GRIGORYEV, A.S. (Moscow)

"The state of stress and the carrying capacity of membrane shells and plates undergoing large deformations".

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 64.

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00051681(

ACCESSION NR: AP4041346 S/0115/64/000/005/0031/0033

AUTHOR: Kulikovskiy, L. F.; Grigor'yev, A. S.; Grigorovskiy, B. K.

TITLE: Photocompensation electrometer

SOURCE: Izmeritel'naya tekhnika, no. 5, 1964, 31-33

TOPIC TAGS: electrometer, radial electrode electrometer, photocompensation electrometer

ABSTRACT: At the zero position of an electrometer movable plate, the light from lamp L (see Enclosure 1) equally illuminates two photovaristors P_1 and P_2. When the measurand is applied to the electrometer input, the plate will move until the measurand is compensated by the voltage drop across feedback resistor r due to current I (the photovaristor-currents difference). Formulas for designing such an electrometer are supplied. An experimental electrometer combined with a standard photo-unit (part of an F-117 galvanometer) had these characteristics:

ACCESSION NR: AP4041346

range, 100—1,000 mv; input resistance, 10^{17} ohms; damping time, 0.5 sec or less; over-all error, 1.5—0.5% for 100—1,000 mv, respectively; the readout instrument may have a full-scale current of 0.1—1.5 ma with an internal resistance of 3 kohms or less. Orig. art. has: 3 figures and 22 formulas.

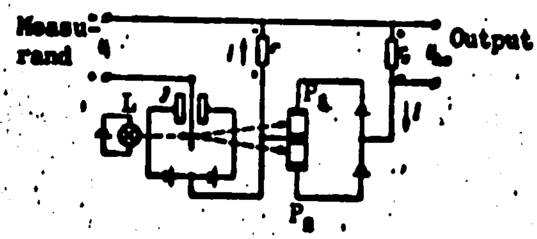
ASSOCIATION: Kuyby*shevskiy politekhnicheskiy institut (Kuyby*shev Polytechnic Institute)

SUBMITTED: 00 ENCL: 01

SUB CODE: EE NO REF SOV: 000 OTHER: 000

ACCESSION NR: AP4041346

ENCLOSURE: 01



A photocompensation-type electrometer

Card 3/3

ACCESSION NR: AP4045921 S/0119/64/000/009/0022/0024

AUTHOR: Grigor'yev, A. S. (Engineer); Kulikovskiy, L. F. (Doctor of technical sciences, Professor)

TITLE: Photoelectric amplifier with a high coefficient of utilization of the electrometer aperture angle

SOURCE: Priborostroyeniye, no. 9, 1964, 22-24

TOPIC TAGS: electrometer, photoelectric amplifier, photoelectrometer

ABSTRACT: A linear-type electrometer with an aperture of 1.5° is used in a new photoelectrometer instrument (see Enclosure 1) in which, at zero reading, the light beam covers one-half of each of two photoresistors connected in opposition (FSK-7, b "differential photoresistor"). The coefficient of utilization of the aperture is 35%. Other technical data given: number of stationary plates, 2 pairs; plate height, 16 mm; ID and OD, 5 and 16 mm, respectively; voltage

ACCESSION NR: AP4045921

range, ±50 mv; current range, 10^{-12} amp; quantity range, 5×10^{-11} coulombs; rated output current, 3 ma; error, 1.5% or less. A standard F-117 photounit and a negative feedback are used in the instrument. Orig. art. has: 5 figures, 17 formulas, and 1 table.

ASSOCIATION: Kuyby*shevskiy politekhnicheskiy institut (Kuyby*shev Polytechnic Institute)

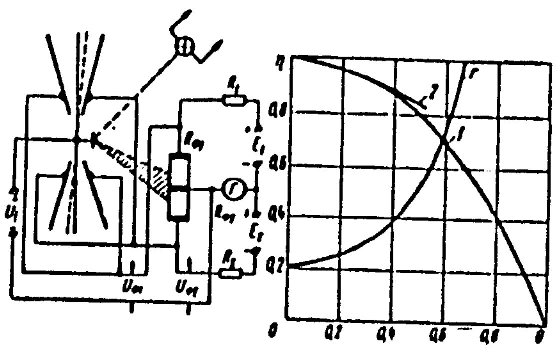
SUBMITTED: 00 ENCL: 01

SUB CODE: IE, EC NO REF SOV: 002 OTHER: 000

Card 2/3

ACCESSION NR: AP4045921

ENCLOSURE: 1



A photoelectrometric amplifier and its characteristics

0 is the coefficient of utilization of aperture

$$\eta = \frac{U_0}{U_{\phi 1}} = \frac{U_{\phi 1}}{U_0}, \qquad r = \frac{R_1}{R_\phi} = \frac{R_{\phi 1}}{R_1},$$

Card 3/3

L 15756-65 EWT(l)/EWA(h) Peb
ACCESSION NR: AP4048842 S/0119/64/000/011/0026/0027

AUTHOR: Grigor'yev, A. S.; Khersonskiy, B. S.; Grigorovskiy, B. K.; Kulikovskiy, L. F.

TITLE: Photoelectrometric amplifier 25

SOURCE: Priborostroyeniye, no. 11, 1964, 26-27 B

TOPIC TAGS: photoelectrometric amplifier, electrometer, electrometer amplifier

ABSTRACT: This article describes a photoelectrometric amplifier used in meauring voltage, current, and charge, and widely applied to ionizing-radiation dosimetry, mass-spectroscopy, biology, and in pH meters. In this device (see Fig. 1 of the Enclosure), a movable element E is placed in the null position and two photocells P_1, P_2 are equally exposed to the light of a lamp L. When input voltage V_i (Fig. 1a) is applied, the element twins, causing unequal photocell exposure and the resultant flow of current I through a feedback resistor R:

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00051681(

L 15756-65
ACCESSION NR: AP4048842

0

$$V_{out} = Ir_1 = \frac{R_1}{R} V_i = K_1 V_i$$

where $K_1 = \frac{R_1}{R}$ is the static amplification factor and R is the load resistor. The negative feedback ensures high operational stability, and the circuit achieves equilibrium without drawing power from the input signal. Variations on the above device, to be used in making current and charge measurements (Fig. 1b and 1c), are described. A construction diagram of an electrometer (developed by the authors) using a standard F-117 photo unit is shown. The specifications on this unit include a measurement range of 0—100 mv, a minimum-precision class of 1.5, a damping time not exceeding 0.5 sec, current output of 1.5 mamp, and an output impedance not exceeding 3 kohm. Orig. art. has: 2 figures and 4 formulas.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 01 SUB CODE: EC

NO REF SOV: 003 OTHER: 000 ATD PRESS: 3141

Card 2/3

L 15756-65
ACCESSION NR: AP4048842

ENCLOSURE: 01

0

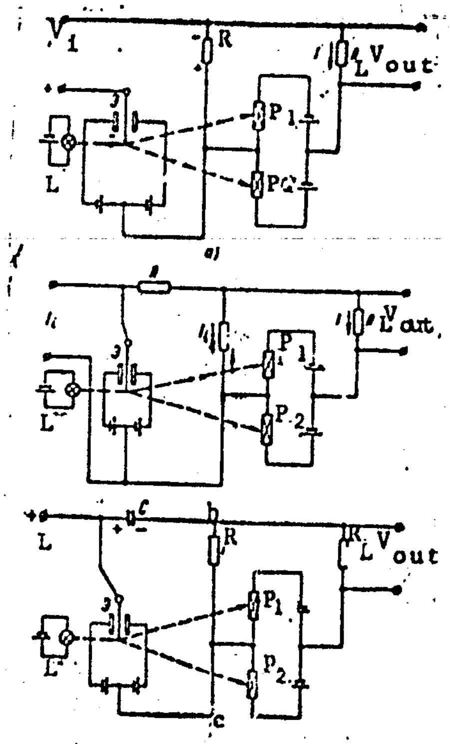


Fig. 1. Electrometer schematics:
a - voltage; b - current; c - charge

e - Electrometer; L - lamp;
P_1, P_2 - photocells; Vi - measured voltage; R - feedback resistor;
Ii - measured current; gi - measured charge; V_{out} - output voltage; c - capacitor; R_L - load resistor.

Car d 3/3

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00051681(

GRIGOR'YEV, ' S. (Moskva)

Carrying capacity of circular and annular plates made of plastically nonhomogeneous material. Inzh.zhur. 4 no.3:560-565 '64. (MIRA 17:10)

1. Institut mekhaniki AN SSSR.

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00051681(

ACCESSION NR: AP4041644 S/0146/64/007/003/0016/0017

AUTHOR: Grigor'yev, A. S.; Grigorovskiy, B. K.

TITLE: Methods for increasing the deflection angle and for linearization of scale of an electrometer

SOURCE: IVUZ. Priborostroyeniye, v. 7, no. 3, 1964, 16-17

TOPIC TAGS: electrometer, electrometer scale

ABSTRACT: A simple addition to a conventional electrometer is suggested. Plates 4—5 (see Enclosure 1) energized by a voltage drop, due to the unequal illumination of two photovaristors, create an additional restoring torque. This square-law torque, acting as a negative feedback, essentially linearizes the scale and widens the working deflection angle of the electrometer. Orig. art. has: 2 figures and 1 formula.

ASSOCIATION: Kuyby*shevskiy politekhnicheskiy institut (Kuyby*shev Polytechnic Institute)

SUBMITTED: 28May63 ENCL: 01

SUB CODE: EE, IE NO REF SOV: 000 OTHER: 000

Card 1/2

GRABISHEVSKIY, V.V.; GRIGOR'YEV, A.S.

Work organization for accident prevention and labor safety. Metallurg 9 no.9:36-38 S '64. (MIRA 17:10)

1. Cherepovetskiy metallurgicheskiy zavod.

ARAMANOVICH, I.G.; GRIGOR'YEV, A.S.; GRIGOLYUK, E.I.;
DZHANELIDZE [redacted]

Letter to the editor on N.D. Tarabasov's article "Stressed state of nonhomogeneous parts connected with a tight fit." Izv. AN SSSR Otd. tekh. nauk. Mekh. i mashinostr. no.2: 188-192 Mr-Ap '63. (MIRA 16:6)

(Strains and stresses)
(Tarabasov, N.D.)

Palladium-antimony alloys. A. T. Grigor'ev. *Ann. inst. platine* 1929, No. 7, 32-44.—Alloys made of pure Sb and of Pd [illegible] were studied as to constitutional diagram, microstructure and elec. cond. In the limit between 50-71 at. % Pd, the alloys are made up of 2 components, the compd. PdSb and a solid soln. (Sb in Pd_3Sb) contg. a limiting concn. of 71 at. % Pd. In alloys contg. 58.17 at. % Pd these 2 components form a eutectic and, on increasing the content of Pd to 62.87 at. %, a eutectoid. At 545° a transformation in solid state takes place accompanied by an evolution of a large amt. of heat. This represents a eutectoid decompn. of solid soln. The existence of Pd_2Sb could not be confirmed. Tables of melting and crystn. of the alloys at various temps. are given, also 12 photomicrographs of annealed and tempered samples. S. L. M.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

Gold-antimony alloys. A. T. Grigor'ev. *Ann. inst. platine* 1929, No. 7, 45-51. A thermal analysis of Au-Sb alloys is given showing melting curves for alloys from pure Au to pure Sb. The diagrams check within exptl. error with those of R. Vogel (*Z. anorg. Chem.* 50, 151 (1906)). Sp. elec. cond. and temp. coeff. of elec. cond. of the alloys were measured for cast and annealed samples. Curves for sp. cond. show a min. and curves for temp. coeff. of elec. cond. show a max. at a point corresponding to [illegible] at. % Sb. These curves confirm the results of thermal analysis and prove the existence of a compd. AuSb₂. S. L. Madorsky

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

BC a-1

Palladium-iron alloys. A. T. [illegible] (Ann. Inst. [illegible], [illegible], [illegible]).—No compound formation occurs in fused Pd-Fe alloys and the solid phase which separates on cooling consists of an unbroken series of solid solutions, with a min. f. p. of 1280° at 50 at.-% Pd. Solid alloys containing about 70 at.-% Pd [illegible] on cooling, pointing to the existence of a compound, Pd_3Fe, with a transformation point at about [illegible]. The existence of this compound is confirmed by hardness, conductivity, and temp. coeff. of conductivity curves.

