8(0) SOV/112-59-1-986

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1959, Nr 1, p 131 (USSR)

AUTHOR: Krest'yaninov, A. G., Vedyayev, Yu. M., and Nizhegorodtsev, N. N.

TITLE: Electrical Pickup for Short-Delay Blasting

PERIODICAL: Byul. tsvetn. metallurgii, 1957, Nr 11, pp 26-28

ABSTRACT: Delaying the action of an electric detonator can be achieved by a thyratron timer associated with a chargeable capacitor. The charging time can be adjusted within 0.01 - 0.07 sec by 7 series-connected resistors. The pickup is AC supplied at 120 or 220 v, 70 w; its dimensions are 25 x 35 x 15 cm, weight 4 kg. The pickup circuit diagram is presented, as well as the method for, and results of its calibration and checking. The operating error found by tests is ± 10%. In open-pit work, the blasted area was increased from 2.5 to 5 m, unsuitable-size pieces were cut to one-half, explosive consumption was reduced, and safety increased.

G.I.S.

Card 1/1

SYROVATSKIY, A.; NIZHEGORODTSEV, P.; MARTYNOV, A.; VIKTOROVICH, Ye.; CHERTILIN, V.; BATYROV, R.

In the oil regions of our country. Neftianik 7 no.1:30-33 Ja. '62. (MIRA 15:2)

(Petroleum industry)

NIZHEGORODTSEV, P.

A friendly collective. Neftianik 7 no.9:29 S '62. (MIRA 16:7)

(Azerbaijan--Oil well drilling, Submarine)

NIZHEGORODTSEV, P.

Undersea gas pipeline. Neftianik 8 no.6:23 Je '63.
(MIRA 16:11)

1. Trest Azmorneftestroy.

NIZHNGORODTSEV, V.A.

Role of color in factories. Mashinostroitel' no.10:24-26 '60.
(MIRA 13:10)

(Factory management)

NIZHEGORODTSEV, V., inzh.

Technical aesthetics and the culture of production. Sov. profsoiuzy 17 no.15:28-30 Ag '61. (MIRA 14:7)

1. Gosudarstvennyy proyektno-tekhnologicheskiy i eksperimental'nyy institut "Orgstankinprom", rukovoditel' proyekta "Kul'tura mashinostroitel'nykh predpriyatiy".
(Industrial hygiene) (Labor productivity)
(Color--Physiological effect)

NIZHEGORODTSEV, V.A.

Mechanizing the cleaning up of industrial areas. Mashinostroitel' no.1:37-39 Ja '62. (MIRA 15:1)
(Factories—Maintenance and repair)

KUZ'MIN, V.V., insh.; NIZHEGORODTSEV, V.A., insh.

Technical trends in the improvement of the organization of production in machinery plants. Vest.mashinostr. 43 no.8:77-80 Ag '63. (MIRA 16:9)

(Machinery industry—Management)

NIZHEL'SKIY, P. Ye.

NIZHEL'SKIY, P. Ye.: "The content of gases in a liquid metal bath during the melting of the furnace charge in a basic open-hearth furnace". Sverdlovsk, 1955. Min Higher Education USSR. Ural Polytechnic Inst imeni S. M. Kirov (Dissertations for the degree of Candidate of Technical Science.)

SO: Knizhnaya Letopis' No. 50 10 December 1955. Moscow.

NIZHEL'SKIY, P. YE.

137-58-5-8870

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5, p 17 (USSR)

AUTHOR: Nizhel'skiy, P. Ye.

TITLE: The Influence of Carbon on the Solubility of Hydrogen in Iron Carbide Alloys (K voprosu o vliyanii ugleroda na rastvorimost' vodoroda v zhelezouglerodistykh splavakh)

PERIODICAL: V sb.: Fiz.-khim. osnovy proiz-va stali. Moscow, AN SSSR, 1957, pp 534-539. Diskuss. pp 650-655

ABSTRACT: The investigation was performed in a vacuum device. Porcelain and alundum crucibles were employed in the melting process. An ingot weighing 50-70 g and containing a specified amount of C (0.2-5%) was placed into a reaction tube which was then evacuated for 1.5 hrs. The evacuation continued until all of the metal had melted. At this point H_2 was introduced into the device in order to clean it out and to effect a reduction of the ferric oxides (three times). After another evacuation, during which the temperature of the melt was kept constant, H_2 was introduced once more in order to saturate the melt. The furnace was turned off 5-6 minutes after equilibrium was attained. Experiments were conducted under various pressures (20-500 mm

Card 1/2

137-58-5-8870

The Influence of Carbon (cont.)

Hg), the melt being maintained at a temperature of 1550°C. It was established that the solubility of H decreases with increasing concentration of C (particularly starting at 1.5% C). A tendency toward increased solubility of H was observed when the C content exceeded 4.3%. The rate at which H dissolved increased with increasing C content. The shape of the solubility curve of H in Fe-C alloys is similar in nature to the liquidus line of the Fe-C system.

Ye. T.

1. Hydrogen--Solubility 2. Iron alloys--Applications 3. Iron carbide alloys --Solvent action 4. Carbon--Applications

Card 2/2

UMRIKHIN, P.V., doktor tekhn.nauk prof.; KUROCHKIN, K.T., kand.tekhn.nauk, dots.; NIZHEL'SKIY, P.Ye., kand.tekhn.nauk

Effect of early slag formation on hydrogen content in the metal during the open-hearth process. Trudy Ural.politekh. inst. no.75:7-19 '59. (MIRA 13:4)
(Steel--Hydrogen content) (Open-hearth process) (Slag)

S/276/63/000/002/012/052
A052/A126

AUTHORS: Pan'shin, I.F., Bershteyn, L.I., and Nizhel'skiy, P.Ye.

TITLE: The second stage of austenite decomposition and properties of steel after refinement

PERIODICAL: Referativnyy zhurnal, Tekhnologiya mashinostroyeniya, no. 2, 1963, 56, abstract 2B240 (Izv. Kurganskogo mashinostroit. in-ta, I, 1962, 77-81)

TEXT: The dependence of toughness and hardness of 30X2H2M (30Kh2-H2M) steel on the hardening temperature and on temperature and duration of tempering was investigated. For hardening, 10 x 10 x 55 mm samples were heated during 15 min in an electric furnace having temperatures of 890, 920 and 950°C, and they were cooled in calm air. By the magnetometric method it has been established that austenite decomposition begins at 420-430°C and ends below the martensite point of 310°C. Some samples were oil hardened (after heating to 890°C) for comparison. The hardness of air and oil-hardened samples was HB388 and HB477 respectively. High tempering

was carried out at 500, 540, 580 and 620°C with 20, 90 and 300 min holding

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S/276/63/000/002/012/052
A052/A126

The second stage of austenite...

including heating time. After tempering the samples were oil cooled. The toughness was determined on samples at -40°C. Curves of the dependence of steel hardness on temperature and duration of tempering (after air and oil hardening) were plotted and tables of toughness and hardness are presented. As a result of the investigation it has been established that the formation of bainite structure in the process of hardening contributes to the increase of the amount of residual austenite the decomposition of which leads to an increase of hardness after tempering at 540°C. As a result of high

figures and 2 references.

