I. Introduction

For a number of years the author and his co-workers have been interested in alloying theory. Initially we were concerned with the rare earths[1] and the actinide elements,[2,3] but more recently we extended our range of interest to include most of the metallic and semimetallic elements of the Periodic Table.[4,5] Soon after we had become involved in this enlarged field, it became apparent that no extensive listing of many of the physical properties and some of the derived properties of the elements, such as the Grüneisen constant, could be found in the commonly available handbooks or reference books. Although some books and review articles contained selected values for a few of these properties of many of the metals, there were still a small number of elements for which data were not available. Furthermore, a number of values listed in the handbooks were found to be outdated and needed to be replaced by more recent data. For these reasons we found it necessary to make our own compilation of data to facilitate furthering our study of the alloying behavior of the elements. It was then felt that these data would not only be of interest to us but also to other scientists actively engaged in the studies of solids; therefore, these values are being presented in the hope that they will be useful to a large segment of research workers.

1. General Description of the Tables of Physical Properties

The physical properties given in this compilation are listed in the accompanying tabulation according to the table in which they can be found. Values for two quantities that have frequently been used in alloying-theory studies, viz., the metallic radius and electronegativity, are not included here. Such data have been compiled and published fairly recently.[6] Other properties, such as magnetic susceptibility, electrical resistivity, and thermal conductivity, which are generally of interest to those studying solids, are not included in this compilation primarily because such properties do not appear to be important in alloying theory.

[1] K. A. Gschneidner, Jr. and J. T. Waber, *in* "The Rare Earths" (F. H. Spedding and A. H. Daane, eds.), p. 386. Wiley, New York, 1961.
[2] J. T. Waber, *in* "Extractive and Physical Metallurgy of Plutonium and Its Alloys" (W. H. Wilkinson, ed.), p. 111. Wiley (Interscience), New York, 1960.
[3] J. T. Waber and K. A. Gschneidner, Jr., *in* "Plutonium 1960" (E. Grison, W. B. H. Lord, and R. D. Fowler, eds.), p. 109. Cleaver-Hume, London, 1961.
[4] K. A. Gschneidner, Jr. and G. H. Vineyard, *J. Appl. Phys.* **33,** 3444 (1962).
[5] J. T. Waber, K. A. Gschneidner, Jr., A. C. Larson, and M. Y. Prince, *Trans. AIME* **227,** 717 (1963).

Table number	Table title
I	Young's (Elastic) Modulus
II	Shear Modulus
III	Poisson's Ratio
IV	Isothermal Compressibility
V	Compressibility at Zero Pressure and the Bulk Modulus
VI	Linear Coefficient of Thermal Expansion
VII	Atomic Volume
VIII	Primary and Secondary Fixed Points of the International Practical Temperature Scale
IX	Melting Point
X	Heat of Fusion
XI	Boiling Point at 1 Atmosphere
XII	Cohesive Energy and Heat of Sublimation at 298°K
XIII	Electronic Specific Heat Constant
XIV	Heat Capacity at Constant Pressure and at Constant Volume and the Dilation Term
XV	Debye Temperatures Obtained from Specific Heat Data and from the Lindemann Equation
XVI	Debye Temperatures Obtained from Specific Heat Data and from Elastic Constants
XVII	Debye Temperatures Obtained from Electrical Resistivity, Thermal Expansion, and X-Ray Intensity Data
XVIII	Comparison of Debye Temperatures

The values of the properties given in the tables, unless otherwise noted, are for the common modifications of the elements existing at 298°K (25°C). Specifically, these are the following: the crystalline forms of boron, carbon (see below), sulfur (see below), arsenic $(A7)$[6a], selenium $(A8)$,[6a] and tellurium $(A8)$[6a]; the hexagonal closest-packed $(A3)$[6a] forms of beryllium, scandium, titanium, cobalt, yttrium, zirconium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, lutetium, hafnium, and thallium; the face-centered cubic $(A1)$[6a] forms of calcium, strontium,

[6] E. Teatum, K. Gschneidner, Jr., and J. Waber, *U.S. At. Energy Comm.* Rept. LA-2345 (June, 1960).
[6a] *Strukturbericht* notation.