Physical Chemistry of Non-aqueous Solutions of Cellulose and Its Derivatives

Wiley Series in Solution Chemistry, Vol. 5, V. V. Myasoedova, John Wiley & Sons, Ltd, Chichester, 2000, xii + 196 pp., £75.00, ISBN 0-471-95924-3

The Wiley 'Series in Solution Chemistry' aims to present authoritative, comprehensive, up-to-date accounts of the many aspects of solution chemistry. Volumes in the series cover experimental investigation, theoretical interpretation and prediction of physical chemical properties and behaviour of solutions, as well as accounts of industrial applications and environmental consequences of properties of solutions. The series comprises both single and multi-authored research monographs and reference level works as well as edited collections of themed reviews and articles, all with comprehensive bibliographies.

Cellulose is the subject of countless publications, and much has been written about the behaviour of solid cellulose. Much less has been written about the interesting behaviour of cellulose and cellulose derivatives in the liquid phase. This volume, therefore, aims to provide a systematic account of the solution chemistry of cellulose and its derivatives, by presenting an overview of the various modern approaches which have been utilised to investigate the physico-chemical properties of such solutions.

'Physical Chemistry of Non-aqueous Solutions of Cellulose and Its Derivatives' is divided into six chapters, the first of which covers phase equilibria and liquid crystalline order in solutions of cellulose and its derivatives. In solution, cellulose derivatives can form liquid crystals which change to a solid state with unique optical and physico-mechanical properties. The second chapter covers the influence of the solvent on the equilibrium and kinetic rigidity of the molecular chain of cellulose and its derivatives in solution, whilst the third chapter discusses the thermochemistry of dissolution of cellulose in non-aqueous solvents, explaining methods of obtaining thermodynamic parameters for solvation in non-aqueous solvents. The solvation of cellulose and its derivatives in non-aqueous solvents, and mathematical models of cellulose and its derivatives in solution, are discussed in the fourth and fifth chapters, respectively. How experimental data and computer simulation can give an insight into the factors which influence the interaction of solvent and solute is explained. The final chapter is devoted to the rheological behaviour of lyotropic LC systems based on cellulose and its derivatives.

In conclusion, this informative volume stimulates interest in developments in the optical properties of solutions of cellulose and its derivatives in non-aqueous solvents, and is recommended to all researchers, both in academia and industry, with interests in the solution properties of cellulose and its derivatives.

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Glycoscience – Synthesis of Oligosaccharides and Glycoconjugates, 2nd ed

H. Driguez & J. Thiem (Eds.), Springer-Verlag, Berlin, 1999, vi + 229, £30.50, ISBN 3-540-65557-3

Glycoscience is becoming a term that covers all sorts of activities within, or at the edge of, carbohydrate research. The purpose of this volume is to compile a number of contemporary reviews focusing upon synthetic developments, and it succeeds by presenting the state of the art in the synthesis of complex saccharide structures, written by leading scientists at the forefront of this rapidly growing field. This volume is composed of eight detailed chapters, and special emphasis has been placed upon the formation of complex saccharide structures employing various enzymes. A major proportion of the presented articles focuses upon these biocatalytic methodologies, which reflects the particular significance of efficient and selective procedures employing enzymes for preparative purposes in the carbohydrate field.

The opening chapter reviews the main applications of glycosidases in the synthesis of glycosidic bonds and lipases in acylation/deacylation reactions of carbohydrates. The second chapter focuses upon the use of glucosyltransferases for the rather complex task of stereospecific and regiospecific glycosylation. The enzymatic and chemical glycosylation of ergot alkaloids is discussed in the third chapter. The biological aspects of such new compounds, in terms of their immunomodulatory, neuroactive and cytostatic activity, are also discussed. The fourth chapter covers the enzymatic synthesis of peptide conjugates, which can be utilised as tools for the study of biological signal transduction. The enzymatic deprotection of carbohydrates, nucleosides and peptides, and the enzymatic synthesis of glycopeptides and lipopeptides is presented in this section.

Approaches to the one-pot synthesis of unique and structurally complex metabolically stable oligosaccharide mimetics by tandem enzyme asymmetric C–C bond formations, are of considerable interest because of their potential bioactivity. Sialic acids are involved in a number of biological processes. A review of the most recent methods for

their synthesis, modification, and for the preparation of sialyl glycosides as biological probes of sialic acid-recognising proteins is presented in the sixth chapter. The synthesis of *N*-acetylneuraminic acid, the most complex natural saccharide, and its analogues, is also discussed in this chapter. The penultimate chapter highlights novel synthetic pathways to unusual oligosaccharides with heptose, uronic acid and fructofuranose residues. The final chapter elucidates the advantages of pyruvate saccharides for the preparation of special oligosaccharides, pyruvic acid acetals being found as so-called non-carbohydrate groups among many bacterial polysaccharides.

In conclusion, this informative volume contains a wealth of information on the synthesis of oligosaccharides and glycosides, particularly by enzymatic methodologies, and is well referenced throughout. It would however, benefit from a subject index. Nevertheless, it is highly recommended to individuals with research interests in any areas of glycoscience.

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