T. Kislyakova

(Abstractor's note: Complete translation.)

Card 2/2

AT 13072-66 EWT(m)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b)/EWA(c) IJP(c) MJW/JD/HW/WE

ACC NR: AP6001688 SOURCE CODE: UR/0148/65/000/012/0116/0121 59 58

AUTHOR: Nizhel'skiy, P. Ye.; Pan'shin, I. F. B

ORG: Kurgan Machine Building Institute (Kurganskiy mashinostroitel'nyy institut)

TITLE: Scaling resistance and structural state of chromium manganese steels 15

SOURCE: IVUZ. Chernaya metallurgiya, no. 12, 1965, 116-121

TOPIC TAGS: metal scaling, crystal structure, chromium steel, manganese steel, stainless steel, heat resistant steel

ABSTRACT: Considering the shortage of nickel, an increasing significance is attached to the development of new grades of stainless and heat-resistant steels in which Ni is completely or partially replaced with other alloy elements. Indicative of this is

blem is how to determine the optimal ratio between Mn and Cr so as to optimally combine scaling resistance with high-temperature strength in the steels used as the material of furnace fittings. In this connection, the authors investigated the scaling resistance of EI921 Cr-Mn steel (0.6% C, 17% Cr and 0.5% Si) and other steels as a function of Mn content and the ambient medium. Scaling resistance was determined by

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UDC: 669.15-194:669.26'74

L 13072-66
ACC NR: AP6001688

heating annealed and degreased specimens in muffle furnaces at 700, 850 and 1000°C for 2, 4, 8, 24, 48, 86, and 100 hr, and, after cooling, weighing them in order to determine from their weight gain the oxidation rate as a function of heating time. Corrosion resistance was determined by heating the specimens for 100 hr at 1000°C in a SO_2 atmosphere. The structural state of the specimens was estimated by magnetometric measurements, metallographic analysis, and measurements of hardness and microhardness: the steels containing 0-13% Mn have a mixed structure consisting of α- and γ-solid solutions. Above 13% Mn, the structure is represented by the γ-solid solution alone. It is at this transition point from α- to γ-solid solution that the gas corrosion is the smallest, which is why a 13% Mn content may be considered optimal. Thus, the scaling resistance of medium-carbon Cr-Mn steels is determined not only by their chemical composition but also by their structural state. In this connection, it is worth noting that the 13% Mn content of EI921 type steel is highly suitable. Orig. art. has: 2 tables and 6 figures.

SUB CODE: 11/ SUBM DATE: 15Jul64/ ORIG REF: 007/ OTH REF: 000

Card 2/2 HW

SOV/137-59-3-7088

Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 3, p 30 (USSR)

AUTHORS: Ipat'yev, V. V., Nizhel'skiy, V. F., Vladimirova, M. G.

TITLE: Atmospheric Oxidation of Cobalt and Alloy of Iron With 13% Cobalt (Okisleniye v vozdukhe kobal'ta i splava zheleza s 13% kobal'ta)

PERIODICAL: Tr. Leningr. lesotekhn. akad. 1958, Nr 80, part 2, pp 47-56

ABSTRACT: The authors investigated the kinetics of atmospheric oxidation of Co in the 700-1200°C temperature range and of an alloy of Fe with 13% Co (I) in the 600-1100° range by the method of periodic weighing of specimens without removing them from the furnace reaction tube. It was found that the oxidation of Co and I is subject to a parabolic law. Micrographic investigations revealed that at 900, 1000, and 1200° Co scale consists of CoO with small inclusions of Co_3O_4 grains of secondary origin. The I scale at 1000° consists of the three following layers: R_2O_3, R_3O_4, and RO.

O. M.

Card 1/1

3 4719

S/137/62/000/002/102/14
A060/A101

18.1152
18.1150

AUTHORS: Vladimirova, M. G., Nizhel'skiy, V. F.

TITLE: Oxidation of molybdenum and its alloys with iron in an air environment

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 2, 1962, 81, abstract 2I550 ("Nauchn. tr. Leningr. lesotekhn. akad.", 1961, no. 92, pt. 3, 105 - 115)

TEXT: The oxidation of Mo in the temperature range 350 - 550°C proceeds basically according to the parabolic law. Oxides forming on the Mo in the course of oxidation in air consist of MoO_2 and MoO_3. The process of oxidation of Fe-Mo alloys containing 5 and 10% Mo occurs according to the parabolic law and the temperature dependences of the processes may be expressed by the equations

$$\log K = - 39,685/4.57\ T + 7.64 \text{ (for the 5\% alloy)}$$

and

$$\log K = - 40,535/4.57\ T + 8.04 \text{ (for the 10\% alloy)}$$

The scale on Fe-Mo alloys with 5 and 10% Mo under oxidation in air (700 - 900°C)

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S/137/62/000/002/101/14
A060/A101

AUTHORS: Nizhel'skiy, V. F., Vladimirova, M. G.

TITLE: On the problem of oxidation of cobalt in air

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 2, 1962, 81, abstract 21548 ("Nauchn. tr. Leningr. lesotekhn. akad.", 1961, no. 92, pt. 3, 117-119)

TEXT: In the course of oxidation of Co covered with metallic Au, the layer of Co oxide which forms in air at 800 - 950°C grows on account of Co diffusion (by 72%) and on account of O_2 diffusion (28%).

Authors' summary

[Abstracter's note: Complete translation]

Card 1/1

WA 50 L 05121-67 EWT(m)/EWP(t)/ETI IJP(c) JD/HW/WB

ACC NR: AP6030895 SOURCE CODE: UR/0080/66/039/008/1689/1693

AUTHOR: Nizhel'skiy, V. F.; Vladimirova, M. G.

