ACCESSION NR: AP4029537

by a period of identity $a = 4.4445 \pm 0.0010$ Å, a density $\rho = 6.58 \pm 0.003$ g/cm^3, a microhardness $H = 840$ kg/mm^2 and a thermal emf $\alpha_{20-120} = 83$ μv/degree. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Ural Polytechnical Institute)

SUBMITTED: 17Sep63   DATE ACQ: 30Apr64   ENCL: 00

SUB CODE: ML   NO REF SOV: 003   OTHER: 004

Card 2/2

ACCESSION NR: AP4029838

AUTHOR: Baum, B. A. (Sverdlovsk); Gel'd, P. V. (Sverdlovsk); Suchil'nikov, S. I. (Sverdlovsk)

TITLE: The electrical conductivity of chromium, silicon, and chromium,disilicide in the solid and liquid states

SOURCE: AN SSSR. Izv. Metallurgiya i gornoye delo, no. 2, 1964, 149-155

TOPIC TAGS: silicide, chromium, silicon, valent state, KM-1 silicon

ABSTRACT: The authors investigated the electroconductivity of phase components of the chromium-silicon system in which the properties, especially in a liquid state, have not been adequately studied. Measurements were made within ranges of 5-1925°C for chromium, 700-1830°C for silicon, and 15-1881°C for $CrSi_2$. Measurement results are presented in graphs. The authors found that a specific resistance of electrolytic chromium at 20°C was 14.1 $\mu\Omega/cm$ and rapidly increased with temperature, reaching 145.5 $\mu\Omega$ at 1800°C. This differed somewhat from previous results. The temperature dependence of the electroconductivity of pure silicon agreed quite well with previous data. Chromium disilicide has an electroconductivity in a solid state which changes with the temperature according to the extreme law, reaching a minimum

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ACCESSION NR: AP4029838

near 385°C. In addition, the stable parameters of the proper conductivity of di-silicide (ΔE=0.92 eV) is obtained at temperatures somewhat exceeding 385°C (for which ΔE=0). The discontinuous increase of electroconductivity observed at the melt-ing point of CrSi$_2$ showed that its transition in the liquid state was accompanied by substantial change in the nature of interparticle interaction. Obviously transfor-mation of the homeopolar bonds into metallic bonds occurred; i.e., processes similar to those observed in the melting of a number of semiconductors (Ge, Si, Si-Ge) and semimetals (Bi, Sb, Bi-Sb). The limited interval of the temperatures studied did not permit the completion of this process to be detected. However, in all the tem-peratures studied, the electroconductivity of chromium disilicide was considerably less (appx. 3 times) than σ of the fused components and could be examined as an in-dication of its retention of adequately-stable quasi-molecular groups (Cr-Si or Si-Cr-Si). From this viewpoint, liquid chromium silicides are in many ways reminis-cent of silicides of other transitional metals (Mn, Fe, Co). Orig. art. has: 3 figures and 4 formulas.

ASSOCIATION: none

SUBMITTED: 12Aug63   DATE ACQ: 30Apr64   ENCL: 00

SUB CODE: ML   NO REF SOV: 023   OTHER: 002
Card 2/2

Pavel, Ivan Iv. S, i.V.

Effect of screening and yield of the versus the metals
on some properties of equiatomic oxides and nitrides of
Ti, V, and Nb. Izor. strukturhim. 5 no. 3 1964.

Trud. na rudite. M. a Ti. tekhnol. i se v Moskva.

L 39465   EWT(n)-2/EWP(k)/EWP(z)/EWA(c)/EWT(m)/EWP(b)/T/EWP(e)/EWP(t)   Pf-4/
Pu-4   IJP(c)   JD/JG

ACCESSION NR: AP4047878   S/0279/64/000/005/0137/0141

AUTHOR: Lyubimov, V.D. (Sverdlovsk); Gel'd, P.V. (Sverdlovsk); Shveykin, G.P. (Sverdlovsk)

TITLE: Self-diffusion of niobium in monocrystalline and fused samples

SOURCE: AN SSSR. Izvestiya. Metallurgiya i gornoye delo, no. 5, 1964, 137-141

TOPIC TAGS: niobium, self diffusion, diffusion rate, diffusion coefficient, monocrystalline niobium, fused niobium, porous niobium

ABSTRACT: The characteristic mass diffusion in niobium monocrystals and in fused metallic niobium samples tagged with Nb^{95} was determined by removing layers and measuring the integral activity of the remaining sample. X-rays showed the diffusion layer was monophased and contained an insignificant amount of impurities. There was little difference between the diffusion coefficients for the monocrystalline and the fused samples. D changed with temperature according to one of the following relationships:

$$D_{Nb,A,B}^{Nb} = 49 \cdot \exp\left(-\frac{115000}{RT}\right) \quad or \quad D_{Nb}^{Nb} = 17 \cdot \exp\left(-\frac{110000}{RT}\right)$$

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L 39465-65
ACCESSION NR: AP4047878

The energy of activation of the diffusion process in these compact samples was calculated: $E = 110-115$ kcal/g. at.   The corresponding values for powdered Nb samples were determined earlier (Gel'd, F. V., Lyubimov, V. D., Izv. AN SSSR OTN, Metallurgia i topliva, 1961, No. 6, 119):

$$D^{Nb}_{Nb_{porous}} = 5. 10^2 \exp \left(-\frac{84000}{RT} \right), \text{ and } E = 84 \text{ kcal/g. at.}$$

Thus the coefficient of diffusion is dependent on the structure of the niobium. "The authors are very thankful to Drs. K. Schlaubitz and E. Rexer (Institute of Applied Physics of Pure Materials, Dresden) for supplying the niobium mono-crystals. "   Orig. art. has: 3 figures, 5 equations and 1 table.

ASSOCIATION: None

SUBMITTED: 27Jun63   ENCL: 00   SUB CODE: MM

NR REF SOV: 006   OTHER: 003

Card 2/2

S/0148/64/000/004/0119/0123

ACCESSION NR: AP4033703

AUTHOR: Gel'd, P. V.; Gol'tsov, V. A.; Shteynberg, M. M.; Kosheleva, V. Yu.

TITLE: The effect of Plastic Deformation and Subsequent Annealing on the Rate of Hydrogen Penetration in Austenite

SOURCE: IVUZ. Chernaya metallurgiya, no. 4, 1964, 119-123

TOPIC TAGS: plastic deformation, annealing, interrupted quenching, Fe Ni alloy, induction furnace, hydrogen permeability, Ni austenite, activation energy, pre exponential factor, polyterm, crystal structure imperfection, complicated migration

ABSTRACT: The authors investigated the diffusion of hydrogen in an Fe-29% Ni alloy melted in a 60 kg induction furnace for the purpose of determining the water permeability of work-hardened austenite. The specimens were reduced by 25% since this degree of reduction intensified the work-hardening of Ni austenite. Quenching from 365 C affects permeability and a disruption appears on the polytherm below which the process is characterized by activation energy and a pre-exponential factor corresponding to equilibrium austenite. Annealing at continuously

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ACCESSION NR: AP4033703

increasing temperatures lowered the parameters of austenite permeability, as calcu-
lated, from the high-temperature sections of the polytherm to values which approxi-
mated those calculated from the low-temperature sections. In order to obtain data
which would supplement earlier studies of the imperfections accounting for the
anomalous changes in hydrogen permeability, the authors investigated the recovered
hardness during a 30-minute annealing of 10 x 10 x 2.5 specimens reduced by 27%.
At 500 C hardness was recovered by 18% and activation energy of permeability by
32%. The authors conclude that the recovery of diffusion characteristics occurs
within a lower temperature range than the recovery of hardness. Hydrogen perme-
ability parameters, as affected by plastic deformation and annealing, have an
exponential relationship $p_0 \approx \exp E$ analogous to that determined in earlier studies
for phase-hardened austenite. Experimental results are explained in the light of
an earlier theory on crystal lattice imperfections which affect diffusion by en-
training hydrogen and making migration in their vicinity difficult. Orig. art.
has:

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Urals Polytechnic Institute)

SUBMITTED: 28Jul63   DATE ACQ: 07May64   ENCL: 00

Card 2/3

ACCESSION NR: AP4033703

SUB CODE: MM   NO REF SOV: 009   OTHER: 001

Card   3/3

L 14327-65   EWP(e)/EWT(m)/EPF(n)-2/EPR/EWP(t)/EWP(b)   Ps-4/Pu-4   ASD(a)-5/
AFWL/AFETR/ESD(gs)   JD/JG/AT/WH
ACCESSION NR: AP4044275   S/0192/64/005/004/0576/0582

AUTHORS: Gel'd, P. V.; Tskhay, V. A.

TITLE: Topography of vacancies in transition metal carbides of
    groups IV and V with NaCl structure

SOURCE: Zhurnal strukturnoy khimii, v. 5, no. 4, 1964, 576-582

TOPIC TAGS: transition metal carbide, vacancy, crystal lattice,
defect structure, crystal defect, carbide

ABSTRACT: The purpose of this article is to investigate in greater
detail the structural characteristics of carbides of transition
group IV metals of the type $Me(IV)C_x$ and of group V metals of the
type $Me(V)C_x$ and specifically the space distribution of vacancies
in them. On the basis of the model in which the valence of C atoms
in cubic carbides of transition metals of groups IV and V is always
satisfied by the metal atoms surrounding them it is shown that the
formation of vacancies in carbon sublattice MeC_x increases the num-
ber of electrons of the unscreened Me-Me bonds which pass through
the C defect. Assuming that 1/3 of the electrons of unscreened Me-
Me bonds are localized in the vacancies the article considers their

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L 14327-65
ACCESSION NR: AP4044275   3

space distribution. It was determined that within homogeneity
regions of VC_x and NbC_x the adjacent distribution of C vacancies is
less probable than in $Me(IV)C_x$, although even in the latter compounds
it is unfavorable energywise.[x] A comparison of Me-Me distances in
defect lattices of carbides, with parameters calculated on the basis
of the number of electrons in the Me-Me bond, along with the data
on space distribution of vacancies enable the explanation of the
positions of the lower stability boundary of vanadium and niobium
carbides (approximately $Me(V)C_{0.70}$) and the reasons for the structur-
al stability of $Me(IV)C_x$ carbides with large defect structures of
the carbon sublattice which extends down to $Me(IV)C_{0.30}$. Orig. art.
has: 2 tables and 3 figures.

ASSOCIATION: Institut khimii ural'skogo filiala AN SSSR (Chemical
Institute of the Ural Branch of the Academy of Sciences of the SSSR)

SUBMITTED: 28Feb63   ENCL: 00

SUB CODE: MM   NR REF SOV: 005   OTHER: 006

Card 2/2

ACCESSION NR: AP4009350   S/0078/64/009/001/0140/0146

AUTHORS: Shtol'ts, A. K.; Gel'd, P. V.; Zagryazhskiy, V. L.

