

Mechanisms of Photophysical Processes and Photochemical Reactions in Polymers (Theory and Applications)

J. F. Rabek

John Wiley and Sons, Chichester, UK, 1987, XX+756 pages, £99 (ISBN 0-471-91180-1)

This book, unlike an earlier version by Guillet (Cambridge University Press, 1985), represents a more comprehensive approach in the field of polymer photophysics and photochemistry. Its aim is to provide, in some organized form, a collation of most of the available knowledge in the field and discuss their applications. The author has carried out this task in a well-written, well-planned and presentable manner and leaves few stones unturned. Whilst much of the information contained in the book is covered elsewhere it nevertheless provides a complete forum on the subject, and in this respect, is an extremely valuable text.

The book is made up of a total of 16 chapters beginning with the inevitable topic of basic photochemistry and leading into energy transfer processes in polymers. The next chapter on applications of polymer luminescence is followed by photoinitiated polymerization. The sixth chapter briefly covers the photochemistry of solvents and this is followed by a voluminous chapter on the photochemistry of initiators and sensitizers. Chapters 8-11 cover photografting, photocycloaddition, photochromism and photocrosslinking in polymer systems while Chapter 12 deals with photoimaging processes, and 13 with photocuring. Photodegradation and photostabilization of polymers are dealt with in Chapters 14 and 15 and the final chapter covers a new topic on the ever increasing importance of polymers in solar energy harnessing applications.

The book is certainly comprehensive and this is supported by more than 4000 references. The presentation is excellent with well drawn diagrams and very detailed mechanistic schemes. Thus, as a reference source it is unsurpassed but is strongly lacking in detailed discussion and could be more critical in approach rather than a compilation of facts. The introductory chapter on photochemistry is better documented elsewhere and could have been omitted and given way to more space for the purpose of discussion. Despite this, the book will form an excellent expansion of the author's

previous book, by the same publishers, on photodegradation and stabilization of polymers and become the bible in the field. In conclusion, a most useful and valuable text recommended to all scientists and technologists in industry, academia and government research establishments working in the field.

N. S. Allen

(Manchester Polytechnic)

Polymer Photophysics and Photochemistry

J. E. Guillet

Cambridge University Press, Cambridge, 1985, XIV+391 pages, £15 ISBN 0-521-23506-5

This book, previously available in hardback, is now available in paperback edition at a much reduced price and therefore more accessible to hard-up research students and academics. The book covers all aspects of the field of polymer photophysics and photochemistry more from the aim of a readable teaching text rather than an up-to-date review or compilation of research articles. In this respect it is a unique and well-written text and valuable to industrialists and academics working in this field who wish to gain a more fundamental understanding of the subject. The author does a fine job in explaining each area of polymer photochemistry and the book is highlighted with excellent representative examples.

The book first introduces the reader to photophysics with emphasis on energy transfer in polymers. Polymer structure and reactivity are then discussed and conveniently followed by diffusional processes. The determination of scission and crosslinking processes then follow with the main emphasis being placed on methods, which is very useful for the more practically minded. The next six chapters deal with basic photoprocesses, fluorescence phenomena and their measurement, excimers and exciplexes, phosphorescence and energy migration studies. Carbonyl photochemistry is an important aspect of the field and this is dealt with as a separate chapter. Photopolymerization processes are then briefly covered followed by photocyclization including photodimerization

and cycloadditions. A chapter on miscellaneous photoprocesses encompasses such topics as photoconductivity, mechanophotochemistry, template effects, polystyrene and the role of hydroperoxides. The last chapter discusses some general photo and radiation topics such as u.v. and X-ray studies on polymeric carbonyl systems, polyacrylates and microlithography.

In general, taking into account the restrictions on the size of books these days and the copious amounts of literature, the author has presented a well-balanced picture of most areas in the field of macromolecular photophysics and photochemistry and at the price quoted is an excellent buy.

N. S. Allen

(Manchester Polytechnic)

Polymeric Reagents and Catalysts

W. T. Ford (Ed.)

ACS Symposium Series 308, American Chemical Society, Washington, 1986

This book, which developed from an ACS symposium held in Florida in 1985, is a collection of authoritative reviews on various aspects of polymeric reagents and catalysts. The field is one of several emerging at the interface of polymer science and organic chemistry and some of the results and conclusions obtained in this area have interest and relevance to other areas dealing with functional polymers, for example, the synthesis of specialty polymers by the chemical modification of pre-formed polymers.

