BOOKS

Chemistry and Properties of Crosslinked Polymers, edited by S. S. Labana, Academic Press, New York, 1977, xiii + 581 pages, $29.50.

The time has long passed since polymer science was a research field of limited interest to non-chemists, namely a field of pure organic synthesis and physicochemical analysis. In a recent article (*Chem. Eng. News,* 55 (21), 19, (1977) it was reported that in 1976 only 29% of NSF funded polymer research (polymers program) was performed by chemists, while a good 17% went to chemical engineers. It is not surprising therefore, that polymeric networks either in swollen or unswollen state are the subject of extensive research by chemical engineers. Moreover, this trend is justified by a broad range of applications of crosslinked polymers, including desalination membranes, elastomers, coatings, adhesives and biomaterials, which are closely related to "standard chemical engineering phenomena."

Consequently, it is understandable that chemical engineers have contributed a substantial number of articles in this newly published book. The book includes 33 papers presented at a recent American Chemical Society symposium under the same title, in San Francisco in September 1976. It is important to note here that many colleagues have found more understanding and interested audience to present their work, under the aegis of other scientific societies outside AIChE. Since I am afraid that this trend did not come by choice, I urge the Polymer Engineering section of AIChE to consider it when scheduling future meetings; polymer engineering is not only rheology and reactors . . .

A wide range of subjects of both industrial and theoretical interest are covered in this book. Particular emphasis is given to rubber elasticity, viscoelasticity, crystallization and applications of crosslinked polymers.

This is not one more volume of proceedings of a meeting! It is an important addition to the literature of the area, and particles such as those by Ferry on rubber networks, Chompff on elasticity, R. Gaylord on stress-induced crystallization and Frisch on interpenetrating polymeric networks (IPN's) will become "classics" of the literature. Unfortunately this cannot be said of a few articles with limited scope and interest, which have been included in this volume. The lay-out and fast publication format are very good and the typographical errors are minimal and insignificant. A very important book for all researchers working in the area of polymeric networks!

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Viscoelastic Fluids: An Introduction to Their Properties and Behavior, Ronald Darby, Marcel Dekker, Inc., New York, 1976, 638 pp., $29.50.

This book is intended to provide students with a background for understanding the complex flow behavior of viscoelastic fluids.

Chapter 1 covers the definitions of stress and deformation, and Chapter 2 discusses the responses of Newtonian fluids, purely viscous non-Newtonian fluids, purely elastic solids, and linear viscoelastic fluids (for example, the Maxwell and Voigt models), to certain types of imposed input conditions. Since anyone who is expected to read this book is assumed to have, at least, an elementary course in fluid mechanics, much material covered in this chapter may not be needed.

The author discusses in Chapter 4 some example solutions of flow problems. Unfortunately, the examples considered shed little light on the role that viscoelastic fluids play. As a matter of fact, more than half of the chapter considers purely viscous fluids and only a few examples, hardly exciting, consider flow problems of linear viscoelastic models. The chapter does not seem to add much to the intended purpose of the book.

For someone who has never observed the flow behavior of viscoelastic fluids, it would be instructive to read about some dramatic experimental demonstrations. However, the author presents very little experimental evidence demonstrating their very unusual flow behavior. If the book is intended for students who have little background in the concepts of the flow behavior of viscoelastic fluids, such demonstrations would be very effective from the pedagogical point of view.

In Chapter 5, the author discusses, first, the method of determining the viscosity function only, and then the method of determining the normal stress functions. Such a separation is purely artificial, and the book devotes an unnecessarily large space to the subject.

It would have been better if the materials covered in Chapter 6 (vectors, coordinate transformations, tensors and their properties) were put in the Appendix, rather than in the main text. Chapter 7 is apparently intended to present the nonlinear behavior of viscoelastic fluids. The author describes a few models, of both the differential and integral types, but fails to point out their advantages and disadvantages. It would have been better if the author evaluated the material constants involved with the various rheological models, and discussed the relative merits of one kind of model against others, so that the reader could grasp the essential features of the different types.

The book may be used as a textbook for engineering students who study the flow behavior of viscoelastic fluids.

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