

BOOK REVIEWS

Radiochemistry, Vol. 3. *Specialist Periodical Report of the Chemical Society, London, 1976.* Edited by G. W. A. Newton; viii + 141 pages.

The series "Specialist Periodical Reports" provide systematic and comprehensive review coverage of the progress in the major areas of chemical research. Volume 3 of the Radiochemistry series covers the literature from 1973 to late 1975 or early 1976.

The general design of this volume is different from the previous two in that it is concerned entirely with some of the applications of radioisotopes. The book is divided in four chapters and the subjects have been reviewed by four experts; Senior Reporter is G. W. A. Newton, Department of Chemistry, University of Manchester.

Chapter 1 considers the industrial applications of radioisotopes. It provides definitions of chemical and physical tracers and descriptions of their uses to solve industrial problems. For the same reason, the techniques of sealed-sources and the analytical applications of radiometric instruments are also described.

Chapter 2 considers the activation analysis in archaeology. The author hopes to attract the attention of more physical scientists to the broader field of archaeometry. To this end, he discusses nuclear activation, making specific reference to problems encountered in archaeological studies, then the crucial question of data-handling and finally some actual results taken from studies of archaeological materials of different types.

Chapter 3 considers the preparation of radiopharmaceuticals and labelled compounds using short-lived radionuclides. This subject has never been reviewed in the purely chemical literature before. The author deals with the various advantages of short-lived radionuclides over longer lived ones in the investigation of human diseases and reviews the general principles of the preparation of radiopharmaceuticals.

Chapter 4 describes the sample preparation procedures for liquid scintillation counting. Liquid scintillation counting has been used in many fields and the author, besides the biomedical and inorganic applications, considers also new and unusual applications in pharmacology, marine biology, petroleum industry, etc. Similarly to the preceding volumes, tables and formulae are clearly illustrated and properly inserted in the text. The bibliography is wide and well selected, and an author index is of great help to the reader.

Considering the continuous increase in the number of publications concerning radiochemistry, also this

volume is certainly a precious tool to the researcher, as the editor intended.

L. MAGON and G. L. ZUCCHINI
Università di Ferrara, Italy

Inorganic Chemistry of the Main Group Elements, Volume 4. *Specialist Periodical Report of The Chemical Society, London, 1977, XI + 454 pages.*

The review covers adequately the literature on the subject that has appeared between October 1974 and September 1975. All the reporters belong to the University of Nottingham, Senior Reporter is Professor Addison. Each of the eight chapters is concerned with one of the main groups of the Periodic Table, from the alkali metal to the noble gases, the chapter on halogens including those aspects of hydrogen chemistry not covered in the remaining part of the volume.

The problem of overlap with other Reports, e.g. with that on Organometallic Chemistry, is solved by making sufficient mention of the most relevant results which belong to more than one field. The table of contents is detailed enough to allow the reader to have immediate access to the subject of his interest.

Obviously, much of the available space is taken by the compounds of boron and of the Group IV and V elements (62, 113 and 84 pages, respectively); nevertheless, the most important results concerning the other elements are adequately described.

In short, a useful and valuable addition to a well established series.

FLAVIO BONATI
University of Camerino, Italy

Critical Survey of Stability Constants of EDTA Complexes, Edited by G. Anderegg, published by Pergamon Press, Oxford, 1977. Price \$ 7.00; flexicover; ISBN 0-08-022009-6.

This slim volume of 42 pp is the first to appear in a series planned by the IUPAC commission on equilibrium data. Other volumes in preparation include ones on amines, amino acids and polypeptides and carboxylic acids. Therefore, this volume is to be viewed as part of a more extensive exercise, the object of which is to provide a simple and clear statement of the most reliable values of metal–ligand stability constants. To this end a 'recommended' (R) or 'tentative' (T) value is given for the complexes of each metal. Ultimately it is likely that IUPAC will sponsor the publication of a booklet containing only the R

and T values for use by those who merely need an appropriate value without wanting to know the reasons behind the recommendation.

