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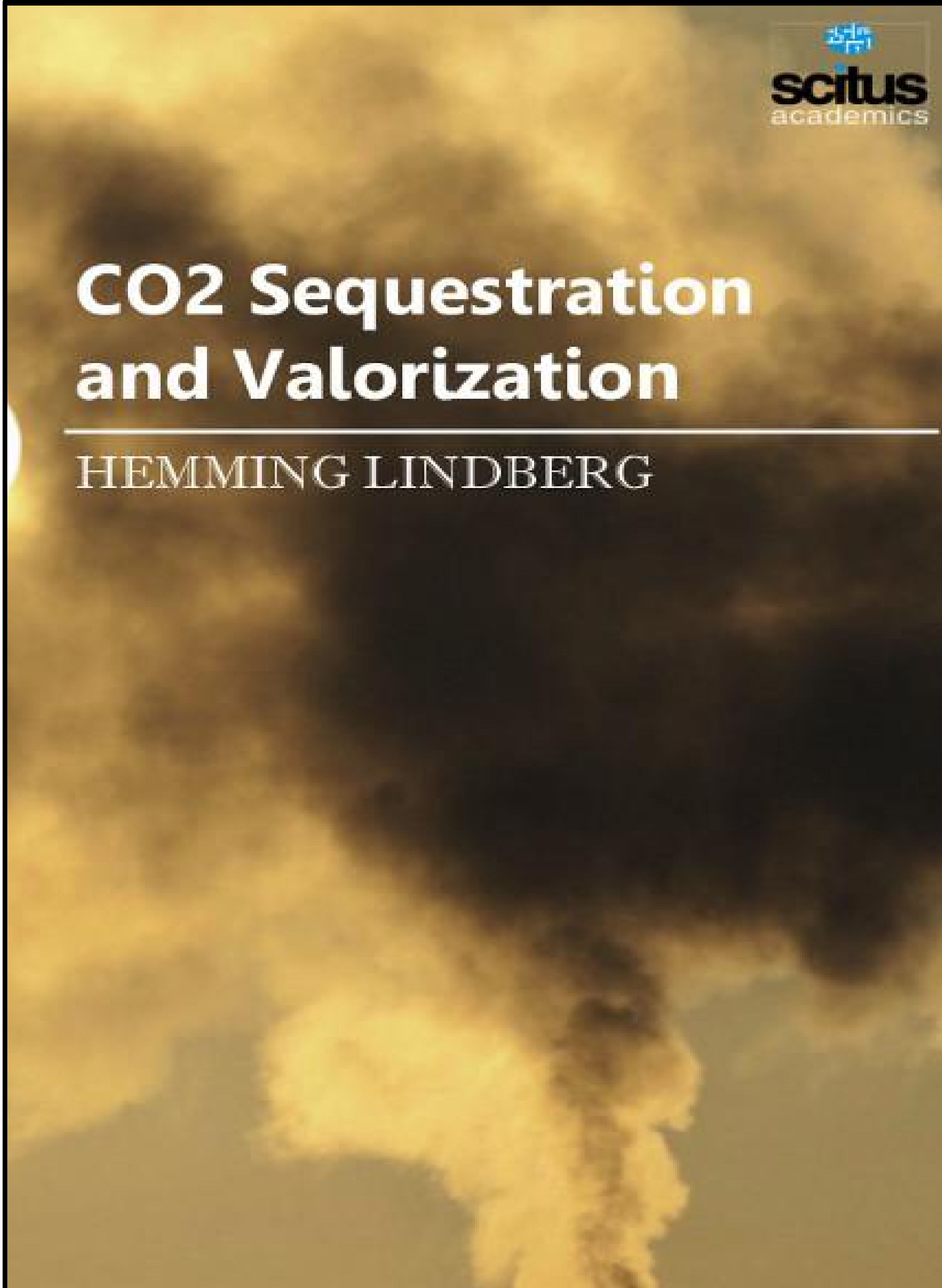

