

NEWS

## Book reviews

### Ullman's Encyclopedia of Industrial Chemistry 5th Edition (in English) Volume A9 (Dithiocarbamic acid to Ethanol)

653 pages, VCH Verlagsgesellschaft, Weinheim, Basel, Cambridge & N.Y., 1987 DM 465

This volume contains entries for: dithiocarbamic acid and derivatives (28 pages), diuretics (7 pages), drawing and writing materials (11 pages), dry cleaning (5 pages), drying oils (17 pages), dyes (51 pages), electroluminescent materials and devices (9 pages), electronic chemicals (31 pages), emulsions (43 pages), enzymes (89 pages), epoxides (15 pages), epoxy resins (17 pages), esters (21 pages) and ethanol (65 pages), in addition to those on electrochemical and chemical deposition (58 pages), and electrochemistry (71 pages).

The entry "Electrochemical and Chemical Deposition" (L. J. Durney, Durney Associates, N.J., USA) is written by a well-known industrial practitioner, who predictably concentrates on the practical aspects of his subject. After brief definitions of plating terminology and a section on sample preparation, he gives recipes for plating 19 metals and 7 alloys. This is followed by cursory coverage of non-electrolytic plating, chromating, oxide coatings, electrolytic oxidation of Al, Mg and Ti and finally testing of deposits. Except for a definition of the term, there is a disappointing omission of a present vogue — pulse plating.

Rather than rely on this source, a practitioner or novice is more likely to consult one of the authoritative manuals on electroplating, such as that by Lowenheim or that edited by Durney himself, which are among the 11 references.

A very different approach is taken by the West

German academic heavyweights F. Beck, H. Goldacker, G. Kreysa, H. Vogt & H. Wendt, in their entry "Electrochemistry" which is written in 4 chapters, supported by 332 references. This is a good overview of the subject of industrial electrochemistry, though the complementary topic of Electrochemical reactors will be covered in the B series of the encyclopedia.

"Electrochemistry" covers electrode kinetics, electrocatalysis, ionic conduction, fluid mechanics and mass transfer in the first chapter. There is a disappointingly short discussion of current density distributions in the second, though an excellent review of gas evolving electrodes. Chapter 3, on inorganic electrochemical processes, covers chloralkali, hypochlorite, chlorate, perchlorate, water electrolysis, peroxydisulphates, electrowinning (Al, Cu, Ni and Zn) and electrorefining (Pb), electrochemistry of nuclear fuel reprocessing (U, Pu,  $N_2H_5^+$ ), electrochemical wastewater treatment, and electrochemical shaping, Chapter 4 covers organic electrochemistry: thermodynamics and kinetics, product classes, functionalisation and functional group conversion, coupling, electrodes and cells, economic aspects.

For the price of this volume, only 20% of which is dedicated to electrochemical topics, a prospective purchaser requiring that information alone would be better advised to invest in a number of suitable text books, e.g. in the *Comprehensive Treatise on Electrochemistry* series. However, several of the non-electrochemical entries in this encyclopedia volume may be of interest, particularly to organic electrochemists.

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### Introduction to Corrosion Control

Edited by K. S. Rajagopalan  
169 pages, Colour Publications PVT Ltd., 126A Dhuruwadi, Dr. Nariman Road, Prabhadevi, Bombay 400 025, India

This monograph was presumably intended to give a very brief coverage of a very broad field, making useful reading for those who require such a quick review. The technical level is adequate for this purpose; the equivalent of about 12 pages are devoted to equations and the remaining text is well-written and easily understandable by the general scientific reader. The references are useful. There are occasional misprints and p. 70 was blank in my copy.

The average chapter length is about 13 pages and the book has 12 chapters, covering the following topics (albeit briefly in a 13 page chapter): brief introduction to types of corrosion, an interesting account of some corrosion failures, an introduction to metallography methods, Pourbaix & Evans diagrams, coatings, examples for corrosion protection, alloying and surface modification for corrosion protection, passivity and inhibition, cathodic protection, design for corrosion prevention, and economics of corrosion.

This book can be recommended only for those requiring a brief review of corrosion control.

