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.

Title Clustering Phenomena in Nuclei

Editor International Conference of Atomic Energy Agency, Vienna 1969, P. O. Box 433, New York, N.Y. 10016

Publisher Unipub, Inc., P. O. Box 433, New York, N.Y.

Pages 345 front and rear material

Price $10.00

Reviewers P. F. Zweifel and David Kaplan

The volume *Cluster Phenomena in Nuclei* is a Conference Proceedings consisting of 14 invited lectures and 53 contributed papers on both theoretical and experimental aspects of clustering phenomena in nuclei. In addition, there are a seminar on "Transformation Brackets" given by M. Moshinsky and an overall summary by L. Rosenfeld.

The conference is testimony to the fact that still another model of nuclear phenomena is coming of age. The cluster model provides a description of the behavior of light nuclei and is, in a sense, complementary to the shell model which has its greatest successes in the medium A region.

Historically, the cluster model (more specifically the α-particle model of the nucleus), predates the shell models. The discovery of the neutron, the existence of closed shells, etc., led to the emphasis on the latter and the dormancy of the former. For several reasons there has been a renewal of interest in the cluster model. The use of electrons and Π-mesons as nuclear probes has provided more sensitive tests of the cluster description of the nuclear states. Theoretical progress has been made in the description of nuclear reactions in terms of free clusters and their relative motion while various bound state properties of nuclei have been computed.

This work is primarily aimed at the specialist in nuclear structure, with nearly all the articles requiring an extensive mathematical background. Those members of the American Nuclear Society who are concerned with cross-section calculation or evaluation should find it a useful addition to their libraries, not because the cluster model is used extensively by cross-section calculators but rather as a general "cultural" addition. Like all conference proceedings, the volume suffers from lack of coherence and continuity, but this is compensated for by the fact that much up-to-date information, not elsewhere available, may be found here. Also, the quality of the individual contributions vary markedly, but the review papers by Wildermuth and summary by Rosenfeld are particularly worthy of mention, and could be read profitably by anyone as a useful introduction to the subject.

P. F. Zweifel has been Professor of Physics and Nuclear Engineering at Virginia Polytechnic Institute and State University since 1968. From 1958-1968 he was a faculty member at the University of Michigan and from 1953-1968 was at KAPL. He received his BS from Carnegie Mellon and his PhD in Physics from Duke (in 1954). A past member of the USAEC's advisory committee on reactor physics and of the ANS board of directors, his research interests include reactor and nuclear physics, neutron transport theory, and applied mathematics. He is a fellow of both ANS and APS. David Kaplan is Associate Professor of Physics at Virginia Polytechnic Institute and State University. He received his PhD from Illinois Institute of Technology (in 1960). His research interests are in nuclear physics and magnetic interactions.

Title Progress in Nuclear Energy, Series IX, Analytical Chemistry, Vol. 10

Editors D. C. Stewart and H. A. Elion

Publisher Pergamon Press

Pages 474

Price $23.90

Reviewer Charles E. Pietri

There is little doubt that this book, the tenth volume in this series, will benefit that segment of the nuclear community concerned with the chemical analysis of highly radioactive materials in hot cells and gloved boxes. It will also be educational to management and others associated with remote analysis in understanding the complex and often-

times costly operations involved and the remedies used to overcome these difficulties. It is the first time that remote analytical chemistry techniques have been so extensively unified into one volume.

The editors of this work state that "remote analytical chemistry is chiefly a matter of applying standard techniques under difficult and demanding conditions . . ." and accordingly justify the publication of this volume "dedicated entirely to the techniques of doing analytical chemistry behind shielding or in glove boxes." This philosophy has resulted in a valuable addition to the the literature of remote analytical chemistry.

