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.

Training Manual on Food Irradiation Technology and Techniques

Author	Joint FAO/IAEA Division of Atomic Energy in Food and Agriculture
Publisher	Unipub, Inc. (1970)
Pages	134
Price	$4.00
Reviewer	Francis X. Rizzo

An IAEA document of this type has been long awaited in the field of food irradiation technology. While the term "training manual" may be a misnomer, this short dissertation is an excellent reference book on the subject and will certainly serve the purpose stated by the authors:

"The manual should prove of value not only to those associated with the IAEA and FAO training programs but also to other research scientists in countries working on development of food preservation, or on the introduction of the irradiation process into the food industry."

Initial examination of the extensive table of contents causes the reader to wonder whether the authors were a little over-enthusiastic when deciding on the scope of the document, especially in a document as short as this one (134 pp.). These apprehensions are laid to rest when the report is read because of the skillful and efficient manner in which it is written. The writing is of an extremely high quality in that each subject is dealt with concisely and comprehensively in a good refreshing literary style.

The document is divided into two parts. Part I contains lecture material covering general information and discussions on applications. In Part II, suggested laboratory exercises are presented.

Part I is 105 pp. long and includes some discussion of each of the subjects one would expect to encounter in food irradiation.

The first 36 pp. of Part I include four sections titled Radioisotopes and Radiation, Radiation and Detection, Health Physics, and Radiation Chemistry. In these sections, the subjects of basic theory and interaction mechanisms of radiation physics and chemistry as well as the methods of detecting radiation and the philosophies of health physics are uniquely summarized and although available elsewhere, the material should prove to be useful to instructors or those planning courses in the field.

While everything which has been included is well done and useful, I question the disproportionate amount of space given to detection methods such as electroscopes, ionization counters, proportional counters, G-M counters, and scintillation counters, and to other subjects such as shielding, radiation units, and the atomic model. Some of this material could have been condensed or completely eliminated with the space devoted to the more important subject of radiation dosimetry. While this is a matter of personal preference, I feel that the authors missed an excellent opportunity to present a much needed thesis on the philosophies and methods of radiation dosimetry in food irradiation. As the document stands, the philosophies of dosimetry are ignored completely and the dosimetry methods presented include an obsolete discussion of the Fricke dosimeter and only casual mention of several other dosimetry methods.

Other topics which are slighted are methods of handling, evaluating, and presenting experimental data and, especially, discussions of statistical methods.

The next 50 pp. of Part I, the most interesting and enlightening part of the document, deal with effects of radiation on living organisms, preservation of food by radiation and by other processes, wholesomeness of irradiated foods, and food packaging. The authors are to be congratulated for their excellence in organizing and presenting a tremendous amount of extremely useful information in such an interesting manner.

The main drawback of this part of the document and, for that matter, of the book in general, is the absence of a well-documented specific reference section. In this part of the book the authors express opinions and draw conclusions based, I am sure, on the results of research studies and scientific reports. The tendency is for the reader to wonder why these conclusions were drawn and where the information came from. The absence of a good reference section will seriously affect the usefulness of the document.

Part II is devoted to laboratory exercises. Thirteen self-explanatory, instructive exercises are presented in the subject areas of dosimetry, radiation chemistry, biology and microbiology, and radiation effects on foods.

The laboratory experiments are well thought out and clearly presented. This material should be of great value especially in setting up training programs.

I recommend this book as a "must" to those, at all levels, involved in food technology and related fields.

Francis X. Rizzo (MS, physics, Hofstra University) is a member of the staff of the Radiation Division of the Department of Applied Science at Brookhaven National Laboratory and is involved in the USAEC food irradiation program. His fields of specialty are radiation physics, dosimetry, and irradiator design.

The Principles of Chemical Equilibrium

Author Kenneth Denbigh

Publisher Cambridge University Press (1971)

Pages 494

Price $14.00

Reviewer Eric Haskin

There were two sources of irritation in my undergraduate thermodynamics work: first, I felt that work done on the system should have the same (positive) sign as heat added to the system, and second, it took me nearly a full semester to lay my hands on a copy of Denbigh's text (then in its first edition). The latter irritant was especially frustrating since my instructor relied more on Denbigh as a source of lecture material and problems than on the assigned text for the course. However, when I was finally able to borrow a copy of Denbigh's text my frustration rapidly subsided and my instructor was slowly forgiven. It is indeed an outstanding book.

I am pleased to find the revisions in this third edition more concerned with the details than with the logic and style of the original presentation. The author has adopted SI units (except for the use of the calorie and the atmosphere in places) and the nomenclature recommended by the International Union of Pure and Applied Chemistry. He has taken work done on the system to be positive—a change which hopefully will not confuse students using older texts simultaneously.

The book is divided into three parts. Part I, "The Principles of Thermodynamics," develops the laws of thermodynamics, the various thermodynamic functions, and criteria for equilibrium. Part II, "Reaction and Phase Equilibria," applies thermodynamics to reaction and phase equilibria and develops the theory of ideal and nonideal solutions. Chemical potentials are employed in accordance with Gibb's methods. Part III, "Thermodynamics in Relation to the Existence of Molecules," is a brief introduction to statistical mechanics treating gases, perfect crystals, the third law, regular solutions, and adsorption. The last chapter, "Chemical Equilibrium in Relation to Chemical Kinetics," includes a short outline of transition state theory.

My chief criticism is not really of the text but of its suitability as a textbook for an undergraduate thermodynamics course. In his preface the author accurately states that the book is concerned with "the second or third round" of study in thermodynamics. While the subject matter in the book is usually presented to undergraudates, it is not usually presented at this level of sophistication. In addition, considering the time limitations imposed on most undergraduate curricula, most instructors would probably desire a thermodynamics text with less emphasis on chemical equilibria. However, the book would be an excellent supplementary reference for any student of thermodynamics. It is also available in paperback.

Eric Haskin (PhD, nuclear engineering, Kansas State University, 1971) is the author of technical papers in the fields of radiation chemistry and activation analysis. He has worked in the Product Exploration Division of the Boeing Company and is currently a visiting assistant professor in the Nuclear Engineering Department at the University of Arizona.