

Journal Of Carbohydrate Chemistry

A unique overview of the most important protecting group strategies in carbohydrate chemistry *Protecting Groups: Strategies and Applications in Carbohydrate Chemistry* provides a detailed account of key strategies and methodologies for the protection of carbohydrates. Divided into two parts, the first focuses on groups that are used best to protect a specific position on a carbohydrate. In the second part, specific carbohydrate residues or compounds are discussed in the context of a specific protecting group strategy used to reach the desired regioisomer. This important book: -Features chapters on protecting groups at the primary and secondary positions of carbohydrates -Describes protecting group strategies towards sialic acid derivatives, glycofuranoses, sulfated glycosaminoglycans, and cyclodextrins -Provides information on automated glycan assembly -Includes a chapter on the industrial scale synthesis of heparin analogs Written by a team of leaders in the field, *Protecting Groups: Strategies and Applications in Carbohydrate Chemistry* is an indispensable guide for academics and industrial researchers interested in carbohydrate and natural product synthesis, pharmaceutical chemistry, and biochemistry.

Since its inception in 1945, *Advances in Carbohydrate Chemistry and Biochemistry* has provided critical and integrating articles written by research specialists that integrate industrial, analytical, and technological aspects of biochemistry, organic chemistry, and instrumentation methodology in the study of carbohydrates. The articles provide a definitive interpretation of the current status and future trends in carbohydrate chemistry and biochemistry. High quality comprehensive reviews covering all aspects of carbohydrate chemistry

The fundamental science and the latest developments in carbohydrate-based vaccines The relatively new field of glycoimmunology has emerged from the marriage of glycobiology and immunology, in recognition of the important role carbohydrates play as antigenic determinants. *Carbohydrate-Based Vaccines and Immunotherapies* comprehensively reviews the state of this exciting field, offering a single source for both the fundamental science and the latest developments. With contributions by leading experts, this resource covers the design, synthesis, evaluation, and applications of various carbohydrate-based vaccines, including polysaccharides, neoglycoproteins, and neoglycolipids. The text approaches vaccine design from a chemical and molecular focus, staying in line with current advances. Key topics covered by *Carbohydrate-Based Vaccines and Immunotherapies* include: Recent developments towards clinically useful vaccines against bacteria, viruses, parasites, and fungi Using adjuvants to improve immunogenicity and/or immunological properties of vaccines Choosing and designing proper adjuvants for specific targets Abnormal carbohydrates expressed by tumors Carbohydrate-based therapeutic cancer vaccines or cancer immunotherapy Clinical trials results for synthetic cancer vaccines Glycoengineering of cell surface carbohydrates and its anticancer applications Using cell surface carbohydrates for disease diagnosis A single, convenient source of state-of-the-art information from leading authorities in the field, *Carbohydrate-Based Vaccines and Immunotherapies* is an essential reference for organic chemists and biochemists, academic researchers, and other students and professionals involved in vaccine design.

First Euroconference on Carbohydrates in Drug Research
Glycobiology and Drug Design

The Organic Chemistry of Sugars

Synthesis and Biomedical Applications of Glycans and Glycoconjugates

Sialic Acids, Part II: Biological and Biomedical Aspects

Volumes in the Proven Synthetic Methods Series address the concerns many chemists have regarding irreproducibility of synthetic protocols, lack of identification and characterization data for new compounds, and inflated yields reported in chemical communications—trends that have recently become a serious problem. Exploring carbohydrate chemistry from both the academic and industrial points of view, this unique resource brings together useful information into one convenient reference. The series is unique among other synthetic literature in the carbohydrate field in that, to ensure reproducibility, an independent checker has verified the experimental parts involved by repeating the protocols or using the methods. Featuring contributions from world-renowned experts and overseen by a highly respected series editor, this latest volume compiles reliable protocols for the preparation of intermediates for carbohydrate synthesis or other uses in the glycosciences. Key Features: Explains reliable and tested protocols for the preparation of intermediates for carbohydrate synthesis Offers a unique resource in glycosciences, compiling useful information in one reference Presents protocols that are of wide use to a broad range of readers in the carbohydrate field and the life sciences, including undergraduates taking carbohydrate workshops Explores synthetic carbohydrate chemistry from both the academic and industrial points of view Guarantees the reader a good, clean, reproducible experiment

