



**Gazelle Academic**

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Evangelos G. Giakoumis  
Editor

# Turbochargers and Turbocharging

Advancements, Applications and Research



MECHANICAL ENGINEERING THEORY AND APPLICATIONS

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### Advances in Materials Science Research Series



#### **Advances in Materials Science Research**

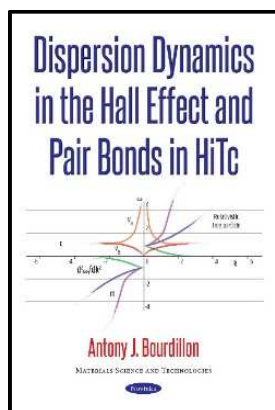
Edited by Maryann C. Wythers

This book provides readers with the latest developments in materials science research. In Chapter One, with regard to the reinforcement elements transfer from gas to liquid, various models more or less complex were proposed according to the simplifying assumptions that were made. Chapter Two provides the main classification and characteristics of composite materials with metal matrix. Analyzed are the composites with metal matrix, specifically regarding to the matrix type, and type, the size and shape of reinforcements. Chapter Three reports on the research project on the effectiveness of geocell reinforced pavement, which included theoretical work with analytical solutions, numerical analyses with parametric study and experimental analyses with laboratory experimental tests and test field experiments. Chapter Four studies conditions for necking in neat polymers of different type and composites on their basis. Measurements have been made on polyethylene, which is a classical model polymer with simple molecular structure. Chapter Five reports on a method of modifying the polyester material to produce ion exchange fiber sorbents.

Volume 30 HB 9781536125061 £217.50 October 2017 Nova Science Publishers 237 pages

Volume 31 PB 9781536127683 £82.99 December 2017 Nova Science Publishers 197 pages

Volume 32 HB 9781536133295 £217.50 March 2018 Nova Science Publishers 196 pages



### **Dispersion Dynamics in the Hall Effect & Pair Bonds in HiTc**

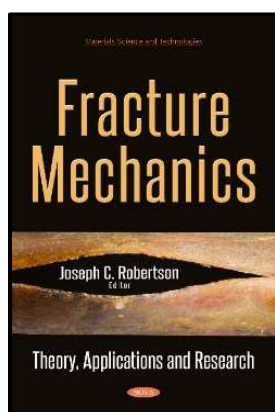
Antony J. Bourdillon

Dispersion dynamics are developed from the stable wave packet in wave mechanics. They are used first in a physical treatment of creation and annihilation, and then applied to measurements in high temperature superconductivity. The dynamics require that the negative energy solution to relativity equations implies negative rest mass in the antiparticle. Dirac's positive mass for his first order equation is inconsistent with dispersion dynamics.

The processing of the ceramic cuprates links the superconductivity not to the isotope effect, as in low temperature superconductors, but to chemical holes in the planar HiTc ceramics. The Hall coefficient is negative in the former case, but positive in the latter – even though the Lorentz force can act on neither voids nor immobile ionic nuclei. Interpretation of the coefficient is an old anomaly. In fact, whether in metals, in p-type semiconductors or in HiTc ceramics, the carriers are all negatively charged. Dispersion dynamics show that the positive coefficient is a consequence of negative second derivatives in the dispersion of conduction bands in semiconductors, in certain metals and in high temperature superconductors.

Existing data from HiTc compounds, especially data from processing, are reinterpreted to show how chemical and physical holes are formed. The holes that are evident in the Hall effect at normal temperatures are readily available to bond with electron pairs at lower temperatures for superconductivity. Wave functions in dispersion dynamics show how the conduction is non-resistive. The book contrasts the two types of superconductivity while uniting the mechanism in them for non-resistive behavior.

