



## Book reviews

**Chitin Chemistry.** Edited by George A.F. Roberts, Macmillan Press, Hong Kong, 1992. 350 pp. Price £65.00. ISBN 0-333-52417.

Chitin, a polysaccharide closely related in chemical structure to cellulose, is being studied by many research groups for development in a wide variety of applications. Most current research centres work on the deacetylated version of chitin, which is called chitosan. The importance of chitin and chitosan has grown partly because they represent a renewable and biodegradable source of materials, and partly because of the recent increased understanding of their functionality in biology and in technological, biotechnological and medical applications. As the second most abundant natural polymer, chitin and its derivative chitosan, represent a great challenge both to the scientific community and to industry.

The increased interest in commercial applications has stimulated research in both academic and industrial laboratories, and this is leading to a much better understanding of the chemistry and macroscopic properties of the polymer. 'Chitin Chemistry' reviews the current status of knowledge of chitin and chitosan and presents the most recent research results in this progressive field including information on occurrence, structure, isolation, characterisation and analysis. The book also deals with preparation of derivatives by chemical modifications, and the chemical behaviour (acid–base properties, metal ion sorption, adsorption and degradation) and solution properties (solubility, solution properties, gelation and adsorption of chitosan) of such derivatives. However, their possible applications have not been discussed in this book apart from a few brief references.

Alphabetical organisation, extensive cross-referencing and a complete index further enhance the utility of this book. 'Chitin Chemistry' should be an important research reference tool, desk-top information resource, and supplementary reading asset to reaching professionals and their students, and we recommend it to all those engaged in a wide variety of scientific fields including polymers, textile, pharmaceuticals, personal care products and agriculture.

**John F. Kennedy**  
**Zilda M.B. Figueiredo**

**Paper Recycling-Strategies, Economics & Technology**  
Edited by Ken L. Patrick, Miller Freeman Publications Inc., San Francisco, 1991. vi + 202 pp. Price \$45.00. ISBN 0-87930-231-3.

The mid 1980s saw a dramatic increase in public awareness and interest in recycling and environmental issues in general. Consequently, the paper industry had to adjust to major changes in markets and technology as public opinion shifted to a preference for recycled goods. This is not to say that recycling is a novel strategy; it is in fact about as old as the papermaking process itself. However, any recycling prior to the 1980s was more or less a matter of economics.

Environmental issues have been somewhat of a catalyst in recent years to the growth in secondary fibre consumption. However, improvements in technology, scarcity of virgin fibre, and the incentive of a lower cost fibre alternative have also contributed.

One of the biggest challenges in today's recycling systems is the removal of contaminants. They are a problem in the manufacture of any recycled paper product, and the worst of these substances are pressure-sensitive adhesives and hotmelt materials, collectively known as 'stickies'. For many paper grades, recycled products can and should be as good as their virgin counterparts. Considerable improvements have been made in the basic recycled pulping operation in recent years. Most gains have been in increased efficiency. However, most recycling research and development efforts of the past decade have been focussed on the deinking process. A deinking system is primarily a separation process, the quality of such a system being defined as the maximum removal of ink particles with minimum fibre loss.

In the 1990s Americans are facing a solid waste disposal crisis, hazardous waste and toxic industrial processes, water and energy shortages, pollution and depletion of natural resources. With paper as one of the most pervasive products in American society, the paper industry finds itself squarely in the environmental spotlight. This book provides a detailed guide to recycling in the US pulp and paper industry, and also provides insight into world trends, legislation and technology in the ever increasing business of recycling. It has a concise index, is well presented, and is thoroughly recommended. It is encouraging to see that the book is itself

printed on recycled paper, proving that high quality recycled products are achievable.

Charles J. Knill  
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**Advances in Chitin and Chitosan.** Edited by C.J. Brine, P.A. Sandford & J.P. Zikakis, Elsevier Applied Science, 1992. 684 pp. Price £135.00/US\$210.00. ISBN 1-85166-899-3.

Next to cellulose, chitin is nature's most abundant polymer. Chitosan, the high molecular weight, linear polymer composed of 2-amino-2-deoxy-D-glucose, is now produced commercially on a large scale by deacetylation of by-product shellfish chitin. Chitosan's unique solubility, solution properties, polyelectrolyte (cationic) character, physical attributes and its chemical and biological activity make it an attractive biopolymer for many applications. Many new uses of chitosan are currently being studied that are leading to even wider acceptance of chitosan in an ever increasing breadth of commercial applications.

Although its original and spectacular properties have been recognised for a long time (it was isolated by Biaconnot in 1811), the first review of chitin was presented by Muzzarelli in 1977. Subsequently International Symposiums on Chitin and Chitosan kept the information up to date.

'Advances in Chitin and Chitosan' is based on proceedings of the 5th International Conference on Chitin and Chitosan held in New Jersey in 1991. Predominate research themes focus on biotechnology and genetic engineering aspects of these compounds and related enzyme systems. Uses of chitosan's derivatives in biomedical applications (wound healing, stimulating immune system, drug delivery, reducing serum cholesterol), veterinary, agricultural and nutritional fields, their physical, chemical and biological properties, chemical reactions and derivatives, as well as exploration of new utilities for chitin and chitosan films, fibres, gels and membranes are outlined.

'Advances in Chitin and Chitosan' has been well edited but the quality of typescript is variable, and presents some minor typing errors. The book is particularly useful as an up-to-date guide in this field and can be considered essential reading, not only for those interested in chitin *per se*; but also for those who can see their potential commercial applications. In addition, a

good subject index and index of contributors makes it of more than transient value as a reference volume.

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**Chirality in Industry — The Commercial Manufacture and Applications of Optically Active Compounds.** Edited by A.N. Collins, G.N. Sheldrake and J. Crosby, John Wiley & Sons Ltd., 1992. 432 pp. Price £65.00/\$107.00. ISBN 0471935956.

The production of optically active intermediates and products as pure enantiomers has been investigated extensively in recent years. The main reasons for this are associated with the biological activity presented by only one enantiomer, the different type of activity that enantiomers may exhibit, the increased activity of the optically pure compound compared with the racemate and some legislation considerations. The use of pure enantiomers has applications in different fields, such as medicine, agriculture and the food industry. In the pharmaceutical industry, for example, it is now accepted that in some circumstances the introduction of the pure enantiomer can provide the benefit of needing a smaller dose and possibly an enhancement of therapeutic effects.

'Chirality in Industry — The Commercial Manufacture and Applications of Optically Active Compounds' is a compilation of papers which sets out to provide the reader with developments in the production and applications of pure enantiomers of a practical scale. The text comprises 21 articles collected from different authors and arranged into five main parts. The opening chapter functions as background material for the rest of the text; following chapters include non biological resolution, biological methods, asymmetric synthesis by chemical methods, immobilization techniques and membrane bioreactors, presenting examples of methods applied to obtain the pure enantiomer.

The book is intended for a wide range of students, researchers and technologists in many diverse fields of research and applications. Overall, the book is timely and will be of great value for the specialist and the newcomer in both academic and industrial fields.

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