

United States-Japan Seminar on Polymer Processing and Rheology. Edited by D. C. BOGUE (University of Tennessee), M. YAMAMOTO (Tokyo Metropolitan University), and J. L. WHITE (University of Tennessee). John Wiley & Sons, Inc., New York, N. Y. 1973. vi + 375 pp. \$12.50.

Volume 20 of Applied Polymer Symposia consists of 27 seminars which were presented at Knoxville and Gatlinburg, Tennessee, in August 1972 by Japanese and American polymer scientists.

The four articles on fundamental studies of polymer melt flow were written by Japanese industrial and university researchers. These seminars are on viscoelastic equations, stress relaxation, non-Newtonian flow, and steady-state compliance of blends.

The nine articles on melt flow in dies are reports of studies on measurements of stress and viscoelastic properties, capillary, irregular and unsteady flow, analysis of broken sections, flow patterns, and stratified bicomponent flow. Four of these were written by representatives of American industries and universities; the remainder were written by Japanese industrial and university researchers.

The five American and five Japanese articles on post-treatment of extrudates are discussions of die swell, wire coatings, melt spinning, film forming, processing of high melting polymer, and injection molding.

Two papers on properties of fabricated polymer were written by Dr. Stein of the University of Massachusetts, and two others on this subject were written by Japanese investigators. These reports were on crystalline polymers, creep, and shrinkage of stretched films.

This treatise consists of an informative selected group of papers which present an insight to industrial and academic approaches on polymer rheology and morphology by investigators from two different nations. These well-written articles should be extremely valuable to those concerned with polymer-processing operations.

Raymond B. Seymour, *University of Houston*

Heterocycles in Organic Synthesis. By A. J. MEYERS (Colorado State University). Wiley/Interscience, New York, N. Y. 1974. xix + 332 pp. \$7.

In this pioneering volume, Professor Meyers gathers together a wide variety of information "to demonstrate that many useful (as well as superior) methods for obtaining functionalized organic compounds and structures of diverse architecture can be found by employing a heterocycle either as a precursor reagent, or vehicle for formation." After an introductory chapter on general considerations, there follow nine chapters, each devoted to a particular type of functional group or structure, setting out a surprisingly varied collection of heterocyclic sources for each. Apart from the use of heterocyclic systems as protecting groups (*e.g.*, dioxolanes to protect carbonyl groups) and from the transient formation of unisolated heterocyclic intermediates as part of a reaction mechanism, there is a veritable galaxy of situations where the selection of a suitable heterocycle allows a specific stereochemistry to be reached, carbon chains to be lengthened or shortened, functional groups to be introduced or removed, and innumerable functional interconversions to be accomplished with superior ease and yield. The value of these methods has been well recognized in recent synthetic chemistry, but the many instances of their use are for the most part buried in long papers dealing with multistep syntheses and scattered widely among otherwise unrelated papers. The task of ferreting them out and devising an organized presentation for them must have required great diligence. The result is a book that is interesting and stimulating, and which with its good bibliographies and both author and subject indexes will be a useful work of reference, at least until this rapidly moving field leaves it behind.

Organic Syntheses. Collective Volume 5. Edited by HENRY E. BAUMGARTEN. Wiley, New York, N. Y. 1973. xiv + 1234 pp. \$24.95.

The late Roger Adams was a prime mover in the establishment of "Organic Syntheses," and he guided it in its development over fifty years into a major literature resource for organic chemists of all the world. It is thus most fitting that this collective volume is dedicated to him.

* Unsigned book reviews are by the Book Review Editor.

There is much more to a collective volume than the mere gathering together of the preparations that appeared in the previous decade (in this instance, 1960-1969). Apart from simple correction of errors, the content has benefited from many modifications and improvements, and in some cases, even complete replacement of procedures. The literature citations have been brought up to date, mostly by the original submitters, a fact that is particularly valuable with respect to the recent shift in emphasis of "Organic Syntheses" toward model procedures illustrating important types of reactions.