ORG: Leningrad Forestry Engineering Academy im. S. M. Kirov (Leningradskaya lesotekhnicheskaya akademiya)

TITLE: Oxidation of cobalt in sulfur dioxide and carbon dioxide gas at high temperatures

SOURCE: Zhurnal prikladnoy khimii, v. 39, no. 8, 1966, 1689-1693

TOPIC TAGS: cobalt oxidation, sulfur dioxide corrosion, carbon dioxide corrosion, gas corrosion, high temperature oxidation

ABSTRACT: Specimens of 99.9%-pure electrolytic cobalt were tested for oxidation resistance in sulfur dioxide and carbon dioxide at 600-1100 C. The oxidation rate in sulfur dioxide was found to be parabolic and substantially higher than that in air or in carbon dioxide (see Fig. 1). The oxide layer formed in sulfur dioxide at 760—950C consists of cobalt oxides and sulfides ($Co_4 S_3$). The layer formed at temperatures over 800C strongly adheres to the base metal. The sulfur content in the layer formed at 700C amounts to 10.14% and in the layer formed at 900C , to

Card 1/2 UDC: 546.73+542.943:

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ACC NR: AP6030895

12.61%. Oxidation in carbon dioxide at 900—1100C follows a linear rate. The

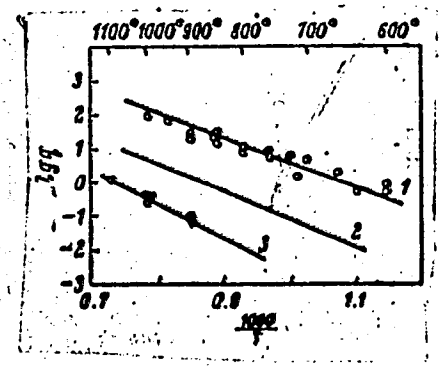

Fig. 1. Temperature dependence of cobalt oxidation rate ($mg/cm^2 \cdot hr$) in sulfur dioxide

1 - In air; 2 - in carbon dioxide 3

oxide layer formed in carbon dioxide is a thin film consisting of Co O. Orig. art. has; 9 figures. [W. A. 50] [ND]

SUB CODE: 13, 11/ SUBM DATE: 27Jun64/ ORIG REF: 003/ OTH REF: 004

Card 2/2

NIZHENKO, V. I., YEREMENKO, V. N., and IVASHCHENKO, Yu. N.

"Measurement of Surface Tension in Metals Using the Stationary Drop Method" a paper read at the International Metallurgists' Conference, Moscow 26-30 June 56

SO: CS-3,302,240, 11 Jan 57.

SOV/24-58-7-31/36

AUTHORS: Yeremenko, V.N., Ivashchenko, Yu.N., Nizhenko, V.I. and Fesenko, V.V. (Kiyev)

TITLE: Determination of the Surface Tension of Metals of the Iron Family (Opredeleniye poverkhnostnogo natyazheniya metallov semeystva zheleza)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, 1958, Nr 7, pp 144 - 146 (USSR)

ABSTRACT: The authors point out that wide discrepancies exist in the published data on the surface tension of iron (Refs 1, 2) and nickel (Refs 3-5) and that only one investigation has been made on that of cobalt (Ref 5). They describe an investigation in which the surface tension of these metals (less than 0.01% impurity) was measured by two methods. In experiments by the recumbent drop method the drop was supported on pure alumina, beryllia or magnesia in a water-cooled quartz tube with suitable screening. Heating was by induction with a graphite element, temperature measurement by a previously calibrated optical pyrometer to an accuracy of 20 °C. The apparatus, shown in Figure 1, was provided with an

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Determination of the Surface Tension of Metals of the Iron Family

optical system for photographing the shadow of the drop. Tests were carried out in vacuo and also in purified helium and hydrogen. The surface tension was calculated with the use of published tables (Ref 6). The reliability of the method was checked by determining the surface tension of aluminium and good agreement with published data was obtained. A second series of determinations was made with the bubble-pressure method (Figure 2). A beryllium capillary was used, allowance being made for wall thickness. Metal temperatures were measured to $\pm$ 10 °C with a type TsNIIChM-1 tungsten-molybdenum thermocouple. Purified helium and hydrogen were used to form the bubble. The results obtained by the two methods at 1 470 - 1 650 °C are tabulated, showing that the accuracy of both is about $\pm$ 5%. There are 2 figures, 1 table and 12 references, 3 of which are Soviet, 6 English and 3 German.

SOV/24-58-7-31/36

Determination of the Surface Tension of Metals of the Iron Family

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN USSR (Cermets and Special Alloys Institute, Ac.Sc., Ukrainian SSR)

SUBMITTED: October 17, 1957

Card 3/3

21(8) PHASE I BOOK EXPLOITATION SOV/2117

Soveshchaniye po eksperimental'noy tekhnike i metodam vysokotemperaturnykh issledovaniy, 1956

Eksperimental'naya tekhnika i metody issledovaniy pri vysokikh temperaturakh; trudy soveshchaniya (Experimental Techniques and Methods of Investigation at High Temperatures; Transactions of the Conference on Experimental Techniques and Methods of Investigation at High Temperatures) Moscow, AN SSSR, 1959. 769 p. (Series: Akademiya nauk SSSR. Institut metallurgii. Academiya po fiziko-khimicheskim osnovam proizvodstva stali) 2,200 copies Printed.

Resp. Ed.: A.M. Samarin, Corresponding Member, USSR Academy of Sciences; Ed. of Publishing House: A.K. Bankvitser.

PURPOSE: This book is intended for metallurgists and metallurgical engineers.

COVERAGE: This collection of scientific papers is divided into six parts: 1) thermodynamic activity and kinetics of high-temperature processes; 2) constitution diagram studies; 3) physical properties of liquid metals and slags; 4) new analytical methods and production of pure metals; 5) ferrosilicy, and 6) general questions. For more specific coverage, see Table of Contents.

S/081/61/000/024/014/086
B138/B102

AUTHORS: Yeremenko, V. N., Nizhenko, V. I., Ivashenko, Yu. N.

