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Superconductive Materials and Some of Their Properties



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Superconductive Materials and Some of Their Properties

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FOREWORD

The NSRDS is a nation-wide program to provide to the U.S. technical community optimum access to the quantitative data of physical science, critically evaluated and compiled for convenience. It was established in 1963 by action of the President's Office of Science and Technology. Responsibility for administering this effort was given to the National Bureau of Standards. The Office of Standard Reference Data was set up within the NBS as the program management and coordinating vehicle. Recently Congress strengthened the program by passing PL90-396, The Standard Reference Data Act, which was signed into law July 11, 1968. The Act states: "It is the policy of the Congress to make critically evaluated data readily available to scientists, engineers, and the general public... The Secretary [of Commerce] is authorized and directed to provide or arrange for the collection, compilation, critical evaluation, publication, and dissemination of standard reference data. "

The System now comprises a complex of data centers and other activities, carried on in Government agencies, academic institutions, and nongovernmental laboratories. The independent operational status of existing critical data projects is maintained and encouraged. Data centers that are components of the NSRDS produce compilations of critically evaluated data, critical reviews of the state of quantitative knowledge in specialized areas, and computations of useful functions derived from standard reference data. In addition, the centers and projects establish criteria for evaluation and compilation of data and make recommendations on needed modifications or extensions of experimental techniques.

Data publications of the NSRDS take a variety of physical forms, including books, pamphlets, loose-leaf sheets and computer tapes. While most of the compilations have been issued by the Government Printing Office, several have appeared in scientific journals. Under some circumstances, private publishing houses are regarded as appropriate primary dissemination mechanisms.

The technical scope of the NSRDS is indicated by the principal categories of data compilation projects now active or being planned: nuclear properties, atomic and molecular properties, solid state properties, thermodynamic and transport properties, chemical kinetics, colloid and surface properties, and mechanical properties.

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This is a noncritical compilation of data on superconductive materials that has been extracted from a portion of the literature published up to early 1968. The properties concerned are composition, critical temperature, critical magnetic field, crystallographic data, and lowest temperature tested for superconductivity. The compilation also includes, bibliography, general reference review articles and a special tabulation of high magnetic field superconductors.

Key Words: Bibliography, compilation of data, composition, critical field, critical temperature, crystallographic data, low temperature, superconductivity.

INTRODUCTION

This monograph extends the data set on superconductive materials published in Vol. IV of Progress in Cryogenics, 1964, * pages 160-231 (subsequently denoted as PC IV) and includes the information given in the addendum, National Bureau of Standards Technical Note 408 of September 1966. The new material includes a portion of that data that is readily available to the author to early 1968. However, the world activity in the study of superconductive materials has continued at a high rate such that more than 1000 references are in hand and yet to be perused for available data as this Technical Note is assembled. The format of PC IV has been maintained except for minor additions such as thermodynamic data references, namely the electronic specific heats and Debye temperatures.

More than 65 years of research on the phenomena of superconductivity has led to a current world activity aimed at further understanding and exploitation. This effort has produced a technology that is being employed by many industrial concerns. Some of the latest developments include superconductive coils capable of producing magnetic fields approaching 25 Tesla. Superconductive magnets with precise and homogeneous fields and with selective spacial configurations are readily produced including some field gradient patterns that are impossible with normal state conductors. A linear accelerator is under construction with superconductive cavity walls. Large superconductive magnets are under construction for hydrogen bubble chambers with coil diameters on the order of 10 feet and more. Plasma researchers have constructed floating superconductive coils. Also a direct current transformer has recently been discovered utilizing a special arrangement of superconductive thin films for tunneling. However the latter device, long sought in the industrial world, is very small in power capacity and remains a scientific demonstration.

Doubtlessly other applications will be stimulated as the information on superconductivity research and the data produced are disseminated to the scientific and industrial community.

^{*}This data set has also been published in a Soviet book "New Materials and Methods of Investigating Metals and Alloys", edited by Professor I.I. Kornilov of the Baikov Institute of Metallurgy, 1966, Moscow, pp. 1-98.

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GENERAL PROPERTIES OF SUPERCONDUCTORS

The historically first observed and most distinctive property of a superconductive body is the near total loss of resistance at a critical temperature T_c characteristic of each material. Figure 1(a) illustrates schematically two types of possible transitions. The sharp vertical discontinuity is indicative of that found for a single crystal of a very pure element or one of a few well annealed alloy compositions. The broad transition, illustrated by broken lines, suggests the transition shape seen for materials that are inhomogeneous and contain unusual strain distributions. Careful testing of the resistivity limits for superconductors shows that it is less than 4×10^{-23} ohm-cm, while the lowest resistivity observed in metals is of the order of 10^{-13} ohm-cm. If one compares the resistivity of a superconductive body to that of copper at room temperature the superconductive body is at least 10^{17} times less resistive.

The temperature interval ΔT_c , over which the transition between the normal and superconductive states takes place, may be of the order of as little as 2×10^{-5} K or several K in width, depending upon the material state. The narrow transition width was attained in 99.9999 pure gallium single crystals.

A Type I superconductive body below T_c , as exemplified by a pure metal, exhibits perfect diamagnetism and excludes a magnetic field up to some critical field H_c , whereupon it reverts to the normal state as shown in the H-T diagram of Figure 1(b).

The difference in entropy near absolute zero between the superconductive and normal states relates directly to the electronic specific heat, γ ;

$$(S_s - S_n)_{T \to 0} = -\gamma T$$

^{*} To convert "cm" to "m", multiply by 10³.

The NBS Office of Standard Reference Data, as administrator of the National Standard Reference Data System, has officially adopted the use of SI units for all NSRDS publications, in accordance with NBS practice. This publication does not use SI units because contractual commitments with the author predate establishment of a firm policy on their use by NBS. Other appropriate conversion factors will be found on pages VII-2 and VIII-5. We urge that specialists and other users of data in this field accustom themselves to SI units as rapidly as possible.



Figure 1. Physical properties of superconductors. (a) Resistivity versus temperature for a pure and perfect lattice (solid line). Impure and/or imperfect lattice (dashed line).(b) Magnetic field-temperature dependence for Type I or "soft" superconductors.(c) Schematic magnetization curve for "hard" or Type II superconductors.

HIGH FIELD SUPERCONDUCTIVITY

The discovery of the large current-carrying capability of Nb₃Sn and other similar alloys has led to an extensive study of the physical properties of these alloys. In brief, a high field superconductor, or Type II superconductor, passes from the perfect diamagnetic state at low magnetic fields to a mixed state and finally to a sheathed state before attaining the normal resistive state of the metal. The magnetization of a typical high field superconductor is shown in Figure 1(c). The magnetic field values separating the four stages are given as H_{c1} , H_{c2} , and H_{c2} . The superconductive state below H_{c1} is perfectly diamagnetic and identical to the state of most pure metals of the "soft" or Type I type. Between Hc1 and Hc2 a "mixed superconductive state" is found in which fluxons (a minimal unit of magnetic flux) create lines of normal superconductor in a superconductive matrix. The volume of the normal state is proportional to $-4\pi M$ in the "mixed state" region. Thus at H_{c2} the fluxon density has become so great as to drive the interior volume of the superconductive body completely normal. Between H_{c_2} and H_{c_3} the superconductor has a sheath of currentcarrying superconductive material at the body surface, and above H_{c3} the normal state exists. With several types of careful measurement, it is possible to determine H_{c1}, H_{c2}, and H_{C3}. Table III contains some of the available data on high field superconductive materials.

High field superconductive phenomena are also related to specimen dimension and configuration. For instance, the Type I superconductor, Hg, has entirely different magnetization behavior in high magnetic fields when contained in the very fine set of filamentary tunnels in an unprocessed Vycor glass. The great majority of superconductive materials are Type II. The elements in very pure form and a very few precisely stoichiometric and well annealed compounds are Type I with the possible exceptions of vanadium and niobium.

CRITERIA FOR THE EXISTENCE OF THE SUPERCONDUCTIVE STATE

Experimental and theoretical attempts to evolve concretely the criteria for superconductivity in elements, alloys and materials still persist. A useful criterion has been found in Matthias' rules. These were developed empirically and then qualitatively shown to be derivable from the electronic properties of the atoms as presented in the periodic table. The primary empiricism of Matthias' rules is the prediction that alloys with average numbers of valence electrons per atom on the low sides of valence 5 and valence 7 will with some probability have high T_c . The average number of valence electrons is taken directly from the periodic table and an example of the validity of the empiricism is shown in Figure 2. Here the critical temperature of the known superconductive compounds having the A15 (β -W) or CrO₃ crystal structure are shown with the critical temperatures plotted versus the mean number of valence electrons per atom. Other parameter considerations such as the atomic volume and the mass of the constituent atoms have been useful but only in comparison within very similar systems.

A new and exciting discovery of a superconductive ternary alloy has been made with a T_c of 20.05 K. This is the first alloy to exceed the Nb₃Sn-base materials with critical temperatures up to about 18.5 K. The alloy follows Matthias' rules by having e/A of 4.55 corresponding to Nb₃Al_{0.8}Ge_{0.2} (see Ref. 704). Subsequent study of the ternary has raised the critical temperature to 20.7 K^{*} with initiation of the transition near 21 K. This is the <u>first</u> known superconductor with a T_c above the boiling point of liquid hydrogen at STP. The e/A ratio is 4.62 (close to the maximum in Fig. 2) and heat treatment temperature as well as the attained state of order appears to be important.

More semiconductive compounds have been found to be superconductive when studied after or during the application of high pressure and strontium titanate has been found superconductive at atmospheric pressure. The very high pressure phases of silicon and germanium have been shown to become superconductive in new dense phases. The additional discoveries of superconductive modifications of antimony, bismuth, cerium and gallium and the discovery of the very low critical temperature of tungsten leads to the repeated prediction that all metals are superconductive even if critical temperatures are currently too low to be measured. Some valid correlations now suggest that the noble metals (see Table I) such as gold and platinum will be superconductive if taken to temperatures of a few times 10^{-4} or 10^{-5} K.

The crystal structure of known superconductors has been a useful guide in discovering others. The classic example is the large number of superconductive Al5 compounds. Other crystal structures such as the Laves phases and the χ -phase of α -Mn structure show a pronounced tendency to be superconductive. It is thought that the crystal structure has a secondary influence on the critical temperature, however, and that the important consideration is the electronic structure which leads to a high density of electron states at the fermi level. Since very few band structures are known for alloys with the structural complexity of the cubic A15 type, little applicable general theory has been achieved to date. Correlations of the electronic specific heat and the Debye θ 's have tended to confirm the BCS (Bardeen-Cooper-Schrieffer) prediction within selected groups of superconductive materials. However there is evidence that precise correlation with the BCS theory is not always possible.

^{*}S. Foner, B.T. Matthias et al. Private communication. To be published in Proceedings of LT11., St. Andrews, Scotland, August 1968.

A continuing factor in the data presented are the newly discovered very low critical temperature superconductive materials and the number of non-superconductive materials studied down to temperatures well below 1 K. The disappointing lack of new superconductive materials with critical temperatures greater than 18.5 K has been overcome in the Nb₃(Al, Ge) ternary system. However, the theoretical problem still exists. Is there a limit to superconductive critical temperatures somewhere in the vicinity of 21 K or are there undiscovered materials with critical temperatures above this? Abrikosov (see Review Article Reference) has suggested from rudimentary theory that the maximum T_c will be about 40 K. He also entertains the possibility that other mechanisms than the Cooper electron pairs may lead to the superconductive state and recent excitement has arisen over the divergence from normal of the isotope coefficient in uranium. The technical desirability of finding superconductors with higher T_c is clear since critical magnetic fields will be proportionately higher.



Figure 2. Critical temperature versus valence electron/atom ratio for " β -W" or Al5 (Cr₃O) - type compounds.

METALLURGICAL ASPECTS

The sensitivity of superconductive properties to the material state is most pronounced and has been used in a reverse sense to study and specify the detailed state of alloys. The mechanical state, the homogeneity, and the presence of impurity atoms and other electron scattering centers are all capable of controlling the critical temperature and the currentcarrying capabilities in high magnetic fields. Well annealed specimens tend to show sharper transitions than those that are strained or inhomogeneous. This sensitivity to mechanical state underlines a general problem in the tabulation of properties for superconductive materials. The occasional divergent values of the critical temperature and of the critical fields quoted for a Type II superconductor may lie in the variation in sample preparation. Critical temperatures of materials studied early in the history of superconductivity must be evaluated in light of the probable metallurgical state of the material as well as the availability of less pure starting elements. It has been noted that recent work has given extended consideration to the metallurgical aspects of sample preparation.

NOTES CONCERNING DATA IN THE MONOGRAPH

Table 1 lists the elements and some of their superconductive properties. The data have been selected generally from recent studies in which sample purity and perfection appear to have been seriously considered.

Table 2 contains superconductive materials reported during the period (including the information presented in Technical Note 408) plus all materials that have been reported to be tested specifically for a superconducting transition down to some temperature T_n without discovery of a transition. All compositions are denoted on an atomic basis, i.e. AB, AB2 or AB₃ for compounds, unless noted. Solid solutions or odd compositions may be denoted as $A_z B_{1-z}$, or $A_z B$. A series of three or more alloys is indicated as $A_x B_y$ or by actual indication of the atomic fraction range such as A0-0.6B1-0.4. The critical temperature of such a series of alloys is denoted by a range of values or possibly the maximum value. In many cases several references will be found for the same alloy. This usually denotes a separate measurement by each source, and in a few cases may even indicate a disagreement over the superconductive properties. In view of the previous discussions concerning the variability of the superconductive properties as a function of purity and other metallurgical aspects, it is recommended that the appropriate literature be checked to determine the most probable critical temperature or critical field of a given alloy. Another point of difficulty lies in the selection of the critical temperature from a transition observed in the effective permeability or the change in resistance, or possibly the incremental changes observed in frequency observed by certain techniques. Most authors choose the mid-point of such curves as the probable critical temperature of the idealized material, and others will choose the highest temperature at which a deviation from the normal state property is observed. Often the choice is not specified.

Table 3 lists high magnetic field superconductors.

Review articles concerned primarily with the experimental and material aspects of superconductivity are appended as well as a complete alphabetical cross-reference to authors by reference number.

Acknowledgments

Preprints and courtesy copies of reports on superconductive materials have been kindly sent by many researchers in the field and found most useful and are gratefully acknowledged. Special appreciation is extended to G.V. Samsonov of Kiev for an extended collection of data on nitrides, carbides and borides and to N.E. Alekseevskii of Moscow for information. The expert recording, collation, checking and typing assistance of Mrs. Joan Wolfe, Miss Mary Beth Marquis and Miss Claudia Gnoinski have contributed greatly to the monograph. The thorough coverage of the scientific literature is due to the library staff's fine efforts in seeking pertinent articles under the direction of Miss Vera O. Chase.

 $(mJ mole^{-1} deg. K^{-2})$ Т_(К) Ho(oersteds) θ_D(K) Cal. Mag. Element Cal. (See tbelow) (See # below) Mag. A1 1.183 1.196 104 99 420 1.36 Cd0.54,0.518 0.56 29.6 30 209 0.688 Ga 1.087,1.078 1,091 59.4, 58.9 51 317, 324.7 0.601, 0.596 Ga (β) 6.2 Ga (y) 7.62 HF* Hg (a) 4.16 4.154 380 410.9 87, 71.9 1.81 Hg (B) 3.949 339 93 1.37 1n 3.407 3.4035 282.7 293 109 1.66 1r 0.14 19 420 3.2 La (α) 4.80 4.9 142 10.0 La (β) 5.91 6.06 1,600 132 6.7 Mo 0.915-0.918 0.92 95 98 460 1.83 Nb 9.17 9.26 1,944 1,980, 277 7.79 HF* Os 0.655 65 500 2.35 Pa 1.4 \mathbf{Pb} 7.23 7.193 803, HF* 96.3 3.0 Pt <0.001 Re 1.699 1.698 188 198 415 2.35 Rh <0.001 500 4.7 Ru 0.49 66 550 3.0 \mathbf{Sb} 2.6-2.7 HF≭ Sn 3,722 3.722 303 305.50 195 1.74 Та 4.39 4.483 780 830, HF* 258 6.0 Tc 8.22, 7.92 Th 1.368 131162 168 4.65 Τi 0.42 0.39 56 100, HF* 425 3.32 T12.38 2.39 176.5 171 78.5 1.47 U (α) 0.68,0.23 206 12.2 U (pseudo- γ) 1.80 (extrapolated value) V 5.37 5.30 1,310 1,020, HF* 399 9.8 W 0.012 1.07 550 3.0 Zn 0.852 0.875 51.8 53 309 0.66 Zr 0.546 47 290 2.78 Zr (11) 0.65

 Table 1. Properties of Superconductive Elements (References given in Table 2, as well as Crystal Structure Data and Information on Non-superconductive Elements)

| (| V | I | I۰ | • 2 |) |
|---|---|---|----|-----|---|
|---|---|---|----|-----|---|

| | Т _с (К) | H _o (oersteds) ¹ | $\theta_{\rm D}$ (K) (mJ mole ⁻¹ deg. K | ⁻²) |
|----------|-----------------------|--|---|-----------------|
| Element | Cal. Mag. | Cal. Mag. | (See t below) (See t below) | |
| | Thin | films formed at various temperate | ires | |
| Al | 1,3-3,7 | | | |
| Ве | ~6, ~8.4 | H _{c2} ≫11,000 | | |
| Bi | ~6.0 | | | |
| Ga | 8.4, 7.2 | | | |
| In | 3.95-4.25, 3.7 | | | |
| La | 5.00-6.74 | | | |
| Мо | ~5 | | | |
| Re | ~7 | | | |
| Sn | 4.6-4.7, 4.1 | | | |
| ті | 1.3M | | | |
| W | 1.7-4.1 | | | |
| | | Under high pressure | | |
| Bi II | 3.916 3.90 3.86 | | Pressure 2 25,000 atm 25,200 atm 26,800 atm | |
| Bi III | 7.25 | HF* | 27,000-28,400 atm | |
| Ce | 1.7 | | 50 kbar | |
| Ge | 4.85-5.4 | | ~120 kbar | |
| Se II | 6.75, 6.95 | | ~130 kbar | |
| Si | 7.1 | | 120-130 kbar | |
| Те | ~3.3 | HF* | ~56,000 atm | |
| T1 (FCC) | 1.45 | | 35 kbar | |
| Tl (HCP) | 1.95 | | 35 kbar | |

† For another data set see Mendelssohn, K., Cryophysics, p. 178 (Interscience, New York, 1960).

* Parkinson, D.H., Rep. progr. Phys. 21, 226 (1958). Also see Reference 572.

HF* See Table 3 for additional data on H_{C1}, H_{C2} and H_{C3}. M equals maximum. FCC is face-centered cubic. HCP is hexagonal close-packed.

¹ To convert "oersteds" to ampere/meters, multiply by 7.957 x 10³. ² To convert "atm" to "newton/meter²", multiply by 1.013 x 10⁵.

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Table 2. Tabulation of Superconductive Materials (including Proven Non-superconductors) with Critical Temperatures and Fields, Crystal Structure Data where determined, and References.

Symbols used:

- * Eutectic alloy.
- Δ Uncertain composition.
- R Resistance measurements.
- M Denotes maximum T_c in series of specimens or compositions.
- ** T_n is the lowest temperature at which a material has been checked for a superconductive transition.
- HF In H_o column indicates that some information is available in Table 3 on high field magnetic properties.
- On material or reference indicates a thin film study.
- ∞ All cell edges are intended to be quoted in Angström units.
- T_{c}^{1} (----) Denotes incremental changes in T_{c} from T_{c} of pure metal.
- o Impure material.
- C Calorimetric determination.
- VA Valence electron/atom.
- SS Solid solution.
- n Number of carriers in superconductive semiconductive materials.
- # Electronic specific heat (γ) and/or Debye θ data given.

(Some of the above symbols may be found only in PROGRESS IN CRYOGENICS article - PC IV).

| "Struckturbericht" Type* | Example | Class |
|-----------------------------|--------------------|--|
| A1 | Cu | Cubic, f.c. |
| A2 | W | Cubic, b.c. |
| A3 | Mg | Hexagonal, close packed |
| A4 | Diamond | Cubic, f.c. |
| A5 | White Sn | Tetragonal, b.c. |
| A6 | In | Tetragonal, b.c. (f.c. cell usually used) |
| A7 | As | Rhombohedral |
| A8 | Se | Trigonal |
| A10 | Hg | Rhombohedral |
| A12 | ∝- Mn | Cubic, b.c. |
| A13 | β-Mn | Cubic |
| A15 | β-W | Cubic |
| B1 | NaCl | Cubic, f.c. |
| B2 | CsCl | Cubic |
| B3 | ZnS | Cubic |
| B4 | ZnS | Hexagonal |
| B81 | NiAs | Hexagonal |
| B82 | Ni ₂ In | Hexagonal |
| B10 | PbO | Tetragonal |
| B11 | γ-CuTi | Tetragonal |
| B17 | PtS | Tetragonal |
| B18 | CuS | Hexagonal |
| B20 | FeSi | Cubic |
| B27 | FeB | Ortho-rhombic |
| B31 | MnP | Ortho-rhombic |
| B32 | NaT1 | Cubic, f.c. |
| B34 | PdS | Tetragonal |

KEY TO CRYSTAL STRUCTURE TYPES FOUND IN TABLE 2

*See W.B. Pearson, Handbook of Lattice Spacing and Structures of Metals (Pergamon, New York, 1958), p. 79, also Vol. II (Pergamon, New York, 1967), p. 3.

| "Struckturbericht" Type* | Example | Class |
|-----------------------------|------------------------|------------------|
| B_{f} | δ-CrB | Ortho-rhombic |
| Bg | MoB | Tetragonal, b.c. |
| B _h | WC | Hexagonal |
| В _і | γ΄-MoC | Hexagonal |
| C1 | CaF_2 | Cubic, f.c. |
| C1 _b | MgAgAs | Cubic, f.c. |
| C2 | FeS_2 | Cubic |
| C6 | CdI_2 | Trigonal |
| C11b | $MoSi_2$ | Tetragonal, b.c. |
| C12 | $CaSi_2$ | Rhombohedral |
| C14 | $MgZn_2$ | Hexagonal |
| C15 | Cu ₂ Mg | Cubic, f.c. |
| C15 _b | $AuBe_5$ | Cubic |
| C16 | CuAl ₂ | Tetragonal, b.c. |
| C18 | FeS_2 | Ortho-rhombic |
| C22 | Fe ₂ P | Trigonal |
| C23 | $PbCl_2$ | Ortho-rhombic |
| C32 | AlB ₂ | Hexagonal |
| C36 | $MgNi_2$ | Hexagonal |
| C37 | Co ₂ Si | Ortho-rhombic |
| C49 | $ZrSi_2$ | Ortho-rhombic |
| C54 | TiSi ₂ | Ortho-rhombic |
| C _c | $\rm Si_2Th$ | Tetragonal, b.c. |
| $D0_3$ | BiF_3 | Cubic, f.c. |
| D0 ₁₁ | Fe_3C | Ortho-rhombic |
| D0 ₁₈ | Na ₃ As | Hexagonal |
| D0 ₁₉ | Ni ₃ Sn | Hexagonal |
| D0 ₂₀ | NiAl ₃ | Ortho-rhombic |
| D0 ₂₂ | $TiAl_3$ | Tetragonal |
| D0 _e | Ni_3P | Tetragonal, b.c. |

| "Struckturbericht" Type* | Example | Class |
|-----------------------------|-----------------------------------|------------------|
| D1 ₃ | Al ₄ Ba | Tetragonal, b.c. |
| D1 _c | $PtSn_4$ | Ortho-rhombic |
| $D2_1$ | CaB_6 | Cubic |
| D2 _c | MnU_6 | Tetragonal, b.c. |
| D2 _d | $CaZn_5$ | Hexagonal |
| $D5_2$ | La_2O_3 | Trigonal |
| $D5_8$ | $\mathrm{Sb}_2\mathrm{S}_3$ | Ortho-rhombic |
| $D7_3$ | $\mathrm{Th}_{3}\mathrm{P}_{4}$ | Cubic, b.c. |
| D7 _b | Ta_3B_4 | Ortho-rhombic |
| $D8_1$ | $\mathrm{Fe}_{3}\mathrm{Zn}_{10}$ | Cubic, b.c. |
| $D8_2$ | Cu ₅ Zn ₈ | Cubic, b.c. |
| $D8_3$ | Cu ₉ Al ₄ | Cubic |
| $D8_8$ | Mn_5Si_3 | Hexagonal |
| D8 _b | CrFe | Tetragonal |
| D8 _i | Mo_2B_5 | Rhombohedral |
| D10 ₂ | ${\rm Fe_3Th_7}$ | Hexagonal |
| $E2_1$ | $CaTiO_3$ | Cubic |
| E93 | $\mathrm{Fe_{3}W_{3}C}$ | Cubic, f.c. |
| L1 ₀ | CuAu | Tetragonal |
| $L1_2$ | Cu ₃ Au | Cubic |
| L_{2b}' | ThH_2 | Tetragonal, b.c. |
| L'_3 | Fe ₂ N | Hexagonal |

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| Material | Т _с (К) | H _o (oersteds) ¹ | T_** | Crystal Structure ∞ | Ref. |
|--|--------------------------------|--|------|--|--------------|
| Ag _{3.3} A1 | | | 0.34 | like A13, a=6.92 | 486 |
| Ag _x A1 _y Zn _{1-x-y} | 0.5-0.845 | | | | 624 |
| Ag7 ^{BF} 4 ⁰ 8 | 0.15 | | | Cubic, a=9.942 | 605 |
| Ag ₅ Ba | | | 0.34 | D2 _d , a=5.71, c=4.64 | 486 |
| AgBi2 | 3.0-2.78 | | | | 606 |
| ^{Ag} 7 ^F 0.25 ^N 0.75 ^O 10.25 | 0.85-0.90 | | | | 605 |
| Ag7 ^{F0} 8 | 0.3 | | | Cubic, a=9.833 | 605 |
| Ag2 ^F | 0.066 | 2.5 | | | 651 <i>#</i> |
| ^{Ag} 0.3-0.02 ^{Ga} 0.7-0.98 | | | 1.4 | | 533,585 |
| Ag _{0.95-0.81} Ga _{0.05-0.19} | | | 1.4 | | 533 |
| Ag0.80-0.30 ^{Ga} 0.20-0.70 | 6.5-8 | | | | 533 |
| Ag _x Ga _y In _{0.10} | 6.5-8 | | | | 533,585 |
| Ag _x Ga _y Sn _{0.10} | 4.2 | | | | 533,585 |
| Ag _x Ga _y Zn _{0.10} | 6.5-8 | | | | 533,585 |
| Ag ₄ Ge | 0.85 | | | Hex., h.c.p. | 487 |
| ^{Ag} 0.438 ^{Hg} 0.562 | 0.64 | | | D8 _{1,2,3} "gamma brass", complex b.c.c. | 489,511 |
| Ag ₃ In | | | 1.4 | | 533,585 |
| Ag _{0.1} In _{0.9} Te (n=1.40 x 1 | 0 ²²)*** 1.20-1.89 | | | Bl, a=6.12 | 470 |
| Ag _{0.2} In _{0.8} Te (n=1.07 x 1 | 0 ²²) 0.77-1.00 | | | B1, a=6.08 | 470 |
| AgLa | 0.92-0.96 | | | | 697 |

Table 2. Tabulation of Superconductive Materials (including Proven Non-superconductors) with Critical Temperatures and Fields, Crystal Structure Data where determined, and References.