Scitus Academics

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Gas Chromatography in Plant Science, Wine Technology, Toxicology & Some Specific Applications
Biotechnology of Biopolymers

Thermodynamics Kinetics of Dynamic Systems

Atomic Absorption Spectroscopy

Aspects on Fundamentals & Applications of Conducting Polymers

Electropolymerization

CO2 Sequestration & Valorization

Mass Transfer in Chemical Engineering Processes

Applications of Gas Chromatography

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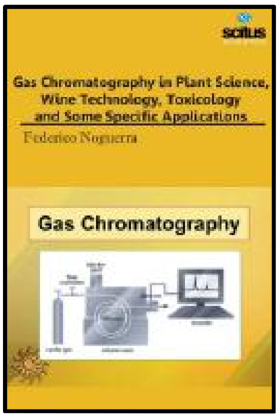

GAS CHROMATOGRAPHY IN PLANT SCIENCE, WINE TECHNOLOGY, TOXICOLOGY AND SOME SPECIFIC APPLICATIONS

Edited by Federico Noguerra

Gas Chromatography (GC) is a commonly used analytic technique in many research and industrial laboratories for quality control as well as identification and quantitation of compounds in a mixture. GC is also a frequently used technique in many environmental and forensic laboratories because it allows for the detection of very small quantities. A broad variety of samples can be analyzed as long as the compounds are sufficiently thermally stable and reasonably volatile. Like for all other chromatographic techniques, a mobile and a stationary phase are required for this technique. The mobile phase (or "moving phase") is a carrier gas, usually an inert gas such as helium or an unreactive gas such as nitrogen. Helium remains the most commonly used carrier gas in about 90% of instruments although hydrogen is preferred for improved separations. The stationary phase is a microscopic layer of liquid or polymer on an inert solid support, inside a piece of glass or metal tubing called a column. The instrument used to perform gas chromatography is called a gas chromatograph. Gas chromatography is also similar to fractional distillation, since both processes separate the components of a mixture primarily based on boiling point differences. However, fractional distillation is typically used to separate components of a mixture on a large scale, whereas GC can be used on a much smaller scale.

Gas Chromatography in Plant Science, Wine Technology, *Toxicology and Some Specific Applications* explore the essential aspects and details of certain gas chromatography applications in Plant Science, Wine technology, Toxicology and the other specific disciplines that are presently being researched. It provides a contemporary picture of the field, including fundamentals and practical applications, in a single source.

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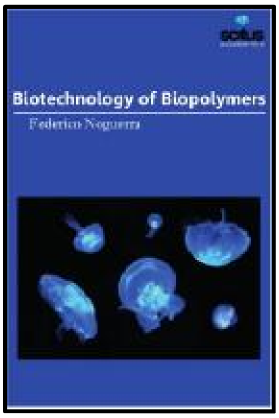

BIOTECHNOLOGY OF BIOPOLYMERS

Edited by Federico Noguerra

Biopolymers are polymers that occur in nature. Carbohydrates and proteins, for example, are biopolymers. Many biopolymers are already being produced commercially on large scales, although they usually are not used for the production of plastics. Even if only a small percentage of the biopolymers already being produced were used in the production of plastics, it would significantly decrease our dependence on manufactured, non-renewable resources. These polymers have been present on earth for billions of years. It is older than synthetic polymers such as plastics. The DNA biopolymer is the most important for humans. The entire body structure as well as genetic behaviors that pass from parents to children is based on it. Both DNA and RNA are composed of nucleic acids that alternate in definite patterns to encode huge amount of genetic data. The most common biopolymer is Cellulose. It is also the most abundant organic compound on this planet. It comprises of 33% of all plant component on Earth. These polymers play an essential role in nature. They are extremely useful in performing functions like storage of energy, preservation and transmittance of genetic information and cellular construction.

Biotechnology of Biopolymers deals with occurrence, synthesis, isolation and production, properties and applications, biodegradation and modification, the relevant analysis methods to disclose the structures and properties of biopolymers, experimental and mathematical models of biopolymers. This book will hopefully be compassionate to many scientists, physicians, pharmaceutics, engineers and other professionals in a wide variety of different disciplines, in academia and in industry.

