
 BOOK REVIEWS

Rare Earth Alloys. A Critical Review of the Alloy Systems of the Rare Earth, Scandium and Yttrium Metals. Prepared under the Auspices of the Office of Technical Information, United States Atomic Energy Commission. By DR. KARL A. SCHNEIDNER, JR., Los Alamos Scientific Laboratory, University of California, Los Alamos, New Mexico. D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, New Jersey. 1961. xiii + 449 pp. 16 × 23.5 cm. Price, \$12.75.

This volume aims to coordinate modern physical-chemical approaches with the metallurgical studies of alloy systems of the rare earths, including scandium and yttrium metals. The first section of the book reviews the physical properties of the pure metals, including considerations of electronic structure, atomic properties, crystal structures, transformations, melting and boiling, heat capacities, magnetic, electrical and electronic properties, engineering and mechanical properties, and so forth.

The main portion of the volume deals with the phase relationships and physical properties of the rare earth alloys *per se*. An introductory chapter on general alloying theory leads on to descriptions of binary alloys between rare earths, alloys of a rare earth metal with a non-rare earth element, ternary alloys containing one or two rare earth components, and quaternary alloys containing one rare earth. A closing section deals with details of crystallographic species.

The author claims 100 phase diagrams, which have been redrawn for the volume, and which often represent amalgamation of data from more than one source. In addition there are some 45 other figures correlating properties with composition, illustrating theory, etc. A great deal of data is condensed into tabular form. The references include over 650 entries, in addition to which there is an alphabetical author index. Binary, ternary and quaternary systems are listed in separate alphabetical indices.

The volume compresses a wealth of information on a currently active field into compact format. It should be useful both to the reader interested in detailed information and to the one interested in theoretical relationships. The author has obviously expended thought and careful effort. In terms of present-day publication, the volume represents good value for the price. One may speculate that in some manner this is linked with its sponsorship by the U. S. Atomic Energy Commission.

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Infrared Absorption of Inorganic Substances. By KATHERYN E. LAWSON, Physical Sciences Research Department, Sandia Corporation, Albuquerque, New Mexico. Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y. 1961. vi + 200 pp. 16 × 23.5 cm. Price, \$6.75.

This book is intended by the author to be "a compilation and review of empirical data and interpretations of the infrared absorption spectra of inorganic substances" (italics mine). The scope of a work which did successfully compile and interpret the infrared absorption spectra of inorganic substances would be awesome indeed. I submit that there is probably no one alive sufficiently eclectic and omniscient to deal satisfactorily with the staggering amount of fact and theory which would be encompassed by such a project, and few daring enough to try. The chief failing of this book, which has, I am sorry to say, a great many, is that the author has actually attempted, albeit in a very superficial way, to fulfill the prescription given in her preface. The result is a rambling and incoherent conglomeration.

A thirteen page introduction is devoted to methods of sample preparation and a summary of the applications of the infrared spectra of inorganic compounds. This is loosely organized, incomplete and almost totally lacking in any theoretical underpinning.

There follow then sixty-three pages entitled "Spectra-structure correlations" (a phrase quite representative of the kind of jargon with which the book abounds). In this section there is a little bit of everything but the proverbial kitchen sink. With some exceptions the treatment here is dull and lacking in thoroughness and authority. It is a series of smatterings. If this part of the book teaches any lesson clearly, it is surely that a thorough knowledge of inorganic chemistry is necessary equipment in writing a valuable and effective discussion of the significance of the infrared spectra of inorganic compounds and that a discussion written without such knowledge just doesn't gel.

After a nine page glossary—which is a mine of misinformation, including, *inter alia*, incorrect definitions of chelate and lattice, and the astonishing assertion that the bonding in a non-polar molecule is *ipso facto* homopolar (or "atomic," whatever that means)—the book concludes with an approximately one hundred page annotated and indexed bibliography. This is said to be based on a search of "the section of Chemical Abstracts entitled 'Electronic Phenomenon (sic!) and Spectra' for the period January 1952 through December 1958" plus a supplementary list which "represents coverage of material appearing in Chemical Abstracts or elsewhere (?) through April, 1960." Assuming no mistakes or omissions occurred in transcribing this list from CA it would appear to be no less valuable—but no more—than CA itself.

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Nouveau Traité de Chimie Minérale. Tome XIII, Deuxième Fascicule. Soufre (II), Sélénium, Tellure, Polonium. Edited by PAUL PASCAL, Membre de l'Institut. Masson et Cie., 120 Boulevard Saint-Germain, Paris 6, France. 1960. pp. 1125-2146. 17.5 × 26 cm. Price, brochés, 310 NF.; cartonnés toile, 330 NF. (two parts).

This is the second part of the volume on the inorganic chemistry of the group VI elements, being concerned with compounds of sulfur, with the elements selenium, tellurium and polonium, and with their compounds. The quality and the amount of information given are truly exceptional, ranging from observations on color changes in reaction to extensive tables of thermodynamic functions. SO₂, for example, has all the usual and unusual inorganic reactions described and discussed and, in addition, is considered as to virial coefficients, critical constants, compressibility, heats of transition, specific heats, entropy, enthalpy, surface tension, viscosity, parachor, magnetic susceptibility, dielectric properties, conductivity, ionization potential, refractive index, Raman, infrared and ultraviolet spectra, crystallography, bond angle, moments of inertia, fundamental vibration frequencies, etc. Documentation is complete with references to the original literature. The extensive bibliographies are scattered throughout the book, but on each page there is an indication of where the next bibliography is to be found. Cut-off dates, given for each bibliography, are mostly late 1958 but in some cases extend into 1960.

Six well-known authors have contributed: the late Paul Mondain-Monval, 32 pages on compounds of sulfur with the halogens; Robert Pointeau, 413 pages on compounds of sulfur with oxygen; P. Pascal, 69 pages on compounds of sulfur with nitrogen; H. Lumbroso, 261 pages on selenium; J. Hoarau, 127 pages on tellurium; and M. Haüssinsky, 81 pages on polonium. The writing is uniformly good and, in fact, is refreshingly attractive in contrast to the other standard treatises in inorganic chemistry. Unlike the Gmelin work, which tells all, this work is selective, at least in not discussing *all* the references. Even so, it occasionally takes clairvoyance to decide which of two contradictory reports the author favors.

The absence of a formula index is to be regretted, but the alphabetic index and the detailed table of contents are