*** n = number of normal carriers per cubic centimeter for semiconductor superconductors.

 1 To convert "oersteds" to ampere/meters, multiply by 7.957 \times $10^3.$

(VIII-6)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure ∞ | Ref. |
|---|--------------------|---------------------------|------|----------------------------------|------------------------------|
| AgLa (9.5 kbar) | 1.2 | | | B2 | 697 |
| AgLu | | | 0.33 | B2 | 658 |
| Ag7 ^{NO} 11 | 1.04 | 57 | | Cubic, a=9.893 | 605 |
| Ag0-1.00 ^{Pd} 1.00-0 | | | | A1 | 572 # |
| AgSi ₂ | | | 1.4 | | 533,58 |
| Ag ₅ Sn | | | 0.34 | A3, a=2.94, c=4.77 | 486 |
| ^{Ag} 1-0.92 ^{Sn} 0-0.08 | | | | | 63 0 <i>#</i> |
| Ag _x Sn _{1-x} ⊽ | 2.0-3.8 | | | | 693 [⊽] |
| Ag ₃ Sn [⊽] | | | | | 693 [⊽] |
| Ag ₅ Sr | | | 0.34 | D2 _d , a=5.68, c=4.62 | 486 |
| AgTe ₃ | 2.6 | | | Cubic, primitive | 487 |
| AgY | | | 0.33 | B2 | 658 |
| Ag _x ^{Zn} 1-x | 0.5-0.845 | | | | 624 |
| Ag0-0.0566 ^{Zr} 1-0.9434 | | | | A3 | 572# |
| Al _{0.1} (with 3d metals) | | | | A2, b.c.c. | 572# |
| Al _{0.2} (with 3d metals) | | | | A2, b.c.c. | 572 # |
| A1 [♥] | 2.13-2.31 | | | | 595 |
| A1 [▽] | 1.5-3.7 | | | | 596 [▽] |
| Al [♥] | 1.3-2.25 | | | | 619 [∇] |
| Al (1 to 21 katm) | 1.170-0.687 | | | A1 | 639 |
| Al ₂ Au | | | 0.34 | C1, a=6.01 | 486 |
| AlAu ₄ | 0.4-0.7 | | | Like A13, a=6.92 | 486 |
| A14C3 | | | 1.38 | | 558 |

(VIII-7)

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure ∞ | Ref. |
|---|--------------------|---------------------------|-----------|---|-------------|
| Alccr2 | | | 1.1 | Hex., "H-phase" | 632 |
| Al ₂ CCr ₃ | | | 4.2 | Hex., "H-phase," A=2.47, c=7.39 | 496,497,638 |
| A12 ^{CMo} 3 | 9.8-10.2 | 1700 | | Al3 + trace 2nd phase | 571 |
| A12 ^{CMo} 3 | 10.0 | | | Al3, a=6.867 | 496,497,632 |
| A1CNb2 | | | 4.2 | Hex. | 497 |
| A12 ^{CNb} 3 | | | 4.2 | Hex., "H - phase," a=2.67, c=8.02 | 496,497,638 |
| Al ₂ CTa ₃ | | | 4.2 | Hex., "H-phase," a=2.68, c=7.97 | 496,497,638 |
| A12 ^{CT1} 3 | | | 4.2 | Hex., "H-phase," a=2.63, c=7.87 | 496,497,638 |
| ALCV2 | | | 1.1 | Hex., "H-phase" | 632 |
| A12 ^{CV} 3 | | | 4.2 | Hex., "H-phase," a=2.52, c=7.52 | 496,497,638 |
| Al ₂ Ce | | | 0.34 | C15 | 655 |
| Al ₂ Ce | | | 0.34 | | 655 |
| ^{A1} 0.107 ^{Co} 0.088 ^{Fe} 0.805 | | | 1.4 | Cub ic | 514# |
| ^{A1} 0.107 ^{C0} 0.176 ^{Fe} 0.717 | | | 1.4 | Cubic | 514# |
| ^{A1} 0.107 ^{C0} 0.259 ^{Fe} 0.634 | | | 1.4 | Cubic | 514# |
| ^{A1} 0.118 ^{Co} 0.446 ^{Fe} 0.436 | | | 1.4 | Cubic | 514# |
| ^{Al} 0.118 ^{Co} 0.523 ^{Fe} 0.359 | | | 1.4 | Cubic | 514# |
| ^{A1} 0.119 ^{Co} 0.352 ^{Fe} 0.529 | | | 1.4 | Cubic | 514# |
| ^{A1} 0.119 ^{Co} 0.610 ^{Fe} 0.271 | | | 1.4 | Cubic | 514# |
| A10.049 ^{Cr} 0.951 | | | 1.4 | A2 | 514# |
| A10.10 ^{Cr} 0.90 | | | 1.4 | Cubic | 514# |

(VIII-8)

| Material | т _с (К) | H _o (oersteds) | T_** | Crystal Structure ∞ | Ref. |
|---|-------------------------|---------------------------|------|---------------------|------|
| Al _{0.146} Cr _{0.854} | | | 1.4 | Cubic | 514# |
| A10.20 ^{Cr} 0.80 | | | 1.4 | Cubic | 514# |
| A10.250 ^{Cr} 0.750 | | | 1.4 | Cubic | 514# |
| A10.30 ^{Cr} 0.70 | | | 1.4 | Cubic | 514# |
| A10-0.30 ^{Cr} 1-0.70 | | | | A2 | 572# |
| AlCr0-0.0016 | T' _c (-0.33) | | | | 598 |
| Al _{1-x} Cr _x | T' deducible | | | | 673 |
| ^{A1} 0.089 ^{Cr} 0.544 ^{Fe} 0.367 | | | 1.4 | Cubic | 514# |
| Al0.09 ^{Cr} 0.046 ^{Fe} 0.866 | | | 1.4 | Cubic | 514# |
| A10.09 ^{Cr} 0.228 ^{Fe} 0.682 | | | 1.4 | Cubic | 514# |
| A10.091 ^{Cr} 0.817 ^{Fe} 0.092 | | | 1.4 | Cubic | 514# |
| A10.095 ^{Cr} 0.453 ^{Fe} 0.452 | | | 1.4 | Cubic | 514# |
| A10.096 ^{Cr} 0.679 ^{Fe} 0.225 | | | 1.4 | Cubic | 514# |
| ^{A1} 0.097 ^{Cr} 0.726 ^{Fe} 0.177 | | | 1.4 | Cubic | 514# |
| Al _{0.100} Cr _{0.632} Fe _{0.268} | | | 1.4 | Cubic | 514# |
| ^{A1} 0.104 ^{Cr} 0.849 ^{Fe} 0.047 | | | 1.4 | Cubic | 514# |
| ^{A1} 0.105 ^{Cr} 0.753 ^{Fe} 0.142 | | | 1.4 | Cubic | 514# |
| A10.10 ^{Cr} 0.63 ^V 0.27 | | | 1.4 | Cubic | 514# |
| A10.111 ^{Cr} 0.801 ^V 0.089 | | | 1.4 | Cubic | 514# |
| A10.114 ^{Cr} 0.267 ^V 0.618 | | | 1.4 | Cubic | 514# |
| ^{A1} 0.115 ^{Cr} 0.708 ^V 0.177 | | | 1.4 | Cubic | 514# |
| A10.115 ^{Cr} 0.839 ^V 0.045 | | | 1.4 | Cubic | 514# |
| A1 0,122 Cr 0,458 V 0,042 | | | 1.4 | Cubic | 514# |

(VIII-9)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure 👓 | Ref. |
|---|---------------------|---------------------------|------|---|--------------|
| A1 _{0.131} Cr _{0.088} V _{0.781} | 1.46 | | | Cubic | 514# |
| ^{A1} 0-0.50 ^{Fe} 1-0.50 | | | | A2 | 572# |
| ^{A1} 0.01-0.02 ^{Fe} 0.99-0.98 | | | | | 572 # |
| A1Fe0-0.0002 | T' (-0.04) | | | | 598 |
| Al _{1-v} Fe _v | T' deducible | | | | 673 |
| A1 0.8 Ge 0.2 Nb 3 | 20.05 | | | A1 5 | 704 |
| AlLa ₃ | 5.57 | | | D0 ₁₉ | 658 |
| Al ₂ La | 3.23 | | | C15, a=8.13 | 486,658 |
| AlLa | | | 0.33 | | 658 |
| Al ₂ Lu | | | 1.02 | C15 | 658 |
| AlLu ₃ | | | 1.1 | | 659 |
| A1Mn0-0.0018 | т <u>'</u> (-0.68) | | | | 598 |
| Al _{1-x} ^{Mn} x | T' deducible | | | | 673 |
| AlN | 1.55 | | | B4, Hex., a=3.104, c=4.965 | 558 |
| A12NNb3 | 1.3 | | | A1 3 | 632 |
| A1 0.33 ^{Nb} 0.66 | 8.5-13.5 | | | D8 _b | 557 |
| A10.10-0.30 ^{Nb} 0.81-0.70 (As cast) | 17.3M | | | | 479 |
| ^{A1} 0.19-0.30 ^{Nb} 0.81-0.70 (Annealed) | 18.3M | | | | 479 |
| A1 _x Nb _{1-x} | 6-9 | | | Cubic | 497 |
| Al _x Nb _{1-x} | <4.2-13.5 | | | D8, a=9.318, c=4.813 to a=9.295, c=4.819 | 497 |
| A1xNb1-x | 12-17.5 | | | A15 | 513 |

(VIII-10)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure∞ | Ref. |
|--|-----------------------|---------------------------|------|---------------------|--------------------------------|
| Al _x Nb _{1-x} | 12 | | | A15, a=5.196 | 513 |
| Alx ^{Nb} 1-x | 17.5 | | | A15, a=5.185 | 513 |
| AlNb3 | 12.5-17.5 | | | A15 | 497 |
| A1 _{0.27} Nb _{0.73} | 17.5 | | | A15, a=5.185 | 497 |
| A10.27 ^{Nb} 0.73-0.48 ^V 0-0.25 | 14.5-17.5 | | | A15, a=5.136-5.185 | 497 |
| A10.27 ^{Nb} 0-0.50 ^V 0.73-0.23 | | | 4.2 | Cubic, a=3.055-3.18 | 497 |
| AlNb V y | <4.2-13.5 | | | | 497 |
| A10.10 ^{Ni} 0.90 | | | | Al, f.c.c. | 572# |
| Al Ni AlPb ^y (Superimposed films) AlPt | T' deducible 1.2-7 | | 0.34 | Cubic, a=4.85 | 673 512 ⁷ 486 |
| Al ₂ Pt | 0.48-0.55 | | | Cl, a=5.92 | 486 |
| A15 ^{Re} 24 | 3.35 | | | A12 | 557 |
| Al ₂ Sc | | | 1.02 | C15 | 658 |
| AlSc ₃ | | | 1.1 | | 659 |
| Al _{1-x} Ti _x | T' deducible | | | | 673 |
| A10.10 ^{T1} 0.63 ^V 0.27 | 3.62 | | | Cubic | 514# |
| ^{A1} 0.11 ^{T1} 0.149 ^V 0.741 | 2.05 | | | Cubic | 514# |
| A1 _{0.120} ^{Ti} 0.328 ^V 0.552 | 2.70 | | | Cubic | 514# |
| A10.125 ^{T1} 0.520 ^V 0.355 | 3.44 | | | Cubic | 514# |
| A10.127 ^{Ti} 0.693 ^V 0.180 | 3.52 | | | Cubic | 514# |
| $^{A1}0.15^{Ti}0.595^{V}0.255$ | 2.36 | | | Cubic | 514# |
| A1 _{0.25} ^{Ti} 0.525 ^V 0.255 | | | 1.4 | Cubic | 514# |
| $^{A1}_{0,30}^{Ti}_{0,49}^{V}_{0,21}$ | | | 1.4 | Cubic | 514# |

(VIII-11)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure 👓 | Ref. |
|---|---------------------|---------------------------|------|-----------------------------------|---------|
| ^{A1} 0.108 ^V 0.892 | 1.82 | | | Cubic | 514# |
| A1 _{0.188} V _{0.812} | | | 1.4 | Cubic | 514# |
| A10.27 ^V 0.73 | | | 4.2 | Cubic, a=3.055 | 497 |
| A10.308 ^V 0.692 | | | 1.4 | Cubic | 514# |
| A10.402 ^V 0.598 | | | 1.4 | Cubic | 514# |
| ^{A1} 0.01-0.40 ^V 0.90-0.60 | | | | A2 | 572# |
| All-x ^V x | T' deducible | | | | 673 |
| Aly ₃ | | | 1.1 | | 659 |
| A12Y | | | 0.34 | C15, a=7.86 | 486,658 |
| Al _x ^{Zn} 1-x | T'c (-0.03,0.0 + | ·) | | | 598 |
| Al _x Zn _{1-x} | 0.5-0.845 | | | | 624 |
| $As_{0.33}$ InTe _{0.67} (n=1.24x10 ²²) | 0.85-1.15 | | | B1, a=5.98 | 470 |
| $As_{0.5}InTe_{0.5}$ (n=0.97 x 10 ²²) | 0.44-0.62 | | | B1, a=5.91 | 470 |
| AsIr | | | 0.35 | | 491 |
| AsIr ₂ | | | 0.35 | | 491 |
| AsPd ₂ (low temperature) | 0.60 | | | Hex., a=9.79,c=6.62 | 491 |
| AsPd ₂ (high temperature) | 1.70 | | | C22, a=6.65, c=3.58 | 491 |
| AsPd ₂ (quenched) | 1.71 | | | C22, a=6.65, c=3.57 | 530 |
| AsPd ₂ (annealed) | 0,6 | | | Hex., a=9.79,c=6.61 | 530 |
| AsPd ₃ | | | 0.35 | DO _e , a=9.986,c=4.830 | 491 |
| AsPd ₃ | | | 0.3 | DO _e , a=9.98, c=4.83 | 530 |
| AsPd ₇ | | | 1.1 | | 530 |
| As ₂ Pd | | | 1.1 | | 530 |

(VIII-12)

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure∞ | Ref. |
|---|--------------------------------|---------------------------|-----------|--|---------|
| As2Pd5 | 0.46 | | | Complex | 491 |
| As 2Pd 5 | U.43-0.50 | | | | 530 |
| As ₂ Pt | | | 0.35 | | 491 |
| As ₃ Pt ₂ | | | 0.35 | | 491 |
| AsRh | 0.58 | | | B31, a=5.65, b=3.58, c=6.00 | 491 |
| AsRh1.4-1.6 | <0.03-0.56 | | | Hex. | 491 |
| AsRh _{1.4} | | | | Hex., a=9.15, c=3.53 + weak a=9.15,c=5.19 | 491 |
| AsRh1.6 | | | | Hex., a=9.32, c=3.67 | 491 |
| AsRh _{1.7} (Quenched) | | | | Ortho. Rh2 ^{As + Rh} 1.6 ^{As} phase | 491 |
| AsRu | | | 0.35 | | 491 |
| AsRu2 | | | 0.35 | | 491 |
| AsSn (n = 2.14 x 10^{22}) | 3.41-3.65 | | | B1, a=5.72 | 470 |
| ^{As} ~2 ^{Sn} ~3 | 3.5-3.6, 1.21 - 1.17 | | | | 470 |
| As_3Sn_4 (n = 0.56 x 10 ²²) | 1.16-1.19 | | | Rhomb., a=12.23, ∝= 19.23 | 470 |
| Au (rapid quench) | | | 0.32 | Al, f.c.c. | 487 |
| Au ₅ Ba | 0.4-0.7 | | | D2 _d , a=5.69, c=4.54 | 486 |
| Au ₅ Ca | 0.34-0.38 | | | C15 _b , a=7.747 | 486,535 |
| AuGa | 1.2 | | | B31, a=6.40, b=6.27, c=3.42 | 486 |
| AuGa2 | | | 0.34 | Cl, a=6.07 | 486 |
| Au _{0.30} Ge _{0.70} | | | 0.32 | h.c.p. + Ge | 487 |
| ^{Au} 0.33 ^{Ge} 0.67 | | | 0.32 | weak complex + h.c.p. + Ge | 487 |

(VIII-13)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure ∞ | Ref. |
|---|--------------------|---------------------------|------|--------------------------------------|------------------|
| ^{Au} 0.40 ^{Ge} 0.60 | 1.63 | | | h.c.p. + Ge + weak complex | 487 |
| ^{Au} 0.47 ^{Ge} 0.53 | 1.63 | | | complex + weak Ge | 487 |
| Au0.50 ^{Ge} 0.50 | 1.63 | | | complex + weak Ge | 487 |
| ^{Au} 0.54 ^{Ge} 0.46 | 1.50 | | | complex | 487 |
| Au0.61 ^{Ge} 0.39 | 1.31 | | | complex | 487 |
| ^{Au} 0.70 ^{Ge} 0.30 | 1.09 | | | complex | 487 |
| ^{Au} 0.725 ^{Ge} 0.275 | 0.99 | | | complex + weak h.c.p. | 487 |
| ^{Au} 0.75 ^{Ge} 0.25 | Trace @ 0.5 | | 0.32 | Hex., h.c.p. + weak complex | 487 |
| ^{Au} 0.775 ^{Ge} 0.225 | Trace @ 0.5 | | 0.32 | Hex., h.c.p. weak + complex + f.c.c. | 487 |
| ^{Au} 0.90 ^{Ge} 0.10 ^{& Au} 0.92 ^{Ge} 0.08 | Trace @ 0.9 | | 0.32 | Cubic, f.c.c. | 487 |
| ^{Au} 0.80 ^{Hg} 0.20 | | | 0.32 | | 489 |
| ^{Au} 0.85 ^{Hg} 0.15 | | | 0.32 | | 489 |
| AuIn | 0.4-0.6 | | | Complex | 486 |
| AuIn2 | | | 0.34 | C1, a=6.51 | 486 |
| Au ₅ K | | | 0.34 | D2 _d ,a=5.64, c=4.48 | 486 |
| AuLa | | | 0.33 | | 658 |
| AuLu | <0.35 | | | B2 | 658 |
| ^{Au} 0.50 ^{Mn} 0.50 | | | | Tet., Distorted CsCl | 572# |
| Au2Na | | | 0.34 | C15, a=7.81 | 486 |
| AuNb ₃ | 1.2 | | | A2, a=3.29 | 568 |
| Au0-0.3 ^{Nb} 1-0.7 | 1.1-11.0 | | | A2 & A15 | 568 |
| AuNb ₃ | 11.5, 11.0 | | | A15, a=5.2027 | 492,568, 572# |

(VIII-14)

| Material | т _с (К) | H _o (oersteds) | T_** | Crystal Structure ∞ | Ref. |
|---|---------------------|---------------------------|------|--------------------------------|-------------------------|
| Au _{0.02} Nb ₃ Rh _{0.98} | 2.53 | | | Al5, a=5.133 | 492 |
| Au0.05 ^{Nb} 3 ^{Rh} 0.95 | 2.52 | | | A15, a=5.137 | 492 |
| Au0.10 ^{Nb} 3 ^{Rh} 0.90 | 2.70 | | | A15, a=5.1412 | 492 |
| ^{Au} 0.30 ^{Nb} 3 ^{Rh} 0.70 | 4.6 | | | A15, a=5.1573 | 492 |
| Au0.50 ^{Nb} 3 ^{Rh} 0.50 | 6.6 | | | A15, a=5.1688 | 492 |
| Au _{0.70} Nb ₃ Rh _{0.30} | 9.5 | | | Al5, a=5.1827 | 492 |
| Au0.90 ^{Nb} 3 ^{Rh} 0.10 | 10.8 | | | A15, a=5.1960 | 492 |
| Au _{0.95} Nb ₃ Rh _{0.05} | 11.0 | | | A15, a=5.200 | 492 |
| Au0.98 ^{Nb} 3 ^{Rh} 0.02 | 10.9 | | | A15, a=5.203 | 492 |
| Au0.25 ^{Nb} 0.075 ^V 0.675 | | | | A15 | 572 # |
| Au0.25 ^{Nb} .1875 ^V .5625 | | | | A15 | 572# |
| Au _{0.25} Nb.375 ^V .375 | | | | A15 | 572# |
| Au _{0.25} Nb.5625 ^V .1875 | | | | A15 | 572# |
| Au _{0.25} Nb.675 ^V 0.075 | | | | A15 | 5 7 2# |
| $AuNb_{3(1-x)}V_{3x}$ | 1.5-11.0 | | | A15, a=4.88-5.22 | 568 |
| Au ₂ Pb 1.1 | 8, 7.12-5.98 | | | C15, a=7.94 | 486,640 |
| AuPb ₂ | 3.15 | | | | 475,521 |
| AuPb2 [∇] | 4.3 | | | | 521 [▽] |
| AuPb ₃ | 4.40 | | | | 475,521 |
| AuPb ₂ [∇] | 4.25 | | | | 521 [▽] |
| Au ₀₋₀ 0/ ^{Pt} 1-0.96 | | | | Al | 5 72 # |
| Au 1 00 ^{Pt} 1 00 0 | | | | Al | 572# |
| Au_Rb | | | 0.34 | D2 ₄ , a=5.6, c=4.4 | 486 |

| (| V | I | I | I | - | 1 | 5 |) | |
|---|---|---|---|---|---|---|---|---|--|
|---|---|---|---|---|---|---|---|---|--|

| Material | Т _с (К) | H _o (oersteds) | T_** n | Crystal Structure - | Ref. |
|--|-----------------------------------|---------------------------|-----------|---|--------------|
| AuSn | 1.25 | | | B8 ₁ , a=4.32, c=5.52 | 486 |
| Au ₅ Sn | 0.7-1.1 | | | A3, a=2.92, c=4.77 | 486 |
| AuSn ₂ [♥] | | | | | 577⊽ |
| $Au_x Sn_{1-x}^{\nabla}$ | 2.0-3.8 | | | | 577⊽ |
| AuSn ₄ ∇ | | | | | 577⊽ |
| Au 3 ^{Te} 5 | 1.62 | | | Primitive cubic | 487 |
| AuTi ₃ | | | | A15, a=5.094 | 522 |
| Au _{0.25} V _{0.75} | | | | A15 | 572 ≇ |
| Au _x Zn _{1-x} | 0.5-0.845 | | | | 624 |
| ^B 0.03 ^C 0.51 ^{Mo} 0.47 | 12.5 | | | ≪- ^{MoC} 1-x ⁺ | 573 |
| (Hot pressed & quenched from 2650°C) | | | | η- _{Mo3} c ₂ | |
| BCMo2 | 5.4, 5.3 -7 0 | | | Ortho-rhombic | 497,635 |
| ${}^{B}{}_{x}{}^{C}{}_{1-x}$ ^{Mo} (quenched) | 14.2 (broad 17.5 - 12.2 |) | | Cubic + some Hex. | 497 |
| BMo | 0.5 (extrapolated) | | | | 497 |
| ₿ ₆ Ca | | | 1.28 | D2 ₁ , Cubic CaB ₆ , a=4.145 | 558 |
| B ₆ Ce | Paramagnetic | | | D2 ₁ , Cubic CaB ₆ , a=4.141 | 558 |
| ^B 6 ^{Ce} | Antiferro. | | 0.35 | | 705 |
| B ₆ Dy | Antiferro. | | 0.35 | | 705 |
| B ₁₂ Er | Antiferro. | | 0.35 | | 705 |
| B ₆ Eu | Paramagnetic | | | D2 ₁ , Cubic CaB ₆ , a=4.175 | 558 |
| ^B 6 ^{Eu} | Ferro. | | 0.35 | | 705 |

(VIII-16)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure∞ | Ref. |
|--------------------------------------|---------------------|---------------------------|------|---|--------------|
| B ₆ Gd | Paramagnetic | | | D2 ₁ , Cubic CaB ₆ a=4.112 | 558 |
| B ₆ Gd | Antiferro. | | 0.35 | | 705 |
| BHf | 3.1 | | | Cubic + extra lines | 558 |
| ^B 6 ^{Ho} | Antiferro. | | 0.35 | | 705 |
| ^B 12 ^{Ho} | Antiferro. | | 0.35 | | 705 |
| B ₆ La | | | 1.30 | D2 ₁ , Cubic CaB ₆ a=4.156 | 558 |
| B ₆ La | 5.7 | | | | 705 |
| B ₁₂ Lu | 0.48 | | | | 705 |
| ^B 0.67 ^{Nb} 0.33 | | | | | 572# |
| ^B 6 Nd | Paramagnetic | | | D2 ₁ , Cubic CaB ₆ , a=4.128 | 558 |
| B6Nd | Antiferro. | | 0.35 | | 705 |
| ^B 6 ^{Pr} | Paramagnetic | | | $D2_1$, Cubic CaB ₆ =4.130 | 558 |
| ^B 6 ^{Pr} | Antiferro. | | 0.35 | | 705 |
| ^B 0.33 ^{Re} 0.67 | | | | | 572 # |
| ^B 2 ^{Sc} | | | 1.30 | C32 Hex. AlB ₂ , a=3.15, c=3.52 | 558 |
| B ₄ Sc | | | 1.34 | | 558 |
| B ₁₂ Sc | 0.39 | | | | 705 |
| ^B 6 Sm | | | 1.28 | $D2_1$, Cubic CaB ₆ , a=4.133 | 558 |
| BTa | 4.0 | | | B _f Ortho. | 558 |
| ^B 6 ^{Tb} | | | 1.28 | $D2_1$, Cubic CaB ₆ , a=4.102 | 558 |
| вбтр | Antiferro. | | 0.35 | | 705 |

(VIII-17)

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure ∞ | Ref. |
|---|---------------------|---------------------------|-----------|---|----------------------|
| B ₆ Th | | | 1.28 | D21, Cubic CaB6, | 558 |
| B ₆ Th | 0.74 | | | a=4.113 | 705 |
| BTI | | | | B27, a=6.12, b=3.06, c=4.56 | 522 |
| B ₂ Ti | | | | C32, a=3.030,c=3.227 | 522 |
| ^B 12 Tm | Antiferro. | | 0.35 | | 705 |
| ^{BW} 2 | 3.1 | | | | 474 |
| ^B 6 ^Y | | | 1.30 | D2 ₁ , Cubic CaB ₆ , a=4.113 | 558 |
| в ₆ ч | 6.5-7.1 | | | | 705 # |
| ^B 12 ^Y | 4.7 | | | | 705 |
| ^B 6 ^{Yb} | | | 1.28 | D2 ₁ , Cubic CaB ₆ , a=4.144 | 558 |
| BZr | 3.4 | | | Cubic + extra lines | 558 |
| B ₁₂ Zr | 5.82 | | | | 7 05 # |
| ^{Ba} x ⁰ 3 ^{Sr} 1-x ^{Ti*} | <0.1-0.55 | HF | | | 611 |
| ^{Ba} 0.13 ⁰ 3 ^W | 1.9 | | | Tet. I Phase, a=12.16, c=3.84 | 575 |
| ^{Ba} ~0.13 ⁰ 3 ^W | 1.9 | | | Tet., a=12.16, c=3.84 | 674 |
| ^{Ba} 0.14 ⁰ 3 ^W | <1.25-2.2 | | | Hex., a=7.307, c=7.426 | 644 |
| Be⊽ | ~6.5 | HF | | | 550⊽,580 |
| Be ₂₂ Mo (Isotope Study) | 2.485-2.529 | | | Cubic, Be ₂₂ Re type | 566 |
| Be ₂₂ Mo | 2.51 | | | Cubic, Be ₂₂ Re type | 566 |
| Be _{0.98} ^{Re} 0.02 (Quenched) | 9.75 | | | Cubic, a=11.56 Like Be ₂₂ Re | 578 |
| * $n = 4.2 - 11 \times 10^{19}$ | | | | | |

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure ∞ | Ref. |
|---|---------------------|---------------------------|-----------|--|------------------|
| ^{Be} 1-0.92 ^{Re} 0-0.08 (quenched) | 8.9-9.75 | | | | 578 |
| ^{Be} 0.98-0.92 ^{Re} 0.02-0.08 | 9.5-9.7 | | | | 578 |
| Be0.957 ^{Re} 0.043 (Quenched) | 9.62 | | | Cubic, a=11.56, like ^{Be} 22 ^{Re} | 578 # |
| ^{Be} 0.957 ^{Re} 0.043 (Annealed) | 9.67 | | | Cubic, a=11.56, like ^{Be} 22 ^{Re} | 57 8# |
| Be ₂₂ Re | 9.65 | | | Cubic, Be ₂₂ Re type | 566 |
| ^{Be} 0.98 ^{Re} 0.02 (Quenched) | 9.75 | | | Cubic, Be ₂₂ Re type a=11.56 | 567 |
| ^{Be} 0.995-0.92 ^{Re} 0.005-0.08 (Quenched) | 8.9-9.75 | | | | 567 |
| ^{Be} 0.98-0.92 ^{Re} 0.02-0.08 (Annealed) | 9.5-9.65 | | | | 567 # |
| ВеТс | 5.21 | | | Cubic | 566 |
| Be ₂₂ W | 4.12 | | | Cubic, Be ₂₂ Re type | 566 |
| BiII | | HF | | | 437 |
| BiIII | | HF | | | 437 |
| Bi⊽ | | | | | 602 [▽] |
| BiC | | | 0.3 | | 606 |
| BiCo | 0.49-0.42 | | | | 606 |
| BiCr | | | 0.3 | | 606 |
| Bi _x Cu _{1-x} (Electrodeposited) | 2.2 | | | | 590 |
| BiCu | 1.40-1.33 | | | | 606 |
| BiFe | | | 0.3 | | 606 |
| ^{Bi} 0.05 ^{In} 0.95 | 4.65 | | | \prec - phase | 634 |
| ^{Bi} 0.10 ^{In} 0.90 | 5.05 | | | ≪ - phase | 634 |
| ^{Bi} 0.15-0.30 ^{In} 0.85-0.70 | 5.3-5.4 | | | ∝& _β phases | 634 |
| BiIn ₂ | 5.65 | | | β - phase | 634 |

(VIII-19)

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure ∞ | Ref. |
|--|---------------------|---------------------------|-----------|---------------------|------------------|
| Bi ₃ In ₅ | 4.1 | | | | 634 |
| ^{Bi} 0.34-0.48 ^{In} 0.66-0.52 | 4.0-4.1 | | | | 634 |
| BiIn | | | 0.5 | %- phase | 634 |
| ^{Bi} 0.01 ^{In} 0.99 | | HF | | | 666 |
| ^{Bi} 0.02 ^{In} 0.98 | | HF | | | 666 |
| ^{Bi} 0.019 ^{In} 0.981 | 3.86 | | | | 544 |
| BiIr | | | 0.35 | | 491 |
| BiIr ₂ | | | 0.35 | | 491 |
| Bi ₂ Ir | ~2.3-1.7 | | | | 606 |
| Bi ₂ Ir (Quenched) | 3.96-3.0 | | | | 606 |
| Bi ₄₋₉ ^{Mg} | ~1.0-0.70 | | | | 606 |
| BiMn | | | 0.3 | | 606 |
| Bi ₃ Mo | 3.7-3.0 | | | | 606 |
| BiNb3 | | | 2.25 | Cubic, a=3.327 | 508 |
| BiNb ₃ (High pressure and temperature) | 3.05 | | | A15, a=5.320 | 508 |
| BiOs | | | 0.3 | | 606 |
| ^{Bi} 0.95 ^{Pb} 0.05 [∇] | | | 1.03 | | 484 [▽] |
| ^{Bi} 0.99 ^{Pb} 0.01 [▽] | | | 1.03 | | 484 [▽] |
| Bi ₁₋₀ Pb ₀₋₁ | 7.25-8.67 | | | | 484 [♥] |
| ^{Bi} 1-0 ^{Pb} 0-1 | 7.26-9.14 | | | | 83 |
| ^{Bi} 0.05-0.40 ^{Pb} 0.95-0.60 | 7.35-8.4 | HF | | HCP to e-phase | 677 |
| Bi7.5 ^{Pb} 92.5 (w/o) | | HF | | | 685 |
(VIII-20)

| Material | т _с (К) | H _o (oersteds) | T ** n | Crystal Structure∞ | Ref. |
|-------------------------------------|-------------------------|---------------------------|-----------|--------------------|------|
| BiRe ₂ | 2.20-1.9 | | | | 606 |
| BiRu | | | 0.35 | | 491 |
| BiRu ₂ | | | 0.35 | | 491 |
| BiRu | 5.7, 4.12-3.31 | | | | 606 |
| BiRu (Quenched) | 2.7- <2 | | | | 606 |
| BiS | | | 0.3 | | 606 |
| BiSc | | | 0.3 | | 606 |
| Bi ₃ Sn | 3.77-3.72, 3.67-3.63 | | | | 606 |
| Bi ₃ Te | ~ 1.0-0.75 | | | | 606 |
| ^{Bi} 0-0.002 ^{T1} | $T'_{c} = (+0.01)$ | | | | 591 |
| BiW | | | 0.3 | | 606 |
| Bi ₃ Zn | 0.87-0.80, 0.80-0.77 | | | | 606 |
| BiZr ₃ | 2.84-2.35 | | | | 606 |
| BiZr ₃ (Annealed) | 3.4-0.4 | | | | 606 |
| C (pyrolytic graphite) | | | 0.011 | | 494 |
| CCdTi ₂ | | | 1.1 | Hex., H-Phase | 632 |
| CCr ₂ Ga | | | 1.1 | Hex., H-Phase | 632 |
| CCsx | 0.020-0.135 | | | Hex. | 494 |
| C ₈ Cs (gold) | 0.020-0.135 | | | | 494 |
| C ₁₆ Cs (blue) | | | 0.011 | | 494 |
| CGaMo2 | 4.1-3.7 | | | Hex., H-Phase | 635 |