TITLE: Area of homogeneity and structure of the hexagonal beta-phase of the Fe-Ge system

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 1, 1964, 140-146

TOPIC TAGS: iron germanium system, beta-phase, x-ray analysis, thermal analysis, metallographic analysis, crystal structure, lattice structure

ABSTRACT: The temperature-concentration area of homogeneity of the hexagonal beta-phase of the Fe-Ge system was defined by x-ray, metallographic and thermal analyses (fig. 1). The effect of composition on the parameters of the lattice of $Fe_{2+y}Ge_{2+x}$ (y is more than 0 and x is either more or less than 0) was studied (fig. 2). From these and densitometric results it was established that the beta-phase is a solid solution, the manner of filling the elementary cell changing with composition: when Fe content is less than 62.5% solution occurs by "introduction and substitution"; when Fe is more

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ACCESSION NR: AP4009350

than 62.5%, by "introduction and subtraction"; and only when Fe = 62.5% is the phase formed in which part of the Fe atoms are embedded in the vacant tetrahedral interstices. Orig. art. has: 3 Tables, 4 Figures and 1 Equation.

ASSOCIATION: None

SUBMITTED: 10Dec62

DATE ACQ: 07Feb64   ENCL: 02

SUB CODE: ML

NR REF SOV: 005   OTHER: 005

Card   2/4

S/0078/64/009/005/1182/1186

ACCESSION NR: AP4036970

AUTHOR: Dubrovskaya, L. B.; Shveykin, G. P.; Gel'd, P. V.

TITLE: The Ta-Ta sub 2 O sub 5 system

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 5, 1964, 1182-1186

TOPIC TAGS: Ta Ta sub 2 O sub 5 system, lower tantalum oxide, tantalum pentoxide, sintering, metallothermal reduction, carbon reduction, high temperature Ta sub 2 O sub 5, low temperature modification Ta sub 2 O sub 5, tantalum carbide, tantalum oxychloride

ABSTRACT: The preparation of lower tantalum oxides was attempted by reduction of Ta_2O_5 with carbon, by fusion with Ta and by sintering with tantalum hydride. X-ray analysis of the metallothermal and carbon reduction products of Ta_2O_5 indicated the absence of any lower oxides in the $Ta-Ta_2O_5$ system above 1650C. Sintering with tantalum hydride at 1560 gave the high temperature modification of Ta_2O_5 and a solid solution of oxygen in tantalum. Carbon reduction at 1700C results in the product consisting of Ta_2O_5 and Ta_2C, formed through the intermediate tantalum oxychloride $Ta_2C_xO_y$ which is more stable below 1700C. Metallo-

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ACCESSION NR: AP4036970

graphic and x-ray analyses of tantalum melts with oxygen showed the Ta-O system has a simple eutectic fusion diagram with the eutectic point approximating the empirical "TaO" composition. Samples prepared by additional annealing for 500 hours at 1050C in a sealed quartz ampoule and subsequent water quenching did not show any changes in the phase structure. The high temperature modification of Ta_2O_5 was readily converted to the low-temperature modification by annealing below 1320C, but the low temperature could not be converted to the high temperature modification even on heating to fusion. Orig. art. has: 1 figure and 1 table.

ASSOCIATION: None

SUBMITTED: 12Oct63   DATE ACQ: 05Jun64   ENCL: 00

SUB CODE: MM, IC   NO REF SOV: 004   OTHER: 012

Card 2/2

DUBROVSKAYA, L.B.; SHVEYKIN, G.P.; GEL'D, P.V.

  Phase components of the system tantalum - carbon. Fiz. met. i metalloved.
  17 no.1:73-77 Ja '64.   (MIRA 17:2)

  1. Institut khimii Ural'skogo filiala AN SSSR i Ural'skiy politekhniches-
  kiy institut im. S.M.Kirova.

KORSHUNOV, V.A.; GEL'D, P.V.

Character of defects in the lattice of higher manganese silicides. Fiz.
met. i metalloved. 17 no.2:292-293 F '64.   (MIRA 17:2)

1. Ural'skiy politekhnicheskiy institut imeni Kirova.

S/0126/64/017/003/0469/0470

ACCESSION NR: AP4029007

AUTHOR: Shteynberg, M. M.; Gol'tsov, V. A.; Gel'd, P. V.; Zhuravlev, L. G.

TITLE: A change in the mechanical properties of austenite and the parameters of its hydrogen permeability as a result of phase cold hardening in γ → ε → γ conversion

SOURCE: Fizika metallov i metallovdeneiye, vol. 17, no. 3, 1964, 469-470

TOPIC TAGS: austenite, hydrogen permeability, mechanical properties, phase cold hardening, γ → ε → γ conversion

ABSTRACT: In a previous paper, the authors have shown that phase cold hardening in a γ → ε → γ conversion increases substantially the activation energy and the pre-exponential multiplier of the process of hydrogen penetration in manganese austenite. Similar properties of hydrogen permeability may be satisfactorily explained provided that the defects of the crystal lattice are contained in hydrogen "traps," in the vicinity of which the elementary act of diffusion becomes complex. A description of the experiment is given; the results are plotted on a graph; the result of phase conversion changed not only the mechanical, but also the diffusion properties of austenite. Changes may also be expected in many of its other physical properties.

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ACCESSION NR: AP4029007

The concept of "phase cold hardening" should be considered in a much broader form than simple mechanical hardening during phase conversions. Orig. art. has: 1 figure.

ASSOCIATION: Ural'skiy politekhnicheskiy institut im. S.M. Kirova (Ural Polytechnical Institute)

SUBMITTED: 10Jly63   DATE ACQ: 27Apr64   ENCL: 00

SUB CODE: ML   NO REF SOV: 002   OTHER: 000

Card 2/2

ZYTKIN, I.M.; SHICHENKO, F.A.; GEL'D, P.V.

Stability of the superlattice of Fe_3Si at high temperature.
Fiz. met. i metalloved. 18 no.6:940-941 D '64.
(MIRA 18:3)

1. Ural'skiy politekhnicheskiy institut imeni Kirova.

L 8653-65   EWT(m)/EWP(b)   IJP(c)   JD

ACCESSION NR: AP4044447   S/0076/64/038/008/2067/2070

AUTHOR: Shtol'ts, A. K.; Gel'd, P. V.   B

TITLE: Iron monogermanide FeGe

SOURCE: Zhurnal fizicheskoy khimii, v. 38, no. 8, 1964, 2067-2070

TOPIC TAGS: iron germanium alloy, iron germanium compound, iron
monogermanide, iron oligermanide

ABSTRACT: Four iron-germanium alloys containing 49, 50, 51, and 60
wt% Ge were investigated in order to verify the existence of a pre-
viously unknown iron germanide. The alloys were melted from single-
crystal germanium and 99.9%-pure iron in an argon atmosphere under
pressure of 0.1 mm Hg. The specimens were homogenized and annealed
in a vacuum of 10^{-3} mm Hg. for 100 hrs at 800C and then for 50 hrs at
600C. Metallographic examinations and x-ray diffraction patterns of
specimens after the first annealing revealed two known intermetallic
compounds, Fe_2Ge and $FeGe_2$. After the second annealing the alloys
with 49—51% Ge consisted of one phase, the FeGe compound. This

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L 8653-65

ACCESSION NR: AP4044447

compound was also found in alloys with 60% Ge. The FeGe compound has a hexagonal lattice with parameters $a = (4.999 \pm 0.002)$kx and $c = (4.046 \pm 0.003)$kkx and forms a peritectoid reaction at a temperature of about 600C. Orig. art. has: 2 figures, 1 table, and 3 formulas.

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Ural Polytechnic Institut).

SUBMITTED: 06Jul63   ATD PRESS: 3111   ENCL: 00

SUB CODE: MM   NO REF SOV: 000   OTHER: 003

Card 2/2

L 61919-65   EWT(m)/T/EWP(t)/EWP(b)/EWA(c)   IJP(c)   JD

ACCESSION NR: AP5016349   UR/0149/65/000/002/0120/0126

669.017.12

AUTHOR: Shtol'ts, A. K.; Gel'd, P. V.; Zagryazhskiy, V. L.

TITLE: Phase diagram of the iron-germanium system

SOURCE: IVUZ. Tsvetnaya metallurgiya, no. 2, 1965, 120-126

TOPIC TAGS: iron alloy, germanium alloy, iron compound, germanium compound, phase diagram

ABSTRACT: About 70 Fe-Ge alloys were prepared by vacuum fusion, homogenized at a high temperature for 100 hr, and studied by using x-ray diffraction and metallographic, densitometric, thermomagnetic, and thermal analyses. In addition, the electrical resistivity, thermoemf, and microhardness of most of the alloys were measured. It was found that the Fe-Ge system contains nine (not five) phase components, viz.: solid solutions of germanium in α and γ iron, six intermetallic compounds ($Fe_{3.25}Ge$, Fe_3Ge, Fe_5Ge_3, $Fe_{11}Ge_9$, $FeGe$, and $FeGe_2$), and germanium alloyed with iron. After annealing, the solid solutions exhibit a tendency toward ordering at temperatures below $1000°$ C: a crystal lattice of BiF_3-type (space group O_h^5) is

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L 61919-65

ACCESSION NR: AP5016349

formed with constant $\alpha = 5.75_4$ kX. The behavior and properties of the phases $Fe_{3.25}Ge$, Fe_5Ge_3, and $FeGe_2$ is described. On the basis of the data obtained and results of other studies, the authors have plotted a new variant of the phase diagram of the Fe-Ge system (see Fig. 1 of the Enclosure). The diagram requires further refinements and verification. Orig. art. has: 6 figures.

ASSOCIATION: Fiziko-tekhnicheskiy fakul'tet, Ural'skiy politekhnicheskiy institut (Physicotechnical Department, Ural Polytechnic Institute)

SUBMITTED: 15Jan64   ENCL: 01   SUB CODE: MM

NO REF SOV: 006   OTHER: 011
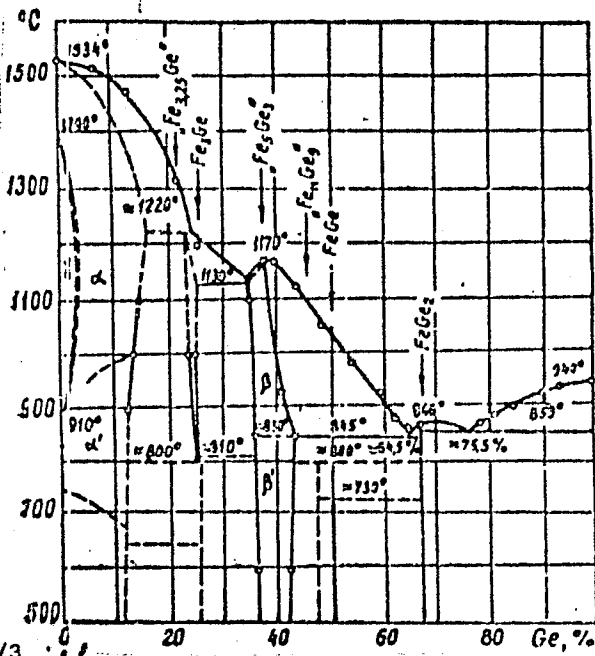
Card 2/3

Fig. 1. Refined version of phase diagram of the Fe-Ge system

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L 33515-65   EWT(m)/EPF(n)-2/EPR/EWG(m)/EWP(e)/EWP(t)/EWP(b)   Ps-4/Pu-4   IJP(c)
JD/JG/AT/WH

ACCESSION NR: AP5006190   S/0226/65/000/002/0033/0040

AUTHOR: Radovskiy, I. Z.; Shubina, T. S.; Gel'd, P. V.; Sidorenko, F. A.   31

TITLE: Magnetic susceptibility of chromium silicides   30

SOURCE: Poroshkovaya metallurgiya, no. 2, 1965, 33-40   B

TOPIC TAGS: magnetic susceptibility, chromium inorganic compound, silicide, semi-
conductor property

ABSTRACT: Chromium silicides were selected for research because of their infusi-
bility, thermal stability and extreme hardness and because of the semiconductor
properties of the bisilicide. There are four intermetallic compounds in the
chromium-silicon system: Cr_3Si, Cr_5Si_3, $CrSi$ and $CrSi_2$. Unfortunately, little
attention has been given to their physical properties. In the studies which have
been made, there is disagreement among the authors as to the value of the magnetic
susceptibility of the lower chromium silicides. This is apparently due to poor
control of the quality and phase state of the specimens. The effect of temperature
on the magnetic susceptibility of the four intermetallic compounds was studied in
the 20-800°C range. It was found that the Curie-Weiss law is true for chromium

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L 33515-65
ACCESSION NR: AP5006190

monosilicide, while the susceptibility of the other compounds is dependent on temperature.

