

NEWS

Book reviews

Organic electrochemistry: An introduction and a guide

M. M. Baizer and H. Lund (Eds.) Marcel Dekker, New York, 1983
1166 pp. \$170 ISBN 0-8247-6855-8

The first edition of 'Organic Electrochemistry: An introduction and a guide' published in the early 1970s was *the* authoritative text on the subject. It did much to promote the growth of the subject in the last decade. In laboratories, the initial cry of 'Where is Baizer?' a reference to the high vapour pressure of the volume in communities of organic electrochemists has given way to a second cry of 'When is the next edition of Baizer coming out?'. Now the joint editors, Professors Baizer and Lund, have supervised the production of a next text with the help of over 20 experts.

The overall impact is of the production of *the* authoritative text for the 1980s. Inevitably, there is a considerable variation in treatment from chapter to chapter. In general, the claim that 'The literature has been monitored through 1982' is wildly optimistic. Most chapters have few references from the 1980s and the booby prize goes to the chapter for which the most recent citation is 1971. This chapter closes with 'This subject is at present in the early stages of exploration'. One wonders what happened in the next 10 years. This is a chapter which has not been

However, this is a minor blemish. The absence of the odd recent reference in no way detracts from the two most valuable features in this text. The first is the clarity of organization and exposition which make the text the recommended entry point for the novice to the world of organic electrochemistry. The second is the comprehensive coverage of the whole subject which ensures that the practising electrochemist will profit from having this text constantly to hand.

Chapter headings have been retained from the first edition. A new chapter describes anodic flourinations. The retention of the format of the first edition is testimony to the favourable reception of that edition and a likely indicator of the success of this second edition. The text is clearly

produced with few errors. It deserves a place in all laboratories concerned even peripherally with organic electrochemistry. A debt of gratitude is due to those who have produced so effectively another major piece of scholarship.

Electro-organic chemistry as a new tool in organic synthesis

T. Shono, Springer Verlag, Berlin, 1984
171 pp. DM 128, ISBN 3-540-13070-5

This is the second book on organic electrochemistry to be reviewed this month. It is very much shorter than the one by Baizer and Lund and the author, Professor Shono, seeks only to make the case for electrolysis as a routine method in the laboratory for organic synthesis. The book is therefore essentially a survey of the many types of electrode reactions with examples, many taken from the author's own work, of the ways in which an electrolysis may, which advantage, be fitted into synthetic schemes. There is a strong emphasis on yields and mechanism is only discussed to the extent that it is necessary to rationalize the synthetic results; often little account is taken of evidence taken from other studies, e.g. cyclic voltametry.

I found the presentation to be somewhat uncritical. I felt the advantages and difficulties of the electrochemical approach to organic synthesis could have been discussed in greater depth and that advice as to the selection of solvents, electrode materials, etc. could have been clearer. The text would have benefitted from stronger editing of the English but the book remains easy to read as the essential message is conveyed by chemical equations and many well organized tables.

D. PLETCHER
University of Southampton

Elements de genie electrochimique

François Coeuret and Alain Storck, Lavoisier Tec Doc, Paris, 1984
402 pp., ISBN 2-85206-243-7

This book is certainly the first of its kind in the

French language and, moreover, it represents a significant contribution to the general literature in electrochemical engineering. The book covers a wide range of subject matter fundamental to engineering application and design in electrochemistry. Chapter topics cover electrochemical thermodynamics and kinetics, transport in electrolytes, hydrodynamics and mass transfer, potential and current distribution, electrochemical reactor concepts, porous electrodes and, finally, new electrochemical cell concepts. The book ends with some illustrative numerical examples.

Readers will find this book akin in nature to John Newman's 'Electrochemical Systems' and David Pickett's 'Electrochemical Reactor Design' but its emphasis distinguishes it from both of these important earlier volume and it does, of course, have the advantage of being more up-to-date in many of its literature references. The authors are to be congratulated on producing a book of considerable importance which presents methods and resources for the sound rational analysis and design of practical electrochemical systems.

This volume will prove useful in advanced courses in Electrochemistry and Chemical Engineering and will be a valuable tool for research and development workers in fields where the interface between electrochemical science and engineering design is of special importance. An English translation of this text would be welcome.

A. A. WRAGG
University of Exeter

Laboratory techniques in electroanalytical chemistry

P. T. Kissinger and W. R. Heineman, (Eds.) Marcel Dekker, New York, 1984
751 pp. SF104—, ISBN 0-8274-1864-X

The editors of this book have set out to provide aid to those starting laboratory work in electrochemistry. There is little doubt that they have succeeded and, moreover, the text will be read with benefit by many already in the field. The book has an unusual uniformity of style and approach for a multi-author text and is always stimulating, authoritative and easy to read. It is a pity it has not avoided the other disease of multi-author texts – on the evidence of the references, several of the chapters were written a number of years ago.