Fourteen subjects are presented in detail in a unit operations style by specialists in the field and begin with a short history of the analysis of radioactive materials by remote methods. The following topics are covered: ordinary weighing and density determinations; thermogravimetric analysis; remote pipetting; application of titrimetry to remote analysis; techniques of sampling, dissolution, evaporation, and combustion; equipment and techniques for handling liquid samples; ion exchange and solvent extraction; fission gas collection and trace gas analysis; spectrographic analysis; instrumental methods including spectrophotometry, atomic absorption, and flame emission spectrometry; application of electrochemical techniques to remote analysis; analytical chemistry in gloved boxes; and the effect of radiation on common analytical reagents. The treatment of each subject is thorough for the most part, although stepwise analytical procedures are not usually included, and the book is well documented with a total of 1152 references. The material presented is not merely a compilation of data available elsewhere, but a critical examination of methods, equipment, and techniques. The chapters on "Sampling, Sample Dissolution, Evaporation, and Combustion" methods and "Equipment and Techniques for Handling Liquid Samples" in hot cells excel in their presentation of the basic techniques. It is unfortunate that the topic of analytical chemistry in gloved boxes, although adequately presented, was not treated in greater detail.

Although the subject of safety and environmental protection is touched upon by several of the authors it is hoped that in the very near future the editors of this series will seriously consider an extensive treatment of safety in the remote analytical chemistry laboratory. In view of the recently increased emphasis on safety, the presentation of some facilities and operations in which plastics, solvents, and other combustible materials are widely used may now be unsatisfactory.

The authors readily admit that this volume is somewhat larger than originally planned. This reviewer cannot see how less material could have been included without destroying the continuity and usefulness of the work. In fact, if there is any major criticism of the book it is in its "failure" to specifically treat in-depth topics such as material and equipment life, the preparation of highly radioactive samples for off-site shipment, the use of standards, and the safety aspect. Furthermore, the inclusion of more material from our overseas colleagues would have been beneficial if for no other reason than for comparison purposes.

There is wide use of descriptive material in the form of tables, diagrams, and photographs included with the text. The two appendixes consist of an interesting but incomplete tabulation and brief description of both domestic and international shielded facilities and a short listing of general literature references. There are only a few typographical errors in evidence, and the references are complete up to 1967.

Generally, the authors have succeeded in presenting the techniques and analytical methods best suited for operations in hot cells and gloved box facilities. In this sense the book can be recommended as a guide to the novice and as a working reference to the experienced analyst.

Charles E. Pietri is a graduate of New York University (1951) and has worked at Oak Ridge National Laboratory, Savannah River Laboratory, and Los Alamos Scientific Laboratory, and is presently chief of the Plutonium Chemistry Section at the U.S. Atomic Energy Commission's New Brunswick Laboratory. He has been actively engaged in remote analytical chemistry in gloved boxes and hot cells during this period.

Title *In Vitro* Procedures with Radioisotopes in Medicine, Proceedings of a Symposium, Vienna, Sept. 8-12, 1969

Editor Staff IAEA

Publisher Unipub, Inc., P. O. Box 433, New York, N. Y. 10016 (1970)

Pages 176

Price $20.00

Reviewer Richard C. Reba

Radiometric analyses have been known for many years, but it was not until the ingenious experiments of Yalow and Berson were published that a new field was born, that of *in vitro* procedures using radiotracer labeled substrates. These techniques add several magnitudes of sensitivity and specificity that were virtually unknown before this time to a host of analytical procedures that have now been perfected so that hormones with a molar concentration in plasma of as little as 1×10^{-12} (nocturnal ACTH) can be measured with exacting accuracy and precision. The principle is of such a universal nature that presently few hormones escape detection by these methods, which have been broadened to include enzymes, enzyme substrates, drugs, vitamins, antibodies and other inhibitors, small amino acid chains, and it is apparent that the list is endless.

Because of the great appeal of this technique and the many workers in the field, many of the important advances were scattered in a variety of technical and clinical journals. It was not until the proceedings of an Oak Ridge Symposium published in June 1968 (*Radioisotopes in Medicine:* In Vitro *Studies*) that a review and report of the current state of the art was available in a single publication. Since that time, there have been reports of several other symposia, but these have usually been problem-oriented and the topics have been from a relatively narrow field. The universality of the technique has attracted workers from all over the world. The need to document again the current state-of-the-art of this revolutionary technique, as well as to bring together