ASSOCIATION: Ural'skiy politekhnicheskiy institut im. S. M. Kirova (Ural Polytechnic Institute)

SUBMITTED: 05Dec63

ENCL: 00

SUB CODE: EM

NO REF SOV: 014

OTHER: 006

Card 2/2

L 00089-66   EWT(m)/EWP(t)/EWP(b)   IJP(c)   JD/JW/JG

ACCESSION NR: AP5022337   UR/0149/65/000/003/0077/0081

669.292

AUTHOR: Volkova, N. M.; Gel'd, P. V.

TITLE: Heats of formation of the lower carbides of vanadium

SOURCE: IVUZ. Tsvetnaya metallurgiya, no. 3, 1965, 77-81

TOPIC TAGS: heat of formation, carbide, vanadium, carbon, crystal structure, vanadium pentoxide

ABSTRACT· Starting material for the tests was metallic vanadium purified by electric furnace melting. The impurity content was : 0.03% carbon, 0.03% oxygen, 0.005% nickel, and iron and silicon each less than 0.01%. The lower carbides of vanadium were synthesized at a temperature of 1950 K for fifteen hours from a briquetted mixture of finely ground vanadium oxides and carbon black. Chemical analysis for vanadium was done by combustion at the oxygen point at 1220 K, and for the content of bound carbon by the weight method. The oxygen content was determined by the difference. Heats of combustion and heats of formation from the elements were determined for carbides of vanadium with compositions ranging from $VC_{0.418}O_{0.018}$ to $VC_{0.698}O_{0.006}$ and are shown in tabular form. X-ray

Card 1/2

L 00089-66
ACCESSION NR: AP5022337

analysis showed that, with the same chemical composition, the lower carbides of vanadium can exist with different crystal lattices: hexagonal or rhombic. Study of the heats of combustion of very pure vanadium gave a value of 77.5±3 kilojoules/gram-atom of vanadium for the change in enthalpy during the formation of vanadium pentoxide from its elements. It was established that there is a possibility of a distortion of the hexagonal lattice of the lower carbide of vanadium into a rhombic lattice. Based on the experimental data, the article advances an equation for the dependence of the heat of formation of the carbide from its elements on its chemical composition. Orig. art. has: 6 formulas, 2 figures, and 2 tables

ASSOCIATION: Institut khimii Ural'skogo filiala AN SSSR (Institute of Chemistry of the Ural Branch, AN SSSR)

SUBMITTED: 16Jan64   ENCL: 00   SUB CODE: MM, TD

NR REF SOV: 006   OTHER: 002

Card 2/2

L 56056-65   EWT(m)/EPF(c)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b)/EWA(c)   Pr-4
IJP(c)   MJW/JD/JW

SION NR: AP5010552   UR/0129/65/000/004/0010/0014
                              669.15-194:669.26'24'28:539.217.5
AUTHOR: Gel'd, P. V.; Gol'tsov, V. A.; Kvater, L. I.; Sklyuyev, P. V.

TITLE: Effect of structure on the hydrogen permeability of steel

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 4, 1965, 10-14

TOPIC TAGS: steel structure, steel hydrogen permeability, steel heat treatment,
granular cementite, lamellar carbide / 80KhNM steel, 34KhNM steel

ABSTRACT: Hydrogen permeability was studied at 280-900C on samples of 34KhNM
steel (0.36% C, 1.59% Cr, 1.48% Ni, 0.22% Mo) and 80 KhNM steel (0.79% C, 1.01%
Cr, 1.03% Ni, 0.15% Mo). Suitable heat treatments produced initial structures
of martensite, bainite, and pearlite in the two steels. The latter were then
subjected to further heat treatments during which the hydrogen permeability was
studied by phase analysis and measurements of the activation energy of the hy-
drogen penetration. The results obtained for both types of steel were quali-
tatively similar: in both cases, in samples with the initial structure of
martensite and bainite, brief annealing caused a decrease in permeability, which
then increased with the holding time. However, owing to the fact that the carbon

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L 56056-65
ACCESSION NR: AP5010552

content of 80KhNM steel is higher, the effect of structure on the hydrogen per-
meability is more pronounced. Thus, upon the solidification of carbides and
formation of granular cementite, the permeability of 34KhNM steel increased by
30-50%, whereas that of 80KhNM steel increased by almost 200%. The structure
most permeable to hydrogen was found to be that of granular cementite. The
higher the carbon content, the more the permeability increases when the lamellar
form of carbides is converted to the granular form. Orig. art. has: 2 figures.

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Ural'sk Polytechnic In-
stitute); Uralmashzavod

SUBMITTED: 00   ENCL: 00   SUB CODE: MM

NO REF SOV: 003   OTHER: 000

Card 2/2

L 56054-65   EWT(m)/EPF(c)/EWA(d)/T/EWP(t)/EWP(k)/EWP(:)/EWP(b)/EWA(c)
Pf-4/Pr-4/Pad.   IJP(c)   JD/JW/HW
ACCESSION NR: AP5010553   UR/0129/65/000/004/0014/0017
                                539.217.5:669.15-194:669.24

AUTHOR: Gol'tsov, V. A.; Gel'd, P. V.; Shteynberg, M. M.

TITLE. Effect of external and phase work-hardening on the rate of penetration of hydrogen into ferrite

SOURCE. Metallovedeniye i termicheskaya obrabotka metallov, no. 4, 1965, 14-17

TOPIC TAGS: work hardening, nickel ferrite, nickel alloy, phase hardening, alloy structure, ferrite phase composition, hydrogen permeability, ferrite heat treatment, plastic deformation, ferrite crystal lattice

ABSTRACT: An iron-nickel alloy (6.24% Ni, 0.11% C, 0.52% Mn, 0.04% Cr, 0.05% Si, 0.023% P, 0.024% S) prepared in a high-frequency induction furnace was studied. Experiments showed that the $\alpha \rightarrow \gamma$ transformation occurs at 620-750C. The effect of compressive deformation and quenching from the γ region from 1000C on the hardening of the alloy and the effect of subsequent annealing on its softening were studied. The penetration of hydrogen into the deformed ferrite up to 575C is characterized by an activation energy that is 13% higher than in the case of annealed ferrite. Cold plastic deformation and phase work-hardening raise the

Card   1/2

L 56054-65

ACCESSION NR: AP5010553

Activation energy, and the preexponential factor in the expression for the temperature dependence of hydrogen penetration also increases. The increase in the parameters of hydrogen penetration is promoted by crystal lattice defects, which apparently act as collectors (traps) of hydrogen. The change in the diffusion constants of hydrogen penetration is reversible; annealing at 450-600C decreases them, and subsequent hardening increases them again. The temperature interval of fast mechanical softening of nickel ferrite and the interval of rapid change in its hydrogen permeability do not coincide. Orig. art. has: 4 figures.

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Ural'sk Polytechnic Institute)

SUBMITTED: 00   ENCL: 00   SUB CODE: MM

NO REF SOV: 006   OTHER: 000

Card 2/2

L 01795-66   EWT(m)/EWP(w)/EPF(c)/T/EWP(t)/EWP(z)/EWP(b)/EWA(c)   IJP(c)   JD/JW/
JWW/CL
ACCESSION NR: AP5020979   UR/0148/65/000/008/0102/0107

AUTHOR: Kosheleva, V. Yu.; Gel'd, P. V.; Gol'tsov, V. A.

TITLE: Effect of phase hardening on the hydrogen permeability of an iron-nickel
alloy
SOURCE: IVUZ. Chernaya metallurgiya, no. 8, 1965, 102-107

TOPIC TAGS: iron nickel alloy, metal hardening, hydrogen, permeability mea-
surement, hydrogen permeability, solid mechanical property, temperature depend-
ence, electric resistance, crystal lattice defect

ABSTRACT: A study was made of the temperature dependence (20-1110 C) of the
hydrogen permeability, the yield and tensile strengths, and the hardness of an
Fe-Ni alloy (28.6% Ni) in equilibrium and hardened conditions. Phase hardening
of the Ni austenite significantly increased its hydrogen permeability and the ener-
gy of activation E of this process: at 350-390 C, E ($\approx$45 kcal/mol) was about
1.5 times greater than E for austenite in equilibrium conditions. Recovery of the
diffusion characteristics of the alloy was especially intense in the 400-500 C
range. Increasing the annealing temperature further to 700-850C had little effect
Card 1/2

L 01795-6:

ACCESSION NR: AP5020979

on permeability and E. Phase hardening significantly increased yield strength, tensile strength and hardness, but had only a little effect on the modulus of elasticity of the alloy. Recovery of mechanical characteristics developed strongly at ~600-700C. The increase in electric resistance with temperature increase of the phase hardened austenite stopped at about 440 C. The coincidence of the recovery of electric resistance and hydrogen permeability is attributed to the possible hypersensitivity of these processes to similar defects. The mechanical and diffusion characteristics are sensitive to different defects in the crystal lattice. The first is apparently determined by the subgrain structure while the second is determined by the nature and distribution of vacancies, dislocations and other similar defects in the crystal lattice. Orig. art. has: 3 figures

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Ural Polytechnical Institute)

SUBMITTED: 11Jul64   ENCL: 00   SUB CODE: MM, SS

NR REF SOV: 008   OTHER: 001

Card 2/2

L 4026-66   EWT(m)/EWP(t)/EWP(b)   IJP(c)   JD
ACCESSION NR: AP5022254   UR/0363/65/001/007/1062/1064
                                             546.882'261:538

AUTHOR: Matveyenko, I. I.; Dubrovskaya, L. B.; Gol'd, P. V.; Tretnikova, M. G.

