

Book Reviews

Photovoltaic and Photoelectrochemical Solar Energy Conversion

edited by F. Cardon, W. P. Gomes and W. Dekeyser; published by Plenum, New York, 1981; 422 pp.; price, U.S. \$49.50

The search for alternative forms of fuel has resulted in considerable interest in photovoltaic and photoelectrochemical solar energy conversion systems. This is one of the most rapidly developing fields of research and it has attracted scientists from many different disciplines. So far, work is at a preliminary stage and has not really reached the point of practical development, but several of the fundamental problems have been identified and solved. Although many different types of system have been tried, most involve light-induced charge separation, usually at an interface, and this is the common feature of this book.

The book arises from a series of lectures presented at a NATO Advanced Study Institute held at the end of 1981. Such is the nature of this field that much of the material is already out of date; fortunately, however, each lecture is sufficiently comprehensive to offset this problem. Each lecture is highly specialized, being contributed by an acknowledged expert in that subject, and serves as a very good introduction for new research workers.

Chapters on photoelectrochemical cells by Gerisher and Nozik are particularly relevant to solar energy storage devices. The first chapter concerns the principles of photoelectrochemical energy conversion and presents an excellent review of the field. The chapter by Nozik is concerned with photoelectrosynthetic cells, where two effective redox couples are present in the electrolyte and a net chemical change occurs on illumination. If the free-energy change of the net electrolyte reaction is positive, optical energy is converted into chemical energy and this subject, together with photocatalysis, is perhaps the most realistic approach for the construction of a practical outlet for solar energy research.

The iron-thionine photogalvanic cell is reviewed comprehensively by Albery but the description is general and could be applied to most thin layer photogalvanic devices. The chapter concentrates on kinetic arguments and much of the material presented is recent work from the author's laboratory.

In the chapter on charge separation and redox catalysis by Kalyanasundaram and Gratzel a detailed summary of the work that has appeared from Gratzel's laboratory over the past few years is presented. Although the majority of the work has already been published, it is useful to have all the material collected together and the reference section is immense.

Theoretical and experimental aspects of heterojunctions and semiconductor-metal Schottky barriers are reviewed in chapters by Townsend, by Loferski and by Bloss and Schock. All three chapters are comprehensive and they complement each other quite well. In particular, the consideration of solar energy conversion using tandem voltaic cells (by Loferski) makes very interesting reading. In the final chapter a theoretical treatment of recombination in solar cells is presented by Landsberg. Although well presented, it is difficult to follow.

Overall, the book is a very useful acquisition. It contains a wealth of information and reference data invaluable to research workers engaged in this field. Its real appeal is to specialist workers; it is not suitable for light reading, and as such its available market is rather limited.

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Specialist Periodical Reports: Photochemistry, Vol. 11

Senior Reporter, D. Bryce-Smith; published by the Royal Society of Chemistry, London, 1981; xxiv + 680 pp.; price, £70.00; ISBN 0-85186-095-8

Specialist Periodical Reports: Photochemistry, Vol. 12

Senior Reporter, D. Bryce-Smith; published by the Royal Society of Chemistry, London, 1982; xix + 587 pp.; price, £70.00; ISBN 0-85186-105-9

I have always been uneasy about the delay between the review period covered and the appearance of the *Specialist Periodical Reports: Photochemistry*. As a result, I had written in somewhat critical tones about the publication of Vol. 11, when Vol. 12 arrived on my desk. In the event, it seems fairer to review both volumes together. Volume 11, which was published in November 1981, covers the literature from July 1978 to June 1979, so that the material considered was from 28 to 40 months old. The following year's literature is reviewed in Vol. 12 (March 1982), so that we have moved 8 months nearer restoring "the original objective of publication within 1 year at the most following the end of the review period". Whatever the publication difficulties, the delays must give rise to some concern, since one of the more important functions of the Reports is to make readily accessible references to *recent* contributions in photochemical research. We are promised by the Senior Reporter that every effort will be made to publish Vol. 13 on time, which presumably means that we may expect to see it by the end of June 1982.

The format of the two volumes follows that of earlier Reports. The reader should not expect to find much in the way of descriptive or, more particularly, critical reviews. Rather, the Reports attempt to give a comprehensive survey of the published literature, with the citations being connected