

'Industrial Electrochemical Processes'

Ed. A. T. Kuhn, xxiv+632 pp., 56 tables, 144 illus., Elsevier, Amsterdam, 1971, Dfl. 165.00 (c. \$45.75)

This is a book that is packed with information and shows just how widely electrochemistry is used in industry. It has been written by a group of reputable authors, selected as experts in the various aspects of the subject.

The book opens with a short foreword, by the Editor, which is both readable and worthy of attention. In it, he comments on such things as the reluctance of some industries to divulge information, on the use of consultants and on this country's fuel policy. Of particular importance in the context of electrochemistry is his suggestion that equipment development deserves greater attention from chemical engineers. This need is highlighted by the fact that, in a book of 620 pages of text, only 6 are devoted to a chapter on cell design. Inevitably in a publication to which eighteen authors have contributed there is some lack of balance and some chapters are better than others. On the whole, though, with the exception of the last two chapters, the book deals thoroughly with its subject matter.

The two opening chapters are concerned with fluorine production and fluorination. These seem too long by comparison with the next chapter on the chlor-alkali industry which should surely receive greater prominence. The use of footnotes throughout these 'fluorine' chapters is rather distracting and a sketch, or other illustration, of the Simons cell might have been some help. The chapter on the chlor-alkali industry could have been dealt with in greater detail in view of the size of the industry; in places, by giving a lot of controversial and contradictory data, the chapter becomes misleading—such as the discussions on the reversible voltage for HCl electrolysis (p. 90). In this chapter perchlorates and hypochlorates are dismissed briefly.

The following two chapters on water electrolysis and heavy water manufacture present a balanced picture of their topics. After this, there are five chapters (246 pages) devoted to various metallurgical applications—metal winning, re-

fining, machining, finishing and forming. These chapters all cover fields where electrochemistry is industrially very important, and manage to do so well; they are probably the best sections in the book.

The chapter on electrodeposition of paint relies heavily on patents as references, which is perhaps a measure of the absence of a great deal of scientific literature on this topic. The chapter is certainly a useful addition to this literature, dealing as it does with the subject on a broad basis. Since the authors come from an important commercial paint organization, one assumes that their selection of the patent literature references is relevant to commercial usage.

The chapter on electrodialysis is well illustrated and presents a readable description, both of some simple theory and of the technology of water desalination by this process. It seems a pity that the information on costs is rather brief and seems to lead the reader into expecting a rather more detailed discussion than actually appears. It is of course understandable that full costing information cannot be revealed.

The chapter on miscellaneous industrial processes is rather disappointing, because it does tend to show that if one excludes the metallurgical applications, the chlorine-caustic industry and water electrolysis there remains little industrial electrochemistry. For those interested in organic processes there are barely six pages, in a book one hundred times as long. While this is an indication that organic electrochemistry is not yet an industrial process, the authors of this chapter could perhaps have spread themselves a little and tried to indicate some future possibilities worth seeking. After all, there is a mass of literature on the behaviour of organic compounds in polarography.

Next, there are two workmanlike chapters concerned with electrodes, diaphragms, and electrolytes, but after this, the book seems to give up. The chapter on cell design seems to miss a real opportunity by assuming that a student of this aspect of the subject will search through the other chapters to get details of various sorts of cell that have been proposed or used. The

chapter could have made a much more positive contribution to the technology by drawing together aspects of cell design from the various industries represented. It could also have given some greater emphasis to recent developments in cell design, arising partly from fuel cell technology, and to some extent from the use of particulate electrodes. Likewise, the last chapter, which purports to be an International Survey of Industrial Electrochemical Processes, directs the reader either to other chapters, or to references that are not quoted from. There seems little point, in a book of this sort, in listing every chlorine plant in India, giving its location, type of cell and capacity, when no similar information is given about much more important chlorine manufacturing countries. The chapter could have been made useful by presenting information from different countries and for different processes in a consistent and comparable whole. As given in the book, it appears as an undigested collection of odd scraps of information.

The Index is most important in a book covering so many differing topics. On the whole this one seems only adequate and is not as full as it should be to make the book really useful. There are some annoying aspects in this Index, as when it refers from one entry to another without giving the page numbers. For instance, against the

entry 'Bags for anodes' the Index has 'See Anodes, bagged'; it would have been quite simple to add the five relevant page numbers. Again, in looking for 'anti-knocks' or 'lead tetra-alkyls' or 'tetra ethyl lead' the reader is directed to 'Acker process', before he finds the relevant page numbers; of these three numbers, the first refers to the Acker process for making sodium, while the second refers to the Nalco process for making tetra alkyl lead and the third to the Szechtmann (Philblack) process to make sodium-lead alloys. These comments arise from a few brief attempts to use the Index.

In conclusion, it is perhaps worth asking why the book has been written. The Editor is to be congratulated in assembling so much valuable material, but it is pertinent to ask what the market for the total collection really is. How many of the people who need to know about Electrochemical Machining really want to know also about the chlorine-caustic industry? It is perhaps characteristic of electrochemists to consider their subject as a whole, but one wonders whether it would not have been more useful to have produced two, or possible three, smaller books, in total at a higher price, but individually cheaper than this one.

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