TITLE: Magnetic susceptibility of cubic niobium carbide

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 7, 1965,
1062-1064

TOPIC TAGS: niobium compound, carbide, magnetic susceptibility

ABSTRACT: Samples of niobium carbide NbC_x were synthesized from $NbC_{0.45}$ and
carbon black; the homogenized preparations contained from 8.28 to 11.22 wt.%
of chemically bound carbon and had a single phase, i.e., the composition ranged
from $NbC_{0.70}$ to $NbC_{0.98}$. Measurements of their magnetic susceptibility (χ) were
made between room temperature and 1000C. The data show that χ and its tempera-
ture coefficient $\frac{d\chi}{dT}$ change substantially with the composition of niobium
carbide. In the region of homogeneity of cubic niobium carbide ($NbC_{0.70}$ -
$NbC_{0.98}$), χ changes with the composition in a complex fashion, exhibiting a
maximum of diamagnetism in the vicinity of $NbC_{0.80}$. The temperature coefficient

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L 4026-66
ACCESSION NR: AP5022254

$\frac{d\chi}{dT}$ is positive over the entire region of homogeneity, but its value changes

monotonically with the composition, decreasing as the stoichiometric composition NbC is approached. The experimental data obtained are explained with the aid of a model proposed by H. Bilz (Z. Phys., 153, 338, 1958), involving M-C and M-M bands in the energy spectrum of electrons in carbides, and by applying the basic tenets of the electron theory of metals (magnetism of the gas of conduction electrons) to the M-M band. Orig. art. has: 3 figures and 1 formula.

ASSOCIATION: Institut khimii, Sverdlovsk (Institute of Chemistry)

SUBMITTED: 26Mar65   ENCL: 00   SUB CODE: IC, EM

NO REF SOV: 003   OTHER: 003

Card 2/2

L 45631-65   EWT(m)/EPF(c)/EPR/EWP(j)/T/EWP(t)/EWP(b)/EWA(c)   Pc-4/Pr-4/Ps-4/Pi-4
IJP(c)/RPL   JD/WW/JW/RM
ACCESSION NR: AP5006468   8/0294/65/003/001/0047/0056

AUTHOR: Letun, S. M.; Gel'd, P. V.

TITLE: Some thermodynamic characteristics of solid and liquid Mn_5Si_3

SOURCE: Teplofizika vysokikh temperatur, v. 3, no. 1, 1965, 47-56

TOPIC TAGS: manganese silicide, liquid state, solid state, thermodynamic property,
entropy, enthalpy, specific heat

ABSTRACT: The silicide Mn_5Si_3 is the main component of commercial silicomanganese,
but its thermodynamic properties have been little investigated. The published data
on the specific heat and enthalpy of solid Mn_5Si_3 at high temperatures are contra-
dictory, and there are none for low temperatures. The authors have therefore in-
vestigated the specific heats and the variation of the enthalpy and entropy of the
substance between 54.31 and 1873.15K. The method of preparing the samples from
pure manganese and pure single-crystal silicon is described briefly. The equipment
used for the measurements was described earlier (Izv. vyssh. uchebn. zaved. Cherna-
ya metallurgiya no. 11, 12, 1962). The reduction of the experimental data is de-

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L 45631-65

ACCESSION NR: AP5006468   /

scribed in detail. The results are tabulated and show that Mn_5Si_3 experiences a
second-order phase transition at 63.6K. The heat of melting determined from the
data was much lower than that called for by the additivity rules. This is attrib-
uted to the fact that melting is accompanied by an appreciable change in the nature
of the interparticle interaction in the near-order structure, with intensification
of the homopolar bonds and formation of the quasi-molecule MnSi. Published data on
the thermodynamic properties of the substance are compared and it is shown that
some are in appreciable error. Orig. art. has: 3 figures, 9 formulas, and 3 tables.

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Ural Polytechnic Institute)

SUBMITTED: 16Jun64   ENCL: 00   SUB CODE: TD, SS

NR REF SOV: 012   OTHER: 006

b/o
Card 2/2

ANDREYEVA, L.P.; GEL'D, P.V.

Coefficients of thermal expansion and modulus of elasticity in iron silicides. Izv. vys. ucheb. zav.; chern. met. 8 no.2:111-117 '65.   (MIRA 18:2)

1. Ural'skiy politekhnicheskiy institut.

MAL'TSEV, L...; MEYER... ... .; SMITH, L.L.

Magnetic susceptibility of Mn$_5$Si$_3$ and Cr$_5$Si. Inv. vys. uchet. zav.;
fiz. 8 no.3:124-125 '65.   (MIRA 18:9)

1. Ural'skiy politekhnicheskiy institut imeni S.M.Kirova.

LETUN, S.M.; GEL'D, P.V.; SEREBRENNIKOV, N.N.

Thermodynamic characteristics of manganese monosilicide. Izv.vys. ucheb.zav.; chern. met. 8 no.4:5-12 '65.

(MIRA 18:4)

1. Ural'skiy politekhnicheskiy institut.

ADAMESKIJ, R.A.; UFIMTSEVA, M.P.; KUDRYAVTSEV, I.P.; GEL'D, P.V.

Texture formation furing the annealing of strongly deformed silicon iron. Izv. vys. ucheb. zav.; chern. met. 8 no.5:133-139 '65.   (MIRA 18:5)

1. Ural'skiy politekhnicheskiy institut.

RADOVSKIY, I.Z.; SIDORENKO, F.A.; GEL'D, I.Z.

Magnetic susceptibility and valent state of the atoms of
manganese in its highest silicide. Fiz. met. i metalloved.
19 no.4:514-520 Ap '65.   (MIRA 18:5)

1. Ural'skiy politekhnicheskiy institut imeni Kirova.

ALAMPSKU, R.A.; KUDRYAVTSEV, I.P. (deceased); FATTENSON, I.M.; FLID, P.V.

Characteristics of texture formation during the cold working
of silicon iron with low and medium degrees of deformation.
Izv. vys. ucheb. zav.; chern. met. 8 no.10:106-109 '65.
(MIRA 18:9)

1. Ural'skiy politekhnicheskiy institut.

L 29520-65   EWG(j)/EWT(m)/EPF(c)/EPF(n)-2/EPR/EWP(t)/EWP(b)   Pr-4/Ps-4/Pu-4
IJP(c)   JD/JG

ACCESSION NR: AP5002811   s/0078/65/010/001/0302/0303

AUTHOR: Alyamovskiy, S. I.; Shveykin, G. P.; Gel'd, P. V.

TITLE: Higher niobium oxides

SOURCE: Zhurnal neorganicheskoy khimii, v. 10, no. 1, 1965, 302-303

TOPIC TAGS: niobium dioxide, niobium pentoxide, higher niobium oxide

ABSTRACT: A study of 11 samples ranging from $NbO_{2.09}$ to $NbO_{2.19}$ in gross composition was carried out with the aim of finding intermediate niobium oxides in the NbO_2-Nb_2O_5 system. An x-ray analysis with a powder camera 143.3 mm in diameter shows that the system contains not only NbO_2 and a high-temperature modification of Nb_2O_5, but also two other niobium oxides one of which is predominant in the $NbO_{2.34}$ -$NbO_{2.41}$ range and the other in the $NbO_{2.45}$-$NbO_{2.48}$ range. The composition of the first is well described by the formula $NbO_{2.40}$ and of the second by the formula $NbO_{2.46}$. The system of lines on the x-ray picture of the two new niobium oxides is very similar to that of the high-temperature modification of Nb_2O_5, indicating that these three niobium oxides have a very similar structure. But the substantial displacement of the analogous lines in the small angles indicates that the new niobium oxides are of an independent nature. The distinct individuality of the new,

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L 29520-65

ACCESSION NR: AP5002811

niobium oxides is confirmed by a qualitative spectral analysis. Orig. art. has: 1 figure.

ASSOCIATION: Institut khimii Ural'skogo filiala Akademii nauk SSSR (Chemistry Institute, Ural Branch, Academy of Sciences, SSSR)

SUBMITTED: 23May64   ENCL: 00   SUB CODE: IC, OP

NO REF SOV: 002   OTHER: 005

Card   2/2

LEVIN, S.M., SEL'D, A.V., GORELANIKOV, N.N.

Thermodynamic characteristics of manganese silicides. Zhur.
neorg. khim. 10 no.5:1250-1264 My '65.   (MIRA 18:6)

L 61077-65   EWA(c)/EWT(m)/EWP(b)/T/EWP(t) —IJP(c)   JW/JL/JG

ACCESSION NR: AP5018257   UR/0078/65/010/007/1758/1758
                                           546.881'26
                                                                       25
                                                                       23
                                                                       B

AUTHOR: Volkova, N. M.; Gel'd, P. V.; Alyamovskiy, S. I.

TITLE: Phase transformation of higher vanadium carbide

SOURCE: Zhurnal neorganicheskoy khimii, v. 10, no. 7, 1965, 1758

TOPIC TAGS: vanadium carbide, carbide phase transformation

ABSTRACT: In a study of the concentration – temperature dependence of the
enthalpy of the phase components in the V - C system, the following interesting
fact was observed: the monotonic increase in the ΔH of samples of the higher
δ' carbide ($VC_{0.889}$) at approximately 1120C was replaced by a fairly large
jump, after which ΔH increased in proportion to the temperature. At 1120C,
the δ' carbide undergoes a transformation associated with an increase in enthalpy
amounting to about 45 kJ/kg (665 cal/mole). The transformation is thought to
be polymorphic in character. This is supported by calorimetric observations
and the reproducibility of the data. X-ray diffraction analysis of samples
annealed and quenched from various temperatures (from 800 to 1700C) showed no

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L 61077-65   2

ACCESSION NR: AP5018257

differences in the type or parameter of the lattice ($a = 4.159$ kX), excluding the possibility of formation of peritectoid or related transformations. The polymorphic transformation observed should be investigated by direct high-temperature x-ray analyses. Orig. art. has: 1 figure.

ASSOCIATION: Institut khimii Ural'skogo filiala Akademii nauk SSSR (Institute of Chemistry, Ural'sk Branch, Academy of Sciences, SSSR)

SUBMITTED: 07Jan65   ENCL: 00   SUB CODE: IC, MM

NO REF SOV: 001   OTHER: 000

Card 2/2

KRENTSIS, R.P.; RADOVSKIY, I.Z.; GEL'D, P.V.; ANDREYEVA, L.P.

Phase conversion of Mn_5Si_3. Zhur. neorg. khim. 10 no.9:2192-2193
S '65.   (MIRA 18:10)

GEL'D, P.V.; ANDREYEVA, L.P.

Certain characteristics of the α-phase in the system Fe - Si.
Fiz. met. i metalloved. 19 no.1:70-77 Ja '65.   (MIRA 18:4)

1. Ural'skiy politekhnicheskiy institut imeni Kirova.

ADAMESKU, R.A.; KUDRYAVTSEV, I.P.; GOLUBEVA, O.A.; GEL'D, P.V.

Certain characteristics of the formation of recrystallization textures in cold-rolled silicon iron with a high degree of deformation. Fiz. met. i metalloved. 19 no.3:432-438 Mr '65. (MIRA 18:4)

1. Ural'skij politekhnicheskiy institut imeni Kirova.

SHUBINA, T.S.; SIDORENKO, F.A.; GEL'D, P.V.

