

entific administrators in national institutions (outside Germany) which provide support for fundamental research.

The contributions (30) are organized in five sections: A—Historical Mementos; B—Oxidation with Organic Peroxides; C—Enzymatic and Biomimetic Oxidations; D—Metal-Catalyzed Selective Oxidations; E—Spectroscopy/Theory. Each section is introduced by an invited contribution (review) on the field covered, and continues with a number of reports (varying from 4 to 13 apart from Section A) on the individual projects. Section A consists of one contribution (an invited one by M. Schulz): a very interesting history of the birth and development of peroxide chemistry during the past century, providing information that would be difficult to collect from other sources.

Section B (Oxidation with Organic Peroxides) opens with a review by W. Zeiss on homogeneously catalyzed epoxidations with emphasis on industrial applications. The remaining chapters address various facets of peroxide chemistry that do not involve metals: the use of azidohydroperoxides (A. G. Griesbeck), of singlet oxygen (W. Adam), of organosulfonic and sulfonimidic peracids (R. Kluge), the generation, characterization, and use of dioxiranes (W. Adam, W. Sander, H. D. Brauer), and the in-situ generation (from hydrogen peroxide) and use of peroxyntous acid (H. Elias).

Section C (Enzymatic and Biomimetic Oxidations) starts with a review (by G. Spiteller) of the latest results on the consequences of lipid peroxidation in age-dependent diseases such as Alzheimer's and Parkinson's, diabetes, atherosclerosis, etc. It continues with more traditional subjects such as the generation and use of peroxycarboxylic acids by lipase (S. Warwel), the oxyfunctionalization of catechols and flavonols using Fe and Cu complexes (B. Krebs), the binding and activation of dioxygen by biomimetic ketoenamine complexes (E. G. Jäger), and the highly diastereoselective synthesis of functionalized tetrahydrofurans catalyzed by vanadyl complexes (J. Hartung).

Section D is dedicated to metal-catalyzed selective oxidations, and comprises the largest number (13) of individual contributions. The opening chapter by T.

Katsuki gives a detailed review of enantioselective epoxidation, C–H hydroxylation, aziridination, and cyclopropanation using chiral metallo-salen complexes. The section continues in the same vein, with several chapters dedicated to the various facets of epoxidation (synthetic and mechanistic aspects, new catalysts, etc., by W. A. Herrmann and W. R. Thiel), enantioselective epoxidation (R. W. Saalfrank, T. Linker, A. Berkessel), oxidation of substituted arenes (A. Rieker), enantioselective Baeyer–Villiger oxidation (C. Bolm), oxidation of phenols, alcohols, and amines (K. Krohn), photocatalytic activation of oxygen by Fe porphyrins (H. Hennig), and the use of perfluorinated solvents (P. Knochel).

Finally, Section E (Spectroscopy/Theory) concludes the book with four contributions: an account by R. D. Bach of work on the nature of transition structures for oxygen transfers from peroxy acids, dioxiranes, and chiral bis(silyl)peroxides, some density functional studies on the mechanistic aspects of catalytic olefin epoxidation (N. Rösch), electronic spectroscopy of singlet oxygen and its photodissociation to oxygen atoms (M. S. Gudipati), and the chemistry of peroxides in the gas phase in the presence of transition metal ions (D. Schröder).

As in many books of this type, the style and breadth of the individual chapters is rather uneven. Some contributions have a broader scope whereas others deal with very specific aspects of peroxide chemistry. However, as I said, the average quality is remarkably high and the overall coverage wide. Personally, I noted the absence of two important fields of catalysis with organic peroxides: the use of polyoxometallates and the use of heterogeneous catalysts for the synthesis of bulk and specialty chemicals. As a matter of fact, the latter topic does not traditionally fall within the domain of organic chemistry but is usually assigned to other areas. In both cases, I believe that these omissions reflect the “national” character of the report.

There is no keyword index, but the individual topics can be located easily through a very detailed table of contents, prepared according to the style of other monographs from Wiley-VCH.

