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Gschneidner K A, Jr. Physical properties and interrelationships of metallic and semimetallic elements. *Solid State Phys.* **16**:275-426, 1964.
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Many of the physical properties of the elements were compiled to provide an extensive and compact listing of these properties in one source. In addition, several interrelationships and correlations between the various properties were examined. [The *SCI*® indicates that this paper has been cited in over 790 publications since 1964.]

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"Work began on this compilation at the Los Alamos Scientific Laboratory in 1961. We (primarily Jim Waber, George Vineyard, and I) were working on the theory of alloy phase formation of the rare earth[1] and actinide[2,3] elements. As our successes and interests grew, we became involved with almost all of the elements in the periodic table,[4-6] especially the metallic and semimetallic elements. It quickly became apparent that there was no extensive listing of many of the physical properties and derived parameters (e.g., the Grüneisen constant) we needed—although some values could be found in the commonly available handbooks or reference books. Furthermore, it was evident that some of the handbook values were outdated and needed to be replaced by more recent data. Thus, we found it necessary to make our own compilation of data to facilitate our continuing study of the theory of phase formation of the elements[1-6] and the theory of metal alloys.[4,5,7]

"In the fall of 1962, as I was starting a year's leave of absence at the University of Illinois, Fred Seitz encouraged me to complete the compilation. Furthermore, he offered to include it in the *Solid State Physics* review series he and D. Turnbull were editing, since we both felt that these data would be of interest to other scientists engaged in the study of solids. It took most of the year to complete the task: gathering the missing data, evaluating them for consistencies, estimating unknown physical properties by making use of the periodic relations of the elements, calculating the derived properties, and examining their interrelationships.

"In 1978, I received the William Hume-Rothery Award from the Metallurgical Society of the American Institute of Mining, Metallurgical and Petroleum Engineers 'in recognition of outstanding scholarly contributions to the science of alloys.' I believe the review was a contributing factor to my winning this award and subsequently, in 1979, to being named a distinguished professor in science and humanities by Iowa State University.

"Predominant, I believe, among the reasons this publication has been cited by others are: 1) that some of the physical property data are difficult to locate in the standard reference books and handbooks and 2) that many of the derived parameters are rarely tabulated. My greatest satisfaction, however, comes from finding that other scientists have made use of these tabulated values in their theories, or in comparison with their experimental data. This counts more than all the personal benefits I have derived from using this compilation in my research and teaching activities. For reviews of recent work, see references 8, 9, and 10."

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2. **Waber J T.** Some principles of the alloy behavior of plutonium. (Wilkinson W D, ed.) *Extractive and physical metallurgy of plutonium and its alloys*. New York: Interscience, 1960. p. 111-47.
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4. **Teatum E, Gschneidner K A, Jr. & Waber J T.** *Compilation of calculated data useful in predicting metallurgical behavior of the elements in binary alloy systems*. Los Alamos, NM: Los Alamos Scientific Laboratory, 1959. 222 p. US Atomic Energy Commission Report LA-2345.
5. ----------. *Compilation of calculated data useful in predicting metallurgical behavior of the elements in binary alloy systems*. Los Alamos, NM: Los Alamos Scientific Laboratory, 1968. 206 p. US Atomic Energy Commission Report LA-4003.
6. **Waber J T, Gschneidner K A, Jr., Larson A C & Prince M Y.** Prediction of solid solubility in metallic alloys. *Trans. Met. Soc. AIME* **227**:717-23, 1963.
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8. **Bennett L H,** ed. *Theory of alloy phase formation*. Warrendale, PA: Metallurgical Society of AIME, 1980. 525 p.
9. **Bennett L H, Massalski T B & Giessen B C,** eds. *Alloy phase diagrams*. New York: North-Holland, 1983. 436 p.
10. **Kittel C.** *Introduction to solid state physics*. New York: Wiley, 1976. 599 p.