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Book Reviews

Progress in Polymer Science Japan Volume 8

Edited by K. Imahori and
T. Higashimura

Wiley, New York, 1975, 244 pp.
£14.75

The latest volume of this series continues the established pattern and presents five chapters, devoted to quite different aspects of polymer science, in which the authors mainly review their own contribution (and sometimes that of other Japanese workers) to the subject under discussion.

The first chapter 'Copolymerization of Carbon Dioxide' by S. Inoue is primarily devoted to copolymerizations with ethylene and propylene oxides using diethylzinc based initiators to produce alternating copolymers. The author describes and collates recent kinetic and mechanistic data obtained in Toyko University and presents arguments used to establish mechanisms of initiation and propagation. Brief descriptions of related zinc chemistry and the properties of the alternating copolymers are given along with mechanisms of copolymerization of carbon dioxide with imines (proposed by other workers) and reports of a condensation polymerization with diamines to form polyureas.

Following reports that so-called uncatalysed polymerizations of methyl methacrylate in the presence of various polymers are influenced by traces of copper, K. Takemoto and Y. Inaki have investigated polymerizations initiated by metal complexes in the presence of carbon tetrachloride. In a long article they describe many cursory kinetic studies of methyl methacrylate and acrylonitrile polymerizations initiated by complexes of Cu^{II} and Fe^{III} with various polymers and model compounds. Spectroscopic data are

described and plausible mechanisms are suggested.

'Photo-induced Ionic Polymerizations' by M. Irie and K. Hayashi provides a detailed discussion of the mechanism of photoinitiation of the cationic polymerization of α -methylstyrene in the presence of tetrahydrofuran as electron acceptor and continues with discussions of the basic features of photo-induced cationic polymerizations of α -methylstyrene and cyclohexene oxide in the presence of various electron acceptors and anionic polymerizations of acrylonitrile and nitroethylene in the presence of electron donors. Evidence for simultaneous cationic and anionic polymerizations in cyclohexene oxide-nitroethylene mixtures is given.

As an introduction to 'Structural Studies of Crystalline Polymers', H. Tadokoro briefly considers problems and techniques relevant to the determination of polymer crystal structures. He then considers crystal structures of a number of polymers which have been determined (or to which a significant contribution has been made) in his laboratory, clearly describing the logic used to discriminate between possible structures. He concludes with a discussion of the relative importance of intra- and inter-molecular interactions in determining crystal structures.

Finally, H. Noguchi gives a general discussion of hydration of biopolymers with some concentration on his (and other Japanese workers) contributions to the field. Aspects considered include changes in volume and of velocity of sound accompanying order-disorder transitions in solutions of polypeptides, the hydration of polysaccharides and polyelectrolytes.

The original aim of this series was to make available a knowledge of Japanese research since (to quote from the dust-cover) '... most is not well-known internationally since the vast proportion of papers are pub-

lished only in Japanese'. This volume contains very few references to Japanese language publications but still serves a useful purpose by providing an opportunity for authors to present a coherent overview of their recent research which is often fragmented in the literature. Given the present value of Sterling sales must be to libraries only.

G. C. Eastmond

Advances in Polymer Science Volume 21: Mechanisms of Poly- reactions - Polymer Characterization

Springer Verlag, Berlin, 1976,
151 pp. \$26.30

Volume 21 of Advances in Polymer Science contains three interesting and timely reviews together with, and unusually for this series, an original account of the preparation and properties of poly (isobutylene-co- β -pinene) by Kennedy and Chou.

Semlyen (28 pp. 224 refs) reviews ring-chain equilibria in polymers. Molar cyclization equilibrium constants are presented for a wide variety of systems: usually they are adequately described by the Jacobson - Stockmayer (Gaussian coil) theory. Particular emphasis is placed upon the conformational information provided by experimental and theoretical studies of ring-chain equilibria.

Inoue (27 pp, 67 refs) reviews the asymmetric catalytic, formation and chain modification reactions of synthetic polypeptides. The important effect of chain conformation (secondary structure) on all these asymmetric reactions is emphasized: and the relevance of these studies to the elucidation of the mode of reaction and the mode of evolution of enzymes is pointed out.

Braun and Guillet (35 pp. 116 refs) review the uses of inverse gas chromatography in polymer science. This technique, involving the molecular probing of a polymeric stationary phase with a volatile solute, has become prominent in the last few years as a source of thermodynamic data for polymer - liquid systems. This work is discussed, together with the wider applications of the technique, e.g. detection of transitions (T_g , T_m), measurement of crystallinity, study of adsorption and diffusion.

C. Booth

Conference Announcement

Statistical and Dynamic Behaviour of Chain Molecules

St. John's College, Oxford, 20 and 21 September 1977

The Statistical Mechanics and Thermodynamics Group in association with the Macromolecular group of the Chemical Society are organizing the meeting 'Statistical and Dynamic Behaviour of Chain Molecules' to be held at St. John's College, Oxford, 20 and 21 September 1977. It is anticipated that the meeting will cover both theoretical and experimental aspects of the above topic. Further information may be obtained from: Dr. M. Lal, Unilever Research, Port Sunlight, Wirral L62 4XN.