

BOOK REVIEW

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



Applied Radiation Chemistry: Radiation Processing

Authors R. J. Woods and A. K. Pikaev
Publisher John Wiley & Sons, Inc., New York (1993)
Price \$74.95
Reviewer Joseph Silverman

According to the dust jacket, this is the "ultimate handbook" for scientists and engineers interested in radiation processing. An additional claim is that it is an ideal textbook for graduate-level courses in radiation applications. In fact, it is not a handbook and not really a textbook. Although there are many tables and figures, a handbook would have far more. A textbook would be expected to present some quantitative examples and exercises; they are conspicuously absent. However, it is a very well written, very useful, concise description of applied radiation chemistry and radiation processing.

It is quite a challenge to provide a comprehensive summary of this vast field. Ionizing radiation is but a form of energy that has been applied to a wide range of processes: crosslinking of plastic insulation and packaging, sterilization of biomedical supplies, preservation of foods, destruction of pathogens in sewage and contaminants in waste streams, doping of semiconductors, and many more. Also, reactor coolant chemistry and radiation damage in terrestrial and space applications are aspects of this field. The radiation source technology includes nuclear reactors, accelerators, and large radioactive sources. It is difficult for any volume of some 500 pages to cover all of this, plus radiation physics and chemistry, but the authors have managed to touch on almost all of these topics.

In doing so, they have emphasized the radiation chemistry, and with good reason. R. J. Woods is the coauthor of

the best-selling *Introduction to Radiation Chemistry*. A. K. Pikaev is a major figure in radiation chemistry with hundreds of research publications and several books to his credit. Thus, while the reader should be prepared for some chemistry, the scientists and engineers for whom the work is intended will find the chemistry (as is often said of modern music but with much less justification) "accessible." Also, the authors are true to their promise of covering radiation processing and have included several process diagrams and considerable technological detail. Furthermore, the references are comprehensive and up-to-date.

The simultaneous attempt at brevity and broad coverage provides a reviewer with many opportunities for specific criticisms. A significant shortcoming is the cursory treatment of spatial dose distributions in complex absorbers, especially now that there are such excellent computer programs for such calculations. However, the book has already served as a useful reference for this reader in providing data on the electron irradiation of waste streams. It has also proved to be an effective means of introducing a University of Maryland graduate student in nuclear engineering to the radiation chemistry of the primary coolant in a pressurized water reactor. It would appear that the publisher's claims have substantial merit.

Joseph Silverman (PhD, physical chemistry, University of Maryland) is Professor Emeritus in the Department of Materials and Nuclear Engineering at the University of Maryland. After receiving his PhD, he spent 8 years in industry and almost all of his subsequent career at the University of Maryland. His principal research activity has been devoted to applied radiation chemistry and physics, and radiation processing; this has been the basis of more than 100 publications. He has served as a consultant to the United Nations, the International Atomic Energy Agency, the Atomic Energy Commissions of the United States and several foreign nations, and industrial companies throughout the world.