

## Book Reviews

**Nucleic Acids Synthesis: Applications to Molecular Biology and Genetic Engineering.** Edited by H. Koster (Universität Hamburg). Information Retrieval Limited, Oxford. 1980. xi + 395 pp. \$40.00.

This volume contains the Proceedings of the International Symposium on Chemical Synthesis of Nucleic Acids held in Egestorf, GFR, on May 5-8, 1980. The papers describe techniques for oligonucleotide synthesis. The papers are relatively short: there are 32 papers of 12 pages average length; the longest of 22 pages is by the editor. Included are 12 papers from North America, 9 from western Europe, 6 from eastern Europe, 3 from China, and 2 from Japan. There are no indexes.

R. Bruce Martin, *University of Virginia*

**Polymer Characterization by ESR and NMR.** Edited by A. E. Woodward (City College of New York) and F. A. Bovey (Bell Laboratories). American Chemical Society, Washington, D.C. 1980. vii + 309 pp. \$32.00.

This book is number 142 in the ACS Symposium Series and is based on papers presented at the Washington meeting of September 1979. The contents consist of eleven full papers covering a range of individual research efforts within the title field. No review or summary articles are included and the authors of each paper presume a minimum level of understanding of the work reported. This book, then, is not an introduction to the applications of NMR and ESR to polymers. Instead, it is a collection of concise descriptions of recent developments.

Four of the eleven papers deal with applications of ESR. The first describes the use of spin probes to examine polymer-surface interactions between, for example, poly(vinyl acetate) and silica. The second reports results from simultaneous ESR and stress evaluations of nylon fibers in various degradative environments. The identification of the primary and secondary intermediates of poly(vinyl chloride) photodegradation were reported for the first time in the third paper. Direct observation of the radicals in low-temperature glasses employed ESR in this work. The last of the four is an extensive description of the combined use of ESR and NMR to investigate the metal binding sites of several membrane-bound ATPases. This report deals with the use of Mn(II) and Gd(III) as probes for these sites leading to the evaluation of some important intramolecular distances within the site itself.

The NMR papers cover a wide range of topics, most of which deal with developments in carbon-13 and solid-state NMR. A report on the use of carbon-13 for determination of the sequence and configuration of copolymers of vinyl chloride and vinylidene chloride is followed by an excellent summary of its application to the evaluation of long-chain branching in a number of polyethylene samples. The determination of solution relaxation parameters and correlation times for several polymers and low molecular weight species at two different frequencies and over a broad temperature range led to the conclusion in a third paper that some polymers and compounds do not fit the simple models available relating molecular motion to these relaxation processes.

Relaxation parameters of solid-state samples were used to examine the effects of plasticizer on poly(vinyl chloride) morphology and to evaluate the homogeneity of polymer blends. A subsequent paper deals with the recently developed multiple pulse procedure for obtaining fluorine-19 spectra of solid polymers. The relaxation parameters reported here for poly(tetrafluoroethylene) are related to morphology and molecular motion. The penultimate paper is an excellent summary and description of a variable-temperature and variable-angle assembly for solid-state NMR experiments. Examples given emphasize the evaluation of relaxation parameters for both crystalline and amorphous polymers. The book culminates in a 75 page tour de force on the application of NMR to the study of drug-DNA interactions in solution. The paper deals with mutagens, antibiotics, and antitumor agents and their binding to various DNA models such as poly(dA-dT).

This last paper (easily worth the price of the entire book) illustrates the value of this book. While it serves poorly as an introduction to the fields covered, it is an excellent collection of exhaustive and up-to-date (1979) reports on specific areas of current research.

Lon J. Mathias, *University of Southern Mississippi*

**Applications of High Performance Liquid Chromatography.** By A. Pryde (Maag A. G.) and M. T. Gilbert (University of Edinburgh). Chapman and Hall Ltd., London EC4P. 1979. xii + 255 pp.

The first part of the book (53 pp) covers theory and practice of HPLC. Chapter 1 covers history briefly, but sufficient for the purpose of this book. Chapter 2 defines all of the terms commonly used in measuring chromatographic performance ( $k'$ ,  $N$ ,  $H$ ,  $\alpha$ ,  $R$ , etc.). No derivations or discussion of theory is included. Chapter 3 discusses the instrumentation required for HPLC, but it is out of date (direct syringe injectors and the wire transport detectors are mentioned, for example). Chapter 4 discusses the practice of HPLC. Single paragraphs describe gradient elution, the mobile phase, and column operating temperature. Quantitative analysis and column packing materials (adsorbents, ion-exchange resins, and chemically bonded packings) are both handled in only two pages. Other topics mentioned include derivatization, TLC vs. HPLC, column packing techniques, trace analysis, and preparative HPLC. The treatments are well-written and accurate, but too short to be useful. There are good references, but nothing later than 1977. Chapter 5 discusses the various modes of chromatography (adsorption, liquid-liquid partition, reverse phase, ion-pair, ion-exchange, and exclusion chromatography). This is an excellent chapter. It defines the different modes, explains their operating principles, and puts the entire field into the proper perspective.

Part II (Chapter 6) discusses the role of HPLC in pharmaceutical analysis. Antibiotics, antibacterials, antidepressants, analgesics, diuretics, drugs of abuse, and alkaloids are discussed in detail. Other analytical techniques used in pharmaceutical analyses are compared briefly to HPLC. A realistic appraisal of the advantages and limitations of HPLC is given. The major advantage of this chapter is 10 well-documented chromatograms and more than 300 references to HPLC applications.

Parts III and IV cover Biochemical Analysis and Environmental Analysis in much the same fashion. Lipids, steroids, carbohydrates, amino acids, nucleotides, and vitamins are covered well in Part III with good chromatograms and extensive references. Pesticides, carcinogens, and industrial pollutants are covered in Part IV. This is the shortest and least referenced part of the three application areas.

In summary, the book is well-written and well-referenced. Some topics are treated too briefly to be useful, and no work later than 1977 is referenced. The pharmaceutical and biochemical application chapters are very worthwhile and should be in the library of workers active in these fields.

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**Macromolecular Reviews. Volume 15.** Edited by A. Peterlin (National Bureau of Standards). John Wiley & Sons, New York. 1980. iii + 486 pp. \$28.00.

"Macromolecular Reviews" have been highly useful contributions to the literature of High Polymers. Volume 15 is no exception and is an excellently written, wide-ranging volume that covers many important subjects in the polymer field. Subjects and authors are: Brillouin Scattering from Polymers (G. D. Patterson and J. P. Latham); Analysis of Antioxidants in Polymers by Liquid Chromatography (R. B. Walter and J. F. Johnson); Polymeric Reagents (M. A. Kraus and A. Patchornik); Progress in the Chemistry of Polyreactive Oligomers and Some Trends of Its Development. II. Specific Features of Network Formation of Oligomers and Properties of Network Polymers (A. A. Berlin and N. G. Matvejeva); Polyisocyanides (F. Millich); Viscosity-Molecular Weight-Temperature-Shear Rate Relationships of Polymer Melts: A Literature Review (N. G. Kumar); Reinforcement of Elastomers by Fillers: Review of Period 1967-1976 (A. Voet); Combined Relaxation Spectroscopy of Polymers (P. Hedvig); Author Index to Volume 15; Subject Index to Volume 15; Cumulative Index to Volumes 1-15. The chapters are authoritative but not equally current; some have literature references to 1978 but these are the exceptions (1976 is more typical). All in all, this is an excellent contribution that continues a worthwhile activity.

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