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E.T. Denisov and I.B. Afanas'ev, editors. Oxidation and Antioxidants in Organic Chemistry and Biology, CRC Press, Taylor and Francis Group, Boca Raton, FL, USA, 2005 (xxi + 981 pp., £115.00, ISBN 0-8247-5356-9)

Oxidation of organic compounds by dioxygen is a phenomenon of paramount significance in nature, technology, and life. The liquid-phase oxidation of hydrocarbons forms the basis of several efficient technological processes. Free radicals participate in the oxidation of organic compounds. Hydroperoxides are formed as intermediates and accelerate oxidation. *Oxidation and Antioxidants in Organic Chemistry and Biology* is a comprehensive review of reactions of oxidation for different classes of organic compounds, polymers, and biological processes. The contents of the book are divided into three major parts. Part I deals with chemistry and kinetics of organic compounds oxidation by dioxygen, which include liquid phase oxidation, oxidation of hydrocarbons, alcohols, ethers, carbonyl compounds, amines, amides, esters and polymers etc.

The autoxidation of organic compounds, their mixtures and products promotes their rapid deterioration due to the action of atmospheric oxygen. Products such as rubber, polymers, hydrocarbon fuels, lubricants, organic solvents, food etc. are spoiled due to oxidation by oxygen. Antioxidants are widely used to prevent these undesirable processes. Part II is focussed on the chemical mechanistic information about antioxidants and their action on the autoxidation of hydrocarbons, alcohols, and other organic compounds and polymers.

Free radicals and oxidative processes play an important role in the biological processes. Many physiological processes are mediated by oxygen and nitrogen free radicals. Pathophysiological disorders may be the consequence not only of overproduction but also the insufficient formation of free radicals. Numerous oxidative processes occur in living organisms, which are regulated or unregulated enzymatically. Part III of the book discusses the various issues related to biological oxidation and antioxidants including major initiators of oxidative processes, prooxidant enzymes, role of mitochondria and microsomes in free radical production, non-enzymatic and enzymatic lipid oxidative processes, protein oxidation, DNA damage. Different antioxidants, antioxidant enzymes, free radical and oxidative stress in pathophysiological processes, and major analytical methods of free radical detection are also discussed. The book also includes a CD-

ROM, which provides a database of oxidation and antioxidants in organic chemistry.

The book provides up-to-date information about the oxidation of different compounds, antioxidants, and biological oxidation. This comprehensive volume can be excellent source of information not only to the students but also to the persons involved in research and academia.

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A.F. Collings and C. Critchley, editors. Artificial Photosynthesis From Basic Biology to Industrial Application (2005, WILEY-VCH, Verlag GmbH & Co. KGaA, Weinheim) (xxvi + 313 pp., £ 90, ISBN 3-527-31090-8)

Artificial Photosynthesis presents a step-by-step dissection of the photosynthetic component processes, current and future technology for recreating the biochemical and biophysical processes in green plants. Expert scientists and bioengineers discuss the basic equations governing energy conversion, hydrogen generation and carbon fixation, as well as the approaches to engineering processes in a bioreactor in this book. The economic, environmental and social issues associated with photosynthetic generation of energy and biomass are also considered here.

This book begins with Ian Lowe's discussion of social and political issues involved in the implementation of artificial photosynthesis. The comprehensive and integrated model of artificial photosynthesis is presented in chapter 2. The other chapters in this book describing research in artificial photosynthesis are grouped into four sections that parallel the processes of natural photosynthesis: photon energy capture and conversion, photovoltaic current generation, photoproduction of hydrogen, the fuel of next century, and carbon dioxide use.

The open chapter of second section explores the decoupling concept from the point of view of biomimetic solar cell design. The second chapter of this section presents the design of natural photosynthetic antenna systems. Identifying Redox-active chromophores in photosystem II by low-temperature optical spectroscopies is discussed in the next chapter. Chapter 6 and 7 focus on the nature of the special-pair radical cation produced by primary charge separation during photosynthesis and protein-based artificial photosynthetic reaction centres

respectively. The detailed chemical composition and geometry of the norbornene building blocks are discussed in the end of this section.

To open the third section, Martin Green presents a review of the current state of the silicon photovoltaics industry and discusses his third-generation, high-efficiency silicon photovoltaic devices. The another chapter of this section describes how artificial molecular systems that mimic bacterial photosynthetic energy conversion can be designed and synthesized.

The first chapter of third section focuses on addressing the hydrogenase oxygen-sensitivity problem. The end of this chapter summarizes the state of the art in getting better irradiation of cells deeper in high-density microalgal culture.

The opening chapter of last section focuses on the manipulating ribulose biphosphate carboxylase/oxygenase in the chloroplasts of higher plants. The next chapter of this chapter presents how to define the inefficiencies in the chemical mechanism of the photosynthetic enzyme rubisco by computational. Carbon-based end products of artificial photosynthesis are discussed in the chapter 15. The next chapter introduce the artificial photosynthesis system. The end chapter of this book describe the greenhouse gas technologies.

Numerous tables, charts and figures throughout this volume provide excellent illustrative material to support the detailed information presented in text. In conclusion, this book outlines the first steps of research in service to energy transformation. This book can be used as a textbook in teaching course as well as in research jobs of this field.

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Kurt Faber, Biotransformations in Organic Chemistry, 5th ed., Springer, Heidelberg, Germany, 2005 (xi + 454 pp., £27.00, ISBN 3-540-20097-5)

The methodology of biotransformation has been developed and used in recent decades. The utilization of natural catalysts (enzymes) for the transformation of non-natural man-made organic compounds is totally different from the early researches. This method has become an indispensable tool for asymmetric, not only in the academic field, but also on an industrial scale.

There are five parts in this textbook. In the first part, it gives a basic introduction in the principles of biocatalytic

methods. It mainly describes the enzyme properties as well as the classification and nomenclature. In the second part, it discusses the biocatalytic applications, which is the main chapter in this book. It gives the principles of different reactions—hydrolysis, reduction, oxidation, addition and elimination, glycosyl-transfer, C–C bond formation. It also describes the principles of stereoselective transformations, and kinetics of enzymes. The following part indicates the special techniques in this field. It focuses on the organic solvents, immobilization, modification and artificial enzymes. The operation and principle of each technique are described in detail. Charts and figures are cited in the text, which help the readers to understand the points more easily. The following part deals with the state of art and outlook. It is a brief summary on the state of the art of biotransformation. The outlook focuses on future developments. The final part is the appendix, which deals with the basic rules for the safe and practical handling of biocatalysts. The abbreviations, suppliers of enzymes and the commonly preparations of enzymes are included in this part.

Biotransformations in Organic Chemistry as a textbook provides an extensive and basic background in this field and it is a foundation book for students of undergraduate and postgraduate in the course of modern organic chemistry.

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E. Klipp, R. Herwig, A. Kowald, C. Wierling and H. Lehrach, editors, Systems Biology in Practice (2005, Wiley/VCH, Weinheim, Germany) (xix + 465 pp., € 99.00, ISBN 3-527-31078-9)

A desire to understand a system of living organisms has existed for a long time. Systems biology is the coordinated study of biological system by the researches in the component of cellular network and interaction, genome technique and computer work with experimental efforts. Therefore, the enterprise of systems biology research requires both breadth and depth of understanding for various aspects of biological, computational, mathematical engineer issues.

Systems Biology in Practice is a textbook based on the concept, implementation and application. It covers extensive aspects of biology and computation, which are important in