R. Truszkowski.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

M

***Alloys of Palladium with Nickel.** A. T. Grigoriev (*Izvestia Platinovo Instituta* (*Annales de l'Institut de Platine*), 1932, (9), 13–22). [In Russian.] The system has been studied by micrographic examination and by measurement of the Brinell hardness and temperature coeff. of electrical resistance. The hardness curve is characteristic of a continuous series of solid solutions, the maximum hardness (156) being reached with 60–64 atomic-% palladium. The structure consists of polyhedral grains typical of solid solutions. The curve of temperature coeff. of electrical resistance has a sharp break at 70.8 atomic-% palladium, corresponding with the transition from magnetic to non-magnetic alloys.—N. A.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

Work of the Analytical Committee of the Institute for the Study of Platinum and Other Noble Metals. B. G. Karpov (Chairman), A. T. Grigorev, S. F. Schemtchushny, O. E. Zviaginsev, N. S. Kurnakov, W. W. Lebedinsky, N. N. Podkopaev, and I. I. Tchernjaev (*Izvestia Platinogo Instituta* (*Ann. Inst. Platine*), 1932, (9), 91–112). [In Russian.] A concise summary of various analytical methods worked out and recommended by the Committee. (1) *A Method of Rapid Analysis of Nugget Platinum.* In addition to Pt, the sample contains Pd, Rh, Au, Cu, Ir, and separation is based on repeated digestion with *aqua regia* and fusion with various reagents. The method appears to be somewhat laborious. (2) *A Method of Analysis with Determination of only the Noble Metals.* This method is based on the same principle as (1). Pt, Au, Rh, Ir, and Ru are determined, the technique of estimation by difference being employed. (3) *A Method of Analysis including the Determination of Cu and Fe.* The Cu estimated is precipitated as CuCNS, out of sulphate solution and determined as CuO, while the Fe is precipitated as the oxalate, re-dissolved in HCl, precipitated with NH_4OH, and determined as Fe_2O_3. (4) *Method of Complete Analysis.* The method is based on repeated digestion in strong reagents, determination of such metals as Cu and Fe by the ordinary methods, evaporating the various solutions to dryness and heating to reduce the residues containing noble metals. (5) *Method of Analysis of the "First Insoluble Residue" Resulting from Dissolving Nugget Platinum in Aqua Regia.* The residue contains Os, Ru, and Rh. (6) *A New Method of Separating Iridium and Platinum by B. G. Karpov and A. N. Fedorov.* The reagent is Hg_2Cl_2, which on heating precipitates Pt out of its chloride salts and chloroplatinates, while reducing Ir to the tervalent condition only. (7) *Analysis of Metallic Rhodium by B. G. Karpov.* The sample is fused with a very large excess of Ag, and dissolved in HNO_3 and *aqua regia*. Pt, Pd, and Ir are removed and the Rh extracted by fusion with Bi and Pb. (8) *Assaying for Pt, Pd, Ir, and Rh of Ingots with a High Pt Content According to the Method Employed in the Laboratories of Johnson and Son.* A description of the method with the Institute's comments. N. A.

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

CA

1

Acid-stable lining instead of lead for receptacles. [illegible]. [illegible] No. [illegible], Ser. 03; *[illegible]* [illegible] No. [illegible](1930).—Products coated with water glass and a siliceous material are resistant to acids in the presence of [illegible]. They are attacked only by HF and some higher fatty acids. Finely pulverized siliceous material is mixed with 4% Na silicate and liquid water glass (38° to 39°Bé.) and applied on metallic or wooden receptacles; 3 or 4 days are necessary for the coat to dry and harden. The coated ware may be treated with H_2SO_4 to improve their resistance to fatty acids.

M. V. Kondoidy

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

CA

1ST AND 2ND GROUPS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH GROUPS

7

Alloys of palladium with manganese. A. I. Grigor'ev. *Ann. inst. anal. phys.-chim.* (U. S. S. R.) 7, 73-88(1935); cf. C. A. 27, 683, 1601.—Pd-Mn alloys contg. 5-95% Pd, cast or tempered at 900° for 16 hrs. and at 800° for 7 days, form on cooling a continuous series of solid solns. Alloys with 39.3-45% Pd show the lowest m. p. With decrease of temp. the solid soln. is converted to a compd. PdMn. On the hardness curve (Brinell and Shore) this compd. is indicated by a min. at 66.04% Pd, and on the photomicrographs by a characteristic double-lined structure. The thermal conversions of the alloys rich in Mn at 1040-80° and 730-97° are evidently conditioned by the conversion of the Mn modifications γ → β and β → α, resp. (cf. Shimizu, C. A. 25, 1190). Chas. Blanc

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

PA

PROCESSES AND PROPERTIES INDEX

Physicochemical analysis of the equilibria between metals. A. I. Ostroumov. *Uspekhi Khim.* 6, 1121-41 (1937); *Chem. Zentr.* 1938, II, 624. A summary. Topics individually treated include: the berthollides, transitions in solid solns., the kinetics of transitions in alloys, hardness and flow pressure, light metals, and the genesis of metals occurring in the free state. M. G. Moore

7

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

Nikolai Ivanovic Stepanov. A. T. Grigoriev (*Izvest. Sekt. Fiziko-Khimich. Analiza* (*Ann. Secteur Anal. Phys.-Chim.*), 1940, 13, 7–12). [In Russian.] A biographical notice.—N. B. V.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00051681(

PROCESSES AND PROPERTIES INDEX

On Iron-Rich Iron-Aluminium Alloys. A. T. Grigor'ev and N. M. Gruzdeva (*Izvest. Sekt. Fiziko-Khim. Anal.* (*Akad. Nauk S.S.S.R.*), 1941, 14, 245-253).—[In Russian.] A study was made of the hardness, electrical resistance and its temperature coeff., microstructure, and magnetic transformations of 14 alloys in the range 0-31 at.-% (0-17·9 wt.-%) aluminium. The results confirm the formation of the compound Fe_3Al from the solid solution of aluminium in iron. The microstructure does not, however, reveal the duplex structure often found in other similar cases. In agreement with the results of previous workers, the magnetic transformation points were found to lie on two curves, corresponding to the ordered and disordered states. In a narrow range of composition (~24 at.-% aluminium) the alloys have two transformation points. Electrical-resistance measurements at high temperatures show that, on heating, Fe_3Al decomposes at 520° C., which practically coincides with the magnetic-transformation temperature of the alloy. Excess of either iron or aluminium over the amount theoretically required for the compound lowers the transformation temperature. The smooth course of the resistance-temperature curves in the region of 500° C. is apparently due to the magnetic transformation and decomposition of Fe_3Al proceeding simultaneously. —S. B. Y.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

MA.

[illegible]

*All[illegible] Iron with Nickel, with High Iron C[illegible]

[illegible] 37, [illegible] [illegible] The [illegible] [illegible] It is di[illegible] to tell whether [illegible] to a phase [illegible]

1947

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00051681(

CA

9

Alloys of iron and manganese. A. T. Grigor'ev and D. L. Kudryavtsev. *Izvest. Sektora Fiz.-Khim. Anal., Inst. Obshchei i Neorg. Khim., Akad. Nauk S.S.S.R.* 16, No. 2, 70-81(1940).—The dilatometric properties, thermal differential analysis, hardness, electroresistance, and microstructure of Fe alloys with up to 50% of Mn were studied depending on the behavior under changing temp. and the nature of the component phases, the alloys could be divided into several groups: (a) alloys in which the $\alpha \rightleftarrows \gamma$ transformation occurred at high temps. had a martensitic structure and their hardness and electroresistance increased sharply upon small addns. of Mn; (b) alloys in which the $\alpha \rightleftarrows \gamma$ transformation took place at low temps. had a twined structure, a very small transformation temp. interval, and the vol. increased rapidly upon heating; (c) alloys of the intermediate range in which transformation occurred at high as well as at low temps.; (d) alloys which formed a solid soln. of Mn with γ-Fe had a rather low hardness, particularly at 30% Mn. Cf. following abstr.

M. Hosch

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00051681(

***Investigation of Iron Alloys with Manganese and Chromium. I. The Austenitic Region.** A. T. Grigor'ev and D. L. Kudryavtsev (*Izved. Sekt. Fiziko-Khim. Anal.*, 1946, **16**, (2), 82–90; [illegible], 1950, **44**, 5297). [In Russian]. Alloys containing approx. 4 and 10% chromium and variable quantities of manganese were subjected to dilatometric, thermal, hardness, electrical resistance, and microstructural analyses. At a manganese content of 0–12%, the $\alpha \rightarrow \gamma$ transformation was accompanied by a considerable thermal effect, a sharp vol. decrease on heating and expansion on cooling. The max. hardness was at a point where the $\alpha \rightarrow \gamma$ transformation lines ended. This transformation took place over a temp. interval which increased with the manganese content. The $\alpha \rightarrow \gamma$ transformation occurred at a higher temp. than $\gamma \rightarrow \alpha$, thereby forming a hysteresis. The latter increased with the manganese content. The initial and final temp. of $\alpha \rightarrow \gamma$ transformation first decreased and then increased with the chromium content. In alloys with 12–30% manganese, the $\varepsilon \rightarrow \gamma$ transformation was observed at low temp. This transformation was connected with a sharp vol. expansion on heating and contraction on cooling. The thermal effect of this transformation was smaller than that of the $\alpha \rightarrow \gamma$ transformation. The $\varepsilon \rightarrow \gamma$ transformation took place within a narrow temp. interval and was not complete when cooled to room temp. The alloys between these two regions had two kinds of transformation: $\alpha \rightarrow \gamma$ at high and $\varepsilon \rightarrow \gamma$ at low temp. Alloys with > 30% manganese formed a solid solution over a wide range of concentrations and did not undergo transformation in the solid state. Up to 10% chromium did not affect the two transformations. A new constituent was observed in alloys with chromium 4 and manganese 18% and chromium 10 and manganese 27%. This phase may be identified with α manganese.

PROCESSES AND PROPERTIES INDEX

B

11

The Influence of Manganese on Polymorphic Transition in Alloys of Iron with Chromium. (In Russian.) A. T. Grigor'ev and D. L. Kudriavtsev. *Bulletin of Academy of Sciences of the U.S.S.R., Section of Chemical Sciences*, July-Aug. 1947, p. 321-336.