Given the broad scope of the original program, the excellent reputation of all the scientists involved, and the wealth of new results that are reviewed, in my opinion the book constitutes the most comprehensive report in this area of organic chemistry since the publication of the Patai classic *The Chemistry of Peroxides* almost 20 years ago.

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Experimental Methods in Polymer Science. (Series: Polymers, Interfaces, and Biomaterials.) Edited by *Toyoichi Tanaka*. Academic Press, San Diego 2000. xii + 604 pp., hardcover £ 59.95.—ISBN 0-12-683265-X

This book aims to introduce the reader to the most important characterization methods used in modern polymer science. It consists of six chapters providing a thorough description of modern techniques of polymer analysis, at a level suitable for readers who already have a basic knowledge of the chemistry and physics of polymers. Chapters 1–5 deal in turn with light scattering methods, neutron diffraction, fluorescence spectroscopy, NMR spectroscopy, and mechanical spectroscopy. A sixth chapter is devoted to phase transformations in polymer gels. Most of the chapters are very useful, as they summarize the latest published work on particular methods in a clear and understandable form, providing a starting point for a more detailed study. Therefore the book is a valuable addition to the literature, and all libraries should have a copy.

The first chapter, by Wu and Chu, is especially useful. It covers static and dynamic light scattering, providing a very readable survey of currently used methods. The chapter is too condensed for beginners, but it offers those with some knowledge of the subject a quick and convenient route into the recent literature. It also provides a useful overview of the most important theoretical results and, for example, lists the main theoretical expressions for shape factors in light scattering by polymers. The part

devoted to dynamic light scattering is also very good. As well as giving a survey of the potential applications of this method in polymer research, it includes a critical evaluation of methods for interpreting the data. For example, the discussion of dynamic light scattering methods for determining particle size distributions (e.g., with the help of the CONTIN software suite) is followed by a warning about the danger of over-interpreting the results. Such caution is certainly appropriate, because light scattering methods are nowadays often used as routine analytical procedures, and pressing the "return" key can sometimes produce a very nice looking particle size distribution which, unfortunately, has no real significance. Every chapter of this book includes a thorough critical discussion of the advantages and shortcomings of each method, and the authors have avoided making unrealistic claims for their own technique as the supreme tool of modern polymer research.

In Chapter 2 the authors (Shibayama, Jinnai, and Hashimoto) have tried to give an introduction to neutron scattering methods in a form that can also be understood by beginners, starting with

basic fundamentals such as the Maxwell distribution of neutron velocities. As well as the theory, they explain in detail the experimental procedure of neutron scattering measurements, then discuss some of the most important results of polymer physics that the method has yielded. Here too, the literature citations extend to the most recent publications, thus providing important information for anyone about to begin work in this field. This chapter can certainly be recommended for the novice as well as for the expert, as it covers a wide range of subject matter, from the fundamentals to some important practical results.

The chapters that follow, dealing with fluorescence spectroscopy, NMR spectroscopy, and mechanical spectroscopy, create an equally positive impression. In all these the authors have used clear and informative diagrams to explain the methods and their practical application, helping the nonspecialist to gain an understanding of the subject and to find relevant up-to-date literature. All the chapters have been written by recognized experts, and Chapter 4 could almost be described as a short textbook on NMR spectroscopy. Chapter 5 by Mours

and Winter also deserves a special mention; this introduction to the mechanical spectroscopy of polymers not only covers the most recent literature but also contains a detailed discussion of the experimental problems of the method. Anyone planning to use this technique for the first time will find the latter part especially useful, as well as learning about the kinds of information that the method can give and understanding its limitations.

It is not entirely clear why Chapter 6, "Polymer Hydrogel Phase Transitions", has been included in this volume. This chapter is not about a characterization method but is instead concerned with a particular polymer system that has been studied intensively by T. Tanaka and his group, leading to results that have already been well reported elsewhere.

Leaving aside that minor criticism, this work is certainly an important addition to the literature in the area of polymer research, and it can be recommended as a reference source.

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