TITLE: Stationary drop method of measuring the surface tension of metals of the iron group

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 24, 1961, 94, abstract 24B690 (Byul. In-t metallokeram. i spets. splavov, AN USSR, no. 4, 1959, 65 - 71)

TEXT: An apparatus has been designed for the measurement of surface tension σ of molten metals, both in a vacuum and in protective atmospheres, using the stationary drop method and h-f heating up to 1750°C. σ was determined for aluminum in a vacuum and in a helium atmosphere. The results are in agreement with published data. Within the limitations of experimental error, estimated at ± 5%, the h-f field did not influence the σ value of molten metals under the conditions used in this case. σ was measured for metals of the iron group. [Abstracter's note: Complete translatio]

Card 1/1

80987

S/180/60/000/03/021/030
E193/E383

18.8100

AUTHORS: Yeremenko, V.N., Nizhenko, V.I. and Tay Shou-Vey (Kiyev)

TITLE: Surface Tension of Liquid Beryllium

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1960, Nr 3, p 116 (USSR)

ABSTRACT: Large grain size and the columnar structure of cast beryllium cause difficulties in machining of this metal. Since addition of surface-active substances is one of the methods used in grain refining, determination of the surface properties of beryllium and its alloys is of considerable practical importance. Taylor (Ref 2), using a semi-empirical formula, calculated the surface tension of beryllium at its melting point to be 1 620 erg/cm^2. The object of the investigation described in the present paper was to determine surface tension of beryllium experimentally, using the sessile drop method. The measurements were made at 1 500 °C on refined beryllium, 99.98% purity, melted in vacuum (5×10^{-5} mm Hg) in beryllia crucibles. The density of beryllium at 1 500 °C was determined from the dimensions of the drop, photographed at that temperature and from the weight of

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S/180/60/000/03/021/030
E193/E383

Surface Tension of Liquid Beryllium

the metal immediately after the experiment and was found to be 1.42 ± 0.04 g/cm³. The surface tension of beryllium at 1 500 °C determined in this way was 1 100 ± 35 erg/cm². The calculated value due to Taylor is 30% higher than that determined experimentally. If the change of density between the melting point of beryllium and 1 500 °C is taken into account, this difference is reduced to about 25% and becomes even smaller if the temperature dependence of the surface tension is also taken into consideration. However, even then the calculated and the experimental values differed by about 10%. Although the present authors were unable to determine the oxygen content of beryllium after their measurements, they believe that the quantity of oxygen absorbed from the beryllia crucible could not be excessively high; if it is assumed that the effect of oxygen on surface tension of beryllium is similar to that on the surface tension of other metals, the value obtained by the present authors is lower than the true value but the error probably

Card2/3

83666

S/073/60/026/004/004/008
B016/B054

18.6100 only 2308

AUTHORS: Yeremenko, V. N. and Nizhenko, V. I.

TITLE: The Influence of Carbon on the Surface Tension of Liquid Cobalt and Nickel As Well As Their Interface Tension With Aluminum Oxide

PERIODICAL: Ukrainskiy khimicheskiy zhurnal, 1960, Vol. 26, No. 4, pp. 423-428

TEXT: As there are no data in publications on the influence of carbon on the surface tension of liquid cobalt and nickel, the authors measured this tension in liquid metals and alloys and the wetting angles at high temperatures (1550-1600°C) in vacuo or in protective gas. Inductive heating by much improved apparatus (as compared with Ref. 1) was used for this purpose. Figs. 1 and 2 show this apparatus schematically. The vacuum was produced by a vacuum pump of the type ЦВЛ-100 (TsVL-100) and a forepump of the type РВН-20 (RVN-20). Table 1 compares the authors' data for the surface tension with data in publications (Refs. 4-6). Fig. 3 shows the isothermal line of the surface tension in Ni-C alloys

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The Influence of Carbon on the Surface Tension of Liquid Cobalt and Nickel As Well As Their Interface Tension With Aluminum Oxide

S/073/60/026/004/004/008
B016/B054

at 1550°C, and Fig. 4 the isothermal line of C-adsorption in liquid nickel. In weakly surface-active substances, the isothermal line of Fig.3 follows well Shishkovskiy's equation. The curve of Fig. 4 was obtained by differentiation of this equation and introduction of the values of $\frac{\partial \sigma}{\partial C}$ in Gibbs's adsorption equation for ideal systems. The isothermal line of the surface tension of Co-C alloys is shown in Fig. 5. Adsorption increases linearly with the concentration within the concentration range investigated. From a comparison of the influence of carbon on the surface tension of nickel and cobalt, the authors conclude that carbon in liquid nickel is more surface-active than in liquid cobalt. Finally, the authors calculated the adhesion energy w_a and the tension $\sigma_{solid-liqu}$ at the interface between liquid metal and solid aluminum oxide for Ni-C and Co-C alloys (Table 2). There are 5 figures, 2 tables, and 12 references: 4 Soviet, 1 British, and 1 German.

86457

S/073/60/026/005/009/019
B004/B063

18.1200

AUTHORS: Yeremenko, V. N. and Nizhenko, V. I.

TITLE: Wettability of Aluminum Oxide by Means of Liquid Tin-Titanium Alloys and Their Interfacial Stress on the Boundary With Aluminum Oxide

PERIODICAL: Ukrainskiy khimicheskiy zhurnal, 1960, Vol. 26, No. 5, pp. 605-608

TEXT: In a previous work (Ref. 2), the authors had found that an admixture of 0.083 % by weight of Ti lowers the surface tension of tin at 300°C from 539 ergs/cm^2 to 155 ergs/cm^2. An Sn-Ti alloy containing 0.2% of Ti has a wetting angle that is much smaller than 90°. This may be of practical importance when soldering ceramics with ceramics or metals. From this point of view the authors have studied the effect of adding Ti to Sn on the stress on the interface between the Sn alloy and solid oxide (Al_2O_3). Using the data of Ref. 2 on the surface tension σ_{liq} of Sn-Ti alloys, the

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Wettability of Aluminum Oxide by Means of Liquid Tin-Titanium Alloys and Their Interfacial Stress on the Boundary With Aluminum Oxide

wetting angle θ, and the surface tension σ_{sd} of solid Al_2O_3 which was set equal to 1050 ergs/cm^2 according to Ref. 4, the interfacial stress was calculated from the relation $\sigma_{int} = \sigma_{sd} - \sigma_{liq}\cos\theta$ (1). At 300°C, the following values were obtained for an increase in Ti concentration C:

C, g-atom/1·10^4	σ_{liq}, erg/cm^2	θ, degree	σ_{int}, erg/cm^2
0.00	539	140	1465
12.86	292	149	1300
48.53	155	148	1180

This effect was ascribed to a reaction with oxygen. Though the concentration of O_2 at 10^{-4} mm Hg does not affect the surface tension of Sn, the Ti admixture acts as a getter and adsorbs oxygen which, in turn, lowers the surface tension. The iridescence observed is also indicative of a reaction with oxygen. Experiments with a Ni-Ti alloy in hydrogen have shown that

YEREMENKO, V.N. (Kiyev); NIZHENKO, V.I. (Kiyev); NAYDICH, Yu.V. (Kiyev)

Surface tension of certain molten intermetallides. Izv. AN. SSSR. Otd. tekh. nauk. Met. i topl. no.3:150-154 My-Je '61. (MIRA 14:7)

1. Institut metallokeramiki i spetsial'nykh splavov AN USSR.
(Surface tension) (Intermetallic compounds)

24655

S/076/61/035/006/007/013
B127/B203

1.1600

AUTHORS: Yeremenko, V. N. and Nizhenko, V. I.