Two cross sections of the Fe-Cr-Mn ternary system with constant Mn contents of 0.6 and 1.4% and with different Cr contents up to 22% were studied by dilatometric analysis, hardness testing, and determination of specific electroconductivities and microstructures. The alpha gamma and reverse transitions and the areas of these phases, as revealed by the experimental work, are extensively discussed. 20 ref.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

CA

The influence of manganese on the polymorphic transition in alloys of iron with chromium. A. T. Grigor'ev and D. L. Kudryavtsev. *Bull. acad. sci. U.R.S.S., Classe sci. chim.* 1947, 329-35(in Russian).—This was an investigation of the 0.6 and 1.4%-Mn sections of the Fe-Cr-Mn system up to 22% Cr. The alloys studied were made in a low-silica Al_2O_3 crucible in a high-frequency furnace using electrolytic Cr and Mn and Armco Fe. The Cr content of the eight 0.6%-Mn (actually 0.48-0.82% Mn) specimens covered the range 3.80 to 22.57%, and the Cr content of the seven 1.4%-Mn (1.03-1.72%) specimens covered the range 6.65 to 22.07%. Dilatometric curves were obtained for annealed alloys with a Chevenard dilatometer and heating and cooling rates of 200° per hr. The $\alpha \rightleftarrows \gamma$ transformation disappeared in the 0.6%-Mn alloys at 14.56% Cr and in the 1.4%-Mn alloys at 15.53% Cr. The min. temp. of the γ loop occurred at about 8% Cr for both Mn contents. The temp. of the $\gamma \rightarrow \alpha$ transformation (cooling) falls continuously with increase in Cr content, while the temp. hysteresis of this reaction increases to a value of 400° at 11.27% Cr and 1.4% Mn. The presence of a small amt. of Mn changed the character of the transformation depending on the direction. The transformation on heating is that characteristic of a closed γ loop; the transformation on cooling is characteristic of a diagram having an open γ region. The alloys obtained by the latter process were concluded to be in a nonequil. condition, from the results of specific elec. resistance measurements on them. Rockwell hardness values were obtained on specimens homogenized at 1200° and quenched after annealing 15 days at temps. between 800 and 1200°. The results showed that with increasing Mn content the boundaries of the γ loop widen while shifting to a region of lower temp. and higher concn. An investigation of microstructures gave results that agreed exactly with those of the hardness data. The fact that quenching doesn't succeed in retaining the austenite structure was explained by the fact that on cooling the diagram is that having an open γ field. The fact that specific elec.-resistance data obtained on annealed specimens with a Thompson double bridge failed to correlate with the other results was explained on the basis of nonequil. structure of these specimens. Values are given for 25 and 100° and are on the order of 40×10^{-6}. 21 references. A. G. G.

3

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

Influence of Manganese on the Polymorphous Transformation in Iron-Chromium Alloys. (In Russian.) A. T. Grigor'ev and D. L. Kudryavtsev. *Izvestiya Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk* (Bulletin of the Academy of Sciences of the USSR, Section of Chemical Sciences), no. 2, Mar.-Apr. 1948, p. 165-173.

Two cross sections of the system Fe-Cr-Mn with a constant manganese content of 0.6% and 1.4% respectively and with a variable content of Cr up to 22% were investigated. Data are charted, tabulated, and illustrated by a series of photomicrographs. 20 ref.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

GRIGOR'YEV, A. T.

USSR/Academy of Sciences
Chemistry - Biography

Mar 49

"In the Department of Chemical Sciences" 2 pp

"Vest Ak Nauk SSSR" No 3

Session of Educ Council, Inst of Gen and Inorg Chem, heard Prof A. T. Grigor'yev's report, "A Biographical Sketch of N. I. Stepanov," and Prof V. Ya. Anosov's "N. I. Stepanov's Work on the Metrics of Chemical Diagrams." Stepanov's work on "composition-characteristic" diagrams led to important findings on speed of chemical transformations.

[redacted]

46/49T6 X

GRIGOR'YEV, A.T.; GRUZDEVA, N.M.

Study of iron - manganese - chromium alloys. Report No.2: Austennite - ferrite and ferrite region. Izv. Sekt. fiz. khim. anal. 18:92-116 '49. (MIRA 11:4)

1. Institut obshchey i neorganicheskoy khimii im. N.S. Kurnakova AN SSSR.
(Iron-chromium alloys) (Austenite) (Ferrite (Steel constituent))

Metallurgy + Metallography

The $\alpha \rightleftarrows \gamma$ transformation in the iron-chromium-manganese system. A. T. Grigor'ev, D. L. Kudryavtsev, and N. M. Gruzdeva. *J. Applied Chem. U.S.S.R.* 33, 601-5 (1960)(Engl. translation); *Zhur. Priklad. Khim.* 33, 568-74 (1960).—Hardness, microstructure, and dilatometric methods show that the $\alpha \rightleftarrows \gamma$ transformation in Fe-Cr-Mn system takes place quite uniformly. The closed γ space extends from the binary system Fe-Cr to 13% Mn, gradually dropping and expanding toward the Cr vertex as the Mn concn. increases. The boundary surfaces stop at 13% Mn, and the solid soln. undergoes the $\alpha \rightleftarrows \gamma$ transformation but remains stable with increasing Mn. With increasing Mn the closed space $\alpha + \gamma$ spreads out toward the Cr vertex and shifts to lower temps.; above 13% Mn, the boundary surfaces leave the Fe-Mn plane and drop to room temp. in the ternary system. The similar binary diagrams for Fe-Ni and Fe-Mn, the martensitic structure of the Fe-Mn and the Fe-Mn-Cr alloys after solidification, and the general structure of the ternary diagram show that diffusion accompanies the $\alpha \rightarrow \gamma$ transformation during heating but does not occur with the $\gamma \rightarrow \alpha$ transformation. K. S. McC.

GRIGOR'YEV, A. T.

Splavy zheleza s khromom i margantsem (Ferrous alloys with chromium and manganese) Diagrammy sostoyaniya. Moskva, Izd-vo Akademii Nauk SSSR, 1952. 155 p. illus., diagrs.
"Literatura": p. 152-(156)
At head of title: Akademiya Nauk SSSR. Institut Obshchey i Neorganicheskoy Khimii.

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00051681(

GRIGOR'YEV, A.T.; GRUZDEVA, N.M.

Effect of carbon on the formation of the structural diagram of the system iron - chromium - manganese. Izv.Sekt.fiz.-khim.anal. 21:121-131 '52. (MLRA 6:7)

1. Institut obshchey i neorganicheskoy khimii imeni N.S.Kurnakova Akademii nauk SSSR. (Iron - chromium - manganese alloys)

GRIGOR'YEV, A. T.

Chemical Abstracts
May 25, 1954
Metallurgy and Metallography

The chemical nature of the σ-phase in the system iron-chromium. A. T. Grigor'ev, N. M. Gruzdeva, and I. A. Bondar (N. S. Kurnakov Inst. Gen. Inorg. Chem., Acad. Sci. U.S.S.R., Moscow). *Izvest. Sektora Fiz.-Khim. Anal., Inst. Obshchei Neorg. Khim., Akad. Nauk S.S.S.R.* 21, 132-43(1952).—The investigated binary system Fe-Cr was part of a ternary Co-Cr-Fe system and of a Fe-Cr system contg. 2% Ni. The alloys studied were homogenized at 1200° for several hrs. They were then annealed at constantly decreasing temps. for constantly longer periods starting with 1000° for 6 days and extending to 13 days at 500°. Addnl. anneal was given the alloys at temps. below the α and α + σ boundary down to room temp. at 100° intervals. In this range the duration was 20-30 days for each step. Thus prepd. specimens were subjected to thermal, dilatometric, microscopic, hardness, and magnetic transformation analyses. A homogeneous σ-phase extended from 46-47 to 50-51% Cr. In the presence of 2% Ni the σ-phase extended between 44 and 53% Cr. The boundary between the areas of α and α + σ on the Fe side is along approx. 30.5 at. % Cr. The highest hardness was observed in alloys contg. 49.98 at. % Cr. This is within the area of homogeneous σ-phase. The absence of a singular point on the hardness curve for the Fe:Cr at. ratio 1:1 indicates that the σ-phase is berthollitic rather than a daltonide. The α ⇄ σ transformation was at 910°. This is higher than the 810° given by Cook and Jones (*Metallurgia* 235(1943); *C.A.* 37, 6232[9]). The difference is explained by the difference in procedure: the rapid heating employed in thermal and dilatometric analyses in this investigation and the prolonged thermal treatment used by Cook and Jones.

M. Hosch

GRIGOR'YEV, A T

Investigation of the alloys of palladium with silicon. A. T. Grigor'ev, L. A. Strunina, and A. S. Adimova (M. V. Lomonosov State Univ., Moscow). *Izvest. Sektora Platiny i Drug. Blagorod. Metal., Inst. Obshchei i Neorg. Khim., Akad. Nauk S.S.S.R.* No. 27, 210-22(1952).—Alloys from 7.2 to 82.01 at. % Si were studied by thermal analysis, microstructure, and hardness. The alloys were prepd. with Pd pptd. by Na formate from a soln. of HCl and with Si contg. 0.93 wt. % Fe. Fifteen-g. melts were made in corundum crucibles under $BaCl_2$ slag in a Kryptol furnace. For analysis, the alloys were pulverized and dissolved by heating in aqua regia. The Pd dissolved but the Si remained in the finely divided state, partly as SiO_2. The soln. was twice evapd. almost to dryness with HCl to remove oxides of N. The residue was treated with distd. H_2O and filtered. The Pd was pptd. from the neutral soln. by reduction with Na formate in the presence of NaOAc. The Pd was filtered off and dried at 118 to 120°. Si was detd. by difference. Thermal analyses were made with a Kurnakov pyrometer and Pt-Rh thermocouples and the results showed that the equil. diagram consisted of 3 regions of eutectic reaction sepd. by the compds. Pd_2Si and PdSi. The eutectic temps. and compns. were: 800°, 16 at. % Si; 720°, 43; 850°, 58. The m.p. of Pd_2Si was 1250° and of PdSi was 1100°. Microstructures of cast and annealed (7 days at 700°, cooled during 6 days) alloys were etched with hot 20% aqua regia. The structure of the annealed 50.95 at. % Si alloy showed large Si crystals rather than the expected eutectic structure. The Vickers hardness (10 kg.) of the Pd-rich alloys increased with Si content as follows: 0 at. % Si, 60 kg./sq. mm.; 7.20, 234.5; 14.40, 304.5; 32.00, 465.0.

A. G. Guy

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00051681(

CA

Equation of the crystallization surface of an indifferent component in a ternary system with one binary chemical compound. A. T. Grigor'ev (N. S. Kurnakov Inst. Gen. Inorg. Chem., Moscow). *Doklady Akad. Nauk S.S.S.R.* 83, 231-4(1952).—In a system $A_1 + A_2 + A_3$, in the absence of chem. interaction, the equation of the crystn. surface in the ternary eutectic system, derived from the Gibbs-Duhem equation, is $n_1 d \ln n_1 + n_2 d \ln x_2 = -n_3(L_3/RT^2)dT$ (equation I), where n is the no. of moles, and L the heat of fusion. This equation is valid for an ideal system. If the nos. of moles are such that $n_1 + n_2 + n_3 = 1$, and $n_3 = x_3$, the equation can be written in the form $d \ln x_3 = (L_3/RT^2)dT$. In the presence of a chem. reaction between A_1 and A_2, represented by $n_1A_1 + n_2A_2 = n_4A$, with the compd. A melting congruently, with no solid solns. present, an analogous thermodynamic derivation (for ideal solns.) leads to the equation $n_3 d \ln x_{3e} + n_4 d \ln n_{4e} = -[(n_3L_3 + l\xi Q_p)/RT^2]dT$ (equation II), where the subscript e refers to equil. concns., $l = n_2/n_1$, and ξ is the degree of chem. conversion; $l\xi n_1$ is the no. of moles of A_1 reacted, and $l\xi n_4$ is the no. of moles of A formed; Q_p is the heat of the chem. reaction. Combination of equations I and II gives $n_3 d \ln x_{3e} + n_4 d \ln x_{4e} = n_3 d \ln x_3 + n_4 d \ln n_4 - (l\xi Q_p/RT^2)dT$, or $n_3 d \ln (x_{3e}/x_3) + n_4 d \ln (x_{4e}/x_3) = -(l\xi Q_p/RT^2)dT$.

