currently available in terms of life cycle assessment and environmental impact. Feedstock recycling is discussed extensively in this review. This report is accompanied by around 400 abstracts from papers in the Rapra Polymer Library database.

Pyrolysis is a recycling technique converting plastic waste into fuels, monomers, or other valuable materials by thermal and catalytic cracking processes. It allows the treatment of mixed, unwashed plastic wastes. For many years research has been carried out on thermally converting waste plastics into useful hydrocarbons liquids such as crude oil and diesel fuel. Recently the technology has matured to the point where commercial plants are now available. Pyrolysis recycling of mixed waste plastics into generator and transportation fuels is seen as the answer for recovering value from unwashed, mixed plastics and achieving their desired diversion from landfill. This book provides an overview of the science and technology of pyrolysis of waste plastics. It describes the types of plastics that are suitable for pyrolysis recycling, the mechanism of pyrolytic degradation of various plastics, characterization of the pyrolysis products and details of commercially mature pyrolysis technologies. This book also covers co-pyrolysis technology, including: waste plastic/waste oil, waste plastics/coal, and waste plastics/rubber.

Nanotechnology is no longer a merely social talking point and is beginning to affect the lives of everyone. Carbon nanotechnology as a major shaper of new nanotechnologies has evolved into a truly interdisciplinary field, which encompasses chemistry, physics, biology, medicine, materials science and engineering. This is a field in which a huge amount of literature has been generated within recent years, and the number of publications is still increasing every year. Carbon Nanotechnology aims to provide a timely coverage of the recent development in the field with updated reviews and remarks by world-renowned experts. Intended to be an exposition of cutting-edge research and development rather than a kind of conference proceeding, Carbon Nanotechnology will be very useful not only to experienced scientists and engineers, who wish to broaden their knowledge of the wide-ranging nanotechnology and/or to develop practical devices, but also to graduate and senior undergraduate students who look to make their mark in this field of the future. · A comprehensive treatment from materials chemistry and structure-property to practical applications · Offers an in-depth analysis of various carbon nanotechnologies from both fundamental and practical perspectives · An easily accessible assessment of the materials properties and device performances based on all of the major classes of carbon nanomaterials, including: carbon fiber; diamond; C60; and carbon nanotubes · A concise compilation of the practical applications of carbon nanotechnologies from polymer-carbon nanocomposites to sensors, electron emitters, and molecular electronics

Concept Behind Conversion of Wastes Into Fuel

Converting Waste Plastics Into Diesel and Other Fuels

Waste Plastic to Carbon Nano Materials

Progressive Thermochemical Biorefining Technologies

Volume 1: Biological Processes

Advanced and Emerging Technologies for Resource Recovery from Wastes

This book provides technical data and information on unconventional- and inactive energy sources. After reviewing the current global energy situation, individual chapters discuss fossil fuel sources and renewable energy sources. It focuses on future energy systems and explores renewable energy scenarios including water energy and power, biofuels and algae energy. It also provides essential information on energy from inactive sources, energy from waste materials and the optimization of energy systems.

This book provides a systematic and comprehensive account of the recent developments in the recycling of plastic waste material. It presents state-of-the-art procedures for recycling of plastics from different sources and various characterization methods adopted in analyzing their properties. In addition, it looks into properties, processing, and applications of recycled plastic products as one of the drivers for sustainable recycling plastics especially in developing countries. This book proves a useful reference source for both engineers and researchers working in composite materials science as well as the students attending materials science, physics, chemistry, and engineering courses.

Incineration has been used widely for waste disposal, including household, hazardous, and medical waste--but there is increasing public concern over the benefits of combusting the waste versus the health risk from pollutants emitted during combustion. Waste Incineration and Public Health informs the emerging debate with the most up-to-date information available on incineration, pollution, and human health--along with expert conclusions and recommendations for further research and improvement of such areas as risk communication. The committee provides details on: Processes involved in incineration and how contaminants are released. Environmental dynamics of contaminants and routes of human exposure. Tools and approaches for assessing possible human health effects. Scientific concerns pertinent to future regulatory actions. The book also examines some of the social, psychological, and economic factors that affect the communities where incineration takes place and addresses the problem of uncertainty and variation in predicting the health effects of incineration processes.

