

It is fortunate indeed that two well recognized industrial polymer chemists, Drs. J. H. Saunders and K. C. Frisch, have collaborated in the writing of this book. Because of their extensive experience in polyurethanes, this volume has the ring of authority.

Part I covers raw materials, reactions of isocyanates and isocyanate derivatives, kinetics and catalysis of isocyanate reactions, formation of urethane forms and relationships between polymer structure and properties in urethanes. It should be pointed out that in addition to the isocyanate route to polyurethanes, there is a growing field of polyurethane chemistry wherein polychloroformates replace polyisocyanates. This latter route, in addition, allows formation of polyurethanes from di-secondary diamines which cannot be prepared from polyisocyanates. Discussion of this phase has been omitted.

Chapters IV and XI are especially useful both to researchers concerned with fundamental aspects of isocyanate chemistry and to technologists concentrating more in the applied field. It might be questioned if the chapter on formation of urethane foams (V) was rightfully included in Part I, but rather should be in Part II, on technology. By including foam technology in Part I, other aspects of end-use urethane products, such as elastomers, might well have been included.

A very useful part of the book is the information included in the Appendices. Sources of commercially available isocyanates, polyethers, polyesters, with their Trade Names and Generic Names, are listed.

This volume is a major contribution to polyurethane chemistry, largely emanating from Industrial Laboratories, beginning from early work in the du Pont and Bayer Companies. It is anticipated that more academic researchers will contribute to the chemistry of polyurethanes, especially to the more obscure aspects, such as mechanism of reactions, secondary reactions, and the true role of the wide variety of catalysts used.

The picture of Professor Otto Bayer as a frontispiece is a fitting tribute to his enormous contribution in the field of isocyanate chemistry as applied to polymers.

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**The Sadtler Standard Spectra of Monomers and Polymers, Vol. I, II, & III.** Sadtler Research Laboratories, Philadelphia, Pa. in three 8.5 × 11 in. loose leaf binders, 29 pp. + 3,200 spectra. \$1,000.

The publishers of these volumes have apparently obtained 3,200 samples of commercial monomers and polymers from a host of national and international companies and determined their infrared spectra. The spectrograms are indexed both according to spectra number and according to an alphabetical listing of the materials by trade name and manufacturers code. The information accompanying each spectrum includes the manufacturer, the type of sample used, and the conditions of measurement. For some spectra, only the trade name is given, while for others, additional information is presented; for example, generic name, melting point, or viscosity.

These spectrograms could be useful to those engaged in identification of polymeric and monomeric materials or in quality control. Although such a vast collection of spectrograms might be a valuable addition to any library, the set is lacking in several respects. There is no foreword to the collection which would be helpful to the reader in letting him know whether there is any system involved in the compilation, and no index by polymer or monomer type or structure.

The choice of materials is somewhat limited. There are included the spectra of polyethylenes from only one manufacturer, of nylons from only one manufacturer and of silicone resins from only one manufacturer. Other significant omissions include caprolactam, styrene monomer, caprolactam based nylon resins and vinyl fluoride-vinylidene fluoride copolymers (Tedlar). These omissions may be corrected when the publishers issue supplemental volumes.

The price appears to be excessive, although those engaged in industrial polymer activities involving identification of commercially available materials may find the spectra useful.

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**Analytical Chemistry of Polymers, Vol. XII, Part III. Identification Procedures and Chemical Analysis**, G. M. KLINE, Editor. Interscience, New York, 1962, XII + 566 pp., \$16.50.

Polymer analysis mostly involves either characterization of a newly synthesized product or identification of an unknown. Although the experimental techniques employed in both types of analysis above are in many respects the same or similar, for some reason, the number of published books or articles which one might classify as dealing with identification per se is rather small in comparison with those which one might classify as dealing with characterization. The book under review indeed corrects this disparity to an appreciable degree. This book, as the title indicates is *Part III* only of a three-part volume and contains five chapters. *I. Systematic Procedures* by G. M. Brauer and E. Horowitz, *II. Color Tests* by G. M. Brauer and S. B. Newman, *III. Microscopy* by S. B. Newman, *IV. Radiochemical Analysis* by R. E. Florin and L. A. Wall and *V. End-Group Analysis* by M. Hellman and L. A. Wall. Other notable features include an extensive cumulative author index for all three parts comprising 60 pages and an equally extensive subject index comprising 86 pages. Each author is an expert in his field and the material covered is quite up-to-date as evident from the vast list of references appearing at the end of each chapter and from the fact that a large number of the references cited date as late as 1961. Neither the editor nor the authors claim any professed originality in the presentation of the material and as such the book is judged strictly from the standpoint of its usefulness to polymer scientists. The book under review is really a product of National Bureau of Standards since the editor, Gordon M. Kline, and the various authors named above have been associated with the Bureau at one time or other. The typography is excellent and the price compares very favorably with books of a similar nature. The reviewer sees no single reason why a basic book of this type may not prove useful to a polymer chemist regardless of whether the prospective reader is an entrenched specialist or he is a novice just entering the field of polymer science.

A curious thing about polymer analysis has been that although the various experimental techniques employed for such analyses are highly specialized and, in many instances, developed especially to suit the macromolecular nature of polymers the reviewer is unable to recall more than half a dozen publications in the bound book form published during the last twenty years or so devoted specifically to this major and specialized branch of chemical analysis. On this count alone the reviewer feels that every library which is proud enough to display a polymer science section on its shelves must also make it a point to place the book under review together with *Parts I* and *II* on the same shelves.

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