(VIII-21)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure ∞ | Ref. |
|---|---------------------------------------|---------------------------|---------------|---------------------|----------------------|
| C _{0.985} Hf | · · · · · · · · · · · · · · · · · · · | | 1.28 | B1, a=4.63 | 559,560,558 |
| CHf ₂ In | | | 1.1 | Hex., H-Phase | 632 |
| ^{CHf} 0.9 ^{Mo} 0.1 | | | 1.38 | B1 | 559 , 560,558 |
| CHf0.8 ^{Mo} 0.2 | | | 1.38 | B1 | 559,560,558 |
| ^{CHf} 0.85 ^{Mo} 0.15 | | | 1. 3 8 | B1 | 559,560,558 |
| ^{CHf} 0.75 ^{Mo} 0.25 | | | 1.4 | B1 | 559,560,558 |
| ^{CHf} 0.5 ^{Mo} 0.5 | 3.4 | | | B1, a=4.450 | 559,560,558 |
| ^{CHf} 0.3 ^{Mo} 0.7 | 5.5 | | | B1 | 559,560,558 |
| ^{CHf} 0.25 ^{Mo} 0.75 | 6.6 | | | B1 | 559,560,558 |
| CHf0.2 ^{Mo} 0.8 | 8.0 | | | Bl, a=4.337 | 559,560,558 |
| ^{CHf} 0.17 ^{Mo} 0.83 | 8.7 | | | B1 | 559,560,558 |
| ^{CHf} 0.15 ^{Mo} 0.85 | 9.0 | | | Bl, a=4.310 | 559,560,558 |
| ^{CHf} 0.07 ^{Mo} 0.93 | 8.2 | | | B1 | 559,560,558 |
| ^C 0.75 ^{Hf} 0.05 ^{Mo} 0.95 | 14.2 | | | B1 | 650 |
| ^{CHf} 0.9 ^{Nb} 0.1 | | | 4.2 | B1 | 559,560,558 |
| CHf0.8 ^{Nb} 0.2 | 5.4 | | | B1 | 559,560,558 |
| CHf0.7 ^{Nb} 0.3 | 6.1 | | | B1 | 559,560,558 |
| CHf0.6 ^{Nb} 0.4 | 4.5 | | | B1 | 559,560,558 |
| CHf0.5 ^{Nb} 0.5 | 4.8 | | | B1, a=4.55 | 559,560,558 |
| CHf0.4 ^{Nb} 0.6 | 5.6 | | | B1 | 559,560,558 |
| CHf0.25 ^{Nb} 0.75 | 7.0 | | | B1 | 559,560,558 |
| CHf0.2 ^{Nb} 0.8 | 7.8 | | | B1 | 559,560,558 |

(VIII-22)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure∞ | Ref. |
|---|--------------------|---------------------------|-------|--|-------------|
| CHf _{0.9} Ta _{0.1} | 5.0 | | | B1 | 559,560,558 |
| CHf _{0.8} Ta _{0.2} | 5.4 | | | B1 | 559,560,558 |
| CHf _{0.7} Ta _{0.3} | 5.1 | | | B1, a=4.56 | 559,560,558 |
| CHf _{0.6} Ta _{0.4} | 5.2 | | | B1 | 559,560,558 |
| CHf _{0.5} Ta _{0.5} | 5.5 | | | B1 | 559,560,558 |
| ^{CHf} 0.4 ^{Ta} 0.6 | 6.1 | | | B1 | 559,560,558 |
| CHf _{0.3} Ta _{0.7} | 7.9 | | | B1 | 559,560,558 |
| CHf _{0.2} Ta _{0.8} | 8.7 | | | B1 | 559,560,558 |
| CHf _{0.1} ^{Ta} 0.9 | 9.0 | | | B1 | 559,560,558 |
| ^{CHf} 0.6 ^{Zr} 0.4 | | | 1.28 | B1 | 558 |
| CInNb ₂ | | | 1.1 | Hex., H-Phase | 632 |
| CInZr ₂ | | | 1.1 | Hex., H-Phase | 632 |
| CK _x | 0.55M | | | | 494 |
| CK (Excess K) | 0.55 | HF | | Hex. | 494 |
| с ₈ к | 0.39 | HF | | Hex. | 494 |
| C ₈ K (gold) | up to 0.55 | HF | | | 494 |
| C ₁₆ K (blue) | | | 0.011 | Hex. | 494 |
| $-C_{1-x}$ Mo _x (quenched) | 14.2 | | | Cubic + some Hex. | 497 |
| $C_{1-x}Mo_x$ (quenched) | 8.8 | | | Hex., n ^{Mo} 3 ^C 2 | 497 |
| $C_{1-x}Mo_x$ (quenched) | 9.4-11.7 | | | ⊓Mo ₃ C ₂ + partial ≪-MoC ₁ -x | 497 |
| C _{0.40} ^{Mo} 0.60 (quenched) | 11.7 | | | Some B1 | 497 |
| CMo _{0.83} Ti _{0.17} | 10.2 | | | B1, a=4.290 | 522 |

| (| V | Π | I | - | 2 | 3 |) |
|---|---|---|---|---|---|---|---|
|---|---|---|---|---|---|---|---|

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure ∞ | Ref. |
|---|--------------------|---------------------------|------|---|-------------|
| ^C 0.42 ^{Mo} 0.58 (Hot pressed & quenched from 1650°C) | 9.0 | | | Hex., n - Mo ₃ C ₂ | 573 |
| C _{0.41} Mo _{0.59} (Hot pressed & quenched from 2200°C) | 9.6 | | | Hex., n - Mo ₃ C ₂ | 573 |
| <pre>C0.40^{Mo}0.60 (Hot pressed & quenched from 2200°C)</pre> | 11.0 | | | $\eta = Mo_3C_2 + \propto - MoC_{1-x}$ | 573 |
| C0.40 ^{Mo} 0.60 (Hot pressed & quenched from 1650°C) | 9.0 | | | n - Mo ₃ C ₂ + trace Mo ₂ C | c 573 |
| <pre>C0.42^{Mo}0.58 (Hot pressed & quenched from 2200°C)</pre> | 9.5 | | | Hex., n - Mo ₃ C ₂ | 573 |
| <pre>C0.41^{Mo}0.59 (Hot pressed & quenched from 2320°C)</pre> | 12.0 | | | \propto - MoC _{1-x} + trace n - Mo ₃ C ₂ | 573 |
| C _{0.44} ^{Mo} 0.56 (Hot pressed & quenched) | 13.0 | | | ∞ - MoC _{1-x} + trace n - Mo ₃ C ₂ | 573 |
| <pre>C0.40^{Mo}0.60 (Hot pressed & quenched from 2650°C)</pre> | 12.2 | | | \sim - MoC _{1-x} + n - Mo ₃ C ₂ | 573 |
| CMo (quenched, 2200°C) | 12.5-13.5 | | | Cubic + Hex. | 571 |
| ^C 0.44 ^{Mo} 0.56 | 12.5-13.5 | 1300, HF | | Cubic + Hex | 571 |
| ^C 0.40 ^{Mo} 0.60 (+2% VC) | 11.2-13.2 | | | | 571 |
| СМо | 6.5 | | | Hex. | 558,559,560 |
| CMo2 | 12.2 | | | Ortho. | 650 |
| C _{1-x} ^{Mo} 2 | 10.8, 8.1 | | | Ortho. | 650 |

(VIII -24)

| Material | т _с (К) | H _o (oersteds) T _n ** | Crystal Structure∞ | Ref. |
|--|---------------------|---|--------------------|--------------|
| ^C 0.40 ^{Mo} 0.60 | 9.0 | | Hex. | 691 |
| ^C 0.44 ^{Mo} 0.56 | 1.30 | | B1 | 691 |
| ^C 0.6 ^{Mo} 4.8 ^{Si} 3 | 7.6 | | D888 | 650 |
| ^{CMo} 0.2 ^{Ta} 0.8 | 7.5 | | B1, a=4.432 | 559,560,558 |
| ^{CMo} 0.5 ^{Ta} 0.5 | 7.7 | | B1, a=4.400 | 559,560,558 |
| ^{CMo} 0.75 ^{Ta} 0.25 | 8.5 | | B1, a=4.326 | 559,560,558 |
| ^{CMo} 0.8 ^{Ta} 0.2 | 8.7 | | B1, a=4.310 | 559,560,558 |
| ^{CMo} 0.85 ^{Ta} 0.15 | 8.9 | | B1 | 559,560,558 |
| ^C 0.15 ^N 0.35 ^{Nb} 0.50 | | | | 572 # |
| ^C x ^N 1-x ^{Nb} | 8.5-17.3 | HF | | 582 |
| ^C 0.9 ^N 0.1 ^{Nb} | 10.5 | | B1 | 559,561,558 |
| ^C 0.8 ^N 0.2 ^{Nb} | 12.4 | | B1 | 559,561,558 |
| ^C 0.7 ^N 0.3 ^{Nb} | 13.8 | | B1 | 559,561,558 |
| ^C 0.6 ^N 0.4 ^{Nb} | 14.7 | | B1 | 559,561,558 |
| ^C 0.5 ^N 0.5 ^{Nb} | 16.1 | | B1 | 559,561,558 |
| ^C 0.4 ^N 0.6 ^{Nb} | 17.4 | | B1 | 559,561,558 |
| ^C 0.35 ^N 0.65 ^{Nb} | 17.8 | | B1 | 559,561,558 |
| ^С 0.3 ^N 0.7 ^{Nb} | 17.5 | | B1 | 559,561,558 |
| ^C 0.28 ^N 0.72 ^{Nb} | 17.9 | | B1 | 559,561,558 |
| ^C 0.26 ^N 0.74 ^{Nb} | 17.8 | | B1 | 559,561,558 |
| ^C 0.24 ^N 0.76 ^{Nb} | 17.6 | | B1 | 559,561,558 |
| ^C 0.22 ^N 0.78 ^{Nb} | 17.8 | | B1 | 559,561,558 |

(VIII-25)

| Material | т _с (К) | H _o (oersteds) | T ** n | Crystal Structure∞ | Ref. |
|---|---------------------|---------------------------|-----------|--------------------|--------------|
| ^C 0.2 ^N 0.8 ^{Nb} | 17.6 | . <u></u> | | B1 | 559,561,558 |
| ^C 0.1 ^N 0.9 ^{Nb} | 16.7 | | | B1 | 559,561,558 |
| ^C 0-0.38 ^N 1-0.62 ^{Ta} | 10.0-11.3 | | | | 691 |
| ^C 0.35-0.50 ^{Nb} 0.65-0.50 | | | | B1 | 572# |
| ^C 0.428 ^{Nb} 0.572 | | | | | 572 # |
| ^C 0.487 ^{Nb} 0.513 | | | | | 57 2# |
| ^C 0.495 ^{Nb} 0.505 | | | | | 572 # |
| CNb (Whiskers) | 7.5-10.5 | HF | | | 582 |
| СИЪ | 8-10 | 800, HF | | Cubic | 571 |
| ^C 0.984 ^{Nb} | 9.8 | | | B1, a=4.47 | 559,560,558 |
| CNb ₂ | 9.1 | | | | 474 |
| ^C ~0.7-1.0 ^{Nb} ~0.3-~0 | 6 - 11 | | | B1 | 497 |
| CNb ₂ Sn | | | 1.1 | Hex., H-Phase | 632 |
| CNb _x Ta _{1-x} | 8.2-13.9 | | | | 628 |
| ^{CNb} 0.4 ^{Ta} 0.6 | 10-13.6 | 990, HF | | Cubic | 571 |
| ^{CNb} 0.8 ^{Ta} 0.2 | 9.7 | | | B1 | 559,560,558 |
| ^{CNb} 0.5 ^{Ta} 0.5 | 9.6 | | | B1 | 559,560,558 |
| CNb0.2 ^{Ta} 0.8 | 9.4 | | | B1 | 559,560,558 |
| CNb0.1 ^{Ti} 0.9 | | | 4.2 | B1 | 559,560,558 |
| CNb0.2 ^{Ti} 0.8 | 4.4 | | | B1 | 559,560,558 |
| CNb0.3 ^{Ti} 0.7 | 5.0 | | | B1 | 559,560,558 |
| ^{CNb} 0.4 ^{Ti} 0.6 | 5.0 | | | B1 | 559,560,558 |

(VIII-26)

| Material | Т _с (К) | H _o (oersteds) | T_** n | Crystal Structure ∞ | Ref. |
|--------------------------------------|---------------------|---------------------------|-----------|---------------------|-------------|
| ^{CNb} 0.5 ^{Ti} 0.5 | 4.6 | | | B1 | 559,560,558 |
| CNb0.6 ^{Ti} 0.4 | 4.8 | | | B1 | 559,560,558 |
| CNb0.7 ^{Ti} 0.3 | 5.8 | | | B1, a=4.37 | 559,560,558 |
| CNb0.8 ^{Ti} 0.2 | 7.0 | | | B1 | 559,560,558 |
| CNb0.9 ^{Ti} 0.1 | 8.8 | | | B1 | 559,558,560 |
| ^{CNb} 0.6 ^W 0.4 | 12.5 | | | Bl, diffuse lines | 558 |
| ^{CNb} 0.8 ^W 0.2 | 12.7 | | | B1, a=4.425 | 558 |
| ^{CNb} 0.9 ^W 0.1 | 11.6 | | | B1 | 558 |
| ^{CNb} 0.1 ^{Zr} 0.9 | 4.2 | | | B1 | 559,560,558 |
| CNb _{0.2} Zr _{0.8} | 6.4 | | | B1 | 559,560,558 |
| CNb0.3 ^{Zr} 0.7 | 6.2 | | | B1 | 559,560,558 |
| CNb0.4 ^{Zr} 0.6 | 4.8 | | | В1 | 559,560,558 |
| ^{CNb} 0.5 ^{Zr} 0.5 | 4.9 | | | B1 | 559,560,558 |
| ^{CNb} 0.6 ^{Zr} 0.4 | 5.6 | | | В1 | 559,560,558 |
| CNb0.7 ^{Zr} 0.3 | 6.0 | | | Bl, a=4.55 | 559,560,558 |
| CNb _{0.8} Zr _{0.2} | 7.5 | | | В1 | 559,560,558 |
| ^{CNb} 0.9 ^{Zr} 0.1 | 8.4 | | | В1 | 559,560,558 |
| CPbTi ₂ | | | 1.1 | Hex., H-Phase | 632 |
| CRb _x | 0.023-0.151 | | | Hex. | 494 |
| C ₈ Rb (gold) | 0.023-0.151 | | | | 494 |
| C ₁₆ Rb (blue) | | | 0.011 | | 494 |
| CRe0.01 ^W | 2.6 | HF | | | 603 |
| CRe0.02W | 3.7 | HF | | | 603 |

(VIII-27)

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure ∞ | Ref. |
|---|---------------------|---------------------------|-----------|---------------------|------------------|
| CRe _{0.4} W | 4.3 | HF | | | 603 |
| CRe0.06 ^W | 5.0 | HF | | | 603 |
| CRe0.08 ^W | 1.3 | | | | 603 |
| ^C 0.96 ^{Sc} | | | 1.38 | B1, a=4.54 | 558 |
| СТа | 9-11.4 | 810, HF | | Cubic | 571 |
| ^C 0.984 ^{Ta} | 9.2 | | | Bl, a=4.45 | 559,560,558 |
| ^C 0.962 ^{Ta} | 7.4 | | | B1 | 559,560,558 |
| CTa^{∇} (sputtered) | 5.09 | | | B1 | 505 [▽] |
| CTa2 | 3.2 | | | | 474 |
| CTi | | | | B1, a=4.329 | 522 |
| ^{CTa} 0.4 ^{Ti} 0.6 | 4.8 | | | B1 | 558 |
| ^{CTa} 1-0.40 ^W 0-0.60 | 8.5-10 | | | B1, a=4.454-4.345 | 694 |
| $CTa_{0.50}$ ^W 0.50 | 1.01 | | | | 494 |
| CTa _{0.2} Zr _{0.8} | | | 4.2 | B1 | 559,560,558 |
| CTa _{0.3} Zr _{0.7} | 5.1 | | | B1 | 559,560,558 |
| CTa _{0.4} Zr _{0.6} | 4.9 | | | Bl, a=4.57 | 559,560,558 |
| CTa _{0.5} Zr _{0.5} | 4.6 | | | В1 | 559,560,558 |
| ^{CTa} 0.6 ^{Zr} 0.4 | 4.7 | | | В1 | 559,560,558 |
| CTa _{0.7} Zr _{0.3} | 6.0 | | | B1 | 559,560,558 |
| CTa _{0.8} Zr _{0.2} | 7.7 | | | B1 | 559,560,558 |
| CTa _{0.9} Zr _{0.1} | 8.3 | | | B1 | 559,560,558 |
| CTc (Excess C) | 3.85 | | | Cubic, a=3.985 | 633 |
| ^C 0.986 ^{Ti} | | | 1.28 | B1, a=4.32 | 559,560,558 |

(VIII-28)

| Material | Т _с (К) | H _o (oersteds) | T ** | Crystal Structure ∞ | Ref. |
|---|---------------------|---------------------------|------|----------------------------------|--------------|
| CTi _{0.5} W _{0.5} | 6.7 | | | B1 | 558 |
| CT10.6 ^W 0.4 | 4.4 | | | Bl, a=4.31 | 558 |
| CTi0.7 ^W 0.3 | 2.1 | | | B1 | 558 |
| CTi0.8 ^W 0.2 | | | 1.38 | B1 | 558 |
| CTi _{0.8} Zr _{0.2} | | | 1.28 | B1 | 558 |
| CTi _{0.6} Zr _{0.4} | | | 1.28 | B1 | 558 |
| ^C 0.50 ^V 0.50 | | | | | 572 # |
| ^c _{0.922} ^v | | | 1.28 | Bl, a=4.18 | 559,560,558 |
| c _{<1} v | | | 1.17 | B1, a=4.169 | 694 |
| CV _{0.4} Zr _{0.6} | | | 4.2 | B1 | 558 |
| CW | 1.0 | | | | 603 |
| ^C 0.92 ^Y | | | 1.38 | B1, a=4.68 | 559,558,560 |
| ^C 0.992 ^{Zr} | | | 1.28 | Bl, a=4.68 | 559,558,560 |
| CaCu ₅ | | | 0.34 | D2 _d , a=5.09, c=4.09 | 486 |
| CaZn ₅ | | | 0.34 | D2 _d , a=5.42, c=4.19 | 486 |
| ^{Ca} x ⁰ 3 ^{Sr} 1-x ^{Ti*} | <0.1-0.55 | HF | | | 611 |
| ^{Ca} 0.10 ^O 3 ^W | 1.4-3.4 | | | Hex., a=7.397,c=7.569 | 644 |
| Cd | 0.518 | 29.6, HF | | | 537 |
| Cd (isotopes) | | | | | 546 |
| ^{Cd} 0.02 ^{Hg} 0.98 | | HF | | | 666 |
| ^{Cd} 0.0075-0.05 ^{In} 1-x | 3.24-3.36 | | | Tet., SS | 670 |
| $* n = 3.7 - 11.0 \times 10^{19}$ | | | | | |

1

(VIII-29)

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure 👓 | Ref. |
|---|---------------------------------------|---------------------------|-----------|-----------------------------------|--------------|
| Cd _{0-0.012} ^{T1} | T' _c (-0.010) | <u>,</u> | | | 591 |
| ^{Cd} 0-0.0815 ^{Zr} 1-0.9185 | | | | A3 | 572 # |
| Ce (at 10 kbar) | | | 0.04 | A1 | 656 |
| Ce (at 50 kbar) | 1.7 | | | | 618 |
| Ce (0-10,000 atm.) | | | 1.25 | ≪- Ce,dense f.c.c. | 542 |
| CeCo ₂ | 0.84 | | | C15 | 655 |
| CeCo1.67 ^{Ni} 0.33 | 0.46 | | | C15 | 655 |
| CeCo _{1.33} Ni _{0.67} | | | 0.33 | C15 | 655 |
| CeCo _{1.33} Rh0.67 | | | 0.33 | C15 | 655 |
| CeCo _{1.67} ^{Rh} 0.33 | 0.47 | | | C15 | 655 |
| CeIr ₃ | 3.34 | | | | 469 |
| CeIr ₅ | 1.82 | | | | 469 |
| CeIr _{1.8} | | | 0.32 | Cl5, a=7.581 | 469 |
| ^{Ce} 0.005 ^{La} 0.995 | 4.6 | | | | 608 |
| ^{Ce} 0.01 ^{La} 0.99 | 3.9 | | | | 608 |
| ^{Ce} 0.013 ^{La} 0.987 | 3.3 | | | | 608 |
| CeNi ₂ | | | 0.015 | C15 | 655 |
| CePt ₂ | | | 0.32 | Cl5, a=7.730 | 469 |
| CePt ₃ | | | 0.32 | Cl5, a=7.640 | 469 |
| CePt ₅ | | | 0.32 | D2 _d , a=5.369,c=4.385 | 469 |
| ^{Ce} 0.20-0.173 ^{Pt} 0.80-0.826 | 1.26-0.70, 1.55M (portion only) | | | | 469 |
| CeRu ₂ | 6.0 | | | C15 | 657 |

(VIII-30)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure ∞ | Ref. |
|---|---------------------------------------|---------------------------|------|---|--------------------|
| Ce ₂ S ₃ | Paramagnetic | | | Cubic, b.c. Ce ₂ S ₃ a=8.618 | 558 |
| Co | | | | | 572 ∦ |
| ^{Co} 0-0.75 ^{Fe} 1.00-0.25 | | | | A2 | 572 ∦ |
| ^{Co} 0-0.04 ^{Fe} 1-0.96 | | | | | 572 # |
| ^{Co} 0.93 ^{Fe} 0.07 | | | | A1 | 572 # |
| ^{Co} 0-0.587 ^{Fe} 1-0.413 | | | | A2 | 572 ∦ |
| ^{Co} 0.915 ^{Fe} 0.085 | | | | A1 | 572 # |
| ^{Co} 0.30 ^{Fe} 0.70 | | | | A2 | 572 # |
| Co Fe Ti | | | | B2 | 572 / # |
| CoLa ₃ | 4.28 | | | DO ₁₁ | 658 |
| CoLa3 | 4.01 | | | DO _{20,} a=7.279, b=10.088, c=6.578 | 469 |
| CoLu ₃ | 0.35 ⁺⁺⁺ (portion only) | | | | 469 |
| Co ₂ Lu | | | 0.32 | C15, a=7.123 | 469 |
| ^{Co} 0.02 ^{Nb} 3 ^{Rh} 0.98 | 2.28 | | | A15, a=5.132 | 492 |
| ^{Co} 0.05 ^{Nb} 3 ^{Rh} 0.95 | 1.96 | | | A15, a=5.135 | 492 |
| ^{Co} 0.10 ^{Nb} 3 ^{Rh} 0.90 | 1.90 | | | A15, a=5.1347 | 492 |
| ^{Co} 0.70 ^{Ni} 0.30-1 | | | | A1 | 57 2 # |
| ^{Co} 0.60 ^{Ni} 0.40 | | | | A1 | 572 # |
| ^{Co} 0.16 ^{Ni} 0.64 ^P | | | 0.99 | | 601 |
| ^{Co} 0.39 ^{Ni} 0.40 ^P | | | 0.99 | | 601 |
| ^{Co} 0.52 ^{Ni} 0.26 ^P | | | 0.99 | | 601 |

+++ Beginning of transition

(VIII-31)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure ∞ | Ref. |
|--|---------------------------------------|---------------------------|------|------------------------------------|--------------------|
| ^{Co} 0.64 ^{Ni} 0.15 ^P | | | 0.99 | | 601 |
| Co_Ni_Ti | | | | B2 | 572# |
| Co ₂ P | | | 0.97 | C23 | 601 |
| ^{Co} 0.95-0.005 ^{Pd} 0.05-0.995 | | | | | 572# |
| ^{Co} ~0.001 ^{Pd} ~0.999 | | | | A1 | 572# |
| ^{Co} 0.035-0.01 ^{Pt} 0.965-0.99 | | | | | 57 2# |
| CoSc3 | | | 0.32 | | 658 |
| CoSc ₂ | | | 0.32 | Cl6, a=6.374, c=5.616 | 469 |
| CoSc 3 | | | 0.32 | | 469 |
| ^{Co} 0.28-0.32 ^{Sc} 0.72-0.68 | 0.35 ⁺⁺⁺ (portion only) | | | | 469 |
| Co ₅ Th | | | 0.32 | D2 _d , a=5.005, c=3.987 | 469 |
| Co _x Ti _y | | | | _ | 522 |
| ^{Co} 0.50 ^{Ti} 0.50 | | | | B2, CsCl, ord. | 572# |
| ^{Co} 0.28 ^Y 0.72 | 0.34 | | | | 469 |
| CoY2 | | | 0.32 | | 469 |
| CoY3 | 0.34 ⁺⁺⁺ (portion only) | | | | 469 |
| ^{Co} (0-150 ppm at.) ^{Zn} | T' _c (-0.075) | | | | 598 |
| Cr | Antiferro. | | 1.4 | A2 | 5 <u>1</u> 4#,572# |
| Cr⊽ | | | 0.3 | | 503⊽,615⊽ |
| ^{Cr} 0.98-0 ^{Fe} 0.02-1 | | | | A2 | 572# |
| Cr _{0.441} Fe _{0.559} | | | | A2 | 572# |
| Cr _{0.441} ^{Fe} 0.559 | | | | D8 _b | 572# |
| Destantes of toront | | | | | |

+++ Beginning of transition

(VIII-32)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure ∞ | Ref. |
|---|--------------------|---------------------------|------|---------------------|------------------|
| ^{Cr} 0.02-0.005 ^{Fe} 0.98-0.995 | | • | | | 572# |
| ^{Cr} 0.90 ^{Mn} 0.10 | | | | A2 | 572# |
| ^{Cr} 0.80 ^{Mn} 0.20 | | | | A2 | 572 # |
| ^{Cr} 0.69 ^{Mn} 0.31 | | | | A2 | 572# |
| ^{Cr} 0.61 ^{Mn} 0.39 | | | | A2 | 572 # |
| ^{Cr} 0.50 ^{Mn} 0.50 | | | | A2 | 572 # |
| ^{Cr} 0.92-0 ^{Mo} 0.08-1 | | | | A2 | 572# |
| Cr _{0.01-0.03} ^{NNb} | | | | | 572# |
| ^{Cr} 1-0.98 ^{Nb} 0-0.02 | | | | A2 | 572# |
| ^{Cr} 0.80 ^{Os} 0.20 | 2.5 | | | Cubic, b.c. a=2.925 | 556# |
| ^{Cr} 0.60 ^{Os} 0.40 | | | 1.40 | d8 _b | 557 |
| ^{Cr} 0.95-0.80 ^{Os} 0.05-0.20 | | | | A2 | 572 # |
| CrOsV | | | | | 572# |
| Cr ₃ P | | | 1.01 | DOe | 601 |
| CrP | | | 1.01 | B31 | 601 |
| ^{Cr} 0.005 ^{Pt} 0.995 | | | | A1 | 572 # |
| Cr _{0.40} ^{Re} 0.60 | 2.15 | | | D8 _b | 557 <i>‡</i> |
| Cr _{1-0.62} ^{Re} 0-0.38 | | | | A2 | 572 # |
| ^{Cr} 0.40 ^{Re} 0.60 | | | | D8 _b | 572# |
| CrReV | | | | | 572# |
| ^{Cr} 0.93-0.86 ^{Re} 0.07-0.14 | | | | A2 | 572 # |
| $Cr_{1-0.99}Ta_{0-0.01}$ | | | | A2 | 572# |

(VIII-33)

| Material | т _с (К) | H _o (oersteds) | T ** n | Crystal Structure 👓 | Ref. |
|--|---------------------|---------------------------|-----------|---------------------|-----------------------|
| ^{Cr} 0.025 ^{Ti} 0.975 | | | | A3 | 572# |
| ^{Cr} 0.025 ^{Ti} 0.975 | 3.5 | | | + w? | 477# |
| Cr_Ti_v (quenched) | | | 1.1 | | 523 |
| Cr _x Ti _y | | | | | 522 |
| ^{Cr} 0.011 ^{Ti} 0.967 ^V 0.022 | 3.6 | | | + w? | 477# |
| ^{Cr} 0.10 ^{Ti} 0.30 ^V 0.60 | 5.6 | 1360, HF | | | 584 |
| ^{Cr} 0.10 ^{Ti} 0.30 ^V 0.60 | >4.2 | HF | | | 616 |
| ^{Cr} 0.0175 ^U 0.9825 | 0.75 | | | β-phase | 700 |
| ^{Cr} 0.23-0.95 ^V 0.77-0.05 | | | | A2 | 572 # |
| ^{Cr} 0.95-0.99 ^V 0.05-0.01 | | | | A2 | 572# |
| ^{Cr} 0.9890 ^W 0.0210 | | | | A2 | 572 # |
| ^{Cr} 0.84 ^W 0.16 | | | | | 572 # |
| Cr(0-13 ppm at.) ^{Zn} | T'c (-0.25) | | | | 598 |
| Cs | | | 0.011 | | 494 |
| ^{Cs} 0.32 ⁰ 3 ^W | 1.12 | | | Hex., a=7.4, c=7.6 | 500 |
| Cu | | | | | 5 37 # |
| Cu | | | | A1 | 572 # |
| Cu ₃ Ga | | | 1.4 | | 585 |
| Cu ₃ Ga | | | 1.4 | | 533 |
| CuLa | 5.85 | | | | 658 |
| ^{Cu} 0.03 ^{Mn} 0.97 | | | | A1 | 572 # |
| ^{Cu} 0.05 ^{Mn} 0.95 | | | | Al | 572 # |
| ^{Cu} 0.09 ^{Mn} 0.91 | | | | Al | 572# |

| (| V | II | I- | 3 | 4) | |
|---|---|----|----|---|----|--|
|---|---|----|----|---|----|--|

| Material | т _с (К) | H _o (oersteds) T | ** n | Crystal Structure ∞ | Ref. |
|--|--------------------|-----------------------------|---------|---------------------|-------------------|
| ^{Cu} 0.18 ^{Mn} 0.82 | | | | Al | 572 # |
| ^{Cu} 0.27 ^{Mn} 0.73 | | | | Al | 572# |
| ^{Cu} 0.27 ^{Mn} 0.73 | | | | Al | 572# |
| ^{Cu} 0.42 ^{Mn} 0.58 | | | | Al | 572 # |
| ^{Cu} 0.57 ^{Mn} 0.43 | | | | A1 | 57 2 # |
| ^{Cu} 0.76 ^{Mn} 0.24 | | | | A1 | 572 # |
| ^{Cu} 0.87 ^{Mn} 0.13 | | | | | 572 # |
| Cu ₃ N | | 1 | . 38 | | 558 |
| ^{Cu} 0.01 ^{Ni} 0.99 | | | | A1 | 572# |
| ^{Cu} 0.10-0.55 ^{Ni} 0.90-0.45 | | | | Al | 572 # |
| ^{Cu} 0.18-0.78 ^{Ni} 0.82-0.22 | | | | Al | 572# |
| ^{Cu} 0.57 ^{Ni} 0.43 | | | | | 57 2 # |
| ^{Cu} 0.58 ^{Ni} 0.42 | | | | A1 | 57 2 # |
| ^{Cu} 0.63 ^{Ni} 0.37 | | | | A1 | 57 2 # |
| ^{Cu} 0.69 ^{Ni} 0.31 | | | | A1 | 572 # |
| ^{Cu} 0.73 ^{Ni} 0.27 | | | | A1 | 572# |
| ^{Cu} 0.89 ^{Ni} 0.11 | | | | Al | 572 # |
| ^{Cu} 0.94 ^{Ni} 0.03 ^{Zn} 0.03 | | | | A1 | 57 2 # |
| ^{Cu} 0.84 ^{Ni} 0.08 ^{Zn} 0.08 | | | | A1 | 572 # |
| Cu0.50 ^{Pt} 0.50 | | | | Rhomb. | 572# |
| CuS ₂ | 1.48-1.53 | | | C18, a=5.790 | 643 |
| CuSSe | 1.5-2.0 | | | C18, a=5.923 | 643 |

