

monomers are reacted together. All these topics are covered in the book, which indeed is an exhaustive repository of information of all kinds on its subject.

The author has taken great pains to be comprehensive, and for this he deserves respect because many people in a similar position would have concentrated on their own work to a large extent. Indeed, it is rare to find such a complete discussion of a topic by its inceptor, giving credit to all those who have followed his lead and contributed to current knowledge of the subject. No one else could claim to bring the same level of authority to this topic, and probably no one else would have been so even-handed in reporting. It has to be said that a by-product of the desire to be comprehensive has meant that some sections of this volume are little more than catalogues; in fact, it might have been possible to present substantial sections of it, notably Chapter 12, in tabular form, but undoubtedly the book is all the more valuable as a work of reference for its inclusion of all the relevant material. A further example of the trouble that the author has taken on behalf of his readers is the addition of the *Chemical Abstracts* citation to references. (Even so, care should be taken in using the information presented: the classic paper on cyclisation by Stoll and Rouvé is attributed, on page 121, to Stoll and Rowe.)

As a compendium of the literature on cyclopolymerisation, it is hard to believe that this book could be surpassed. It could have been written in a more personal dramatic style but that is not the author's way. The price is in line with that of scientific texts in general, and this means that it will appeal to libraries (where it will certainly be indispensable) rather than to individuals. In summary, this is a 'horse's mouth' text that completely satisfies the need for a state-of-the-art statement on its subject.

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### Polymer Yearbook 9

R. A. Pethrick (Ed.)

Harwood Academic Publishers,  
Philadelphia, 1992, 431 pages,  
\$95.00, £52.00  
ISSN 0738-1743

'Polymer Yearbook' is an annual series. The ninth volume is divided into three sections. The first one collects review articles from Russian researchers, the second one consists of a list of reports on different topics under the title 'Progress of polymer science in Japan' and the third section, 'Current awareness', a tradition

of this series, contains reports on several international and Russian conferences, held in 1990, and covering different topics in the area of macromolecular science and technology. In addition, an impression is given of the state of polymer science research in Russia, Korea and Eastern Europe and a list of recent publications in polymer science is presented.

The first section contains eight review articles. The first, 'Doping of properties of carbon- and hetero-chain polymers by organic silicon and silicon compounds', by L. M. Khananashvili, emphasizes the concept that the introduction of the above substances, even in small amounts, considerably modifies the technological and processing properties of the polymeric materials. In the second review, 'Biodegradable polymer-based drug delivery systems: the physicochemical aspects', by V. S. Livshits and G. E. Zaikov, several physicochemical parameters, such as crystallinity, molecular weight and its distribution, degree of crosslinking and drug content of the biodegradable polymers, which may influence the release rate from polymeric systems, are considered. In the other six review articles: 'The interrelation between relaxation properties and factors influencing polymer fracture' by V. E. Gul' and Yu. G. Yanovsky, 'The role of intermolecular interaction in polymer degradation processes' by E. F. Vainstein, 'The influence of stress on the kinetics of thermal and thermal oxidative processes in elastomers' by E. F. Vainstein, A. A. Sokolovskii and A. S. Kuzminskii, 'Kinetics of the changing products molecular-mass distribution in thermodegradation of associated polymers' by E. A. Baranova, E. F. Vainstein and O. F. Shlensky, 'Molecular-dynamic concept of the reactivity of polymers and solids in the light of PVT-effects' by A. L. Kovarskii, and finally 'Quantitative criterion of polymer hydrophilicity' by L. P. Razumovskii, A. L. Iordanskii and G. E. Zaikov, the authors interpret the main aspects of the above topics in terms of kinetics, thermodynamics and microscopic properties in order to find a rationalization and a prediction of the macroscopic phenomena.

In the second section, an impression of recent research in polymer science in Japan is given by 12 reports dealing with a wide range of topics such as conductive polymers as solid solvents, ionic polymerization, block and graft copolymers, solution properties of the polymers, polyaddition and polycondensation, polymeric biomaterials, physical properties and superstructure of polymeric solids, biopolymers, polymeric membranes, polymer dynamics and rheology, photo-sensitive polymers, polymer engineering and technology and finally silicon- and fluorine-containing polymers.

The third section presents reports on conferences, held in 1990 in Russia

and in other countries, devoted to macromolecular chemistry and to polymeric materials, as well as to more specific topics such as: stabilization and controlled degradation of polymers, combustion of polymers, modification of polyolefins, their processing, properties and applications, free radical processes in biological systems, complexes of organometallic compounds with polymers as catalysts, polymer blends, relaxation effects on polymeric materials and low-combustibility polymers.

In addition, an overview on 'Polymer science in Eastern Europe' is given on the occasion of the 1989 conference commemorating the 30th anniversary of the establishment of the Division of Polymers and Composite Materials of the Institute of Chemical Physics of the USSR Academy of Sciences.

A wide list of publications in polymer science is given, including selected books on polymers published in Russian in 1990. Selected titles of dissertation abstracts on polymer science are also reported, mainly covering 1988-1990. Finally, a compilation of journals in the area of macromolecular science is given.

In conclusion, this book is readable and comprehensive. It is useful for managers and academic professors but it is also aimed at students with experience in polymer science. In my opinion the book is good value for money. The only criticism I have is the poor quality of the figures in the first section.