Magnetic susceptibility and valent state of iron monosilicide
atoms. Fiz. met. i metalloved. 19 no.4:544-549 Ap '65.
(MIRA 18:5)

1. Ural'skiy politekhnicheskiy institut imeni Kirova.

RADOVSKIY, I.Z.; SIDORENKO, F.A.; GEL'D, P.V.

Magnetic susceptibility and valency of the atoms of chromium and its bisilicide. Fiz. met. i metalloved. 19 no.6:915-922 Je '65. (MIRA 18:7)

1. Ural'skiy politekhnicheskiy institut imeni Kirova.

L 1352-66   EWT(m)/EWP(t)/EWP(b)   IJP(c)   JD/JG

ACCESSION NR: AP5021935

UR/0126/65/020/002/0243/0250
537.311+669.018.4

AUTHOR: Dubrovskaya, L. B.; Matveyenko, I. I.; Gel'd, P. V.

TITLE: Effect of temperature and composition on the electric conductivity of β- and γ-phases of the tantalum-carbon system

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 2, 1965, 243-250

TOPIC TAGS: tantalum compound, carbide, electric conductivity, carbide phase, carbon, electron mobility

ABSTRACT: The temperature and concentration dependencies of the electric resistance of tantalum carbides were measured in the range of compositions $TaC_{0.21}$-$TaC_{1.22}$ and temperatures 80-1500°K. Specimens of the carbides were prepared by high-temperature sintering (at 2200°C) of briquets from carefully mixed powders of pure tantalum and carbon black. The low-temperature measurements (80 to 300°K), were performed by means of electrodeless methods (electric conductivity was determined by measuring the torque on a cylindrical specimen placed in a rotating magnetic field). Findings: the temperature dependence of the carbides of all the investigated compositions, except the maximally carbon-saturated monocarbide (of the γ-phase) of

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L 1352-66

ACCESSION NR: AP5021935

the composition $TaC_{0.98}$, is nearly linear, characteristic of metals, which indicates a low temperature sensitivity of the energy spectrum of electrons in the carbides. As for the concentration dependence of the electric conductivity of β- and γ-phases of the Ta-C system, this is determined by the relative role of two factors: the variation in the electron concentration within the conduction band (Me-Me band) and the variation in electron mobility with decreasing concentration of vacancies in the carbon sublattices of these carbides. Thus, the appearance of a defect in the carbon sublattice is accompanied by a decrease in the number of the valence electrons of Ta atoms participating in the bondings with C atoms. As a result, the electron concentration in the Me-Me band, which is responsible for the electric conductivity of the carbide, increases.

ASSOCIATION: Institut khimii UFAN SSSR (Institute of Chemistry UFAN SSSR)

SUBMITTED: 19Jan65   ENCL: 00   SUB CODE: EM, NP

NO REF SOV: 013   OTHER: 006

Card 2/2

L 8094-66   EWT(m)/T/EWP(t)/EWP(z)/EWP(b)/EWA(c)   IJP(c)   JD/JL

ACC NR: AP5027136   SOURCE CODE: UR/0126/65/020/004/0524/0530

AUTHOR: Simakov, Yu. P.; Gel'd, P. V.; Steynberg, M. M.; Gol'tsov, V. A.

ORG: Ural Polytechnic Institute im. S. M. Kirov (Ural'skiy polite-khnicheskiy institut)

TITLE: The effect of ordering on the hydrogen permeability of Ni$_3$Mn

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 4, 1965, 524-530

TOPIC TAGS: permeability, hydrogen, nickel alloy, manganese alloy, ordered alloy

ABSTRACT: The alloy was melted in vacuum in an induction furnace from technically pure components and was poured (also in vacuum) into ingots with a cross section 40 x 40 mm. The ingots were annealed for one hour at 1100°C and forged into rods (30 x 30 mm). The alloy contained 24.82% manganese, 0.30% silicon, 0.05% carbon, 0.03% phosphorous, and 0.006% sulfur. The degree of ordering of the samples, subjected to different treatments, was evaluated on the basis of the results of dilatometric and magnetic tests. The hydrogen permeability was studied on film type samples by the steady state flow method. These studies showed that the ordering temperature of the alloy agreed well with

UDC: 519.12+669.788

Card 1/3

L 8094-66

ACC NR: AP5027136

literature data near 520°C. The kinetics of the ordering process of the alloy was further studied at various temperatures. Before the experimental tests, the diffusion samples were heated to 1000°, held at this temperature for one hour, quenched in water, and then ordered for 12 (or 100) hours at 460°. The hydrogen permeability was studied during stepwise heating (from 350 to 950°) and cooling. On heating from 350 to 400°, the hydrogen permeability of Ni_3Mn increases noticeably. Above 400°, the temperature coefficient of hydrogen penetration falls substantially, and near 450° returns to zero. Further increase in the temperature leads to a decrease in the hydrogen permeability, which reaches a minimum at 510-520°, that is near T_0. Further heating of the alloy is accompanied by a rapid increase in the hydrogen penetration rate. However, between 820 and 900°, there is observed a marked decrease in the hydrogen permeability, replaced at higher temperatures by an exponential rise of the hydrogen permeability with temperature. The anomalous changes in the hydrogen permeability of Ni_3Mn during heating and cooling are bound up with the destruction and formation of long-range order, and are determined by the kinetic characteristics of these processes. An ordered alloy has a higher hydrogen permeability than an unordered one. Above the temperature of the "order-unorder" transition, the rate of hydrogen penetration depends on the temperature in a complicated fashion and obeys an exponential

Card 2/3

L 8094-66

ACC NR: AP5027136   3

relationship only above 900°. It ean by assumed that the anomalous
changes in the hydrogen permeability above T_0 are bound up with the
nature of the short-range order, and with the degree of the defective-
ness of the lattice of the alloy. Orig. art. has: 3 figures.

SUB CODE: MM/ SUBM DATE: 30Nov64/ ORIG REF: 011/ OTH REF: 005

Card 3/3

RIKH..., ...

Effect of shielding on phase and structural properties of cubical carbides of the fifth group transition metals. Zhur. fiz. khim. 39 no.5:1150-1156 My '65. (MIRA 18:8)

L 11032-66   EWT(m)/EWP(t)/EWP(b)   IJP(c)   JD

ACC NR: AP5028722   SOURCE CODE: UR/0363/65/001/011/1917/1920

AUTHOR: Zagryazhskiy, V. L.; Shtol'ts, A. K.; Gel'd, P. V.

ORG: Ural Polytechnic Institute im. S. M. Kirov, Sverdlovsk (Ural'skiy politekhnicheskiy institut)

TITLE: Structure and some physical properties of the α and β phases of the Cr-Ge system

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 11, 1965, 1917-1920

TOPIC TAGS: chromium alloy, germanium alloy, solid solution, solution concentration, metal physical property, metal phase system

ABSTRACT: X-ray diffraction, metallographic, and densitometric investigations of a series of Cr-Ge alloys containing 2.0 to 31.0 at % Ge showed that substitutional solid solutions based on Cr and the intermetallic compound Cr_3Ge are formed. The concentration ranges of single-phase existence of these solutions at 1150°C extend approximately up to 3.0 at % Ge for the Cr-base solid solution (α phase) and from 23.1 to 25.7 at % Ge for the Cr_3Ge-base solid solution (β phase). The solubility of Ge in Cr at 1150°C is approximately 30%. Increase in the Ge content of the β phase is accompanied by a rise in thermo-emf and decreasing microhardness. Changes in the lattice constant a of the β phase and in the density of the alloys with changing germanium content were determined. Orig. art. has: 4 figures.

SUB CODE: 07,11/   SUBM DATE: 26May65/   ORIG REF: 002/   OTH REF: 002

UDC : 546.3-19'76'289

Card 1/1

ALYAMOVSKIY, S.I.; SHVEYKIN, G.P.; GEL'D, P.V.

    Higher niobium oxides. Zhur. neorg. khim. 10 no.1: 302-303
    Ja '65.   (MIRA 18:11)

    1. Institut khimii Ural'skogo filiala AN SSSR. Submitted
    May 23, 1964.

L 10430-66 EWT(d)/EWT(1)/EWT(m)/EPF(n)-2/EWF(t)/EWP(b) IJP(c) JD/WW

ACC NR: AP6000292 SOURCE CODE: UR/0078/65/010/009/2192/2193

AUTHOR: Krentsis, R.P.; Radovskiy, I.Z.; Gel'd, P.V.; Andreyeva, L.P.

ORG: none

TITLE: Phase transition of Mn_5Si_3

SOURCE: Zhurnal neorganicheskoy khimii, v. 10, no. 9, 1965, 2192-2193

TOPIC TAGS: electric conductivity, magnetic susceptibility, manganese compound, silicide, phase transition, temperature dependence, heat capacity

ABSTRACT: The magnetic susceptibility and electrical conductivity of Mn_5Si_3 were studied in the range of 20 — 300K. Measurements were taken on a pure, single-phase silicide sample annealed for 24 hr at 900C. The magnetic susceptibility was measured by the Faraday method in fields of 1000 Oe, and the electrical resistance by the standard compensation method. The results are shown in Fig. 1. The heat capacity values show distinct anomalies around 60K. The somewhat stretched temperature intervals of the anomalies of χ and ρ, which attain 20 degrees, are probably due to the fact that the measurements were taken under dynamic conditions. Above the transition point, the magnetic susceptibility of Mn_5Si_2 rapidly decreases with rising temperature; the Curie-Weiss law is followed closely in this region, and it follows that $\mu_{eff} = 3.9\mu_B$. The resistance grows fairly rapidly with temperature, indicating that the conduction is metallic in character. From the temperature dependence of the magnetic susceptibility it is concluded that the transition under consideration involves the breakdown of a weak ferromagnetic interaction and a change of the substance into the paramagnetic state.

UDC: 546.711'23
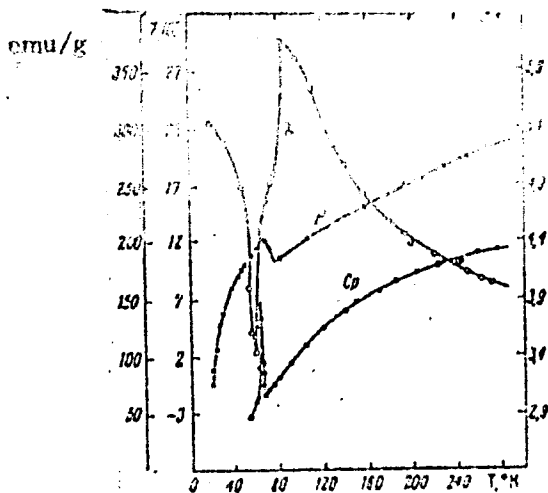
Card 1/2

Cp, J/mole deg

emu/g

μ·10⁴ ohm cm

Fig. 1.   Effect of temperature on the heat capacity, magnetic susceptibility, and electrical resistance of Mn_5Si_3.

Orig. art. has: 1 figure.