This book contains contributions from interdisciplinary scientists to collectively address the issue of targeting carbohydrate recognition for the development of novel therapeutic and diagnostic agents. The book covers (1) biological problems involving carbohydrate recognition, (2) structural factors mediating carbohydrate recognition, (3) design and synthesis of lectin mimics that recognize carbohydrate ligands with high specificity and affinity, and (4) modulation of biological and pathological processes through carbohydrate recognition.

Demonstrating the interdisciplinary nature of modern glycosciences, this volume covers research in the fields of polysaccharides and small carbohydrates from the synthetic and structural viewpoints, with applications ranging from biology to the bioeconomy. Key aspects of the synthesis and properties of imino disaccharides and regioselective glycosylation reactions are reviewed, glycosyltransferase inhibitors are shown to be potential future therapeutic agents, protein-carbohydrate interactions in plant cell-wall biodegradation are targeted by the use of glycan microarrays, biological properties of polysaccharidic microbial surface antigens are discussed with respect to their intimate structure, and contributions on carbohydrate-based hydrogelators, green/blue sugar-based surfactants and carbohydrate-based green solvents illustrate the modern design of tomorrow's chemicals. With the increase in volume, velocity and variety of information, researchers can find it difficult to keep up to date with the

literature in their field and this book remains a valuable addition to any researcher's library.

Nomenclature of Carbohydrates

Recent Trends in Carbohydrate Chemistry

Biological Problems, Methods, and Applications

Preparative Carbohydrate Chemistry

Carbohydrate Recognition

Carbohydrate Chemistry for Food Scientists, Third Edition, is a complete update of the critically acclaimed authoritative carbohydrate reference for food scientists. The new edition is fully revised, expanded and redesigned as an easy-to-read resource for students and professionals who need to understand this specialized area. The new edition provides practical information on the specific uses of carbohydrates, the functionalities delivered by specific carbohydrates, and the process for choosing carbohydrate ingredients for specific product applications. Readers will learn basic and specific applications of food carbohydrate organic and physical chemistry through clearly explained presentations of mono-, oligo-, and polysaccharides and their chemistry. This new edition includes expanded sections on Maillard browning reaction, dietary fiber, fat mimetics, and polyols, in addition to discussions of physical properties, imparted functionalities, and actual applications. It is an invaluable resource on the chemistry of food carbohydrates for advanced undergraduate and graduate students, and a concise, user-friendly, applied reference book for food science professionals. Identifies structures and chemistry of all food carbohydrates – monosaccharides, oligosaccharides and polysaccharides Covers the behavior and functionality of carbohydrates within foods Contains extensive coverage of the structures and properties of individual polysaccharides, including cellulose, inulin, gellans and pectins, amongst others In recent years C-glycoside chemistry has been one of the main topics in carbohydrate chemistry, not only because of the synthetic challenges posed, but also because C-glycosides have the potential to serve as carbohydrate analogues resistant to metabolic processes. Consequently, this class of compounds is currently receiving much interest as a potential source of therapeutic agents for clinical use. This book provides a broad coverage of the various synthetic methods available for the preparation of C-glycosides,

and illustrates the interesting breadth of connections between carbohydrate chemistry and modern general synthetic organic chemistry by including topics such as transition-metal catalysis, radical chemistry, cycloaddition and rearrangement processes. In addition, in the final chapter of the book, the syntheses of C-di and trisaccharides reported through 1994 are reviewed. This well organised account of the synthetic chemistry in this field will prove to be very valuable to a wide range of researchers and advanced students, both as an introduction to the topic and for reference.

