fied in its level of presentation, notation, units and approach. The recent volume *Plasma Physics in Theory and Application* edited by Wulf B. Kunkel comes to mind as a successful example of what can be done. Nonetheless, this book is a valuable reference work that will be a welcome addition to research libraries catering to plasma physicists.

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Composite monograph

CERAMIC FIBERS AND FIBROUS COMPOSITE MATERIALS. By H. W. Rauch Sr, W. H. Sutton and L. R. McCreight. 436 pp. Academic, New York, 1968. $12.50

by THOMAS R. CASS

Although the concept of composite strengthening is not new, interest in its application to materials technology is rapidly growing. This is primarily because with composite materials one is able to "design" mechanical properties by choice of the amount and type of reinforcing phase. In doing so one can provide strength-to-density and stiffness-to-density ratios superior to those of homogeneous materials.

This monograph is described by the publisher as a survey of composite technology; however, the monograph is itself a composite. Unfortunately it is not apparent that it is an improvement over a homogeneous presentation. The survey was performed under Air Force contract, and was accomplished by personal and written contacts as well as by a patent and literature search. Accordingly the monograph is composed of four heterogeneous sections. The first section, which comprises one-fourth of the monograph, consists of chapters on fiber-composite technology, reinforcements, testing fine filaments and whiskers and fiber-composite materials. The remaining three sections present contract reports (95), patent abstracts (200) and references (789).

The initial chapters of the monograph give a general discussion of composite technology and are worthwhile introductory reading for materials engineers and interested scientists. However, because of the sensitivity of mechanical properties of composites to subtle variables, many of the early property data presented should be considered tentative. I also noted a bias towards discontinuous "whisker"-reinforced composites relative to continuous-filament composites. This bias probably is traceable to the authors' greater experience with single crystal Al_2O_3 whisker composites. Little mention is made of two of the more important composite systems in use today, boron–epoxy and graphite–epoxy. Finally the problem of the physicochemical compatability of filament-matrix combinations is not treated in any detail. Chemical research between reinforcement and matrix presently limits the application of metal-matrix composites at elevated temperatures. Widespread recognition of this problem, however, was not forthcoming until 1967, after the monograph was written.

This comment brings us to the major criticism of this monograph as a source book of the rapidly expanding field of composites; its latest reference is Fall 1966. Much the same information was available, albeit to a limited audience, earlier than 1969 in the form of the original Air Force contractual reports. Nonetheless for those to whom these reports are inaccessible, the monograph will be of use as an index of composite technology.

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The reviewer is chief of the advanced materials research section at the Orlando Division of the Martin Marietta Corp., where he is involved in research programs dealing with metal-matrix composites.

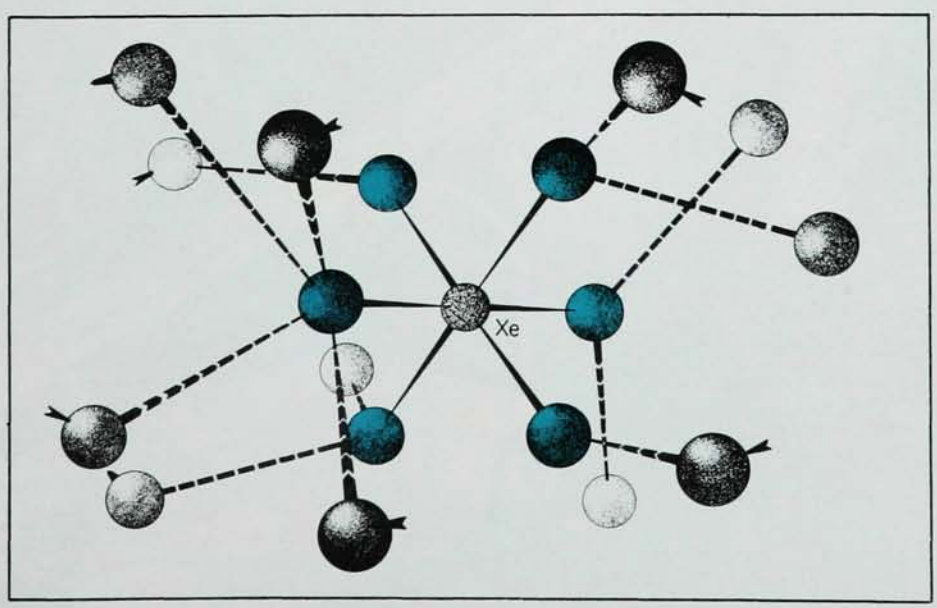
The omnipresent hydrogen bond

HYDROGEN BONDING IN SOLIDS: METHODS OF MOLECULAR STRUCTURE DETERMINATION. By Walter C. Hamilton, James A. Ibers. 284 pp. W. A. Benjamin, New York, 1968. $13.95

by JOSEPH G. HOFFMAN

The eight chapters and one appendix of this book pull together much timely information about the strangest, and possibly the most important, type of chemical bond known. Certainly in macromolecules, the hydrogen bond is paramount in determining the chemical properties that have led to the dazzling successes of molecular biology.

This book is the best yet available for an introduction to the physical methods and the chemical criteria for studying the bond. The first four chapters review methods of electron, x-ray and neutron diffraction along with those of spectroscopy and nuclear magnetic resonance. Essential theory underlying each method is outlined and compared with experiment. Organic and biological molecules, inorganic crystals and hydrates and ferroelectrics are discussed with a generous complement of structural formulas and



HYDROGEN BONDING in part of sodium perxenate octahydrate, showing the surrounding of a single perxenate ion. Color shows oxygen atoms.