Bachelor Thesis from the year 2012 in the subject Engineering - Chemical Engineering, Wollo University (Kombolcha Institute Of Technology), course: Chemical Engineering , language: English, abstract: Abstract: The objective of the work is the conversion of waste plastics into fuel oil. Plastic wastes such as, polypropylene, low density polyethylene, high density polyethylene, polystyrene are the most frequently used in everyday activities and disposed of to the environment after service. Plastic are those substances which can take long periods of time to decompose if disposed off simply to the environment. Therefore, waste plastic should be changed into usable resources. The different waste plastics were thermally cracked at different temperature and then it was tried to measure the oil produced, the residue left after the reaction is completed, and the gas produced. Then it is compared that which types of plastics can yield higher amount of oil. There are a number of methods by which plastic wastes can be managed such as incineration, recycling, land filling, and thermal cracking. But this work focuses on thermal cracking of waste plastic to change them into usable resources, because in this method the emission of hazardous gases to the environment insignificant. This means we can change all the waste in to useful resources. Keywords: liquid oil, thermal cracking, and waste management system

Technology Innovation in Mechanical Engineering

Plastics Waste Management

Recent Developments in Plastic Recycling
Volume 2: Chemical Processes
A review with Nordic perspectives
Waste Energy for Life Cycle Assessment

Plastics to Energy: Fuel, Chemicals, and Sustainability Implications covers important trends in the science and technology of polymer recovery, such as the thermo-chemical treatment of plastics, the impact of environmental degradation on mechanical recycling, incineration and thermal unit design, and new options in biodegradable plastics. The book also introduces product development opportunities from waste materials and discusses the main processes and pathways of the conversion of polymeric materials to energy, fuel and chemicals. A particular focus is placed on industrial case studies and academic reviews, providing a practical emphasis that enables plastics practitioners involved in end-of-life aspects to employ these processes. Final sections examine lifecycle and cost analysis of different plastic waste management processes, exploring the potential of various techniques in modelling, optimization and simulation of waste management options. Introduces new pathways for the end-of-life treatment of plastics and polymers, including conversion to energy, fuel and other chemicals Compares different options to assist materials scientists, engineers and waste management practitioners to choose the most effective and sustainable option Covers the latest trends in the science and technology of polymer energy recovery

This book focuses on plastics process analysis, instrumentation for modern manufacturing in the plastics industry. Process analysis is the starting point since plastics processing is different from processing of metals, ceramics, and other materials. Plastics materials show unique behavior in terms of heat transfer, fluid flow, viscoelastic behavior, and a dependence of the previous time, temperature and shear history which determines how the material responds during processing and its end use. Many of the manufacturing processes are continuous or cyclical in nature. The systems are flow systems in which the process variables, such as time, temperature, position, melt and hydraulic pressure, must be controlled to achieve a satisfactory product which is typically specified by critical dimensions and physical properties which vary with the processing conditions. Instrumentation has to be selected so that it survives the harsh manufacturing environment of high pressures, temperatures and shear rates, and yet it has to have a fast response to measure the process dynamics. At many times the measurements have to be in a non-contact mode so as not to disturb the melt or the finished product. Plastics resins are reactive systems. The resins will degrade if the process conditions are not controlled. Analysis of the process allows one to strategize how to minimize degradation and optimize end-use properties.

With the huge amount of plastics floating in the oceans, fish and other sea creatures are directly suffering the consequences. On land, city leaders and planners are banning one-use plastics as well as plastic bags from grocery stores in an effort to stem the use. Many countries have made official announcements and warnings concerning the pollution caused from plastic wastes. These urgent developments have stimulated the author to study the problem and write Polymer Waste Management. Plastic recycling refers to a method that retrieves the original plastic material. However, there are many sophisticated methods available for the treatment and management of waste plastics such as basic primary recycling, where the materials are sorted and collected individually. In chemical recycling, the monomers and related compounds are processed by special chemical treatments. Other methods, such as pyrolysis, can produce fuels from waste plastics. These methods and others are treated comprehensively in the book This ground-breaking book also discusses: General aspects, such as amount of plastics production, types of waste plastics, analysis procedures for identification of waste plastic types, standards for waste treatment, contaminants in recycled plastics. Environmental aspects, such as pollution in the marine environment and landfills. The advantages of the use of bio-based plastics. Recycling methods for individual plastic types and special catalysts.