The fields of glycochemistry and glycoscience are rich and varied and where much can be learned from Nature. As Nature is not always able to produce carbohydrates in quantities useful for not only in research but also as therapeutic agents, new ways need to be found to optimize the yield. This book presents an overview of the latest developments in the field of carbohydrates, ranging from de-novo approaches via cyclodextrin chemistry to the synthesis of such highly complex glycoconjugates as glycosphingolipids and GPI anchors. The main emphasis remains on the synthetic aspects making the book an excellent source of information for those already involved in carbohydrate chemistry, as well as for those organic chemists who are beginners in this field. Equally of interest to synthetic chemists, as well as medicinal chemists and biochemists.

Advances in Stereoselectivity and Therapeutic Relevance

Essentials of Glycobiology

Synthesis of Oligosaccharides

The Chemistry of C-Glycosides

Food Carbohydrate Chemistry

Intrigued as much by its complex nature as by its outsider status in traditional organic chemistry, the editors of The Organic Chemistry of Sugars compile a groundbreaking resource in carbohydrate chemistry that illustrates the ease at which sugars can be manipulated in a variety of organic reactions. Each chapter contains numerous examples demonst

Carbohydrate chemistry provides access to carbohydrate-based natural products and synthetic molecules as useful biologically active structures relevant to many health care and disease-related biological processes. Recent Trends in Carbohydrate Chemistry: Synthesis, Structure, and Function of Carbohydrates covers green and sustainable reactions, organometallic carbohydrate chemistry, synthesis of glycomimetics, multicomponent reactions, and chemical transformations leading to molecular diversity based on carbohydrates. These include inhibitors of glycogen phosphorylase, which are relevant in controlling type 2 diabetes and sugar sulfates. Polysaccharides, which

are commonly modified chemically, are also examined with contributions covering polysaccharide synthesis and modification of polysaccharides to obtain new structures and properties. Recent Trends in Carbohydrate Chemistry: Synthesis, Structure, and Function of Carbohydrates is ideal for researchers working as synthetic organic chemists, and for those interested in biomolecular chemistry, green chemistry, organometallic chemistry, and material chemistry in academia as well as in industry.

Not since "Sugar Chemistry" by Shallenberger and Birch (1975) has a text clearly presented and applied basic carbohydrate chemistry to the quality attributes and functional properties of foods. Now in Food Carbohydrate Chemistry, author Wrolstad emphasizes the application of carbohydrate chemistry to understanding the chemistry, physical and functional properties of food carbohydrates. Structure and nomenclature of sugars and sugar derivatives are covered, focusing on those derivatives that exist naturally in foods or are used as food additives. Chemical reactions emphasize those that have an impact on food quality and occur under processing and storage conditions. Coverage includes: how chemical and physical properties of sugars and polysaccharides affect the functional properties of foods; taste properties and non-enzymic browning reactions; the nutritional roles of carbohydrates from a food chemist's perspective; basic principles, advantages, and limitations of selected carbohydrate analytical methods. An appendix includes descriptions of proven laboratory exercises and demonstrations. Applications are emphasized, and anecdotal examples and case studies are presented. Laboratory units, homework exercises, and lecture demonstrations are included in the appendix. In addition to a complete list of cited references, a listing of key references is included with brief annotations describing their important features. Students and professionals alike will benefit from this latest addition to the IFT Press book series. In Food Carbohydrate Chemistry, upper undergraduate and graduate students will find a clear explanation of how basic principles of carbohydrate chemistry can account for and predict functional properties such as sweetness, browning potential, and solubility properties. Professionals working in product development and technical sales will value Food Carbohydrate Chemistry as a needed resource to help them understand the functionality of carbohydrate ingredients. And persons in research and quality assurance will rely upon Food Carbohydrate Chemistry for understanding the principles of carbohydrate analytical methods and the physical and chemical properties of sugars and polysaccharides.