PB 9781536125689 £71.50 October 2017 Nova Science Publishers 120 pages



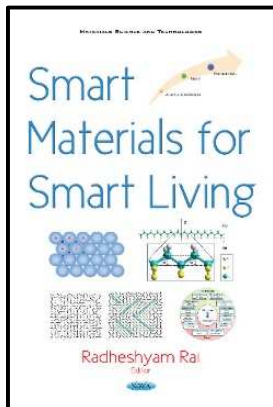
### **Fracture Mechanics**

#### **Theory, Applications & Research**

Edited by Joseph C. Robertson

Classical fracture mechanics that emerged during the 1920s has gained popularity via LEFM from the 1940s to the 1960s. The principles of classical fracture mechanics evolved from experimental observation of the behavior of glass that contains pre-existing cracks and is largely supported by physical reasoning. Chapter One presents a robust analysis of problems encountered in the field of pipeline networks and boiler components as a result of structural imperfection. Chapter Two deals with an analytical model of cracking, which is induced by thermal stresses in a porous multi-particle-matrix system. This system consists of spherical pores and isotropic spherical particles, which are both periodically distributed in an isotropic infinite matrix. Chapter Three reports on an analytical model of cracking in a multi-particle matrix system with isotropic whiskers, which are periodically distributed in an isotropic infinite matrix.

PB 9781536125009 £71.50 October 2017 Nova Science Publishers 124 pages

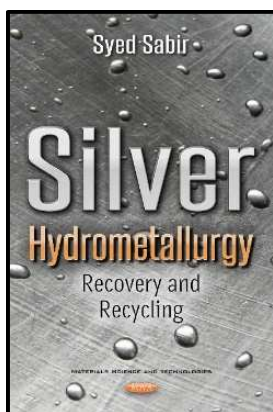


## **Smart Materials for Smart Living**

Edited by Radheshyam Rai

Smart Materials for Smart Living has a wide range of materials that are involved in the things that govern our day to day lives. Applications of SMNFs are used in different areas such as filtration media, gas sensing and a great deal of biomedical applications too. The treatment of heart blockage and brain hemorrhage has been significantly affected by these materials. Due to their extremely small pore size, large surface volume ratio and being light in weight, they prove to be better materials in solar cells, batteries and many other transducer applications. In today's modern world where everyone is moving towards advancement, humanity forgets to keep up with sustainable development. Hence, the responsibility rests on the shoulders of researchers to make materials that not only keep us updated with the modern world, but also help us keep the environment clean. Keeping this point of view in mind, this book consists of chapters that deal with lead free and non-toxic materials. Population, industrialization and agricultural development are a few factors that led to the degradation of environment. This book helps us to know how different species are connected with each other. There are different technologies used for the conservation of biodiversity and life. All chapters will help readers understand what the role of materials for different applications are and how to sustain biodiversity; the different sustainable approaches; and the various steps adopted by global bodies for conservation.

HB 9781536122695 £199.99 September 2017 Nova Science Publishers 405 pages



## **Silver Hydrometallurgy**

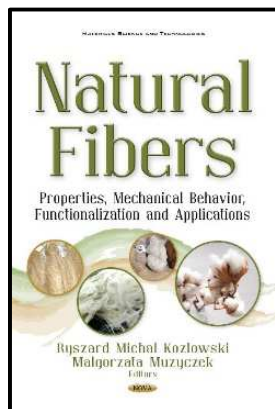
### **Recovery & Recycling**

Syed Sabir

The main impression of this book is to draw attention to the most advance technologies in silver recovery and recycling from various sources. The state-of-the-art in silver recovery from different sources by hydrometallurgical and bio-metallurgical processing, and varieties of leaching, cementing, reducing agents, peeling, electro-coagulants, adsorbents, electro-dialysis, solvent extraction, ion exchange resins and bio-sorbents are highlighted in this book. It is shown that the major economic driver for the recycling of depleted sources is for the recovery of silver. In order to develop a nature-friendly technique for the recovery of silver from diverse sources, a critical comparison of existing technologies is analyzed for both economic viability and environmental impact were made in this amendment, and silver ion toxicity is highlighted in this book. This book comprises four chapters, each of which is further divided into sections and subsections for the proper convenience and understanding of the work, though extensive work has been reported on silver hydrometallurgy.

PB 9781536122060 £71.50 September 2017 Nova Science Publishers 85 pages





## Natural Fibers

### Properties, Mechanical Behavior, Functionalization & Applications

Edited by Ryszard Michal Kozlowski, Malgorzata Muzyczek

Natural fibers – both lignocellulosic and protein – are renewable and biodegradable. They are characterized by good air permeability, hygroscopicity, and do not release harmful substances. They have been well-known to mankind for more than 9,000 years.

