BOOK REVIEWS

Selection of books for review is based on the editors' opinions regarding possible reader interest and on the availability of the book to the editors. Occasional selections may include books on topics somewhat peripheral to the subject matter ordinarily considered acceptable.

Direct Conversion of Nuclear Radiation Energy

Author	George H. Miley
Publisher	American Nuclear Society
Pages	518
Price	$34.90
Reviewer	Richard T. Schneider

Direct Conversion of Nuclear Radiation Energy is part of a series of monographs on nuclear science and technology, published by the American Nuclear Society. The objective of this series is to cover very specific areas of nuclear science and technology. This is exactly what this book does; it covers the *direct* conversion of nuclear energy into electricity only. The author states that he has plans for a second volume which would cover direct conversion of nuclear energy into light (nuclear pumped lasers and incoherent light). Although the book was written before the current science recession, it is written in a manner to fulfill an important function in the present day situation—namely, conserving accumulated knowledge in an easily accessible form for the future, when, hopefully, direct energy conversion (DEC) will be in demand again. Consequently, the book stresses basic principles in Chaps. 1 through 6 while only one chapter is devoted to specific applications.

Chapter 1 (Introduction) gives an overview of the field starting from basic physical principles and ending with a report on the status of cell development in simple terms. This chapter may even be useful to non-technical persons (e.g., journalist, consumer advocate) who may want to be informed on the subject.

Chapter 2, "Basic Concepts in Direct Collection," deals with the different geometries and configurations of direct collection cells and the problem germaine to geometry. Cell efficiency is also covered.

Chapters 3 and 4 treat charged particle transport theory, slowing down of fast ions and electrons, and the application of the theory to cell calculations. Chapter 5 deals with secondary electron emission, a subject which is of great importance for cell design. Chapter 6 deals with leakage currents and the methods to handle this problem. Finally, Chap. 7 discusses specific applications.

The book is certainly a valuable compilation of the accumulated knowledge applicable to the design of direct collection cells and interaction energy cells. In addition, in Chaps. 3 and 4 the book contains valuable information which is of more general interest. Workers doing research which is connected in any way to the interaction of fission fragments or other fast ions with solids and gases will find these chapters very useful.

The book is written in a clear style; it uses figures generously. As a matter of fact, the artwork in this book is excellent and the publishers should be commended for it.

The author has certainly tried hard to make the book useful for the researcher working in the described areas. A typical example is the inclusion of a nomogram for the range of low q-particles.

On the negative side, it has to be said that a more comprehensive collection of literature references would have been in order. As the author states, the book does not intend to "sell" direct conversion devices to the audience. This is certainly true and commendable. On the other hand, it is not a critical review either; e.g., an unreasonable claim for 95% efficiency for a thermonuclear direct conversion cell could have been put in the right perspective instead of just being reported. While this should not be construed as a serious criticism of the book, the reader must understand that he must make his own evaluations of the described devices. A minor point is that the foreign language references are consistently misspelled.

The references are given at the end of each chapter, which is a quite common practice. However, it has the disadvantage that some references have to be repeated chapter after chapter. Since the number of references is moderate, a listing of the references at the end of the book might have been more advantageous.

However, the above mentioned shortcomings are not serious enough to distract from the value of the book for the serious student and applied scientist interested in direct energy conversion devices for nuclear energy.

Richard T. Schneider (Dr. rer. nat. in physics, University of Stuttgart, 1961) is the author of technical publications in the field of plasma spectroscopy, MHD-power generation, thermionic energy conversion, image restoring, data processing, properties of uranium and uranium hexafluoride, gaseous core reactors, and nuclear pumping of lasers. He was formerly the Section Chief for Plasma Physics, General Motors Corporation, and is now professor of nuclear engineering sciences at the University of Florida.