

Book Reviews

Power Sources 7

Edited by J. Thompson, published by Academic Press, London, 1979, 774 pp., £65.00 or \$134.50.

The previous volumes of the Power Sources series (Proceedings of the International Power Sources Symposia held every other year at Brighton), edited by D. H. Collins, have become widely known among specialists in chemical cells and batteries of many countries. The present volume is devoted to the 11th Symposium held in September, 1980. It carries on the established traditions in a creditable manner.

The volume contains 49 papers presented at the Symposium as well as the discussions. Nearly all communications deal with chemical power sources — primary cells, storage cells, and fuel cells. Only one paper (No 27) treats the problem of the conversion of solar energy into electrical energy using photovoltaic cells.

Numerous different systems of chemical power sources, both conventional and new versions, are considered. A relatively large number of papers dealing with "old" systems (lead and alkaline storage batteries, Leclanché cells) indicates that these systems will continue to be used for a fairly long time in spite of intensive efforts directed towards developing new systems. Among the papers on lead batteries, it might be well to point out the results of morphological studies on the PbO_2 electrode (No 1) and the paper on a new alloy for the electrode grids of maintenance-free batteries in which many of the disadvantages of the lead-calcium alloys are absent (No 5). Among the communications on alkaline storage cells, particularly noteworthy is the paper on the iron electrode for a nickel-iron cell (No 20). As regards new power sources, consideration is given to zinc-bromine batteries, silver-hydrogen storage cells, aluminium-air cells and many others.

Besides the papers describing specific features of particular systems of power sources, the volume contains some papers of more general interest. Communication No 2 treats the electrolyte conductivity in the electrode pores of a lead storage battery and its influence on the characteristics. The same problems arise for other batteries. The possible appearance of fatigue phenomena in sintered electrodes of alkaline batteries, pointed out in paper No 7, may start similar studies for other electrodes. The same holds true for the influence of wetting phenomena on processing operations (No 8). In paper No 16 concerned with silver-hydrogen cells, major attention is given to water transfer through the membrane during operation. Such phenomena may be of importance also in other cell types. The analysis of the rates of separate self-discharge of components in primary alkaline cells and a theoret-

ical computation of their maximum possible shelf-life (No 39) should also be mentioned.

With every year, the number of techniques used in investigating cell processes increases. In particular, interesting results can be obtained by using the microcalorimetric method (Nos 35 and 40, discussion of 33). Of general importance also is the method for computer modelling of a system containing a large number of cells connected in parallel (No 46).

It should be noted that as a rule the discussions on the papers complement essentially their texts. In some cases the discussion is of independent interest. Thus, for example, the discussion of paper No 26 involves the problem of relative advantages of fuel cells with acid and alkaline electrolytes and the reasons for different approaches to this problem in the USA and in Europe.

On the whole, the volume under review gives a good idea of the main problems tackled at present by investigators of chemical power sources. It is of interest both for specialists engaged in developing power sources and for the users of these sources. The book is carefully edited and well printed.

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The Sun: Our Future Energy Source

by D. K. McDaniel, University of Oregon. Published by John Wiley & Sons, Inc., 1979, 265 pp., £ 13.00 (\$ 27.50), paperback £ 6.50.

This book originated from lecture notes for a one-quarter introductory course on solar energy taught by the author at the University of Oregon. It provides a broad background in scientific ideas and methods about what solar energy is and how it can be tapped.

The text is not directed to specialists on solar energy matters, but to individuals who wish to obtain a general but sufficiently deep knowledge on every question related to solar energy utilization.

To experts, the book is a good topic gatherer and, maybe, a guide to explain the subject to individuals not directly involved in the solar energy field. The book is readable and is divided into 11 chapters. At the end of every chapter, the author presents problems and multi-choice questions. This allows its utilization as a text-book for introductory courses on solar energy.

The first three chapters are not directly concerned with solar energy but they provide valuable information on the place of solar energy conversion in the present socio-economic world. Questions of energy growth