1992 International Carbohydrate Symposium Issue

Carbohydrate-Based Vaccines and Immunotherapies

1996 International Carbohydrate Symposium Issue

Glycochemistry

Organic Synthesis with Carbohydrates

Carbohydrates are the most widely distributed naturally-occurring organic compounds on Earth. They make up much of our food, clothing and shelter, and are as vital to national economies as they are to our diet. This book is the first broad treatment of carbohydrate chemistry in many years, and presents the structures, reactions, modifications, and properties of carbohydrates. Woven throughout the text are discussions of biological properties of carbohydrates, their industrial applications, and the history of the field of carbohydrate chemistry. Written for students as well as practicing scientists, this text/reference will be of interest to a wide range of disciplines influenced by carbohydrates: biochemistry, chemistry, food and nutrition, microbiology, pharmacology, and medicine.

Carbohydrates offer a ready source of enantiomerically pure starting materials. They have been used for the imaginative

synthesis of a wide range of compounds, and have been found to be effective chiral auxiliaries which enable the introduction of a range of functionalities in a highly enantioselective manner. In a subject dominated by volumes at research and professional level, this book provides a broad understanding of the use of carbohydrates in organic synthesis, at postgraduate student level. Emphasis is placed on retrosynthetic analysis, with discussion of why a particular synthetic route has been chosen, and mechanistic explanations are provided for key and novel reactions. Wherever possible, the authors highlight points of general significance to organic synthesis. Selected experimental conditions and reaction details are incorporated to ensure that information can be utilised in research. The book is extensively referenced and so provides a convenient point of entry to the primary literature.

The finding by Emil Fischer that glucose and fructose on treatment with phenylhydrazine gave the identical osazone led him to the elucidation of stereochemistry of carbohydrates. Since then, progress in the field of carbohydrates has been amazing with the unraveling their basic structure, biosynthesis, immunology, functions, and clinical uses, for pure carbohydrates and for protein-linked carbohydrates (glycoproteins and proteoglycans). The chapters in Carbohydrate Chemistry, Biology and Medical Applications present a logical sequence leading from the chemistry and biochemistry of carbohydrates, followed by their role in various pathological conditions, to carbohydrates as potential therapeutic and diagnostic agents. This book offers a detailed panoramic review of the chemistry and biology of carbohydrates for chemists, biologists and health professionals. Each chapter is authored by contributors expert in the particular area of research. Explains how carbohydrates are important to life Details the chemistry, biology and medical aspects of carbohydrates Interdisciplinary and international team of authors

Biomedical and Material Science Applications

Proven Synthetic Methods, Volume 5

Chemical and Biological Approaches

Food Carbohydrates

Proven Synthetic Methods

Sialic Acids, Volume 76, the most recent release in the Advances in Carbohydrate Chemistry and Biochemistry series, is the second volume of a two-volume set devoted to the sialic acids. Vol. 76, devoted to the biological and biomedical aspects of sialic acids, includes chapters on "Sialic Acids in Neurology," "Sialic Acids in Nonenveloped Virus Infections," and "The Biology of Gangliosides," all written by leading experts in their fields. Features contributions from leading authorities and industry experts who specialize in carbohydrate chemistry, biochemistry and research Integrates the industrial, analytical and technological aspects of biochemistry, organic chemistry and instrumentation methodology in the study of carbohydrates Informs and updates on all the latest developments in the field

All essential areas of basic synthetic carbohydrate chemistry are covered and appropriately described. In

addition, this book explains the basic reaction mechanisms while taking into account modern concepts such as stereoelectronic principles.