TITLE: Effect of titanium admixtures on the surface tension of nickel and cobalt and on their interfacial tension with aluminum oxide

PERIODICAL: Zhurnal fizicheskoy khimii, v. 35, no. 6, 1961, 1301-1306

TEXT: The present paper deals with the effect of titanium admixtures on the surface tension of Ni and Co, which metals are used in powder metallurgy as binding agents for titanium carbide, titanium nitride, or titanium boride. The surface tension is determined by the method of the drop lying on a horizontal base. For the alloys, 99.99 % pure Ni and Co, as well as titanium iodide with less than 0.07 % impurities, were fused together in the arc furnace. The tables of Bashforth and Adams in a modified form were used to calculate the surface tension. Besides, a new table was compiled with the values Φ in direct dependence on x/z of the drop (Fig. 1) at $\varphi = 60^{\circ}$. The function was $\Phi = b^2/\beta(2x)^2$. The surface tension σ was calculated from $\sigma = \Phi(2x)^2 \Delta\rho g$. The error of measurement was

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21655
S/076/61/035/006/007/013
B127/B203

Effect of titanium admixtures on...

3-5 %. In the system Co,To,Al_2O_3, the study was conducted in vacuum at $1 \cdot 10^{-4}$ mm Hg and 1600°C. The titanium content was 1.96 %. Titanium admixtures of 0.23 g-atom/l and more showed no effect on the surface tension. With 0.05 g-atom/l Ti, the interfacial tension at the boundary Co - Al_2O_3 dropped by more than 1000 erg/cm^2. The adhesive power increased simultaneously with the reduction of interfacial tension. Thus, a considerable interaction between alloy and Al_2O_3 base took place. In the system Ni,Ti, and Al_2O_3, the same results were obtained as for Co. At a vacuum of $1 \cdot 10^{-4}$ mm Hg, the specimen was always covered with a thin, but noticeable oxide layer during the experiment. The same phenomenon appeared in the case of BeO instead of Al_2O_3 as a base; likewise, in higher vacuum obtained by freezing the vapors of the oil diffusion pump with liquid N_2. On addition of Ti, a reduction of the Ni surface tension was observed. All this changed abruptly if the experiments were made in H_2 atmosphere. In this case, no activation by Ti on the interface Ni - gas was observed. The interfacial activity increased at the same time. The

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Effect of titanium admixtures on...

same occurred by melting the specimen in H_2 medium, and subsequent separation of H_2 by evacuation. In the system Sn, Ti, Al_2O_3, a high surface activity of titanium was observed at the interface of the liquid Sn. This effect is explained by the adsorption of O_2 residues from the vacuum by Ti. O_2 causes the surface activity. Adsorption of Ti at the metal - Al_2O_3 interface. In the Ni and Co system, Ti develops higher interfacial activity due to high formation energy of the lowest Ti oxide. With the use of the Gibbs adsorption equation, the excessive Ti concentration at the interface metal - Al_2O_3 was calculated (by graphical differentiation of the curve). Fig. 4 shows the results for Co - Ti and Ni - Ti on Al_2O_3. In the maximum of the curve, the corresponding thickness of the adsorption layer is $2.7 \cdot 10^{-8}$ cm. It is assumed that the lattice nodes occupied by O ions are the active centers of adsorption of Ti atoms on the Al_2O_3 surface. In maximum adsorption, every Ti is bound to an O. The authors mention joint papers by V. N. Yeremenko with Yu. V. Naydich and

Card 3/6

24655

S/076/61/035/006/007/013
B127/B203

Effect of titanium admixtures on...

A. A. Nosonovich: Elektronika, no. 4, 136, 1959; Zh. fiz. khimii, 34, 1186, 1960. There are 4 figures, 2 tables, and 11 references: 8 Soviet-bloc and 3 non-Soviet-bloc. The most recent reference to the English-language publication reads as follows: Kingery W. D., J. Amer. Ceram. Soc. 37, 42, 1954.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov (Institute of Powder Metallurgy and Special Alloys)

SUBMITTED: September 25, 1959

Fig. 1: Diagram for calculating the surface tension from the form of the drop.

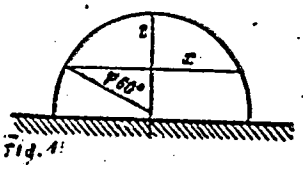

Fig. 1

Card 4/6

S/075/62/028/004/004/004
I017/I217

AUTHORS: Yeremenko, V.N., Nizhenko, V.I., Levi, N.I., and Bogatyrenko, B.B.

TITLE: Surface tension of liquid alloys of binary metalic systems having maximum on the liquidus curve

PERIODICAL: Ukrainskiy khimicheskiy zhurnal, v.28, no.4, 1962, 500-505

TEXT: The surface tension and the density of liquid alloys of nickel with aluminum at 1540°C and nickel with berillium at 1500°C were determined. It was found that the formation of the alloys in the studied systems, is accompanied by chemical interaction which causes decreasing of volume and negative deviation of the isotherm of the specific volumes from the additive values.
The analogy between the type of diagrams: surface tension/composition and the diagram of state is stated. The compound NiBe is inactive toward bothe the components of the system. The compound NiAl

Card 1/2

S/0000/63/000/000/0097/0109

ACCESSION NR: AT4030795

AUTHOR: Yaremenko, V. N.; Nishenko, V. I.