(VIII-35)

| Material | т _с (К) | H _o (oersteds) | T ** n | Crystal Structure ∞ | Ref. |
|---|---------------------|---------------------------|-----------|-----------------------|---------------|
| CuSe ₂ | 2.30-2.43 | | | C18, a=6.123 | 643 |
| CuSeTe | 1.6-2.0 | | | C18, a=6.302 | 643 |
| CuTe2 | <1.25 - 1.3 | | | C18, a=6.600 | 6 43 |
| CuTi | | | | B11, a=3.108, c=5.887 | 522 |
| CuY | | | 0.33 | B2 | 658 |
| ^{Cu} x ^{Zn} 1-x | 0.5-0.845 | | | | 624 |
| Fe | | | | | 57 2 # |
| ^{Fe} 0.96-0.88 ^{Ge} 0.04-0.12 | | | | A2 | 572 # |
| ^{Fe} 0.939-0.910 ^{Ir} 0.061-0.090 | | | | | 572# |
| ^{Fe} 0.05-0.01 ^{Ir} 0.95-0.99 | | | | | 57 2 # |
| ^{Fe} 0.01 ^{Ir} 0.985 ^Y 0.005 | | | | | 563 |
| ^{Fe} 0.01 ^{Ir} 0.99 ^Y 0.0005 | | | | | 563 |
| ^{Fe} 0.01 ^{La} 0.01 ^{Rh} 0.98 | ~0.75 | | | | 563 |
| ^{Fe} 0.01 ^{La} 0.001 ^{Rh} 0.99 | ~0.75 | | | | 563 |
| ^{Fe} 0.53 ^{Mn} 0.47 | | | | A1 | 572# |
| ^{Fe} 0.55 ^{Mn} 0.45 | | | | A1 | 572# |
| ^{Fe} 0.66 ^{Mn} 0.34 | | | | Al | 572 # |
| ^{Fe} 0.76 ^{Mn} 0.24 | | | | Al | 5 7 2# |
| Fe0.84 ^{Mn} 0.16 | | | | Al | 572# |
| ^{Fe} 0.89 ^{Mn} 0.11 | | | | Al | 57 2 # |
| ^{Fe} 0.98-0.995 ^{Mn} 0.02-0.005 | | | | | 572 # |
| Fe0.60 ^{Mn} 0.25 ^{Ni} 0.15 | | | | Al | 572# |
| ^{Fe} 0.45 ^{Mn} 0.25 ^{Ni} 0.30 | | | | Al | 572# |

(VIII-36)

| Material | Т _с (К) | H _o (oersteds) T _n ** | Crystal Structure∞ | Ref. |
|--|---------------------|---|--------------------|----------------------------|
| ^{Fe} 0.30 ^{Mn} 0.25 ^{Ni} 0.45 | | and the second se | Al | 572 # |
| ^{Fe} 0.15 ^{Mn} 0.25 ^{Ni} 0.60 | | | A1 | 572 # |
| ^{Fe} 1-0.98 ^{Mo} 0-0.02 | | | | 572# |
| ^{Fe} 1-0.99 ^{Nb} 0-0.01 | | | | 57 2 # |
| ^{Fe} 1-0.96 ^{Ni} 0-0.04 | | | | 572# |
| ^{Fe} 0.72 ^{Ni} 0.28 | | | Al | 572# |
| ^{Fe} 0.647 ^{Ni} 0.353 | | | | 57 2 # |
| ^{Fe} 0.63 ^{Ni} 0.37 | | | Al | 572 # |
| ^{Fe} 0.60 ^{Ni} 0.40 | | | Al | 572 # |
| ^{Fe} 0.55 ^{Ni} 0.45 | | | Al | 57 2 # |
| ^{Fe} 0.52 ^{Ni} 0.48 | | | Al | 572 # |
| ^{Fe} 0.45 ^{Ni} 0.55 | | | Al | 572# |
| ^{Fe} 0.42 ^{Ni} 0.58 | | | Al | 57 [°] 2 # |
| ^{Fe} 0.20 ^{Ni} 0.80 | | | Al | 572# |
| ^{Fe} 0.16 ^{Ni} 0.84 | | | Al | 57 2 # |
| ^{Fe} 0.05 ^{N1} 0.95 | | | Al | 572 # |
| ^{Fe} 0.03 ^{Ni} 0.97 | | | Al | 572# |
| ^{Fe} 0.01 ^{Ni} 0.99 | | | Al | 572# |
| ^{Fe} 0.19 ^{Ni} 0.60 ^P | | 0.99 | | 601 |
| ^{Fe} 0.26 ^{Ni} 0.52 ^P | | 0.99 | | 601 |
| ^{Fe} 0.31 ^{Ni} 0.48 ^P | | 0.99 | | 601 |
| ^{Fe} 0.9925 ^{Os} 0.0075 | | | | 57 2# |

(VIII-37)

| Material | т _с (К) | H _o (oersteds) T _n ** | Crystal Structure∞ | Ref. |
|---|---------------------|---|--------------------|--------------|
| Fe ₂ P | | 0.97 | C22 | 601 |
| FeP | | 0.97 | B31 | 601 |
| ^{Fe} 0.5 ^{PPd} 3 | | 0.35 | | 491 |
| ^{Fe} 0.0152-0 ^{Pd} 0.9848-1 | | | A1 | 572 # |
| ^{Fe} 0.9679 ^{Pt} 0.0321 | | | | 572 # |
| ^{Fe} 0.005 ^{Pt} 0.995 | | | A1 | 572# |
| ^{Fe} 0.9985 ^{Re} 0.0015 | | | | 572# |
| ^{Fe} 0.90 ^{Re} 0.10 | | | A2 | 572 # |
| ^{Fe} 0.01 ^{Rh} 0.99 | | | | 572 # |
| ^{Fe} 0.50 ^{Ru} 0.50 | | | A3 | 572 # |
| ^{Fe} 0.25 ^{Ru} 0.75 | | | A3 | 572# |
| ^{Fe} 0.946 ^{Sb} 0.054 | | | A2 | 572# |
| ^{Fe} 0.99-0.98 ^{Si} 0.01-0.02 | | | | 572# |
| ^{Fe} 0.96-0.75 ^{Si} 0.04-0.25 | | | A2 | 572 # |
| ^{Fe} 0.96-0.92 ^{Sn} 0.04-0.08 | | | A2 | 572# |
| ^{Fe} 0-0.015 ^{Ti} y | | | | 554# |
| ^{Fe} 0.010 ^{Ti} 0.990 | | | A3 | 572 # |
| ^{Fe} 0.015 ^{Ti} 0.985 | | | A3 | 572# |
| ^{Fe} 0.08 ^{Ti} 0.92 | | | A2 | 572 # |
| ^{Fe} 0.50 ^{Ti} 0.50 | | | B2 | 572# |
| ^{Fe} 0.98-0.995 ^{Ti} 0.02-0.005 | | | | 572 # |
| ^{Fe} 0.01 ^{Ti} 0.99 | 2.3 | | | 477# |

(VIII-38)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure 🛥 | Ref. |
|--|--------------------------|---------------------------|------|------------------------------|---------------------|
| ^{Fe} 0.015 ^{T1} 0.985 | 2.8 | | | | 477# |
| ^{Fe} 0.08 ^{Ti} 0.92 ^{Fe} x ^{Ti} y Fe ₄ TiZr | | | | A2 | 477# 522 572# |
| ^{Fe} 0.044 ^V 0.956 | | | | A2 | 572 # |
| ^{Fe} 0.138 ^V 0.862 | | | | A2 | 572 # |
| ^{Fe} 0.08-0.67 ^V 0.92-0.33 | | | | A2 | 572 # |
| ^{Fe} 0.22 ^V 0.78 | | | | | 572# |
| ^{Fe} 0.26 ^V 0.74 | | | | A2 | 572 # |
| ^{Fe} 0.31 ^V 0.69 | | | | A2 | 572 # |
| ^{Fe} 0.67 ^V 0.33 | | | | A2 | 572 # |
| Ve0.90 ^V 0.10 | | | | A2 | 572# |
| ^{Fe} 0.98-0.995 ^V 0.02-0.005 | | | | | 572 # |
| ^{Fe} 1-0.99 ^W 0-0.01 | | | | | 572# |
| ^{Fe} (0-~200ppm at.) ^{Zn} | t' _c (-~0.25) | | | | 598 |
| Ga⊽ | 7.2 | | | | 596⊽ |
| Ga | 6.2 | | | R-phase | 642 |
| Ga | 7.62 | HF | | Y-phase | 642 |
| Ga | 1.078 | 58.9 | | | 537#,580 |
| GaLa ₃ | 5.84 | | | | 658 |
| GaLu ₃ | | | 1.1 | | 659 |
| GaN (Black) | 5.85 | | | B4, Hex., a=3.182 c=5.173 | 433,558 |
| GaN | | | ~2. | | 528 |

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure∞ | Ref. |
|---|---------------------|---------------------------|------|---|------------------|
| GaN _x 0 _{1-x} (Brown) | | | 1.38 | | 433,558 |
| Ga _x ^{Nb} 1-x | | HF | | | 583 |
| GaP | | | 1.68 | B3, Cubic ZnS, a=5.436 | 558 |
| GaPt | | | 0.34 | B20, a=4.91 | 486 |
| Ga ₂ Pt | 1.7-1.9 | | | | 486 |
| GaSb (120 kbar, 77°K, Annealed) | 4.24 | HF | | A5 | 695 |
| GaSb (Unannealed) | ~5.9 | | | | 695 |
| GaSc 3 | | | 1.1 | | 659 |
| ^{Ga} 0-0.05 ^{Sn} 1-0.95 | 3.703-3.938 | | | | 576 |
| Ga ₀₋₁ Sn ₁₋₀ (Quenched) | 3.47-4.18 | | | | 576 |
| Ga ₀₋₁ Sn ₁₋₀ (Annealed) | 2.6-3.85 | | | | 576 |
| GaV ₃ | 14.2-14.6 | | | | 645 |
| GaV2.1-3.5 | 6.3-14.45 | HF | | A15, a=4.813-4.829 | 646 |
| GaV~3 | 14.45 | | | A15, a=4.818 | 646 |
| GaV3 | | HF | | | 564 |
| ^{Ga} 0.25 ^V 0.75 | | | | A15 | 572 # |
| Ga5V2 | | | 2.1 | Tet., a=8.9723, c=2.6895, Hg ₅ ^{Mn} 2 type | 661 |
| Ga_0.46 ^V _0.54 | | | 2.1 | Hex., a=8.496, c=5.174 | 661 |
| GaV3 | 14.47 | HF | | A15 | 684 |

| (VIII | -40) |
|-------|------|
|-------|------|

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure∞ | Ref. |
|--|-------------------------|---------------------------|-----------|--------------------|----------------------|
| GaV4.5 | 9.15 | HF | | | 684 |
| ^{Ga} 0.23-0.26 ^V 0.77-0.74 (Annealed) | 14.3M | | | | 479 |
| Ga _{0.23-0.26} V _{0.77-0.74} (Annealed) | 14.5R | | | | 479 |
| GaY ₃ | | | 1.1 | | 659 |
| ^{Gd} 0-0.02 ^{La} 1-0.98 | | | | | 572 # |
| Gd Lal-x | <1.0-5.5 | | | | 608 |
| ^{Gd} 0.008 ^{La} 0.992 | | | | | 61 3 # |
| Ge0.0036-0.0085 ^{Pd} 0.9964- 0.9915 | | | | | 572# |
| ^{Gd} 0.005 ^{Pt} 0.995 | | | A1 | | 572 # |
| ^{Ge} 0-0.06 ^Y 1-0.94 | | | | | 572# |
| ^{Gd} 1-0.7 ^Y 0-0.3 | | | 4.2 | | 663 |
| Ge (~120 kbar pressure) | 4.85-5.4 | | | | 540 |
| Ge7Ir3 | 0.87 (portion only) | | | | 491 |
| ^{Ge} 0.667 ^{La} 0.333 | | | | Tet., b.c. | 572 # |
| Ge ₂ La | 2.2 | | | | 676# |
| GeMo 3 | 1.4 | | | | 474 |
| Ge ₃ N ₄ | | | 1.38 | | 558 |
| GeNb ₃ (quenched) | 176. + some below 4. | | | A15 | 498 |
| ^{Ge} 0.25-0.29 ^{Nb} 0.75-0.71 | 6. | | | A15 | 498 |

(VIII-41)

| Material | т _с (К) | H _o (oersteds) | T_** | Crystal Structure 🛥 | Ref. |
|---|--------------------|---------------------------|------|-----------------------------------|--------------|
| ^{GE} 0.29 ^{Nb} 0.71 | 6. | | | Al5, a=5.149 | 498 |
| GePd2 | | | 0.35 | | 491 |
| Ge1.5 ^{Pd} | Trace | | | | 491 |
| Ge2Pd5 | | | 0.35 | | 491 |
| GeTe (Ag doped)(n=27x10 ²⁰) | 0.21 | | | | 481 |
| GeTe (Ag doped)(n=64x10 ²⁰) | 0.41 | | | | 481 |
| $Ge_{1-x}Te_x$ (n=9-16x10 ²⁰) | 0.07-0.31 | | | B1 | 482 |
| Ge _{0.937} Te (n=14.3x10 ²⁰) | 0.30 | | | | 501 |
| Ge _{0.950} Te (n=11.8x10 ²⁰) | 0.24 | | | | 501 |
| Ge _{0.963} Te (n=9.3x10 ²⁰) | 0.17 | | | | 501 |
| $Ge_{0.976}Te (n=8.5x10^{20})$ | 0.07 | | | | 501 |
| ^{Ge} 1.006 ^{Te} (n≈7.5x10 ²⁰) | | | 0.02 | | 501 |
| Ge ₃ Te ₄ (n=1.06x10 ²²) | 1.55-1.80 | | | Rhomb. a=13.11, ∝=17.93 | 470 |
| $Ge_{3}Te_{4}$ (n=1.06x10 ²²) | 1.80-1.55 | | | Rhomb. a=13.11, ∝=17.93 | 622 |
| ^{Ge} 0.950 ^{Te} | 0.17-0.27 | | | | 623# |
| Ge ₂ Ti | | | | C54, a=8.594,b=5.030, c=8.864 | 522 |
| Ge ₃ Ti ₅ | | | | D8 ₈ , a=7.552,c=5.234 | 522 |
| GeV3 | 6.0,6.1 | | | | 474,645 |
| ^{Ge} 0.25 ^V 0.75 | | | | A15 | 572# |
| ^{Ge} 0.618 ^Y 0.382 | | | | Tet., b.c. | 572 # |

(VIII-42)

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure∞ | Ref. |
|--|---------------------|---------------------------|-----------|--------------------|---------|
| ^{Ge} 1.62 ^Y | 2.4 | | | | 676# |
| H _{1.8} La (with free La) | | | 1.1 | | 488 |
| ^H 1.96 ^{La} | | | 0.33 | | 488 |
| ^H 2.03 ^{La} | | | 1.1 | | 488 |
| ^H 2.11 ^{La} | | | 1.1 | | 488 |
| ^H 2.15 ^{La} | | | 1.1 | | 488 |
| ^H 2.36 ^{La} | | | 1.1 | | 488 |
| ^H >0.41 ^{Nb} | | HF | 1.8 | Ortho. | 631 |
| ^H 0.36-0.47 ^{Pd} 0.64-0.53 | | | | | 572# |
| Hf | | | | | 572# |
| Hf ₂ InN | | | 1.1 | Hex., H-Phase | 632 |
| ^{NfN} 0.989 | 6.6 | | | B1, a=4.50 | 559,558 |
| ^{Hf} 0.75 ^{Nb} 0.25 (Arc Cast) | >4.2 | HF | | | 616 |
| Hf _{0.75} Nb _{0.25} (Cold rolled) | >4.2 | HF | | | 616 |
| ^{Hf} 0.30 ^{Ta} 0.70 | | | | A2 | 572# |
| ^{Hf} 0.50 ^{Ti} 0.50 | | | | A3 | 572# |
| HfV ₂ | 9.57-8.9 | | | C15 | 640 |
| ^{Hf} 0.50 ^{Zr} 0.50 | | | | A3 | 572# |
| Hg | 4.154 | 410.88 | | | 579#∙ |
| Нg | 4.16 | 380 | | | 527# |

(VIII-43)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure - | Ref. |
|---|-------------------------|---------------------------|------|------------------------------------|---------------|
| Hg ₅ Mn ₂ | | | 2.1 | | 661 |
| ^{Hg} 0.80 ^{Pt} 0.20 | | | 0.32 | | 489 |
| ^{Hg} 0-0.012 ^{T1} | $T_{c} = (-0.13)$ | | | | 591 |
| In | 3.407 | 282.66 | | | 579# |
| In (Particles) | 3.396 | | | | 604 |
| In⊽ | 3.7 | | | | 532⊽,596⊽,602 |
| InLa ₃ | 9.83 | | | ^{L1} 2 | 658 |
| InLa ₃ (0-35 kbar) | 9.75-10.55 | | | | 658 |
| In _{1-x} ^{Mn} x | T _c (-0.28) | | | | 598 |
| In _{1-x} ^{Mn} x ^{Pb} | T _c (-0.016) | | | | 598 |
| InN | 3.38? | | | B4, hex., ZnS, a=3.540, c=5.706 | 558 |
| InNTi ₂ | | | 1.1 | Hex., H-Phase | 632 |
| InNb ₃ | | | 2.25 | Cubic, a=3.326 | 508 |
| InNb ₃ (high pressure & temperature) | 4-8 | | | A15, a=5.303 | 508 |
| ^{In} 0.11 ⁰ 3 ^W | <1.25-2.8 | | | Hex., a=7.407, c=7.545 | 644 |
| In _{1-x} Pb _x | | | | | 609 |
| ^{In} 0.17 ^{Pb} 0.83 | | HF | | | 627 |
| ^{In} 0.98 ^{Pb} 0.02 | 3.45 | 310, HF | | | 662 |
| ^{In} 0.96 ^{Pb} 0.04 | 3.68 | 348, HF | | | 662 |
| ^{In} 0.94 ^{Pb} 0.06 | 3.90 | 385, HF | | | 662 |
| ^{In} 0.913 ^{Pb} 0.087 | 4.2 | HF | | | 665 |
| ^{In} 0.30 ^{Pb} 0.70 | | HF | | | 683 |

(VIII-44)

| Material | т (к) | H (oersteds) | т ** | Crystal Structure m | Ref |
|--|-------------------------|--------------|------|-----------------------------------|--------------|
| | 1c(11) | | 'n | | |
| In _{1-0.90} Pb _{0-0.10} | 0.7-1.1 | HF | | | 480 # |
| InPd | 0.7 | | | B2 | 489 |
| InRh | | | 0.32 | B2 | 489 |
| InSb | 2.1 | 1100 | | | 471 |
| InSb (Metallic) | 1.6-2.1 | | | 6-Sn structure; a=5.72, b=3.18 | 502 |
| InSb (Quenched) | 2.1 | | | Tet., a=5.79, c=3.15 | 539 |
| InSb (From 170 kbar in Liq. N ₂) | 4.8 | | | Like A5 | 681 |
| InSb (30 ~170 kbar, 77 ~523 K) | 1.6-5.1 | | | Like A5 | 689 |
| InSbSn _{0.02} -0.80 (Quenched) | 4.0-4.4 | | | | 539 |
| InSbSn _{0.05-0.80} (Heat treated, quenched) | 3.8-4.6 | | | | 539 |
| InSbSn _{0.05} -0.90 (Heat treated, quenched) | 3.8-5.1 | | | | 539 |
| In _x Sn _{1-x} (Single Crystals) | T' _c (-0.10) | | | | 562 |
| In _{1-x} ^{Sn} x | | | | | 609 |
| In _{0.04} Sn _{0.96} | | HF | | | 666 |
| InTe | | | 1.5 | Tet., a=6.06, c=6.55 II Phase | 696 |
| $In_{1-x}Te_{x}$ (n=0.8-1.71x10 ²²) | 1.0-3.45 | | | B1 | 622 |
| InTe (n=1.71 x 10 ²²) | 3.45-3.20 | | | Bl, a=6.18 | 622 |
| In _{0.82} Te (n=0.83x10 ²²) | 1.02-1.06 | | | Bl, a=6.052 | 506,515 |
| In _{0.83} Te (n=0.88x10 ²²) | 1.09-1.15 | | | B1, a=6.055 | 506,515 |

(VIII-45)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure ∞ | Ref. |
|--|--------------------|---------------------------|------|-----------------------------|------------------|
| In _{0.87} Te (n=1.09x10 ²²) | 1.40-1.55 | | | Bl, a=6.081 | 506,515 |
| In _{0.91} Te (n=1.28x10 ²²) | 1.87-2.04 | | | Bl, a=6.110 | 506,515 |
| In _{0.95} Te (n=1.47x10 ²²) | 2.5-2.7 | | | B1, a=6.14 | 506,515 |
| InTe (n=1.71x10 ²²) | 3.2-3.45 | | | B1, a=6.16 | 506 |
| InTe (n=1.71x10 ²²) | 3.20-3.45 | | | B1, a=6.177 | 470,515 |
| InTe | | | 1.6 | InTe (I) | 507 |
| In _{1.015} Te (n=1.67x10 ²²) | 3.25-3.51 | | | B1, a=6.178 | 515 |
| In _{1.05} Te (n=1.58x10 ²²) | 2.95-3.41 | | | B1, a=6.181 | 515 |
| In _{1.10} Te (n=1.45x10 ²²) | 2.55-2.80 | | | B1, a=6.182 | 515 |
| In _{1.15} Te (n=1.34x10 ²²) | 2.35-2.60 | | | B1, a=6.179 | 515 |
| In ₂ Te ₃ | | | 1.0 | | 515 |
| In ₃ Te ₄ (n=0.47x10 ²²) | 1.15-1.25 | | | Rhomb., a=13.75, ∝=17.80 | 470,515,622 |
| In1.000 ^{Te} 1.002 ^{II} | 3.5-3.7 | HF | | B1, a=6.154 | 507 |
| ^{In} 0.62 ^{T1} 0.38 | 2.760 | HF | | | 664 |
| ^{In} 0.78-0.69 ^{T1} 0.22-0.31 | 3.18-3.32 | | | Tet. | 692 |
| ^{In} 0.69-0.62 ^{T1} 0.31-0.38 | 2.98-3.3 | | | Cubic, f.c. | 692 |
| ^{In} 0-0.1126 ^{Zr} 1-0.8874 | | | | A3 | 572# |
| Ir | | | | | 572 # |
| Ir⊽ | | | 0.3 | | 503⊽,615⊽ |
| Ir2La | 0.48++ | | | C15, a=7.686 | 469 |
| Ir ₃ La | 2.46, 2.32 | | | dio ₂ | 469,658 |

++ Powder transition

(VIII-46)

| Material | т _с (К) | H _o (oersteds) | T ** n | Crystal Structure 🛥 | Ref. |
|---|------------------------|---------------------------|-----------|---|---------|
| Ir ₃ La ₇ | 2.24 | | | D10 ₂ , a=10.235, c=6.473 | 469 |
| Ir5La | 2.13 | | | | 469 |
| IrLu | | | 0.32 | B2, a=3.330 | 469 |
| IrLu ₂ | 0.84 (portion only) | | | | 469 |
| IrLu ₃ | | | 0.32 | | 469 |
| Ir ₂ Lu | 2.47 | | | C15, a=7.443 | 469 |
| Ir3Lu7 | 2.89 | | | C15, a=7.434 | 469 |
| Ir ₃ Lu | 0.78 (portion only) | | | | 469 |
| ¹ r0.25 ^{Mo} 0.75 | | | | A15 | 572# |
| Ir0.37 ^{Nb} 0.63 | 2.32 | | | D8 _b | 557# |
| Ir _{0.37} Nb _{0.63} | | | | D8 _b | 572# |
| IrNb ₃ | | | 1.7 | A15, a=5.1356 | 492 |
| ^{Ir} 0.02 ^{Nb} 3 ^{Rh} 0.98 | 2.43 | | | A15, a=5.131 | 492 |
| Ir _{0.05} Nb ₃ Rh _{0.95} | 2.38 | | | A15, a=5.132 | 492 |
| Ir _{0.10} Nb ₃ Rh _{0.90} | | | 1.7 | A15, a=5.1329 | 492 |
| Ir _{0.30} Nb ₃ Rh _{0.70} | | | 1.7 | A15, a=5.1340 | 492 |
| Ir _{0.50} Nb ₃ Rh _{0.50} | | | 1.7 | A15, a=5.1349 | 492 |
| Ir _{0.70} Nb ₃ Rh _{0.30} | | | 1.7 | A15, a=5.1349 | 492 |
| Ir _{0.90} Nb3 ^{Rh} 0.10 | | | 1.7 | A15, a=5.1345 | 492 |
| IrOs | | | | | 574,699 |
| $Ir_{0.65-1}os_{0.35-0}$ | | | | Al | 572# |

| (VII | I-47) |
|------|-------|
|------|-------|

| Material | Т _с (К) | H _o (oersteds) | T ** | Crystal Structure • | Ref. |
|---|---------------------------------------|---------------------------|------|---------------------|--------------|
| Ir _{0.7} 0s _{0.3} Rh | · · · · · · · · · · · · · · · · · · · | | | | 574 |
| Ir _{0.5} 0sRh _{0.5} | | | | | 574 |
| IrOsRh | | | | | 699 |
| IrP | | | 0.35 | | 491 |
| Ir ₂ P | | | 0.35 | | 491 |
| IrPd | | | | | 574,699 |
| IrPt | | | | | 574,699 |
| ^{Ir} 0.10-0 ^{Pt} 0.90-1 | | | | Al | 572 # |
| IrReRh | | · | | | 699 |
| Ir _{0.8} ^{Re} 0.2 ^{Rh} | | | | | 574 |
| IrRh | | | | | 574,699 |
| IrRu | | | | | 574,699 |
| IrS | | | 0.32 | | 552 |
| IrS _{2.6} | | | 0.32 | | 552 |
| IrSb | | | 0.35 | | 491 |
| Ir ₂ Sb | | | 0.35 | | 491 |
| IrSc | | | 0.32 | B2, a=3.205 | 469 |
| Ir _{0.32} Sc _{0.68} | | | 0.32 | | 469 |
| IrSc ₃ | | | 0.32 | | 469 |
| Ir ₂ Sc | 2.07 | | | C15, a=7.347 | 469 |
| Ir _{2.5} Sc | 2.46 | | | C15, a=7.343 | 469 |
| Ir _{2.5} Sc | 0.42 ⁺ (portion only) | | | | 469 |

+ Beginning of transition of powdered sample

(VIII-48)

| Material | Т _с (К) | H _o (oersteds) | т_** | Crystal Structure∞ | Ref. |
|---|---------------------------------------|---------------------------|------|---|--------------|
| Ir _{2.5} Sc | 2.13++ | | | | 469 |
| Ir ₃ Sc | | | 0.32 | | 469 |
| IrSe ₂ | | | 0.32 | Ortho-rhombic, a=20.94, b=5.93, c=3.74 | 552 |
| IrSe _{2.9} | | | 0.32 | | 552 |
| IrSn ₂ | 0.65-0.78 | | | C1, a=6.34 | 486 |
| Ir _{0.5} Te _{0.5} | 3.0+++ | | | | 552 |
| IrTe ₂ | | | 0.32 | C6, a=3.930, c=5.393 | 552 |
| IrTe ₃ | 1.18 | | | C2, a=6.413 | 552 |
| IrTh | 0.37+ | | | B _f , a=3.894, b=11.13, c=4.266 | 469 |
| Ir ₃ Th | 4.71 | | | | 469 |
| Ir ₅ Th | 3.93 | | | D2 _d , a=5.315, c=4.288 | 469 |
| ^{Ir} 0.69-0.67 Th 0.31-0.33 | | | | Cubic | 572 # |
| IrV ₃ | | | 0.35 | A1 5 | 498 |
| Ir _{0.33} V _{2.67} | 1.39 | | | A15 | 498 |
| ^{Ir} 0.28 ^W 0.72 | 4.49 | | | d8 _b | 557 # |
| ^{Ir} 0.28 ^W 0.72 | | | | d8 _b | 572# |
| IrY ₄ | | | 0.32 | | 469 |
| ^{Ir} 0.01 ^Y 0.99 | 0.35 (portion only) | | | | 469 |
| ^{Ir} 0.0175 ^Y 0.9825 | 0.49 ⁺⁺⁺ (portion only) | | | | 469 |

++ Powder transition

+++ Beginning of transition

(VIII-49)

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure∞ | Ref. |
|--|---------------------|---------------------------------------|-----------|--------------------------|-----------------------|
| ^{Ir} 0.65 ^Y 0.35 | 1.38 | · · · · · · · · · · · · · · · · · · · | | C15, a=7.525 | 469 |
| ^{Ir} 0.69 ^Y 0.31 | 1.98 | | | C15, a=7.501 | 469 |
| ^{Ir} 0.69 ^Y 0.31 | 1.44++ | | | C15, a=7.501 | 469 |
| ^{Ir} 0.70 ^Y 0.30 | 2.16 ⁺⁺ | | | C15, a=7.501-7.512 | 469 |
| Ir ₂ Y | 1.09 | | | C15, a=7.518 | 469 |
| Ir ₂ Y | 2.18, 0.88 | | | C15, a=7.500-7.520 | 469 |
| Ir ₂ Y ₃ | 1.61 | | | | 469 |
| Ir _{3 or 4} Y | 3.50 | | | | 469 |
| К | | | 0.011 | | 494,618 |
| ^K 0.27-0.31 ^O 3 ^W | 0.50 | | | Hex., a=7.4, c=7.6 | 500 |
| ^K 0.40-0.57 ⁰ 3 ^W | 1.5 | | | Tet., a=12.3, c=3.8 | 500 |
| 6-La | 6.06 | | | Al, a=5.29 (95% Al) | 536 |
| La [▽] (<1000A) | | | 1.2 | | 607 [▽] |
| La [∀] (1000-18,000A) | 5.00-6.74 | | | | 607 [♥] ,572 |
| La | 4.9 | | | | 676# |
| LaMg2 | 1.05 | | | C15 | 658 |
| LaMg | | | 0.33 | | 658 |
| ^{LaN} 0.98 | | | 1.38 | B1, a=4.44 | 558,559 |
| LaN | 1.35 | HF | | | 668 |
| LaP | | | 1.68 | B1, a=6.013 | 558 |
| LaPd ₃ | | | 0.32 | ^{L1} 2, a=4.233 | 469 |

