

Very unfortunately, there is neither an author nor a subject index. However, the table of contents gives the names of co-authors and the full title of each paper. Also, after the experimental section of each article, there are the literature references which were given in the original paper. In an extensive work of this kind, one would expect, and here finds, some misprints and occasional awkward translation expressions. The book provides a splendid means of acquiring a broad picture of the extensive studies carried out over a period of 30 years by one who has contributed so much to Soviet chemistry and education, and also to organic chemistry generally. It is a compliment to Professor Nesmeyanov that he has carried on such a comprehensive research program in addition to meeting so well the other great demands on his time and energy. In particular, we refer to his directorship of the Institute of Element-Organic Chemistry where he has assembled a highly competent and productive staff to effectively extend organometallic chemistry in varied directions.

The price of the book is such that few individual purchasers can afford it. It should, however, find a useful place in reference libraries.

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HENRY GILMAN

Crystallization of Polymers. By LEO MANDELKERN, Professor of Chemistry, Florida State University. McGraw-Hill Book Co., Inc., 330 West 42nd St., New York, N. Y. 1964. 359 pp. 16 × 24 cm. Price, \$13.50.

In this book the structural requirements for polymer crystallization are analyzed with competence as well as certain aspects of the thermodynamic and kinetic processes associated with fusion. Professor Mandelkern discusses in great detail previous work on the fusion of homopolymers, copolymers, and also cross-linked polymers. In addition, the crystallization of oriented polymers and diluent compositions are described in individual chapters devoted entirely to these systems.

The relatively recent discoveries of stereospecific synthesis and polymer single crystals have completely changed our understanding of crystallization phenomena in polymers. Owing to these exciting developments, a considerable amount of research is currently being conducted to test many new concepts which have emerged. As a result, the chapter on polymer morphology is very incomplete and important structural data have been omitted. In particular, the occurrence of regular chain folding in both single crystals and bulk polymer is not given sufficient emphasis.

Unfortunately, like other recent books in polymer science, the author emphasizes certain areas of crystallization phenomena with which he is most familiar. Subsequently, the entire manuscript development is based on a single point of view. Throughout most of the theoretical treatment, fundamental structural models are used which as a result of recent research have questionable validity.

Nevertheless, "Crystallization of Polymers" is recommended to individuals who are doing work in this field of polymer science. Despite the complexity of the subject matter, the manuscript is well written. There are numerous references at the end of each chapter and also many tables containing valuable data.

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ERIC BAER

International Series of Monographs on Analytical Chemistry. Volume 16. Analytical Chemistry of Niobium and Tantalum. By ROSS W. MOSHIER, Aerospace Research Laboratories, Wright-Patterson Air Force Base, Ohio. The Macmillan Co., 60 Fifth Ave., New York 11, N. Y. 1964. v + 278 pp. 16 × 23.5 cm. Price \$12.75.

Roughly one-fourth of this reference book is devoted to the general chemical and physical properties of niobium and tantalum and their compounds, and their detection and identification as well as the classical methods of dissolution of materials and the gravimetric determination of the elements after separations. The older classical methods of Schoeller and Powell and others are supplemented by methods based upon the newer complexing agents and the more recently available organic chelating agents.

In the remainder of the treatise, there are separate chapters on separations by solvent extraction, separations by ion exchange and chromatography, and separations by chlorination and distillation.

Detailed coverage is given on colorimetric determinations (four chapters), reduction and titration, polarography, X-ray methods, both diffraction and fluorescence, neutron activation and radioactive tracer methods, spectrographic methods, and the determination of impurities in purified niobium or tantalum, their alloys, etc.

The treatise gives a very broad coverage of the methods. At times the treatment impresses one as rather noncritical and as presenting all likely methods that have been published. A broad basis is provided for the reader and research worker for selection of methods for various purposes.

There are useful Author and Subject Indexes.

Few misprints or typographical errors were noted. On p. 12 niobium is written as "nobium" in the second paragraph.

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Physical and Chemical Methods of Separation. By EUGENE W. BERG, Coates Chemical Laboratories, Louisiana State University, Baton Rouge, La. McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36, N. Y. 1963. xiv + 366 pp. 15.5 × 23.5 cm. Price, \$12.50.

The chemical analyst, the research chemist, and the process developer—be he chemist or chemical engineer—depend heavily in the discharge of their tasks on the ability to separate phases and components of mixtures. The required separations, whether partial or quantitative, must be under the rigid control of one who would exploit them effectively. Chemical engineers are trained specifically in the principles and techniques of separations—physical separations, at least—and are prepared to deal with them in their earliest postbaccalaureate days. Not so chemists emerging from most colleges and universities, at whatever degree level. They will have had a hit-or-miss encounter with separations, according to Professor Berg, who deplors such deficiency in the chemist's academic experience, has set about correcting it at his institution, and has written himself a textbook for his course.

The resulting book is probably unique, and it fairly achieves the author's aim "to present a concise and informative survey of separation techniques." The separations described are fractional distillation, extraction, chromatography (gas-solid, gas-liquid, and paper), electrochromatography, ring-oven concentration, zone melting, ion exchange, ion exclusion, dialysis and electroanalysis, precipitation and related phenomena, froth flotation, and biological methods. Included also is a chapter on sequestration—sometimes a reasonable substitute for separation—by Philip W. West. The chapter on gas-liquid chromatography is by Buddhadev Sen.

The experienced reader will recognize at once that many separation methods are missing. This reviewer constructed a list that contained as many ignored as treated by the author. Admittedly half of these were mechanical phase separations, whereas Berg has tacitly but almost completely confined his attention to component separations; admittedly also many were less important than most of Berg's. No doubt an author who intends not to produce an encyclopedic work, like Weissberger's "Techniques of Organic Chemistry," must draw an arbitrary line somewhere. Yet one wishes that this book might contain chapters or sections on gas absorption and desorption, selective dissolving, perhaps electrolysis, and such enormously valuable but often subtle mechanical separations as sedimentation, filtration, and precipitate washing.

By and large, the subjects included are presented adequately if sometimes inelegantly. The weakest treatments are so because of their portions on theory (*e.g.*, Chapter 5, "Gas Chromatography"). Too often there are derivations that give the impression of being pointlessly long and uncomfortably unauthoritative. For a book of this magnitude, a better practice might be to offer whatever theory-based relationships are useful with only reference to published sources of the supporting derivations. On the other hand, the inclusion in each chapter of sections on applications and restrictions, the detailed documentation of the text, and the presentation of extensive bibliographies are features of excellent strength. And the collection between