TITLE: Surface properties of nickel based alloys

SOURCE: AN UkrSSR. Institut metallokeramiki i spetsial'nykh splavov. Poverkhnostnyye yavleniya v rasplavakh i protsessakh poroshkovoy metallurgii (surface phenomena in liquid metals and processes in powder metallurgy). Kiev, Izd-vo AN UkrSSR, 1963, 97-109

TOPIC TAGS: surface property, nickel based alloy, powder metallurgy, infusible surface, nickel, aluminum oxide, surface tension, binary alloy, copper containing alloy

ABSTRACT: The results of the investigation were compared with diagrams of conditions for the same systems. The authors concluded that the isotherm of surface tension for alloys in a system with inorganic solubility in the solid, as well as the liquid state, was given by Zhukhovitskiy's equation (A. A. Zhukhovitskiy, ZhFKh, vol. 18, 1944, p. 214) for an ideal solution (nickel-copper). In the binary liquid systems examined, the component with the least surface tension had an active surface relative to the second component. The lowering of the surface tension in these systems practically ceased in a composition which corresponded to the monotectic point

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ACCESSION NR: AT4030795

coordinate (nickel-silver). Surface tension in a nickel-chromium system was studied and the isotherm of the surface tension showed a very slight deviation of the surface tension in alloys from the additive values. It was established that in systems with maxima on the fusibility curves corresponding to the congruently melting electron compounds having an electron concentration of 3:2, extreme points in the form of a maximum (nickel-beryllium) or a point of bend (nickel-aluminum) were detected on the isotherms of surface tension. In the nickel-tin system, such points were not detected although the isotherm in the region of the composition of the electron compound Ni_3Sn having an electron concentration of 1.75 had an abnormal path. Orig. art. has: 12 figures.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR(Institute of Powder Metallurgy and Special Alloys, AN UkrSSR)

SUBMITTED: 23Nov63 DATE ACQ: 16Apr64 ENCL: 00

SUB CODE: ML NO REF SOV: 016 OTHER: 008

Card 2/2

YEREMENKO, V.N.; NIZHENKO, V.I.

Surface properties of Ni-Au-Al_2O_3 liquid alloys. Zhur.neorg.khim. 8 no.9:2124-2127 S '63. (MIRA 16:10)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.

YEREMENKO, V.N.; NIZHENKO, V.I.

Surface properties of nickel-based liquid alloys. Part 1. Effect of silver on the surface tension of nickel. Ukr. khim. zhur. 29 no.11:1157-1160 '63. (MIRA 16:12)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.

ACCESSION NR: AP4029201 S/0226/64/000/002/0011/0018

AUTHOR: Mishenko, V. I.; Yeremenko, V. N.

TITLE: On the surface active additions in liquid metals

SOURCE: Poroshkovaya metallurgiya, no. 2, 1964, 11-18

TOPIC TAGS: liquid metal, addition, surface activity, sublimation, melting temperature

ABSTRACT: In this paper the authors discussed the criteria of surface activity. The differences in the specific heats of sublimation of the dissolved substance and solvent, as well as the differences of full potential barriers, are proposed as new criteria. They graphically present relationships between the specific heat of sublimation and the melting temperature of the metals, the specific heat of sublimation and the hardness of the metals, the total potential barrier and the free surface energy, the total potential barrier and the melting temperature, and the total potential barrier and hardness. Properties of the elements used for evaluating the reliability of the criteria of surface activity in the metal systems are presented in a table. This reliability was checked by experimental data of over 100 metal systems. The best criteria proved to be the difference between the free surface

Card 1/2

ACCESSION NR: AP4029201

energies, full potential barriers and specific heats of sublimation of the dissolved substance and the solvent. To verify the reliability of the criteria, it is necessary to obtain experimental data and ensure for the purity of the materials used. Orig. art. has: 1 table, 8 figures and 3 formulas.

ASSOCIATION: Institut problem materialovedeniya AN SSSR (Institute of Metal Behavior Problems, AN SSSR)

SUBMITTED: 16Aug63 DATE ACQ: 28Apr64 ENCL: 00

SUB CODE: ML NO REF SOV: 015 OTHER: 004

Card 2/2

ACCESSION NR: AP4021975 S/0073/64/030/002/0125/0132

AUTHOR: Yeremenko, V. N.; Nishenko, V. I.

TITLE: Surface properties of liquid alloys based on nickel. I. The Ni-Sn-Al_2O_3 system.

SOURCE: Ukrainskiy khimicheskiy zhurnal, v. 30, no. 2, 1964, 125-132

TOPIC TAGS: liquid nickel alloy, nickel tin alloy, metalloceramics, surface property, surface tension, density, density temperature function, specific volume isotherm, nickel, surface tension temperature function, tin, surface active additive, Ni_3Sn, Ni_3Sn_2, capillary property, refractory, nickel tin alumina system, wetting ability, refractory wetting

ABSTRACT: Surface properties are very significant in the processing of metalloceramics. Experimental studies were therefore made of the surface properties of liquid alloys based on nickel at the interface with the gas phase and with the interface in contact with the surfaces of refractory materials.. The density and its dependence on temperature of liquid alloys of the Ni-Sn system were determined. The specific volume isotherm of these alloys at 30 and 1500 C showed a significant

Card 1/3

ACCESSION NR: AP4021975

deviation from additive values. The density-temperature relationship of liquid Ni is approximated by the equation: $\rho = 7.78 - 0.0006(t-1453)$ gm/cm^3. The surface tension of Ni was determined in the 1500-1790 C temperature interval; the surface tension-temperature relationship is described by the equation: $\sigma = 1745 - 0.34$ $(t-1500)$erg/cm^2. For Sn the surface tension-temperature function is described by $\sigma = 510 - 0.092(t-800)$erg/cm^2. The surface tension at 1500 C of various alloys (including Ni_3Sn and Ni_3Sn_2) of the Ni-Sn system was also determined. The deviation of the surface tension-concentration isotherm from the isotherm for an ideal solution is explained by the retention, in the liquid state, of groups of atoms corresponding to the intermetallide Ni_3Sn. The effect of the addition of up to 1.0% Sn on the surface tension of Ni, and on its interphase tension at the interface with Al_2O_3 was investigated; Sn in small amounts is a surface active additive. The wetting of Al_2O_3 with liquid Ni-Sn alloys was determined by measuring the angle of contact on Al_2O_3. The capillary properties of these Ni-Sn alloys was determined

Card 2/3

ACCESSION NR: AP4021975

by measuring the angle of contact on Al_2O_3. The capillary properties of these Ni-Sn alloys at 1500 C at the interface with Al_2O_3 were calculated. Orig. art. has: 7 figures, 1 table and 5 equations.

ASSOCIATION: Institut metallokeramiki i spetssplavov AN UkrSSR(Institute of Metalloceramics and Special Alloys, AN UkrSSR)

SUBMITTED: 25Oct62 DATE ACQ: 09Apr64 ENCL: 00

SUB CODE: ML, PH NO. REF. SOV: 008 OTHER: 005

3/3

Card

ACC NR: AR6035409 SOURCE CODE: UR/0137/66/000/009/A008/A008

AUTHOR: Nizhenko, V. I.; Yeremenko, V. I.; Sklyarenko, L. I.