Most of the lignocellulosic fibers from plants and animals such as cotton, flax, hemp, jute, kenaf, sisal, ramie, curaua, pineapple, bamboo, coir, sheep, alpaca wool and silk can be extracted, processed, modified, functionalized, and used in the production of textiles (woven, knitting, nonwoven, technical, and 3D textiles), and as reinforcement for more environmentally friendly composites.

Special treatment and functionalization methods such as degumming, enzymes, ultrasounds, plasmas, coronas, liquid ammonia, flame retardant treatments and protection against biodeterioration provide new promising features and properties for all natural fibers. The production of natural fibers is expected at the level of about 40 million tons/year in the middle of the 21st century. Global fiber production was 95 million tons in 2015 and it is estimated to grow 3% annually, reaching 122 million tons in 2025.

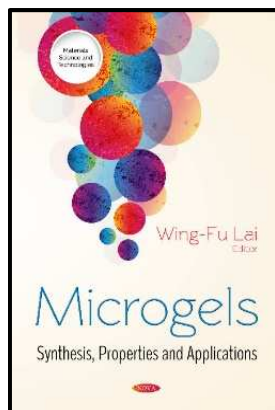
Some natural fibers are susceptible to dyeing by natural dyestuffs, UV resistant and can be easily protected against flammability. Natural fibers and fabrics after special functionalization by MOFs (Metal-organic Frameworks), POMs (Polyoxymetalates) and dendritic polymers will play an important role in the near future not only in defense and military apparels, but in very effective filter materials as well.

The book contains (in eleven chapters with eleven sub-chapters) topics about:  
-Cotton as a dominant natural fiber; the novel challenge for bast fibers; flax and hemp; breeding and cultivation of flax in China (the biggest processor of flax and hemp in the world); new emerging sources of lignocellulosic fibers, i.e., curaua and *Daphnopsis fasciculata* fibers from South America; the role of apparels based of natural fibers in human physiology; bioengineering as a driving force in natural fibers' stabilization and production growth; chemical and biochemical functionalization and finishing of natural fibers, including treatment by dendritic polymers; and alpaca fiber production, characteristics and use.

-Composites based on natural fibers; bio-based composites; poly( $\epsilon$ -caprolactone)/poly(lactic acid)/oil palm fiber composites; plant fibers: renewable reinforcing fillers in polyolefins biocomposites; and use of palm fibers reinforced in polymer matrices.  
-Natural lignocellulosic raw materials as both a source of nanocellulosic fibers and of further information about natural fibers.

The book presents the latest research data about new and emerging areas of natural fibers in the scope of production, processing and its applications.

HB 9781536120714 £199.99 September 2017 Nova Science Publishers 300 pages

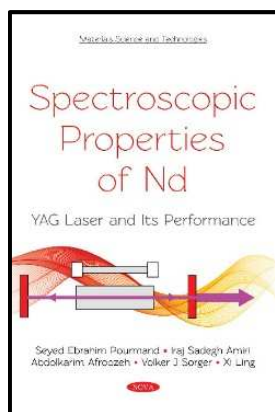


## Microgels Synthesis, Properties and Applications

Edited by Wing-Fu Lai

Since the turn of the last century, significant advances have been documented in the literature on the design and engineering of microgels. Specialized reviews, each covering only a specific aspect of microgel development, are available; however, works that provide a comprehensive overview of the recent status of microgel research can hardly be found. The latter is important to the field as it can offer a broad view of the current situation and the possibilities for future microgel research. The objective of this book is to fill this gap by presenting a snapshot of the latest advances in the synthesis, characterization and applications of microgels. This book consists of three sections. The first section aims at providing an overview of the latest status of microgel research. Concepts in the current understandings of microgel fabrication and characterization will be discussed. The second section is devoted to exploiting microgel properties and engineering techniques. The development of a diversity of gel systems, ranging from stimuli-responsive microgels and noncovalent crosslinking microgels to phenol formaldehyde-based aerogels, will be reviewed. The potential use of electrospray technologies to manipulate the microstructure of microgels will also be exploited. The last section intends to highlight the application potential of microgels, with a special focus on wastewater treatment, drug delivery, tissue engineering, gene delivery, bioimaging, and antifouling. It is hoped that this book will not only lay a foundation of knowledge and terminology to those interested in a future research career in the subject, but can also serve as a reference guide to researchers working in the field in terms of the concepts and techniques relating to microgel development.

