NEWS

Book review

Laboratory techniques in electroanalytical chemistry
(2nd edn, revised and expanded)
Edited by P. T. Kissinger and W. R. Heineman
Marcel Dekker, New York (1996), 986 pp

The editors are commended for this new edition with the remark: 'at last [here is] a text which demonstrates the usefulness of electroanalytical techniques without submerging the reader (practitioners and users) in a quagmire of mathematics ...' D. C. Johnson.

Kissinger and Heineman have co-authored the theoretical chapters (Chs. 2, 3 and 4) and Kissinger has provided instrumental chapters (Chs. 5 and 6) including 'Electrochemical Detection in Liquid Chromatography and Capillary Electrophoresis' (Ch. 27). Additional to the contributions of the editors, some 42 other authors have prepared 22 chapters, beginning with 'Electrochemical Cells' (Ch. 9). There are five contributions on electrodes (Chs. 10–14) and 'Solvent and Supporting Electrolytes' (ch. 15), which continue through applications: 'Electrochemical Studies at Reduced Temperatures' (Ch. 16), 'Electrochemistry in Molten Salts' (Ch. 17), 'Vacuum-Line Techniques' (Ch. 18), 'Electrochemistry in the Dry Box' (Ch. 19), 'Electrochemical Preconcentration' (Ch. 24), 'Photonic Electrochemistry' (Ch. 28), 'Principles and Techniques of Electrochemical-Electron Paramagnetic Resonance Experiments' (Ch. 29), and organic electrochemistry: 'Evaluations of Organic Reactions' (Ch. 21), 'Electroorganic Synthesis' (Ch. 22), 'Electrochemistry in Pharmaceutical Analysis' (Ch. 26). Chapter 7 deals with the problems to overcome resistance in potentiostatic circuits, chapter 23 discusses instructional examples of electrode mechanisms of transition metal complexes. Different authors focus on 'Digital Simulation of Electrochemical Problems' (Ch. 20), 'Conductivity and Conductometry' (Ch. 8) and 'Controlled-Current Coulometry' (Ch. 25).

The revision and expansion for this edition are in terms of: (i) the size (over 200 pp more than the first edition) and hence the scope is greater; (ii) on updating of the original chapters with a substantial addition of recent literature to 1994; and (iii) new or rewritten chapters (*viz.* chapters 10–13, 16, 17, 22 and 27 on the subjects of carbon electrodes, film electrodes, microelectrodes, chemically modified electrodes, electrochemical studies at reduced temperatures, vacuum-line techniques, electroorganic synthesis and electrochemical detection in liquid chromatography and capillary electrophoresis, respectively). The theoretical chapters are a valuable resource for the expert. However, they are often too detailed for the novice and may fuel the natural aversion of some chemists towards electrochemistry.

The Classical Heyrovski d.c. polarography and the work of Peter Zuman, as well as the fundamental contribution of G. C. Barker in UK to make moderate polarography and voltammetry vital in terms of sensitivity a competitive technology by introducing pulse techniques (square wave and pulse polarography/voltammetry), in the mid–late 1950s and later the work of the Osteryoungs in the USA, deserve more attention. Barker proposed anodic stripping techniques, opening the route to ultratrace analysis down to 10^{-9}–10^{-10} M and less. Pulse polarography and voltammetry in their diverse applications are the battle horses of the modern electroanalytical research, control and industrial laboratory. The spirit of this publication is, as stated by the editors in their preface to the second edition, not exhaustive; also, only key references to the most critical information are cited.

The subjects of adsorption polarography or voltammetric immuno-assay (VIA) are not mentioned. Tensammetry, when correctly used, has proven to be a simple, very powerful tool for the assay of nonreducible/nonoxidizable, surface-active compounds (surfactants). This technique, however, is dismissed in a single page.

Practitioners will be interested in chapters 10 to 16 because of the multitude of very useful practical information which is assembled in a concise and comprehensive way, seldom found in modern books. Chapter 22, by Steckhan, presents a balanced, comprehensive survey of the state of the art of electroorganic synthesis up to the early 1990s.

Worthy of notice is the attention played by different authors to (ultra) microelectrodes (UMEs) (cf. Ch. 12) and their application. It is foreseeable that the UMEs will play the same important role in the practical laboratory as the electrochemical detection in HPLC and FIA, is today. The referee therefore regrets that no special chapter is devoted to the applications of UMEs from ultratrace to technical concentrations or in the speciation field.

This well-bound and printed text is remarkably free of errors. Accolades from the first edition, namely, that it is 'an excellent and comprehensive survey...' which will prove a very valuable tool for professionals in many different fields involved in advanced electroanalytical chemistry and thus 'should be found on the book-shelf of every electrochemist' are equally valid for this edition.

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