

book reviews

Plastics Materials 5th Edn

J. A. Brydson

Butterworths, Guildford, 1989

xiv + 839 pages, £57.50

ISBN 0-408-00721-4

If a plastics technologist were to be invited to that mythical 'desert island' his choice of a book to while away the hours could well be Brydson's *Plastics Materials*. No longer than some modern novels or biographies it provides a comprehensive survey of the science and technology of plastics, including of course the full range of materials for boat building!

This fifth edition, appearing after Brydson has retired from the Polytechnic of North London, closely follows the fourth edition of 1982. Apart from trivial additions there is new material on alloys, acetal-polyurethane, polysulphone with ABS or SAN, reaction injection moulding, now including nylon, and high temperature materials, BBB and aromatic polyesters. Temperature index is given as the U.L. continuous use temperature; the alternative use in flammability studies as the temperature at which the critical oxygen level reaches 21% is not mentioned.

Earlier editions of this book have been used successfully as text books for undergraduates. For the increasing number of people in industry needing to have some knowledge of plastics materials, this book is an excellent point of first reference.

T. R. Manley

Complexes in Free-radical Polymerization

J. Barton and E. Borsig

Elsevier, Amsterdam, 1988,

xiv + 296 pages US\$ 126.35

ISBN 0-444-98930-7

This book is volume 6 of the Polymer Science Library (Edited by A. D. Jenkins). It deals with the role of complexes in the free radical polymerization of vinyl and polyene compounds. The English version appears four years after publication of the Slovak version. A wide variety of complexes are included and their effects at various stages in the polymerization are considered. Organometallic compounds are omitted but the scope of the book is still wide.

The three chapters cover initiation, propagation and termination with a variety of initiators, monomers and

monomer mixtures. This is not an easy field to review and the authors have done remarkably well to develop a structured approach to the important topics. The discussion is both concise and comprehensive. The illustrations are well presented and the extensive information in the text is clear. References (936 of them) are collected together and there are extensive and separate indexes of authors and subjects. Attention is given to the nature of the complexes, mechanisms of important reactions, rate expressions, equilibria and meaningful correlations.

The construction of the book is robust and the type is easy to read. Workers in this field should have access to the book.

B. W. Brooks

(University of Technology,
Loughborough)

Colloid Chemistry of Polymers

Yuri S. Lipatov

Elsevier Science, Amsterdam,

1988, ix + 450 pages, DFL 298

ISBN 0-444-43006-7

It has been recognized for some time that the distinction between the polymers on the one hand, and colloids on the other, is not only arbitrary, but also potentially inimical to our understanding. It is thus both timely and to be welcomed that a comprehensive book covering the wide range of polymer behaviour from the point of view of their colloidal properties has just been published.

Lipatov's book is a brave attempt at a colossal task and, by and large, a successful one. In order to end on a positive note, perhaps one should start with the shortcomings of the book. First, and perhaps most importantly for an introductory text (the author's description), the references are in a high proportion to the rather inaccessible Russian literature, and this makes it difficult to progress beyond the author's sometimes sketchy treatment. Second, there are some surprising omissions – it is hard to imagine a chapter on polymer adsorption at interfaces that makes no mention of either Scheutjens (although Fleer makes a fleeting appearance) or de Gennes. To make up for this, there are a few new personalities: Gamakker had me most puzzled, until I recalled that Hamlet is called Gamlet in Russian, and whilst I imagine that Vrij will be delighted to be credited with being the 'V' in DLVO, I'm not so sure how Verwey would react. Third, the language is rather turgid, and sometimes turbid, and the transmission coefficient is further reduced in places by a large number of typographical errors.

For those in the know, it is not too hard to work out that '0' really means 'θ', but for a complete beginner this might prove a shade unsettling. Finally, I was a little disappointed by the sparse reference to modern experimental methods such as small angle neutron scattering, and to the lack of detail about computer simulation of polymer configurations, both in solution and at interfaces.

