



Book Review

Carbohydrate Chemistry

Benjamin G. Davis, Antony J. Fairbanks; Oxford University Press Oxford, 2002, 100 pages, ISBN 0-19-855833-3, £8.99

Carbohydrate Chemistry is a subject of great importance taught in all undergraduate chemistry courses. Carbohydrates are fundamental to life as they play a vital role in metabolism and in a number of biological processes. Carbohydrate compounds also provide illustrations to demonstrate some underlying principles of stereochemistry. This handbook incorporates the right level of detail for undergraduate study. It has been designed to provide concise introductions relevant to all students of chemistry. This book is divided into nine sections each explaining and illustrating key concepts of Carbohydrate Chemistry.

The introductory chapter provides a basic overview of carbohydrates and their natural existence as well as dealing with misconceptions about Carbohydrate Chemistry. The second chapter focuses on open chain and ring structure of monosaccharides. With its clear illustrations, it demonstrates the structural formulae and stereochemistry of monosaccharides. Chapter 3 builds upon Chapter 2, it discusses reactions of the anomeric centre and gives detailed understanding of the relationship between carbonyls, hemiacetals and acetals. Both Chapters 3 and 5 deal with reactions of the anomeric centre. The former chapter focuses on the consequences and underlying reasons for the anomeric effect and the process of mutarotation, whereas the latter focuses mainly on nucleophilic substitution/addition reactions and problems associated with control of stereochemistry at the anomeric centre. It also explores the possibilities of extending or shortening the carbon sugar chain by one unit.

Both Chapters 4 and 6 discuss reactions of hydroxyl groups. The first chapter explores the significance of three

types of hydroxyl groups found in sugars and the importance of reacting these hydroxyl groups to allow regioselective reaction of those left unprotected. It also explores reactions involving non-anomeric hydroxyl groups whereas the sixth chapter provides detailed descriptions of reactions of hydroxyl groups with particular reference to cyclic acetals.

The next two chapters are based on disaccharide formation with the first focussing on the chemical route and the second looking at the enzymatic route via two classes of carbohydrate processing enzymes. The principles of iterative oligosaccharide synthesis and the use of orthogonal glycosyl donors/acceptors are also explained in Chapter 7.

The final chapter covers the importance of sugars in biology with particular emphasis on metabolism, fermentation and structural building blocks. It also explains clearly with the use of examples, the concept of glycode and the central role that carbohydrate plays in infection and inflammation by microorganisms. This chapter summarises the wide and varied roles of carbohydrate containing structures in biology.

This book provides invaluable information on carbohydrates and their wide range of uses in a single, concise volume. Excellent, easy to follow reaction mechanisms are illustrated throughout the text. It should be of value to undergraduates and individuals with professional or personal interest in carbohydrate chemistry.

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