

In Chapter XIX on The Magnetic Properties of Glass, the discussion of Verdet's constant has been extended.

In Chapter XX on Constitution, discussion has been added at the close concerning network-formers other than silicon.

While much of the volume is a repetition of the original, new material has been added. Both editions are valuable reference books in the glass library.

A more detailed index is desirable, especially for tables and figures, reference to which must be gleaned from descriptive portions of the text.

The closing index of Properties of Glasses in Various Systems has been revised and improved. The old index was too congested.

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Metallurgy of the Rarer Metals—1 Chromium. By A. H. SULLY, Ph.D., M.Sc., F.Inst.P., F.I.M. Academic Press, Inc., Publishers, 125 East 23rd St., New York 10, N. Y., 1954. xii + 272 pp. 14.5 × 22.5 cm. \$5.50.

This first book in a series expected to cover chromium, zirconium, titanium, molybdenum, manganese, platinum and allied metals, and uranium sets a high standard for the series. A physicist, Dr. Sully combines a scholarly treatment with clear evidence of appreciation of the engineering and economic aspects. The designation of chromium as a "rare metal" in spite of its wide occurrence and manifold usage is based on the fact that only recently has application of pure chromium and of chromium rich alloys stimulated the development of a large body of reliable literature on the properties of the pure metal and of rich alloys. This is most clearly demonstrated by a table of reported values for the m.p. of pure chromium, starting with the 1510° figure reported by E. A. Lewis in 1902 with an almost steady climb to 1850° in 1951 and 1900° in 1952, with perhaps a 50° present uncertainty.

A short introductory chapter on the properties, occurrence, mining and dressing of chromite ore is followed by a chapter covering commercial methods of producing ferro-alloys and commercially pure chromium and of methods of preparing high purity chromium. The chapter on physical properties of pure chromium comprises a critical evaluation of literature values for crystal structure, elastic moduli, thermodynamic properties, electrical and optical characteristics, and in addition a discussion of oxidation resistance and vacuum reaction at high temperatures. The abnormalities exhibited as apparent discontinuous changes in some, but not all, of the properties at several temperature levels is discussed, but not resolved. A table of recommended values of properties is given at the end of the book.

Melting, casting, powder metallurgy and workability of pure chromium and rich alloys with the attendant difficulties due to contamination by impurities and to sharp transitions from brittle to ductile behavior are described in the fourth chapter. The author makes every effort to explain the characteristics of the processes in terms of properties of the metals and of reactions due to impurities, but again a number of apparently anomalous phenomena are evident.

Surface treatment with chromium, by electrodeposition and by chromizing (chromium introduction into the surface by diffusion) is described in the following two chapters. Methods, theory, thermodynamics and rates of the processes and properties of the coatings produced are discussed with the emphasis on surface treatment of steel base stocks. Corrosion resistance of the coatings and surface deposition of chromium from its carbonyl and by vacuum evaporation and by sputtering are briefly described.

The final chapter is devoted to descriptions of the composition and properties of chromium alloys. Phase equilibria are given for many of the binary systems and for a few ternary systems. The author concludes this chapter with a rather pessimistic outlook for increasing use of chromium-rich alloys for high temperature use.

The book is well illustrated with numerous charts, photographs, flow sheets and drawings of equipment. Reference is made to well over 300 original articles and the author gives evidence not only of thorough conversance with the literature, but of a great deal of first-hand laboratory experience in the high-temperature alloy field.

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BOOKS RECEIVED

September 10, 1954–October 10, 1954

ROBERT C. BRASTED. "Comprehensive Inorganic Chemistry." Volume Three. "The Halogens." D. Van Nostrand Company, Inc., 250 Fourth Avenue, New York, N. Y. 1954. 250 pp. \$5.00.

NICHOLAS D. CHERONIS. "Technique of Organic Chemistry." Volume VI. "Micro and Semimicro Methods." Edited by Arnold Weissberger. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1954. 628 pp. \$12.00.

T. L. COTTRELL. "The Strengths of Chemical Bonds." Academic Press Inc., Publishers, 125 East 23rd Street, New York 10, N. Y. 1954. 310 pp. \$5.50.

PAUL DELAHAY. "New Instrumental Methods in Electrochemistry. Theory, Instrumentation, and Applications to Analytical and Physical Chemistry." Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1954. 437 pp. \$11.50.

FRANK R. N. GURD (edited by). "Chemical Specificity in Biological Interactions." Harvard Memoirs Number 3. Academic Press Inc., Publishers, 125 East 23 Street, New York 10, N. Y. 1954. 234 pp. \$6.00.

PHILIP B. HAWK, BERNARD L. OSER, AND WILLIAM H. SUMMERSON. "Practical and Physiological Chemistry." The Blakiston Company, Inc., 575 Madison Avenue, New York 22, N. Y. 1954. 1439 pp. \$12.00.

EMIL OTT, HAROLD M. SPURLIN, AND MILDRED W. GRAFFLIN (edited by). "Cellulose and Cellulose Derivatives." Part I. High Polymers, Volume V. Second completely revised and augmented edition. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1954. 509 pp. \$12.00.

E. H. RIDDLE. "Monomeric Acrylic Esters." Reinhold Publishing Corp., 430 Park Avenue, New York 22, N. Y. 1954. 221 pp. \$5.00.

G. K. ROLLEFSON, Editor, and R. E. POWELL, Associate Editor. "Annual Review of Physical Chemistry." Volume 5. Annual Reviews, Inc., Stanford, California. 1954. 540 pp. \$7.00.

WARD C. SUMPTER and F. M. MILLER. "Heterocyclic Compounds with Indole and Carbazole Systems." Volume VIII of Heterocyclic Compound Series. Arnold Weissberger, Consulting Editor. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1954. 307 pp. \$10.00 single copy, \$9.00 subscription price.

STIG VEIBEL. "The Identification of Organic Compounds." A Manual of Qualitative and Quantitative Methods. G. E. C. Gad, Publisher, Vimmelskaftet 32, Kobenhavn K, Denmark. 1954. 346 pp. 45 sh.

ARTHUR R. VON HIPPEL. "Dielectric and Waves." John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1954. 284 pp. \$16.00.

ARTHUR R. VON HIPPEL (edited by). "Dielectric Materials and Applications." John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1954. 438 pp. \$17.50.