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## Book Review

**MULTIPHASE FLOW IN POLYMER PROCESSING**, by Chang Dae Han. Academic Press, New York 1981. 480 pp.

This book, written by the well-known American scientist, head of the Polymer Technology Department of the Polytechnical Institute of New York, is a continuation of the work published by Academic Press (1975). It is entitled “Rheology in Polymer Processing”. The present book is highly topical, since it deals, mainly, with filled polymeric systems which find most extensive application in modern engineering. Filling of polymers with a solid disperse phase, especially in those cases when the latter comprises fibrous materials, such as fiber glass or carbon fibres, substantially increases strength characteristics of the polymers and makes them fit for use as construction materials.

Present-day industry produces a lot of homopolymers, but for converting them into products of an appropriate quality it is often necessary to employ their mixtures. For example, polystyrene is noted for high brittleness, and this disadvantage is eliminated by using a mixture of polystyrene with rubber.

Most polymers are incompatible, and therefore their mixtures are heterophase systems.

In recent years gas-filled polymers have come into importance because they feature a reduced heat conductivity, a high sound insulating capacity, and are economically advantageous. In view of the above-stated, the importance of Hans’s book is obvious.

The book consists of eight chapters. The first chapter is an introduction written in a masterly fashion, in which a general idea about the problem as a whole is given in a concise form. The second chapter is devoted to the fundamentals of rheology, the level of exposing the material is good, but its incorporation in the book is

open to argument, inasmuch as it is a kind of development of the previous book. It should be noted, that an attempt to discuss the experimental techniques used for measuring the viscoelastic properties of polymeric liquids on 16 pages is hardly justifiable, since monographs of several authors have been published, in which this problem is considered. It should also be noted, that the general statement to the effect that branched polymers are characterized by a lower viscosity than linear ones is erroneous.

Chapters 3–6 constitute the first part of the book and are of tremendous interest, since here the factual material is collected and generalized for the first time. The structure of these chapters is as follows; first experimental data are presented and illustrated by a large number of diagrams. Then the theoretical aspect is considered and, finally, the principles and methods of processing the corresponding materials are set forth. At the end of each chapter a series of problems can be found, since the book can also be used as an educational aid.

The third chapter is an exposition of the specific features of polymeric systems containing a disperse phase in the form of solid particles.

The fourth chapter considers the flow of disperse heterogeneous systems. They can be in the form of an emulsion, and also in the form of polymers filled with a solid polymeric component.

The fifth chapter, small in volume, is devoted to the special problem of the destruction of drops in the flow of emulsions. In this chapter data are generalized, obtained by the author in his most recent investigations.

In the sixth chapter results are summarized for the first time concerning the processes of the evolving of gases and the dynamics of motion of gas bubbles.

In the second part of the book (Chapters 7 and 8) the processes of coextrusion of polymeric systems are considered. These processes are widely employed in the duplication of films, as well as in producing multilayer fibres and multilayer coatings for wires. Of great interest is the discussion in Chapter 8 of the reasons for the instability of multilayer coatings, i.e. for disturbances in the regularity of their contacts, e.g. the origination of waviness. It should be pointed out that the problem is considered in connection with the isothermal process of coextrusion.

All the chapters are supplied with extensive references, but Russian literature sources are limited to the investigations pertaining to the reviewer's school only.

The book will be of interest and use to all who deal with polymeric materials.

GEORGE V. VINOGRADOV