++ Powder transition

(VIII-50)

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure∞ | Ref. |
|--|---------------------|---------------------------|-----------|---|---------|
| La _{1-x} ^{Pr} x | Range | | | | 608 |
| LaPt ₂ | 0.46 | | | C15, a=7.776 | 469 |
| La _{0.28} ^{Pt} 0.72 | 0.54 | | | C15, a=7.722 | 469 |
| LaPt ₅ | | | 0.32 | D2 _d , a=5.386, c=4.376 | 469 |
| LaRh ₂ | | | 0.32 | C15, a=7.646 | 469 |
| LaRh ₃ | 2.60 | | | | 469 |
| LaRh ₅ | 1.62 | | | | 469 |
| La7 ^{Rh} 3 | 2.58 | | | D10 ₂ , a=10.145, c=6.434 | 469 |
| La0.001-0.01 ^{Rh} 0.999-0.99 | 1.6 | | | | 563 |
| La7Rh3 | 2.58 | | | D10 ₂ | 658 |
| LaS | | | 1.25 | | 617 |
| La ₃ S ₄ | 6.5 | HF | | Cubic, a=8.73, Th ₃ P ₄ type | 617 |
| La ₂ S ₃ | | | 1.25 | Cubic, b.c. Ce ₂ S type, a=8.723 | 558,617 |
| La ₃ S ₄ + additional compositions | 6.5 | HF | | D7 ₃ , a=8.73 | 534 |
| LaSe | | | 1.25 | | 534,617 |
| La2Se3 | | | 1.25 | | 534,617 |
| La ₃ Se ₄ + additional compositions | 8.6 | HF | | D7 ₃ , a=9.05 | 534 |
| La ₃ Se ₄ | 8.6 | HF | | Cubic, a=9.05, Th ₃ P ₄ type | 617 |
| La _{0.333} Si _{0.667} | | | | Tet., b.c. | 572# |
| LaSi ₂ | 2.3 | | | | 676# |
| La _{0.15} Y _{0.85} | | | | A3 | 572# |

(VIII-51)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure ∞ | Ref. |
|---|---------------------|---------------------------|------|---------------------|--------------|
| La _{0.35} Y _{0.65} | | | | A3 | 572 # |
| La _{0.48} Y _{0.52} | | | | Hex., Sm type | 572# |
| ^{La} 0.60 ^Y 0.40 | | | | Hex., La type | 572 # |
| ^{La} 0.75 ^Y 0.25 | | | | Hex., La type | 572 # |
| ^{La} 0.85 ^Y 0.15 | | | | Hex., La type | 57 2# |
| La _{1-x} Yb _x | Range | | | | 608 |
| LaZn | 1.04 | | | B2 | 658 |
| Lu | | | 0.03 | | 660 |
| LuRh | | | 0.32 | B2, a=3.334 | 469 |
| LuRh ₂ | | | 0.32 | C15, a=7.404 | 469 |
| ^{Lu} 0.275 ^{Rh} 0.725 | 1.27 | | | C15, a=7.355 | 469 |
| LuRh ₅ | 0.49 | | | | 469 |
| Lu2 ^{Rh} | | | 0.32 | | 469 |
| Lu ₃ Rh | | | 0.32 | | 469 |
| ^{Mg} 24 ^Y 5 | | | 1.30 | A12 | 557 |
| МgY | | | 0.33 | B2 | 658 |
| Mn (~) | | | | A12 | 572# |
| Mn (A) | | | | A13 | 572# |
| Mn (γ) | | | | ۲- form | 572# |
| Mn (j) | | | | J - form | 572# |
| ^{Mn} 0.63 ^{Mo} 0.37 | | | 1.30 | D8 _b | 557 |
| ^{Mn} 0.73 ^{Mo} 0.27 | | | 1.30 | D8 _b | 557 |

| (| V | I | I | I - | 52 |) |
|---|---|---|---|-----|----|---|
|---|---|---|---|-----|----|---|

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure∞ | Ref. |
|---|----------------------|---------------------------|------|--------------------|--------------|
| ^{Mn} 0.75 ^{Ni} 0.25 | | | | Al | 572 # |
| ^{Mn} 0.60 ^{Ni} 0.40 | | | | Al | 572# |
| ^{Mn} 0.40 ^{Ni} 0.60 | | | | A1 | 572 # |
| ^{Mn} 0.30 ^{Ni} 0.70 | | | | A1 | 572# |
| ^{Mn} 0.25 ^{Ni} 0.75 | | | | Cubic | 572# |
| ^{Mn} 0.25 ^{Ni} 0.75 | | | | A1 | 572# |
| ^{Mn} 0.25 ^{Ni} 0.75 | | | | A1 | 572 # |
| ^{Mn} 0.20 ^{Ni} 0.80 | | | | A1 | 572 # |
| MnP | | | 0.01 | B31 | 601 |
| ^{Mn} 0.005 ^{Pt} 0.995 | | | | A1 | 572# |
| ^{Mn} x ^{Sn} 1-x | T' _c (≈0) | | | | 598 |
| ^{Mn} .0017017 ^{Ti} .9983983 | | | | A3 | 572 # |
| ^{Mn} .020 ^{Ti} .980 | | | | A3 | 572 # |
| ^{Mn} 0.14 ^{Ti} 0.86 | | | | A2 | 572# |
| Mn0.0028 ^{Ti} 0.9972 (quenched) | 2.6R | | | | 523 |
| ^{Mn} 0.0028-0.04 ^{T1} 0.9972-0.96 (quenched from 1000°C) | | | 1.1 | | 523 |
| ^{Mn} 0.0028-0.04 ^{Ti} 0.9972-0.96 (quenched from 690°C) | ~3.0R | | | pure∝+ pure β | 523 |
| ^{Mn} 0.01 ^{Ti} 0.99 | 1.2 | | | | 490 |
| Mn 0.01-0.14 ^{Ti} 0.99-0.86 (guenched from 1000°C) | <1.4 | | | | 523 |

(VIII-53)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure 👓 | Ref. |
|---|-------------------------|---------------------------|------|---------------------|--------------|
| ^{Mn} 0.02 ^{Ti} 0.98 | 1.7 | | | | 477 |
| Mn0.02 ^{Ti} 0.98 (quenched) | 1.9 | | | | 523 |
| ^{Mn} 0-0.0065 ^{Ti} y | | | 0.06 | | 490 |
| ^{Mn} x ^{Ti} y | 0.2-0.4 | | | | 490 |
| Mn _x Ti _y | | | | | 522 |
| ^{Mn} 0.002 ^{Ti} 0.499 ^{Zr} 0.499 | | | | A3 | 572 # |
| ^{Mn} (0-14 ppm at.) ^{Zn} | T' _c (-0.46) | | | | 598 |
| Mo (Isotopes) | 0.886-0.912 | | | | 566 |
| Мо | 0.915-0.918 | 95 | | | 543#,572# |
| Мо⊽ | ~5 | | | A2 + extra lines | 503⊽,615⊽ |
| ^{Mo} 0-1.00 ^{Nb} 1.00-0 | | | | A2 | 572 # |
| ^{Mo} 0-1.00 ^{Nb} 1.00-0 | | | | A2 | 572# |
| ^{Mo} 0.15 ^{Nb} 0.85 | | | | A2 | 572# |
| ^{Mo} 0.62 ^{Os} 0.38 | 5.60 | | | D8 _b | 557#,572# |
| Mo ₃ P | 5.31 | | | DOe | 601 |
| МоР | | | 1.01 | ^B b | 601 |
| ^{Mo} 0.60 ^{Pd} 0.40 | | | | | 572# |
| ^{Mo} 0.50 ^{Pd} 0.50 | | | | | 572# |
| ^{Mo} 0.40 ^{Pd} 0.60 | | | | | 572# |
| ^{Mo} 0.57 ^{Re} 0.43 | 14.0 | | | | 592 |

| (VIII | -54) |
|-------|------|
|-------|------|

| Material | Т _с (К) | H _o (oersteds) | T ** | Crystal Structure ∞ | Ref. |
|--|---------------------|---------------------------|------|---------------------|--------------|
| ^{Mo} 0.42 ^{Re} 0.58 | 6.35 | | | D8b | 557# |
| ^{Mo} 0.23 ^{Re} 0.77 | 9.25 | | | A12 | 557 # |
| ^{Mo} 0.52 ^{Re} 0.48 (Cold worked) | 11.1 | HF | | | 555 |
| ^{Mo} 0.52 ^{Re} 0.48 (Cold worked) | 11.1 | HF | | · · | 555 |
| Mo _{0.52} Re _{0.48} (Annealed 1250°C, slow cooled) | 11.1 | HF | | | 555 |
| ^{Mo} 0.52 ^{Re} 0.48 (Annealed 1250°C + slow cooled) | 11.1 | HF | | | 555 |
| Mo _{0.52} Re _{0.48} (Annealed 1250°C + quenched) | 11.1 | HF | | | 555 |
| Mo _{0.52} Re _{0.48} (Annealed 2000°C + slow cooled) | 11.1 | HF | | | 555 |
| ^{Mo} 0.60 ±0.05 ^{Re} 0.395 (Cold worked) | 10.6 | HF | | | 555 |
| <pre>Mo 0.60 ±0.05^{Re 0.395 (Annealed 1 hr. 1100°C, slow cooled)}</pre> | 10.6 | HF | | | 555 |
| ^{Mo} 0.60 ±0.05 ^{Re} 0.395 (Annealed 19 hr. 1100°C, slow cooled) | 10.6 | HF | | | 555 |
| ^{Mo} 1-0.50 ^{Re} 0-0.50 | | | | A2 | 572# |
| ^{Mo} 0.42 ^{Re} 0.58 | | | | D8 _b | 572# |
| ^{Mo} 0.23 ^{Re} 0.77 | | | | A12 | 572 # |
| ^{Mo} 0.61 ^{Ru} 0.39 | 7.18 | | | D8 _b | 557# |

(VIII-55)

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure∞ | Ref. |
|---|---------------------|---------------------------|-----------|--------------------|--------------------|
| ^{Mo} 0.95 ^{Ru} 0.05 | | | | A2 | 572# |
| ^{Mo} 0.70 ^{Ru} 0.30 | | | | A2 | 572# |
| ^{Mo} 0.61 ^{Ru} 0.39 | | | | D8 _b | 572# |
| ^{Mo} 0.333 ^S 0.667 | | | | | 572# |
| Mo ₃ Si | 1.3 | | | | 474 |
| Mo ₃ Sn | | | 1.0 | Cubic, a=3.165 | 509 |
| Mo ₃ Sn (high pressure and temperature) | | | , 0.35 | Al5, a=5.094 | 509 |
| ^{Mo} 0.50 ^{Tc} 0.50 | | | | A2 | 572 1 / |
| ^{Mo} 0.16 ^{Ti} 0.84 | 4.18 | <985, HF | | | 584 |
| ^{Mo} 0.913 ^{Ti} 0.087 | 2.95 | HF | | | 600 |
| ^{Mo} 0.16 ^{Ti} 0.84 | 4.18 | HF | | | 616 |
| ^{Mo} 0.16 ^{Ti} 0.84 | 4.246 | HF | | | 565# |
| ^{Mo} 0.086 ^{Ti} 0.914 | | | | A2 | 572# |
| ^{Mo} 0.075 ^{Ti} 0.925 | | | | A2 | 572# |
| ^{Mo} 0.065 ^{Ti} 0.935 | | | | A2 | 572 # |
| ^{Mo} 0.063 ^{Ti} 0.937 | | | | A2 | 572# |
| ^{Mo} 0.025 ^{Ti} 0.975 | 1.8 | | | A3 | 477#,572# |
| ^{Mo} 0.04 ^{T1} 0.96 | 2.0 | | | b.c.c., w + h.c.p. | 477 |
| Mo _x Ti _y | | | | | 522 |
| ^{Mo} 0.296 ^U 0.704 | | | | A2 | 572 # |
(VIII-56)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure∞ | Ref. |
|--|---------------------|---------------------------|---------|--------------------|--------------|
| ^{Mo} 0.253 ^U 0.747 | | | <u></u> | A2 | 572 # |
| ^{Mo} 0.216 ^U 0.784 | | | | A2 | 572 # |
| ^{Mo} 0.118 ^U 0.882 | | | | A2 | 572 # |
| ^{Mo} 0.137 ^U 0.863 | | | | A2 | 572# |
| Mo ₂ Zr | 4.75-4.27 | | | C15 | 640 |
| ^N 0.456 ^{Nb} 0.544 | | | | | 572# |
| ^N 0.476 ^{Nb} 0.524 | | | | | 572# |
| NNb (Whiskers) | 10-14.5 | HF | | | 582 |
| ^N x ^{Nb} 1-x | Range | | | | 588 |
| NNb (Diffusion wires) | 16.10 | HF | | | 553 |
| ^N 0.988 ^{Nb} | 14.9 | | | B1; a=4.39 | 559,558 |
| ^N 0.952 ^{Nb} | 15.3 | | | B1 | 559,558 |
| ^N 0.920 ^{Nb} | 14.7 | | | B1 | 559,558 |
| ^N 0.900 ^{Nb} | 15.2 | | | B1, a=4.38 | 559,558 |
| ^N 0.868 ^{Nb} | 14.8 | | | B1 | 559,558 |
| ^N 0.824 ^{Nb} | 14.4 | | | B1 | 559,558 |
| ^N 0.795 ^{Nb} | 12.9 | | | Cubic & Tet. | 559,558 |
| ^N 0.752 ^{Nb} | 12.6 | | | Cubic & Tet. | 559,558 |
| ^N 0.700 ^{Nb} | 11.3 | | | Cubic & Tet. | 559,558 |
| NNbx | | | | B1 | 483 |

(VIII-57)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure • | Ref. |
|--|-------------------------|---------------------------|------|---------------------|------------------|
| NNb [∇] (sputtered) | 6-9 | | | B1 | 505 [▽] |
| NNb _x O _y | 13.5-17.0 | HF | | B1 | 483 |
| ^N 100-42 w/o ^{Nb} 0-58 w/o ^{Ti} | 15-16.8 | | | | 588 |
| ^N 100-75 w/o ^{Nb} 0-25 w/o ^{Zr} | 12.5-16.35 | | | | 588 |
| NNb _{1-0.75} ^{Zr} 0-0.25 (wires) | | HF | | | 553 |
| NNb _x Zr _{1-x} | 9.8-13.8 | HF | | B1, a=4.38-4.56 | 652 |
| ^N 0.93 ^{Nb} 0.85 ^{Zr} 0.15 | 13.8 | HF | | B1, a=4.42 | 652 |
| N Nb Zrz | | HF | | | 517 |
| ^N 0.98 ^{Pr} | | | 1.38 | Bl, a=5.16 | 559,558 |
| ^N 0.97 ^{Sc} | | | 1.38 | Bl, a=4.44 | 559,558 |
| NTa | 12-14 (Extrapolated) | | | B1 | 691 |
| NTa^{∇} (sputtered) | 4.84 | | | B1 | 505⊽ |
| NTa_2^{∇} (sputtered) | | | 1.2 | Hex. | 505 [⊽] |
| ^N 0.987 ^{Ti} | 5.8 | | | B1, a=4.20 | 559,558 |
| ^N 0.99-0.60 ^{Ti} | <1.17-4.35 | | | B1, a=4.243-4.238 | 694 |
| ^N 0.8-0.6 ^T i | | | 1.17 | | 694 |
| ^N 0.99 ^{Ti} | 4.35 | | | | 694 |
| N _{0.84} Ti | 1.2 | | | | 694 |
| ^N 0.898 ^V | 5.9 | | | B1, a=4.13 | 559,558 |
| ^N 0.99-0.785 ^V | 2-8 | | | B1, a=4.132-4.084 | 694 |

(VIII-58)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure∞ | Ref. |
|---|---------------------|---------------------------|------|----------------------|---------|
| ^N 0.99 ^V | 7.9 | | · . | | 694 |
| ^N 0.9 ^V | 4.8 | | | | 694 |
| ^N 0.82 ^V | 2.9 | | | | 694 |
| ^N 0.97 ^W | | | 1.38 | B1 | 559,558 |
| NY | | | 1.4 | B1, a=4.895 | 694 |
| ^N 0.984 ^{Zr} | 9.5 | | | B1 | 559,558 |
| ^N 0.971 ^{Zr} | 8.8 | | | B1 | 559,558 |
| ^N 0.965 ^{Zr} | 6.3 | , | | B1 | 559,558 |
| ^N 0.958 ^{Zr} | 5.6 | | | B1 | 559,558 |
| ^N 0.932 ^{Zr} | 3.0 | | | B1 | 559,558 |
| ^N 0.906 ^{Zr} | | | 1.38 | B1 | 559,558 |
| NZr | 9.8 | | | B1, a=4.56 | 652 |
| ^{Na} 0.3 ⁰ 3 ^W | | | 0.3 | Perovskite | 575 |
| Na0.403W | | | 0.3 | Perovskite | 575 |
| ^{Na} 0.8 ⁰ 3 ^W | | | 0.3 | Perovskite | 575 |
| ^{Na} 0.28-0.35 ⁰ 3 ^W | 0.56 | | | Tet., a=12.1, c=3.75 | 625 |
| ^{Na} 0.3 ⁰ 3 ^W | | | 0.3 | E21 | 674 |
| ^{Na} 0.4 ⁰ 3 ^W | | | 0.3 | E21 | 674 |
| ^{Na} 0.8 ⁰ 3 ^W | | | 0.3 | E21 | 674 |
| Na _{0.2} 03 ^W | 0.55 | | | Tet., a=12.1,c=3.7 | 500 |

(VIII-59)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure . | Ref. |
|---|--|---------------------------|-------|----------------------|------------------------|
| ^{Na} 0.28-0.35 ⁰ 3 ^W | 0.56 | | | Tet., a=12.1, c=3.75 | 472 |
| ^{Na} 0.10 ⁰ 3 ^W | | | 0.040 | Tet. II, a=5.2,c=3.9 | 500 |
| Na _x 0 ₃ W | | | 0.011 | Perovskite, a=3.8 | 500 |
| NB | | HF | | | 538,679# |
| NB | 9.22 + 9.25* | HF | | | 544,505, 525#, 531# |
| Nb [∇] | | HF | | | 518 [∇] |
| Nb⊽ (2000-20000Å) | 6.5-9.4 | | | | 529 [▽] |
| Nb [∇] (420-6000Å) | 6.70-9.11 | | | | 505 [▽] |
| NB [▽] | <bulk< td=""><td></td><td></td><td></td><td>503[▽]</td></bulk<> | | | | 503 [▽] |
| Nb | 9.26 | | | | 620#,572# |
| NЪO | 1.25 | | | | 481 |
| Nb ₃ Os | | | 1.7 | A15, a=5.1359 | 492 |
| ^{Nb} 0.60 ^{Os} 0.40 | 1.89 | | | D8 _b | 557 # ,572# |
| ^{Nb} 3 ^{Os} 0.02 ^{Rh} 0.98 | 2.42 | | | Al5, a=5.134 | 492 |
| ^{Nb} 3 ^{Os} 0.05 ^{Rh} 0.95 | 2.39 | | | A15, a=5.132 | 492 |
| ^{Nb} 3 ^{Os} 0.10 ^{Rh} 0.90 | 2.30 | | | A15, a=5.1302 | 492 |
| ^{Nb} 3 ^{Os} 0.30 ^{Rh} 0.70 | | | 1.7 | A15, a=5.1315 | 492 |
| ^{Nb} 3 ^{Os} 0.50 ^{Rh} 0.50 | | | 1.7 | A15, a=5.1334 | 492 |
| ^{Nb} 3 ^{Os} 0.70 ^{Rh} 0.30 | | | 1.7 | Al5, a=5.1345 | 492 |
| ^{Nb} 3 ^{Os} 0.90 ^{Rh} 0.10 | | | 1.7 | Al5, a=5.1354 | 492 |
| * Residual Resistivi | ty Ratio = ~500 | | | | |

(VIII-60)

| Material | Т _с (К) | H _o (oersteds) T _n ** | Crystal Structure 👓 | Ref. |
|---|---------------------|---|-------------------------|--------------|
| ^{Nb} 0.60 ^{Pd} 4.40 | 1.60 | | D8 _f & Cubic | 557# |
| ^{Nb} 0.60 ^{Pd} 0.40 | | | d8 _b | 572# |
| ^{Nb} 3 ^{Pd} 0.02 ^{Rh} 0.98 | 2.50 | | Al5, a=5.133 | 492 |
| ^{Nb} 3 ^{Pd} 0.05 ^{Rh} 0.95 | 2.49 | | A15, a=5.134 | 492 |
| ^{Nb} 3 ^{Pd} 0.10 ^{Rh} 0.90 | 2.55 | | A15, a=5.1345 | 492 |
| Nb3Pt | 10.9 | | A15, a=5.1547 | 492 |
| ^{Nb} 0.62 ^{Pt} 0.38 | 4.21 | | D8 _b | 557#,572# |
| Nb3 ^{Pt} 0.02 ^{Rh} 0.98 | 2.52 | | A15, a=5.132 | 492 |
| Nb3 ^{Pt} 0.05 ^{Rh} 0.95 | 2.53 | | A15, a=5.133 | 492 |
| ^{Nb} 3 ^{Pt} 0.10 ^{Rh} 0.90 | 2.8 | | A15, a=5.1336 | 492 |
| ^{Nb} 3 ^{Pt} 0.30 ^{Rh} 0.70 | 5.1 | | A15, a=5.1395 | 492 |
| Nb3 ^{Pt} 0.50 ^{Rh} 0.50 | 6.25 | | A15, a=5.1450 | 492 |
| Nb3 ^{Pt} 0.70 ^{Rh} 0.30 | 7.4 | | A15, a=5.1487 | 492 |
| Nb3Pt0.90Rh0.10 | 7.9 | | A15, a=5.1534 | 492 |
| Nb3 ^{Pt} 0.95 ^{Rh} 0.05 | 8.9 | | A15, a=5.160 | 492 |
| Nb3Pt0.98 ^{Rh} 0.02 | 9.6 | | A15, a=5.157 | 492 |
| Nb _{0 38} ^{Re} 0 62 | 2.43 | | A1 2 | 557# |
| Nb _{0 29} ^{Re} 0 71 | 5.60 | | A1 2 | 557 <i>‡</i> |
| ^{Nb} 0.20 ^{Re} 0.80 | 8.83 | | A12 | 557# |

(VIII-61)

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure∞ | Ref. |
|---|---------------------|---------------------------|-----------|---|--------------|
| ^{Nb} 0.38 ^{Re} 0.62 | | | | A12 | 572# |
| ^{Nb} 0.29 ^{Re} 0.71 | | | | A12 | 572 # |
| ^{Nb} 0.20 ^{Re} 0.80 | | | | A12 | 572 # |
| Nb ₃ Rh | 2.64 | | | Al5, a=5.1317 | 492 |
| ^{Nb} 0.60 ^{Rh} 0.40 | 4.21 | | | D8 _b + ? | 557 <i>‡</i> |
| ^{Nb} 0.60 ^{Rh} 0.40 | | | | D8 _b | 572 # |
| ^{Nb} 3 ^{Rh} 0.90 ^{Ru} 0.10 | 2.44 | | | Al5, a=5.1346 | 492 |
| ^{Nb} 3 ^{Rh} 0.95 ^{Ru} 0.05 | 2.42 | | | A15, a=5.135 | 492 |
| ^{Nb} 3 ^{Rh} 0.98 ^{Ru} 0.02 | 2.42 | | | A15, a=5.132 | 492 |
| ^{Nb} 0.90-0.62 ^{Ru} 0.10-0.38 | | | | A2 | 572 # |
| ^{Nb} 0.33 ^S 0.67 | | | | | 572 # |
| NbS ₂ | 6.1-6.3 | | | Hex., 2 layer NbSe ₂ type | 675 |
| NbS2 | 5.0-5.5 | | | Hex., 3 layer type | 675 |
| NbSe2 | 5.15-5.62 | | | Hex., NbS ₂ type, a=3.44, c=12.54 | 636 |
| NbSe1.9-2.25 | >4.2 | | | | 636 |
| NbSe ₂ | 7.0 | | | Hex. | 647 |
| ^{Nb} 1.05 ^{Se} 2 | 2.2 | | | | 647 |
| ^{Nb} 1-1.05 ^{Se} 2 | 2.2-7.0 | | | Hex., NbS ₂ type, a=3.45, c=12.54 | 647 |

(VIII-62)

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure∞ | Ref. |
|--|---------------------|---------------------------|-----------|-----------------------|----------|
| ^{Nb} ~0.96-1.06 ^{Se} 2 | 5.9-6.3 | | | Hex., a=3.44, c=25.24 | 647 |
| ^{Nb} 1.05 ^{Se} 2 | 2.2 | HF | | | 654 |
| ^{Nb} 0.8 ^{Sn} 0.2 (950°C @ 72 hrs., 1550°C @ 3 hrs.) | 7.5 | | | Al5, a=5.284 | 593 |
| ^{Nb} 0.8 ^{Sn} 0.2 (1550°C - 4 hrs.) | 5.5 | | | Al5, a=5.283 | 593 |
| ^{Nb} 0.85 ^{Sn} 0.15 (950°C - 72 hrs., 1550°C - 3 hrs.) | 4.8 | | | Al5, a=5.282 | 593 |
| Nb ₃ Sn (Various heat treatments) | 6.2-17.5 | | | Al5, a=5.282-5.289 | 593 |
| Nb ₃ Sn | 18.0 | | | Al5, a=5.289 | 473,572# |
| Nb ₃ Sn (quenched) | 4-16.7 | | | A15 | 498 |
| Nb ₃ Sn (sintered) | | HF | | | 485,564# |
| ^{Nb} 0.5-0.83 ^{Sn} 0.5-0.17 (as cast) | 17.6M | | | | 479 |
| ^{Nb} 0.5-0.83 ^{Sn} 0.5-0.17 (annealed) | 1 7. 95M | | | | 479 |
| NbSnTa ₂ | 10.8 | | | Al5, a=5.280 | 473 |
| Nb ₂ SnTa | 16.4 | | | A15, a=5.289 | 473 |
| Nb2.5 ^{SnTa} 0.5 | 17.6 | | | A15 | 473 |
| ^{Nb} 2.75 ^{SnTa} 0.25 | 17.8 | | | A15 | 473 |
| NbSnTaV | 6.2 | | | A15, a=5.175 | 473 |

| Material | т _с (К) | H _o (oersteds) | T_** | Crystal Structure∞ | Ref. |
|--|---------------------|---------------------------|-------|------------------------|-------------------|
| Nb2 ^{SnTa} 0.5 ^V 0.5 | 12.2 | <u> </u> | | A15 | 473 |
| NbSnV ₂ | 5.5 | | | A15, a=5.115 | 473 |
| Nb2 ^{SnV} | 9.8 | | • | A15, a=5.171 | 473 |
| ^{Nb} 2.5 ^{SnV} 0.5 | 14.2 | | | A15 | 473 |
| ^{Nb} 0.10 ^{Ta} 0.90 | | HF | | | 478 |
| ^{Nb} 0.5 ^{Ta} 0.5 | 6.25 | | | | 544 |
| NbTe2 | | | , 1.0 | Like CdCl ₂ | 675 |
| ^{Nb} 0.6 ^{Ti} 0.4 | 9.8 | | | | 592 |
| Nb32 w10 ^{Ti} 68 w10 | | HF | | | 682 |
| ^{Nb} 0.025 ^{Ti} 0.975 | 1.5 | | | Hex. | 499 |
| ^{Nb} 0.04 ^{Ti} 0.96 | | | | A3 | 477#,554# 572# |
| Nb _x Ti _y | | | | | 522 |
| ^{Nb} 0.259 ^U 0.741 | | | | A2 | 572# |
| ^{Nb} 0.88 ^V 0.12 | 5.7 | | | A2 | 572# |
| ^{Nb} 0.75 ^{Zr} 0.25 | | HF | | | 597 |
| ^{Nb} 0.66 ^{Zr} 0.33 | | HF | | | 597 |
| ^{Nb} 0.40 ^{Zr} 0.60 | | | | A2 | 572 # |
| ^{Nb} 0.50 ^{Zr} 0.50 | | | | A2 | 572 ∦ |
| ^{Nb} 0.75 ^{Zr} 0.25 | | | | A2 | 572# |

| (| V | II | I- | 6 | 4) |
|---|---|----|----|---|----|
|---|---|----|----|---|----|

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure ∞ | Ref. |
|---|--------------------|---------------------------|------|---|------------------|
| ^{Nb} 0.75 ^{Zr} 0.25 | | | | A2 | 572 ∦ |
| ^{Nb} 0.90 ^{Zr} 0.10 | | | | A2 | 572 # |
| ^{Nb} 0.15-0.90 ^{Zr} 0.85-0.10 | | HF | | | 686 |
| ^{Nb} 0.75 ^{Zr} 0.25 | | HF | | | 690 |
| Nd2 ^S 3 | | | 1.68 | Cubic, b.c. Ce ₂ S ₃ type, a=8.699 | 558 |
| Ni | | | 0.35 | | 270,572# |
| Ni ₃ P | | | 1.01 | DOe | 601 |
| Ni ₂ P | | | 1.01 | C22 | 601 |
| ^{Ni} 0.80-0 ^{Pd} 0.20-1 | | | | Al | 572# |
| Ni0.005 ^{Pt} 0.995 | | | | Al | 572# |
| ^{Ni} 0.96-0.92 ^{Sb} 0.04-0.08 | | | | A1 | 572 # |
| ^{Ni} 0.96-0.92 ^{Si} 0.04-0.08 | | | | Al | 572# |
| ^{Ni} 0-0.08 ^V 1-0.92 | | | | A2 | 572# |
| ^{N1} 0.60 ^V 0.40 | | | | Al | 572# |
| ^{N1} 0.65 ^V 0.35 | | | | A1 | 572 # |
| ^{Ni} 0.72 ^V 0.28 | | | | A1 | 572 # |
| ^{Ni} 0.82 ^V 0.18 | | | | A1 | 572# |
| ^{Ni} 0.91 ^V 0.09 | | | | Al | 572# |
| Ni _{0,91-0,74} $Zn_{0,09-0,26}$ | | | | Al | 572# |