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**Kinetics of Electrochemical Metal Dissolution**

L. Kiss

256 pages, Akadémiai Kiado, Budapest, Hungary &amp; Elsevier, Amsterdam, 1988, US \$97.5, Dfl. 200

The coverage of the subject area implied by this monograph's title is not exhaustive, being restricted to topics of interest to the author's research group in the last 20 years and excluding alloy dissolution and metal dissolution in molten salt and non-aqueous solvents. It is concerned mainly with active dissolution of metals in aqueous electrolytes, with some reference to their passivation (22 pages) and transpassive dissolution.

Its distinctive feature, the subject of much of chapter 2 (154 pages), is the steady-state kinetic analysis of consecutive and parallel multi-step electron transfer reactions involved in metal dissolution, a topic covered in few other texts and certainly not with the same thoroughness. The author shows how the rate constants and concentrations of intermediates may be derived from current/potential data and steady-state kinetic models, including the role of diffusion polarization and ligand complexation of metal ions in such multi-step reactions.

**Biophysical Chemistry of Membrane Functions**

A. Kotyk, K. Janáček and J. Koryta

J. Wiley &amp; Sons, Chichester, England (£45)

This book describes the chemistry of membranes and considers those aspects of biology where the latter can be considered important. That might seem like a mammoth task since it is hard to think of a biological function that does not involve either the membrane itself or some component thereof. The authors are to be congratulated for both seeing the need for such a book and, to a large extent, being successful in their treatment of the products of the many disciplines which contribute.

The book begins with a chapter on the "Membrane Principle of Cell Organization" which provides the reader with a nice, easy introduction to the wide-ranging aspects of cellular biology which are relevant. At this stage, I did not miss individual references. However, in the next chapter, on membrane structure, although there were general references given, from time-to-time this reader yearned for access to a more detailed treatment. This chapter was, perhaps perforce, something of a catalogue: some of the information given in the tables, for example, that of "The Fatty Acid Composition of Selected Membranes" was superfluous. One very interesting section concerned the mobility of membrane proteins. I have no doubt that some readers will find the next chapter, on "Membranes as Mediators of Flow of Matter", interesting but, though one recognises that the material being considered and the method of treatment, are important, it was with relief that one managed to get on to the next topic, "Membranes as Convertors of Energy". This chapter which was mainly, but not

However, much of the supporting material, e.g. chapter 1 (28 pages), covering the thermodynamics of metal/aqueous electrolyte equilibria and potential-pH diagrams for Zn-H<sub>2</sub>O and Fe-H<sub>2</sub>O systems, and the treatment of rotating disc and ring-disc electrodes in chapter 2, is available in many other texts.

Chapter 3 (48 pages) covers spontaneous electrochemical reactions involving metals, as in corrosion, but again allowing for multi-step electron transfer reactions.

Although the book is a revised and enlarged version of the original Hungarian publication, few of the extensive number of references at the end of each sub-chapter have post-1980 dates. The quality of the printing of the text and diagrams is poor, particularly considering the book's price. However, for those electrochemists involved with metal dissolution processes, the book will be a valuable addition to the literature of a subject which undoubtedly has many technologically important applications.

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solely, concerned with the photosynthetic apparatus and with the mitochondrion, was full of invaluable information and to a large extent, usefully presented. The absence of detailed references was sorely missed at this stage. How the authors could not reference the marvellous work of Deisenhofer, Huber, Michel and co-workers on the X-ray diffraction study of the photosynthetic reaction centre of *Rhodospseudomonas viridis*, for which the Nobel Prize was awarded last year, defies the imagination. The whole way through this chapter, this lack of the easy availability of additional information was frustrating. Having said that, let me emphasise that the authors have done a very good job in conveying the interest and, indeed, excitement there is in the subject. Obviously, there are instances where one disagrees with the authors, e.g., the nature of the copper electron transfer site in cytochrome oxidase and that of the manganese in photosystem II, but, considering the large amount of background material that the authors had to cover, they can be pleased with the outcome. The final chapter on the "Processing of Information in Membranes" was, in the most part, new to me and I found it interesting. Even the final section on signalling in the immune system was thought-provoking.

Most readers will not, I am sure, read this book from cover-to-cover. They will find that their interest is, like mine, more engaged by one chapter as compared to another. Having said that, it would be frequently referred to and, with the sole disadvantage of the lack of specific references, many scientists would benefit from the stimulation provided by the different subjects described.

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