N. Thon

GRIGOR'YEV, A.T.

Equation of the crystallization surface of a binary chemical compound, melting congruently in a ternary system. Doklady Akad. Nauk S.S.S.R. 84, 989-92 '52. (MLRA 5:7)
(CA 47 no.20:10325 '53)

GRIGOR'YEV, A.T.

Equations of the crystallization surface of a congruently melting ternary chemical compound and of its components in the ternary system. Dokl. Akad. Nauk S.S.S.R. 85, 1281-4 '52. (MLRA 5:9)
(CA 47 no.21:10983 '53)

GRIGOR'YEV, A. T.

Solid State Physics, Thermodynamics (4896)
Izv. Sektora Fiz.-Khim. Analiza (Inst. Obshch. i Neorgan. Khimii A. N. SSSR),
No 22, 1953, pp 122-128
Grigor8yev, A. T., and Gruzdeva, N. M.
Effect of Tungsten on the Structure of Diagram of State of the Ternary
System Iron-Chromium-Magnanese

An isothermal cross section at room temperature is made of the diagram Fe-Cr-Mn + 2% W within limits of 6-16% Mn and 30% Cr. It was found by metallographic investigation that the presence of W shifts the exterior limit of gammaloop to higher concentrations of Cr, which leads to a formation of a three-phase region.

So: Moscow, Referativnyy, Zhurnal,-- Fizeka, No 5, 1954 W-31059

GRIGOR'YEV, A.T.

<u>Transformations in solid state</u> in the system iron-chromium-nickel. I. Distribution of phase domains at room temperature. A. T. Grigor'ev and I. A. Bondar. *Izvest. Sektora Fiz.-Khim. Anal., Akad. Nauk S.S.S.R.* 23, 142–54(1953).—The purpose of this investigation was the diagram of state of the system Fe–Cr–Ni with up to 55% Cr and 20% Ni. Alloy specimens were homogenized for 5 hrs. at 1200°, then the temp. was lowered stepwise by 100° and the time extended as the temp. decreased. The total time was 600 hrs. Phase boundaries were ascertained by microscopic examns. and detn. of microhardness. On the phase diagram of this system are found 3 monophase areas α, γ, and σ, four 2-phase areas $\alpha + \gamma$, $\gamma + \sigma$, and $2 \alpha + \sigma$, and two 3-phase $\alpha + \gamma + \sigma$ areas. M. Hosch

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GRIGOR'YEV, A.T.

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USSR.

Equations for the crystallization surface in ternary reciprocal systems. A. T. Grigor'ev. *Doklady Akad. Nauk S.S.S.R.* 88, 278-0(1953); cf. C.A. 47, 10083g.—Math. Equations are developed for the crystn. surface in ternary systems in which a vol. decompn. or mutual displacement occurs. J. Rovtar Leach

BB GRN

GRIGOR'YEV, A. T.

USSR/Chemistry - Silver-chrome alloys

FD-677

Card 1/1 : Pub. 129 - 12/25

Author : Grigor'yev, A. T.; Sokolovskaya, Ye. M.; Kruglova, M. I.

Title : Alloys of silver with chromium

Periodical : Vest. Mosk. un., Ser. fizikomat. i yest. nauk, Vol. 9, No. 3, 77-82, May 1954

Abstract : Investigate the silver-chromium system by thermal analysis, micro-hardness measurements, and study of macro-and micro-structures. Establish the silver-chromium equilibrium diagram from these results.

Institution : Laboratory of the Chemistry of Metallic Alloys

Submitted : February 4, 1952

GRIGOR'YEV, A.T.; SOKOLOVSKAYA, Ye.M.; KRUGLOVA, M.I.

Silver-chromium alloys. Vest.Mosk.un. 9 no.5:77-81 My '54.
(MLRA 7:7)

1. Laboratoriya khimii metallicheskikh splavov.
(Silver-chromium alloys)

Evaluation B-82533

GRIGOR'YEV, A.T.

USSR

13228 The Chemical Nature of the Sigma Phase in the Iron-Chromium System. A. T. Grigor'ev, N. M. Gruzdeva, and I. A. Bondar. Henry Brutcher Translation No. 3454, 15 p. (Condensed from *Izvestiya Sektora Fiziko-Khimicheskogo Analiza*, v. 21, 1954, p. 132-143.) Henry Brutcher, Altadena, Calif.

Discussion of nature of σ phase in the light of hardness measurements. Correlation of results of present research with literature (chiefly Russian). Tables, diagrams, micrographs. 7 ref.

(2)

GRIGOR'YEV, A.T.; GRUZDEVA, N.M.

Study of cobalt-chromium alloys. Izv.Sekt.fiz.-khim.anal. 24:124-131 '54. (MIRA 8:4)

1. Institut obshchey i neorganicheskoy khimii im. N.S.Kurnakova Akademii nauk SSSR.
(Cobalt-chromium alloys)

GRIGOR'YEV, A.T.; BONDAR', I.A.

Solid-state conversions in the system: iron — chromium -- nickel. Report no.2. Structural diagram. Izv.Sekt.fiz.-khim.anal. no.25: 94-116 '54. (MIRA 8:5)

1. Institut obshchey i neorganicheskoy khimii im. N.S.Kurnakova Akademii nauk SSSR.
(Iron-chromium-nickel alloys)

GRIGOR'YEV, A.T.

Investigation of alloys of the system aluminum-palla-
dium. V. A. Nemilov, A. T. Grigor'ev, and T. A. Strunina.
Izvest. Sektora Platiny i Drug. Blagorod. Metal., Inst. Obsh-
chei i Neorg. Khim., Akad. Nauk S.S.S.R. 1954, No. 28,
276-9.—This was the first exptl. study of this system.
Twenty three alloys, ranging from 2 to 96.5 at % Pd were
prepd. from refined Pd and from Al contg. 0.001 wt. % im-
purities by melting in a Kryptol furnace in a corundum cru-
cible under a slag of KCl and NaCl for the Al-rich alloys
and of dehydrated $BaCl_2$ for the Pd-rich alloys. Data from
cooling-curve detns. and chem. analysis were used to con-
struct an equil. diagram. There was a eutectic reaction in-
volving Al or its dil. solid soln. and Al_4Pd at 630° and 7 at.
% Pd, a peritectic involving Al_3Pd_2 and Al_4Pd at 794° and
25%, a peritectic involving α-AlPd and Al_3Pd_2 at 910° and
40%, a phase change from α-AlPd to β-AlPd at 1046°, a
peritectic involving β-AlPd and the γ-solid soln. contg.
about 78 at. % Pd at 1300° and 60%, and a region of solid-
soln. formation of the γ solid soln. of Pd ranging from the
m.p. of Pd down to 1311°, from liquid compns. of 100% to
about 45%, and from γ compns. of 100% to about 78%.
Solid soln. formation was not studied in Al-rich alloys but
occurred in the γ-phase. The compn. of γ was estd. to de-
crease to 85 at. % Pd at 300°. Microscopic examn. was
made of alloys homogenized for 8 hrs. at 900° (Pd-rich) or
for 10 hrs. at 550° (Al-rich) and cooled during about 25 hrs.
to room temp. Etching of the Pd-rich alloys was with 4%
nital and of the Al-rich alloys was with an aq. soln. of 1%
HNO_3 + 1% HCl + 1% HF. The micrographic results
agreed well with the cooling-curve data, however, some
anomalies were observed in the Pd-rich alloys and it was
concluded that addnl. work was needed on the Pd-rich half
of the diagram. X-ray studies showed that Al_4Pd had an
orthorhombic structure with $a = 7.07 \pm 0.005$, $b = 7.51_6 \pm$
0.005, $c = 5.07_1 \pm 0.005$ kX. Al_3Pd_2 was hexagonal with
$a = 4.200_5 \pm 0.001$ and $c = 5.156 \pm 0.002$. β-AlPd was
body-centered cubic of the CsCl type with $a = 3.043 \pm$
0.0008. α-AlPd was hexagonal with $a = 3.951_4 \pm 0.001$
and $c = 5.603 \pm 0.002$. A. G. Guy

GRIGOR'YEV, A.T.

Study of alloys of palladium with silver and copper. V. A. Nemilov, A. T. Grigor'ev, and E. M. Sokolovskaya (M.V. Lomonosov State Univ., Moscow). *Izvest. Sektora Platiny i Drug. Blagorod. Metal., Inst. Obshchei i Neorg. Khim., Akad. Nauk S.S.S.R.* No. 29, 163-82(1955); cf. C.A. 37, 2704; 44, 6207c; 45, 5224; 49, 2143d.—The previous work on the 3 binary systems and the ternary system was reviewed. For the exptl. work 60 alloys were prepd. covering the ternary [illegible] from [illegible] [illegible] and Cu [illegible] were [illegible]. Most of the alloys were analyzed chemically. The alloys were studied by thermal analysis, metallography, hardness tests, and by specific elec. resistance, and its temp. coeff. Cast alloys that had been annealed for 150 to 200 hrs. near the solidus temp. and then slowly cooled to room temp. were studied microscopically. An addnl. heating for 10 to 40 hrs. at temps. from 400 to 675° preceded quenching in ice water. Brinell hardness values were obtained with a 10-mm. ball and a 250-kg. load. Elec. resistance was measured on wire specimens. Microhardness was measured in the range 40 to 60% Pd under loads of 20 to 100 g. Differential heating curves were obtained at 7°/min. The results showed the expected general features and were presented in the form of vertical sections at 10% intervals in Pd content, the liquidus surface, and a composite diagram of isothermal sections. The binary eutectic line extended into the diagram to 30% Pd. Beyond this compn. the 3-phase region in the vertical section was still triangular with its vertex just below the liquidus curve. Also, when the 3-phase region broke away from the liquidus surface the triangular contour changed into a line connecting the compn. of the end of the eutectic line with the crit. point of the surface of solid solns. The mutual soly. of Ag and Cu increased with increase in per cent Pd. The region of ternary solid soly. at room temp. extended from the Pd corner of the diagram to 60% Pd. The presence of the binary compds. $PdCu_3$ and Pd_3Cu_5 was indicated. The max. hardness, about 146 Brinell, occurred at about 60% Pd and 25% Ag. The max. elec. resistance, about [illegible] microhm cm., occurred at about [illegible]% Pd and [illegible]% Ag.

A. G. Guy

(2)

PM

Grigor'ev A. T.