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure∞ | Ref. |
|---|---------------------|---------------------------|-----------|-----------------------|-----------------------|
| ^{Ni} (0-~400 ppm at.) ^{Zn} | T'c (-~0.1) | | | | 598 |
| Np | | | 0.41 | | 495 |
| ⁰ 3 ^{Rb} 0.27-0.29 ^W | 1.98 | | | Hex., a=7.4, c=7.6 | 500 |
| 0_{3} SrTi (n = 10 ²⁰) | 0.43 | HF | | | 5 94 # |
| 0 ₃ SrTi (n = 10 ²⁰) | 0.33 | HF | | | 594# |
| 0_{3} SrTi (n = 3.3x10 ¹⁹) | ~0.28 | | | | 610 |
| 0_{3} SrTi (n = 2.5x10 ²⁰) | ~0.25 | | | | 610 |
| 0_3 SrTi (n = 2.6x10 ¹⁹) | | 0.4 | | | 610 |
| 0 ₃ SrTi (n=1.7 - 12.0x10 ¹⁹) | 0.12-0.37 | HF | | | 611 |
| 0 ₃ SrTi (n=10 ¹⁸ -10 ²¹) | 0.05-0.47 | | | | 621 |
| 0_{3} SrTi (n = ~10 ²⁰) | 0.47 | | | | 621 |
| ⁰ 3 ^{Sr} 0.08 ^W | 2.0-4.0 | | | Hex., a=7.414,c=7.569 | 644 |
| OTi | 0.58 | | | | 581 |
| ⁰ 3 ^{T1} 0.30 ^W | 2.00-2.14 | | | Hex., a=7.344,c=7.482 | 644 |
| o ₃ w | | | 0.3 | | 575 |
| °2 ^w | | | 0.3 | | 575 |
| ow ₃ [♥] | | (| 0.012 | | 615 [▽] |
| ow ₃ [▽] | 3.35, 1.1 | | | A15 | 615 [⊽] |
| °2 ^w | | | 0.3 | | 674 |

(VIII-66)

| Material | т _с (К) | H _o (oersteds) | т ** n | Crystal Structure∞ | Ref. |
|---|---------------------|---------------------------|-----------|---|--------------------|
| o ₃ w | | | 0.3 | | 674 |
| Os (Pressure to 30 katm) | 0.65 | | | | 569 |
| 0s | | | | | 572 # |
| ^{Os} 0.30 ^{Re} 0.70 | | | | A3 | 572 # |
| ^{Os} 0.70 ^{Re} 0.30 | | | | A3 | 572# |
| ^{Os} 0.33-1 ^{Ru} 0.67-1 | | | | A3 | 572 / # |
| ^{0s} 0.67 Th 0.33 | | | | Cubic | 572# |
| PPd _{3.0-3.2} | <0.35-0.7 | | | D0 ₁₁ | 491 |
| ^{PPd} 3.0 | | | | DO ₁₁ , a=5.18, b=6.00, c=7.46 | 491 |
| ^P 2 ^{Pd} | | | | Monoclinic, a=6.20, b=5.857, c=5.874, P=111.80° | 491 |
| P ₃ Pd ₇ (high temperature) | 1.00 | | | Rhombohedral, $a=7.28$, $\propto = 110.12^{\circ}$ | 491 |
| P ₃ Pd ₇ (low temperature) | 0.70 | | | Complex | 491 |
| P ₇ Pt ₂₀ | | | 0.35 | | 491 |
| PRh ₂ | 1.3 | | | Cl, a=5.516 | 491 |
| PRu | | | 0.35 | | 491 |
| PRu2 | | | 0.35 | | 491 |
| PV | | | 1.01 | B31 | 601 |
| PW | | | 1.01 | B31 | 601 |

(VIII-67)

| Material | т _с (К) | H _o (oersteds) | T_** n | Crystal Structure∞ | Ref. |
|--|---------------------|---------------------------|-----------|-----------------------------------|------------------|
| PW3 | 2.26 | | | DO _e , a=9.890,c=4.808 | 601 |
| Pa | 1.4 | | | Tet., a=3.925,c=3.238 | 504 |
| Pa | 1.4 | | | Tet., a=3.925,c=3.238 | 614 |
| РЪ | | HF, Type I | | | 586 |
| Pb [∇] (With Hg, Sn, In, Tl, Al, Zn, Cd, Cu, Fe films) | | | | | 598 [⊽] |
| РЪ⊽ | | | | | 602 [∇] |
| РЪ | 7.16 | 800 | | | 653 |
| РЪ | | HF | | | 666 |
| Pb [∇] | | HF | | | 672 [⊽] |
| РЪ | 7.19 | | | | 476 <i>‡</i> |
| PbRh ₂ | | | 0.32 | | 489 |
| PbSb _{1 w10} (quenched) | | HF | | | 589 |
| PbSb _{1 w/o} (annealed) | | HF | | | 589 |
| PbSb _{2.8 w10} (quenched) | | HF | | | 589 |
| PbSb _{2.8 w1o} (annealed) | | HF | | | 589 |
| PbTe (+<0.1 w/o Pb) | 5.3-5.34 | HF | | | 669 |
| PbTe (+0.1 w/o Pb) | 5.19 | | | | 669 |
| PbTe (+0.1 w/o T1) | 5.24-5.27 | | | | 669 |
| PbT12.9 w/o | | HF | | | 586 |
| PbT14.87 w/o | | HF | | | 586 |
| PbT1 10.1 w/o | | HF | | | 586 |

| Material | Т _с (К) | H _o (oersteds) | T _n ** | Crystal Structure∞ | Ref. |
|---|--------------------|---------------------------|-------------------|-----------------------------|--------------|
| PbT119.9 w/o | | HF | | | 586 |
| PbT1 29.9 w/o | | HF | | | 586 |
| PbT1 1.06 w/o | | Туре І | | | 586 |
| PbT10.27 | 6.43 | 756, HF | | | 653# |
| PbT10.17 | 6.73 | 796, HF | | | 653# |
| PbT10.12 | 6.88 | 849, HF | | | 653# |
| PbT10.075 | 6.98 | 880, HF | | | 653# |
| PbT10.04 | 7.06 | 864, HF | | | 653# |
| ^{Pb} 1-0.26 ^{T1} 0-0.74 | 7.20-3.68 | HF | | | 649 |
| Pb1-0 ^{T1} 0-1 | 7.26-2.38 | | | | 83 |
| ^{Pb} 0.97 ^{T1} 0.03 | | HF | | | 666 |
| ^{Pb} 0.99 ^{T1} 0.01 | | HF | | | 666 |
| Pd | | | | | 637,572# |
| ^{Pd} 0-1.00 ^{Rh} 1.00-0 | | | | A1 | 572 # |
| PdS | | | 0.35 | | 491 |
| Pd _{2.2} S (quenched) | 1.63 | | | Cubic, a=8.93 | 491 |
| Pd2.8 ^S | | | 0.35 | | 491 |
| Pd ₄ S | | | 0.32 | Tet., a=5.1147, c=5.5903 | 552 |
| PdSb ₂ | | | 0.35 | | 491 |

(VIII-69)

| Material | Т _с (К) | H _o (oersteds) | T_** n | Crystal Structure ∞ | Ref. |
|--|--------------------|---------------------------|-----------|---|--------------|
| Pd _{0.63} Sb _{0.37} (quenched) | | | 0.35 | | 491 |
| PdSc ₂ | | | 0.32 | E9 ₃ , a=12.442 | 469 |
| PdSe | | | 0.32 | B34, a=6.727, c=6.912 | 552 |
| Pd ₄ Se | 0.42 | | | Tet., a=5.2324, c=5.6470 | 552 |
| Pd _{6 or 7} Se | 0.66 | | | Similar to Pd ₄ Te compound | 552 |
| Pd ₁₇ Se ₁₅ | | | 0.32 | Cubic, a=10.606 | 552 |
| PdSn | 0.41 | | | B31, a=3.87, b=6.13, c=6.32 | 491 |
| Pd ₂ Sn | 0.41 | | | C37, a=8.12, b=5.65, c=4.31 | 491 |
| Pd ₃ Sn ₂ | 0.47-0.64 | | | ^{B8} 2, a=4.399, c=5.666 | 491 |
| PdTe | 3.85 | | | ^{B8} 1, a=4.152, c=5.670 | 552 # |
| PdTe _{1.02} | 2.56 | | | B8 ₁ , a=4.144, c=5.661 | 552 |
| PdTe1.04 | 2.11 | | | B8 ₁ , a=4.143, c=5.659 | 552# |
| PdTe1.06 | 2.11 | | | B8 ₁ , a=4.138, c=5.652 | 552 |
| PdTe1.08 | 1.88 | | | B8 ₁ , a=4.135, c=5.647 | 552 |
| PdTe2 | 1.69 | | | C6, a=4.036, c=5.132 | 552 |
| PdTe2.1 | 1.89 | | | C6, a=4.037, c=5.128 | 552 |
| PdTe2.3 | 1.85 | | | C6, a=4.037, c=5.127 | 552 |
| Pd _{1.1} Te | 4.07 | | | ^{B8} 1, a.4.152, c=5.671 | 552 |

(VIII-70)

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure∞ | Ref. |
|---------------------------------------|---------------------------|---------------------------|-----------|--|-----------------------|
| ^{Pd} 0.71 ^{Te} 0.29 | 0.40 | | | X-ray evidence of Pd ₃ Te, Pd _{2.5} Te and Pd ₂ Te | 552 |
| Pd ₃ Te | 0.76 | | | X-ray evidence of ^{Pd} 3 ^{Te, Pd} 2.5 ^{Te} and Pd ₂ Te | 552 |
| Pd ₄ Te | | | 0.32 | Cubic, a=12.674 | 552 |
| ^{Pd} 0.50 ^{Te} 0.50 | | | | Hex. | 57 2 # |
| ^{Pd} 0.49 ^{Te} 0.51 | | | | Hex. | 572 # |
| ^{Pd} 0.99 Th 0.01 | | | | A1 | 572# |
| ^{Pd} 0.98 Th 0.02 | | | | A1 | 572# |
| ^{Pd} 0.95 Th 0.05 | | | | A1 | 572 # |
| ^{Pd} 0.90 Th 0.10 | | | | Al | 572# |
| PdTh ₂ | 0.85 | | | C16, a=7.33, c=5.93 | 469 |
| Pd5Th | | | 0.32 | | 469 |
| Pd ₃ Y | | | 0.32 | Ll ₂ , a=4.076 | 469 |
| Pr ₂ S ₃ | | | 1.68 | Cubic, b.c. Ce ₂ S ₃ type, a=8.611 | 558 |
| Pt | | | | | 637 |
| Pt | <0.001 (Extrapolation) | | | | 699,572# |
| Pt [♥] | | | 0.3 | | 503⊽,615 [°] |
| Pt _{0.87} S _{0.13} | | | | Bl7-type + Pt | 552 |

(VIII-71)

| Material | Т _с (К) | H _o (oersteds) | T_** n | Crystal Structure ∞ | Ref. |
|--|---------------------|---------------------------|-----------|--|------|
| PtSc | | | 0.32 | B2, a=3.268 | 469 |
| PtSc ₄ | | | 0.32 | | 469 |
| Pt ₃ Sc | | | 0.32 | Ll ₂ , a=3.958 | 469 |
| ^{Pt} 0.87 ^{Se} 0.13 | | | | Monoclinic PtSe _{0.80} + Pt | 552 |
| PtSn | 0.37 | | | B8 ₁ , a=4.11, c=5.44 | 486 |
| PtSn ₂ | | | 0.34 | Cl, a=6.42 | 486 |
| PtTe | 0.59 | | | Ortho-rhombic, a=6.6144, b=5.6360, c=11.865 | 552 |
| PtTh | 0.44 | | | B _f , a=3.900, b=11.09, c=4.454 | 469 |
| Pt ₃ Th ₇ | 0.98 | | | D10 ₂ , a=10.126, c=6.346 | 469 |
| Pt ₂ Th | | | 0.32 | | 469 |
| Pt ₃ Th | | | 0.32 | | 469 |
| Pt ₄ Th | | | 0.32 | | 469 |
| Pt ₅ Th | 3.13 | | | | 469 |
| ^{Pt} 0.02 ^U 0.98 | 0.87 | | | °-phase | 698 |
| ^{Pt} 0.02 ^U 0.98 ^(9.5 kbar) | | | 1.2 | | 698 |
| ^{Ft} 0.0175 ^U 0.9825 | 0.85 | | | °-phase | 700 |
| PtV3 | 2.87-3.20 | | | | 645 |
| ^{PtV} 2.5 | 1.36 | | | A15 | 498 |
| PtV ₃ | 2.83 | | | A15 | 498 |

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure∞ | Ref. |
|--------------------------------------|----------------------------|---------------------------|-------|--|------------------------------------|
| PtV3.5 | 1.26 | | | A15 | 498 |
| Pt0.91 ^W 0.09 | | | | A1 | 572# |
| Pt0.42 ^Y 0.58 | 0.76*, 0.33 ⁺⁺⁺ | | | | 469 |
| Pt0.77 ^Y 0.23 | 1.80 (portion only) | | | | 469 |
| ^{Pt} 0.80 ^Y 0.20 | 1.96 (portion only) | | | | 469 |
| Pt0.77-0.80 ^Y 0.23-0.20 | 1.6-2.0 (portion only) | | | | 469 |
| PtY | | | 0.32 | | 469 |
| Pt ₂ Y ₃ | 0.90 | | | | 469 |
| Pt _{2.2} Y | 1.70 | | | C15, a=7.576 | 469 |
| Pt ₃ Y | | | 0.32 | Ll ₂ , a=4.075 | 469 |
| Pt ₃ Y ₇ | 0.82 | | | D10 ₂ , a=9.864, c=6.299 | 469 |
| Pt ₅ Y | | | 0.32 | | 469 |
| Pu | | | 0.50 | | 495 |
| Rb | | | 0.011 | | 494,618 |
| Re [▽] | 1.9-~7 | | | | 503 ⁷ ,615 ⁷ |
| Re | | | | | 572# |
| Re | 1.70 | | | | 680 |
| * Probably associated | with Y3Pt2 | | | | |

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+++ Beginning of transition

(VIII-73)

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure ∞ | Ref. |
|--|---------------------------|---------------------------|-----------|---|------------------|
| Re _x Ti _y | | | | | 522 |
| ^{Re} 0.76 ^V 0.24 | 4.52 | | | D8 _b | 557 |
| ^{Re} 0.92 ^V 0.08 | 6.8 | | | A3 | 572 # |
| ^{Re} 0.50 ^W 0.50 | 5.12 | | | D8 _b | 557# |
| ^{Re} 0-0.25 ^W 1-0.75 | | | | A2 | 572 # |
| ^{Re} 0.50 ^W 0.50 | | | | D8 _b | 572 # |
| ^{Re} 0.88 ^W 0.12 | | | | A3 | 572 # |
| Rh | | | | | 637,572# |
| Rh [∀] | | | 0.3 | | 615 [▽] |
| Rh | <0.001 (Extrapolation) | | | | 699 |
| Rh [▽] | | | 0.3 | | 503⊽ |
| RhSc ₄ | | | 0.32 | | 469 |
| ^{Rh} 0.24 ^{Sc} 0.76 | 0.92 (portion only) | | | | 469 |
| ^{Rh} 0.25 ^{Sc} 0.75 | 0.88 (portion only) | | | | 469 |
| ^{Rh} 0.32 ^{Sc} 0.68 | | | 0.32 | | 469 |
| Rh ₃ Sc | | | 0.32 | Ll ₂ , a=3.898 | 469 |
| ^{Rh} 0.67 ^{Te} 0.33 | 0.49 | | | | 552 |
| RhTh | 0.36 | | | ^B f, a=3.866, b=11.24, c=4.22 | 469 |

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(VIII-74)

| Material | т _с (К) | H _o (oersteds) | T ** n | Crystal Structure ∞ | Ref. |
|---|---------------------|---------------------------|-----------|-------------------------------------|------|
| Rh ₂ Th | | | 0.32 | | 469 |
| Rh ₃ Th | | | 0.32 | L12 | 469 |
| Rh ₅ Th | 1.07 | | | | 469 |
| ^{Rh} x ^{Ti} y | | | | | 522 |
| ^{Rh} 0.02 ^U 0.98 | 0.96 | | | | 698 |
| Rh ₃ Y ₇ | | | 0.32 | D10 ₂ | 658 |
| RhY | | | 0.32 | B2, a=3.410 | 469 |
| RhY ₂ | | | 0.32 | | 469 |
| RhY ₃ | 0.65 | | | | 469 |
| Rh ₂ Y | | | 0.32 | C15, a=7.489 | 469 |
| Rh ₂ Y ₃ | 1.48 | | | | 469 |
| Rh ₃ Y | 1.07 | | | C15, a=7.424 | 469 |
| Rh ₃ Y ₇ | | | 0.32 | D10 ₂ , a=9.793, c=6.196 | 469 |
| Rh ₅ Y | 0.56 | | | | 469 |
| ^{Rh} 0-0.08 ^{Zr} 1-0.92 | | | | | 572# |
| RhZr ₂ | 10.8 | | | C16, a=6.4937, c=5.6058 | 648 |
| ^{Rh} 0.10-0.45 ^{Zr} 0.90-0.55 | ~10.8 | | | Two phase | 648 |
| RhZr | | | 1.7 | | 648 |
| ^{Rh} 0.001-0.01 ^{Zr} | 2.1-4.3 | | | ∝'-phase | 648 |

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(VIII-75)

| Material | Т _с (К) | H _o (oersteds) | T_** n | Crystal Structure∞ | Ref. |
|---|---------------------|---------------------------|-----------|------------------------------------|-----------------|
| ^{Rh} 0.02-0.04 ^{Zr} 0.098-0.096 | 2.7-3.9 | | | Hex., a=5.055, c=3.103, w-phase | 648 |
| ^{Rh} 0.05-0.09 ^{Zr} 0.95-0.91 | 5.7-6.3 | | | Cubic, a=3.55, B-phase | 648 |
| Rh0.005-0.07 ^{Zr} (Annealed) | 7.8-10.4 | | | | 648 |
| ^{Rh} 0.001-0.003 ^{Zr} (Annealed) | | | 1.7 | | 648 |
| ^{Rh} 0.005 ^{Zr} (Annealed) | 5.8 | | | | 648 |
| Ru | 0.48 | | | 5 | 69,572 # |
| RuS ₂ | | | 0.32 | C2, a=5.609 | 552 |
| RuSb | | | 0.35 | • | 491 |
| Ru ₂ Sb | | | 0.35 | | 491 |
| RuSe ₂ | | | 0.32 | C2, a=5.934 | 552 |
| RuTe2 | | | 0.32 | C2, a=6.391 | 552 |
| ^{Ru} 0.67 Th 0.33 | | | | Cubic | 572 # |
| Ru _x Ti _y | | | | | 522 |
| ^{Ru} 0.45 ^V 0.55 | 4.0 | | | B2 | 572# |
| ^{Ru} 0.35 ^V 0.65 | | | | B2 | 572# |
| ^{Ru} 0.25 ^V 0.75 | | | | A2 | 572# |
| ^{Ru} 0.15 ^V 0.85 | | | | A2 | 572# |

(VIII-76)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure ∞ | Ref. |
|--|------------------------------------|---------------------------|------|--|--------------|
| ^S 3 Sm 2 | Paramagnetic | | | Cubic, b.c. Ce ₂ S type, a=8.465 | 558 |
| S ₂ Ta | | | 1.0 | Cd (OH) ₂ type | 675 |
| Sb* | 2.6-2.7 | HF | | | 520 |
| SbSn | 1.30-1.42, 1.42-2.37 | | | Bl or distorted Bl | 470 |
| SbSn | 1.42-1.30, 2.37-1.42 | | | B1, Two phase | 622 |
| ^{Sb} 0-0.004 ^{T1} | ∆ ^T c (-0.02 +0.015) | | | | 591 |
| ^{Sb} 0.01-0.03 ^V 0.99-0.97 | | | | A2 | 572 # |
| ^{Sb} 0.01 ^V 0.99 | 3.76 | | | A2 | 514# |
| ^{Sb} 0.02 ^V 0.98 | 3.29 | | | A2 | 514# |
| ^{Sb} 0.03 ^V 0.97 | 2.63 | | | A2 | 514# |
| ^{Sb} 0-0.0185 ^{Zr} 1-0.9815 | | | | A3 | 572 # |
| Sc | | | 0.03 | | 660,572# |
| ^{Sc} 0.90 ^{Ti} 0.10 | | | | A3 | 572# |
| ^{Sc} 0.80 ^{Zr} 0.20 | | | | | 572# |
| ^{Sc} 0.50 ^{Zr} 0.50 | | | | | 572# |
| ^{Sc} 0.25 ^{Zr} 0.75 | | | | | 572# |
| Sc _{0.10} Zr _{0.90} | | | | | 572# |

* Formed at 120 kbar, pressure removed at 77°K

(VIII-77)

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure ∞ | Ref. |
|---|---------------------|---------------------------|-----------|------------------------------------|------------------------------------|
| ^{Sc} 0.05 ^{Zr} 0.95 | | | | | 5 7 2# |
| Se (~130 kbar) | 6.75 + 6.95 | | | Se II (unknown) | 547 |
| Se ₂ V | | | 1.0 | Like Cd(OH) ₂ | 675 |
| Si ("120-130 kbar) | 7.1 | | | | 540 |
| Si ₂ Th | 3.2 | | | X- form | 474 |
| Si ₂ Th | 2.4 | | | β- form | 474 |
| Si2 ^{Ti} | | | | C54, a=8.252, b=4.783 c=8.540 | , 522 |
| Si ₃ Ti ₅ | | | | D8 ₈ , a=7.475, c=5.162 | 522 |
| siv ₃ | 17.1 | | | | 474 |
| ^{Si} 0.1-0.38 ^V 0.99-0.52 (as cast) | 16.7M | | | | 479 |
| ^{Si} 0.1-0.38 ^V 0.99-0.62 (annealed) | 16.95M | | | | 479 |
| SiV ₃ | 16.38-16.95 | | | A15 | 645,626 |
| ^{Si} 0.25 ^V 0.75 | | | | A15 | 57 2# |
| Si ₂ W ₃ | 2.8 | | | | 474 |
| ^{Si} 0.655 ^Y 0.345 | | | | Tet., b.c. | 572 # |
| Si _{1.90} Y | | | | | 676# |
| Sn | 3.722 | 305.50 | | | 579#,580# |
| Sn [∇] | 4.1 | | | | 596 [⊽] ,602 [⊽] |

(VIII-78)

| Material | т _с (К) | H _o (oersteds) | T ** n | Crystal Structure∞ | Ref. |
|---|---------------------|---------------------------|-----------|----------------------------------|------------------------------------|
| Sn (quenched) | 3.7 | | | Tet., a=5.819, c=3.175 β-form | , 539 |
| Sn [∇] | | | | | 516 [♥] ,532 [♥] |
| SnTa ₃ | 6.4 | | | A15, a=5.278 | 473 |
| ^{Sn} 0.174-0.104 ^{Ta} 0.826-0.896 | 6.5 - <4.2 | | | A15, a=5.279-5.278 | 581 |
| SnTa ₃ (high state of order) | 8.35 | HF | | A15, a=5.280 | 581 |
| SnTa ₃ (low state of order) | 6.2 | HF | | A15, a=5.277 | 581 |
| ^{Sn} 0.26-0.10 ^{Ta} 0.74-0.90 | 7.2-<4.2 | | | | 581 |
| SnTaV ₂ | 2.8 | | | A15, a=5.041 | 473 |
| SnTa ₂ V | 3.7 | | | A15, a=5.174 | 473 |
| $Sn_{x}Te_{y}$ (n=10.5-20x10 ²⁰) | 0.07-0.22 | | | B1 | 482 |
| SnTe $(n=10.5 \times 10^{20} \text{ to} n=20 \times 10^{20})$ | | HF | | | 687 |
| ^{Sn} 0.02-0.06 ^V 0.98-0.94 | | | | A2 | 572 # |
| ^{Sn} 0.02 ^V 0.98 | 2.87 | | | A2 | 514# |
| ^{Sn} 0.04 ^V 0.96 | 1.86 | | | A2 | 514# |
| ^{Sn} 0.057 ^V 0.943 | ~1.6 | | | A2 | 514# |
| SnV ₃ | 3.8 | | | A15, a=4.96 | 473 |
| ^{Sn} 0-0.0906 ^{Zr} 1-0.9094 | | | | A3 | 572# |
| Та | 4.48 | | | | 505,572# |

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure 👓 | Ref. |
|--|--|---------------------------|-----------|------------------------|------------------------------------|
| Ta | | HF | | | 519 |
| Та | | | | | 525 |
| Ta [∇] (1100-<5000Å) | 3.25-4.30 | | | | 505 [⊽] ,529 [⊽] |
| Ta [▽] | <bulk< td=""><td></td><td></td><td></td><td>503[⊽]</td></bulk<> | | | | 503 [⊽] |
| ^{Ta} 0.5 ^{Nb} 0.5 | | HF | | | 627 |
| TaTe ₂ | | | 1.0 | Like CdCl ₂ | 675 |
| ^{Ta} 0.025 ^{Ti} 0.975 | 1.3 | | | Hex. | 499 |
| ^{Ta} 0.05 ^{Ti} 0.95 | 2.9 | | | Hex. | 499 |
| Ta _x Ti | | | | | 522 |
| ^{Ta} 0.05 ^V 0.95 | 4.30 | | | A2 | 58 7 #,572# |
| ^{Ta} 0.25 ^V 0.75 | 2.80 | | | A2, a=3.111 | 572 # |
| ^{Ta} 0.50 ^V 0.50 | 2.35 | | | A2, a=3.182 | 572 # |
| ^{Ta} 0.75 ^V 0.25 | 2.65 | | | A2, a=3.254 | 572 # |
| ^{Ta} 0.84-0 ^W 0.16-1 | | | | A2 | 572 # |
| Тс | 7.92 | | | A3, a=2.740, c=4.399 | 633 |
| Тс | 7.79 | | | | 566 |
| ^{Tc} 0.05 ^W 0.95 | | | ~0.8 | Cubic, a=3.1617 | 524 |
| ^{Tc} 0.10 ^W 0.90 | 1.25 | | | Cubic, a=3.1553 | 524 |
| ^{Tc} 0.20 ^W 0.80 | 3.85 | | | Cubic, a=3.147 | 524 |

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure∞ | Ref. |
|--|---------------------|---------------------------|------|---|--------------------------------|
| Tc0.30 ^W 0.70 | 5.75 | HF | | Cubic, a=3.134 | 524 |
| ^{Tc} 0.40 ^W 0.60 | 7.18 | HF | | Cubic, a=3.126 | 524 |
| ^{Tc} 0.50 ^W 0.50 | 7.52 | HF | | \varkappa + trace σ , a=3.117 | 524 |
| ^{Tc} 0.60 ^W 0.40 | 7.88 | HF | | Trace≪+ σ,≪-a=3.117 σ-a=9.520, c=5.003 | , 524 |
| Te (~56,000 atm.) | ~3.3 | HF | | | 510,667 |
| Te ₂ V | | | 1.0 | Like Cd(OH) ₂ | 675 |
| Th | 1.4 | | | | 504,614 |
| Ti | 0.14 | | | | 523 |
| Ti | 0.42 | 56 | | | 490# |
| Ti | | | | | 477# |
| Ti [∇] | 1.3M | | | | 619 [⊽] ,572# 554# |
| Ti | | HF | | | 688 |
| TiU ₂ | | | | C32, a=4.82, c=2.84 | 522 |
| ^{T1} 0.70 ^V 0.30 | 6.14 | | | Cubic | 514# |
| ^{Ti} 0.96 ^V 0.04 | 2.7 | | | | 477# |
| ^{Ti} 0.975 ^V 0.025 | 1.4 | | | Hex. | 499 |
| TiV | | | | | 522 |
| ^{Ti} 0.775 ^V 0.225 | 4.7 | <1100, HF | | | 584 |
| $T_{0,75}^{V_{0,25}}$ | 5.3 | <1940, HF | | | 584 |

(VIII-81)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure∞ | Ref. |
|--|---------------------|---------------------------|------|--------------------|--------------|
| ^{Ti} 0.615 ^V 0.385 | 7.07 | HF | | | 600 |
| ^{Ti} 0.516 ^V 0.484 | 7.20 | HF | | | 600 |
| ^{Ti} 0.415 ^V 0.585 | 7.49 | HF | | | 600 |
| ^{Ti} 0.775 ^V 0.225 ^(arc cast) | | HF | | | 616 |
| Ti _{0.75} V _{0.25} (arc cast) | | HF | | | 616 |
| Ti _{0.75} V _{0.25} (cold rolled) | | HF | | | 616 |
| ^{Ti} 0.96 ^V 0.04 | | | | | 554# |
| ^{Ti} 0.96 ^V 0.04 | | | A3 | | 572 # |
| ^{Ti} 0.80-0 ^V 0.20-1.00 | | | A2 | | 572 # |
| ^{Ti} 0.12 ^V 0.88 | | HF | | | 688 |
| ^{Ti} 0.09 ^V 0.91 | | HF | | | 688 |
| ^{Ti} 0.06 ^V 0.94 | | HF | | | 688 |
| ^{Ti} 0.03 ^V 0.97 | | HF | | | 688 |
| ^{Ti} 0.75 ^{Zr} 0.25 | | | A3 | | 572 # |
| ^{Ti} 0.25 ^{Zr} 0.75 | | | A3 | | 572# |
| Ti _{0.5} Zr _{0.5} (annealed) | 1.23 | | | | 477 |
| Ti _{0.5} Zr _{0.5} (quenched) | 2.0 | | | | 477 |
| Tl | 2.38 | 176.5 | | | 527# |
| Tl (35 kbar) | 1.95 | | A3 | | 641# |

(VIII-82)

| Material | Т _с (К) | H _o (oersteds) | T_** | Crystal Structure∞ | Ref. |
|--------------------------------------|---------------------|---------------------------|-------|---------------------------------|--------------------------|
| Tl (35 kbar) | 1.45 | | | Al | 641 <i>‡</i> |
| Tl (25-48 kbar) | 1.38-1.5 | | | A1 | 641 |
| υ | 0.21-0.25 | | | A20 | 698 |
| υ | 1.8 | | | | 614,629# |
| u ²³⁸ | | | 0.17 | | 701 |
| υ | 1.8 | | | Cubic | 504,702, 703 |
| v | 5.31* | HF | | | 548 |
| v | | | | | 525 |
| v | 5.37 | | | | 572 |
| v | 4.59 | | | | 572# |
| v | | ~1500, HF | | | 548 |
| ^V 0.26 ^{Zr} 0.74 | ≈5.9 | HF | | | 678 |
| w⊽ | ~3 | | | | 615 [⊽] |
| w | | | | | 572 # |
| ₩ [▽] (~2000A) | 1.7-4.1 | HF | | | 671 [▽] |
| W | 0.012 | 1.070 | | | 493, 612 <i>#</i> |
| W | 0.005-0.011 | ~1 | | | 526 |
| W [∇] (various films) | 0.4-3.35 | | 0.012 | Al5 (when supercon- ductive) | 503 [⊽] |

