

NEWS

Book reviews**Modern chlor-alkali technology – Volume 2**

C. Jackson (Ed.) Society for Chemical Industry/
Ellis Horwood Ltd, Chichester, 1983
390 pp., £35, ISBN 0-85312-525-2

The twenty four chapters of this book cover the lectures presented at the Third International Chlorine Symposium held in London during June 1982. As is to be expected, the presentations covered diverse aspects of the chlor-alkali industry including cell components (membranes, diaphragm materials, catalytic electrodes), cell design and construction, chlorate manufacture, the impact of increased energy costs, business prospects and safety.

Although only three years have passed since the publication of Volume 1 of this series covering the 1979 symposium, the books show clearly fundamental changes in the attitudes of the chlorine industry. Firstly, the papers of the 1982 Symposium show, with much more clarity, the impact of rising electricity costs during the last decade. Also, speakers were, obviously, more aware of the industry's failure to maintain its earlier rate of growth; indeed, this should be no surprise since the meeting coincided with a minimum in cell room operating rate (in the USA the average rate was only 65% of installed capacity). More positively, the period 1979-82 had seen a substantial shift towards general acceptance of membrane cell technology. It was universally agreed that for new installations and for conversions of existing cell rooms, membrane cells were the likely choice of technology because they combine low energy consumption, high product purity and freedom from known environmental hazards. Several companies described membrane cell plants.

The book suffers from many of the problems associated with conference proceedings. Several chapters were seemingly prepared without thought given to the contents of other chapters. More irritating are those chapters which read as advertising leaflets and, moreover, not the type of leaflets likely to lead to sales to a sophisticated, science based industry! Certainly there is considerable overlap between chapters and some presentations would have benefited from a more precise, scientific approach.

Even so, this reviewer recommends this book strongly to all serious students of electrochemical technology. Overall, it summarizes the present status and attitudes of a large and successful industry totally dependent on electrolysis. The book does something else very well: it demonstrates, in a practical way, the thought and attention to detail which is necessary to the design of a complete cell system. Moreover, it shows man's ability, even in a large and long established industry, to overcome rapidly problems arising from changes in circumstances (e.g. the cost of energy, environmental factors and the availability of new materials). Examples in this book would include the rapid improvement in ion exchange membrane materials and the success in changing cell designs to reduce energy consumption.

Conference proceeding books have received much criticism of late but I hope this series will continue; they represent good additions to our bookshelves.

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Ion-selective electrodes, Second edition

Jiri Koryta and Karel Stulik, Cambridge University Press, Cambridge, 1983
217 pp., £25, ISBN 0-521-23873-0

This substantially revised and updated version of Koryta's original provides a generally thorough account of both theoretical and practical aspects of ion-selective electrodes (ISEs). Much as in the first edition, the authors commence with a brief historical introduction to membrane potential phenomena and their application in analytical chemistry, proceeding to give an account of the theory of membrane potentials in general and ion-selective electrodes in particular. This is followed by a consideration of the practical aspects of the use of ISEs. Topics covered include their construction, calibration, selectivity and response time, and experimental techniques for their use are described. New sections describing more recent developments in the field of microelectrodes and ion-selective field effect transistors are also included.

Next, real electrode systems, based on both conventional glass membranes and liquid membranes incorporating ion-exchangers and ionophores are considered. The five page chapter on potentiometric biosensors which follows is disappointingly brief and the meagre treatment given to composite systems in general, both gas sensors and enzyme electrodes, fails to do justice to this important aspect of the subject. The authors conclude with a completely new chapter reviewing the comparatively recent development of voltammetry at the interface between two immiscible electrolyte solutions.

On the whole the book provides a comprehensive and up to date account of ion-selective electrodes, from theory to practice, and is to be recommended to both students and practitioners, in the field of analytical chemistry, alike.

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Power sources – Volume 9

J. Thompson (Ed.) Academic Press, London 1983
592 pp., £60.00/\$99.50 ISBN 0-12-689160-5

As a young industrial electrochemist of the mid 1950s, the earliest Joint Services Symposium which I remember was held at Christchurch and I wondered on that occasion what good would come from this rather strange conference. And rather strange it did seem to the young scientist for in those days scientific conferences were as much for the impressing of one's fellow scientists with how 'academic' one could be as for anything else and 'pure' science was the general order of the day. Now technology is academically OK; indeed today it may be even more than that. The JSEPSC biennial conference was ahead of its time for the technology of batteries was its unashamed subject. Technology it had to be for the battery electrochemistry has got just about the worst of all possible systems to deal with. The proceedings of these conferences have pointed a way forward for the industry; have emphasized the growing and shrinking areas of the developing technology; and foreshadowed the hopes and aspirations for the future. This last volume of the conference proceedings (for 1982) follows the established pattern. Thirty-seven papers from the major battery research and development centres of the world constitute the proceedings.

The largest group of these papers is dedicated to the lithium systems which are becoming increasingly important in contemporary battery technology. This group of eleven papers is representative of the whole field; notable ones deal with rechargeable lithium systems and the propulsion of miniature aircraft for covert operational use using high energy density lithium systems.

The lead acid battery industry has also contributed nine interesting papers which again reflect the advancing front of technology. The reader is left in no doubt that fully-sealed units of high specific energy are now readily achievable. However, it is interesting to note that the classical tubular positive electrode is still considered sufficiently important to warrant the first paper of the Conference Proceedings.

There are a few papers concerned with the zinc electrode in alkali. However, one paper from this group is devoted to the silver oxide electrode and one deals with separators for this cell. This underlines the search for new methods to operate with the zinc electrode commercially, that is, in addition to the primary applications.

Only one paper contains the words 'fuel cell' in the title and this reflects the disenchantment of the industry with the fuel cell concept. The amount of research in this area has been severely restricted although it is clear that 'spin-off' applications such as a paper devoted to the storage of hydrogen using the silver-hydrogen system still continue to benefit from the technique established during what might be called the 'fuel-cell dream' period. A final paper describes the only thermal battery contribution.

It would not be appropriate to mention separate authors since all have achieved the customary high standard of excellence and clarity which is the hallmark of these Conference Proceedings. This is in no small measure due to the editorial control of Dr Jim Thompson and his excellent committee which must surely be the most experienced of any in the World. Over the years this committee have produced a run of Proceedings now under the general heading *Power Sources* which occupy a position unique in their usefulness to the battery technologist. This present Volume 9 is no exception.

The book is well produced and free from misprints.

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