

and so on, depends intimately on the alloy system under investigation.

In summary, the book, which is well produced and contains microstructural illustrations of a high standard, will be of great interest to experts in the subject and will find its way into all the relevant scientific and technical research libraries. I suspect personal purchase by working scientists will be inhibited by the rather disturbingly high price of £12.50.

J. E. BAILEY

Spectral Analysis

Analytical Spectrometry. By L. de Galan. Pp. viii+279. (Adam Hilger: London, September 1971.) £6.

THIS book is based on a course "intended for the general analytical chemist" and is an updated version of the 1969 Dutch edition. The author is at the Technische Hogeschool, Delft.

The word "spectrometry" is used in its most general sense and includes mass spectra as well as the spectrum of electromagnetic radiation from γ -rays to mm waves. More or less all "spectrometric" methods in general use for structural, qualitative and quantitative chemical analysis are included—molecular absorption (ultraviolet to infrared), atomic absorption and emission spectra, X-ray absorption and fluorescence, γ -ray emission of elements activated by neutrons, crystal structure by X-ray diffraction, and nuclear magnetic resonance spectroscopy. Notable omissions—presumably considered to be in insufficient general use—are Raman spectra, electron spectroscopy and Fourier transform spectroscopy. Electron paramagnetic resonance receives only very brief mention.

The principles of each type of spectrometry considered are very carefully set out, commencing with the background theory and leading on to the instrumentation necessary to make use of the general method. It is always difficult for an author to decide where to start. In this case the treatment is so elementary at the beginning of each section that one might think the book is intended for those who have almost no knowledge of physics and have not met even the laws of refraction nor the term "refractive index". On the other hand, a good facility in algebra and calculus is assumed. Such readers will be able to follow the book but will have mental indigestion before they have finished reading any one section. There must, however, be many who are experienced in some types of spectrometry—perhaps ultraviolet absorption and emission spectra—and who would like to consider the possibilities of some of the newer methods and they will find this book invaluable.

In general the book is written so that statements are very clear and precise.

Some of the criticisms on detailed points which one has noticed may be mentioned. The use of the phrase "continuum spectra" in place of the usual "continuous spectra" can be a little irritating. The author asserts that numerical wavelengths should always be the value in vacuum, whereas wavelengths in air at STP are normally used; the former is perhaps more logical although this means that the first two Balmer lines for hydrogen are given as 658 and 487 nm, instead of the usual 656 and 486 nm; but he is inconsistent and in Fig. 2.2 sodium wavelengths in air are indicated. A problem on page 42 asks for the quantum numbers of the outer electron of aluminium. This is not a fair question; from what he has been told, the reader will "guess" the right answer. But he will then have the impression that he can deduce the answers for the ground states of other atoms—which is certainly not true for the heavy atoms!

At the end of each chapter is a useful list for "further reading" together with an assortment of problems carefully designed to make the reader think. To summarize, any analytical chemist anxious to widen his knowledge of spectrometric methods will find it very useful to have this book on his shelf.

G. F. LOTHIAN

Polymer Science

Textbook of Polymer Science. Second edition. By Fred W. Billmeyer, jun. Pp. xiv+598. (Wiley: New York and London, June 1971.) £7.50.

THIS textbook is a revised edition of that produced almost ten years ago. It comprises five sections dealing respectively with characterization of polymers, structure and properties, polymerization, properties of commercial polymers and polymer processing.

The characterization section serves as a brief introduction also, reminding the reader about intermolecular forces and bonds. Polymer solutions are dealt with in general, by stating the conclusions of theoretical studies and then applying them. This too is the case for measurement of molecular size and shape and for analysis and testing, this latter part devoted to physical methods.

The concepts of regularity and order are developed in discussing morphology, rheology and the relationship of physical properties to structure. Here again, the approach is readably descriptive, basic mathematical theory being referred to and results stated and used.

The section on polymerization deals with the chemistry, mechanism and kinetics and covers condensation, free radical addition, ionic, coordination and ring opening processes. This is extended to deal with the more complex situations which develop when

copolymerization systems are studied.

A useful part of the book is devoted to commercial polymers, where cost and performance have to be balanced and where minor variants of the main polymer may have important uses in speciality items. More technological details such as plasticization and stabilization are dealt with here, and the thermosetting resins which do not fall easily into earlier more fundamental chapters.

The shorter final section deals descriptively with polymer processing and includes moulding, extruding, blowing and spinning, together with a brief mention of vulcanization.

To cover an extensive and advancing area of science and technology in detail in a single volume is clearly impossible, and in the present textbook the author has pruned away much of the detailed theory. The emphasis remaining is chiefly on a fairly descriptive level, showing what can be achieved by applying the results of theory to understanding complex polymer systems and relating these to the end technology.

This is a very readable book which can be recommended to student and practitioner alike, the former gaining a preliminary insight into this fascinating field of study and the latter having his horizons widened painlessly. The illustrations are good, many useful tables are provided, and the text is well referenced.

JAMES C. ROBB

Fast Reactions

Fast Reactions. By David N. Hague. Pp. viii+159. (Wiley Interscience: London and New York, July 1971.) £3.

DURING the past twenty years the accumulated knowledge concerning rapid reactions, that is, those which have half-lives of less than a second, has grown enormously. So much so that "fast" reaction kinetics is now an established and indispensable part of chemistry and biology. Although there have been a great number of research papers and reviews published in this field, so far there have been few textbooks. The author states in the preface that this book was written as an attempt to bring to the attention of the general chemist or biologist some of the excitement experienced by those working on fast reactions, who are continuously developing and improving their techniques, thereby revealing interesting new information concerning chemical reactivity. Since fast reaction applications are so wide ranging, it is hardly surprising that in a book of this size the author seems to have been exceedingly selective in his attempts to convey an impression of significant advances. It is questionable whether his treatment which often only scratches the surface in one or two places is likely to achieve his declared aim.