The twenty four chapters cover basic concepts, techniques, instrumentation, the design of cells and choice of electrodes, solvents, etc., digital simulation and the applications of electrochemistry in both analysis and mechanistic chemistry. The fundamental chapters are clearly written and show an inventive approach to the presentation of concepts; I sometimes, however, found the selection of material difficult to understand and the dismissal of unwanted themes almost cavalier. The heart of the book is undoubtedly the chapters relating to practical matters and those on instrumentation, electrode materials, solvents and cells will surely be widely consulted and recommended to others. The chapters reviewing mechanistic studies and analytical application are also of a high standard and benefit greatly from the examples and practical detail which they contain.

For the outsider, it is often difficult to discern the unifying theme within the mixture of analysis, mechanism, anhydrous solvents and favoured techniques which in American academic circles is known as 'Electroanalytical Chemistry'. This book is clearly a flagship for this area of endeavour but those of us who are outsiders can still appreciate the good qualities and dip into those chapters of interest to us. The book also has American biases which are more disappointing. The IUPAC convention on signs and symbols is not followed while references to the work of those inside the 'US Electroanalytical Club' greatly outnumber those who work elsewhere (for example, the section on cyclic voltametry contains no references to the papers of Saveant!).

Ion exchange membranes

D. S. Flett (Ed.) Ellis Horwood Ltd, Chichester, 1983
210 pp. £19.50, ISBN 0-85312-640-2

and

Ion exchange technology

D. Naden and M. Streat, Ellis Horwood Ltd, Chichester, 1984
742 pp. £45, ISBN 0-85312-770-0

The past year has seen the publication of two books on ion exchange materials which contain

much information of interest to electrochemists. Both are, in fact, the proceedings of conferences organized by the Society of Chemical Industry and produced by the same Publishing House.

The first concentrates on ion exchange membranes and their applications in electrochemical technology. The thirteen chapters cover the physical chemistry of ion exchange membranes and their use as sensors and as separators in batteries and in cells for the manufacture of chlorine and caustic soda, other synthetic processes, effluent treatment, metal extraction and the separation of anions; two chapters discuss inorganic membranes which operate at high temperature. The book is particularly timely since it covers an exciting and rapidly developing field; membrane cells have suddenly become very much the technology for the future in the chlor-alkali industry, electrodialysis looks increasingly attractive and sensors for on-line and *in vivo* analysis are presently receiving much attention. All these developments result from the design and synthesis of new ion exchange materials and an increasing understanding of the relationship between structure and properties. The lectures discuss all these topics and the chapters are, on the whole, well written by distinguished workers in their fields. Moreover, the book is an unusually balanced account of a field for conference proceedings. My major criticism relates to the figures; several chapters would benefit from a substantial increase in the number of illustrations while in others the authors have forced their figures into too small a space (both symptoms of direct reproduction?). Despite this small criticism, the book is very highly recommended.

The second takes a much broader view of ion exchange materials and the seventy-five papers discuss the physical chemistry of ion exchange, developments in ion exchange materials, and the application of ion exchange resins for solution conditioning, for deionizing water for effluent treatment, in hydrometallurgy and in other fields, for example, catalysis. There are no papers on electrochemistry and hence the book is, inevitably, of less immediate relevance to electrochemists. Even so, many practising electrochemists will find it a useful source of current technology in a

D. PLETCHER
University of Southampton

Charge and field effects in biosystems

M. J. Allen and P. N. R. Usherwood (Eds.) Abacus Press, Tunbridge Wells, 1984

536 pp. £37.50, ISBN 0-85626-432-6

The monograph contains the majority of the papers given at the International Symposium on Bioelectrochemistry and Bioenergetics, held at the University of Nottingham in September 1983. The main aim of this conference was to cover fundamental aspects of bioelectrochemistry and bioenergetics, and therefore to bring together those directly involved in the rapid advances in this area with those peripherally interested in this rather new subject.

Bioelectrochemistry lies at the cross-roads of biochemistry, biophysics and electrochemistry and the objective of the organizing committee was to establish a broad spectrum dialogue between scientists who do not always speak the same language. The subject matter of the meeting was divided into the following categories:

- (a) Electron transport in biological systems, including solid state theoretical and experimental approaches to charge and energy transfer in biomass molecular and intact cellular systems
- (b) Ion and electron transport properties of biological and artificial systems
- (c) Photo-induced bioelectrochemical processes
- (d) Effects of electrochemical processes and magnetic fields on biological systems
- (e) Bioelectrochemical technology including biosensors and bioanalytical chemistry

Each section was composed of invited lectures with the purpose of reviewing knowledge in the field, of contributed lectures chosen to emphasize important topics, and of poster lectures which gave a good 'pin point' view of the latest progress in these fast moving areas.

The well-structured organization of this book makes it not only another 'run-of-the-mill' proceedings but gives a real comprehensive picture of the present state of bioelectrochemistry. It is particularly recommended for all electrochemists who wish to have an overview on this subject.

H. GERAULT
University of Southampton