

# Book Reviews

## *Reviews in macromolecular chemistry, Volume 3.*

Edited by G. B. BUTLER and K. F. O'DRISCOLL, Marcel Dekker: New York, 1969,  
9½ in. × 6½ in. 422 pp. \$16.50

THIS volume is the latest of several review series of monographs on polymer science from different publishers. Comparison with rival publications is quite favourable although it must be stressed that the title word 'Review' might be more correctly substituted by 'Compilation of References'.

Material covered consists of a series of articles by M. Sander and E. Steininger (Phosphorus-containing resins, Inorganic phosphorus polymers, Phosphorylation of polymers); E. J. Goethals (Sulphur containing polymers); N. R. Amundson and D. Luss (Polymer molecular weight distributions); A. D. Delman (Heteroatom ring-containing polymers); M. Shen, W. F. Hall and R. E. de Warner (Molecular theories of rubber-like elasticity and polymer viscoelasticity); S. R. Palet and B. M. Mandal (End group studies using dye techniques); J. D. Ingham (Free-radical spin labels for biological macromolecules); and J. Idris Jones (The synthesis of thermally stable polymers).

Literature coverage extends to the latter part of 1967 and the various chapters would be useful to research workers starting in the particular fields. Unfortunately there is little critical comment to help the casual reader and as a result this volume is recommended for library use only.

A. LEDWITH

## *Biological Macromolecules Series, Volume 2: Structure and Stability of Biological Macromolecules.*

Edited by SERGE N. TIMASHEFF and GERALD D. FASMAN, Marcel Dekker: New York,  
1969. 9 in. × 6 in. 694 pp. \$33.50

THIS work contains a number of review articles which have as their main theme the interrelation of structure and stability of some biological macromolecules, particularly in respect of their structures and transformations in solution. The first article by Howard DeVoe on the 'theory of conformations of biological macromolecules in solution' presents the modern statistical-mechanical techniques which are enabling biophysicists to increasingly predict the thermodynamics of transformation in polypeptides and polynucleotides. Also discussed are the various types of free energy contributions to such changes. The article is very readable and it is a useful contribution to this field.

The next five chapters have as a common theme the factors determining the structural stability of various biological macromolecules mainly in aqueous solution. They are: 'Thermodynamics and kinetic aspects of protein conformations in relation to physiological function' by R. Lumry and R. Biltonen; 'Conformational transitions of proteins in water and in aqueous mixtures' by J. F. Brandts; 'The comparison of protein structure in the crystal and in solution' by J. A. Rupley; 'Conformations of hexosepolysaccharides in solution' by A. L. Stone; 'The effects of neutral salts on the structure and conformational stability of macromolecules in solution' by P. H. von Hippel and T. Schleich. Of these I found the article by R. Lumry and R. Biltonen the least satisfactory. The style used by these authors lacks clarity, making the understanding of many of the concepts presented difficult. Fortunately, much of the subject discussed in the second chapter is more clearly explained in subsequent parts of the book, particularly in the chapters by J. F. Brandts and by P. H. von Hippel and T. Schleich. In fact, chapters 3-6 by dealing with more limited aspects are far more useful to the reader. Of particular note is the inclusion by P. H. von Hippel and T. Schleich of a resume of the latest concepts for the structure of water and the evidence on which they are based. As stressed throughout the book, protein conformation is governed to a large extent by solvent structure and composition.

The final chapters in the book by H. Susi—'Infrared spectra of biological macromolecules and related systems'—presents a useful account of the characteristic vibrations of the amide

group in poly- $\alpha$ -amino acids and proteins. Although, aspects of the theory of molecular vibrations in polymers are introduced, their application by the uninitiated reader would require a much more detailed presentation. H. Susi also discussed, in the biopolymer field, the group frequency concepts, infra-red spectroscopy as an analytical tool, and the study of hydrogen bonding by infra-red spectroscopy.

In general I found this volume to be a useful source-book for the researcher, both for concepts and facts, particularly as not many other reviews of these subjects are available. However, I suspect that in the light of the vast expansion of this field of interest, the volume will date somewhat rapidly.

H. BLOCK

### *Polymer Science: Current Concepts and Civic Applications*

Consulting Editor, FRANCIS W. MICHELOTTI. *Annals of the New York Academy of Sciences*, Volume 155, Article 2, 1969. 9 in.  $\times$  6 in. 275 pp. \$11.50

SHOULD any bright and enquiring young mind demand to know what polymer science is about, then this volume is the one to recommend, for not only does it provide a compact outline of polymer research in a number of currently interesting areas but it will undoubtedly serve as a stimulus and source of inspiration for many a potential polymer scientist.

To say merely that the reviews and summary research papers in this volume were presented by eminent authorities at a conference held in New York in May, 1967, and to list the titles, would be to do it less than justice. The whole collection manages to convey admirably the keen sense of excitement that pervades a rapidly developing subject, and in spite of the rather prosaic titles of some of the papers, their contents illustrate perfectly the kind of thinking, the wide range of disciplines and the different methods of approach that polymericists must now become involved in. Juxtaposition of some direct research reports with current state-of-the-art reviews adds distinctly to the overall impression of vitality. By its commendable decision to also include contributions on civic applications the Academy afforded a gentle, but timely, reminder that polymer scientists too have social responsibilities.

Particularly stimulating articles are those on Telecommunications (Baker), Mechanical Properties and Dislocation Theory (Williams) and Polymer Science in the Prevention of Air Pollution (Gregor, Heller and Mark): noteworthy exemplars of the methods and techniques of polymer research are the papers of Kennedy and Canter (Copolymerization of Isobutene with Butadiene and Isoprene), Metz and Ballantine (Gamma Radiation-induced Ionic Vinyl Polymerization), and Sauer (Morphology and Structure of Polymer Crystals).

In each of the other contributions the authors have succeeded in showing how their particular interests serve to illuminate some more general aspect of polymer behaviour. In order of appearance the remaining topics covered are: Cation Radicals in Polymer Synthesis (Ledwith), Anionic Polymerization (Szwarc), Esterolytic Activity of Copolymers Containing Imidazole Groups (Overberger *et al*), Stereospecific Polymerization of Olefins (Tornqvist), Microtacticity (Bovey), Non-covalent Interactions in Solution (Nemethy), Polymers in Dilute Solution (Berry and Casassa), Conductive Polymers (Lupinski), Optical Studies of Polymer Films (Stein), Polymer Science and Water Pollution Prevention (Teot), Polymers in the Automotive Industry (Weiss), Polymers in Building Construction (Lauren).

Anyone who wonders where polymer science is going cannot afford to neglect reading these papers.

P. F. ONYON