HB 9781536135220 £199.99 June 2018 Nova Science Publishers 338 pages

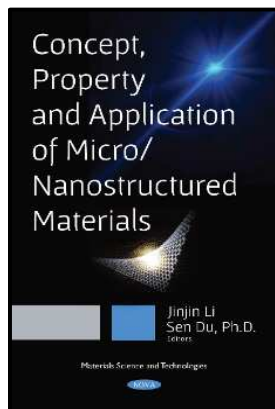


## Spectroscopic Properties of an Nd YAG Laser Pumped by a Flashlamp at Various Temperatures and Input Energies

Seyed Ebrahim Pourmand, Iraj Sadegh Amiri, Abdolkarim Afroozeh, Volker J. Sorger

The purpose of this book was to investigate the temperature and input energy dependency of Nd:YAG laser performance pumped by flashlamp. A commercial laser rod Nd:YAG laser crystal was utilized as a gain medium. The laser rod was placed parallel to a linear flashlamp filled by xenon gas at 450 Torr. The Nd:YAG crystal together with the flashlamp was flooded with a coolant comprising of a mixture with 60% ethylene glycol and 40% distilled water, which covers a range of temperature from  $-30,^{\circ}\text{C}$  to  $+60,^{\circ}\text{C}$ . Spectroscopic properties of the Nd:YAG rod under pulsed flashlamp pumping was investigated from the output fluorescence spectrum of the flashlamp radiation and the Nd:YAG rod. The linewidth of each fluorescence line was measured for an estimation of an effective emission cross section and saturation intensity. The influence of temperature and input energy on a fluorescence emission cross section of Nd<sup>3+</sup>:YAG crystal was studied. The cross-section was found to decrease as the temperature and the input energy was increased. The inter-stark emission showed a Lorentzian line shape indicating homogeneous broadening. This was attributed to the thermal broadening mechanism of the emission line. The spectral widths and shifts of the emission lines for the three and four level inter-Stark transitions within the respective intermanifold transitions of  $4F_3/2_j \rightarrow 4I_9/2$  and  $4F_3/2_j \rightarrow 4I_{11}/2$  were investigated over the range of 0 to 75 J. The emission lines for the  $4F_3/2_j \rightarrow 4I_9/2$  transitions shifted towards a longer wavelength and broadened, while the positions and linewidths for the  $4F_3/2_j \rightarrow 4I_{11}/2$  transitions remained unchanged with the increase of input energy. Finally, the temperature dependence of quasi-three-level laser transitions for long pulse Nd:YAG laser was also investigated.

PB 9781536131475 £71.50 April 2018 Nova Science Publishers 75 pages

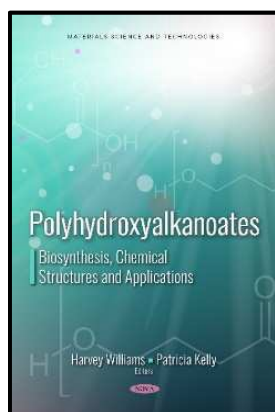


## Concept, Property and Application of Micro/Nanostructured Materials

Edited by Jinjin Li, Sen Du

From the perspectives of theory and experiment, this book introduces several different micro/nanostructure materials, including the Mg-based alloy materials, carbon nanotubes and graphene-based materials, micro-crystals, nanostructured Al-SiC composites, optomechanical systems, compound containing functional groups, and biologically active diazoles. Using this book, readers will be able to understand, derive, and confidently implement the relevant phenomena in other complex micro/nanostructures that have not been investigated by traditional methods. Dozens of figures and diagrams throughout this book enhance the understandability through visualization of experimental techniques and computational procedures. Meanwhile, the extensive references and detailed index allow for the further exploration of this evolving area. This book provides a comprehensive treatment of the subject for graduates and researchers within material science, quantum chemistry, as well as atomic, molecular and solid-state physics.

