BOOK REVIEWS

Introductory Actinides

The Actinide Elements. By K. W. Bagnall. Pp. xi+272. (Elsevier: Amsterdam, London and New York, 1972.) Dfl. 80; \$25.

PROFESSOR K. W. Bagnall's *The Actinide Elements* provides a conveniently expeditious and lucid entry into an important area of contemporary inorganic chemistry. The outstanding feature of the book is a systematic description of the solid compounds of the actinide elements, with brief descriptions of preparative procedures and crystal properties featured. Particularly noteworthy are the surveys of actinide element alkoxides, diketones, organometallic derivatives and other complex compounds. Other aspects are less thoroughly covered. Thus, for example, the nuclear chemistry and solution chemistry of the actinide elements are discussed in a much more restricted fashion.

The intention of the author as stated in the preface, namely to provide a "comprehensive, not in the sense of containing every detail, but as a broad survey in some depth which should be useful to those studying or teaching the subject at the honours level," and "a sufficiently strong backing of references for it to also make acceptable reading to those already engaged in research in this interesting field and . . . [to be] a helpful point of departure for those planning to undertake new work in the field of actinide chemistry," is well realized. Recognizing this limitation and its restriction to a discussion of the chemical properties, a more restrictive title such as *Introduction to Actinide Chemistry* might have been more appropriate.

Chapter 9, "Carboxylates, Xanthates, Dithiocarbamates, Alkoxides, Phenoxides and Related Sulphur Compounds"; chapter 10, "Complexes with β -Diketones, Tropolone, 8-Hydroxyquinoline and Other Chelating Ligands"; and chapter 11, "Borohydrides, Organometallic Compounds and Amides" — covering the exotic actinide compounds — are fairly comprehensive, relative to total knowledge in these areas, and will be helpful to those planning new work

in these particular fields of actinide chemistry. Chapter 12, "The f Orbitals and the Magnetic Properties and Absorption Spectra of the Actinides," although far from all-inclusive, is particularly to be recommended when used with the references given, as an introduction to electronic structure effects in the actinide and lanthanide series.

Perhaps not too surprising, there are a few deficiencies and discrepancies in the text. As an example, the information presented in chapter 2, "Oxidation States," is perhaps more out of date than might have been expected from the publication date. Although Table 3 fails to list divalent californium, the preparation of californium dibromide is described in chapter 7. Some of the electronic structures in Table 1 are inconsistent with the publication date. And the symbol Lw is used for lawrencium even though this was changed to Lr years ago.

Over all, Bagnall does a very good job within the constraints of his stated purpose. The book is well written and it should be a stimulating and effective course book for upper division chemistry majors who want more exposure to this very relevant aspect of inorganic chemistry and a concise, useful, modern reference work for actinide chemists and inorganic chemists in general. GLENN T. SEABORG

Electrolytes

Nonaqueous Electrolytes Handbook. By G. J. Janz and R. P. T. Tomkins. Vol. 1, pp. xiii+1108. (Academic Press: New York and London, October 1972.) \$55.

THIS book is in no sense a textbook, or even a monograph for research workers. It is a handbook, a compilation of tabular information about pure solvents and their solutions. The information in the handbook covers the literature to 1972, though the coverage of work before

1924 is not complete and readers are referenced to P. Walden's *Elektrochimie Nichtwässiger Lösungen*. The book is divided into eight areas or chapters of unequal length. There is a chapter on the physical properties of solvents, which consists of tables of boiling point, melting point, viscosity dielectric constant specific conductance and density—the last four as functions of temperature where the data is available. These tables are given for a wide variety of solvents and mixed solvents. No data on vapour pressures are given.

The second chapter deals with solvent purification. This really serves as a bibliography of techniques, nothing more. After all, two lines are scarcely sufficient to describe the purification of hydrogen fluoride, one of the most difficult solvents to dry and handle satisfactorily. The third chapter on electrical conductance, is by far the longest in the book, consisting as it does of 750 of the book's 1100 pages. There is no doubt that this represents an extremely useful bibliography. The tables in this section give Ω , Ω , concentration in $\text{eq/l} \times 10^4$ and comments on the data.

Section F of "Quaternary Ammonium Salts and Amines in Single Solvents" contains data on the quaternary ammonium salts, their melting points, decomposition temperatures and densities as well as the X-ray crystal data, but its relevance is not immediately apparent.

Chapter 5 contains a listing of measured densities of solutes in solvents, at a variety of temperatures when these measurements have been made. Chapter 6 contains similar data on viscosity, and chapter 7 on transference numbers. Chapter 8 is called additional references and data sources, and is rather a rag-bag of information.

The book is extremely useful as a bibliography, but the coverage of properties is relatively restricted, and there is no discussion of the accuracy or reliability of the measurements. Readers will have to turn to the original papers for this. I welcome having the book on my shelves, but I should hate to have to try to justify buying it for a chemistry library when money is tight and there are so many more urgent calls on resources. T. C. WADDINGTON