REVIEW: Chain Molecules

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sidechain), asymmetric vinyl chains (chains whose repeat unit does contain a sidechain), and polypeptides and proteins. For each repeat unit studied, the statistical weight matrix is derived from physical considerations and direct computation of the conformational energies. Relevant moment properties are then computed and compared with experiment.

Chapter VIII contains a more detailed statistical mechanical analysis of the freely jointed and other model chains, and Chapter IX describes the theoretical background required to relate optical properties and radiation scattering measurements to moments of the spatial distribution.

In summary, this text contains a very complete description of the application of the rotational isomeric state model. The mathematical manipulations in Chapter I-III were found to be quite straightforward and followed easily from material contained within the text. Derivations in later chapters are not as transparent; however, references to the original papers are very complete. The physical and chemical arguments used to derive statistical weight matrices are very informative in understanding conformational properties of polymers. Thus, in general Flory does achieve his goal of a self-contained treatise. He has written a clear, complete overview of the statistical mechanics and physical basis of conformations in isolated chain molecules in solution. For researchers interested in this subject area, this book is excellent.

However, the book may prove to be too specialized to attract much attention from the general chemical engineering audience. For example, the interest of chemical engineers is often in the bulk thermodynamic properties of polymer solutions and/or their rheological properties; this book does not touch on either of the subjects (except obliquely by, for example, describing methods for calculating the mean square radius of gyration which can be related to hydrodynamic radius).

It is therefore unlikely that the book could be used as the text for an undergraduate or graduate course in chemical engineering. Since the book was written as a research monograph, it does not lend itself to use as a textbook—for example, there are no exercises or assignable problem sets. Faculty who are teaching courses in applied statistical mechanics courses may find it useful in preparing several lectures on the rotational isomeric state model and its application to real polymer chains. This would certainly serve as an extension of the material on the statistical thermodynamics of polymers found in typical statistical mechanical textbooks, such as D.A. McQuarries' *Statistical Thermodynamics*.

In summary, the text is recommended to researchers interested in the physical basis and mathematical description of polymer conformations, and some of the material in Chapters I, II, III, and V might be suitable as part of an upper-level graduate course in statistical mechanics. ❐

ChE books received

Cooling Technology for Electronic Equipment, by Win Aung; Hemisphere Publishing Co., 79 Madison Ave., New York, NY 10016-7892; 838 pages, $125 (1988)

Transport Properties of Fluids: Thermal Conductivity, Viscosity, and Diffusion Coefficient, by Kestin and Wakeham; Hemisphere Publishing Corp., 79 Madison Ave., New York, NY 10016-7892; 344 pages, $98 (1988)

Properties of Inorganic and Organic Fluids, by Liley, Makita, and Tanaka; Hemisphere Publishing Corp., 79 Madison Ave., New York, NY 10016-7892; 309 pages, $80, (1988)

Specific Heat of Solids, by Cezairliyan; Hemisphere Publishing Corp., 79 Madison Ave., New York, NY 10016-7892; 484 pages, $98 (1988)

Flexible Manufacturing Systems in Practice, by Roger Bonetto; Hemisphere Publishing Corp., 79 Madison Ave., New York, NY 10016-7892; 208 pages, $37 (1988)

Standard Methods of Hydraulic Design for Power Boilers, by Lokshin, Peterson, and Schwarz: Hemisphere Publishing Corp., 79 Madison Ave., New York, NY 10016; 345 pages, $52.50 (1988)

Encyclopedia of Engineering Materials: Part A, Polymer Science and Technology, edited by N. P. Cheremisinoff (Vol. 1 of 3); Marcel Dekker, Inc., 270 Madison Ave., New York, NY 10016; 783 pages, $185 (or $157.25 each for all 3), (1988)

Natural Rubbers Science and Technology, edited by A. D. Roberts; Oxford Science Publications, 200 Madison Ave., New York, NY 10016; 1136 pages, $150 (1988)

Adsorption and Ion Exchange: Fundamental and Applications, edited by LeVan, Knaebel, Sircar, and Wankat; AIChE, 345 East 47th St., New York, NY 10017; $18 members, $35 non-members (1988)

Resource Recovery of Municipal Solid Wastes, Peter J. Knox, Editor; AIChE, 345 East 47th St., New York, NY 10017; $23 members, $45 others (1988)