

Finally we come to the moment of truth. How good is this book and can it be recommended? My own judgment is that I would like to have it available in a library but would not feel I needed it for my own bookshelves.

*Abraham S. Goldin, associate professor of environmental chemistry at the Harvard School of Public Health, has been an active worker in the determination of radioactive materials for over 20 years. A chemist by training, he has developed both chemical and instrumental methods for radionuclides, with particular emphasis on determinations at environmental levels. Methods for the determination of radium, of strontium isotopes, and for the gamma spectrometric radioassay of milk were developed under his direction. For several years, he was in charge of quality assurance for Public Health Service national networks determining radionuclides in milk and foods.*

**Spent Nuclear Fuel Transfer: Fuel Casks and Transfer Operations**

*Editor* D. J. Groetch  
*Publisher* American Society of Mechanical Engineers  
*Pages* 44  
*Price* \$6.00  
*Reviewer* Robert Doda

This publication is a compilation of papers presented at a Symposium of the same name held at the Winter 1971 Meeting of the American Society of Mechanical Engineers. It is an attempt to summarize current solutions to the cask design problem and to the attendant fuel thermal analysis problem. The net effect has a surprisingly good coherence and yields good background data.

The information presented should appeal to those who are involved with nuclear fuel cask design and with the regulations which affect this design. The general cask design problem is defined with respect to the controlling regulations, 49 CFR, Parts 171 to 178, and 10 CFR, Part 71. The hypothetical accident conditions,

which the cask design must successfully meet, are treated from a state-of-the-art standpoint and with a lack of comprehensiveness indicative of the shallow background of experimental data. Designs for various fuel assemblies are included along with a smattering of fuel thermal analyses. These papers do emphasize thoroughly the importance of finding new design methods and of obtaining experimental data in order to reduce the great conservatism which is now prevalent in these designs.

A single paper, only somewhat related, is presented on the handling and cooling of fuel subassemblies for the EBR-II reactor. Heat transfer characteristics and experimental procedures are well described, and special problem areas are indicated. The EBR-II presentation is very well done, making for an interesting report.

*Robert J. Doda (BS, chemical engineering, University of North Dakota, 1955; MS, nuclear engineering, University of Arizona, 1963) is a nuclear engineer and is general manager of American Atomics Corporation. Since 1964, he has been involved with the application and development of radioisotopes in various fields and in developing specialized hardware and techniques for prototype and production manufacture of radioisotopic devices. Gaseous radioactive handling systems, and shipment and containment of gaseous isotopes have been of primary interest. He has worked extensively with regulatory agencies concerning licensing and transportation of radioisotopes.*

**The Radiation Chemistry of Water**

*Authors:* Ivan G. Draganic and Zorica D. Draganic  
*Publisher:* Academic Press (1971)  
*Pages:* 244  
*Price:* \$14.00  
*Reviewer:* Sheffield Gordon

During the period covered by the "Manhattan Project," the study of the radiation chemistry of water re-

ceived an enormous stimulus from the interest of nuclear engineers and physicists in the use of water in cooling systems and moderators of nuclear reactors. This stimulus resulted in widespread activity in this field throughout the world, and in 1961 progress in this area was summarized in A. O. Allen's monograph *Radiation Chemistry of Water and Aqueous Solutions*. Since the appearance of Allen's book, the advent of pulse radiolysis together with the development of sophisticated fast reaction techniques inaugurated a new chapter in the history of this subject. Use of this technique led to the discovery of numerous reaction intermediates in irradiated water and aqueous solutions. A notable example of these was the discovery of the absorption spectrum of the hydrated electron.

The appearance of this volume by Draganic and Draganic is a welcome successor to the Allen monograph. The book begins with an excellent historical survey of the radiation chemistry of water. The authors then treat the interaction of ionizing radiation with water, covering the physics of the absorption process and then going into a discussion of the origin of the resulting short-lived species which cause chemical change in irradiated water.

One chapter is devoted to the short-lived reducing species, namely the hydrated electron and the hydrogen atom as well as the primary molecular hydrogen formation. Another chapter treats the primary oxidizing species, the OH radical, and the primary hydrogen peroxide. Both of these chapters give good summaries of the yields and rate constants of these species with various solutes, including numerous references to the literature. In addition to comparing the yields of primary products in H<sub>2</sub>O and D<sub>2</sub>O, another chapter is devoted to a more detailed discussion of the radiation chemical yield of the primary products of water radiolysis and the dependence of these yields on ion track density (LET), concentration of solute, pH, dose rate temperature, and pressure. There is an excellent chapter on diffusion-kinetic model calculations as applied to the reactions of the primary species. The final chapter is devoted to a short summary of the important experimental technique used in aqueous radiation chemistry.