BOOK REVIEWS

Encyclopedia of Polymer Science and Technology. Volume 10. Herman F. Mark, Norman G. Gaylord, and Norbert M. Bikales, Eds. Wiley (Interscience), New York, 1969.

Volume 10 of the "Encyclopedia of Polymer Science and Technology" covers phenolic resine to polyelectrolytes. The volume maintains the excellent quality of the previous members of the series. The subject matter represents much work on the part of the editors and authors and will be as useful as the previous volumes for research purposes in the macromolecular area. This reviewer was particularly impressed with the article on plastisizers (the author being J. R. Darby) and the section on oxidative polymerization (the author being A. S. Hay). These are first rate informative reviews. Again, the editors and authors should be congratulated for the excellent presentation of the material. This series will be a monument for general reference material in the macromolecular field.

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Statistical Mechanics of Chain Molecules. Paul J. Flory

This new book of Professor Paul Flory is an important event in polymer physics. An outstanding scientist who has made many valuable contributions to the field has written a book which not only completes the structure of statistical mechanics of chain molecules but contains much new information obtained during recent years—mainly by the author and his collaborators.

In the first chapter the spatial configurations of chain molecules are analyzed and the most important theoretical models are treated. The book does not contain the details of the theory of excluded volume effect. However the general physical ideas about the "theta point" and "theta solvents" suggested by Flory two decades ago are exposed in a very clear and exact form. The same must be said about the temperature coefficients of dimensions of macromolecules. The interdependence of internal rotation in the chain is treated in the third chapter, containing an elegant mathematical description of the configurational statistics of chain molecules based both on rotational isomerism and on the concept of cooperativity. Very interesting and important results obtained recently by Flory and Jernigan concerning statistical properties of finite length chains are also included in this chapter. It ends with a very educational analysis of the difference between Markoff chains and polymeric chains with configurational statistics.

Chapter IV presents the mathematical treatment of the moments of chain molecules which are needed for the calculations of a series of geometrical and physical properties. This chapter contains also an important theory of Markoffian copolymers and an application of the theoretical physics of macromolecules to the chemistry of polymer synthesis. The method given by Flory will have important applications also in molecular biophysics and in the theory of biochemical evolution.