PB 9781536136081 £82.99 June 2018 Nova Science Publishers 186 pages



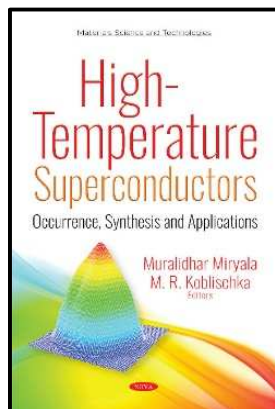
## Polyhydroxyalkanoates

### Biosynthesis, Chemical Structures and Applications

Edited by Harvey Williams, Patricia Kelly

*Polyhydroxyalkanoates: Biosynthesis, Chemical Structures and Applications* opens with an exposé on employing extremophiles as polyhydroxyalkanoate (PHA) producers. The authors suggest that extremophiles may be easily subjected to a long-term continuous cultivation processes, which considerably enhances overall productivity while reducing the energy demand in biopolymer production. Conversely, a range of challenges remain, including improving the metabolic capability of extremophiles, recycling of fermentation broth, various process engineering aspects, and adaptation of bioreactor materials and process controlling devices to conditions shortening their life span. Following this, the enzymes, regulators and genes involved in PHA biosynthesis are analyzed for their potential as an alternative to synthetic polymers. They are synthesized as intracellular carbon and energy storage compounds from over 300 species in the presence of excess carbon and under oxygen, nitrogen or phosphorus limitation, or after pH shifts. This collection goes on to suggest PHA as a promising alternative for petrochemical compounds. The challenges of increasing economic feasibility in the global market, minimizing costs, and improving the polymer yield are reviewed. Additionally, recent research on structural variations of PHAs has been centered on the design, biosynthesis, and properties of biodegradable and biocompatible materials, which can be used for bioengineering. This collection also includes a focus on the roles of polyhydroxyesters and PHAs in the construction of tissue engineering scaffolds, which are used in bone, cartilage, ligament, skin, vascular tissues, neural tissues and skeletal muscles. Their exceptional properties, such as high surface-to-volume ratio, high porosity with very small pore size, and biodegradation have made them gain a lot of attention in this field. The biomedical applications of PHAs are explored, including *in-vivo* implants, tissue engineering, anticancer agents, drug delivery, biocontrol agents and memory enhancers, as their low acidity allows for minimal risk in usage. In order to enhance its applicability in various fields, the blends and nanocomposites of PHAs are studied and their potential challenges, applications and opportunities are addressed. After which, the industrial and agricultural applications are described, with specific focus on potential applications of PHAs in packaging. Other applications include moulded goods, paper coatings, non-woven fabrics, adhesives, films and performance additives. Recent advances in this area, by means of peer-reviewed literature and patents, are introduced and discussed. Moreover, innovative strategies for the synthesis of novel polymer blends, adequate for food contact applications, are presented.

HB 9781536134391 £199.99 May 2018 Nova Science Publishers 407 pages



## High-Temperature Superconductors Occurrence, Synthesis and Applications

Edited by Muralidhar Miryala, M. R. Koblischka

Following the discovery of the oxide superconductors in 1986 by Bednorz and Müller, a number of new superconducting compounds was found exhibiting superconductivity above the liquid nitrogen temperature including rare-earth oxides and bismuth oxides, enabling cheaper cooling methods to be applied. The new class of superconducting materials featuring high critical temperatures ( $T_c$  above 77 K) and high second critical magnetic fields gave a new impetus to the research and development in superconductivity. Governments of many countries worldwide have encouraged scientists, engineers and industry to develop high temperature superconducting materials for practical use. Environmentally benign scenarios of high speed transport systems, energy saving by utilizing DC cables, medical equipment (e.g., magnetic resonance imaging (MRI) systems), a new class of magnetic drug delivery system (MDDS), nuclear magnetic resonance (NMR), and non-contact rotating machinery are expected. Nowadays, there is already a variety of high- $T_c$  superconducting products available on the market, like single domain, batch processed bulks with diameters up to 140 mm, hundreds of kilometers of the first generation silver-sheathed Bi-2223 and Bi-2212 wires and tapes, and several kilometers of the second generation Y-123 tapes ('coated conductors') for winding coils of superconducting super-magnets or for constructing high- $T_c$  super-cables for high energy transfer.