E-4

Category : USSR/Solid State Physics - Systems

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3782

Author : Grigor'ev, A.T., Sokolovskaya, Ye. M., Maksimova, M.V.
Title : Investigation of Alloys of the Gold-Cobalt System

Orig Pub : Zh. neorgan. khimii, 1956, 1, No 5, 1047-1051

Abstract : The microstructure, hardness, electric resistivity, and temperature coefficient of electric resistivity of Au-Co alloys were studied. The initial materials were 99.99% gold and cobalt containing approximately 0.01% carbon. The resulting diagram of state is good agreement with data of other investigators. Increasing the Co content results in a linear increase in the hardness of the alloys in the two-phase region, reaching 145 kg/mm^2 at 98% Co. In the solid-solution region, the hardness drops off towards the pure components, sharply towards Au, and less sharply towards Co. The electric resistivity of the alloys first increases as Co is added, and then varies almost linearly with a slight reduction towards Co. The temperature coefficient of the electric resistivity varies also almost linearly in the two-phase region, and increases with increasing content of Co.

Card : 1/1

GRIGOR'YEV A.T.

E-4

Category : USSR/Solid State Physics - Systems

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 6599

Author : Grigor'ov, A.T. Sokolovskaya, Ye.M., Budennaya, L.D., Iyutina, I.A., Maksimova, M.V.

Title : Investigation of the Palladium-Gold-Cobalt System

Orig Pub : Zh. neorgan. khimii, 1956, 1, No 5, 1052-1063

Abstract : Thermal-analysis methods and studies of the hardness and the microstructure after annealing and hardening from different temperatures, of the specific electric resistivity, and of its temperature coefficients were all used for the first time to study the Pd-Au-Co triple system. The two-phase region in the gold-cobalt system spreads extensively into the triple region, which reaches up to 47% Pd at the center of the diagram at room temperature, and is gradually reduced with increasing temperature, reaching 35% Pd at 1000°. The double-eutectic line starts out from the eutectic point of the Au-Co system and extends into the triple system until it reaches a section with 20% Pd. The remaining portion of

Card : 1/2

USSR/Thermodynamics - Thermochemistry. Equilibria. Physical-Chemical Analysis. Phase Transitions. B-8

Abs Jour : Referat Zhur - Khimiya, No 6, 1957, 18503

Author : A.T. Grigor'yev, L.A. Panteleymonov, L.M. Viting, V.V. Kuprina.

Title : Study of System Copper - Cobalt.

Orig Pub : Zh. neorgan. khimii, 1956, 1, No 5, 1064-1066

Abstract : The system Cu - Co was studied by the methods of thermal analysis of microstructure and hardness (Brinell's method). The initial materials were electrolitic Cu and Co containing not more than 0.01% of C. Melting was carried out in a Kryptol furnace in corundum crucibles under $BaCl_2$ slag. The results of chemical analyses of the top and bottom sides of alloys do not confirm the bibliographic data concerning the solubility absence in the liquid state. No signs of foliation were discovered. A small addition of Cu to Co causes a sharp rise of the alloy hardness. The phase graph is attached.

Card 1/1

E-4

Category : USSR/Solid State Physics - Systems

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3792

Author : Grigor'ev, A.T., Panteleymonov, L.A., Kuprina, V.V., Rybak, L.I.

Title : Investigation of the Palladium-Copper-Cobalt System.

Orig Pub : Zh. neorgan. khimii, 1956, 1, No 5, 1067-1073

Abstract : The diagram of state of the Pd-Cu-Co system was investigated by metallographic methods and by methods of thermal analysis, hardness measurement, measurement of electric resistivity, and measurement of the temperature coefficient of electric resistivity. It is shown that the mutual solubility of Cu and Co increases with increasing Pd contents. The heterogeneous region of the Cu-Co system is transformed into a triple system at room temperature, is gradually reduced with increasing content of Pd in the alloys, and is closed at approximately 55% Pd. The hardness of alloys of the sections through the triple diagram with constant Pd content increases strongly from Pd-Cu side, passes through a maximum, and diminishes towards the Pd-Co side. The electric resistivity of the Pd-rich sections of the system varies in an analogous manner.

Card : 1/1

USSR/Physical Chemistry - Thermodynamics. Thermochemistry. Equilibrium. Physico-Chemical Analysis. Phase Transitions B-3

Abs Jour : Referat Zhur - Khimiya, No 2, 1957, 3731

Author : Grigor'yev A.T., Panteleymonov L.A., Sokolovskaya Ye.M., Bunina T.V., Mastyugina M.V.

Inst : Institute of General and Inorganic Chemistry, Academy of Sciences USSR

Title : Investigation of Alloys of the Palladium-Cobalt-Nickel System

Orig Pub : Izv. Sektora Fiz.-khim. analiza IONKh, AN SSSR, 1956, 27, 185-197

Abstract : By methods of thermal analysis, investigations of microstructure, hardness and electric resistance, a study has been made of the Pd-Co-Ni system. Shape of liquidus and solidus curves of sections with constant Pd content, and also the microstructure of the alloys, indicate that the components of the ternary system Pd-Co-Ni form with one

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USSR/Physical Chemistry - Thermodynamics. Thermochemistry. Equilibrium. Physico-Chemical Analysis. Phase Transitions B-8

Abs Jour : Referat Zhur - Khimiya, No 2, 1957, 3731

another a continuous series of solid solutions. Addition of Co to Pd-Ni alloys results in a lowering of the hardness of the latter. Small additions of Ni to Pd-Co alloys decrease greatly the hardness of binary alloys rich in Co; in the case of alloys less rich in Co, additions of Ni result in slight decrease of hardness. Specific electric resistance of alloys increases with rising temperature. Lines of equal specific electric resistance at 25° show that it decreases from the palladium corner of the system, toward the Co-Ni side and at the same time the temperature coefficient of electric resistance decreases from the palladium corner of the system, toward the central part of the diagram and then increases again to the Co-Ni side. It was found that changes in properties of alloys, depending on the composition (hardness, electric resistance), on sections of constant Pd content,

Card 2/3

USSR/Physical Chemistry - Thermodynamics. Thermochemistry. B-8
Equilibrium. Physico-Chemical Analysis. Phase Transitions

Abs Jour : Referat Zhur - Khimiya, No 2, 1957, 3731

take place along curves not similar to curves of binary systems with a continuous series of solid solutions.

Card 3/3

GRIGOR'YEV, A. T.

USSR/Solid State Physics - Phase Transformation in Solid Bodies E-5

Abs Jour : Ref Zhur - Fizika, No 1, 1958, 989

Author : Grigor'ev, A.T., Sokolovskaya, Ye.M., Pyatnitskiy, V.N.

Inst : Moscow State University

Title : Transformations in the Solid State in Alloys of the Copper-Zinc System in the Region of the α-Solid Solution.

Orig Pub : Zh. neorganich. khimii, 1957, 2, No 7, 1547-1551

Abstract : An investigation was made of the system Cu-Zn in the region of the α-solid solution using the methods of differential thermal analysis, electric resistivity at high temperature, hardness, heat capacity, X-ray analysis, electric resistivity, and its temperature coefficient. Two kinds of transformations have been established in alloys, and these are explained by the authors by the formation of two modifications of the chemical compound Cu_3Zn, namely

Card 1/2

AUTHORS: Grigor'yev, A. T., Panteleymonov, L. A., Kuprina, V. V., Vorob'yev, V. S.

SOV/78-3-11-17/23

TITLE: The Investigation of the System Gold-Silver-Cobalt (Issledovaniye sistemy zoloto-serebro-kobal't)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol 3, Nr 11, pp 2532-2536 (USSR)

ABSTRACT: The phase diagram of the system gold-silver-cobalt was constructed and investigated. The investigations covered the thermal analysis, microstructure, Brinell hardness, electric resistance, and its temperature coefficients. The purest metals with impurities of a maximum of 0,01% were the source material. The alloys were treated in krypton furnaces under a barium chloride layer.

The fusion and hardness diagrams of the system Ag-Co in the case of a varying Au-content are given in the figures 2 and 3. The determination of the electric resistance was carried out by means of a potentiometer at 25° and 100°C. The electric resistance of the system Ag-Co in the case of a varying Au-content is given in figure 4. The electric resistance reaches a maximum

approximately at a ratio of Ag : Co = 1 : 1. The results of the calculation of the temperature coefficients of the electric resistance in the temperature range 25 - 100°C are given in the tables 1 and 5. The diagrams of the temperature coefficients analogous to the diagrams mentioned above have a maximum and a minimum.

The microstructure of the alloys was investigated after the determination of the hardness of the latter. Dark phases in the alloys are rich in cobalt, light phases are rich in gold. The limits of the individual ranges in the phase diagram were determined by means of the microstructure investigations. The investigations showed that the separation zone in the binary system silver-gold exists at room temperature and is reduced by the addition of gold. It vanishes completely in the range of about 67% gold.

There are 6 figures, 2 tables, and 10 references, 4 of which are Soviet.

SUBMITTED: October 21, 1957

AUTHORS: Kuprina, V. V., Grigor'yev, A. T. SOV/78-3-12-21/36

TITLE: Investigations of Alloys of the System Iron-Cobalt-Palladium (Issledovaniye splavov sistemy zhelezo-kobal't-palladiy) I. Melting Curves of the System Iron-Cobalt-Palladium (I. Diagramma plavkosti sistemy zhelezo-kobal't-palladiy)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol 3, Nr 12, pp 2736-2739 (USSR)

ABSTRACT: To determine the melting curves of the iron-cobalt-palladium system, alloys were studied which had a constant palladium content of 10-90 atoms % and varying iron and cobalt contents. As the starting materials the purest electrolytic iron, refined palladium and cobalt, and a carbon content not higher than 0.01% were used. The cooling curves were plotted using a Kurnakov recording pyrometer. The form of the liquidus and solidus curves of the sections shows that in the ternary system Fe-Co-Pd a continuous series of solid solutions form. The crystals of the solid solutions were ascertained by a micro-structural determination.

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Investigations of Alloys of the System Iron-Cobalt-Palladium. I. Melting Curves of the System Iron-Cobalt-Palladium SOV/78-3-12-21/36

Hardness determinations were carried out on alloys tempered at 1000° C. There are 4 figures, 1 table, and 27 references, 7 of which are Soviet.

SUBMITTED: July 24, 1958

Card 2/2

5(3), 18(6) SOV/156-59-2-15/48

AUTHORS: Pyatnitskiy, V. N., Grigor'yev, A. T., Sokolovskaya, Ye. M.

TITLE: On Transformations in Solid Phase in Alloys of the System Silver - Zinc in the Range of the Solid α-Solution (O prevrashcheniyakh v tverdom sostoyanii v splavakh sistemy serebro - tsink v oblasti α-tverdogo rastvora)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Khimiya i khimicheskaya tekhnologiya, 1959, Nr 2, pp 280-283 (USSR)

ABSTRACT: Investigations by other authors (Refs 1-10) pointed out anomalies in the system silver - zinc which are more closely investigated by the present paper. The method of differential thermal analysis, the measurement of the electric resistance at high temperature and its temperature coefficient, as well as hardness are applied. The differential curves of thermal analysis show each of them two heat effects at low and at high temperature (Fig 1) pointing out endothermal transformations in the α-range and which are caused by stable phase transitions. Figure 2 gives the phase diagram and table 1 the temperatures at which the effects set in. The phase diagram shows that at long annealing Ag_3Zn forms which has two modifications: α_1 at low and α_2 at high temperature. The curves

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APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00051681(

SOV/156-59-2-15/48

On Transformations in Solid Phase in Alloys of the System Silver - Zinc in the Range of the Solid α-Solution

electric resistance - temperature (Fig 3) of the alloys with 17.6 - 36.0% by atom Zn confirm the formation of Ag_3Zn and facilitate a more accurate determination of the transformation temperature (Table 2). The differences between the values of the thermal analysis and the measurement of resistance are explained by the different rates of heating. The hardness of annealed alloys (Table 3, Fig 4) shows in the range of 25% by atom Zn a broad, flat minimum which is also indicative of Ag_3Zn. The minimum at 31% by atom Zn might indicate the limit of the solubility of zinc in silver at low temperature. The temperature coefficient of the electric resistance shows a maximum at 25% by atom zinc which is also explained by the formation of Ag_3Zn. There are 4 figures, 4 tables, and 12 references, 2 of which are Soviet, and 1 Polish.