*Residual Resistivity Ratio = 27

| Material | Т _с (К) | H _o (oersteds) | T ** n | Crystal Structure 🛥 | Ref. |
|---------------------------|--------------------|---------------------------|-----------|-------------------------------|------------------|
| w [∇] (~20-310Å) | 4.1M | | | | 541 [▽] |
| Y | | | | | 570,572# 676# |
| Y | | | 0.03 | | 660 |
| YZn | | | 0.33 | B2 | 658 |
| Zr (Isotope Study) | 0.49 | | | | 570 |
| Zr | 0.65 | | | Hex., w=Zr, a=5.03, c=3.12 | 549 |
| Zr (annealed) | 0.6 | | 1 | w-Zr converted to ≪-Zr | 549 |
| Zr | 0.70 + 0.73 | | | ≈-Zr | 549,572# |
| Zr (annealed) | ~0.46 | | | | 551 |

Table 3. High Magnetic Field Superconductive Materials and Some of Their Properties

(NOTE: All fields are quoted in kilo-oersteds. T_{obs} indicates temperature of measurement in degrees Kelvin. See text for discussion of field nomenclature. H_p is paramagnetic critical field).

| Material | Tc | H _{c1} | H _{c2} | H _{c3} | Tobs | Ref. |
|---|------------------------|--|-----------------------------|-----------------------|--------------|--------------------------------|
| A12 ^{CMo} 3 | 9.8-10.2 | 0.091 | 156 | (H _p =181) | 1.2 | 571 |
| ^{Ba} x ⁰ 3 ^{Sr} 1-x ^{Ti} | <0.1 - 0.55 | 0.0039M | ſ | | | 611 |
| Be [∇] Bi II, Bi III ^{Bi} 0.01 ^{In} 0.99 | ~6.5 | (High fi (H _{c3} /H _c | ≫11 eld data given va | a given) s.t) | | 550 [⊽] 437 666 |
| ^{Bi} 0.02 ^{In} 0.98 | | (H _{c3} /H _c | given vs | s.t) | | 666 |
| Bi0.05-0.40 ^{Pb} 0.95-0. | 60 ^{7.35-8.4} | 0.122 | ~30 | | 4.2 | 677 |
| ^{Bi} 7.5 w/o ^{Pb} 92.5 w/o | | | 2.32 | | | 685 |
| CK (Excess K) | 0.55 | | 0.160 | (нГс) | | 494 |
| CK (Excess K) | 0.55 | | 0.730 | (н с) | | 494 |
| C ₈ K (Excess K) | 0.55 | | 0.160 0.730 | (H⊥C) (H∥C) | 0.32 0.32 | 494 494 |
| C ₈ K (Stoichiometric) | 0.39 0.39 | | 0.025 0.250 | (H⊥C) (H C) | 0.32 0.32 | 494 494 |
| ^C 0.44 ^{Mo} 0.56 | 12.5-13.5 | 0.087 | 98.5 | (H _p =238) | 1.2 | 571 |
| C _x N _{1-x} Nb | 8.5-17.3 | ≤0.1 | ~110 | | 4.2 | 582 |
| CNb (Whiskers) | 7.5-10.5 | | | | | 582 |
| СИР | 8-10 | 0.12 | 16.9 | (H _p =130) | 4.2 | 571 |
| ^{CNb} 0.4 ^{Ta} 0.6 | 10-13.6 | 0.19 | 14.1 | $(H_{p}=214)$ | 1.2 | 571 |
| CRe0.01W | 2.6 | | | | | 603 |
| CRe0.02W | 3.7 | | | | | 603 |

(IX-2)

| Material | Tc | Hcl | Hc2 | ^H c3 | Tobs | Ref. |
|---|-----------|----------------------------------|--------------------|-----------------|--------|------|
| CRe0.04 ^W | 4.3 | | | | | 603 |
| CRe0.06 ^W | 5.0 | | | | | 603 |
| CTa | 9-11.4 | 0.22 | 4.6 (H | I_=185) | 1.2 | 571 |
| Cax ⁰ 3 ^{Sr} 1-x ^{Ti} | <0.1-0.55 | 0.00215 | , | | | 611 |
| ^{Cd} 0.02 ^{Hg} 0.98 | | (H _{c3} /H _c | given vs. | t) | | 666 |
| Cr _{0.10} Ti _{0.30} V _{0.60} | 5.6 | 0.071 | 84.4 | | (0) | 584 |
| Cr _{0.10} Ti _{0.30} V _{0.60} | >4.2 | | >27 | | 4.2 | 616 |
| Ga (ð) | 7.62 | | >3 | | | 642 |
| Ga _x ^{Nb} 1-x | | | >28 | | 4.2 | 583 |
| GaSb (Annealed) | 4.24 | | 2.64 | | 3.5 | 695 |
| GaV2.1-3.5 | 6.3-14.45 | | 230-300 (Linear |) Extrap.) | | 646 |
| GaV3 | | | (Critical | . currents | given) | 564 |
| GaV3 | 14.17 | | 96 | | 4.2 | 684 |
| GaV ₃ | 14.17 | | 208 (Ext | rap.) | (0) | 684 |
| GaV _{4.5} (Wires) | 9.15 | | 94 | | 4.2 | 684 |
| GaV _{4.5} | 9.15 | | 121 (Ext | rap.) | (0) | 684 |
| H_>0.41 ^{Nb} | | | | | | 631 |
| Hf0.75 ^{Nb} 0.25 (Arc cast) | >4.2 | | >26 | | 4.2 | 616 |
| Hf _{0.75^{Nb}0.25 (Cold rolled)} | >4.2 | | >28 | | 4.2 | 616 |
| In _{0.17} Pb _{0.83} | | | 2.8 | 5.5 | 4.2 | 627 |
| In _{0.98} Pb _{0.02} | 3.45 | 0.1 | | 0.12 | 2.76 | 662 |

| Material | т _с | H _{c1} | H _{c2} | H _{c3} | ^T obs | Ref. |
|---|------------------|-----------------------|----------------------------------|-----------------|------------------|-------------|
| In _{0.96} ^{Pb} 0.04 | 3.68 | 0.1 | 0.12 | 0.25 | 2.94 | 662 |
| In _{0.94} Pb _{0.06} | 3.90 | 0.095 | 0.18 | 0.35 | 3.12 | 662 |
| ^{In} 0.913 ^{Pb} 0.087 | 4.2 | ~0.17 | 0.55 | 2.65 | | 665 |
| ^{In} 0.30 ^{Pb} 0.70 | | | 3.9 | | 4.2 | 683 |
| In1-0.90 ^{Pb} 0-0.1 | 0.7-1.1 | (H _{c2,3} ra | easured butio form | ut quoted) | in | 480 |
| ^{In} 0.04 ^{Sn} 0.96 | | | (H _{c3} /H _c | given vs | .t) | 666 |
| ^{In} 0.02 ^{Sn} 0.98 | | | (H _{c3} /H _c | given vs | .t) | 666 |
| In _{1.000} Te _{1.002} II | 3.5-3.7 | | 1.2 | | (0) | 50 7 |
| In _{0.62} Ti _{0.38} | 2.760 | | | | | 664 |
| LaN | 1.35 | 0.45 | | | 0.76 | 668 |
| La3S4 | 6.5 | ≈0.15 | >25 | | | 617 |
| La3S4 | 6.5 | 0.15 | >25 | | 1.3 | 534 |
| La3Se4 | 8.6 | 0.2 | >25 | | 1.25 | 534 |
| La ₃ Se ₄ | 8.6 | ≈0.2 | >25 | | | 617 |
| Mo _{0.52} Re _{0.48} (Cold worked) | 11.1 | | 21.3 | 33 | 4.2 | 555 |
| Mo _{0.52} Re _{0.48} (Cold worked) | 11.1 | | 27.9 | 42.8 | 1.3 | 555 |
| Mo _{0.52} Re _{0.48} (Annealed & Slow cooled) | 11.1 | | 14.4 | 22.2 | 4.2 | 555 |
| Mo _{0.52} Re _{0.48} (Annealed 1250°C slow cooled) | 11.1 | | 17.8 | | 1.3 | 555 |
| Mo _{0.52} Re _{0.48} (Annealed 1250°C,q | 11.1 uenched) | | 14.6 | 23.8 | 4.2 | 555 |

(IX-4)

| Material | T _c | H _{c1} | H _{c2} | H _{c3} | Tobs | Ref. |
|---|----------------|-----------------|-----------------|-----------------|------|------|
| Mo _{0.52} Re _{0.48} (Annealed 1250°C Quenched) | 11.1 | | 19.2 | | 1.3 | 555 |
| <pre>Mo 0.52^{Re 0.48 (Annealed 2000°C slow cooled)}</pre> | 11.1 | | 14.8 | 27.3 | 4.2 | 555 |
| ^{Mo} 0.52 ^{Re} 0.48 (Annealed 2000°C slow cooled) | 11.1 | | 18.3 | 37.5 | 1.3 | 555 |
| ^{Mo} 0.60 <u>+</u> .05 ^{Re} 0.395 (Cold worked) | 10.6 | | 19 | 28.3 | 4.2 | 555 |
| ^{Mo} 0.60 <u>+</u> .05 ^{Re} 0.395 (Cold worked) | 10.6 | | 25.5 | 37.3 | 1.3 | 555 |
| <pre>Mo 0.60 ± .05^{Re 0.395 (Annealed 1 hr., 1100°C, slow cooled}</pre> | 10.6) | | 14.5 | 19.6 | 4.2 | 555 |
| ^{Mo} 0.60 <u>+</u> .05 ^{Re} 0.395 (Annealed 1 hr., 1100°C, slow cooled | 10.6) | | 19 | 26.2 | 1.3 | 555 |
| Mo0.60 <u>+</u> .05 ^{Re} 0.395 (Annealed 19 hr. 1100°C, slow cooled | 10.6) | | 14.3 | | 4.2 | 555 |
| ^{Mo} 0.60 <u>+</u> .05 ^{Re} 0.395 (Annealed 19 hr., 1100°C, slow cooled | 10.6) | | 20.1 | | 1.3 | 555 |
| ^{Mo} 0.16 ^{Ti} 0.84 | 4.18 | 0.028 | 98.7 | | (0) | 584 |
| ^{Mo} 0.913 ^{Ti} 0.087 | 2.95 | 0.060 | ~15 | | 4.2 | 600 |
| ^{Mo} 0.16 ^{Ti} 0.84 | 4.18 | | 38 | | 3.0 | 616 |
| ^{Mo} 0.16 ^{Ti} 0.84 | 4.246 | | 36 | | 3.0 | 565 |

| (IX-5 |
|-------|
| |
| |

| Material | т _с | H _{c1} | Hc2 | H _{c3} | T _{obs} | Ref. |
|---|--------------------|------------------------|------------------------|------------------|------------------|------------------|
| NNb (Whiskers) | 10-14.5 | | | | | 582 |
| NNb (Wires) | 16.10 | | 132 | | 4.2 | 553 |
| NNb (Wires) | 16.10 | | 153 <u>+</u> 3 | | (0) | 553 |
| NNb (Wires) | 16.10 | | 95 | | 8 | 553 |
| NNb (Wires) | 16.10 | | 53 | | 12 | 553 |
| NNb _x O _y | 13.5 - 17.0 | (H _{c2} -some | samples | <38 kgaus | s) | 483 |
| $\sum_{x}^{Nb} y^{Zr} z$ | | | >130 | | 4.2 | 517 |
| NNb _{1-0.75} ^{Zr} 0-0.25 (Wires) | | | >100 -12 0 | | 4.2 | 553 |
| NNb _x Zr _{1-x} | 9.8 - 13.8 | | 4 -> 130 | | | 652 |
| ^N 0.93 ^{Nb} 0.85 ^{Zr} 0.15 | 13.8 | | >130 | | | 652 |
| Nb | 9.15 | | 1.710 | | 4.2 | 531, 679 |
| | 9.15 | | 2.020 | | 1.4 | 531 |
| Nb (unstrained) | 1.1-1.8 | | 3.40 | 6.0-9.1 | 4.2 | 538 |
| Nb (strained) | 1.25-1.92 | | 3.44 | 6.0-8.7 | 4.2 | 538 |
| Nb (cold drawn wire) | 2.48 | | 4.10 | ≈10 | 4.2 | 538 |
| Nb [▽] | | | >25 | | 4.2 | 518 [∇] |
| ^{Nb} 1.05 ^{Se} 2 | 2.2 | | | | | 654 |
| Nb ₃ Sn | | (| Critical | currents | given) | 564 |
| Nb ₃ Sn (sintered) | | (Criti fiel | cal curre ds quotec | ent densit 1) | У | 485 |
| ^{Nb} 0.10 ^{Ta} 0.90 | | 0.084 | 0.154 | | 4.195 | 478 |
| Nb 32 w10 ^{Ti} 68 w10 | | | | | | 682 |

(IX-6)

| Material | т _с | H _{c1} | Hc2 | H _{c3} | Tobs | Ref. |
|--|----------------|----------------------------------|-------------------|-----------------|-------|------------------|
| ^{Nb} 0.75 ^{Zr} 0.25 | | | | | | 597 |
| Nb0.66 ^{Zr} 0.33 | | | | | | 597 |
| ^{Nb} 0.15-0.90 ^{Zr} 0.85 | -0.10 | | 44-123 (M at~N | b.,) | (0) | 686 |
| ^{Nb} 0.75 ^{Zr} 0.25 | | | | 0.4 | | 690 |
| 0 ₃ SrTi | 0.43 | 0.0049 | 0.504 | Calcula- | (0) | 594 |
| ⁰ 3 ^{SrTi} | 0.43 | 0.0044 | 0.300 | tou | 0.15 | 594 |
| 0 ₃ SrTi | 0.43 | 0.0036 | 0.300 | | 0.25 | 594 |
| 0 ₃ SrTi | 0.43 | 0.0027 | 0.200 | | 0.32 | 594 |
| 0 ₃ SrTi | 0.43 | 0.0013 | 0.070 | | 0.39 | 594 |
| ⁰ 3 ^{SrTi} | 0.33 | 0.00195 | 0.420 | Calcula- ted | (0) | 594 |
| 0 ₃ SrTi | 0.33 | 0.00135 | 0.180 | | 0.13 | 594 |
| 0 ₃ SrTi | 0.33 | 0.0015 | 0.220 | | 0.14 | 594 |
| 0 ₃ SrTi | 0.33 | 0.0012 | 0.180 | | 0.19 | 594 |
| 0 ₃ SrTi | 0.33 | 0.001 | 0.160 | | 0.246 | 594 |
| 0 ₃ SrTi | 0.33 | 0.00075 | 0.100 | | 0.273 | 594 |
| 0 ₃ SrTi | 0.33 | 0.00045 | 0.004 | | 0.315 | 611 |
| 0 ₃ SrTi | 0.12-0.37 | 0.0027, 0.00275 | | | | 611 |
| РЪ | | | | 0.591 | 4.2 | 586 |
| РЪ | | (H _{c3} /H _c | given vs. | t) | | 666 |
| Pb [▽] | | | | | | 672 [▽] |
| PbSb ₁ w/o (Quenched) | | | >1.5 | | 4.2 | 589 |
| (Quenched) | | | | | | |

| (IX- | 7) |
|------|----|
|------|----|

| Material | Tc | H _{c1} | Hc2 | H _{c3} | Tobs | Ref. |
|--|-----------------------|-----------------|------------------|-----------------|-------|------|
| PbSb ₁ w1o (Annealed) | | | >0.7 | | 4.2 | 589 |
| PbSb 2.8 w/o (Quenched) | | | >2.3 | | 4.2 | 589 |
| PbSb _{2.8 w} /o (Annealed) | | | >0.7 | | 4.2 | 589 |
| PbTe(+<0.1 w/o Pb) | 5.3 . 5.34 | ~0.85 | | | 2.465 | 669 |
| PbTe(+<0.1 w/o Pb) | 5.3-5.34 | ~0.8 | | | 3.79 | 669 |
| PbTe(+<0.1 w/o Pb) | 5.3-5.34 | ~0.6 | | | 4.2 | 669 |
| PbTe(+<0.1 w/o Pb) | 5.3-5.34 | ~0.91 | | | 2.15 | 669 |
| PbT1 1.06 w/o | | | | 0.906 | 4.2 | 586 |
| PbT12.9 w/o | | | | 1.415 | 4.2 | 586 |
| PbT14.87 w/o | | | 1.048 | 1.844 | 4.2 | 586 |
| PbT1 10.1 w/o | | | 1.691 | 2.974 | 4.2 | 586 |
| PbT1 19.9 w/o | | | 2.580 | 4.404 | 4.2 | 586 |
| PbT1 29.9 w/o | | | 2.927 | 4.751 | 4.2 | 586 |
| PbT10.27 | 6.43 | | | | | 653 |
| PbT10.17 | 6.73 | (| 4.5 (Extrap.) | | | 653 |
| PbT10.12 | 6.88 | | | | | 653 |
| PbT10.075 | 6.98 | | | | | 653 |
| PbT10.04 | 7.06 | | | | | 653 |
| ^{Pb} 1-0.26 ^{T1} 0-0.74 | 7.20-3.68 | | 2-6.96 | | (0) | 649 |
| Pb _{0.97} T1 _{0.03} (H _{c3} /H _c given vs.t) | | | | | | 666 |
| Pb _{0.99} T1 _{0.01} (H _{c3} /H _c given vs.t) | | | | | | 666 |

(IX-8)

| Material | т _с | H _{c1} | Hc2 | H _{c3} | T _{obs} | Ref. |
|---|--------------------|-------------------|--------|-----------------|------------------|------|
| Sb* | 2.6-2.7 | | 4.4 | | 1.55 | 520 |
| SnTa ₃ (High order | c) 8.35 | | 72.5 | | 4.2 | 581 |
| SnTa3(Low order) |) 6.2 | | 15.5 | | | 581 |
| SnTe(n = 10.5 x) | 10 ²⁰) | 0.00045 | | | 0.012 | 687 |
| SnTe(n = 10.5 x) | 10 ²⁰) | | 0.0052 | | 0.015 | 687 |
| SnTe(n = 12.5 x) | 10 ²⁰) | 0.00043 | 0.005 | | 0.068 | 687 |
| SnTe(n = 16.5 x) | 10 ²⁰) | 0.00236 | | | 0.020 | 687 |
| SnTe(n = 16.5 x) | 10 ²⁰) | | 0.052 | | 0.063 | 687 |
| $SnTe(n = 20 \times 10)$ |) ²⁰) | 0.00168 | | | 0.043 | 687 |
| $SnTe(n = 20 \times 10)$ |) ²⁰) | | 0.0775 | j. | 0.079 | 687 |
| Ta (99.95%) | | 0.090 | 0.375 | | 3.72 | 519 |
| | | 0.275 | 1.175 | | 2.66 | 519 |
| | | 0.325 | 1.425 | | 2.27 | 519 |
| | | 0.425 | 1.850 | | 1.30 | 519 |
| ^{Ta} 0.5 ^{Nb} 0.5 | | | 3.55 | | 4.2 | 627 |
| Tc _{0.30} ^W 0.70 | 5.75 | | 7.5 | | 4.2 | 524 |
| ^{Tc} 0.40 ^W 0.60 | 7.18 | | 19.0 | | 4.2 | 524 |
| ^{Tc} 0.50 ^W 0.50 | 7.52 | | 29.0 | | 4.2 | 524 |
| ^{Tc} 0.60 ^W 0.40 | 7.88 | | 43.5 | | 4.2 | 524 |
| Те | ~3.3 | 0.25 <u>+</u> 0.0 | 05 | | (0) | 667 |
| Ti | | | | 2.7 | 4.2 | 688 |
| ^{Ti} 0.775 ^V 0.225 | 4.7 | 0.024 | 172 (| $H_{p} = 86.5)$ | (0) | 584 |
| ^{Ti} 0.75 ^V 0.25 | 5.3 | 0.029 | 199 (| $H_{p} = 97.5)$ | (0) | 584 |
| ^{Ti} 0.615 ^V 0.385 | 7.07 | 0.050 | ~34 | · | 4.2 | 600 |

* Formed at 120 kbar, pressure removed at 77°K.
| Material | Tc | H _{c1} | H _{c2} | H _{c3} | Tobs | Ref. |
|---|---------|-----------------|-----------------|-----------------|------|------------------|
| ^{Ti} 0.516 ^V 0.484 | 7.20 | 0.062 | ~28 | | 4.2 | 600 |
| ^{Ti} 0.415 ^V 0.585 | 7.49 | 0.078 | ~25 | | 4.2 | 600 |
| ^{Ti} 0.775 ^V 0.225 (Arc cast) | | | ≈22 | | 4.2 | 616 |
| ^{Ti} 0.75 ^V 0.25 (Arc cast) | | | ≈34 | | 4.2 | 616 |
| ^{Ti} 0.75 ^V 0.25 (Cold rolled) | | | ≈36 | | 4.2 | 616 |
| ^{Ti} 0.12 ^V 0.88 | | | 17.3 | 28.1 | 4.2 | 688 |
| ^{Ti} 0.09 ^V 0.91 | | | 14.3 | 16.4 | 4.2 | 688 |
| ^{Ti} 0.06 ^V 0.94 | | | 8.2 | 12.7 | 4.2 | 688 |
| ^{Ti} 0.03 ^V 0.97 | | | 3.8 | 6.8 | 4.2 | 688 |
| v | | 0.8 | 3.3 | | 1.6 | 548 |
| v | 5.31 | ~0.80 | ~3.40 | | 1.79 | 548 |
| | 5.31 | ~0.75 | ~3.15 | | 2. | 548 |
| | 5.31 | ~0.45 | ~2.20 | | 3. | 548 |
| | 5.31 | ~0.30 | ~1.20 | | 4. | 548 |
| V _{0.26} Zr _{0.74} | ≈5.9 | 0.165 | | | 3.5 | 678 |
| V _{0.26} ^{Zr} 0.74 | ≈5.9 | 0.185 | | | 3.04 | 678 |
| V. 26 ^{Zr} 0 7/ | ≈5.9 | 0.227 | | | 1.78 | 678 |
| V _{0.26} ^{Zr} 0.74 | ≈5.9 | 0.238 | | | 1.05 | 678 |
| w▽ | 1.7-4.1 | | >34 | | 1 | 671 [▽] |

(X-1)

BIBLIOGRAPHY

- 467. Lange, F.K., J. Exp. Theor. Phys. 42, 42 (1962); Soviet Phys. JETP 15, 29 (1962).
- 468. Taylor, A., Kagle, B.J., and Doyle, N.J., J. Less Common Metals 5, 26 (1963).
- 469. Geballe, T.H., Matthias, B.T., Compton, V.B., Corenzwit, E., Hull, G.W. Jr., and Longinotti, L.D., Phys. Rev. <u>137</u>, A119-27 (1965).
- 470. Geller, S., and Hull, G.W. Jr., Phys. Rev. Letters <u>13</u>, 127-9 (1964).
- 471. Geller, S., McWhan, D.B., and Hull, G.W. Jr., Science 140, 62-3 (1963).
- 472. Raub, C.J., Sweedler, A.R., Jensen, M.A., Broadston, S., and Matthias, B.T., Phys. Rev. Letters 13, 746-7 (1964).
- 473. Cody, G.D., Hanak, J.J., McConville, G.T., and Rosi, F.D., RCA Rev. <u>25</u>, 338-41 (1964).
- 474. Hulm, J.K., and Hardy, G., Third Internat. Conf. on Low Temp. Phys. and Chem., Houston, Texas, Dec. 1953 (MIT Library).
- 475. Caswell, H.L., Solid State Comm. 2, 323-4 (1964).
- 476. Neighbor, J.E., Cochran, J.F., and Shiffman, C.A., Proc. 9th Int. Conf. on Low Temp. Physics, 479-81 (1965). (ed. J.G. Daunt, D.O. Edwards, F.J. Milford, M. Yaqub).
- 477. Bucher, E., Heininger, F., and Muller, J., See Ref. 476, p. 482-6.
- 478. French, R.A., Lowell, J., and Mendelssohn, K., See Ref. 476, p. 540-3.
- 479. Kunz, W., and Saur, E., See Ref. 476, p. 481-3.
- 480. Gygax, S., Olsen, J.L., and Kropschot, R.H., See Ref. 476, p. 587-90.
- 481. Hulm, J.K., Jones, C.K., Mazelsky, R., Miller, R.C., Hein, R.A., and Gibson, J.W., See Ref. 476, p. 600-3.
- 482. Hein, R.A., Gibson, J.W., Allgaier, R.S., Houston, B.B. Jr., Mazelsky, R., and Miller, R.C., See Ref. 476, 604-6.
- 483. Gaule, G.K., Breslin, J.T., Ross, R.L., Pastore, J.R., and Shappirio, J.R., See Ref. 476, p. 612-5.
- 484.7 Adler, J.G., and Ng, S.C., Canad. J. Phys. 43, 594-604 (1965).
- 485. Coles, G.W., Corsan, J. M., Buxton, A., and Lewis, B., J. Less Common Metals <u>8</u>, 402 (1965).
- 486. Hamilton, D.C., Raub, C.J., Matthias, B.T., Corenzwit, E., and Hull, G.W. Jr., J. Phys. Chem. Solids (GB) <u>26</u>, 665-7 (1965).
- 487. Luo, H.L., Merriam, M.F., and Hamilton, D.C., Science 145, 581-3 (1964).
- 488. Merriam, M.F., and Schreiber, D.S., J. Phys. Chem. Solids 24, 1375-7 (1963).
- 489. Merriam, M.F., Sweedler, A.R., and Hamilton, D.C., Bull. APS 9, 268 (1964).
- 490. Falge, R.L. Jr., Phys. Rev. Letters 11, 248-50 (1963).
- 491. Raub, C.J., Zachariasen, W.H., Geballe, T.H., and Matthias, B.T., J. Phys. Chem. Solids <u>24</u>, 1093-1100 (1963).
- 492. Zegler, S.T., Phys. Rev. 137, A1438-40 (1965).
- 493. Johnson, R.T., Vilches, O.E., Wheatley, J.C., and Gygax, S., Phys. Rev. Letters <u>16</u>, 101-4 (1966).

- 494. Hannay, N.B., Geballe, T.H., Matthias, B.T., Andres, K., Schmidt, P., and Macnair, D., Phys. Rev. Letters 14, 225-6 (1965).
- 495. Meaden, G.T., and Shigi, T., Cryogenics <u>4</u>, 90-2 (1964); also Meaden, G.T., Cryogenics <u>4</u>, 105-7 (1964).
- 496. Johnston, J., Toth, L., Kennedy, K., and Parker, E.R., Solid State Comm. 2, 123 (1964).
- 497. Johnston, J., U. of Cal. Berkeley, Lawrence Rad. Lab. UCRL-11390 (1964).
- 498. Matthias, B.T., Geballe, T.H., Willens, R.H., Corenzwit, E., and Hull, G.W. Jr., Phys. Rev. <u>139</u>, A1501 (1965).
- 499. Raub, C.J., and Zwicker, U., Phys. Rev. 137, A142-3 (1965).
- 500. Sweedler, A. R., Raub, C. J., and Matthias, B. T., Phys. Letters 15, 108-9 (1965).
- 501. Hein, R.A., Gibson, J.W., Mazelsky, R., Miller, R.C., and Hulm, J.K., Phys. Rev. Letters <u>12</u>, 320-2 (1964).
- 502. Bommel, H.E., Darnell, A.J., Libby, W.F., and Tittman, B.R., Science <u>139</u>, 1301-2 (1963).
- 503. Bond, W. L., Cooper, A. S., Andres, K., Hull, G. W., Geballe, T. H., and Matthias, B. T., Phys. Rev. Letters <u>15</u>, 260-1 (1965).
- 504. Fowler, R.D., Matthias, B.T., Asprey, L.B., Hill, H.H., Lindsay, J.D.G., Olsen, C.E., and White, R.W., Phys. Rev. Letters <u>15</u>, 860-2 (1965).
- 505.7 Gerstenberg, D., and Hall, P. M., J. Electrochem. Soc. 111, 936-42 (1964).
- 506. Geller, S., Jayaraman, A., and Hull, G.W. Jr., Appl. Phys. Letters <u>4</u>, 35-7 (1964).
- 507. Banus, M.D., Hanneman, R.E., Strongin, M., and Gooen, K., Science <u>142</u>, 662-3 (1963).
- 508. Killpatrick, D.H., J. Phys. Chem. Solids 25, 1213-6 (1964).
- 509. Killpatrick, D. H., J. Phys. Chem. Solids 25, 1499-500 (1964).
- 510. Matthias, B.T., and Olsen, J.L., Phys. Letters 13, 201-2 (1964).
- 511. Merriam, M.F., Phys. Letters 9, 100-1 (1964).
- 512. Hauser, J.J., and Theuerer, H.C., Phys. Letters 14, 270-1 (1965).
- 513. Johnston, J., Toth, L., and Parker, E.R., UCRL-11317, p. 133-7.
- 514. Pessall, N., Gupta, K. P., Cheng, C. H., and Beck, P. A., J. Phys. Chem. Solids <u>25</u>, 993-1003 (1964).
- 515. Geller, S., Jayaraman, A., and Hull, G.W. Jr., J. Phys. Chem. Solids <u>26</u>, 353-61 (1965).
- 516. Alekseevskii, N.E., and Mikheeva, M.N., Z. Eksper. i. Teoret. Fiz. <u>38</u>, 292-3 (1960).
- 517. Anderson, D. E., Toth, L. E., Rosner, L.G., and Yen, C. M., Appl. Phys. Letters <u>7</u>, 90-2 (1965).
- 518. D'Yakov, I.G., Lazarev, B.G., Matsakova, A.A., and Ovcharenko, G.N., Z. Eksper. i. Teoret. Fiz. <u>46</u>, 831-2 (1964); Soviet Phys. JETP <u>19</u>, 568-9 (1964).