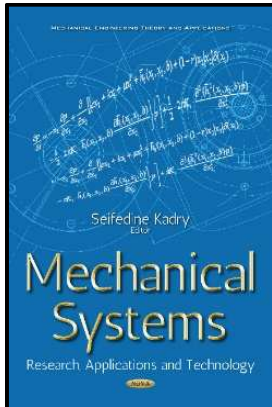
The authors hope that, especially for young researchers, new upcoming engineers and students of superconductivity theory extension, the collected know-how in technology of superconducting thin films, wires, and bulks, and the new opportunities available for practical applications by the unique features of high- $T_c$  materials will be very useful. The volume is designed to cover the recent achievements in occurrence, synthesis and application of high- $T_c$  superconductors. The volume consists of a total of seventeen chapters, each of them defining in-depth the chapter subject and surveying recent developments in the field. The main objective of this volume is to summarize the recent advances in material science of high- $T_c$  superconductors, including their properties, processing, and applications. New and challenging issues appear in this book, like superconducting large grain bulk RE-123, flux pinning, nanowire network fabrics and their applications, and a quantitative analysis on the normal-state Nernst coefficient. Furthermore, the book also covers recent developments on a variety of materials and the progress made, especially concerning the magnetic characterization of bulk C-doped MgB<sub>2</sub>, silver added bulk FeSe, and (BiPb)SrCaCuO systems, respectively. To show a full picture of the currently ongoing research efforts, the book covers large scale applications of bulk materials, including magnetic bearings, superconducting electric motors and their design layouts, hybrid-type superconducting magnetic bearings for rotating machinery, compact magnetic field generators, refrigerators, and recent developments in the application of superconducting super-magnets in the medical field.

The authors would like to take this opportunity to express their sincere gratitude to all of the chapter contributors for their great endeavor in completing this book in time. They also wish to acknowledge Carra Feagaiga from NOVA Science Publisher for offering invaluable advice at every stage of editing this book. We would also like to extend our thanks to President Prof. M. Murakami-sensei, SIT for his constant support and encouragements.

The team of authors and the editors sincerely hope that the presented ideas and information in this book will be helpful for interested readers, scientists, young researchers, bachelor and master students, and will encourage further development in the field.

HB 9781536133417 £199.99 May 2018 Nova Science Publishers 392 pages



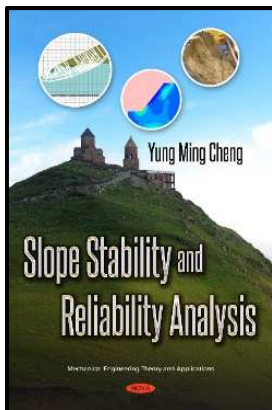


### **Mechanical Systems Research, Applications & Technology**

Edited by Kadry Seifedine

This book includes eleven excellent chapters that have been prepared using state-of-art methodologies by professional researchers from ten different countries. The chapters in the book comprise the following titles: "System Diagnostics and Prognostics: A Review"; "Random Vibro-Impact Vibration in Mechanical Systems", "The Machine for Cutting Cane and Other Aquatic Plants in Navigable Waterways by Agustín de Betancourt y Molina": Analysis by Computer-Aided Engineering Techniques with an Autodesk Inventor Professional"; "Mechanical Systems and Microfluidics: The Application of a Vision System in the Testing of Fluids Behavior"; "The Study of Limited Invariant Sets and Structures of Relay Stabilized Systems"; "Finding an Unbiased Warranty Length for a Product Under Parametric Uncertainty of Underlying Lifetime Models"; "Modeling of Mechanical Aspects' (Static, Dynamic) Influence on the Production of Electric Fuel Cell (PEMFC) Power"; "Quantum Graph-Type Models of the Helmholtz Resonator and Completeness of Resonance States"; "Applied Research in Forensic Engineering"; "Energy Efficiency via a Turbulator"; and "A Mathematical Model of a Rocket Engine for Reliability Analysis".