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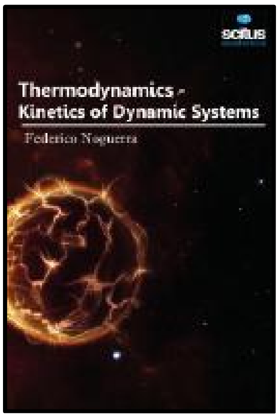

THERMODYNAMICS
KINETICS OF DYNAMIC SYSTEMS

Edited by Federico Noguerra

Thermodynamics is the study of heat, "thermo," and work, "dynamics." Thermodynamics is the branch of physics that deals with the relationships between heat and other forms of energy. In particular, it describes how thermal energy is converted to and from other forms of energy and how it affects matter. It was born in the 19th century as scientists were first discovering how to build and operate steam engines. Thermodynamics deals only with the large scale response of a system which we can observe and measure in experiments. Small scale gas interactions are described by the kinetic theory of gases. The methods complement each other; some principles are more easily understood in terms of thermodynamics and some principles are more easily explained by kinetic theory. Thermodynamics, then, is concerned with several properties of matter; foremost among these is heat. Heat is energy transferred between substances or systems due to a temperature difference between them. As a form of energy, heat is conserved, i.e., it cannot be created or destroyed. It can, however, be transferred from one place to another. Heat can also be converted to and from other forms of energy.

Thermodynamics - Kinetics of Dynamic Systems, being concentrated on a wide range of applications of thermodynamics, gathers a series of contributions by the scientists in the world, gathered in a systematic manner. It can be used in post-graduate courses for students and researchers to whom the thermodynamics is one of the areas of interest.

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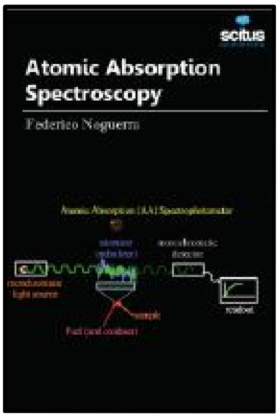

ATOMIC ABSORPTION SPECTROSCOPY

Edited by Federico Noguerra

Atomic absorption spectroscopy (AAS) is a spectroanalytical procedure for the quantitative determination of chemical elements using the absorption of optical radiation (light) by free atoms in the gaseous state. Atomic absorption is so sensitive that it can measure down to parts per billion of a gram (µg dm–3) in a sample. The technique makes use of the wavelengths of light specifically absorbed by an element. They correspond to the energies needed to promote electrons from one energy level to another, higher, energy level. Atomic absorption spectrometry has many uses in different areas of chemistry. Examining metals in biological fluids such as blood and urine, Monitoring our environment – e.g. finding out the levels of various elements in rivers, seawater, drinking water, air, petrol and drinks such as wine, beer and fruit drink. In some pharmaceutical manufacturing processes, minute quantities of a catalyst used in the process (usually a metal) are sometimes present in the final product. By using AAS the amount of catalyst present can be determined. Many raw materials are examined and AAS is extensively used to check that the major elements are present and that toxic impurities are lower than specified – e.g. in concrete, where calcium is a major constituent, the lead level should be low because it is toxic. By using AAS the amount of metals such as gold in rocks can be determined to see whether it is worth mining the rocks to extract the gold.

Atomic Absorption Spectroscopy aims to cover all major topics which are required to equip scholars with the recent advancement in this field. The book provides a systematic treatment of combining flow injection methods with all fields of atomic absorption spectrometry (AAS) including flame, hydride generation and electrothermal AAS.

