

remaining eight chapters of the first part are concerned with those aspects of Fraunhofer diffraction which are related to crystal problems. The author bases his treatment entirely on Fourier transforms, of which he exhibits a wide understanding. Although he assumes that his reader knows what such a transform is, he gives enough illustrated examples to give a reality to the technique that is unusual in the more formal treatments; and it would be possible for a reader who knew little or nothing of Fourier transforms to learn about them here. The first part ends with a statement of the fundamental problem of diffraction analysis: the determination of the phases of the scattered beams whose intensities have been measured.

The second part is concerned with the determination of structures. In this part, the first chapter is a very brief account of some photographic methods for the measurement of X-ray diffraction intensities. The second chapter is concerned with the calculation of the Patterson function, the third with the determination of the space group, and the fourth with the problem of determination of the structure. This part of the book gives an account of the whole progress of an X-ray investigation which is very clear and should be understandable to a reader outside the field who has the necessary mathematical background. For one who plans to work in the field it provides a connected introduction on which to hang additional reading.

The third and shortest part is concerned with powder, liquid and fiber diagrams and the study of texture by these methods.

This text is an example of the clarity of language and presentation for which the French are noted and which makes its reading so pleasant and informative. The planning of the course is worthy of a real study by anyone who has the duty of teaching X-ray crystallography, and this and the earlier volumes are recommended for students of crystallography who have or need facility in French.

The book is produced in photo-offset from justified typescript and is an excellent example of this technique even as far as the X-ray photographs are concerned.

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Landolt-Börnstein. Zahlenwerte und Funktionen aus Physik, Chemie, Astronomie, Geophysik, und Technik. Sechste Auflage. Zweiter Band. Eigenschaften der Materie in Ihren Aggregatzuständen. 4. Teil. Kalorische Zustandsgrößen. Edited by KLAUS SCHÄFER and ELLEN LAX. Springer-Verlag, Heidelberger Platz 3, Berlin-Wilmersdorf, Germany. 1961. xii + 863 pp. 20.5 × 27.5 cm. Price, DM. 438.--

This book contains values of the thermodynamic properties of the elements, compounds, and alloys, as well as heats of reaction for the formation of compounds from the elements and the change in heat content accompanying some other important reactions, such as the heat of neutralization of acids with bases and the heat of wetting of solid surfaces with liquids. The values are given generally in terms of joules per mole, except in a few cases where values in calories are also given. References are given to the original papers in the literature as well as references to prior compilations, though in general the two kinds of sources are not distinguished.

Covered in this book are the following: experimental and theoretical basic values for heats of combustion of organic compounds, by H. Kienitz; standard values at 25° for elements, inorganic compounds and organic compounds, for the heat capacity, entropy, heat of formation, and free energy of formation, for the change in heat content and heat capacity for changes of state, as transition, fusion, and vaporization, by W. Auer; values of the thermodynamic functions at standard pressure as a function of temperature, from low to high temperatures, for the elements and selected inorganic and organic compounds, by Kl. Schäfer and W. Auer; heat capacity as a function of temperature, from low to high temperatures, for the elements and inorganic and organic compounds, by W. Auer; heat capacity of gases as a function of pressure, by H. D. Baehr; heat capacity of gases in the plasma state, to 30,000°K., by F. Burhorn and R. Weinecke; values of the Planck-Einstein function and of the Debye function for thermodynamic functions, by Fr. Losch; values for anharmonicity and for free and

restricted internal rotation, by Kl. Schäfer; values for the Joule-Thomson effect and the isothermal Drossel effect, by H. D. Baehr; magneto-thermodynamic effect for paramagnetic salts at low temperatures, in tabular and graphical form, by H. Nelkowski; thermodynamic functions for metallic solutions, by O. Kubaschewski; heats of adsorption and wetting, by K. Bratzler; and heats of neutralization, by A. Neckel.

Prof. Dr. Klaus Schäfer and his associates are to be complimented on an excellent job. While significant advances have already occurred, it is hoped that in the years to come more international uniformity will prevail in the details of the presentation of material of this kind, including symbols, values of the fundamental constants, units of energy, etc. Every research library in science and engineering will need to have ready access to this book.

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Biochemical Applications of Gas Chromatography. By H. P. BURCHFIELD, Southwest Research Institute, San Antonio, Texas, and ELEANOR E. STOOBS, Boyce Thompson Institute, Yonkers, New York. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1962. xviii + 680 pp. 16.5 × 23.5 cm. Price, \$22.00.

Gas chromatography, like other "chromatographic" techniques, is a device to resolve mixtures of compounds that are otherwise difficult to separate. It has accumulated already more than its due share of jargon. While the authors explain this by their repeated definitions, they do little to discourage it. If one consults a popular Oxford dictionary, one reads that "chromatography" is the "description of (or by) colors." The term chromatography was not unsuitable when applied to the visible separations of leaf pigments by Tswett on a solid column, and at least it had some justification in the early separation of protein amino acids on paper, for this operation was followed by the visible detection of the amino acids with ninhydrin. However, the term has lost all significance in its application to the separation of a mixture by what is known as "gas chromatography." It is too late to reverse the march of events and to devise a more rational nomenclature, but one hopes that this most valuable field of work is not to be as cluttered by uncritical applications as it is by unjustifiable or unclear jargon. If the simple operation long known as dialysis were to be rediscovered today, one trembles to think what the nomenclature might be.

In a necessary and systematic listing of terms, one reads (page 9) that "A chromatogram is a plot of the detector response versus time or volume of carrier gas. Idealized chromatograms obtained with differential and integral detectors for one component are shown in Figure 3." Or, again, "A peak is the portion of the chromatogram recording the detector response [differential type] while a single component emerges from the column [if separation of a mixed sample is incomplete, two or more components may appear as one peak]." This sort of thing, whether quoted from other sources or not, proceeds through innumerable definitions and descriptions of phases of the technique. One wonders whether those who approach the problem without prior knowledge of the subject will find it easy to interpret this sort of writing. And when under Essential Oils one reads about "gas chromatography" of whole plant families, described as "chromatography of Myricaceae," "chromatography of Rosaceae (rose oils)," "chromatography of Labiatae," etc., one wonders whether all traces of sensitivity to the precise use of words has disappeared. If botanists use the book, some will shudder to see whole plant families apparently characterized by one sample separation of one class of compounds, from one or even a few species. While some may justify this sort of thing by expediency and a plea that everybody knows what the authors mean, is it too much to ask that the words that are to convey this meaning should be appropriate? Perhaps, however, the "chromatography" is not any more precise than the words which describe it, for one gets the impression that the unwary may place implicit faith in the deceptively precise peaks on the line tracings that appear on the gas "chromatograms." In this, as in all other cases of chromatography of complex mixtures, a peak may often cover up more than one com-