SUB CODE: 07 / SUBM DATE: 27Jan65 / ORIG REF: 004 / OTH REF: 001

Card 2/2

L 10852-66   EWP(e)/EWT(m)/EPF(n)-2/EWP(t)/EWP(b)   IJP(c)   JD/WW/JW/JWG

ACC NR: AP5025652   SOURCE CODE: UR/0080/65/038/010/2174/2181

AUTHOR: Lyubimov, V. D.; Gel'd, P. V.; Shveykin, G. P.; Alyamovskiy, S. I.

ORG: none

TITLE: Kinetics of the reduction of lower niobium oxides with carbon

SOURCE: Zhurnal prikladnoy khimii, v. 38, no. 10, 1965, 2174-2181

TOPIC TAGS: niobium compound, chemical reduction, carbon

ABSTRACT: Pressed NbO_2 + C and NbO + C powder mixtures were heated at 1200-1600°C, and the kinetics of reduction of NbO_2 and NbO were studied in a vaccum as a function of temperature, compacting pressure and presence of additives (K_2CO_3, Na_2CO_3, $CaCO_3$, TiO_2). The degree of reduction was studied as a function of temperature, time, type of carbon and amount of graphite. The reduction process was found to be complex. Under certain conditions, in addition to the usual two-stage mechanism of direct reduction, intermediate niobium carbides form. Because of its diffusive nature, the decomposition of these carbides is kinetically hindered to a considerable degree. While the initial stages of the interaction the rate-determining factor is the gasification of carbon, during the final stages the rate-determining processes involve diffusion. It is concluded that in order to accelerate the reduction, it is necessary to avoid the formation of niobium oxycarbides, e. g., by maintaining a high vacu-

UDC: 531.1+542.941+546.882

Card 1/2

L   10852-66

ACC NR: AP5025652

um in the vicinity of the reaction zones, i. e., in the microvolumes of the charge..
Orig. art. has: 6 figures, 1 table.

SUB CODE: 07/   SUBM DATE: 26Sep63/   ORIG REF: 016/   OTH REF: 003

HW

Card   2/2

ACC NR: AR6013658   SOURCE CODE: UR/0058/65/000/010/E009/E009

AUTHOR: Baum, B. A.; Gel'd, P. V.; Kocherov, P. V.; Knyshev, E. A.

TITLE: Viscosity of liquid chromium-silicon alloys

SOURCE: Ref. zh. Fizika, Abs. 10E64

REF SOURCE: Tr. Ural'skogo politekhn. in-ta, sb. 144, 1965, 136-139

TOPIC TAGS: fluid viscosity, silicon containing alloy, iron base alloy, chromium base alloy, liquid metal

TRANSLATION: Results of a study of the viscosity v of silicon and chromium and its silicides are given. Graphs of v vs alloy temperature are given. The anomalous change in the v of Si and $CrSi_2$ with increasing temperature ($\partial^2 v/\partial T^2 < 0$) is explained by changes in the nature of interparticle interaction and in the structure of these alloys. The viscosity properties of chromium-silicon and iron-silicon alloys are compared.

SUB CODE: 11

Card 1/1

ACC NR: AM6032822   Monograph   UR/

Yesin, Oleg Aleksandrovich; Gel'd, Pavel Vladimirovich   .

Physical chemistry of pyrometallurgical processes. pt. 2: Interac-
tions with the aid of fusions (Fizicheskaya khimiya pirometallurgiches-
kikh protsessov. ch. 2: Vzaimodeystviya s uchastiyem rasplavov) 2d
ed., rev. and enl. Moscow, Izd-vo "Metallurgiya," 1966. 702 p.
illus., biblio. Errata slip inserted. 6000 copies printed.

TOPIC TAGS: liquid metal, molten metal, refractory metal, slag, glass,
liquid metal property, slag property, glass property

PURPOSE AND COVERAGE: This book is intended for scientific workers
and engineers, as well as for students wishing to deepen and broaden
their knowledge of the theory of metallurigical processes. The book,
which is the second of two parts, examines the structural peculiari-
ties of liquid metals, glasses, and molten slags, equilibrium condi-
tions, the mechanism and speed of reaction of gasses with liquid
metals and slags, as well as of liquid metals with slags (desulphuri-
zation, dephosphorization, and decarbonization). In describing the
various reactions involving liquid phases, considerable attention is
devoted to their molecular-kinetic analysis. There are 1101 refer-
ences, 832 of which are Soviet.

Card 1/ 4   UDC: NONE

ACC NR: AM6032822

TABLE OF CONTENTS [abridged]:

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ACC NR: AM6032822

Card 3/4

ACC NR: AM6032822

SUB CODE: 07,11/ SUBM DATE: 11May66/ ORIG REF: 700/ OTH REF: 333/

Card 4/4

ACC NR: AP6036903   SOURCE CODE: UR/0226/66/000/011/0066/0071

AUTHOR: Zelenin, L. P.; Radovskiy, I. Z.; Sidorenko, F. A.; Gel'd, P. V.
Rabinovich, B. S.

ORG: Ural Polytechnic Institute im. S. M. Kirov (Ural'skiy politekhnicheskiy
institut)

TITLE: Structural peculiarities of solid solutions of chromium dicilicide with
vanadium and titanium dicilicides

SOURCE: Poroshkovaya metallurgiya, no. 11, 1966, 66-71

TOPIC TAGS: disilicide, solid solution, chromium vandium alloy, titanium solid.
solution, vanadium solid solution, vanadium disilicide, titanium disilicide,
chromium disilicide

ABSTRACT: An analysis was made of the region of solubility for vanadium and
titanium bisilicides in chromium bisilicide. It is shown that the chromium and
titanium bicilicides possess an inorganic mutual solubility in the solid state, while
the solubility of $TiSi_2$ in $CrSi_2$ exceeds 80 mol%. It is also established that the
solid solutions of VSi_2 and $TiSi_2$ in $CrSi_2$ have complete crystal lattices of the

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ACC NR: AP6036903

C-40 type, with three metal atoms and six atoms of silicon in unit cell. The volume of the unit cells increases with the increase of vanadium and titanium contents in the alloys. The imperfection of the solid solutions is noted and a hyphothesis of its causes is given. Orig. art. has: 3 figures and 2 tables.

[NT]

SUB CODE: 11/SUBM DATE: 10Nov65/ORIG REF: 006/OTH REF: 003/

Card 2/2

L 10346-67   EWT(m)/EWP(t)/ETI   IJP(c)   JD
ACC NR: AP6031596   SOURCE CODE: UR/0226/66/000/008/0055/0060

AUTHOR: Zagryazhskiy, V. L.; Shtol'ts, A. K.; Gel'd, P. V.; Kuz'menko,
N. V.   30

ORG: Ural Polytechnic Institute im. S. M. Kirov (Ural'skiy politekhni-
cheskiy institut)

TITLE: Phase diagram of the chromium-germanium system

SOURCE: Poroshkovaya metallurgiya, no. 8, 1966, 55-60

TOPIC TAGS: chromium germanium system, chromium germanium alloy,
alloy phase diagram, alloy phase composition, alloy structure, ALLOY
SYSTEM, CHROMIUM BASE ALLOY, GERMANIUM CONTAINING ALLOY

ABSTRACT: A phase diagram of the chromium-germanium system (see Fig. 1)
has been plotted on the basis of data obtained by physicochemical
analysis of about 50 alloys containing from 0 to 100 at.% chromium.
Alloys were melted from 99.98%-pure electrolytic chromium and 99.99%-pure
single-crystal germanium.   Five intermetallic compounds were identified:
$Cr_{11}Ge_{19}$, $CrGe$, $Cr_{11}Ge_8$, Cr_5Ge_3, and Cr_3Ge.   The first four compounds
are formed at 955, 1025, 1160 and 1250C respectively; the last one melts

Card 1/2
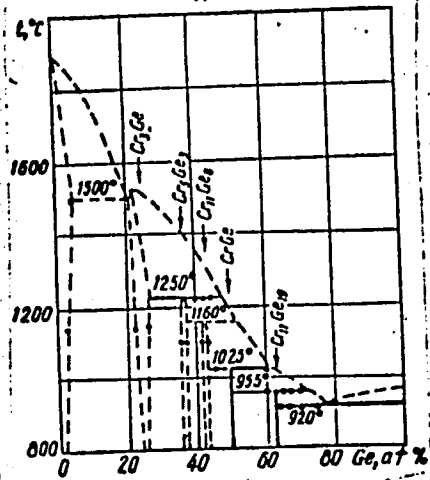
L 10346-67

ACC NR: AP6031596

Fig. 1.   Phase diagram of the chromium-germanium system

congruently. The alloy with 22 at% germanium has the highest melting point. Orig. art. has: 3 figures.   [TD]

SUB CODE: 11/   SUBM DATE: 14Apr66/   ORIG REF: 005/   OTH REF: 005

L 02222-67   EWT(1)EWT(m)/EWP(w)/T/EWP(t)/ETI   IJP(c)   JD/JG/JH

ACC NR: AR6013679   SOURCE CODE: UR/0058/65/000/010/E102/E102

AUTHOR: Gel'd, P. V.; Suchil'nikov, S. I.; Baum, B. A.

TITLE: Electric conductivity of alloys of the chromium-aluminum system

SOURCE: Ref. zh. Fizika, Abs. 10E822

REF. SOURCE: Tr. Ural'skogo politekhn. in-ta, sb. 144, 1965, 134-136

TOPIC TAGS: chromium alloy, aluminum alloy, electric conductivity, intermolecular complex

ABSTRACT: The authors investigated the electric conductivity (σ) of Al-Cr alloys in the temperature interval 15 — 1850C by a contactless method in a rotating field. Depending on the composition, σ of solid and liquid alloys varies in accordance with an extremal law. The results show that the quasimolecular complexes corresponding to melts with ~ 50 at.% of Al and Cr are stable formations up to a temperature of 1750C. [Translation of abstract]

SUB CODE: 20

Card 1/1

L 47129-66 EWT(m)/EWP(t)/ETI IJP(c) JD/HW/JG

ACC NR: AR6013657   SOURCE CODE: UR/0058/65/000/010/E008/E008

AUTHOR: Kocherov, P. V.; Gel'd, P. V.; Baum, B. A.   61
                                                                          B

REF SOURCE: Tr. Ural'skogo politekhn. in-ta, vb. 144, 1965, 139-141

TITLE: Kinematic viscosity in liquid alloys of the iron-silicon system

SOURCE: Ref. zh. Fizika, Abs. 10E63

TOPIC TAGS: silicon containing alloy, activation energy, entropy, isobaric potential

TRANSLATION: The kinematic viscosity of the phase components of the iron-silicon sys-
tem (Fe3Si, Fe21Si11, Fe3Si3, FeSi2) and alloys containing 62 and 85% Si was studied.
The experimental data obtained permits the calculation of the activation energies,
changes in isobaric-isothermal potential and changes in activation entropy for vis-
cous flow of melts. From this, one can make conclusions concerning the microinhomoge-
neous structure of iron-silicon melts.