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ASPECTS ON FUNDAMENTALS AND APPLICATIONS OF CONDUCTING POLYMERS

Edited by Eckbert Freund

Since the establishment of the conductive properties of intrinsic conductive polymers, an enormous variation of basic and applied research has been carried out, including different polymers, copolymers, blends, mixtures and composites. Until about 30 years ago all carbon based polymers were rigidly regarded as insulators. The notion that plastics could be made to conduct electricity would have been considered to be absurd. Indeed, plastics have been extensively utilized by the electronics industry for this very property. They are used as inactive packaging and insulating material. This very narrow perspective is rapidly changing as a new class of polymers known as intrinsically conductive polymers or electroactive polymers are being discovered. Consequently, ultimate understanding of physical and chemical properties of these materials has been pursued, while the applied facets have advanced very rapidly, crossing the boundaries between disciplines. Conductive polymers or, more precisely, intrinsically conducting polymers are organic polymers that conduct electricity. Such compounds may have metallic conductivity or can be semiconductors. The biggest advantage of conductive polymers is their processability, mainly by dispersion. Conductive polymers are generally not thermoplastics. But, like insulating polymers, they are organic materials. They can offer high electrical conductivity but do not show similar mechanical properties to other commercially available polymers. This book, Aspects on Fundaments and Applications of Conducting Polymers, deliver information about the development of fundamentals, and about some applications of conductive polymers.

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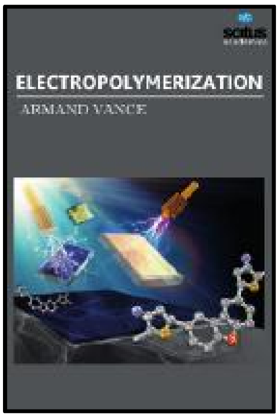

ELECTROPOLYMERIZATION

Edited by Armand Vance

In recent years, great focus has been placed upon polymer thin films. These polymer thin films are significant in many technological applications, ranging from coatings and adhesives to organic electronic devices, as well as sensors and detectors. *Electropolymerization* is the polymerization in the presence of an electrical current. Polymerization is any process in which relatively small molecules, called monomers, combine chemically to produce a very large chainlike or network molecule, called a polymer. The monomer molecules may be all alike, or they may represent two, three, or more different compounds. Usually at least 100 monomer molecules must be combined to make a product that has certain unique physical properties—such as elasticity, high tensile strength, or the ability to form fibres—that differentiate polymers from substances composed of smaller and simpler molecules; often, many thousands of monomer units are incorporated in a single molecule of a polymer. Electrochemical polymerization is preferable, especially if the polymeric product is intended for use as polymer thin films, because electrogeneration allows fine control over the film thickness, an important parameter for fabrication of devices. Moreover, it was demonstrated that it is possible to modify the material properties by parameter control of the electrodeposition process. This book entitled *Electropolymerization* deals with introductory topics and fundamentals as well as advanced insights. The book provides a timely overview of a recent state of knowledge regarding the use of electropolymerization for new materials preparation, as well as conducting polymers and several potentials of applications.

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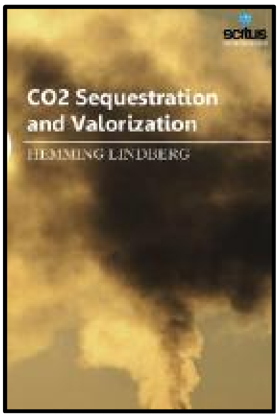

CO2 SEQUESTRATION AND VALORIZATION

Hemming Lindberg

The reconciliation of economic development, social justice and reduction of greenhouse gas emissions is one of the biggest political challenges of the moment. Carbon dioxide (CO2) capture and sequestration (CCS) is a set of technologies that can greatly reduce CO2 emissions from new and existing coal- and gas-fired power plants and large industrial sources. Carbon sequestration describes long-term storage of carbon dioxide or other forms of carbon to either mitigate or defer global warming and avoid dangerous climate change. It has been proposed as a way to slow the atmospheric and marine accumulation of greenhouse gases, which are released by burning fossil fuels. Carbon dioxide is naturally captured from the atmosphere through biological, chemical, or physical processes. Artificial processes have been devised to produce similar effects, including large-scale, artificial capture and sequestration of industrially produced CO2 using subsurface saline aquifers, reservoirs, ocean water, aging oil fields, or other carbon sinks. Carbon dioxide (CO2) capture and sequestration (CCS) could play an important role in reducing greenhouse gas emissions, while enabling low-carbon electricity generation from power plants. CCS technologies are currently available and can dramatically reduce (by 80-90%) CO2 emissions from power plants that burn fossil fuels. This book entitled *CO2 Sequestration and Valorization* offers strategies for mitigating CO2 emissions on a large scale using sequestration, storage and carbon technologies. This book is an important source of information for researchers, policymakers and anyone with an inquiring mind on this subject.