HB 9781536123708 £199.99 September 2017 Nova Science Publishers 339 pages

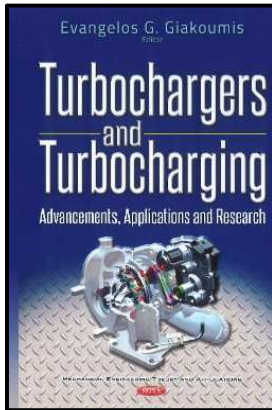


### **Slope Stability and Reliability Analysis**

Yung Ming Cheng

Slope stability is always a very important topic in many developed and highly congested cities, particularly for many cities in China where slope failures have killed many people with significant loss of properties. The author has also participated in different types of slope stability research and consultancy works in different countries and has published two books entitled "Soil Slope stability analysis and stabilization – new methods and insights" and "Frontier in civil engineering, vol.1, Stability analysis of geotechnical structures" which are well favoured by many students, engineers and researchers. The author also frequently receives email about the details of the more innovative slope stability analysis methods, stabilization and monitoring system, as well as the procedures in the numerical implementation of some of the stability analysis methods. In views of the various improvements in the theory of slope stability analysis over the years, the author would like to write a new book on slope stability analysis and slope reliability analysis, and the new materials will be useful to both students, engineers as well as researchers. In this book, different methods of slope stability analysis will be discussed in a broad sense. Following that, the limit equilibrium and finite element methods will be discussed in more details, as these two methods are the methods commonly used for practical works. Detailed procedures for limit equilibrium analysis will be provided to aid the students in learning, while the program SLOPE2000 will be introduced for the solution of more complicated problems. Some interesting engineering cases will be illustrated in this book. The author will also try to introduce the use of distinct element slope stability method, which is a technique still far from practical applications, but it does offer some insights which are not possible with the other methods. Following that, the author will introduce the importance of reliability slope stability analysis, which is an important issue for cities with complicated ground conditions and high water table. Due to the intensive computation required for reliability analysis, the author has proposed many improvements to various reliability assessment methods in order to maintain a balance between accuracy and time of computation.

HB 9781536129359 £199.99 January 2018 Nova Science Publishers 373 pages



## **Turbochargers & Turbocharging Advancements, Applications & Research**

Edited by Evangelos G. Giakoumis

Supercharging has long been established as the most successful means to maximize power output from a specific engine size. Through supercharging, the inlet air density is increased, usually by means of a compressor, and by doing so the amount of air trapped in the cylinders is increased accordingly. As a result, efficient burning of a proportionately higher amount of fuel is enabled.

By far, the most successful version of supercharging is turbocharging. Here, the expansion in a turbine of the exhaust gases leaving the cylinders supplies the power needed to drive the compressor. At the moment, practically all diesel engines are turbocharged, with a continuously increasing penetration in the highly competitive market of SI-powered vehicles.

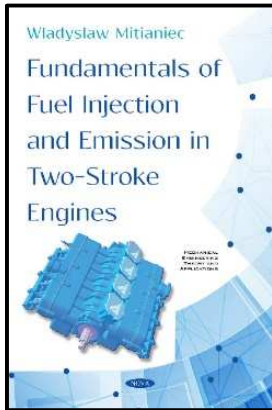
The current book on turbochargers and turbocharging, comprising fifteen chapters, gathers important and novel research on many modern aspects of turbocharging for all kinds of gasoline and diesel-powered engine applications (automotive, marine and aircraft). For example, characterization of the value proposition of turbocharged vehicles, marine engines turbo-compounding, fundamental issues of turbocharger lag and its relation with engine-out PM emissions, variable geometry compressors, automotive two-stage turbocharging, and dynamic operation of turbochargers including VGT and surging effects are amongst the topics analyzed.

Review papers form a very important part of the book, namely the discussion and in-depth analysis of various automotive boosting systems, turbocharger reduced-order modeling, heat transfer and pulsating flows in turbomachinery, mathematical models for turbocharged engines, and turbomachine-based engine throttling.

A considerable portion of the book (seven chapters) deals with control-oriented modeling techniques relating to the turbocharger and/or the whole engine power-plant. Such models have proven valuable during the design of both turbochargers and turbocharged engines and are described and discussed in detail for a variety of automotive and aircraft applications.