- 519. Bots, G.J.C., Pals, J.A., Blaisse, B.S., DeJong, L.N.J., and Van-Engelen, P.P.J., Physica <u>31</u>, 1113-23 (1965).
- 520. McDonald, T. R. R., Gregory, E., Barberich, G. S., McWhan, D. B., Geballe, T. H., and Hull, G. W. Jr., Phys. Letters <u>14</u>, 16-7 (1965).
- 521. Caswell, H.L., Phys. Letters 10, 44-5 (1964).
- 522. Zwicker, U., Z. Metallkde, Dtsch. 54, 477 (1963).
- 523. Cape, J.A., Phys. Rev. <u>132</u>, A1486-92 (1963).
- 524. Autler, S.H., Hulm, J.K., and Kemper, R.S., Phys. Rev. <u>140</u>, A1177-80 (1965).
- 525. Yun Lung Shen, L., Senozan, N. M., and Phillips, N. E., Phys. Rev. Letters <u>14</u>, 1025-7 (1965).
- 526. Gibson, J.W., and Hein, R.A., Phys. Rev. Letters 12, 688 (1964).
- 527. van der Hoeven, B.J.C. Jr., and Keesom, P.H., Phys. Rev. 135, A631-7 (1964).
- 528. Rabenau, A., and Berben, T.J., Phys. Letters <u>12</u>, 167 (1964).
- 529. Rairden, J. R., and Neugebauer, C. A., Proc. IEEE 52, 1234-7 (1964).
- 530. Raub, C.J., and Webb, G.W., J. Less Common Metals 5, 271-7 (1963).
- 531. Weber, R., Phys. Rev. <u>133</u>, A1487-92 (1964).
- 532. V Artemenko, I.A., and Mikhailov, G.O., Ukr. Fiz. Zh. 9, 1369-71 (1964).
- 533. Alekseevskii, N. E., Z. Eksper. i. Teoret. Fiz. <u>49</u>, 159-62 (1965); Soviet Phys. JETP <u>22</u>, 114-6 (1966).
- 534. Bozorth, R. M., Holtzberg, F., and Methfessel, S., Phys. Rev. Letters <u>14</u>, 952-3 (1965).
- 535. Raub, C.J., and Hamilton, D.C., J. Less Common Metals 6, 486-8 (1964).
- 536. Leslie, J. D., Cappelletti, R. L., and Ginsberg, D. M., Phys. Rev. <u>134</u>, A309 (1964).
- 537. Phillips, N.E., Phys. Rev. 134, A385 (1964).
- 538. Catterall, J.A., Williams, I., and Duke, J.F., Brit. J. Appl. Phys. <u>15</u>, 1369-75 (1964).
- 539. Banus, M.D., Vernon, S.N., and Gatos, H.C., J. Appl. Phys. 36, 864 (1965).
- 540. Buckel, W., and Wittig, J., Phys. Letters <u>17</u>, 187-8 (1965).
- 541. V Strongin, M., Phys. Letters 17, 224-5 (1965).
- 542. Smith, T.F., Phys. Rev. 137, A1435-7 (1965).
- 543. Rorer, D.C., Onn, D.G., and Meyer, H., Phys. Rev. 138, A1661 (1965).
- 544. McConville, T., and Serin, B., Phys. Rev. Letters 13, 365-7 (1964).
- 545. Batterman, B.W., and Barrett, C.S., Phys. Rev. Letters 13, 390-2 (1964).
- 546. Olsen, J.L., Cryogenics 2, 356-8 (1962).
- 547. Wittig, J., Phys. Rev. Letters 15, 159 (1965).
- 548. Martin, R. B., and Rose-Innes, A. C., Phys. Letters 19, 467-9 (1965).
- 549. Tittman, B., Hamilton, D., and Jayaraman, A., J. Appl. Phys. 35, 732-3 (1964).

- 550.⊽ Lazarev, B.G., Semenenko, E.E., and Sudovtsov, A.I., Z. Eksper. i. Teoret. Fiz. 45, 391-2 (1963); Soviet Phys. JETP 18, 270-1 (1964).
- 551. Brandt, N.B., and Ginzberg, N.I., Z. Eksper. i. Teoret. Fiz. <u>46</u>, 1216-9 (1964); Soviet Phys. JETP <u>19</u>, 823-5 (1964).
- 552. Raub, C.J., Compton, V.B., Geballe, T.H., Matthias, B.T., Maita, J.P., and Hull, G.W. Jr., J. Phys. Chem. Solids <u>26</u>, 2051-7 (1965).
- 553. Hechler, K., Saur, E., Wizgall, H., Zeitschrift für Physik 205, 400-8 (1967).
- 554. Heiniger, F., Muller, J., Phys. Rev. 134 (1964).
- 555. Lerner, E., and Daunt, J.G., Phys. Rev. 142, No. 1, (1966).
- 556. Heiniger, F., Phys. kondens. Materie 5, 285-301 (1966).
- 557. Bucher, E., Heiniger, F., Muller, J., Physik der kondensierten Materie 2 (3), 210-40 (1964).
- 558. Shulishova, O. I., Institut Metallofiziki AN USSR, Kiev, (1966g).
- 559. Shulishova, O. I., Khimicheskaya Svyazb V Poluprovodnikakh i Termodinamika, Minsk, 299-316 (1966).
- 560. Alekseevskii, N. E., Samsonov, G. V., Shulishova, O. I. Neorganicheskie Materialy 3:1, 61-66 (1967).
- 561. Shulishova, O. I., Neorganicheskie Materialy No. 8, 1434 (1966).
- 562. Takafumi, Aomine, Hironobu, A., Shibuyo, Y., J. Phys. Soc. Japan 20: 282 (1965).
- 563. Arrhenius, G., Fitzgerald, R., Hamilton, D. C., Holm, B. A., Matthias, B. T., Corenzwit, E., Geballe, T. H., Hull, G. W., Jr., J. Appl. Phys., U. S. A. <u>35</u>, No. 12, 2487-90 (1964).
- 564. Babiskin, J., Siebenmann, P.G., Otto, G., and Saur, E., Leitz. fur Physik <u>180</u>, 483-488 (1964).
- 565. Barnes, L.J. & Hake, R.R., Phys. Rev. 153, 435 (1967).
- 566. Bucher, E. & Palmy, C., Phys. Letters 24A, 340 (1967).
- 567. Bucher, E., Heiniger, F., Muller, J. & Spitzli, P., Phys. Letters 19, 263(1965).
- 568. Bucher, E., Laves, F., Muller, J. and von Philipsborn, H., Phys. Letters 8, 27 (1964).
- 569. Bucher, E., Muller, J., Olsen, J. L. & Palmy, C., Cryogenics 5, 283 (1965).
- 570. Bucher, E. & Muller, J., Phys. Letters 15, 303 (1965).
- 571. Fink, H.J. Thorsen, A.C., Parker, E., Zackay, V.F. & Toth, L., Phys. Rev. 138A, 1170 (1965).
- 572. Heininger, F., Bucher, E., & Muller, J., Phys. kond. Materie 5, 243 (1966).
- 573. Toth, L.E., Rudy, E., Johnston, J. & Parker, E.R., J. Phys. Chem. Solids <u>26</u>, 517 (1965).
- 574. Jensen, M. A., Matthias, B. T. & Andres, K., Science 150, 1448 (1965).
- 575. Sweedler, A. R., Hulm, J. K., Geballe, T. H. & Matthias, B. T., Phys. Letters <u>19</u>, 82 (1965).

(X-5)

- 576. Knapp, G. & Merriam, M. F., Phys. Rev. 140A, 528 (1965).
- 577. Klokholm, E. & Chiou, C., Acta Met. 14, 565 (1966).
- 578. Bucher, E., Heiniger, F., Muller, J. & Spitzli, P., Phys. Letters Netherl. 19, 263 (1965).
- 579. Finnemore, D. K. & Mapother, D. E., Phys. Rev. 140A, 507 (1965).
- 580. Reich, R., Thesis, University of Paris, (1965).
- 581. Courtney, T.H., Pearsall, G.W., Wulff, J., J. Appl. Phys. 36 (10), 3256 (1965).
- 582. Darnell, F. J., Bierstedt, P. E., Forshey, W. O., Waring, R. K., Jr., Phys. Rev. Letters Abstracts 15 (14), A4 (1965), Phys. Rev. 140, A1581 (1965).
- 583. Gutz, Z. A., Krivko, N. I., Morozova, V. K., Sidorova, T. A., Fogel, A. A., Sov. Phys. Tech. Phys. 10, 1295-6 (1966), Zhur. Tech. Fiz. 35 (9), 1675 (1965).
- 584. Hake, R. R., Phys. Rev. 158 (2), 356-76 (1967).
- 585. Alekseevskii, N. E., Zh Eks Teor Fiz <u>49</u> (1), 159-62 (1965), JETP <u>22</u>(1), 114-116 (1966).
- 586. Hart, H. R., Jr., Swartz, P. S., Phys. Letters, Netherl. 10, 40-1 (1964).
- 587. Hake, R. R., Brammer, W. G., Phys. Rev. 133, A719 (1964).
- 588. Hechler, K., Saur, E., Zeitschrift fur Physik, 205, 392-9 (1967).
- 589. Chang, Chi-Jui, Ts'ao, Hsiao-Wen, Kuan, Wei-Yen, Sci. Sinica, (Peking) <u>14</u> (2), 306-9 (1965), Acta. Physica <u>20</u>, (6) 568-70, (1964).
- 590. Alekseevskii, N. E., Bondar', V. V. and Polukarov, Yu. M., Inst. of Phys. Prob., Acad. of Sciences, U. S. S. R., JETP (Oct. 9, 1959), J. Exptl. Theoret. Phys. (USSR) 38, 294-295 (Jan. 1960).
- 591. Lazarev, B.G., Lazareva, L.S., Makarov, V.I., Ignat'eva, T.A., Sov. Phys. JETP <u>19</u>, No. 3, p. 566-567 (Sept. 1964).
- 592. DeSorbo, W., Phys. Rev. A, 140, (3), 914 (1965).
- 593. Courtney, T. H., Pearsall, G. W. and Wulff, J., Trans. AIME 233, No. 1, p. 212-18 (1965).
- 594. Ambler, E., Colwell, J. H., Hosler, W. R., and Schooley, J. F., Phys. Rev. (USA) <u>148</u>, No. 1, 280-6 (1966).
- 595. Abeles, B., Cohen, R.W., Stowell, W.R., Phys. Rev. Letters 18: 21, 992-5 (1922).
- 596. Abeles, B., Cohen, R. W., Cullen, G. W., Phys. Rev. Letters <u>17</u>, No. 12, p. 632-34 (1966).
- 597. Benz, H., Fischer, E., Z. angew. Math. Phys., Schweiz 15, No. 6, 659-60 (1964).
- 598. Boato, G., Gallinaro, G., and Rizzuot, C., Phys. Rev. 148, No. 1, 353-61 (1966).
- 599. Bergmann, G., Z. Physik 187, (4), 395-410 (1965).
- 600. Blaugher, R. D., Phys. Letters 14, No. 3, 181 (1965).
- 601. Blaugher, R. D., Hulm, J. K. and Yocom, P. N., J. Phys. Chem. Sol. <u>26</u>, 2037 (1965).
- 602. Bergmann, G., Hilsch, R. and Minnigerode, G. v., Z. Naturforsch, <u>19a</u>, 580-6 (1964).

- 603. Neshpor, V.S., Novikov, V.I., Noskin, V.A. and Shalyt, S.S., JETP 54, 26 (1968).
- 604. Feder, J., Kiser, S.R., Rothwarf, F., Phys. Rev. Letters 17, (2), 87-89 (1966).
- 605. Robin, M. B., Andres, K., Geballe, T. H. Kuebler, N. A., McWhan, D. B. Phys. Rev. Letters <u>17</u>, No. 17, 917 (1966).
- 606. Matthias, B.T., Jayaroman, A., Geballe, T.H., Phys. Rev. Ltrs., <u>17</u>, No. 12, 640-643 (1966).
- 607. Hauser, J.J., Phys. Rev. Letters 17, No. 17, 921-22, (1966).
- 608. Smith, T. F., Phys. Rev. Letters 17, No. 7, 386-90 (1966).
- 609. Merriam, M. F., Phys. Rev. Letters 11, 321 (1963).
- 610. Schooley, J. F., Hosler, W. R. and Cohen, M. L., Phys. Rev. Letters <u>12</u>, No. 17, 474-5 (1964).
- 611. Frederikse, H. P. R., et al, Phys. Rev. Letters 16, 579-81 (1966).
- 612. Johnson, R. T., Vilches, O. E., Wheatley, J. C. and Gygax, S., Phys. Rev. Letters <u>16</u>, 101-4 (1966).
- 613. Finnemore, D. K., Hopkins, D. C. and Palmer, P. E., Phys. Rev. Letters <u>15</u>, 891 (1965).
- 614. Fowler, R. D., Matthias, B. T., Asprey, L. B. and Hill, H. H. et al, Phys. Rev. Letters 15, No. 22, 860-2 (1965).
- 615. Bond, W. L., Cooper, A. S., Andres, K., Hull, G. W., Geballe, T. H. and Matthias, B. T., Phys. Rev. Letters 15, 260-1 (1965).
- 616. Hake, R. R., Phys. Rev. Letters 15, 865 (1965).
- 617. Bozorth, R. M., Holtzberg, F., Methfessel, S., Phys. Rev. Letters 14, 952-3 (1965).
- 618. Wittig, J. Phys. Rev. Letters 21, 1250 (1968).
- 619. Strongin, M., Krammerer, O. F., Paskin, A., Phys. Rev. Letters 14, 949 (1965), Proc. Int. Symp. Grundprobleme der Physik dunner Schichten Gottingen, 505-510 (1966).
- 620. Shen, L. Y. L., Senozan, N. M. and Phillips, N. E., Phys. Rev. Letters <u>14</u>, 1025-6 (1965).
- 621. Schooley, J. F., Hosler, W. R., Ambler, E., Becker, J. H., Cohen, M. and Koonce, C.S., Phys. Rev. Letters 14, 305-7 (1965).
- 622. Geller, S. and Hull, G. W., Jr., Phys. Rev. Letters 13, 127-9 (1964).
- 623. Finegold, L., Phys. Rev. Letters 13, No. 7, 233-4 (1964).
- 624. Farrell, D., Park, J.G. and Coles, B.R., Phys. Rev. Letters 13, 328 (1964).
- 625. Raub, Ch. J, Sweedler, A. R., Jensen, M. A., Broadston, S. & Matthias, B. T., Phys. Rev. Letters <u>13</u>, 746 (1964).
- 626. Farrell, D., Park, J.G. & Coles, B.R., Phys. Rev. Letters 13, 328 (1964).
- 627. Hempstead, C. F. & Kim, U. B., Phys. Rev. Letters 12, 145 (1964).
- 628. Wells, M., Pickus, M., Kennedy, K. & Zackay, V., Phys. Rev. Letters <u>12</u>, 536 (1964).
- 629. Ho. J. C., Phillips, N. E. & Smith, T. F., Phys. Rev. Letters 17, 694 (1966).

(X-7)

- 630. Green, B. A., Jr. & Culbert, H. V., Phys. Rev. 137A, 1168 (1965).
- 631. Rauch, G.C., Rose, R. M. & Wulff, J., J. Less Common Metals 8, 99 (1965).
- 632. Toth, L. E., Jeitschko, W. & Yen, C. M., J. Less Common Metals 10, 29 (1966).
- 633. Giorgi, A. L. & Sklarz, E. G., J. Less Common Metals 11, 455 (1966).
- 634. Hutcherson, J. V., Guay, R. L. & Herold, J. S., J. Less Common Metals <u>11</u>, 296 (1966).
- 635. Toth, L. E., J. Less Common Metals 13, 129 (1967).
- 636. Revolinsky, E., Lautenschlager, E. P. & Armitage, C. H., Solid State Commun. 1, 59 (1963).
- 637. Ulmer, K., Solid State Commun. 2, 327 (1964).
- 638. Johnston, J., Toth, L., Kennedy, K. & Parker, E., Solid State Commun. 2, 123 (1964).
- 639. Levy, M. & Olsen, J. L., Solid State Commun. 2, 137 (1964).
- 640. Sadogopan, V., Pollard, E. & Gatos, H. C., Solid State Commun. 3, 97 (1965).
- 641. Gey, W., Solid State Commun. 4, 403 (1966).
- 642. Feder, J., Kiser, S.R., Rothwarf, F., Burger, J.P. & Valette, C., Solid State Commun. <u>4</u>, 611 (1966).
- 643. Bither, T. A., Prewitt, C. T., Gillson, J. L., Bierstedt, P. E., Flippen, R. B. and Young, H. S., Solid State Comm. <u>4</u>, 533 (1966).
- 644. Bierstedt, P. E., Bither, T. A. and Darnell, F. J., Solid State Commun. 4, 25 (1966).
- 645. Greytak, T. J. and Wernick, J. H., J. Phys. Chem. Solid 25, 535, (1964).
- 646. Levinstein, H. J., and Wernick, J. H., J. Phys. Chem. Solids 26, 1111 (1965).
- 647. Revolinsky, E., Spiering, G.A. and Beerntsen, D.J., J. Phys. & Chemistry of Solids, 26, 1029 (1965).
- 648. Zegler, S. T., J. Phys. Chem. Solids 26, 1347 (1965).
- 649. Bon Mardion, G., Goodman, B. B. and Lacaze, A., J. Phys. Chem. Solids 26, 1143 (1965).
- 650. Sadagopan, V. and Gatos, H.C., J. Phys. Chem. Solids 27, 235 (1966).
- 651. Andres, K., Kuebler, N.A., Robin, M.B., J. Phys. Chem. Solids 27, 1747 (1966).
- 652. Toth, L. E., Yen, C. M., Rosner, L. G. and Anderson, D. E., J. Phys. Chem. Solids <u>27</u>, 1815 (1966).
- 653. Sekula, S. T. and Kernohan, R. H., J. Phys. & Chem. Solids 27, 1863 (1966).
- 654. Spiering, G. A., Revolinsky, E. and Beerntsen, D. J., J. Phys. Chem. Solids 27, 535 (1966).
- 655. Smith, T. F. and Harris, I. R., J. Phys. Chem. Solids 28, 1846 (1967).
- 656. Ho, J.C., Phillips, N.E. and Smith, T.F. (Unpublished) Quoted in Ref. 655.
- 657. Smith, T. F. (Unpublished) Quoted in Ref. 655.
- 658. Smith, T. F. and Luo, H. L., J. Phys. Chem. Solids 28, 569 (1967).

- 659. Matthias, B. T. Private communication. Quoted in Ref. 658.
- 660. Jensen, M. A., Ph. D. Thesis, University of California, San Diego, La Jolla (1965).
- 661. Van Vucht, J. H. N., Bruning, H. A. C. M. and Donkersloot, H. C., Phys. Letters 7, 297 (1963).
- 662. Gygax, S., Olsen, J. L. and Kropschot, R. H. Phys. Letters Nethrl. 8, 228 (1964).
- 663. Hennephof, J., Phys. Letters 11, 273 (1964).
- 664. Doidge, P. R. & Kwan, S., Phys. Letters, Netherl. 12, 82 (1964).
- 665. Druyvesteyn, W. F., Phys. Letters 13, 195 (1964).
- 666. Rosenblum, B. & Cordona, M., Phys. Letters, Netherl. 13, 33 (1964).
- 667. Matthias, B. T. & Olsen, J. L., Phys. Letters 13, 202 (1964).
- 668. Veyssie, J. J., Brochier, D., Nemoz, A. & Blanc, J., Phys. Letters Netherl. <u>14</u>, 261 (1965).
- 669. Lalevic, B., Phys. Letters 17, 16 (1965).
- 670. Merriam, M. F., Phys. Letters 17, 224 (1965).
- 671. Kammerer, O. F. & Strongin, M., Phys. Letters 17, 224 (1965).
- 672. Seidel, T. & Meissner, H., Phys. Letters 17, 100 (1965).
- 673. Aoki, R. & Ohtsuka, T., Phys. Lett. Netherl. 19, 456 (1965).
- 674. Sweedler, A. R., Hulm, J. K., Matthias, B. T. & Geballe, T. H., Phys. Letters <u>19</u>, 82 (1965).
- 675. Van Maaren, M. H. & Schaeffer, G. M., Phys. Lett. 20, 131 (1966).
- 676. Satoh, T. & Ohtsuka, T., Phys. Lett. 20, 565 (1966).
- 677. King, H. W., Russell, C. M. & Hulbert, J. A., Phys. Letters 20, 600 (1966).
- 678. Kramer, L., Phys. Letters 20, 619 (1966).
- 679. Ferreira Da Silva, J., Van Duykeren, N. W. J., Dokoupil, Z., Phys. Letters 20, 448 (1966).
- 680. Jones, C. K. & Rayne, J. A., Phys. Letters 21, 510 (1966).
- 681. Minomura, S., Okai, B., Nagasaki, H. & Tanuma, S., Phys. Lett. 21, 272 (1966).
- 682. Sutton, J. & Baker, C., Phys. Lett., Netherl. 21, 601 (1966).
- 683. Druyvesteyn, W. F., Niessen, A. K. & Staas, F. A., Phys. Lett. Netherl. <u>22</u>, 127 (1966).
- 684. Montgomery, D. B. & Wizgall, H., Phys. Lett. Netherl. 22, 48 (1966).
- 685. Malseed, C. F. S., Nethercott, R. B. & Rachinger, W. A., Phys. Lett. Netherl. 22, 551 (1966.
- 686. Williamson, S.J., Phys. Letters 23, 629 (1966).
- 687. Hein, R. A., Phys. Lett. 23, 435 (1966).
- 688. Kwasnitza, K. & Rupp, G., Phys. Letters 23, 40 (1966).
- 689. Minomura, S., Okai, B., Onoda, Y. & Tanuma, S., Phys. Lett. 23, 641 (1966).

- 690. Ralls, K. M., Phys. Letters 23, 29 (1966).
- 691. Toth, L. E., Zackay, V. F., Wells, M., Olson, J. & Parker, E. R., Acta Met. 13, 379 (1965).
- 692. Luo, K. H. L., Hagen, J. & Merriam, M. F., Acta Met 13, 1012 (1965).
- 693. Chiou, C. & Klokholm, E., Acta Met. 12, 883 (1964).
- 694. Toth, L. E., Wang, C. P. & Yen, C. M., Acta Met. 14, 1403 (1966).
- 695. McWhan, D. B., Hull, G. N., Jr., McDonald, T. R. R. & Gregory, E., Science 147, 1441 (1965).
- 696. Sclar, C.B., Carrison, L.C. & Schwartz, C.M., Science 147, 1569, (1965).
- 697. Chao, C. M., Luo, H. L. & Smith, T. F., J. Phys. Chem. Solids 27, 1555 (1966).
- 698. Geballe, T. H., Matthias, B. T., Andres, K., Fisher, E. S., Smith, T. F. & Zachariasen, W. H., Science 152, 755 (1966).
- 699. Jensen, M.A., Matthias, B.T. & Andres, K., Science 150, 1448 (1965).
- 700. Matthias, B. T., Geballe, T. H., Corenzwit, E., Andres, K., Hull, G. W., Jr., Ho, J. C., Phillips, N. E. & Wohlleben, D. K., Science 151, 985 (1966).
- 701 Dempesy, C. W., Gordon, J. E. & Romer, R. H., Phys. Rev. Letters 11, 547 (1963).
- 702. Howlett, B. W., Science 154, 542 (1966).
- 703. Matthias, B.T., Science 154, 543 (1966).
- 704. Matthias, B. T., Geballe, T. H., Longinotti, L. D., Corenzwit, E., Hull, G. W., Willens, R. H. & Maita, J. P., Science 156, 645 (1967).
- 705. Matthias, B. T., Geballe, T. H., Andres, K., Corenzwit, E., Hull, G. W. & Maita, J. P., Science 159, 530 (1968).
- 706. Wittig, J., Phys. Rev. Letters 21, 1250 (1968).

REVIEW ARTICLES AND BOOKS ON SUPERCONDUCTIVITY

- Onnes, H. Kamerlingh, Commun. Kamerlingh Onnes Lab. 13, Supplement 34b (1913-14).
- Crommelin, C.A., Physik. Zeitschr. 21, 274, 300, 331 (1920).
- Meissner, W., Metallwirtschaft 15, 289 (1930).
- Schulze, A., Z. Ver. duet. Ing. 74, 149-52 (1930).
- Bates, L. F., Science Progress 24, 565-72 (1930).
- Meissner, W., Metallwirtschaft 10, 289, 310 (1931).
- DeHaas, W.J., and Voogd, J., Commun. Kamerlingh Onnes Lab. 20, Supplement 73a (1932).
- Clusius, K., Zeits. Elektrochem. 38, 312-26 (1932).
- Meissner, W., Erg. Der Exakt. Naturw. 11, 219 (1932).
- McLennan, J.C., Nature 130, 879 (1932).
- McLennan, J. C., Pharm. J. 128, 470 (1932).
- Kikoin, I., and Lazarev, B., J. Tech. Phys. (USSR) 3, 237-54 (1933).
- Meissner, W., Physik. Zeitschr. 35, 931 (1934).
- Tammann, G., Z. Metallkunde 26, 61 (1934).
- Burton, E. F. (Ed.), "The Phenomenon of Superconductivity," Univ. of Toronto Press, Toronto (1934).
- McLennan, J.C., Reports on Prog. in Physics 1, 206 (1934).
- McLennan, J.C., Roy. Soc. Proc. 152A, 1-46 (1935).
- Meissner, W., "Handbuch der Experimental Physik XI", Part 2, 204-262 (1935).
- Smith, H.G., and Whilhelm, J.O., Rev. Mod. P^Hys. 7, 237 (1935).
- Darrow, K. K., Rev. Sci. Instr. 7, 124 (1936).
- Ruhemann, M., and Ruhemann, B., "Low Temperature Physics," Cambridge Univ. Press (1937).
- Steiner, K., and Grassmann, P., "Supraleitung," Vieweg und Sohn, Brunswick (1937).
- Silsbee, F.B., J. Wash. Acad. Sci. 27, 225-44 (1937).
- Shoenberg, D., "Superconductivity," Cambridge Univ. Press (1938).
- Shoenberg, D., Uspekhi Fiz. Nauk. 19, 448-91; 20, 1-28 (1938).
- Jackson, L.C., Reports on Prog. in Physics 5, 335-44 (1939).
- Burton, E. F., Grayson Smith, H., and Whilhelm, J.O., "Phenomena at the Temperature of Liquid Helium," Reinhold Publishing Corp., New York, pp. 87-123 (1940).
- Casimir, H. B. G., Nederland. Tijdschr. Natuurkunde 8, 113-23 (1941).
- Laue, M. Von, Ber. 75B, 1427-32 (1942).
- Laue, M. Von, Physik. Z. 43, 274-84 (1942).
- Mendelssohn, K., Reports on Prog. in Physics 10, 358-77 (1944-45).
- Itterbeek, A. van, Soc. Roy. belge ing. ind., Mem. Ser B 1, 47-51 (1945).

- Justi, E., Naturwiss. 33, 292-7, 329-33 (1946).
- Ginsburg, V. L., "Superconductivity," Academy of Science USSR, Moscow, Leningrad (1946).
- Hewlett, C. W., G. E. Rev. 49, 19-25 (1946).
- Andronikashvili, E. L., and Tumanov, K. A., Uspekhi Fiz. Nauk. 33, 469-532 (1947).
- Justi, E., "Leitfahigkeit und Leitungsmechanismus fester Stoffe," Gottingen, Vandenhoeck and Ruprecht, pp. 187-270 (1948).
- Laue, M. Von, Ann. Physik. 3, 40-2 (1948).
- Meissner, W., and Schubert, G.V., Fiat Rev. German Science (1939-46); Physics of Solids Pt. II, 143-62 (1948).
- Gorter, C.J., Physica 15, 55-64 (1949).
- Mendelssohn, K., Reports on Prog. in Physics 12, 270-290 (1948-49).
- Vick, F.A., Science Progress 37, 268-74 (1949).
- Wexler, A., Research, Lond. 3, 534 (1950).
- Shoenberg, D., Nuovo Cimento 10, Ser. IX, 459-89 (1953).
- Unknown, Physica 19, 745-54 (1953).
- Eisenstein, J., Rev. Mod. Phys. 26, 277 (1954).
- Buckel, W., Naturwiss. 42, 451 (1955).
- Serin, B., Handbuch Der Physik, Band XV Kältephysik II, Springer-Verlag, Berlin, pp. 210-73 (1956).
- Zavaritskii, N.V., Priroda 45, 37-44 (1956).
- Wexler, A., Metal. Progr. 69, 89 (1956).
- Abrikosov, A. A., Vestnik Akademii Nauk SSSR #4, 30-36 (1958).
- Boorse, H. A., Amer. Jour. of Physics 27, 47 (1959).
- Buckel. W., Metall. 13, 814 (1959).
- Cooper, L. N., Amer. Jour. of Physics 28, 91 (1960).
- Schoenberg, D., "Superconductivity," (2nd Ed., 1960 Printing), Cambridge Univ. Press (1960); (1st Ed., 1938; 2nd Ed., 1952).
- Bardeen, J., and Schrieffer, J.R., Prog. in Low Temp. Phys. Vol. III.
- Kropschot, R. H., and Arp, V., Cryogenics 2, 1 (1961).
- Jones, W. H., Milford, F. J., and Fawcett, S. L., J. of Metals <u>14</u>, 836 (1962); Also Battelle Technical Review, (Sept. 1962).
- Tanenbaum, M., and Wright, W. V. (Ed.), "Superconductors," John Wiley & Sons, New York (1962).
- Bardeen, J., "Critical Fields and Currents in Superconductors", Rev. Modern Phys. <u>34</u>, 667 (1962).
- Bowen, D. H., "Effects of Pressure" in High Pressure Physics and Chemistry Vol. I, R. S. Bradley (Ed.), Academic Press, London, New York, pp. 355-73 (1963).

- Bardeen, J., "Superconductivity" in Advances in Materials Research in the NATO Nations, MacMillan, New York, pp. 281-90 (1963).
- Matthias, B. T., Geballe, T. H. and Compton, V. B. "Superconductivity (Compounds)". Rev. Mod. Phys. 35, 1 (1963).
- Anderson, D. E., "Superconductivity" in Magnetic Materials Digest 1964, M. W. Lads, Philadelphia, pp. 196-217 (1964).
- "Proc. Inter. Conf. on Science of Superconductivity, Hamilton, N.Y., Aug. 1963", Rev. Mod. Phys. 36 (1964).
- Gaballe, T. H., and Matthias, B. T., "Superconductivity" in <u>Annual Review of Physical</u> Chemistry Vol. 14, pp. 141-160 (1964).
- Lynton, E. A., "Superconductivity," Metheun & Co., London; John Wiley & Sons, New York (1964).
- Yasukochi, K. and Ogasawara, T., Metal Physics (Tokyo) 10, 137, 197 (1964).
- Livingston, J.D. and Schadler, H.W., "The Effect of Metallurgical Variables on Superconducting Properties." Progress in Materials Science 12, 183-287 (1964).
- Klose, von W., "Harte Supraleiter", Natur wissenschaften 51, 180-186 (1964).
- Abrikosov, A. A., "The Present State of the Theory of Superconductivity", Usp. Fiz. Nauk 87, 125-42 (1965); Soviet Physics Uspekhi 8, 710 (1966).
- F. Block, "Some Remarks on the Theory of Superconductivity", Physics Today 19, 27 (May) (1966).
- deGennes, P.G., "Superconductivity of Metals and Alloys" (Theory), Frontiers in Physics, Benjamin, New York (1966).
- Ralls, K. M. and Wulff, J., "The Electronic Structure of Transition Metal-Interstitial Atom Alloy Superconductors", J. Less Common Metals 11, 127-34 (1966).
- Roberts, B. W., "Superconductive Properties" in Intermetallic Compounds, Edited by J. H. Westbrook, John Wiley and Sons, New York, pp. 581-613 (1967).

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