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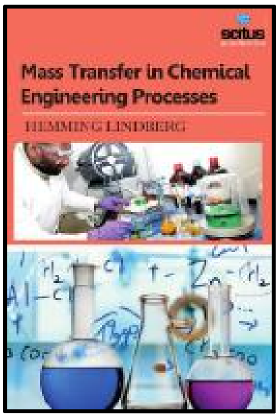

MASS TRANSFER IN CHEMICAL ENGINEERING PROCESSES

Hemming Lindberg

Mass transfer describes the net movement of mass from one location, usually meaning stream, phase, fraction or component, to another. Mass transfer happens in many processes, such as absorption, evaporation, adsorption, drying, precipitation, membrane filtration, and distillation. Mass transfer is used by different scientific disciplines for different processes and mechanisms. The phrase is commonly used in engineering for physical processes that involve diffusive and convective transport of chemical species within physical systems. The theory of mass transfer allows for the computation of mass flux in a system and the distribution of the mass of different species over time and space in such a system, also when chemical reactions are present. The purpose of such computations is to understand, and possibly design or control, such a system. Some usual phenomenon of mass transfer processes are the evaporation of water from a pond to the atmosphere, the purification of blood in the kidneys and liver, and the distillation of alcohol. In industrial processes, mass transfer operations include separation of chemical components in distillation columns. Mass transfer is frequently attached to additional transport processes, such as in industrial cooling towers. These towers combine heat transfer to mass transfer by sanctioning hot water to flow in dealings with hotter air and evaporate as it grips heat from the air. This book entitled *Mass Transfer in Chemical Engineering Processes* compromises several approaches in solving mass transfer problems for different practical chemical engineering applications. The book should be of great importance to its readers with interesting ideas and inspirations or direct solutions of their particular problems.

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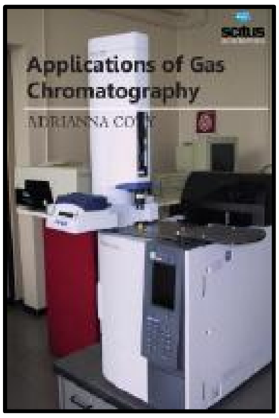

APPLICATIONS OF GAS CHROMATOGRAPHY

Edited by Adrianna Coty

Gas chromatography is a term used to describe the group of analytical separation techniques used to analyze volatile substances in the gas phase. In gas chromatography, the components of a sample are dissolved in a solvent and vaporized in order to separate the analyses by distributing the sample between two phases: a stationary phase and a mobile phase. The mobile phase is a chemically inert gas that serves to carry the molecules of the analyze through the heated column. Gas chromatography is one of the sole forms of chromatography that does not utilize the mobile phase for interacting with the analyze. The stationary phase is either a solid adsorbent, termed gas-solid chromatography (GSC), or a liquid on an inert support, termed gas-liquid chromatography (GLC). Helium remains the most commonly used carrier gas in about 90% of instruments although hydrogen is preferred for improved separations. This inert gas goes through a glass column packed with silica that is coated with a liquid. Materials that are less soluble in the liquid will increase the result faster than the material with greater solubility. The purpose of this book entitled *Applications of Gas Chromatography* is to provide a better understanding on its separation and measurement techniques and its application. Since chromatography techniques are separating and analyzing methods, this book will help other researchers and young scientists to choose a suitable chromatography technique. Furthermore, this book illustrates the newest challenges in this area. This valuable book aims to provide a connection between various chromatography techniques and different processes.