Since carbohydrate oligomers are still a challenge in synthetic chemistry, this book on recent developments fulfils a great need. Covering the chemistry necessary to synthesize exact copies of these structures, top authors from all around the world comprehensively deal with synthesis from anomeric halides, from miscellaneous glycosyl donors, and by indirect and special methods, as well as 1-oxygen-and 1-sulfur-substituted derivatives. They demonstrate the best approach for the stereoselective formation of the intermonomeric bond, making this essential reading for every biochemist working in biosynthesis, the exploration of biopathways and vaccines.

Recommendations 1996

From Monosaccharides to Complex Glycoconjugates

Carbohydrate Chemistry

Volume 42

Carbohydrate Triflates

With the increase in volume, velocity and variety of information, researchers can find it difficult to keep up to date with the literature in their field. This invaluable volume contains analysed, evaluated and distilled information on the latest in carbohydrate research. The discovery and synthesis of novel carbohydrates and mimetics with diverse applications continues to be a major challenge for carbohydrate chemists. The understanding of the structure and function of carbohydrates and glycoconjugates remains vital in medicine and molecular biology. This volume collates modern carbohydrate research from theory to application and demonstrates the importance of carbohydrates in new lead generation. It is of benefit to any researcher who wishes to learn about the latest developments in the carbohydrate field.

Will update existing publications on carbohydrate-based drug design and further shape the emerging data and thinking in this new area.

The second volume in the series Carbohydrate Chemistry: Proven Synthetic Methods, Volume 2 offers a collection of synthetic procedures valuable to the practice of synthetic carbohydrate chemistry. The series takes an important and unique approach in that all described procedures have been independently verified as reliable and reproducible. With editors and contributors who are highly respected scientists in the field, this book provides a widely useful reference for both researchers and students, exploring

carbohydrate chemistry from both academic and industrial points of view. The book begins with an introductory section that offers tricks and tips collected by the series editor from many years of experience working in carbohydrate laboratories. The subsequent chapters present detailed protocols on both specific synthetic transformations and the preparation of common synthetic intermediates, with figures to aid in comprehension. Procedures are described for regioselective benzylidene ring opening reactions, oxidation reactions to provide uronic acids, stereoselective alpha-glucosylation reactions, and more. Protocols for synthetic intermediates of general utility include 3,4,6-tri-O-acetyl-d-galactal, phenyl 4,6-O-benzylidene-1-thio- α -d-mannopyranoside, 1,2-anhydro-3,4,6-tri-O-benzyl- β -d-mannopyranoside, and methyl N-acetylneuraminic acid, among many others. Each chapter presents in-depth experimental descriptions for the reported procedures, including reaction setup, reaction conditions, work-up procedures, and purification protocols. The chapters also provide detailed characterization of all products and intermediates as well as copies of the ^1H NMR and ^{13}C NMR of the described products and intermediates to indicate the purity of the obtained materials and to serve as a valuable reference for future practitioners. This book provides an important starting point to reliably access synthetic carbohydrate materials and as such offers a valuable resource for the synthetic organic chemistry community. Through the streamlined access of well-defined products it provides a thrust to the rapidly growing field of chemical glycobiology.

Essentials of Carbohydrate Chemistry

Biology of Carbohydrates

Synthesis, Mechanisms, and Stereoelectronic Effects

Advances in Carbohydrate Chemistry and Biochemistry

Chemistry, Physical Properties, and Applications

Annotation 'Carbohydrate Chemistry' provides review coverage of all publications relevant to the chemistry of monosaccharides and oligosaccharides in a given year.