Part inspirational story of how the author transformed her family's life for the better by reducing their waste to an astonishing 1 liter per year; part practical guide that gives readers tools & tips to diminish their footprint & simplify their lives. Original.

Properties and Applications
On the Conversion of Plastic Wastes into Oil
Feedstock Recycling and Pyrolysis of Waste Plastics
Environmental Impact, Societal Issues, Prevention, and Solutions
Plastics Waste
Municipal Waste Plastics to Different Categories of Fuel

Plastic Waste and Recycling: Environmental Impact, Societal Issues, Prevention, and Solutions begins with an introduction to the different types of plastic materials, their uses, and the concepts of reduce, reuse and recycle before examining plastic types, chemistry and degradation patterns that are organized by non-degradable plastic, degradable and biodegradable plastics, biopolymers and bioplastics. Other sections cover current challenges relating to plastic waste, explain the sources of waste and their routes into the environment, and provide systematic coverage of plastic waste treatment methods, including mechanical processing, monomerization, blast furnace feedstocks, gasification, thermal recycling, and conversion to fuel. This is an essential guide for anyone involved in plastic waste or recycling, including researchers and advanced students across plastics engineering, polymer science, polymer chemistry, environmental science, and sustainable materials. Presents actionable solutions for reducing plastic waste, with a focus on the concepts of collection, re-use, recycling and replacement Considers major societal and environmental issues, providing the reader with a broader understanding and supporting effective implementation Includes detailed case studies from across the globe, offering unique insights into different solutions and approaches

The book focuses on a global issue--municipal solid waste management (MSWM) and presents the most effective solutions based on energy recovery processes. There is huge potential in employing different technologies and modern management methodology for recovering energy from various waste streams to establish a sustainable and circular economy. In several countries, energy recovery from municipal solid wastes (MSW) is seen as a way of reducing the negative impact of waste on the environment and also reducing the burden on land resources. The book primarily focuses on highlighting the latest insights into energy recovery from various waste streams in different countries, with a particular emphasis on India. Further, it paves the way for sustainability in the energy sector as a whole by addressing waste management issues and simultaneous energy recovery. The chapters present high-quality research papers selected and presented in the conference, IconSWM 2018.

This book introduces advanced or emerging technologies for conversion of wastes into a variety of high-value chemicals and materials. Energy and resources can be recovered from various residential, industrial and commercial wastes, such as municipal wastewater and sludge, e-waste, waste plastics and resins, crop residues, forestry residues and lignin. Advanced waste-to-resource and energy technologies like pyrolysis, hydrothermal liquefaction, fractionation, de-polymerization, gasification and carbonization are also introduced. The book serves as an essential guide to dealing with various types of wastes and the methods of disposal, recovery, recycling and re-use. As such it is a valuable resource for a wide readership, including graduate students, academic researchers, industrial researchers and practitioners in chemical engineering, waste management, waste to energy and resources conversion and biorefinery.

This book comprises selected peer-reviewed proceedings of the International Conference on Advances in Industrial Automation and Smart Manufacturing (ICAIASM) 2019. The contents focus on innovative manufacturing processes, standards and technologies used to implement Industry 4.0, and industrial IoT based environment for smart manufacturing. The book particularly emphasizes on emerging industrial concepts like industrial IoT and cyber physical systems, advanced simulation and digital twin, wireless instrumentation, rapid prototyping and tooling, augmented reality, analytics and manufacturing operations management. Given the range of topics covered, this book will be useful for students, researchers as well as industry professionals.