TITLE: Use of the lying drop method to determine the surface energy and density of liquids that wet the substrate material

SOURCE: Ref. zh. Metallurgiya, Abs. 9A51

REF. SOURCE: Sb. Poverkhnostn. yavleniya v rasplavakh i voznikayushchikh iz nikh tverd. fazakh. Nal'chik, 1965, 211-215

TOPIC TAGS: surface property, liquid property, surface energy, fluid density measurement, calcium fluoride, copper

ABSTRACT: It is shown that the lying drop method can be used for an exact determination of the surface energy and density of liquids by forced formation of a symmetrical drop of the wetting liquid on a substrate even at contact angles less than 45°. The method was verified on CaF_2 and Cu. The data obtained agree with the earlier determinations. 4 illustrations. Bibliography, 11 titles. (From RZH Fiz.) [Translation of abstract]

SUB CODE: 20, 11

Card 1/1 UDC: 669-154:532.61

ACC NR: AR6035408 SOURCE CODE: UR/0137/66/000/009/A007/A007

AUTHOR: Yeremenko, V. N.; Nizhenko, V. I.; Sklyarenko, L. I.

TITLE: Surface properties of chrome-nickel alloys

SOURCE: Ref. zh. Metallurgiya, Abs. 9A44

REF. SOURCE: Sb. Poverkhnost. yavleniya v rasplavakh i voznikayushchikh iz nikh tverd. fazakh. Nal'chik, 1965, 297-301

TOPIC TAGS: surface property, surface tension, nichrome alloy, temperature dependence, molten metal

ABSTRACT: The surface tension σ and the density of nichrome alloys were investigated by the large-drop method in a helium atmosphere as a function of the temperature and concentration. The chromium reduces the σ of liquid Ni, especially when the chromium content exceeds 10 at.%. A minimum is observed on the isotherm of σ at concentrations near 50 at.% Cr. A study was made of the temperature and time dependence of the contact angle when Al_2O_3 is wetted by molten nickel or Cr-Ni. The best adhesion characteristics in the Cr-Ni melt + Al_2O_3 system is possessed by nichromes containing up to 30 at.% chromium; with further increase of the chromium content, the temperature at which the contact angle becomes minimal increases. Therefore nichromes containing up

Card 1/2 UDC: 669.24'26-154:532.61

ACC NR: AR6035408

to 30 at.% of chromium are the most suitable binders in cermets of the Me-Al_2O_3 type up to 1550°. 5 illustrations. Bibliography, 9 titles. A. Granovskaya. [Translation of abstract]

SUB CODE: 20, 11

Card 2/2

L 34984-66 EWT(m)/T/EWP(t)/ETI IJP(c) JD/WW/JW/HW/JG
ACC NR: AP6025520 SOURCE CODE: UR/0370/66/000/002/0188/0192

AUTHOR: Yeremenko, V. N. (Kiev); Nizhenko, V. I. (Kiev); Sklyarenko, L. I. (Kiev) 64 13

ORG: none

TITLE: Surface tension and density of molten alloys of the system Ni-Ca and their miscibility with Al sub 2 O sub 3

SOURCE: AN SSSR. Izvestiya. Metally, no. 2, 1966, 188-192

TOPIC TAGS: surface tension, molten metal, nickel alloy, gallium alloy, aluminum oxide, alloy phase diagram, metal property, specific density, specific volume

ABSTRACT: This report shows that on the isotherm of free surface energy (σ) of molten alloys of the system Ni-Al there is a clearly pronounced point of inflection corresponding in composition to the congruently melting intermetallide NiAl. Gallium is an analog of aluminum and therefore it was of interest to study the surface properties of the Ni-Ca system and to compare them with the phase diagram.

The temperature and concentration relationships of the density of alloys in the Ni-Ca system were determined. It was established that specific volumes of alloys both in the molten and in the solid states differ sharply from additive values.

The temperature and concentration relationships of the free surface energy of molten alloys in the Ni-Ca system were studied.

It was shown that the isotherm plotted from experimental data passes

UDC: 669.017.12

Card 1/2 0916 0901

ACC NR: AR7000858 SOURCE CODE: UR/0058/66/000/009/E011/E011

AUTHOR: Yeremenko, V. N.; Nizhenko, V. N.; Sklyarenko, L. I.

TITLE: Temperature dependence of the free surface energy of molten iron

SOURCE: Ref. zh. Fizika, Abs. 9E92

REF SOURCE: Sb. Poverkhnostn. yavleniya v rasplavakh i voznikayushchikh iz nikh tverd. fazakh. Nal'chik, 1965, 287-292

TOPIC TAGS: temperature dependence, molten metal, carbonyl iron, free surface energy, surface energy

ABSTRACT: The surface tension (σ) of molten iron in the 1540—1750C temperature range is measured by the lying-drop method. The object of the investigation was carbonyl iron, annealed in hydrogen at 1000—1200C and remelted in a 10^{-4} mm Hg vacuum. Consideration of all possible measurement errors leads to the expression $\sigma = 1856 \pm 2{,}3 - 0{,}23 \pm 0{,}02 \cdot (t - 1534)$. The thermodynamic characteristics of the molten iron surface are computed from the data of σ and $\partial\sigma/\partial T$. A. Vertman. [Translation of abstract] [NT]

SUB CODE: 20/

Card 1/1

L 07201-67 EWT(1) GD

ACC NR: AT6020430 (N) SOURCE CODE: UR/0000/65/000/000/0155/0160

AUTHOR: Nizhenskiy, A. D.; Khrizman, S. S.

35
B+1

ORG: Institute of Electrodynamics, AN UkrSSR (Institut elektrodinamiki AN UkrSSR)

TITLE: Design of a temperature stabilized reference voltage source using a Zener diode

25

SOURCE: AN UkrSSR. Preobrazovaniye i stabilizatsiya elektromagnitnykh protsessov (Conversion and stabilization of electromagnetic processes). Kiev, Naukova dumka, 1965, 155-160

TOPIC TAGS: voltage stabilizer, Zener diode, temperature stabilization, thermistor, voltage reference

ABSTRACT: A design procedure for a temperature stabilized voltage reference circuit is given. The addition of a compensating circuit to a Zener diode considerably improves its performance as a voltage stabilizing element. Figure 1 shows the circuit. The reference voltage is developed across the Zener diode *D*. The emitter follower using transistor *Q1* is driven by the reference voltage. The input impedance of the emitter follower is high and the output impedance is low; thus the loading on the reference diode is much reduced, as is the effect of the external load across the output of the emitter follower. The performance of the reference diode can be expressed