The editor is to be congratulated on his critical assessment of data from such divergent sources as e.m.f., polarographic, spectrophotometric and solvent extraction methods. Of particular worth are the estimates of true uncertainty in a value. These quantities are found by reference to multiple determinations of the same value, the scatter amongst which is usually much larger than the standard deviations of individual determinations. For each metal the values given are for metal-EDTA complexes in various states of protonation. Values are not given for mixed complexes. Literature cover includes 1975, with two references from 1976.

The values discussed are the logarithms of the complex association constants and the pK's relative to the acid dissociation constant. This reviewer found the juxtaposition of the two types of constant confusing. On a more pedantic note, neither logK nor pK are defined in the introduction, and nowhere are actual units of concentration discussed. In presenting logK values certain assumptions are being made concerning standard states which make it possible to view the equilibrium constants as dimensionless quantities. These assumptions should have been stated.

A brief supplement gives lists of enthalpies of reaction of EDTA with metal ions obtained by direct calorimetric measurements. Incredibly these values are given in kcal/mol in this IUPAC publication!

In assembling recommended values in this compact form the editor has performed a very valuable service. Understandably no attempt has been made to rationalize values, as this would have extended the work enormously. Nevertheless it is tantalizing that no structural information is given, such as the quinquidentate nature of the ligand in $[\text{Cr}^{\text{III}}\text{L}(\text{H}_2\text{O})]$ or the heptacoordinate nature of the complex $[\text{Fe}^{\text{III}}\text{L}(\text{H}_2\text{O})]$, since knowledge of this sort is essential to understanding of the equilibrium data. This is particularly true of deprotonation reactions where the proton may be lost in some circumstances from the coordinated water molecule rather than from the EDTA.

P. GANS
The University of Leeds,
U.K.

Hazards in the Chemical Laboratory, 2nd Edition; edited by D. G. Muir, published by The Chemical Society, Burlington House, London W1V 0BN, 1977; Clothbound, 480 pages; price £ 8.00 (US\$ 14.00).

If the aim of this book is to provide adequate and exhaustive information in order to improve safety

in laboratories — considering the potential perils of any chemical — such aim, no doubt, has been fulfilled. In fact only information and practical advice can bring about a reduction of hazards allowing the choice of the best policy, since, as S. G. Luxon rightly points out, “every human being, and chemists are no exception, tends towards the view that although an accident may happen to another, it will never happen to him personally because he is too wise and knowledgeable”.

This volume was first published in 1971 under the same title but in this second edition the former text has been rewritten in the light of new outcome and legislative changes and enriched by the addition of four new chapters. The subject matter is then divided into the ten following chapters: Introduction (S.G. Luxon), Health and Safety at Work *etc.* 1974 (P. F. Corbett), Planning for Safety (J. S. Beard, E. N. Dodd), Fire Protection (G. C. Ackroyd, M. Sheldom, H. D. Taylor), Reactive Chemical Hazards (L. Bretherick), Chemical Hazards and Toxicology (L. Magos), Medical Services and First Aid (J. M. L. Gilks), Hazardous Chemicals (G. D. Muir), Safety in Hospital Biochemistry Laboratories (D. W. Neill, J. Russel Daggart), Precautions against Radiations (S. B. Osborn).

The yellow section, now renamed *Hazardous Chemicals* and expanded to over 325 pages (approximately 67% of the whole book), deals with the properties and effects upon the human body of 460 flammable, explosive, corrosive and toxic substances or groups of substances used in laboratories. In case of emergency alphabetical listing allows a rapid consultation of this coloured section which contains detailed information about properties, toxic effects, first aid treatments, together with injunctions and cautionary instructions about fire hazards, spillage disposal procedures and hazardous reactions.

This handbook and its references can be extremely useful for chemists and research workers and can also answer educational purposes by providing first-hand experience in handling dangerous materials.

The text is clearly and accurately written but perhaps a larger number of drawings of safety devices would have been commendable as much as the avoidance of the use of English measures in chapter 4. The clothbound format is practical and the types functional.

In my opinion, *Hazards in the Chemical Laboratory* belongs to the category of books which ought to be within reach in every chemical laboratory as it enables workers to decide by themselves what they must do to safeguard their health.

SANDRO CALOGERO
Laboratorio di Chimica e Tecnologia
dei Radioelementi del C.N.R.,
Padua, Italy