At only two cents per page, this work is surely one of the biggest bargains available in today's reference literature of organic chemistry, and personal purchase can be strongly recommended.

Nylon Plastics. Edited by M. I. KOHAN. John Wiley & Sons, Inc., New York, N. Y. 1973. xvi + 683 pp. \$34.95.

Less than 10% of all nylon produced is used as a moldable or extrudable plastic, but the annual volume of this plastic is almost 100 million pounds. This high-performance product was the first plastic to be classified as an engineering plastic. The author who has worked with nylon for 15 years is well qualified to edit this volume.

According to the information given in the Appendix, there are 16 other suppliers of various nylon plastics. However, 16 of the 19 contributors to this monograph were du Pont employees. Approximately half of the 20 chapters were authored or coauthored by Dr. Kohan or Dr. Lacey. The chapters on monomer casting, powdered nylons, and injection molding were written by authors outside the du Pont organization.

As stated in Chapter 1, much of the recent progress in synthetic plastics of all kinds is the result of the original investigations of Carothers who synthesized nylon-66 in 1935. Nylon bristles and molding powder were marketed in 1938 and 1941, respectively. Nylon-6 molding powder which was developed in Germany was marketed in the U. S. in 1954.

The preparation, chemistry, and characterization of nylons are thoroughly discussed in Chapters 2 and 3. Injection molding, extrusion, processing, and forming of nylons are discussed authoritatively in subsequent chapter. The last chapter describes many applications of nylon plastics. In spite of its depth in many phases of nylon, too little attention has been given to reinforced nylon which is one of the most important reinforced thermoplastics.

However, there is much more information about nylon plastics in this monograph than has been available before. The Society of Plastics Engineers Committee should be congratulated on its selection of subject matter and the author of its second book in the SPE monograph series.

Raymond B. Seymour, *University of Houston*

Techniques of Combined Gas Chromatography/Mass Spectrometry: Applications in Organic Analysis. By W. H. MCFADDEN (Finnigan Corp.). Wiley-Interscience, New York, N. Y. 1973. 463 pp. \$18.95.

The explosive growth in the application of gas chromatography-mass spectrometry (GC-MS) precipitated a rapidly increasing number of publications in a range of diverse fields from neurobiology to geochemistry. Developments in areas of instrumental methodology, derivative formation, and gas chromatography plus the inherently extreme sensitivity of GC-MS contribute to this phenomenon. This book is of value from two viewpoints. On one hand, newcomers benefit from lucid and detailed discussions of individual components in a GC-MS system, while, on the other hand, veterans appreciate the collection of original research papers of the most up-to-date research topics as well as the literature references for the wide range of topics covered in this book.

The first seven chapters comprise three-fourths of the book. Chapter Two examines inlet systems, ionization methods, mass analyzers, amplification, and recording methods. The third chapter analyzes the GC column, stationary phase, carrier gas, and injector. Chapter Four discusses vacuum technology—an obligatory but infrequently discussed aspect of GC-MS. The next chapter deals with GC-MS interfaces—the most critical aspect of combining GC with MS. Chapter Six considers the GC techniques, derivative formation, scanning methods, and total ion current monitoring techniques.

Chapter Seven examines the role of computers in GC-MS, the computer system, acquisition and reduction of GC-MS data, file searching, and computer interpretation.

Fifteen "minipapers" concerning topics in the forefront of research today comprise the unique last chapter. Individual authors briefly discuss their specific use of GC-MS in the following fields—flavors and fragrances, geochemistry, biochemistry, clinical and forensic chemistry, ecology, and special techniques. Editorial comments following each paper note important features and shortcomings of each application.

A few unfortunate errors occur in the book. For example, chemiionization and chemical ionization are used interchangeably and erroneously, throughout the book. (Ironically, an eight-page subsection on chemical ionization employs the correct term.)

This book is a most welcome addition to the collection of all aspects of GC-MS and is heartily recommended to anyone interested in the manifold uses of one of the most powerful analytical methods currently available.