Recent Trends in Carbohydrate Chemistry: Synthesis and Biomedical Applications of Glycans and Glycoconjugates covers biomedically relevant bacterial cell wall carbohydrates including recent findings on biosynthetic aspects, advances in the chemical assembly of bacterial lipopolysaccharide fragments and teichoic acids, and modern NMR approaches to unravel structural details. The first part introduces and provides the relevant background for synthetic glycoconjugate vaccines. The second section focuses on synthetic carbohydrate-based vaccines of therapeutic potential that are licensed or under development. This second volume of

Recent Trends in Carbohydrate Chemistry is ideal for researchers working as synthetic organic chemists, as well as those interested in glycoconjugation, protein chemists, immunologists, and microbiologists, in academia as well as in industry. Highlights important features of bacterial glycoproteins Illustrates modern chemical synthesis and structural analysis of bacterial glycans Demonstrates the importance of carbohydrate chemistry for the synthesis of lipopolysaccharides and teichoic acid Covers recent findings on glycan ligation Gives an overview of the most recent developments on carbohydrate-based vaccines

Recent Trends in Carbohydrate Chemistry: Synthesis and Biomedical Applications of Glycans and Glycoconjugates covers biomedically relevant bacterial cell wall carbohydrates including recent findings on biosynthetic aspects, advances in the chemical assembly of bacterial lipopolysaccharide fragments and teichoic acids, and modern NMR approaches to unravel structural details. The first part introduces and provides the relevant background for synthetic glycoconjugate vaccines. The second section focuses on synthetic carbohydrate-based vaccines of therapeutic potential that are licensed or under development. This second volume of Recent Trends in Carbohydrate Chemistry is ideal for researchers working as synthetic organic chemists, as well as those interested in glycoconjugation, protein chemists, immunologists, and microbiologists, in academia as well as in industry.

Carbohydrate Chemistry for Food Scientists

Modern Synthetic Methods in Carbohydrate Chemistry

Carbohydrates in the Development of Antibiotics

Handbook of Chemical Glycosylation

Protecting Groups: Strategies and Applications in Carbohydrate Chemistry

Unique in its broad range of coverage, Food Carbohydrates: Chemistry, Physical Properties and Applications is a comprehensive single-source reference on the science of food carbohydrates. This text goes beyond explaining the basics of food carbohydrates by emphasizing principles and techniques and their practical application in quality control, product development, and research. The editor incorporates information on analytical methods, the structural analysis of polysaccharides, physical properties, molecular conformation and characterization, and industrial applications of polysaccharide gums. The analytical methods and structural analysis of polysaccharides are rarely presented in books on food carbohydrates - topics this text fully illustrates. presents particulars on starch and starch modification, with a focus on reaction principles, improved functional properties, and practical applications. Food Carbohydrates: Chemistry, Physical Properties and Applications is the only known current reference to include basic chemistry, analytical methodologies, structural analysis, conformation and functional properties, and rheological and thermal properties of food carbohydrates all in one text. This book is ideal as a professional reference for researchers, engineers, and those interested in food carbohydrates, as well as a textbook for graduate students.

Sugar chains (glycans) are often attached to proteins and lipids and have multiple roles in the organization and function of all organisms. "Essentials of Glycobiology" describes their biogenesis and function and offers a useful gateway to the understanding of their

of glycans.

Detailing commonly used methods and procedures, this reference discusses the reactions and derivative forms of carbohydrates. Preparative Carbohydrate Chemistry covers the formation, cleavage, and reactions of derivatives and illustrates bond-forming reactions of SN2 types, free radicals, chain extensions, and branching. The contents include: sugar derivatives; selected reactions in carbohydrate chemistry; chemical synthesis of oligosaccharides and O- and N-glycosyl compounds; enzymatic synthesis of sialic acid, KDO, and related deoxyulosonic acids, and of oligosaccharides; synthesis of α -glycosyl compounds; carbocycles from carbohydrates; and total synthesis of sugars from non-sugars. This authoritative reference offers relevant chapters on reactions and derivative forms of carbohydrates, including commonly used methods as well as new experimental procedures. It also contains insightful chapter commentaries and succinct topic histories.

2D and CP-MAS NMR Spectroscopy

Essentials of Carbohydrate Chemistry and Biochemistry

Carbohydrates

Carbohydrate Chemistry, Biology and Medical Applications

Journal of Carbohydrate Chemistry