

with pressure, latent heat of fusion, latent heat of evaporation, critical values, compressibility, viscosity, heat content, surface tension, solubility. The tables of compounds are grouped according to Cox-Chart families. Means are provided for interpolation and reasonable extrapolation, based on the systematic way in which the properties vary within a given homologous series. This third volume contains a cumulative index applicable to all three volumes. This volume is a necessary reference book for all scientists and engineers whose work requires knowledge of the properties of organic compounds. The technical world owes Dreisbach a debt of gratitude for this valuable work.

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Struktur und Eigenschaften der Materie in Einzeldarstellungen. Band XXIII. Gruppentheorie der Eigenschwingungen von Punktsystemen. By FRANK MATOSI, Ord. Professor für Physikalische Chemie an der Universität Freiburg i. Br. Springer-Verlag, Heidelberger Platz 3, Berlin-Wilmersdorf, Germany. 1961. viii + 191 pp. 16 × 23.5 cm. Price, DM 39.—.

In a field where books tend to run to several hundreds of pages, Professor Matossi has written a short and concise little monograph. Though the text is in German, the two subject indices serve also as brief German-English, English-German technical dictionaries, and were found to be most useful by the reviewers. There is in addition also a name index, which seems quite thorough.

The author has aimed his book at the experienced researcher in the field as well as at the advanced student. He has, therefore, attempted to give not only the formulas, but also to present the fundamentals systematically for those with a background training in physics and physical chemistry, in the hope that he may provide the tools for fruitful and original applications of group theory methods in the treatment of molecular vibrations.

In this ambitious project the author has made a commendable job. The presentation of the point groups commonly encountered in dealing with molecules and crystalline solids is suitably detailed and small oscillation theory is developed completely from first principles. The treatment of space groups is brief, but adequate, and in keeping with the aims of the author.

The method of symmetry co-ordinates is adopted to factor the F and G matrices corresponding to the potential and kinetic energy functions respectively. A more fundamental approach, however, and one that can be applied to a wider class of problems, can be based directly on the methods of I. Schur (originally published in the *Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften*, Berlin, 1905 and 1906) and would surely have deserved at least a mention by Professor Matossi. Examples of computing the F and G matrices are given in unusually great detail for three molecular structures (two-dimensional and one three-dimensional), for the Wurzite lattice and for a linear chain, and should be of value to anyone attempting these difficult calculations for the first time. Selection rules are also discussed and employed to determine active and inactive Raman spectra for several cases.

Perhaps the main criticism that may be leveled at the book is that only selected aspects of group theory are presented so that the theory appears to become a rather specialized and restricted mathematical tool. Thus the student will gain considerable facility in performing analyses closely similar to those treated by the author, but he will not become sufficiently familiar with the standard group theoretical methods to perform new analyses, nor will he understand clearly the extent to which the results of his method depend on the group theory involved.

Tables are presented where possible to summarize results, and a total of 25 diagrams are included to advantage. Not out of place, however, would have been a Table listing the symbols adopted and used throughout the text. References are included in many places to original papers where either different or more extensive accounts are given of special topics treated necessarily rather briefly in the text, though no mention appears to be made of the very complete compilation of symmetry groups to be found, for example, in Vol. 1 of the "International Tables for X-ray Crystallography."

However, in spite of some minor shortcomings, the book by Prof. Matossi (who also has one on the Raman effect to his credit) is a welcome addition, not so much to group theory, as to studies in the application of symmetry co-ordinates to the determination of characteristic vibrations of point groups. For such studies we can confidently recommend the book, which is well produced with good type and paper, and seemed free of any obvious typographical errors, though perhaps priced rather high (\$9.75).

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Preparativní Reakce V Organické Chemii. Díl VI. Reakce Organokovových Činidel. By Inž. DR. KAREL BLÁHA. Publishing House of the Czechoslovak Academy of Sciences, Vodičková 40, Praha 2, Czechoslovakia. 1961. 954 pp. 18.5 × 24 cm. Price, Kčs. 105.—.

"Reactions of Organometallic Reagents" is the sixth volume of the encyclopedic series "Preparative Reactions in Organic Chemistry" published by the chemical section of the Czechoslovak Academy of Sciences.¹ The present volume is an attempt at a systematic description of the reactions of organometallic compounds containing magnesium, cadmium, zinc, mercury, alkali metals, alkaline earths and aluminum. Emphasis is placed on the use of organometallic reagents in the synthesis of organic substances, but information is also included concerning the analytical aspects and chemical bonding problems.

Three-quarters of the book is devoted to the discussion of the preparation, properties and synthetic uses of the organic compounds of magnesium. A brief historical introduction is followed by detailed treatment of the direct and indirect methods for the preparation of Grignard reagents. The structure and analytical estimation of these reagents receive attention in two separate sections. The synthetic utilization of Grignard reagents is treated in subsequent chapters with attention to all known variants of the Grignard reaction. The discussion is arranged according to the various modes of reaction of the organomagnesium halides, *i.e.*, reactions involving cleavage of bonds, addition to double bonds, addition to triple bonds and "anomalous" reactions of Grignard reagents. The vast amount of descriptive material is thoroughly documented by references to thousands of original publications and, in many instances, conveniently summarized in tabular form. The text contains numerous illustrative experimental procedures which can be used by the experienced experimenter in the laboratory without having to consult the original sources in every instance. Every attempt has been made to achieve a thorough, up-to-date coverage of the subject matter. Sections on the preparation and reactions of Grignard reagents of the fluorocarbon and cyclopentadiene series illustrate this endeavor.

The remaining one-quarter of the book is devoted to the treatment of the organic compounds of the remaining Group I and Group II elements and of aluminum. Among these, the organolithium compounds receive the greatest amount of attention in view of their increasing synthetic importance. The subject matter dealing with organolithium compounds is arranged and treated similarly to the corresponding material on magnesium derivatives. Modern aspects of the chemistry of organic lithium compounds, such as dehydroaromatic (benzyne) compounds and "ylids," are included. The organic compounds of the other alkali metals, zinc, cadmium, mercury, the alkaline earths and aluminum are dealt with in the several remaining shorter chapters. The discussion of mercury and zinc compounds is largely restricted to areas where the corresponding organometallic reagents have still retained sufficient importance in the synthesis of organic compounds. Among the other organometallic compounds included in the book, the sodium, cadmium and aluminum derivatives are steadily gaining in importance and are, therefore, treated in greatest possible detail.

"Reactions of Organometallic Reagents" is a treatise conceived on a large scale and, in the opinion of the reviewer, successfully executed. The broad coverage of the field,

(1) Cf. *J. Am. Chem. Soc.*, **83**, 2969 (1961), for a review of the fifth volume of this series.