Dominic M. Desiderio, Jr., *Baylor College of Medicine*

Injection Molding: Theory and Practice. By I. I. RUBIN (Robinson Plastics Corp.). John Wiley & Sons, Inc., New York, N. Y. 1972. xiii + 657 pp. \$24.95.

Since over 5 billion pounds of plastics are injection molded annually in the U. S., and no American book was previously available, the Society of Plastics Engineers selected Mr. Rubin to write this essential volume. The author who has had more than 30 years experience in the plastics industry has written a comprehensive treatise in which he has interwoven both the theory and practice of injection molding. Since some readers may not be interested in the theoretical concepts, much of the practical information is stated clearly in nontechnical language.

As stated in the first chapter, the injection molding machine was patented by the Hyatt brothers in 1972. John Wesley Hyatt, who invented celluloid and is considered by many to be the father of plastics industry, also introduced the first multicavity mold. These crude machines and molds have been constantly improved and there are now more than 70,000 injection molding machines in use in this country. Almost 100 pages in Chapter 2 are devoted to a description of molds.

These chapters are followed by ones on theory, materials, and mechanisms. Other short chapters on correcting molding faults and examples of molded parts will prove to be of considerable value to many readers. In his final example, the author, who is an adjunct professor of plastics at the New York Institute of Technology, describes an illuminated molded bust of Apollo. Rubin designed and built the crude mold in 1940 when he was unaware of the theory and practice of injection molding. The author modestly explains why it was possible to mold these busts with improperly designed molds.

Conversion tables and other pertinent information are included in the Appendix. While this book will be of prime interest to plastics engineers, it will also be valuable as a textbook for students in educational programs.

Raymond B. Seymour, *University of Houston*

Recent Developments in Separation Science. Edited by N. N. LI (Esso Research and Engineering Co.). CRC Press, Cleveland, Ohio. 1972. x + 229 pp. \$35.00.

This volume is a reference book which includes a variety of well-known and lesser known separation techniques. Topics which are covered include Melt Crystallization, Separation of Unsaturation Through Complexation, Parametric Pumping, Molecular Sieves, Adsorbent Methods, Natural Gas Sweetening, Ion Exchange Chromatography of Organic Ions, Immobilized Liquid Membranes, Liquid Membrane Water Treating, Enzyme Polymer Membranes, and Semipermeable Microcapsules. Individual chapters are written by different authors who are experts, and in some cases inventors, of the particular technique described.

This volume is potentially useful to chemists; however, many of the topics covered are highly specialized and oriented toward engineering. The book should therefore be particularly useful to those who specialize in chemical engineering.

Hans Veening, *Bucknell University*

Nuclear Magnetic Resonance Spectroscopy of Nuclei Other Than Protons. Edited by T. AXENROD (City College of the City University of New York) and G. A. WEBB (University of Surrey, England). John Wiley & Sons, Inc., New York, N. Y. 1974. xiii + 740 pp.

This book arrived on my desk at the same time I had undertaken several heteronuclear nmr projects. My research group was exercising a carbon magnetic resonance spectrometer using a large number of compounds including multiply ¹³C-labeled compounds. We had already discovered that the literature dealing with the nmr spectroscopy of nuclei other than protons was diffuse and rarely in review form yet. This volume then filled a particular need for us.

The book is, primarily, a collection of papers presented at an Institute which met in Tirrenia, Italy, in September of 1972. The editors, Axenrod and Webb, have assembled a collection of carefully referenced manuscripts, all of which deal with some aspect of "non proton" nmr. For our particular problems we found the chapter on paramagnetism by G. A. Webb to be especially helpful. The contributors have provided carefully edited papers and references to the problems they discuss. They have also employed quantitative and qualitative arguments in effective admixture. Other chapters are equally useful and also well written. I am certain each of these chapters will appeal to some of the specialists in the nmr field. Anyone who experiments in multinuclei nmr would be well served if he had a copy of this book close at hand.

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