Sustainable Mobility
Waste Management as Economic Industry Towards Circular Economy
Plastics to Energy
Waste Incineration and Public Health
Waste Plastics to Fuels
Economic Policy Instruments for Plastic Waste

Although there were many books and papers that deal with gasification, there has been only a few practical book explaining the technology in actual application and the market situation in reality. Gasification is a key technology in converting coal, biomass, and wastes to useful high-value products. Until renewable energy can provide affordable energy hopefully by the year 2030, gasification can bridge the transition period by providing the clean liquid fuels, gas, and chemicals from the low grade feedstock. Gasification still needs many upgrades and technology breakthroughs. It remains in the niche market, not fully competitive in the major market of electricity generation, chemicals, and liquid fuels that are supplied from relatively cheap fossil fuels. The book provides the practical information for researchers and graduate students who want to review the current situation, to upgrade, and to bring in a new idea to the conventional gasification technologies.

Polymers constitute a separate area on the environmental issues. Due to the generation of excessive amounts of polymers wastes by industries and householders, the world has confronted a serious crisis. Furthermore, due to the rising environmental awareness, economical and petroleum concerns an increasing attempt is being made to cope with the polymers wastes during the last few years. The traditional methods used to dispose polymer wastes such as combustion of polymers wastes or burying underground show a negative influence on the environment.From the existing studies, it seems that the recycling process is one of the best techniques to treat the waste polymer products. Recycling of polymers through advanced techniques is an important topic that is driven by both the commercial and environmental influences. Several new techniques have been developed along with the means of reusing recycled polymers. Some of the commercially important technological processes for recycling of waste polymers include mechanical recycling, chemical or feedstock recycling and energy recovery. Keeping in mind the advantages of the recycled polymers, this book gives an overview of on properties and processing of different kinds of recycled polymers along with their composites for a range of applications. This book is unique in the sense that it deals exclusively with the properties and processing of different recycled polymers which are otherwise considered as waste.The book is the outcome of untiring efforts of the researchers from different parts of the world with extensive research experience in the field of recycled polymers across different disciplines. Some of the main features are:- Present state-of-the-art recycled polymers from different resources - Includes contributions from world renowned experts on recycled polymers - Discusses the properties and durability of recycled polymers based materials - Highlights new frontiers in the properties and applications of recycled polymers - Focus on recyclability and up-to date progress on recycled polymers - Effect of different parameters on properties of recycled polymers are presented - Solutions for widespread application are recommended - Current problems, recent developments and applications are discussed

Plastics have woven their way into our daily lives and now pose a tremendous threat to the environment. Over a 100million tonnes of plastics are produced annually worldwide, and the used products have become a common feature at over flowing bins and landfills. Though work has been done to make futuristic biodegradable plastics, there have not been many conclusive steps towards cleaning up the existing problem. Here, the process of converting waste plastic into value added fuels is explained as a viable solution for recycling of plastics. Thus two universal problems such as problems of waste plastic and problems of fuel shortage are being tackled simultaneously. In this study, plastic wastes (low density polyethylene)were used for the pyrolysis to get fuel oil that has the same physical properties as the fuels like petrol, diesel etc.

This book highlights the latest advances in waste management, resource recovery and resource circulation in various countries, with a special emphasis on India. It leads the way towards a sustainable circular economy developing local economy and enhances the sustainability of the energy sector as a whole by holistically addressing waste management. Waste management is a major problem around the globe; effective waste disposal is one of the most plaguing issues faced by municipalities. Yet waste can also serve as a major source of energy rather than a disposable material. The book discusses various upstream and downstream aspects of waste management systems, e.g. conversion processes and collection methods, that are needed in order to make waste management systems into an effective industry and move closer to a circular economy. It also provides information on management tools for analysis and decision support. All chapters included here are based on high-quality research papers presented at the conference IconSWM 2018.

Plastic-Free
A System Analysis of Converting Non-recyclable Plastic Waste Into Value-added Products in a Paper Industry Cluster
Proceeding of International Conference in Mechanical Engineering Research 2021
Preliminary study on the conversion of different waste plastics into fuel oil
Feedstock Recycling, Chemical Recycling and Incineration
How I Kicked the Plastic Habit and How You Can Too

The atmosphere may be our most precious resource. Accordingly, the balance between its use and protection is a high priority for our civilization. While many of us would consider air pollution to be an issue that the modern world has resolved to a greater extent, it still appears to have considerable influence on the global environment. In many countries with ambitious economic growth targets the acceptable levels of air pollution have been transgressed. Serious respiratory disease related problems have been identified with both indoor and outdoor pollution throughout the world. The 25 chapters of this book deal with several air pollution issues grouped into the following sections: a) air pollution chemistry; b) air pollutant emission control; c) radioactive pollution and d) indoor air quality.