PRESENTED BY: Kafedra obshchey khimii Moskovskogo gosudarstvennogo universiteta im. M. V. Lomonosova (Chair of General Chemistry, Moscow State University imeni M. V. Lomonosov)

SUBMITTED: November 28, 1958

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APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00051681(

18(6)

AUTHORS: Grigor'yev, A. T., Kuprina, V. V., Nedumov, N. A. SOV/78-4-3-24/34

TITLE: The Phase Diagram of the System Chromium - Tantalum (Diagramma sostoyaniya sistemy khrom - tantal)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 3, pp 651-654 (USSR)

ABSTRACT: The system chromium - tantalum was investigated by the method of thermal and microscopic analysis. As initial product tantalum was used in a purity of 99.4 % and chromium in a purity of 99.68 %. Chromium diffuses extremely slowly in tantalum alloys. In order to attain the equilibrium a longer treatment at higher temperature is necessary. In the system the chemical compound Cr_2Ta is formed, which melts at 2,020° without decomposing. The chemical compound Cr_2Ta dissolves the individual components to a hardly recognizable extent. It was found that the chemical compound Cr_2Ta forms a eutectic with solid solutions of chromium in tantalum at 1,980° and 75 % tantalum. With solid solutions of tantalum

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in chromium it forms a eutectic mixture at 1,700° and 34 % tantalum. The solubility of tantalum in chromium amounts at a eutectic temperature to ~10 %. This value agrees well with the values given in publications. The cooling curve of the alloy was plotted corresponding to the chemical compound Cr_2Ta. The first thermal effect at 2,020° corresponds to the crystallization of the alloy from the liquid state. The second effect at 1,805° points to the transformation of the modification of Cr_2Ta from $\zeta \rightarrow \varepsilon$. Based upon the results the phase diagram chromium - tantalum was plotted and is given in figure 4. There are 4 figures and 2 references.

SUBMITTED: July 2, 1958

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00051681(

18(3)

AUTHORS: Kuprina, V. V., ~~Grigor'yev, A. T.~~ SOV/78-4-3-25/34

TITLE: Investigation of the System Iron - Palladium (Issledovaniye sistemy zhelezo - palladiy)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 3, pp 655-661 (USSR)

ABSTRACT: The system iron - palladium was investigated by microstructural and differential-thermal analysis, determination of the electric resistance and hardness. The hardness of the alloys was determined in softened and hardened samples at 1,000°, 900°, 800°, 750°, 700°, and 600°. Microstructural analysis was carried out on the same sample. The electric resistance was determined at 25° and 100° by means of the potentiometer PPTN-1. Based upon the microstructural and differential-thermal analysis the diagram was plotted and is given in figure 1. This system contains two chemical compounds: PdFe and Pd_3Fe. The solubility of palladium at 800° in α iron is not more than 5 atom %. γ iron mixes with palladium to an unlimited extent. In the case of alloys with 40 atom % palladium a polymorphic transformation occurs at

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Investigation of the System Iron - Palladium SOV/78-4-3-25/34

low temperatures caused by the transition of α iron into γ iron. Hardness in hardened alloys with 40-80 atom % palladium is characterized by a minimum. In the case of higher temperatures the minimum in hardened alloys is more intensive. As an explanation for the minimum the formation of martensite and the stabilization of the γ phase are mentioned. The chemical compound Pd_3Fe occurs in the case of low temperatures as PdFe. The curves of the specific electric resistance at 25° and 100° and of the temperature coefficient show marked singular points of the chemical compound PdFe in the hardened alloy. In the case of softened alloys the curve of hardness shows a weakly marked minimum. The section of the curve limiting the chemical compounds leads to the formation of a eutectic point at 65 atom % palladium. There are 5 figures, 3 tables, and 10 references, 4 of which are Soviet.

SUBMITTED: September 30, 1958

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5(2), 18(3), 18(7) SOV/78-4-7-23/44

AUTHORS: Kuprina, V. V., Grigor'yev, A. T.

TITLE: Conversions in the Solid State of the Alloys of Iron With Cobalt and Palladium (Prevrashcheniya v tverdom sostoyanii v splavakh zheleza s kobal'tom i palladiyem)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 7, pp 1606-1612 (USSR)

ABSTRACT: An investigation was carried out of alloys in the cross section of the phase diagram parallel to the iron-cobalt side with a palladium content of 2, 5, 10, 20, 30, 40 and 50 at% Pd by the method of the differential thermal analysis and examination of the microstructures. The results obtained are shown in a table and in figure 1. The analysis of the thermograms (Figs 2,3) proved that in the majority of cases of investigated alloys a conversion in the solid state occurs within the range of between 700 and 900°, which is accompanied by considerable thermal effects. A comparison between the data of the thermal analysis and those of the microstructures showed that these effects correspond to the temperature of transition from the heterogeneous range into the range of the solid γ-solutions. With an increase

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SOV/78-4-7-23/44

Conversions in the Solid State of the Alloys of Iron With Cobalt and Palladium

in the palladium content the curves separating the range of the mechanical mixture from that of the homogeneous solid solution become increasingly higher, pass through a flat minimum, and then decline sharply. An eutectoidal decay in the system Fe - Pd, in the case of alloys that are rich in iron, leads to a broad three-phase range $\alpha-\gamma-\gamma_1$ (γ_1 = solid solution in the compound PdFe). Figure 5 shows the microstructures of the hardened or annealed alloys. With a content of 2 at% Pd the ordered range α_1 enters into the two-phase range ($\alpha+\gamma$), where it is conserved until about 46 at% Pd is attained. The range of the ternary solid γ-solutions, in the case of alloys rich in cobalt, as well as in that of alloys containing more than 50 at% Pd, is conserved right down to room temperature. There are 5 figures, 1 table, and 13 references, 3 of which are Soviet.

SUBMITTED: January 28, 1959

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SOV/78-4-9-18/44

5(2),18(7)

AUTHORS: Pyatnitskiy, V. N., Grigor'yev, A. T., Sokolovskaya, Ye. M., Lysova, Ye. V.

TITLE: On Transformations in Solid State in the Alloys of the System Silver - Cadmium in the Range of the Solid α-Solution

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 9, pp 2039-2042 (USSR)

ABSTRACT: The above system was chosen in expectance of an analogy to the solid solutions Cu-Zn, Au-Zn, and Au-Cd, which exhibit transformations in the solid state. Thermal analysis was applied together with the determination of the hardness of annealed alloys hardened by quenching. Alloys containing 2 - 40 atom% Cd were investigated. Thermal analysis was carried out by means of a PK-52 pyrometer. Thermal effects indicating transformations in the solid α-solution occurred as shown in figure 1. Results are given in table 1, the phase diagram in figure 2. Compounds formed were Ag_3Cd at 370°, Ag_2Cd at 450°, and another below 700° containing 4 - 8 atom% Cd, the composition of which is being investigated. The hardness of the annealed alloys is given in table 2 and figure 3. One wide minimum in the region

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On Transformations in Solid State in the Alloys of the System Silver - Cadmium in the Range of the Solid α-Solution SOV/78-4-9-18/44

25 - 33 atom % Cd replaces the two minima expected for Ag_3Cd and Ag_2Cd, thus indicating formation of a eutectic. The hardness of the alloys heated to 300 and 550° and quenched with solid carbon dioxide (Table 3, Fig 4) reveals that at 300° the minima in the regions 25 - 33 atom % and 4 - 8 atom % Cd are maintained whereas at 550° only the latter is preserved and still found at 650°. The heat capacity and electric resistance of these alloys at high temperatures are being investigated at present. There are 4 figures, 3 tables, and 7 references, 2 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova Kafedra obshchey khimii (Moscow State University imeni M. V. Lomonosov, Chair of General Chemistry)

SUBMITTED: October 9, 1958

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SOV/78-4-9-38/44

5(2)

AUTHORS: Grigor'yev, A. T., Guseva, L. I., Sokolovskaya, Ye. M., Maksimova, M. V.

TITLE: On Polymorphous Transformations of Chromium in Alloys With Tantalum

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 9, pp 2168-2169 (USSR)

ABSTRACT: The cooling curve for liquid chromium determined by N. A. Nedumov (Ref 4) exhibits, in the vicinity of the very distinct maximum corresponding to the crystallization temperature, a second maximum which relates to the transition of chromium into another modification at 1815°. By means of microscopic, thermal, and X-ray analyses the chromium-tantalum alloy was investigated in the range rich in chromium after hardening; The location of the solidus and the limits of solubility of Ta in Cr were checked. 1830° was found to be the temperature of transition between the modifications ε and δ. In contrast with the data obtained by N. Grant (Refs 1, 2) it was found that immediately after freezing chromium does not possess a face-centered but a cubic body-centered

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crystal lattice, which is in agreement with the fact that a continuous series of solid solutions of chromium and σ-iron form. There are 1 figure and 4 references, 1 of which is Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova Kafedra obshchey khimii (Moscow State University imeni M. V. Lomonosov, Chair of General Chemistry)

SUBMITTED: January 12, 1959

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SOLOV'YEV, Yuriy Ivanovich; ZVYAGINTSEV, Orest Yevgen'yevich; GRIGOR'YEV, A.T., prof., otv.red.; BANKVITSER, A.L., red.izd-va; MAKUNI, Ye.V., tekhn.red.

[Nikolai Semenovich Kurnakov; his life and works] Nikolai Semenovich Kurnakov; zhizn' i deiatel'nost'. Moskva, Izd-vo Akad. nauk SSSR, 1960. 205 p. (MIRA 13:4)
(Kurnakov, Nikolai Semenovich, 1860-1941)

18.1150 2308, 1471, 1456

84308
S/189/60/000/004/004/006
B002/B060

AUTHORS: Grigor'yev, A. T., Sokolovskaya, Ye. M., Simanov, Yu. P., Sokolova, I. G., Pavlov, V. N., Maksimova, M. V.