The symposium was relatively brief and in consequence the coverage of the field of polymeric reagents and catalysts is by no means complete.

The subject index is considerable and very useful but the author index only lists the chapter contributors.

All the chapters are well written and contain a mine of information. That by Bergbreiter is of interest as the subject of reactive *linear* polymers has previously been reviewed only rarely. The same can be said of Waller's chapter on reactions catalysed by NAFION strong acid ion-exchange resin.

To gain the maximum benefit from polymer-supported reactants it should be possible to recycle them. Unfortunately this important aspect has rarely been studied in any depth. The chapter by

Garrou describes the work carried out in recent years at Dow and elsewhere on the stability of supported transition metal complex catalysts. Some of the side reactions which lead to loss of catalytic activity are discussed and possible improvements in catalyst design identified. It should be borne in mind, however, that the metal-ligand bond is particularly weak and, indeed, needs to be so for catalytic activity in many systems. Consequently this type of catalyst can be expected to be less durable than many other types.

In the reviewer's opinion the two most outstanding chapters are the last one of Ford's and the one by Wulff. Site

isolation is a topic of great interest in the general area covered by the book but it tends to have caused some confusion and misunderstanding with some workers. In some systems it needs to be *minimized* for maximum efficiency of a reagent or catalyst: in other systems it needs to be *maximized*. Ford has gathered together all the information available on the topic, carefully and authoritatively analysed it, and clearly presented the conclusions. The chapter will be an invaluable starting point for all those who wish to study or exploit site isolation.

Several years ago Wulff pioneered the development of crosslinked polymers which contain a chiral imprint and which,

in consequence, can be used to resolve enantiomers by chromatographic techniques. More recently silicas have been prepared with similar properties. These topics and the development of polymers which can achieve stereoselective reactions make stimulating reading and give the reader an insight into what might be achieved in this general area in future.

Overall the book is a welcome addition to the relatively few on the topic of polymer-supported reagents and catalysts.

P. Hodge
(University of Lancaster)

BOOKS FROM WRIGHT

POLYMERS IN CONTROLLED DRUG DELIVERY

Edited by

Lisbeth Illum, BPharm, PhD, MPS, Associate Professor of Pharmaceutics, Royal Danish School of Pharmacy, Denmark

Stanley Stewart Davis, BPharm, PhD, DSc, CChem, FRCS, MPS, Lord Trent Professor of Pharmacy, University of Nottingham

- ★ Describes how polymers can be used to provide better methods for the delivery of drugs to the various organs of the body
- ★ Each chapter written by an expert or experts in the field
- ★ Highlights the multidisciplinary nature of present investigations
- ★ Brings together contributions from the physical, chemical, biological and pharmaceutical sciences

Contents: Controlled drug delivery • The fate of microparticulate drug carriers after intravenous administration • Monolithic albumin particles as drug carriers • Poly(lactic acid) microspheres as drug carrier systems • Poly(alkyl 2-Cyanoacrylate) (PAC) microspheres as drug carrier systems • Gelatin microspheres as drug carrier systems • Poly(acryl) - starch microspheres as drug carrier systems • Release and diffusion of drugs from polymers • Design and synthesis of bioresorbable polymers for the controlled release of drugs • Polysaccharide macromolecules as drug carrier systems • References • Index

November 1987 216 pages 234 × 156 mm Hardback Illustrated 0 7236 0573 4 £45.00

For details of other Wright titles, please contact the appropriate office.

Orders should be sent to the appropriate office listed below.

The UK headquarters serves all UK and overseas markets except where there is a local Butterworths office.

John Wrights Distributors
United Kingdom and Rest of the World
IOP Publishing Ltd
7 Great Western Way
Bristol, BS1 6HE, UK

Australia, Papua New Guinea and New Zealand
Williams and Wilkins and Associates
43, Herbert Street
PO Box 431
Artarmon, NSW 2004
Australia.

USA and Canada
PSG Publishing Company Inc
545 Great Road
PO Box 6
Littleton, MA 01460,
USA