Advanced Technology for the Conversion of Waste into Fuels and Chemicals: Volume 2: Chemical Processes is the second of two volumes by the editors (the first volume is Advanced Technology for the Conversion of Waste into Fuels and Chemicals: Biological Processes). This volume presents advanced techniques and combined techniques used to convert energy to waste, including combustion, gasification, paralysis, anaerobic digestion and fermentation. The title focuses on solid waste conversion to fuel and energy, presenting advances in the design, manufacture and application of conversion technologies. Contributors from physics, chemistry, metallurgy, engineering and manufacturing present a truly trans-disciplinary picture of waste to energy conversion. Huge volumes of solid waste are produced globally while, at the same time, huge amounts of energy are produced from fossil fuels. Waste to energy (WTE) technologies are developing rapidly, holding out the potential to make clean, sustainable power from waste material. These WTE procedures incorporate various methods and blended approaches, and present an enormous opportunity for clean, sustainable energy. Presents the latest advances in waste to energy techniques for converting solid waste to valuable fuel and energy Brings together contributors from physics, chemistry, metallurgy, engineering and the manufacturing industry Includes advanced techniques such as combustion, gasification, paralysis, anaerobic digestion and fermentation Goes far beyond municipal waste, including the recouping of valuable energy from a variety of industrial waste materials

This book comprises select papers presented at the conference on Technology Innovation in Mechanical Engineering (TIME-2021). The book discusses the latest innovation and advanced research in the diverse field of Mechanical Engineering such as materials, manufacturing processes, evaluation of materials properties for the application in automotive, aerospace, marine, locomotive and energy sectors. The topics covered include advanced metal forming, Energy Efficient systems, Material Characterization, Advanced metal forming, bending, welding & casting techniques, Composite and Polymer Manufacturing, Intermetallics, Future generation materials, Laser Based Manufacturing, High-Energy Beam Processing, Nano materials, Smart Material, Super Alloys, Powder Metallurgy and Ceramic Forming, Aerodynamics, Biological Heat & Mass Transfer, Combustion & Propulsion, Cryogenics, Fire Dynamics, Refrigeration & Air Conditioning, Sensors and Transducers, Turbulent Flows, Reactive Flows, Numerical Heat Transfer, Phase Change Materials, Micro- and Nano-scale Transport, Multi-phase Flows, Nuclear & Space Applications, Flexible Manufacturing Technology & System, Non-Traditional Machining processes, Structural Strength and Robustness, Vibration, Noise Analysis and Control, Tribology. In addition, it discusses industrial applications and cover theoretical and analytical methods, numerical simulations and experimental techniques in the area of Mechanical Engineering. The book will be helpful for academics, including graduate students and researchers, as well as professionals interested in interdisciplinary topics in the areas of materials, manufacturing, and energy sectors.

Achieving a high quality of waste plastic materials and recycling processes is a key challenge in closing the resource loops for plastics. This report reviews the status and trends for plastic waste flows and treatment in Denmark, Finland, Norway and Sweden. Furthermore, it gives an overview of existing policy instruments and the main challenges for designing policy instruments for improved recycling of plastic waste in these Nordic countries. The report identifies potential market failures associated with closing the resource loops for plastics. It reviews the economics research literature on policy instrument design for achieving optimal recycling rates and makes policy recommendations from the Nordic perspective. Finally, it presents results from a survey on market conditions to managers in the recycling and plastic manufacturing industry in Sweden.