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### Comprehensive Polymer Science: First Supplement

S. L. Aggarwal and S. Russo  
(Vol. Eds)

Pergamon Press, Oxford,  
1992, 690 pages, £150.00  
ISBN 0 08 0370713

'Lexicographer: a writer of dictionaries,  
a harmless drudge.'  
Samuel Johnson, 1755

My first traumatic essay at public speaking came in my last year at school with a requirement to respond to the toast 'Dr Johnson's old school' to an audience of academics and middle class professionals who had both eaten and drunk well, advantages not afforded to me at that time. In preparation for and performance of this ordeal I learned several valuable lessons. First, that the works of the

learned Doctor, including the above self-deprecatory description of the function for which he is best known to the English-speaking world, are a valuable source of quotations to rival even the Bible. Secondly, that compilers of dictionaries, encyclopedia and similar works provide very valuable practical tools for activities varying from erudite scholarship to the practice of a technical skill. Thirdly, that an audience of academics and middle class professionals who have both eaten and drunk well are relatively easily amused.

This, like each of the previous seven volumes in this compilation, is a splendid book. Any multi-authored work is bound to display some variation in quality and style but the editors who have worked on this series have served the community well in maintaining a high standard with very few falls from grace. Experience of this kind of work makes me fairly confident that, at the time they were writing their various sections, most of the thirty-eight contributors would not have disputed Johnson's description of the work as drudgery. However, practising polymer scientists, both now and for a good many years to come, will be very grateful to them for their labours and to the editors who cajoled them to produce manuscripts in their areas of expertise. It is undoubtedly the case that Comprehensive Surveys, Reviews, Dictionaries and the like are valuable to the communities at which they are targeted provided that they are carefully researched, written by experts who have been encouraged to critically evaluate the information on which their articles are based, and well produced. This volume, like the previous seven volumes published in 1989, meets all these criteria and will undoubtedly find a place on the library shelves of any institution where polymer science is practised and/or undergraduates are taught.

The series is comprehensive (or becoming comprehensive) in its breadth of cover of the field of polymer science. That is not to say that the individual contributions are simply all inclusive compilations of everything which has been published under the heading of that particular section. Indeed, such indiscriminating compilations are of little value and effectively became redundant with the advent of computer searching of the literature. The vast majority of these articles are descriptions and evaluations of particular themes of work and, as such, are likely to be of value to anybody wanting access to a particular field of knowledge. I have found the earlier volumes of great value for finding information in relation to solving problems, planning research programmes and for teaching and I am sure that these

pages will become a part of my rapid access knowledge base. Another often quoted statement from the good Doctor is: 'Knowledge is of two kinds. We know a subject ourselves, or we know where we can find information upon it.' It is clear to anyone looking at the block of eight volumes which now constitute 'Comprehensive Polymer Science' that there is too much knowledge there for it to be of the kind we know ourselves but it is certainly good to know where we can find reliable information. This first supplement has twenty-one sections and an appendix concerned with the polymer literature. The material falls into the themes; polymerization kinetics and mechanism, functionalized polymers, fundamental properties, degradation of polymers, generic polymer systems and applications and reactive processing. These volumes are of the kind in which the reader browses or searches for specific information; in reviewing this volume during the last few weeks I have done both and have read between a third and a half of the total (there are lots of structures!) with considerable enjoyment. I hope it will find its way onto library shelves, those who purchased the first seven will not be deterred by the price, which at today's prices is not really excessive for a volume which should prove useful to a lot of readers over a number of years.

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### Physics of Polymer Surfaces and Interfaces

I. C. Sanchez (Ed.)

Butterworth-Heinemann, Oxford,  
1992, £62.00  
ISBN 0 7506 9214 6

The first seven chapters of this book present short pedagogical reviews of theories of fluid interfacial phenomena applicable to polymer interfaces. The striking aspect of these chapters, particularly Chapters 1, 2, 5 and 7, is how much of the classical theory of capillarity has been imported into polymer surface science. For example, the reader will find reviews of interfacial thermodynamics, square gradient theory, density functional theory and capillary wave phenomena. One quickly gains the impression that polymer science and liquid state theory

are merging into one subject: the study of complex fluids. One finds no mention of power law dispersion interactions which are perhaps the last significant bridge to cross in this merger and which work of the past decade (and much earlier in the USSR) has shown to play such a dominant role in fluid interfacial phenomena. More traditional polymer physics is presented in Chapters 4 and 6, where lattice techniques and random walk theory are applied to the structure of homogeneous polymers. In a typically individualistic chapter, de Gennes discusses the possible significance of chain end adsorption to the mechanical properties of polymer interfaces. In all, these seven theoretical chapters serve as an introduction to the field, rather than as a detailed survey, and most of the technical detail necessary for applications to polymer problems is left to the references.

The second half of the book concentrates on the characterization of polymer surfaces and interfaces. Each chapter gives an introduction to a technique, describing the underlying principles and how it may be applied to studying interfaces and surfaces. As is inevitable with such a diverse range of techniques and authors each places their own emphasis either on the technique or the application. Since in general the underlying theory is not discussed in great detail, i.e. beyond the level found in much of the existing literature on these topics, we feel the book would have gained in interest considerably had there been greater emphasis on the novel applications of the cited techniques. Chapter 8, which discusses interlayer diffusion using neutron reflectivity, presents a good balance between explanation of the technique and its application. Other chapters consider mainly optical methods of characterizing interfaces, including more erudite techniques such as forward recoil spectroscopy, but also scanning angle reflectometry, Fourier transform infra-red spectroscopy and surface light scattering. As a reprieve from these 'conventional experiments' Dean and Webber present an interesting chapter on Monte Carlo simulations of polymer coils at interfaces in particular looking at direct- and electron-energy transfer processes.

Our overall impression is that the book gives a flavour of the diversity of techniques which may be used to probe surfaces and interfaces in general, and polymer interfaces in particular. The book will prove useful to graduate students and researchers wishing to learn more about related and complementary techniques.

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