TITLE: High-temperature Modifications of Chromium and the Phase Diagram of the System Chromium - Molybdenum in the Region Rich in Chromium

PERIODICAL: Vestnik Moskovskogo universiteta. Seriya 2, khimiya, 1960, No. 4, pp. 23 - 24

TEXT: A study of the binary system chromium - molybdenum (up to 22 wt% Mo) showed that due to the phase transformations of chromium there arise four zones of mixed crystal formation and three two-phase zones (Fig. 2), having their origin in the transformation points of chromium: 1830°C ($\varepsilon \rightleftarrows \delta$), 1650°C ($\delta \rightleftarrows \gamma$), and 1300°C ($\gamma \rightarrow \beta$). These transformation points are also found on the heating and cooling curves of chromium iodide (Fig. 1). X-ray analysis of the chilled samples gave the following results: The ε-modification is a body-centered cubic crystal with a = 2.887 ± 3 kX; the δ-phase is hexagonal, and for 13% Mo it has the constants a = 2.764 ± 3 kX and

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High-temperature Modifications of Chromium and the Phase Diagram of the System Chromium - Molybdenum in the Region Rich in Chromium

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c/a = 1.604; the γ-phase is a body-centered cubic crystal with a lattice constant similar to the ε-phase; the β-modification is probably a face-centered cubic crystal. Results obtained from studies of the systems Cr-Mo, Cr-W, Cr-Nb, Cr-Ta, Cr-Fe, Cr-Ni, Cr-Co, Cr-Fe-Ni, and Cr-Co-Ni, were communicated to the konferentsiya po zharoprochnym metallam i splavam (Conference on Heat-resistant Metals and Alloys) in April, 1958, and April, 1960, as well as to the VIII Mendeleyevskiy s"yezd (8th Mendeleyev Congress) in March, 1959. There are 2 figures and 2 non-Soviet references.

ASSOCIATION: Kafedra obshchey khimii (Chair of General Chemistry). Kafedra neorganicheskoy khimii (Chair of Inorganic Chemistry)

SUBMITTED: April 2, 1960

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18.1280

69024

S/078/60/005/04/021/040
B004/B016

AUTHORS: Grigor'yev, A. T., Sokolovskaya, Ye. M., Zargarova, M. I., Maksimova, M. V.

TITLE: Investigation of Alloys of the Palladium - Silver - Chromium System

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol 5, Nr 4, pp 894 - 901 (USSR)

ABSTRACT: The authors briefly refer to data available in publications on the binary systems Pd - Ag, Ag - Cr, and Pd - Cr and in this connection mention Ye. Ya. Rode (Ref 3), V. G. Kuznetsov (Ref 4), V. A. Nemilov et al. (Ref 5), and A. T. Grigor'yev et al. (Ref 7). To investigate the phase diagram of the ternary system Pd - Ag - Cr alloys of seven sections were prepared with a palladium content between 20 and 80% increasing by 10% each time. Furthermore, the sections with 35.65 and 75% palladium were investigated. Thermal analysis was made by means of an N. S. Kurnakov recording pyrometer. The results are given in table 1 and illustrated in figure 2. The hardness test was carried out by impressing a steel ball of a diameter of 10 mm with a load of 250 kg into the annealed specimens (Table 2, Fig 3). The microstructure (Figs 4,5) was investigated on samples etched by an alcoholic bromine solution. Electrical resistance at

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Investigation of Alloys of the Palladium - Silver - Chromium System

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25 and 100° was determined by the potentiometric method (Table 1, Fig 6). Therefrom the temperature coefficient of electrical resistance was calculated (Table 1, Fig 7). On the basis of the resultant data the phase diagram (Fig 1) was plotted. The region of decomposition occurring in the Ag - Cr system likewise exists in the ternary system and reaches up to about 42% Pd. The largest part of the diagram consists of a region of mechanical mixing. A eutectic point is assumed to be near the Ag in the Ag - Cr system, which is connected with the eutectic point of the Pd - Cr system by the line of the double eutectic. Part of the diagram in the palladium corner consists of a solid solution resulting from the binary system Pd - Cr and adjoining the system Pd - Ag as a narrow zone. There are 7 figures, 2 tables, and 9 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova Kafedra obshchey khimii (Moscow State University imeni M. V. Lomonosov, Chair of General Chemistry)

SUBMITTED: January 31, 1959

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S/078/60/005/05/19/037
B004/B016

18.1200

AUTHORS: Grigor'yev, A. T., Sokolovskaya, Ye. M., Altunina, L. N., Maksimova, M. V.

TITLE: Investigation of Alloys in the System Palladium - Copper - Chromium

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 5, pp. 1112-1118

TEXT: In the introduction the authors give a survey of publications dealing with the binary component systems of the ternary system Pd - Cu - Cr. They refer to papers by V. A. Nemilov et al. (Ref. 12) and A. A. Rudnitskiy (Ref. 13). Fig. 1 gives the phase diagrams of the binary systems (adjacent to the resultant diagram of the ternary system). The ternary system was investigated in nine sections with a Pd content of between 10 - 90 wt% Pd increasing by 10% each time. The thermal analysis was made by means of an N. S. Kurnakov pyrometer (Fig. 2). Further the microstructure of the alloys was investigated, which were annealed at 800-1,000° and hardened, as well as etched with alcoholic bromine solution (Figs. 3, 4). Their Brinell hardness was determined (Fig. 5), the electric resistance measured at 25° and 100° (Fig. 6), and its temperature coefficient determined (Fig. 7). The experimental data are also summarized in a table. The phase diagram is given in Fig. 1. The range of disintegration in the liquid state, which is observable in the system Cu-Cr, is also maintained in the phase diagram of the ternary system

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69541

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B004/B016

and reaches up to 35% Pd. The major part of the diagram is occupied by a mechanical mixture with a binary eutectic line which connects the eutectic points of the systems Cu-Cr and Pd-Cr. In the Pd corner there is a range of solid solution which originates from the system Pd-Cr and is adjacent to the system Pd-Cu as a narrow strip. The range of solid solution increases with increasing temperature. There are 7 figures, 1 table, and 14 references, 3 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova Khimicheskiy fakul'tet Kafedra obshchey khimii (Moscow State University imeni M. V. Lomonosov, Chemical Department, Chair of General Chemistry)

SUBMITTED: February 20, 1959

Card 2/2

GRIGOR'YEV, A.T.; SOKOLOVSKAYA, Ye.M.; SIMANOV, Yu.P.; SOKOLOVA, I.G.; PAVLOV, V.I.

High-temperature modifications of chromium and the structural diagram of the system chromium - molybdenum in the region rich in chromium. Vest. Mosk un. Ser. 2: Khim. 15 no.4:23-24 Jl-Ag '60. (MIRA 13:9)

1. Kafedra obshchey khimii i kafedra neorganicheskoy khimii Moskovskogo universiteta.
(Chromium) (Molybdenum)

S/078/60/005/011/001/025
B015/B060

AUTHORS: Grigor'yev, A. T., Panteleymonov, L. A., Ozerova, Z. P., Akatova, Ye. V.

TITLE: Investigation of the Iron - Palladium - Silver System

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 11, pp. 2395-2402

TEXT: The ternary system iron - palladium - silver was for the first time investigated by means of thermal analysis, analysis of microstructure, determination of hardness according to Brinell, and determination of electrical resistance and its temperature coefficients. The cooling curves were recorded by a Kurnakov pyrometer (Table 1, Fig. 2, results). The electrical resistance and its temperature coefficients were measured on rodlike specimens made from the alloys concerned by means of a potentiometer at temperatures of 25° and 100°C (Table 1, Figs. 3-6, results). Hardness was determined on annealed specimens with the aid of an automatic Brinell press (Table 1, Figs. 7-8, results). The same specimens

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Investigation of the Iron - Palladium - Silver System

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were then etched in an alcoholic bromine solution and the microstructure was examined (Fig. 9, microphotographs, Table 2, compositions of alloys at which layers separate in the liquid phase). The investigation results supplied show that the region of layer separation observed in the binary system iron - silver extends far into the ternary system and reaches into the middle of the diagram up to a content of about 57 atom% of palladium. In the palladium corner of the diagram there is the region of solid solutions which in the form of two narrowing bands at the opposite sides of the diagram reaches into the region palladium - silver and palladium - iron. Between the region of solid solutions and that of layer separation there is the heterogeneous field with the eutectic line. The latter starts from pure silver near the boundary to the solid solution and then draws away toward the center of the heterogeneous region (Fig. 1). Investigations of the hardness of cross sections showed that the transition from one phase region to another is in most cases characterized at the hardness curve by intersecting curve branches. In contrast therewith, the boundaries of the phase regions may not be determined on the basis of the curves of electrical resistance and respective temperature coefficient.

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By slight additions of silver the effect of the .'nary chemical compound Pd_3Fe upon hardness, electrical resistance, and re. ective temperature coefficient of the ternary diagram alloys (Figs. 5, ') was unmistakably established. Ye. Ya. Rode, V. V. Kuprina, V. A. Nemilov, C. I. Petrenko are mentioned in the text. There are 9 figures, 2 tables, and 15 references: 6 Soviet, 7 German, 1 French, 1 US, and 1 British.

SUBMITTED: December 29, 1959

Card 3/3

87337
S/078/60/005/011/025/025/XX
B015/B060

18 1235 1045, 1454

AUTHORS: Grigor'yev, A. T., Sokolovskaya, Ye. M., Maksimova, M. V., Sokolova, I. G., Nedumov, N. A.

TITLE: Polymorphous Conversions of Chromium in Alloys With Tantalum

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 11, pp. 2640-2642

TEXT: The authors have established in Refs. 1-5 that chromium appears in five modifications in its alloys. In addition to data from Refs. 1, 2, the present article presents the results of a study on the polymorphism of chromium in the constitution diagram Cr - Ta in the chromium-rich region. The specimens prepared in previous experiments (Refs. 1, 2) with 0.2 to 12 wt% Ta were examined. In doing so, the authors applied the thermal method by recording the heating and cooling curves on N. A. Nedumov's device, and the differential heating curves of annealed alloys (up to 1350°C) by a ПК-52 (PK-52) pyrometer. Microhardness was measured, and X-ray analyses were made. The constitution diagram (Fig. 1) was drawn on the basis of microstructural determinations (Fig. 2) and thermal analyses (Table). The

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diagram displays five regions of solid solutions formed by the α-, β-, γ-, δ-, and ε-modifications as well as four two-phase regions α+β, β+γ, γ+δ, and δ+ε which proceed from the points of mutual transition of the chromium modifications: 1830°C (ε ⇄ δ), 1650°C (δ ⇄ γ), about 1300°C (γ ⇄ β), and about 930°C (β ⇄ α). Four eutectoid transformations were established in the region of the Cr - Ta constitution diagram at 1490°C, 1150°C, 950°C, and 775°C, which are caused by the eutectoid decomposition of the respective solid solutions. X-ray data of the individual phases agree with those yielded by previous investigations. There are 2 figures, 1 table, and 5 Soviet references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet, Kafedra obshchey khimii (Moscow State University, Department of General Chemistry)

SUBMITTED: June 6, 1960

S/078/60/C05/011/018/025
B015/B060

AUTHORS: Grigor'yev, A. T., Ye Yuy-Pu, Sokolovskaya, Ye. M.