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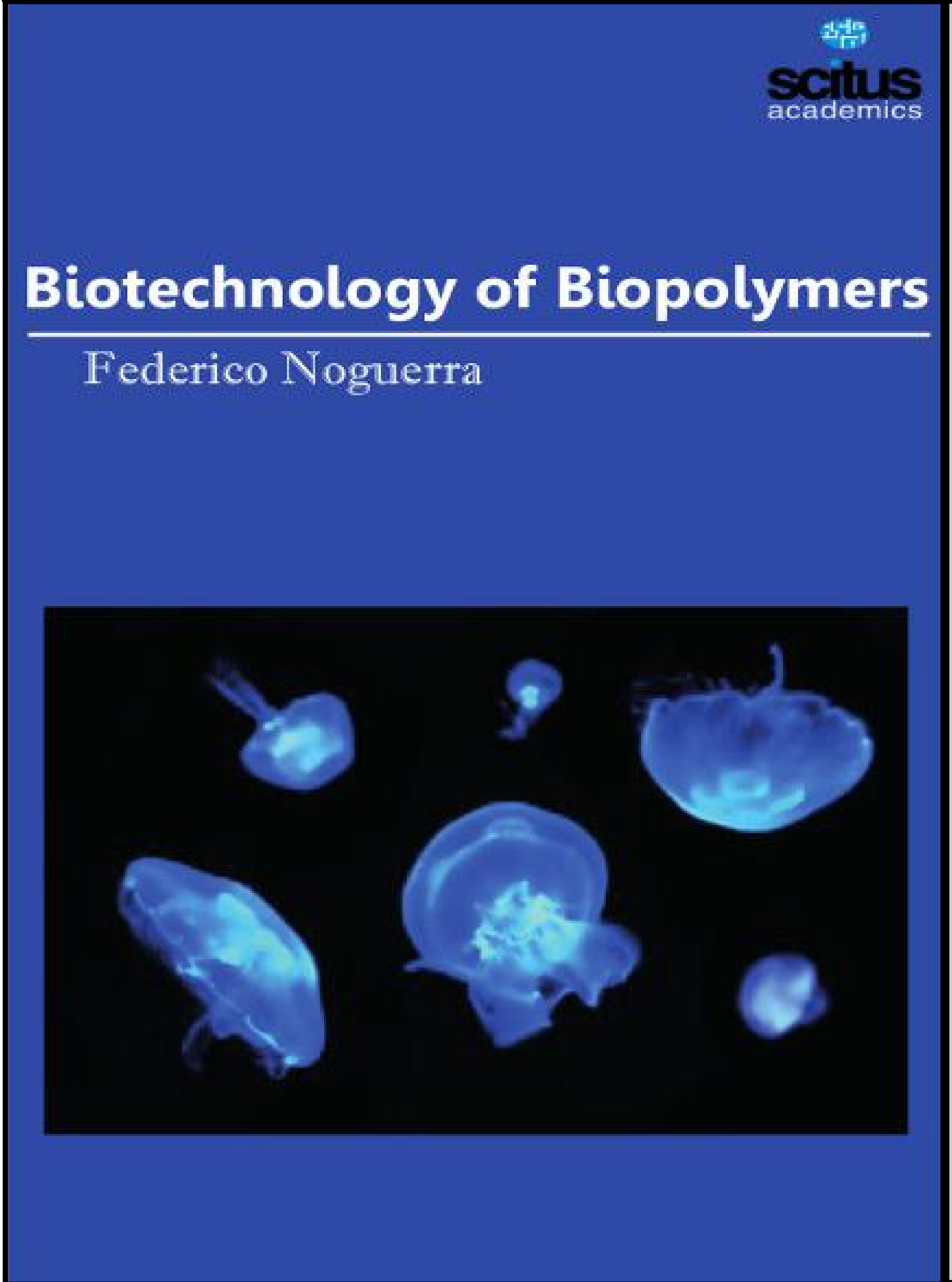

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