The target audience of this book includes post-graduate students, engineers and researchers in the field of internal combustion engines (diesel and SI) and turbochargers.

HB 9781536122398 £199.99 September 2017 Nova Science Publishers 435 pages



## Fundamentals of Fuel Injection and Emission in Two-Stroke Engines

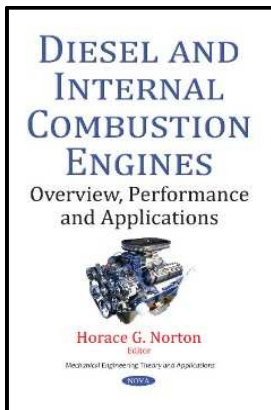
Wladyslaw Mitianiec

The main goal of the book is the presentation of the last theoretical and experimental works concerning fuel injection systems, mainly in small power two-stroke engines as well as in marine engines.

This book includes thirteen chapters devoted to the processes of fuel injection and the combustion that takes place in a stratified charge within the cylinders of two-stroke engines. In the first two chapters, the division into different injection systems in two-stroke engines and each injection system is briefly described. Various theoretical and practical solutions of fueling system designs are described. In Chapter Three, mathematical models, the spatial movement of gas in the cylinder and the combustion chamber are introduced, taking into account the turbulence of the charge. Chapter Four relates to the behavior of fuel injected into the gaseous medium, including evaporation processes, disintegration and processes occurring while the fuel drops connect with the wall. The next section describes the zero-dimensional model of fuel injection in two-stroke engines along with examples of numerical calculations. The sixth chapter is devoted to CFD multi-dimensional models of movement and evaporation of the fuel in a closed gaseous medium, occurring also in other engine types. Chapter Seven describes a two-zone model of the combustion process and the effect of the geometry of the combustion chamber on the flame propagation with a simplified verification model of combustion. Chapter Eight compares the propagation phase of gas and liquid fuels concerning direct fuel injection as well as the direct fuel injection from the cylinder head and the thermodynamic parameters of the charge. The formation of the components during the combustion process in the direct fuel injection two-stroke engine was obtained by numerical calculations and results are discussed in Chapter Nine. Chapter Ten describes the parameters of the two-stroke engine with a direct fuel injection carried out at the Cracow University of Technology. Additionally, the chapter presents CFD simulations of fuel propagation and combustion processes, taking into account the formation of toxic components and exhaust gas emission. The processes of two direct rich mixture injection systems – FAST and RMIS – developed in CUT are presented in Chapter Eleven. Miscellaneous problems of direct fuel injection, such as characteristics of fuel injectors, problems of direct gaseous fuel injection, and the application of fuelling systems in outboard engines and snowmobile vehicles are presented in Chapter Twelve. A comparison of working parameters in two- and four stroke engines is also mapped out. The last chapters contain the final conclusions and remarks concerning fuel injection and emission of exhaust gases in small two-stroke engines.

This book is a comprehensive monograph on fuel injection. The author presents a series of theoretical and design information from his own experience and on the basis of the works of other authors. The main text intends to direct fuel injection with respect to gas motion in the combustion chamber and influence the injection parameters for exhaust emission. The book presents its own theoretical work and experimental tests concerning a two-stroke gasoline engine with electrically controlled direct fuel injection. The book describes the processes of a general nature also occurring in other types of engines and presents a comparison of different injection systems on working parameters and gas emission. The book contains 294 images, 290 equations and 16 tables obtained from the CFD simulation and experimental works.

HB 9781536124729 £199.99 December 2017 Nova Science Publishers



**Diesel & Internal Combustion Engines  
Overview, Performance & Applications**

Edited by Horace G. Norton

Chapter One discusses the fully variable valve train as a possible solution to reduce emissions and improve internal combustion engines. Chapter Two presents the development results of the redesigned and indirectly controlled Full Variable Valve Train (FVVT) system that is the core of the authors' research project. Chapter Three reports the effects of jatropha oil as a substitute for diesel fuel and wet methanol on diesel engine performance and soot emissions in an EGR environment.

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