SUB CODE: 11/

Card 1/1 afs

L 27429-66   EWT(m)/T/EWP(t)   IJP(c)   JD/JG

ACC NR: AP6017686   SOURCE CODE: UR/0363/65/001/008/1289/1295

AUTHOR: Baum, B. A.; Gel'd, P. V.; Radovskiy, I. Z.; Suchil'nikov, S. I.   46

ORG: Ural Polytechnic Institute (Ural'skiy politekhnicheskiy institut)   B

TITLE: Electrical conductivity of liquid and solid phase components of chromium-
silicon (Cr sub 3 Si, Cr sub 5 Si sub 3, and CrSi) systems   27

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 8, 1965, 1289-1295

TOPIC TAGS: electric conductivity, chromium compound, silicide, temperature
dependence

ABSTRACT: In a previous study, Baum, et al (Izv. AN SSSR, Otd. Tekh. i
Metallurgiya i Gornoye Delo, No 2, (1964), p 149) reported some observations
concerning the electrical conductivity (σ) of Si, Cr and silicon disilicide
which were prepared by levitation melting in a rotating magnetic field at
temperatures ranging from 20 to 1900°C. The present study presents the re-
sults of analogous measurements which were carried out with the lower sili-
cides in the same temperature interval. The reasons for carrying out a
similar investigation was the fact that preparations of varying purity were
used previously and only data for their properties at room temperature was
presented as well as the fact that the reports concerning the nature of
conductivity in the lower chromium silicides are fundamentally different
and, as a rule are based only on the results of low-temperature measurements.

Card 1/2   UDC: 546.76'281

L 27429-66

ACC NR: AP6017686

The present authors investigated the electrical conductivity of lower chrom-
ium silicides in temperatures ranging from room to 1900°C. It was shown that
Cr_3Si and $CrSi$ possess negative temperature coefficients all the way up to
the melting point. On the other hand, Cr_5Si_3 changes type of conductivity
above 600-800°C. It was discovered that liquid lower chromium silicides have
a predominantly metallic nature of conductivity. Reasons for the temperature
path of the electrical conductivity of these compounds in the solid state are
expressed on the basis of a comparison of the distance between the Cr and Si
atoms in the unit cell of the studied silicides with the sum of their metallic
radii. The electrical conductivity of solid Cr_3Si drops monotonously with a
rise in temperature. The temperature dependence of the electrical conductivity
of Cr_5Si_3 has a complex character. Apparently some of the bonds in Cr_5Si_3 are
of a covalent nature and provide for stronger interatomic reactions. It is
obvious that the electrons of these bonds are excited at sufficiently high
temperatures, causing a rise in the electrical conductivity and change in the
sign of $d\sigma/dt$. Hence, in contradiction to Cr_3Si, Cr_5Si_3 possesses an extremal
dependence of σ to t. Chromium monosilicide does not reveal an extremal
relationship of σ and by its electrical properties occupies an intermediate
position between Cr_3Si and Cr_5Si_3. The electrical conductivity of $CrSi$
rises sharply at 1480°C and then a break is observed in the proximity of
1600°C. This is accompanied by a change in $d\sigma/dt$. These effects reflect the
phase transformations in the system and are in fair agreement with the data
for the measurement of the heat content in solid and liquid chromium monosili-
cide. The structural singularities of liquid Cr_3Si alloys were also examined.
Orig. art. has: 2 formulas and 3 figures. [JPRS]
SUB CODE: 20, 07 / SUBM DATE: 01Apr65 / ORIG REF: 019 / OTH REF: 003
Card 2/2

LETUN, S.M. (Sverdlovsk); GEL'D, P.V. (Sverdlovsk); SHREBENTSHCHOV, N.N.
(Sverdlovsk)

Thermochemistry of Mn_3Si. Izv. AN SSSR. Met. no.6:137-147 N-D '65.
(MIRA 19:1)

1. Submitted July 13, 1964.

ARTOLST, A.Y.; GEL'D, P.V.; ZAGRYAZHSKIY, V. .

Constitutional diagram of the system iron - germanium.
Izv.vys.ucheb.zav.; tsvet.met. 8 no.2:120-126 '65.
(MIRA 19:1)

1. Fiziko-tekhnicheskiy fakul'tet Ural'skogo politekhnicheskogo
instituta. Submitted January 15, 1964.

ZAGRYAZHSKIY, V.L.; SHTOL'TS, A.K.; GEL'D, P.V.

Structure and some physical properties of α - and β -phase of the Cr - Ge system. Izv. AN SSSR. Neorg. mat. 1 no.11:1917-1920 N '65.

(MIRA 18:12)

1. Ural'skiy politekhnicheskiy institut imeni S.M. Kirova, Sverdlovsk. Submitted May 26, 1965.

LYUBIMOV, V.D.; GEL'D, P.V.; SHVEYKIN, G.P.; ALYAMOVSKIY, S.I.

    Kinetics of the reduction of lower niobium oxides by carbon.
    Zhur. prikl. khim. 38 no.10:2174-2181 O '65.   (MIRA 18:12)

    1. Submitted Sept. 26, 1963.

L 36958-66   EWT(m)/EWP(j)/EWP(t)/ETI   IJP(c)   RM/JD/WH/JW J3
ACC NR: AP6014896   (A)   SOURCE CODE: UR/0076/65/039/012/2999/3001

AUTHOR: Kelishevich, G. I.; Gel'd, P. V.; Krentsis, R. P.

ORG: Ural Polytechnic Institute im. S. M. Kirov (Ural'skiy
politekhnicheskiy institut)

TITLE: Standard heat capacities, entropies, and enthalpies of silicon,
and of chromium and its silicides

SOURCE: Zhurnal fizicheskoy khimii, v. 39, no. 12, 1965, 2999-3001

TOPIC TAGS: heat capacity, entropy, enthalpy, silicon, chromium
compound

ABSTRACT: The article reports a study of the temperature dependence of
the heat capacities of silicon and of chromium and its silicides in the
temperature interval from approximately 54 to 300°K. The alloys for the
investigation were prepared from monocrystalline silicon ($>$ 99.999% Si)
and electrolytic chromium ($\sim$ 99.98% Cr). Corresponding amounts of the
components were melted in a type MVP-3M induction furnace in an argon
atmosphere. A homogenizing anneal of the billets was carried out at
1600°K. By this method, the following stoichiometric silicides were
obtained: Cr_3Si, Cr_5Si_3, $CrSi$, and $CrSi_2$. A large table gives the

UDC: 541.11

Card 1/2

L 36958-66

ACC NR: AP6014896

values found for the heat capacities of the above substances at different temperatures. From the heat capacity measurements, calculations were made of the characteristic temperatures Θ_D, the standard entropies $S_o^{298.5}$, and the enthalpies $\Delta H_o^{298.5}$. The additive rule is not valid for calculation of the heat capacities of the chromium silicides; its application for the calculation of the standard entropies gives an error not exceeding 4-5%. Orig. art. has: 1 figure and 2 tables.

SUB CODE: 20/ SUBM DATE: 30Oct64/ ORIG REF: 007/ OTH REF: 002

Card 2/2

L 07383-67   EWT(m)/EWP(t)/ETI   IJP(c)   JD/WW/JW/JG
ACC NR: AP6027750   (A)   SOURCE CODE: UR/0370/66/000/004/0132/0138

AUTHOR: Lyubimov, V. D. (Sverdlovsk); Gel'd, P. V. (Sverdlovsk); Shveykin, G. P.
(Sverdlovsk); Vel'mozhnyy, E. Yu. (Sverdlovsk)

ORG: None

TITLE: Self-diffusion of niobium in alloys with titanium and zirconium

SOURCE: AN SSSR. Izvestiya. Metally, no. 4, 1966, 132-138

TOPIC TAGS: metal diffusion, niobium base alloy, zirconium containing alloy, titanium
containing alloy

ABSTRACT: The authors study the parameters of self-diffusion of niobium in various
alloys with titanium and zirconium. Unlimited series of solid solutions of niobium
with β-Ti and β-Zr are formed in these systems over a wide temperature range (from ap-
proximately 1000-1100°C to the melting points). The dimensions of component atoms in
alloys of niobium with titanium (as well as their lattice parameters) are extremely
close (r_{Nb}=1.45 A, r_{Ti}=1.46 A). The atomic radii of the components in the Nb-Zr sys-
tem differ considerably (r_{Zr}=1.6 A) so that the periods of the elementary cell are con-
siderably dependent on composition. Thus a comparison of the characteristics of nio-
bium alloys with β-titanium and β-zirconium is of interest from the standpoint of the

Card 1/2   UDC: 669.293.5'295'296

L 07383-67
ACC NR: AP6027750   /

effect which the size factor has on the diffusion mobility of niobium atoms. Homoge-
neous β-phase alloys were melted with various concentrations of titanium (5.0, 15.1,
29.8 and 40.9%) and zirconium (5.0, 15.1, 24.2 and 36.1%). The coefficient of self-
diffusion of niobium in the solid solutions was studied by using Nb^{95} with the removal
of layers and measurement of the integral radioactivity.   Self-diffusion was studied as
a function of alloy composition and temperature from 1400 to 1950°C. It was found that
an increase in the concentration of alloying elements raises diffusion mobility while
reducing the activation energy and the preexponential fact r. The addition of niobium
to titanium reduces the activation energy more rapidly than in the case of Nb-Mo alloys.
The activation energy in Nb-Ti alloys changes more rapidly with the preexponential fac-
tor than in Nb-Mo alloys. This is probably due to the difference between the atomic
ratios of the components and the length of the elementary displacement as well as to
the activation spaces produced by the impurity atoms. In spite of the considerable
difference between the atomic radii of zirconium and niobium, the effect of zirconium
on activation energy and preexponential factor is much weaker than that of titanium.
This is apparently due to the fact that the rate of diffusion depends not only on the
atomic radii but also on the potential fields and vibration frequencies of the atoms.
It is shown that there is a simple linear relationship between activation energy and
the logarithm of the preexponential factor. There is a regular increase in the corre-
lation factor with the dimensions of the alloying atoms (Mo, Ti and Zr). Orig. art.
has: 4 figures, 2 tables, 5 formulas.

SUB CODE: 11, 07 SUBM DATE: 12Mar65/ ORIG REF: 010/ OTH REF: 003

Card 2/2   LJ

L 44400-66   EWT(m)/T/EWP(t)/ETI   IJP(c)   JD/JG

ACC NR: AP6023641

AUTHOR: Gel'd, P. V.; Vel'mozhnyy, E. Ya.; Lyubimov, V. D.; Shveykin, G. P.

ORG: Chair of Physics, Ural Polytechnic Institute (Ural'skiy politekhnicheskiy institut Kafedra fiziki)

TITLE: Self diffusion of niobium in some of its alloys with molybdenum

TOPIC TAGS: niobium containing alloy, molybdenum containing alloy, activation energy, radioisotope, x ray diffraction, temperature dependence

ABSTRACT: Self diffusion coefficients (D) were obtained for niobium alloyed with 5, 10, 20, 30 and 45% Mo. The values of D were determined from radioactive tracer measurements of Nb^{95} in the form of $Nb_2^{95}O_3$. Lattice parameters were determined by the powder method and both hardnesses and microhardnesses were obtained by standard methods. The self diffusion coefficient of Nb is given as a function of Mo content for temperatures ranging from 1600 to 2100°C while both the activation energy E and the diffusion parameter $\ln D_0$ are given as functions of Mo content. The relation between $\ln D_0$ and E is given by

$$\ln D_0 = -26.9 + 0.276E$$

UDC: 669.293

Card 1/2

SOURCE CODE: UR/2768/66/000/009/0017/0021

ACC NR: AT6036294

AUTHOR: Gel'd, P. V.; Dubrovskaya, L. B.; Matveyenko, I. I.

