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Book reviews

Recent Research on Wood and Wood Based Materials. Edited by N. Shiraishi, H. Kajita and M. Norimoto. Elsevier Science, UK, 1993. xiii + 262 pp. Price Dfl. 292.00; US$166.75. ISBN 0-444-81691-7.

To enhance the effort in disseminating knowledge and technology from the Japanese scientific and engineering community to other parts of the world, the book '*Recent Research on Wood and Wood Based Materials*' which is the 11th volume of the *Current Japanese Materials Research (CJMR)* series is aiming to highlight the current Japanese achievements in the field of materials science and technology.

Everyone would agree that wood is one of the natural resources which has made a significant contribution towards mankind's civilisation and development. As it is composed of 50–55% cellulose, 15–25% hemicellulose and 20–30% lignin with additional small quantities of minor components, wood has been used as a raw material for a variety of physical and chemical processes for the production of valuable and useful end-products such as fibre board, particle board, furniture, pulp and paper and plywood panel. Wood has the competitive edge over other materials like metal, plastic and glass because it is a multicomponent, hydroscopic, anisotropic, fibrous, porous, biodegradable and renewable material.

The book is a compilation of various technical papers, in which all the 18 topics can be classified into several main areas or sections. They are structural and chemical properties of wood, applications and high value added products, processing technology, biodegradation mechanism of wood and finally preservation techniques to prevent biodeterioration. Since the contributors of the book are the expertise from the universities, senior researchers from the research and development institutes and experienced executives from the relevant industry, the book provides a wide spectrum of information, knowledge and the latest technology for the readers. Physical, mechanical, chemical, technical, biochemical and engineering aspects are well covered, except the economical, environmental and social aspects are not documented. The book is probably tailored more towards the production of good quality wood and wood based materials. Therefore, the book is a good investment to anyone who is interested in wood and wood based materials, particularly to those who are directly involved in this interesting and challenging area. Lecturers, research students, relevant R & D and industrial communities are recommended to have this book on the shelf.

John F. Kennedy
Wan Hasamudin

Gas–Solid Hydroxyethylation of Potato Starch. By N.J.M. Kuipers. PhD Thesis, University of Groningen, 1995. vi + 353 pp. Price £30 (paperback); £40 (hardback). ISBN 90-9008137-2.

Starch can be chemically modified, by e.g. oxidation, esterification, etherification, etc., in order to improve specific properties. In order to retain the easy flow and handling properties and to avoid excessive drying costs, chemical modifications of starch are preferably carried out in such a way that the granular structure is maintained. The industrial derivatisation of starch is performed for a variety of reasons, however, the most important motives are to modify the gelatinisation and cooking characteristics of granular starch, to decrease the retrogradation and gelling tendencies of amylose-containing starches, to increase the water-binding capacity of starch dispersions, to enhance either hydrophilic or hydrophobic properties and/or to introduce ionic substituents.

Manufacturing techniques for the production of hydroxyalkyl ethers of starch (white, odourless and tasteless powders) have been around for several decades. From about 1950, these processes were applied to manufacture hydroxyalkyl ethers of relatively low degrees of ether group substitution by reacting alkaline starch with ethylene oxide.

This thesis focuses on the development of a gas–solid reactor for the hydroxyethylation of potato starch. The first chapter discusses the background and overall outline of the thesis. Chapter 2 reviews the properties of the major components playing a role in the hydroxyethylation, namely ethylene oxide, (potato) starch particles, and water absorbed by the starch granules and the hydroxyethyl starch product. This information is beneficial in understanding the reactive diffusion behaviour of the overall system. Chapters 3–6 deal with the intra-particle diffusion and reaction of gaseous ethylene oxide in semi-dry potato starch granules.

The design of a suitable reactor for this process requires the selection of a gas–solid contactor and knowledge of the flow behaviour of the reagents in such a reactor. Gas–solid mass transfer and heat transfer will

also play a role. All such considerations are explored in Chapters 7–9. In the final chapter, a potential set-up of a pressure-controlled stirred vibrating fluidised bed reactor is presented for the gas–solid hydroxyethylation of potato starch. The process is optimised and compared to the classical slurry process. Further, additional research topics are defined which are required to obtain a safe and accurate scale-up.

Overall, this is an interesting and extremely informative thesis which is well presented and thoroughly referenced. It should prove useful to anyone working within the starch industry or those in academia with interests in starch chemistry.

Charles J. Knill
John F. Kennedy

Sugarless — Towards the Year 2000. Edited by A.J. Rugg-Gunn. The Royal Society of Chemistry, Cambridge, UK, 1994. x + 197 pp. Price £37.50. ISBN 0-85186-495-3.

It is scientifically well established that frequent consumption of sugar, particularly between meals, increases the risk of dental caries. The World Health Organization (WHO), therefore, recommends the use of non-cariogenic sweeteners in frequently consumed snacks. Over the past 15 years, epidemiologists have charted a pattern of decreasing caries incidence amongst children in the majority of industrialised societies. However, many children still suffer considerable dental health problems.

This volume is based on the proceedings of an international symposium held at the University of Newcastle-upon-Tyne, UK which provided an opportunity for the discussion and exploration of ways to reduce sugar consumption in the United Kingdom, and to review the progress already achieved in this endeavour. The programme consisted of talks by nutritionists, dentists, food scientists, industrialists and experts on food legislation. The two principal groups of sugar containing products that were targeted were confectionery and liquid-oral medicines.

Sections in this volume chart the considerable progress that has been achieved in recent years, as well as indicating areas where further work is required in order to facilitate and encourage the move towards a sugarless diet. Specific products covered include sugar-free chocolate, sugar-free gum and non-sugar medicines. Information and discussion on the legal status and regulations regarding non-sugar sweeteners is also provided. Other topics covered include the sugar eating habits of children and adults, manufacturing opportunities with non-sugar sweeteners, and advice to consumers on the selection of medicines.

This is a well presented and informative volume, dealing with important consumer conscious issues and is recommended for those with interests in any area of food science.

John F. Kennedy
Charles J. Knill

Environmental Chemistry. By Stanley E. Manahan. Lewis Publishers, CRC Press, USA, 1994. 811 pp. Price £48.00. ISBN 1-56670-088-4.

In past decades, chemical processes producing massive amounts of a wide variety of chemicals have given humankind an unprecedented standard of living and quality of life. However, this has exacted a price of pollution and environmental degradation. On the other hand, it is only through the enlightened applications of chemistry that environmental quality can be improved. It is essential, therefore, that anyone entering the chemical profession have a basic understanding of environmental chemistry and its applications.

Environmental Chemistry may be defined as the study of the sources, reactions, transport, effects and fates of chemical species in water, soil, and air environments and the effects of technology thereon. All major areas of environmental chemistry are discussed in the revised sixth edition of this classic book, which is organised in 26 chapters, including Aquatic chemistry, Atmospheric chemistry, Chemistry of the geosphere and soil, and Hazardous wastes. New chapters have been added to the sixth edition to reflect the evolving nature of environmental chemistry, and these include: Environmental science and technology, Environmental chemistry and chemical cycles, Technology, Resources and energy. Also included for the first time are sections on the Fundamentals of Chemistry, Organic chemistry and Environmental biochemistry.

This book is written with two major goals: to provide an overview of chemical science within an environmental chemistry framework; and to provide the basics of environmental chemistry for those who need to know about this essential topic for their profession or for their overall education. *Environmental Chemistry* will help its reader to understand the ways in which this discipline can contribute to environmental preservation and improvement. This essential reference is a must for all environmental scientists.

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