Enough of such carping criticism! On the positive side, Lipatov has managed to cover an impressive amount of ground, and has brought together much material not usually found between one pair of covers. The early chapters deal with colloid chemistry of polymers, structure both in solution and in melts, the surface tension of polymer solutions and melts, polymer surfactants and polymer adsorption and adhesion. The chapter on filled polymers was particularly useful, and the discussion of the mechanical properties of these composites will be of interest to anyone involved in designing such new materials. A sensible discussion of the properties of polymer mixtures follows, drawing the distinction between miscibility and compatibility, firmly based on Flory theory. The final chapters cover the important topics of gelation and polymer emulsions and foams. Some interesting notes on the rheology of polymer blends, and the conditions under which phase separation may occur in these systems are included in the later chapters, and whilst the treatment may be unfamiliar to British readers, this is all to the good, since it sheds some new light on these important questions.

To summarize, this is a useful and comprehensive book and one which manages to cover a very wide range of topics. It is *not* an introduction, however, except for unusually sophisticated beginners.

S. D. Lubetkin

(University of Bristol)

Applied Polymer Analysis and Characterization: Recent Developments in Techniques, Instrumentation, Problem Solving

John Mitchell Jr. (Ed.)

Hanser Publishers, Munich, 1987,

xvii + 573 pages, £77.20

ISBN 3-446-14710-1

The sub-title of this large volume fairly accurately conveys an impression of its content. It is a quite comprehensive work subdivided into five sections, three of

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which are written by the editor, but the other two very large chapters contain contributions by a considerable number of different authors.

The first section is titled *Reviews of Recent Literature*. This contains short reports on a large number of characterization techniques under fifteen specific headings such as chemical methods, infra-red and Raman spectroscopy, microscopy, chromatography, X-ray methods etc. The material is of necessity presented in condensed form as the work in 518 separate references is discussed.

The second section, *Advances in Analysis and Characterization Methods*, has twelve sub-sections by different authors. These are too numerous to cite in this review, but contributions on electrochemical methods in polymer analysis, Raman spectroscopic investigations of drug-membrane interactions, acoustic emission of polymers, thermogravimetry, high resolution pyrolysis-gas chromatography, size-exclusion chromatography and new developments in the characterization of polymers by trans-

mission electron microscopy were particularly well presented. This massive section, as big as many books, contained 606 references.

The third, also large, section (306 references) called *Approaches to Problem Solving* is sub-divided into seven subsections covering topics which range from the general – analysis of polymers by Fourier-transform infra-red spectroscopy, infra-red spectra examination of volatile effluents from the thermal treatment of polymers, the determination of long-chain branching of polymers by multi-technique procedures and the identification of textile fibres – to the very specific – characterization of the structure and synthetic reactions of polyamido-amine ‘starburst’ polymers, the characterization of tapes with adhesive backings in the forensic science laboratory and the determination of microstructure by ^{19}F n.m.r. spectroscopy.

The final two sections on new instruments and new books, respectively, are short by comparison with the previous two sections. The first of these

sections, on new instruments, is divided into a general subsection and subsections on element and functional group determinations, spectroscopy, X-ray methods, microscopy, chromatography, thermal methods and physical methods. Recent developments of instruments are listed giving very brief outlines of their specifications and the addresses of the manufacturers. Unfortunately, however, it contains no critical assessment of any of the instruments mentioned. The section on new books is very short listing only title, author and publisher.

The reviewer is likely to be one of the few people to read this book from cover to cover, but as it is a very comprehensive work it is certain to contain sections of interest to many who are involved in the characterization and in the analysis of polymers. Although of a generally good standard, it is not totally uniform in this respect.

D. J. Hourston
(University of Lancaster)

Erratum

‘Influence of side groups on thermotropic behaviour of polyorganophosphazenes’

M. Kojima and J. H. Magill

Polymer 1989, **30**, 579–584

In ‘Results and Discussion’ the second sentence should read ‘For instance, the thermotropic behaviour has been investigated for PBPP^{4,9,15}.’

References 20–22 are as follows.

- 20 Masuko, T., Hoshi, M., Kitami, J. and Yonetake, K. *J. Mater. Sci. Lett.* 1988, **7**, 1241
- 21 Bishop, S. M. and Hall, J. H. *Br. Polym. J.* 1974, **6**, 193
- 22 Beres, J. J., Schneider, N. S., Desper, C. R. and Singler, R. E. *Macromolecules* 1979, **12**, 566