

example, Table 8.5 on page 70 is placed backwards on the page).

Finally, even if one were to overlook all of the above, it would still remain clear that this book may have the breadth claimed for it by author and publisher, but lacks sufficient depth to justify its price. Note that graphite is dismissed with barely a page of text, the duPont polymer Viton (so useful as a gasket material) is not mentioned, and the dispersion-strengthened alloys, TD-Nickel and SAP, are ignored. It is obvious that Mr. Evans was too ambitious in his undertaking with the result that his book is little more than a catalog of materials—certainly insufficient to be used as a sourcebook for those “responsible for the choice of engineering materials, in all process industries.”

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Liquid Thermal Conductivity—A Data Survey to 1973, D. T. Jamieson, J. B. Irving, and J. S. Tudhope, Pendragon House, Palo Alto, California (1974).

This well-prepared book is an updated version of previous NEL reports that surveyed thermal conductivity data of liquids (NEL 137, 1964; NEL 435, 1969). The authors are experts in data evaluation and have tabulated and assessed liquid thermal conductivities for some 850 liquids and liquid mixtures. Organic and inorganic liquids are included as are molten salts and aqueous solutions. Molten metals are not covered. Values are graded A, B, or C to indicate the approximate accuracy, that is, <2%, <5%, and >5%, respectively.

This book will be well received and well used by process design groups throughout the world.

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Kinetics and Mechanisms of Polymerization Reactions, Applications of Physico-chemical Principles, P. E. M. Allen and C. R. Patrick, one of the Ellis Horwood Series in Physical Chemistry, T. M. Sugden, editor, Halsted Press, New York (1974). Price \$43.50. 586 pages.

This extraordinary work by two former students of Sir Melville Burnett, well known in their own right, deserves careful attention. In the preface the authors note

The most important problem of polymer science now is the relationship between the mechanical and molec-

ular properties of a polymer. Not only is the chemical structure of the polymer important in this respect, but also are the sizes and the distribution of the sizes of the constituent macromolecules. When our understanding of the relationship is better developed it should be possible to prepare polymers having prescribed mechanical properties.

The book treats comprehensively, with different organization than other works in the field, the kinetics and mechanism of polymerization reactions, with the following chapter headings: 1. Basic Physical Chemistry of Polymerization, 2. Diffusion-controlled reactions, 3. Chain Reactions in Polymerization, 4. Thermodynamics of Polymerization Processes, 5. Polyesterification and Polyamidation, 6. The Reactivity of Radicals and Ions, and the Susceptibility of Unsaturated and Cyclic Compounds to their Attack, and finally, 7. The Kinetics of Addition Polymerization. One may have minor problems with such organization, because, for example, if one is interested in anionic polymerization, one will find it treated in chapters 1, 3, 4, 6, and 7; in the long run I believe this organization will prove valuable in giving a better view of the field. Certainly the authors have succeeded in emphasizing the physical-chemical principles of polymerization reactions. Chapter 4 on Thermodynamics is the most complete treatment of the topic to be found in the literature. This book invites comparison with *Principles of Polymerization* by George Odian (McGraw-Hill, 1970) and with *Organic Chemistry of Synthetic High Polymers* by Robert W. Lenz, Wiley, (1967), as well as the first part of *Chimie Macromoléculaire*, G. Champetier, (ed.), Herman (Paris, 1970). The specialist in polymer synthesis will find *Kinetics and Mechanisms of Polymerization Reactions*, quite different than, and complementary to, the other works, each one of which is valuable in its own way. Considerably more attention is devoted by Patrick and Allen to kinetics and mechanisms, while some polymer producing reactions such as phenol-formaldehyde condensations and isocyanate reactions are not included.

I found the work particularly valuable for its penetrating discussion of and discrimination among references from the literature and for the authors' uniformly good presentation of their own viewpoints. They do not sift the literature as if they were novices lacking in their own opinions of plausibility and reasonableness. I also enjoyed the more than occasional appearance of wit, for example on p. 521. “While a rate coefficient for radical propagation dating from 1947 should be regarded

with the same respect as a claret of that vintage, a ten-year-old coefficient for ionic polymerization should be treated with the same suspicion as a ten-year-old egg.”

The book includes an up-to-date compilation of 385 references and an appendix of tables of kinetic rate constants including anionic and cationic constants for free ion, ion pair, and mixed ion-ion pair propagation not found elsewhere. These features contribute to the intrinsic excellence of the work and make it a valuable acquisition for any university library and for the collections of serious workers in the chemistry of polymerization.

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Product Design and Process Engineering, B. W. Niebel and A. B. Draper, McGraw-Hill, New York. (1974). 832 pages. \$19.50.

This is a very readable and distinguished work which embraces an ambitious range of subjects pertinent to the industrial design engineer. Most notable is the discussion of material properties and manufacturing techniques for most important types of metals and polymer materials. There are also useful treatments of quality control methods, operations scheduling, and patent law. These latter issues are of particular value to the engineer in a new or small company which does not have great breadth in its technical management.

Writing with rare practical insight, the authors bring to bear fully their extensive industrial experiences and have provided both a useful text and an even more valuable reference book for the practicing engineer. This book has particular value to the graduate of an engineering science program who may be lacking in the know-how required for competence and recognition in his profession. Few chemical engineering curricula encompass any of the subjects presented in this text; this fact makes the book even more attractive to the new graduate entering industry and needing useful insights to the industrial practice of mechanical and industrial engineering.

Very few books combine the attributes of an effective academic text and the utility of a valued reference text for the practicing professional. This work, in my opinion, is one of them.

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