TITLE: Constitution Diagram of the Chromium - Cobalt System in the Chromium-rich Region

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 11, pp. 2642 - 2644

TEXT: In continuation of earlier papers (Refs. 1-6), where it has been stated that in chromium alloys chromium has five modifications, the chromium polymorphism was studied here by drawing the Cr - Co constitution diagram in the chromium-rich region. The microstructure of specimens annealed and hardened at different temperatures was examined, thermal analyses were carried out, and hardness was measured along with microhardness. The specimens were annealed in argon at 1000°C for 20 h, at 900°C for 190 h, at 800°C for 190 h, at 700°C for 310 h, at 600°C for 320 h, at 500°C for 450 h, and at 400°C for 360 h, and were then allowed to cool down slowly to room temperature. The hardening took place at 1700°-1450°C in earlier described (Ref. 2) furnaces, or at 1300°-900°C in water. On the strength of data of microstructural analysis, a number of two-phase regions were determined on the constitution diagram (Fig. 1) ($\alpha + \beta$, $\beta + \gamma$, $\gamma + \delta$, $\delta + \varepsilon$) proceeding from the chromium ordinate and shifting toward lower temperatures with decreasing chromium content. At 1700°C the following phase regions were observed with rising cobalt content: δ-solid solution (99.1 at% Cr), mechanical mixture of solid solutions δ and ϵ (needle-shaped crystals from 97.5 at% Cr down), a very narrow region of homogeneity. The δ-phase does not form any corresponding alloy. Examination at the other hardening temperatures indicated the solid γ-solution, the mechanical mixture $\gamma + \delta$, the solid δ-solution and the mixture $\delta + \varepsilon$. As contrasting with other constitution diagrams on chromium base there occurs no eutectoid dissociation in the β-region, and the region is conserved down to low temperatures. The results of thermal analysis confirmed those obtained from microscopic examinations. The thermal effects (Table) at 1090° and 1080°C upon the curves of the alloys with 77.3 and 86.5 at% Cr correspond to the eutectoid horizontal, i.e., to the dissociation of the solid γ-solution, whereas the break at 1140°C (77.4 at% Cr) corresponds to the second eutectoid line, i.e., tc the dissociation of the solid δ-solution. The thermal effects observed at

Constitution Diagram of the Chromium - Cobalt System in the Chromium-rich Region S/078/60/005/011/018/025 B015/B060

600-700°C could not be clarified. Measurements of microhardness showed that alloys of the same composition, but hardened from different phase regions, have different degrees of hardness. There are 2 figures, 1 table, and 7 references: 6 Soviet and 1 US.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet, Khimicheskiy fakul'tet (Moscow State University, Department of Chemistry)

SUBMITTED: June 6, 1960

GIRGOR'YEV, A.T.

Evaluation of Newtonian mechanics in the "Autobiography" of Einstein. Trudy Inst. ist. est. i tekh. 34:177-186 '60. (MIRA 14:2)
(Mechanics)

30340

S/189/61/000/006/001/005
D228/D304

18.1235

AUTHORS: Grigor'yev, A.T. and Sokolovskaya, Ye.M.

TITLE: Solid-state transformations in chromium and its alloys

PERIODICAL: Moscow, Universitet. Vestnik.Seriya II. Khimiya, No. 6, 1961, 3-15

TEXT: The authors discuss their own and other data on solid-state transformations in chromium and its alloys. The increased brittleness of such materials -- the cause of which is not definitely understood at present -- generally hinders their practical application, so the question of the allotropic modifications of chromium is of great interest. In recent years the investigation of chromium and its binary and ternary alloys has been carried out at the Laboratoriya khimii metallicheskikh splavov Kafedry obshchey khimii MGU (Laboratory of the Chemistry

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of Metal Alloys, Department of General Chemistry, Moscow State University) by A.T. Grigor'yev et al. Their experimental techniques included thermal, microscopic, and X-ray analyses; hardness determinations; and electroresistance measurements. Equipment designed by N.A. Nedumov (Ref. 27: Zh.fiz.khimii, 34, no.1, 184, 1960) was employed to ascertain the transformation temperatures. By constructing structural diagrams for binary alloys of the system Cr - Ni the authors detected 5 homogeneous regions: α, β, γ, δ, ε. In accordance with N.S. Kurnakov's principle (Ref. 31: Vvedeniye v fiziko-khim. analiz /Introduction to physico-chemical analysis/, Izd. AN SSSR, 1940) these monophase regions represent solid solutions formed on the base of modifications of chromium with body-centered cubic, face-centered cubic, and hexagonal structures. On quenching different alloys two-phase regions were observed at the following Ni concentrations and temperatures: 4% - 1700°; 1%-1500°; and 13%-1500°. They are believed to be due to the polymorphic

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Solid-state transformations ...

conversion of the δ, γ, and β forms to the respective ε, δ, and γ modifications. The two-phase regions $\varepsilon + \delta$, $\delta + \gamma$, and $\gamma + \beta$ were also detected in binary Cr - W alloys. Here the eutechtoid decomposition of the solid solutions ε, δ, and γ - with eutechtic points at 1320° (47% W), 1150° (16% W), and 1050° (12% W) respectively - is observed on the structural graph at the intersection of the three regions with the binodal curve; this is corroborated by data cited for the structure of alloys whose composition corresponds to these points. Analogous results were obtained by the authors when studying binary alloys of Cr with Nb, Ta, Mo, Fe, and Co. Their data for the ternary systems Cr - V - Mo and Cr - Fe - Ni, in which 3 three-phase and 4 two-phase regions occur, also confirm the main conclusions deduced from the investigation of binary systems: the existence of five polymorphic modifications of chromium - α, β, γ, δ, ε - with approximate transition temperatures of 930° for $\alpha \to \beta$, 1320° for

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Solid-state transformations ...

$\beta \to \gamma$, 1650° for $\gamma \to \delta$, and 1830° for $\delta \to \varepsilon$. There are 13 figures and 32 references: 16 Soviet-bloc and 16 non-Soviet-bloc. The reference to the 4 most recent English-language publications read as follows: E.P. Abrahamson, N.I. Grant, Trans. Amer. Inst. Min.Met. Eng. 206, 975 (1955) and Ductile chromium, Amer. Soc. Met., 277, 287 (1957); M. Hansen, K. Anderko, Constitution of binary alloys, New York (1958); A.R. Edwards, J.Inst. Met. Austral. 5, no. 2, 182 (1960).

ASSOCIATION: Kafedra obshchey khimii (Department of General Chemistry)

SUBMITTED: June 12, 1961

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21122
S/153/61/004/001/001/009
B110/B203

18 7500 4016, 1145, 1555

AUTHORS: Kuprina, V. V., Grigor'yev, A. T.

TITLE: Polymorphous $\alpha \rightleftarrows \gamma$ conversion in alloys of iron with cobalt and palladium

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, v. 4, no. 1, 1961, 7-10

TEXT: The authors studied the limits of polymorphous $\alpha \rightleftarrows \gamma$ conversion in Fe - Co - Pd alloys. The transition from binary to ternary systems has been described in publications. According to earlier investigations carried out by the authors, the conversion temperature in the Fe - Pd system drops with increasing Pd content until the intersecting point with the curve limiting the range of the chemical compound PdFe (phase γ_1). The intersecting point represents the eutectic (620°C and 40 at% Pd). In the present paper, the authors studied cross sections of tempered and hardened Fe - Co alloys with a constant Pd admixture of 2, 5, 10, 20, 30, 40, 50 at% by differential thermoanalysis (I) and microstructural

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analysis (II). To obtain complete conversion in solid state, the alloys were long annealed in an induction furnace under a $BaCl_2$ layer, and then suddenly cooled in ice water from 1000, 900, 800, 750, 700, 600°C to study microstructure; the annealing time was increased with decreasing annealing temperature (1000°C: 250 hr; 900°C: 250-300 hr; 800°C: 800-600 hr; 750°C: 500-880 hr; 700°C: 800-500 hr; 600°C: 750-1000 hr). In method (I), the heating curves of tempered alloys were recorded with a ПК-52 (PK-52) Kurnakov pyrometer and a Pt-PtRh thermocouple (Fig. 1). Here, conversion takes place in solid state with any Pd admixtures between 700 and 900°C. The heat effect observed corresponds to the transition temperature from the heterogeneous range to the range of solid γ-solutions, as is shown by a comparison of results of thermal analysis and the microstructure of alloys suddenly cooled from temperatures above and below the conversion points. In strongly ferriferous alloys, the eutectic decomposition occurring in the Fe - Pd system leads to a wide three-phase range ($\alpha + \gamma + \gamma_1$) in the ternary system. The transition from the three-phase state to two-phase ($\alpha + \gamma$) is characterized by additional thermal effects on the differential heating curves.

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Polymorphous $\alpha \rightleftarrows \gamma$ conversion ...

In method (II), the same alloys were etched with alcoholic Br_2 solution. When cooling an alloy of 50 at% Fe, 45 at% Co, and 5 at% Pd from 1000°C (A) and 900°C (B) it was found that the conversion took place with considerable heat effect at 960°C. Typical solid solutions appeared in (A), whereas the α-phase was observed in (B). Increasing Pd content lowers the conversion points (with 20 at% Pd, solid solutions still existing at 900°C, two phases being observable only at 800°C), and produces highly disperse structure of the α-phase separated. There are 3 figures, 1 table, and 11 references: 2 Soviet-bloc and 9 non-Soviet-bloc. The three references to English-language publications read as follows: M. Hansen, Constitution of binary alloys. N. Y., Toronto, London, 1958; R. Hyltgren, Nature 142, 395 (1938); W. C. Ellis, Trans. ASME, 29, 415 (1941).

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SUBMITTED: April 18, 1959

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21754

18.1235 1496, 1454, also 1418

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B121/B208

AUTHORS: Grigor'yev, A. T., Sokolovskaya, Ye. M., Nedumov, N. A., Maksimova, M. V., Sokolova, I. G., and Ye Yuy Pu

TITLE: Polymorphous conversion of chromium and the phase diagram of the system chromium - nickel in the range of concentrated chromium

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 6, no. 5, 1961, 1248 - 1251

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TEXT: The alloys of chromium with nickel were studied in the range of concentrated chromium by microscopic, thermal and X-ray analyses. Thermal analyses were made by recording the heating and cooling curves of the alloys hardened at 1200°C by means of a ПК-52 (PK-52) pyrometer. The phase diagram of the system chromium - nickel in the range of concentrated chromium was drawn on the basis of microstructural and thermal analyses; it is schematically presented in Fig. 1. Five homogeneous ranges of the solid solutions of α, β, γ, δ, and ε modifications of chromium

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Polymorphous conversion of ...

were found which are separated by diphase ranges $\alpha+\beta$, $\beta+\gamma$, $\gamma+\delta$, and $\delta+\varepsilon$. Four eutectoid conversions occur at 850, 960, 1140, and 1220°C. X-ray analysis indicated that the solid solution ε of the alloy with 17 % nickel has a body-centered cube with a = 2,879 ± 3 kX. In the alloy with 13 % nickel, hardened at 1400°C, with the solid solution $\varepsilon+\delta$ the hexagonal lattice of the solid solution of δ with the parameters a = 2.514 kX, c = 6,445 kX, and $\frac{c}{a}$ = 1,62 was found in addition to the body-centered cube of the solid solution of ε. The alloys with the phases $\alpha+\beta$ and β have a face-centered cube. Alloys with 17 % nickel, hardened at 900°C and more, have a face-centered cube. The results obtained are in good agreement with the data in Refs. 1 - 6 (Ref. 1: A. T. Grigor'yev, L. N. Guseva, Ye. M. Sokolovskaya, M. V. Maksimova. Zh. neorgan. khimii, 4, 2168 (1959). Ref. 2: A. T. Grigor'yev, Ye. M. Sokolovskaya, Yu. P. Simanov, I. G. Sokolova, V. N. Pavlov, M. V. Maksimova. Vesten. MGU, no. 4, seriya II, khimiya, 23 (1960). Ref. 3: A. T. Grigor'yev, Ye. M. Sokolovskaya, Yu. P. Simanov, I. G. Sokolova, M. V. Maksimova, L. I. Pyatigorskaya. Zh. neorgan. khimii, 5, 2136 (1960). Ref. 4: A. T. Grigor'yev, Ye. M. Sokolovskaya, M. V. Maksimova, I. G. Sokolova, N. A. Nedumov. Zh. neorgan.

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