

Book reviews

Xylans and Xylanases. Edited by J. Visser, G. Beldman, M.A. Kusters-van Someren and A.G.J. Voragen, Elsevier, Amsterdam. xiii + 576 pp. Price US\$208.50. ISBN 0-444-89477-2/1992.

Xylans, which are non-cellulose complex polysaccharides from plant cell walls, and xylanases, which can degrade xylans, have been highlighted, in recent years, as they have been recognised as important types of applied polysaccharide chemicals. There are many diverse types, the compositions and structure of which are now being elucidated. Xylanases are destined to play a crucial role in the biological and enzymatic treatment of lignocellulosic resources such as in biological pulping and the application of lignocellulosic resources in diet. However, there are relatively few references to xylans and xylanases compared with cellulose and cellulases, though they may be vital.

Xylans and Xylanases, as the seventh volume of the series *Progress in Biotechnology*, offers a collection of lectures and short contributions based on posters presented at the International Symposium on Xylans and Xylanases, organised in The Netherlands, and consists of six chapters. The structure, physical and chemical properties of xylans are focused on in the first chapter. The identification, mode of action and chemical properties of xylans are the topics considered in the second chapter. Accessory enzymes in xylan degradation and molecular genetics and regulation of xylanase biosynthesis in microbial systems are covered in both the third and fourth chapters, respectively. Studies regarding the application of xylanases in food, feed and wood technology are reported in the fifth chapter. Short communications based on poster presentations (45 papers) are collected in the last chapter, which covers all sorts of research activities for xylans and xylanases. In particular, it is noteworthy that a large number of studies throughout this book cover the diversity between species, genetics, kinetics and industrial applications of xylanases.

This book is timely for those wishing to know the front line of studies on xylans and xylanases and is recommended to all researchers involved in any form of cellulose and lignocellulose applied chemistry.

John F. Kennedy
Jiro Shimizu

Chemically Modified Surfaces. Edited by Joseph J. Pesek and Ivan E. Leigh, Royal Society of Chemistry. xii + 224 pp. Price £49.50.

Surface chemistry has become of great importance, particularly as the advantages of having greater areas of reactive surfaces compared with dense homogeneous materials, are becoming increasingly realised. The range of materials on which surface modifications can be accomplished is expanding, as is the range of methods by which surfaces can be modified chemically and this has produced an increase in the type of techniques for studying them.

Chemically Modified Surfaces, compiled from the Fifth Symposium held in Malvern, Pennsylvania, USA, is a presentation of new scientific contributions on the chemical modification of different materials, surface characterisation, and other topics of current interest in this area. The book thoroughly covers the spectrum of chemically modified surfaces while also being extremely specialist in each topic. For a chemist interested in one particular topic, it is very detailed, explanatory and precise. For anyone interested in the general chemistry of modified surfaces, it covers a vast area of this subject.

While including the traditional topics, the book also covers industrial applications of surface modifications, i.e. conversion of oxide to hydride surfaces, modifications of polymer surfaces, modification and characterisation of catalysts, and surface studies on membranes and thin films.

An expanse of topics are covered from Catalysts For The Environment, Control Mechanism of Surfactant-Assisted Increase In Coal Liquefaction Yields, to New Methodology For Grafting of Polymer Surfaces. Surface grafting is a polymerisation that incorporates an additional monomer from solution to form a second covalently bonded surface polymer phase. Existing methodology for grafting is based predominantly on radical polymerisations. New grafting chemistry involves new synthetic approaches to grafting onto polyethylene surfaces, and grafting using an impregnated catalyst. Thermal Stabilisation Of Enzymes Through Surface Attachment by Covalently Bonded Phospholipids, Surface Chemistry Of Microporous Manganese Oxides, High Temperature Sorbents For Oxygen Supported On Platinum Modified Zeolites looks at the role of platinum in the reduction of metals like cobalt and copper when added to zeolite by ion exchange.

While considering the physical chemistry aspect, it also covers characterising chemical modifications of surfaces, including magnetic resonance, infra-red spectroscopy, X-ray, photoelectron spectroscopy and also presentation of new scientific contributions in this area.

This is altogether a very comprehensive and informative book which will be of interest to those interested in polymer materials, surface and colloidal science, as well as analytical chemistry, chromatography and applied spectroscopy.

J.F. Kennedy
S.J. Macknight

NMR Spectroscopy of Polymers. Edited by R.N. Ibbett, Blackie Academic & Professional. xiii + 362 pp. Price £79.00. ISBN 075140005X.

The advent of superconducting magnets has greatly enhanced the resolving power of NMR spectroscopy allowing a greater level of stereochemical and sequence information to be accessed. This has meant the study of polymers has become no different from any other type of chemical NMR, in that the technical advances have revolutionised the ease of acquisition and content of spectroscopic data. The numerous multi-pulse techniques now available have been applied to polymer problems and these techniques have now become standard spectroscopic methods for the polymer spectroscopist. This has allowed identification of added ingredients down to very low levels, as well as the assortment of impurities that may be present in industrial polymers, thus making NMR an invaluable tool in the synthetic polymer scientist's arsenal. The development of techniques for the identification of end groups and minor architectural structures has developed in its own right and has progressed to the stage where the information obtainable can be used in establishing polymer reaction mechanisms and kinetics.

This book deals with both solution and solid state NMR and loosely divides the text between the two. In recent years rapid progress has been made in the field of high resolution solid state NMR culminating in a technique that can now be applied routinely. It provides high chemical resolution and can provide insight into polymer chain packing and morphology. Often it is the physical heterogeneity of the solid rather than instrumental effects that lead to spectral broadening. Rather

than limiting the information content, these physical influences can often be interpreted in terms of chain arrangements. As well as making an impact in the study of intractable polymers it has made equal impact as a tool for determining solid-state polymer dynamics. Thus NMR has taken on the role of a molecular scale tool for mechanical analysis, with the additional chemical dimension. These are just some of the important themes this text embraces; each chapter author has been chosen on the basis of their expertise in the given field and has contributed their knowledge on the subject, with the underlying principal of each chapter forming a building block for the next to reinforce.

The objective of the book is to provide a source of information on all major aspects of NMR spectroscopy of synthetic polymers by housing numerous strands of the subject under one roof — as a single comprehensive volume. It identifies with the readership at every scientific level and aims to be useful to the majority of polymer scientists and NMR spectroscopists. The text contains full analysis of available techniques and full exploration of many polymer science applications, thus providing a guide to the practical study of polymers and interpretation of experimental data. Specialists will find it a dictionary of proven methodologies as well as a sourcebook for dealing with the very latest developments in the subject.

The reader is gently introduced to the subject of each chapter by an explanation of the basic principles which then goes on to discuss the most recent experimental and theoretical developments. The authors selflessly make the reader aware of alternative texts whether they cover general NMR or simply treat NMR as one of the range of spectroscopic techniques available for polymer characterisation.

This book achieves its objectives admirably with uniform text and clear diagrams throughout. Each chapter includes a cited literature index, and the book itself contains an extensive subject index. In conclusion, this book is invaluable to those working in the polymer or NMR field.

John F. Kennedy
Andrew D. Suett