Technological Advancement in Mechanical and Automotive Engineering
Advances in Industrial Automation and Smart Manufacturing

Advanced Technology for the Conversion of Waste into Fuels and Chemicals
Fuel, Chemicals, and Sustainability Implications
Recycling of Solid Waste for Biofuels and Bio-chemicals

Waste plastic, both industrial and municipal sources, is posing a major environmental challenges in developing countries such as India due to improper disposal methods. Large quantities of non-recyclable plastic waste get collected in paper recycling plants in Muzaffamagar and other regions in India. The plastic waste is typically in the form of protective covers, thin film, binding coils etc., which gets separated from paper during the pulping process. Because of its low value in recycling markets, the plastic waste is currently being burned as a substitute fuel for biomass in meeting the steam generation needs in paper production. Though incineration of plastic along with other solid waste for energy recovery is a common practice in countries like Europe, low technology employed in grate boilers without proper environmental equipment are creating serious problems in this region due to combustion-generated pollution. Instead, pyrolysis technologies in combination with innovative catalysts are evolving in recent years for converting waste plastic into fuel oil, diesel, and LPG. These technologies are proven to be safe and environmental-friendly, while producing value-added products that are in high demand. The primary objective of this research study is to investigate suitable technologies to convert waste plastic that is generated in the Muzaffarnagar paper cluster into value-added products, while considering certain unique requirements such as the ability to handle large quantities of mixed plastic, availability of biomass heating sources, lack of skilled workers, and limited capital and operating costs that play an important role in new technology adoption. Moreover, implementation of a suitable technology subject to economic and social considerations in this region is explored at a system-level. This systems thinking approach is deemed to be suitable for handling such complex problems, where non-technical issues play a crucial role in finding an appropriate solution.

The book focuses on a global issue—municipal solid waste management (MSWM) and presents the most effective solutions based on energy recovery processes. There is huge potential in employing different technologies and modern management methodology for recovering energy from various waste streams to establish a sustainable and circular economy. In several countries, energy recovery from municipal solid wastes (MSW) is seen as a way of reducing the negative impact of waste on the environment and also reducing the burden on land resources. The book primarily focuses on highlighting the latest insights into energy recovery from various waste streams in different countries, with a particular emphasis on India. Further, it paves the way for sustainability in the energy sector as a whole by addressing waste management issues and simultaneous energy recovery. The chapters present high-quality research papers selected and presented in the conference, IconSWM 2018.

Waste plastics found in our landfill are renewable energy sources that are capable of producing energy. After plastics are used and discarded, they become a problem for the environment and they are very troublesome to get rid of. Waste plastics are non-biodegradable so, they occupy landfill for a long period of time. When waste plastic come in contact with light and starts photo degrading, it starts releasing harmful compounds like carbon monoxide, nitrogen sulfide and sulfur dioxide in to the atmosphere. Drastic actions are taken against waste plastics management by city authorities all over the world. NSR has developed a thermal cracking method with fractional distillation to convert waste plastics into a liquid hydrocarbon fuels. The thermal degradation of waste plastic was studied at moderate temperatures 100-450 °C under an atmosphere and under atmospheric pressure using a-batch process operation. The products obtain five different category liquid hydrocarbon fuels. The average yield of produce fuels 90%, gas 6% and residue 4% and no catalytic process. The fuel can be produced at low cost, since the resource is already at disposal.

Considering the deleterious impacts of fossil fuels on the environmental and natural ecosystems, it has become imperative to make a paradigm shift towards renewable fuels, chemicals and materials. The exhaustive everyday usage of fossil fuels and processed petrochemical products are the leading cause for the increase in greenhouse gas emissions, global warming, climate changes, acid rain, ozone layer depletion, pollution of air, water and soil

as well as accumulation of non-biodegradable materials in the soil and oceans. On the contrary, biofuels, biochemicals and biomaterials derived from renewable wastes such as non-edible plant biomass (e.g., agricultural and forestry biomass), energy crops, microalgae, municipal solid waste, sewage sludge and other biogenic residues seem to be carbon neutral. Therefore, the global interest in biorefining technologies, especially thermochemical and biological conversion processes are gaining momentum in academic and industrial perspectives. The book offers all-inclusive coverage of the most crucial topics as follows: State-of-the-art information on the production and utilization of biofuels through thermochemical biorefining technologies Conversion of waste biomass through pyrolysis, liquefaction, torrefaction, carbonization, gasification, reforming and other clean technologies Waste-to-energy/chemical generation Fuel upgrading technologies Techno-economic analysis and life-cycle assessment of biorefining processes Persistently fabricated to be instantly applicable, this volume serves as a reference book for undergraduate and graduate students, scientific investigators and research scholars working in the areas relating to energy and fuels.

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