BOOK REVIEWS

Testing of Polymers, Vol. II. J. V. SCHMITZ, Ed. Interscience, New York, 1966. 440 pp. $19.00.

Volume II of Schmitz' series is a valuable collection of scientific and technological data about physical properties as well as testing of polymers.

Stress relaxation and other mechanical properties are discussed by R. L. Bergen, Jr. and by D. H. Kaelble in two useful reviews. J. J. Bikerman treats the wetting properties of plastic surfaces.

For the space and radiation scientists, there are chapters on cryogenic testing by J. H. Lieb and R. E. Mowers, and radiation resistance of polymers by D. J. Metz. The latter author adds a convenient listing of commercial sources of radiation equipment.

Flexural tests (H. S. Loveless) are becoming more important wtih the increasing use of sandwich construction. Flammability tests (L. B. Allen and L. N. Chellis) are also of immediate interest, in view of the accelerated use of plastics in building.

The chapter on hardness and wear (J. J. Gouza) reveals no fewer than 26 tests. The chapter on surface appearance, by R. S. Hunter and L. Boor, includes a discussion of Hunter's own widely used glossmeter. E. Weiss discusses ozone resistance, with particular emphasis on the unsaturated elastomers.

Processing of Numerical Test Data, by J. Mandel and T. W. Lashof, is a salutary review of the principles of statistical analysis and planning of experiments.

Irving Skeist

Skeist Laboratories, Inc.
Newark, New Jersey

Chemiefasern nach dem Viscoseverfahren, 3rd. Ed. (2 Volumes). KURT GÖTZE. Springer-Verlag, Berlin, 1967. 1282 pp. $62.00.

This is a monumental work! Since the publication of the second edition in 1951 polymer chemistry as a whole, cellulose chemistry in particular and, most of all, the technology of viscose rayon production has made such enormous progress that a completely new plan had to be developed for the third edition. No single man could possibly cope with this tremendous task alone. Thus Dr. Götze had to look for co-workers and in doing so he was successful in assembling a list of most competent and prominent contributors for the fundamental and applied chapters for this new work. After a relatively short historical and general orientation on the subject there is presented a comprehensive and detailed description of the raw materials with special emphasis on wood pulp and its importance for the viscose process. Next, the reader is given a very thorough orientation on the fundamentals of each individual step of the transformation of the original cellulosic material into the final fiber beginning with the structure of cellulose, its relation to water and alkali and continuing to the washing and drying of the final fibers, yarns, and fabrics. The next part discusses special spinning methods, fiber properties, and structure–property relationships with particular emphasis on high wet modulus staple fibers and

on tire yarns and cords and with very educational chapters on the x-ray investigation of cellulose and on other physical fiber analysis. There follows in Part V the detailed description of the single processing steps as they are carried out in viscose rayon plants and as Part VI a comprehensive and complete survey on existing chemical, mechanical, and other physical test methods.

Each contribution is provided by an outstanding authority in the particular area, yet Dr. Götze has succeeded in molding all these individual chapters in a unified pattern which is complete but still manageable and highly educational. No other fiber field, natural or man-made, possesses an equally impressive cross-section through all phases of its activities.

The two volumes are true "Springer Books"—excellently printed, organized and very attractively made up. The "Götze" is indispensable for anyone who is interested not only in cellulosics but in textiles in general, and every user will draw great profit and much pleasure from its use.

H. Mark

Polytechnic Institute of Brooklyn
Brooklyn, New York 11201

Non-Newtonian Flow and Heat Transfer. A. H. P. SKELLAND. Wiley, New York, 1966. xvi + 469 pp. $17.95.

From an empirical science, polymer chemistry has grown to a 13 billion pounds industry. Much has been published on the configuration, polymerization kinetics, and reactions of polymers, as well as on the fabrication of plastics by molding, extrusion, and calendering. But little has been known on the design and engineering of polymerization and polycondensation plants. Scaling-up reactors, heat exchangers, pumps, and piping had been done mostly empirically, based on a few simple factors received from equipment manufacturers. The need existed for an engineering book on the flow, agitation, and heat transfer of highly viscous polymeric melts, solutions, emulsions, and suspensions. This gap has been filled by the outstanding textbook of A. H. P. Skelland.

His book has been written especially for chemical engineers working in the polymer industry and responsible for the design of new polymer plants and optimizing existing equipment. It is also an excellent book for students and polymer chemists who want to learn and familiarize themselves with the problems of time-independent non-Newton fluids, thixotropic and rheopectic fluids. This had been an area which had not yet been treated from an engineering design viewpoint. It is shown that pumps for thixotropic fluids, for example, must be sized according to the energy required during the initial pumping period.

Laminar, transitional, and turbulent flow are discussed extensively relating boundary layer theory, mixing, agitation, and heat transfer. The high viscosity of most polymers causes laminar flow more frequently than for monomer or other chemicals of low consistency. Fluids with and without yield stress are dealt with in separate chapters. The turbulent boundary layers are analyzed employing the von Karman integral method.

Production and process engineers in the polymer industry will value this text as a handbook for calculating cost reduction and improved operation. For example, how to estimate optimum pipe diameter or optimum pumping temperature is indicated. Mixing and shear agitation are dealt with.

The selected problems and summaries given at the end of each polymer will help all of us to acquaint ourselves more with the behavior and flow of polymeric fluids through pipes, tubular reactors, heat exchangers, and in agitated kettles. The numerous un-