ORG: none

TITLE: Electric conductivity of tantalum carbides

SOURCE: AN SSSR. Ural'skiy filial. Institut khimii. Trudy, no. 9, 1966. Fiziko-khimicheskiye issledovaniya soyedineniy redkikh tugoplavkikh elementov (Ti, V, Nb, Ta), ch. 1: Tverdofaznyye protsessy (Physicochemical analysis of compounds of rare refractory elements (Ti, V, Nb, Ta), pt. 1: Solid-phase processes), 17-21

TOPIC TAGS: tantalum compound, carbide, resistivity

ABSTRACT: The electric resistivity of carbide phases of tantalum was measured over a wide range of compositions ($TaC_{0.21}$-$TaC_{0.98}$) and temperatures (80-1500°K) on samples prepared by sintering in a vacuum at 2200°C at 5×10^{-5} mm, cooling rapidly to room temperature, and annealing. On the basis of the data obtained, resistivity isotherms (see Fig. 1) and polytherms for 15 carbides of various compositions were plotted. It is apparent that the electric conductivity of the phase components of the tantalum-carbon system depends substantially on their composition (the carbon content being a major factor) and temperature. The data indicate that the carbide phases of tantalum have a metal-type conduction in the investigated range of compositions and temperatures. The absolute value of the resistivity strongly depends on

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ACC NR: AT6036294

Fig. 1. Electric resistivity
of tantalum carbides TaC$_x$ vs.
composition x.
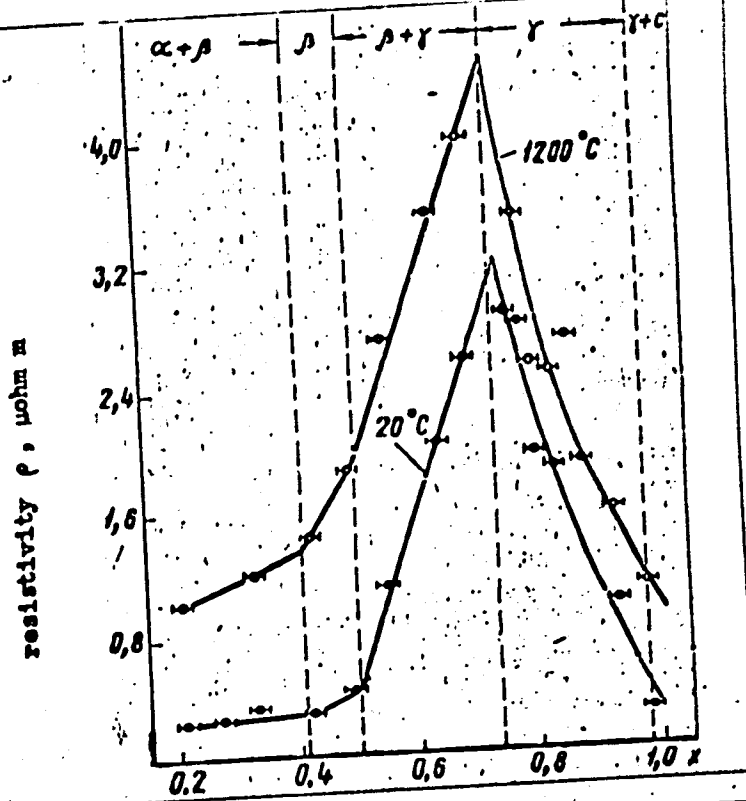
Card   2/3

ACC NR: AT6036294

the concentrations of vacancies in the carbon sublattice of the compound and on the contribution of unscreened Ta-Ta interactions. Orig. art. has: 2 figures, 1 table and 2 formulas.

SUB CODE:20,07/   SUBM DATE: none/   ORIG REF: 005/   OTH REF: 007

Card   3/3

ACC NR: AT6036295   SOURCE CODE: UR/2768/66/000/009/0043/0050

AUTHOR: Shchetnikov, Ye. N.; Shveykin, G. P.; Gel'd, P. V.

ORG: none

TITLE: Reaction of vanadium with carbon monoxide

SOURCE: AN SSSR. Ural'skiy filial. Institut khimii. Trudy, no. 9, 1966. Fiziko-khimicheskiye issledovaniya soyedineniy redkikh tugoplavkikh elementov (Ti, V, Nb, Ta), ch. 1: Tverdofaznyye protsessy (Physicochemical analysis of compounds of rare refractory elements (Ti, V, Nb, Ta), Pt. 1: Solid-phase processes), 43-50

TOPIC TAGS: vanadium, carbon monoxide, chemical kinetics, activation energy

ABSTRACT: The kinetics of the reaction of powdered and massive vanadium with carbon monoxide were studied at various pressures and temperatures, for which the reaction rates were determined. The activation energy for both forms of vanadium was found to be 35.3 kcal/mole at 1400-1500°C. X-ray and metallographic analyses indicate that a cubic oxycarbide δ' phase (VC_xO_y) is formed on the surface of the samples, and an oxycarbide γ' phase ($V_2C_xO_y$) is located under it. This shows that the diffusion front of carbon moves faster than that of oxygen, since, if the opposite were true, an oxide phase instead of a carbide phase would be located at the metal boundary. The δ' phase accumulates on the surface of the sample in the form of a loose layer which sometimes peels off on cooling, whereas the layer of the γ' phase remains

Card   1/2

ACC NR: AT6036295

approximately stationary. It is concluded that the diffusion of carbon and oxygen and the reverse diffusion of vanadium through the γ' phase determine the kinetics of oxidation of vanadium by carbon monoxide. Orig. art. has: 6 figures, 2 tables and 1 formula.

SUB CODE: 07/ SUBM DATE: none/ ORIG REF: 009/ OTH REF: 004

Card 2/2

GEL'DASH, N.A.

High quality of work. Avtom. telem. i sviaz' 8 no.2:16-17
F '64.   (MIRA 17:6)

1. Starshiy inzh. Osnovyanskoy distantsii signalizatsii i
svyazi Yuzhnoy dorogi.

CZECHOSLOVAKIA/Chemical Technology. Chemical Products H
          an Their Uses. Part III. Industrial
          Organic Synthesis.

Abs Jour : Ref Zhur-Khimiya, No 15, 1958, 51138

Author   : Naumov, A. I., Geldelberg, E. I.,
           Lapteveva, E. G.

Inst   : -
Title   : Preparation of Cyclohexylamine by Hydro-
           genation of Aniline.

Orig Pub : Chem. Prumysl, 1957, 7, No 1, 579-581

Abstract : Aniline (I) was hydrogenated at usual
           pressures, in a heated quartz tube, using
           various catalysts. Hydrogenation was con-
           ducted in a gas phase. The product's com-
           position was determined by distillation

Card   : 1/4

CZECHOSLOVAKIA/Chemical Technology. Chemical Products H
and Their Uses. Part III. Industrial
Organic Synthesis.

Abs Jour : Ref Zhur-Khimiya, No 15, 1958, 51188

in a column. Two reactions were studied:
$C_6H_5NH_2 + 3H_2 \longrightarrow C_6H_{11}NH_2$ (A) and
$2C_6H_{11}NH_2 \longrightarrow NH_3 + (C_6H_{11})_2NH$ (B). Using
a Ni/Al_2O_3 catalyst, the reactions pro-
ceed smoothly at $160-230°$ when molar ratio
of $I : H_2 = 1 : 15$ and contact time is
3-4 seconds. The latter catalyst activates
both reactions but favors reaction B. Mi-
xed catalyst CoO-CaO at $190-200°$ activates
only reaction A. Such selectivity of the
catalysts permits the preparation of
$C_6H_{11}NH_2$ (II) or $(C_6H_{11})_2NH$ (III) predo-
minantly. The ease and reversibility of

Card   : 2/4

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Card   : 3/4

and Their Uses. Part III. Industrial
Organic Synthesis.

Abs Jour : Ref Zhur-Khimiya, No 15, 1958, 51188

mole of III the reaction rate increases
almost linearly. The authors believe that
analogous reactions of III with amines of
the type NHRR' should occur with Ni, Co,
and Cu catalysts fixed on activated Al_2O_3.
-- T. Zvarova

Card   : 4/4

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GEL'DERMAN, I. M.

Use of carbon electrodes in spectral analysis of solutions. I. M. Nagibina and I. A. Gel'derman. Sbornik Statei Leningrad. Inst. Tochnoi Mekh. i Optiki 1954, No. 11 1-8, 15; Referat. Zhur., Fiz. 1955. No. 20903 — Three methods of introducing soln. into C electrodes of the arc (satn. of the electrode by soln. in a bath; placing a drop on the face plane of the heated C; preliminary treatment of the electrode by a 3% soln. of polystyrene in benzene with the subsequent placing and drying of the drop of the soln. to be analyzed) were investigated. In a soln. contg. Mn and Mg, the different character of the burning down of these elements in the various methods of introducing soln. in the discharge is shown and is explained by the differences in interaction of the soln. with C in the 1st 2 methods and by the absence of such interaction in the 3rd method. In the 1st method, the calibrated graph constructed by using the coördinates log (I_{Mn}/I_{Mg}), log $C_{relative}$, has little slope, and the dispersion of current is great. In the 3rd method, the graph up to great relative concns. has a 45° slope, and the dispersion of the curve is significantly less. The best of the methods studied is the 3rd. By this method, calibrated graphs were obtained for solns. contg. Mn-Mg, Fe-Cu, and Cd-Zn, at wide intervals of relative concn. For the 1st term the graph is straight in the region of concn. 0.01–10% (tangent of the angle of inclination $b = 1$), for the 2nd at intervals of 0.03–3%, $b = 0.6$, for the 3rd at intervals of 0.1–1%, $b = 0.92$, and at intervals of 1–300%, $b = 0.66$.

I. Rovtar Leach

PROCESSES AND PROPERTIES INDEX

High-speed tool steel for hack saws. Ya. S. Gints burg, L. S. Gol'dzman and A. N. Zhuravlin. Repts Central Inst. Metals (Leningrad) No. 16, 131 6(in German) 160)(1934).—An exptl. investigation of the problems of heat treatment, rolling and annealing of steel used in the manuf. of hack saws.   S. I. Markesky

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

9

ca

The manufacture of stainless bimetal. Ya. S. Gusta-
burg, L. S. Gol'derman and A. D. Gol'dberg. Repts.
Central Inst. Metals (Leningrad) No. 17, 158-64 (in
German 164)(1934).—A discussion is given of methods
of making 2-layer metal plates, where one layer is re-
sistant to corrosion. The problem has not yet been
completely solved and that exptl. work should be carried
out in making bimetal as well as trimetal plates.
S. L. Madorsky

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