

Book reviews

Reactive Oxygen Species in Biological Systems: An Interdisciplinary Approach

D. L. Gilbert & C. A. Colton, Kluwer Academic/Plenum Publishers, New York, 1999, xxv + 707 pp, £97.50, ISBN 0-306-45756-3

Recognition of the importance in biological systems of reactive oxygen species (ROS), which include free radicals, peroxides, singlet oxygen, ozone, and nitrogen monoxide and dioxide free radicals, has led to considerable interest and intense research in this constantly expanding area. This volume aims to provide a concise, yet comprehensive, overview of this important field and focuses on three main areas, namely the destruction of cellular function by ROS resulting in pathological states, the protection of an organism by ROS against invading organisms that cause infection, and the role of ROS in normal physiological processes.

'Reactive Oxygen Species in Biological Systems' is essentially divided into eight parts, with a total of 28 chapters. Part I contains two introductory chapters, which provide the essential background information on the history and chemistry of ROS which is required for better comprehension of future chapters. The six chapters that comprise Part II focus upon general biochemistry and molecular biology of ROS, and include specific chapters on the production of ROS by mitochondria, the molecular biology of antioxidant enzyme activation, and inflammation regulation of manganese superoxide dismutase. Part III on nitrogen reactive species covers the importance of nitrogen radicals, and includes chapters on nitric oxide synthase, the beneficial and deleterious effects of nitric oxide, and the protective role of nitroxides against oxidative stress. Environmental pro- and anti-oxidants, such as ozone, which filters out damaging UV radiation, are examined in Part IV. The damaging effects of ozone and nitrogen dioxide on biological organisms, and antioxidants in nutrition are also discussed. Internal pro- and anti-oxidants are covered in Part V. The antioxidant effects of lipid soluble ubiquinol and the hormone melatonin are presented, along with the ability of xanthine oxidase to contribute to a pro-oxidant condition in biological organisms.

Part VI of this volume explores ROS in specific tissues, such as plant tissue and nervous tissue, and discusses the production of ROS by phagocytes, spermatozoa and fertilised ova. Brain chemiluminescence and the role of ROS in neuronal function are also covered in this section, which leads nicely into part VII, which details pathological states and ageing. Specific chapters in this section focus upon

Parkinson's disease, Alzheimer's disease, amyotrophic lateral sclerosis (Lou Gehrig's disease), and the oxidation of proteins in ageing. The volume concludes in part VIII with an overall summary chapter, which includes other topics not covered in the volume, such as the role of ROS in programmed cell death, cataracts, hypoxia, proxisomes, arachidonic acid and reperfusion injury.

In conclusion, 'Reactive Oxygen Species in Biological Systems' is a well written informative volume, that provides an excellent overview of the expanding area of ROS. It is therefore highly recommended to all individuals with research interests which include ROS.

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Comprehensive Organic Transformations: A Guide to Functional Group Preparations (2nd ed)

R. C. Larock, John Wiley & Sons, Inc., New York, 1999, xliii + 2583 pp., £96.99, ISBN 0-471-19031-4

Organic synthesis is a constantly evolving area, with new reagents and reactions being reported in the scientific literature on a regular basis. It has, therefore, become impossible for a practising organic chemist to keep abreast of all the latest synthetic organic methodologies and technologies at their disposal. It is the intention of this volume to provide a comprehensive, highly condensed, systematic collection of useful synthetic methodologies that is of direct practical use to not only the long term practitioner of organic synthesis, but also to the synthetic novice.

All presented reactions have been systematically organised according to synthetic target functionality, resulting

in nine extensive chapters covering alkanes and arenes, alkenes, alkynes, halides, amines, ethers, alcohols and phenols, aldehydes and ketones, and finally, nitriles, carboxylic acids and derivatives. Within each chapter the methodology is subdivided into major processes, for example, the opening chapter on alkanes and arenes is divided into five sections, namely reduction, coupling, alkylation, ring-forming and aromatisation. Stringent criteria have been used with respect to reaction selection in order to ensure real synthetic utility of included reactions, and that the necessary reagents are readily available or easily prepared and handled in the laboratory.

All of the presented transformations are fully referenced allowing the reader to expand their search. Synthetically useful multiple functional group transformations are also covered and are cross-referenced in appropriate sections. The volume culminates with an invaluable 'Transformation Index' that lists all of the reactions covered in the text, sorted according to the IUPAC name of the organic products. The use of protecting groups is not covered, since excellent reviews on this subject are already available. Likewise, heterocyclic chemistry has been omitted, except where heterocycles are employed to effect simple functional group manipulations/transformations.

In summary, this highly recommended encyclopaedic volume contains information on tens of thousands of synthetic methodologies and references, and certainly fulfils its mandate to serve as a concise and comprehensive single volume sourcebook of organic reactions and functional group preparations. It will, therefore, be extremely useful for researchers and students alike, with interests in any areas of synthetic organic chemistry.

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Nonradioactive Analysis of Bio-molecules 2nd Edit

Editor: C. Kessler, Springer-Verlag, London Ltd, 2000, 750 pp., £61.50, ISBN 3-540-64601-9

Since the first edition many of the non-radioactive

methods of labelling bio-molecules and their subsequent detection have progressed and improved. This has occurred mainly in the medical and life sciences, where progress has been related to the increased characterisation of biological material particularly DNA and RNA.

The book extensively reviews the analysis of bio-molecules such as proteins, glycoproteins and nucleic acids. The techniques described such as colorimetric, luminescence and fluorescence can, however, be used for a much wider range of bio-molecules including carbohydrates. The labelling of glycoproteins by their sugar residues for detection is discussed generally. Specific examples of such labelling procedure are given in the individual chapters.

Each of the 65 chapters gives a concise account of the theory allied to a reaction or technique, followed by a variety of detailed protocols depending on the material to be examined. A summary of reagents required is given. Also, various methods appropriate to the detection of labelled compounds are described. The chapters have sections on troubleshooting and detection sensitivity, which would prove extremely useful to both the novice and experienced scientist.

This book is of interest to professionals in the field of bio-analysis, particularly DNA, RNA, proteins and glycoproteins. It also has considerable information of technical and experimental use to the carbohydrate chemist.

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Metabolism of Agrochemicals in Plants

Terry Roberts (Ed.). John Wiley & Sons, Inc., Chichester, 2000, xiv + 300 pp., £95.00, ISBN 0-471-80150-X

Recent years have seen remarkable advances in areas of research directed towards increasing the quality and quantity of food and fibre by chemical and other means. The importance of understanding the metabolism of agrochemicals in plants is immense. As food safety and environmental concerns are increasing, knowledge of the metabolic