

Book Reviews

The Solvent Extraction of Metal Chelates. By J. Stary. Pergamon Press, The Macmillan Company, New York, (December 28, 1964), 240 pages, \$8.50.

This book is devoted to the theory of metal-chelate solvent extraction and its application in analytical, inorganic, and nuclear chemistry and technology. The first three chapters deal with the theoretical aspects of metal chelates. The fourth chapter is also theoretical in nature despite the somewhat misleading title of "Analytical Applications." In this chapter Prof. Stary discloses how to calculate from the extraction constants of metal-chelate systems the best conditions for the separation of many metals. He also describes the recent, highly selective method of substoichiometry which is finding application in trace analysis chemistry. In this technique, less than stoichiometric quantities of chelate formers are used in contrast to the generally accepted large excesses of these reagents. For a successful determination it is necessary to isolate exactly the same amount of the element in question from solutions of standard and sample alike in which the element is present in different amounts. Equal amounts of organic reagent for producing an extractable chelate are added with the stipulation that these amounts are smaller than that which corresponds stoichiometrically to the amount of element present. Quantitative isolation is not required, which is a great analytical advantage. Stary is largely responsible for this important addition to analytical techniques, which makes solvent extraction even more selective. He presents the theory of substoichiometry in a clear, concise manner.

The remaining chapters, approximately 75% of the book, are given to systems in which the chelate formers are described by classes, and to selective extraction procedures for individual metals. It is this fraction of the book that is of most interest and concern to process and analytical separations chemists.

Perhaps the simplest statement, yet the most informative to prospective purchasers of the book, to make concerning this work is that it will undoubtedly find wide acceptance and be equally widely used. In this respect its arrival will be as welcome as that afforded to Morrison and Freiser's *Solvent Extraction in Analytical Chemistry* (J. Wiley & Sons, New York, 1957). Stary's book is useful. He has gone to much trouble to make his information easily and readily accessible. This is a refreshing approach in contrast to some authors who seemingly like to have the reader struggle a bit to get the information desired. The tables in Chapter 5, which delineate the optimum conditions for extraction for each metal ion by a specific reagent, are exemplary. In Chapter 6, a detailed extraction procedure is given by element. The chapters are nicely complementary to each other.

The references signify the truly cosmopolitan character of research in this field. The works of the leading

proponents of chelate solvent extraction from the Western and Eastern world are well represented. In short, the references are as complete as humanly possible. Stary has given us a book that will now serve as the definitive work in the solvent extraction of metal chelates.

J. C. White

Analytical Chemistry Division
Oak Ridge National Laboratory*
Oak Ridge, Tennessee

About the Reviewer: J. C. White is the Assistant Director in charge of research and development of the analytical Chemistry Division of the Oak Ridge National Laboratory. He has been a member of the staff of ORNL since receiving his PhD degree from Ohio State University in 1950. His research interests have been in separations by solvent extraction and the analysis of molten salts.

*Research sponsored by the USAEC under contract with Union Carbide Corporation.

Radioisotopic Power Generation. By William R. Corliss and Douglas G. Harvey. Prentice Hall, 304 pages, \$14.75.

As indicated in the preface, the authors had two objectives in mind: one was to bring together in a book the widely varying subject matter from the different disciplines involved in the engineering of radioisotopic power generators; the other was to record and preserve some of the fascinating history of radioisotopic generator development. Authors Corliss and Harvey have indeed achieved their goals; accordingly, as they also state, the book is primarily descriptive rather than tutorial in character.

The book is divided into two parts: Part A entitled "General Design Considerations" and Part B entitled "Specific Radioisotopic Generators." Each part contains five chapters, with 149 pages in Part A and 105 pages in Part B. The authors devote another 30 pages to two appendices and a bibliography. The bibliography is divided into ten sections, one for each chapter, and lists 237 references. In appendix 1, the authors tabulate data on 36 radioisotopes selected on the basis that the half-life is between 100 days and 100 years, the specific power is greater than 0.1 w/g, and the emission is not pure or nearly pure gamma radiation. Included in the tabulation are particulate disintegration energies and the average energy available for power production. Appendix 2 is a glossary of specialized terms.

The book contains a large number of illustrations and tables. Of the 199 figures, nearly 40% are photographs furnished by organizations involved in the development of