

THE STRUCTURE OF METALS AND ALLOYS

By

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(The Institute of Metals, 3s. 6d.)

Dr. Hume-Rothery is very well known to the investigators of metallic alloys as expounder of varying electronic valency of metallic elements in the formation of alloy system. As stated in the preface the monograph is written at the request of the Council of the Institute of Metals. Within the last two decades large amount of informations has been collected and it has been indeed difficult for any worker to secure the informations in a single treatise.

The book is divided into five parts. Part I deals with the electronic background to metallurgy, starting from the structure of the atom developing that of the molecule and finally dealing with the structure of the crystals. Parts II and III deal with the crystal structure of the elements and their atomic radii. Part IV gives a comprehensive survey of the primary metallic solid solutions, the pioneer work in this subject due to Bain, Onowen and Preston. The X-ray diffraction photographs has revealed the nature of crystal lattice and super-lattice and Dr. Hume-Rothery has himself contributed substantial work in this domain. The form of liquidus curves of several systems representing different types and the form of solidus curves as well as the lattice constants of some important alloys have been treated in this section. Part V deals with the intermediate phases in alloy systems. The question of the sharing of electrons in co-valent linkages of atoms and in ionic structures the passage of valency electrons from one atom to another with the production of oppositely charged ions has been the starting point. Number of typical structures have now been treated and finally the cases where structures are determined by the size factor. Part VI is a collection of work on imperfections in crystals—a subject which is comparatively undeveloped but undoubtedly of the greatest importance to metallurgy. Here, as the author has clearly stated, a knowledge of the ideal crystal structure as revealed by the ordinary X-ray crystal structure analysis is not sufficient and urges new methods of investigations.

Each section has a very complete bibliography upto 1935.

Practice identifying and interpreting particulate models of alloys in this set of free questions designed for AP Chemistry students. Science AP College Chemistry beta Molecular and ionic compound structure and properties Structure of metals and alloys. Structure of metals and alloys. AP.Chem: SAP'3 (EU), SAP'3.D (LO), SAP'3.D.2 (EK), SAP'3.D.3 (EK). Google Classroom. A metal alloy is a metallic substance, but it is not a single chemical element. An alloy forms by the union or mixture of two or more metals. It may consist of one ore plus other metals; or one metal and another nonmetal. Examples of alloys are carbon and iron, forming steel, and copper alloys such as bronze and brass. The design of structures such as aircraft wings which are subject to rapidly fluctuating loads requires fatigue strength values. Fatigue strength is influenced by surface condition, microstructure, cold work, and a corrosive environment. When there are frequent repetitions of a stress, some metals will fail or rupture, even when sufficient stress may not result in permanent deformation if continuously applied for a relatively brief time. Structure & Uses of Alloys. An alloy is a mixture of two or more metals or a metal and a nonmetal. Alloys often have properties that can be very different to the metals they contain, for example they can have more strength, hardness or resistance to corrosion or extreme temperatures. Alloys contain atoms of different sizes, which distorts the normally regular arrangements of atoms in metals. This makes it more difficult for the layers to slide over each other, so alloys are usually much harder than the pure metal. The regular arrangement of a metal lattice structure is distorted in alloys. 1 2. The Structure of the Molecule 17 3. The Structure of the Crystal 24 4. Electron Theory of Alloys 41 Part II. "The Crystal Structure of the Elements 46 Part III. "The Atomic Radii and Some Physical Properties of the Elements 63 Part IV. "Primary Metallic Solid Solutions: 1. Introduction . 97 2. The Concept of Atomic Size-Factor PREFACE TO 1962 EDITION The continued advance in the Science of Metals and Alloys has made it necessary to rewrite some sections of the book, whilst others have been shortened to make space for the new material. We must again express our thanks to Mr. N. R. Vaughan, of the Institute of Metals, for his continued help. W. HUME-ROTHJISKY, Department of Metallurgy, Parks Road, Oxford. As a result, although most of the ideas reached by the use of the older methods have withstood this attack, other conceptions have had to be modified, and in one or two cases, drastically. The Structure of Metals and Alloys By Dr. William Hume-Rothery. (Monograph and Report Series No. 1.) Pp. 120 + 4 plates. (London: Institute of Metals, 1936.) 3s. 6d. net. The Structure of Metals and Alloys. @article{F1936TheSO, title={The Structure of Metals and Alloys}, author={T. F.}, journal={Nature}, year={1936}, volume={138}, pages={7-8} }. F. T. Published 1936.