Card 1/3

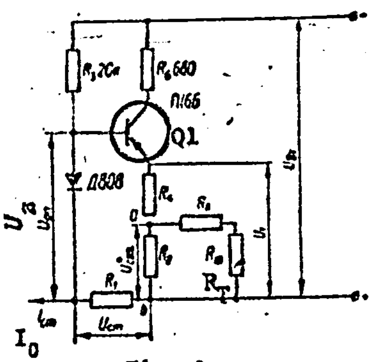


Fig. 1

in terms of the stabilization coefficient K_U, which is the ratio of the relative change in the supply voltage to the relative change in the reference voltage. This coefficient can be given in terms of circuit parameters as

$$K_U = \frac{R_s}{R_d} \cdot \frac{R_d + R_3}{R_s + R_3}$$

where R_s is the dc resistance of the Zener diode, and R_d is the dynamic resistance of the Zener (20 ohms for the particular unit). Under given conditions, K_U turns out to be 500, i. e., a 20% change in supply voltage (nominal 16 volts) causes 0.04% change in the reference voltage. The experiments indicate that the primary error sources during the operation of the stabilizing circuit are the dependence of the reference voltage and the emitter-to-base voltage of the transistor on the temperature. By adding a thermistor R_T to the emitter load, these errors can be effectively compen-

sated for. The following expression for stabilization of the output reference voltage U_1 is derived:

$$\frac{\Delta U_1}{U_1} = -\frac{R_2 R_4 \Delta R_T}{(R_x + R_T)[R_4(R_x + R_T + R_2) + R_2(R_x + R_T)]}.$$

For given values of R_2, R_T and R_4, the value of R_x can be calculated assuming a desired value of voltage stability. This circuit was tested over a temperature range of 10 to 50°C and proved to be stable within 0.02% over the total range--an improvement by a factor of 160 over the performance of an uncompensated circuit. Orig. art. has: 16 formulas, 1 figure.

SUB CODE: 09/ SUBM DATE: 26Oct65/ ORIG REF: 006

ACC NR: AP7004255 (A) SOURCE CODE: UR/0432/66/000/002/0028/0030

AUTHOR: Nizhenskiy, A. D.; Khrizman, S. S. (Candidate of technical sciences)

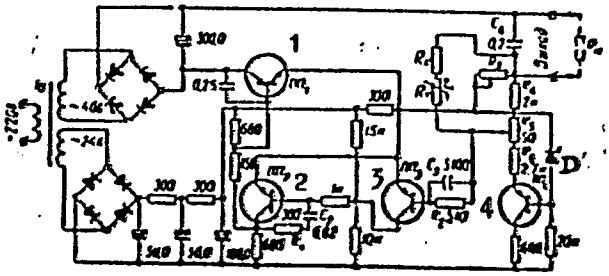
ORG: none

TITLE: High-accuracy semiconductor stabilizer

SOURCE: Mekhanizatsiya i avtomatizatsiya upravleniya, no. 2, 1966, 28-30

TOPIC TAGS: semiconductor ~~stabilizer~~ research, current stabilizer, current stabilization

ABSTRACT: The developement (at the Institute of Electrodynamics, AN UkrSSR) of a high-accuracy current stabilizer based on a voltage-regulating Si (Zener) diode is reported. The distinguishing features of the circuit used (see figure) are: (1) A high-input-resistance emitter follower is employed as a load of the Zener diode; this enhances the stabilization factor of the circuit; (2) A temperature compensation of the reference voltage in the output circuit of the emitter follower is used; the compensation



Card 1/2 UDC: 621.316.722.1:621.382

ACC NR: AP7004255

circuit is designed from temperature characteristics of the Zener diode and the emitter follower. In the figure: 1 - controlling transistor, 2 and 3 - two-stage transistorized amplifier, 4 - emitter follower, D - voltage-regulating D808 Si diode. Experimental data: Voltage variation of 0.02 is caused by a temperature variation of 10--50C; stabilizer error of 0.1% is caused by a supply-voltage variation of ± 20%; a load variation of 0.1--150 ohms causes a stabilizer error of 0.03%; after a continuous 10-hr operation, the stabilized current differed by ± 0.04% from the current obtained after a 15-min operation. The above stabilizer has been in operation since 1963 in an automatic differential calorimeter outfit. Orig. art. has: 1 figure and 1 formula.

SUB CODE: 09 / SUBM DATE: none / ORIG REF: 003

Card 2/2

ACC NR: AR7000956 SOURCE CODE: UR/0275/66/000/011/V025/V025

AUTHOR: Nizhenskiy, A. S.; Khrizman, S. S.

TITLE: High-precision semiconductor current regulator

SOURCE: Ref. zh. Elektronika i yeye primeneniye, Abs. 11V165

REF SOURCE: Mekhaniz. i avtomatiz. upr. Nauchno-proizv. sb., no. 2, 1966, 28-30

TOPIC TAGS: current regulator, transistor, cascade amplifier, voltage regulator

ABSTRACT: A current regulator, developed at the Institute of Electrodynamics, AN Ukrainian SSR, was assembled using a circuit with a regulating transistor, a twin-cascade d-c amplifier, and a reference-voltage source with a silicon stabilitron tube connected in series to the base circuit of the output-emitter repeater. A variable standard resistance and a load resistance are connected to the emitter circuit of the regulating transistor temperature compensation, according to the condition cited, is accomplished with the aid of a network consisting of a linear resistance and a thermoresistor connected in parallel to the reference

UDC: 621.316.722.1

Card 1/2

ACC NR: AR7000856

voltage divider. For insuring temperature stability, a reference stabilitron tube, the emitter repeater transistor, and the thermoresistor are placed in a heavy thermostat of red copper. With a temperature change from +10 to +50°C, the reference voltage showed a change of about 0.02%. With a change in line voltage of ± 20, the load resistance changed within the limits of 0.1—150 ohms and the output current showed a change of $< 0.04\%$. The voltage regulator has operated in a differential-calorimeter circuit since 1963. With an uninterrupted operation of 6—8 hr per day, the current instability has not exceeded ± 4.1%. The bibliography contains 3 titles. [Translation of abstract] [NT]

SUB CODE: 09, 20/

Card 2/2

NIZHIBITSKIY, O.N.

Machines for manufacturing capron fibers. Khim.volok. no.5:37-44 '62. (MIRA 15:11)

1. Leningradskiy zavod im. Karla Marksa.
(Nylon)
(Textile machinery)

NIZHIBITSKIY, O.N.

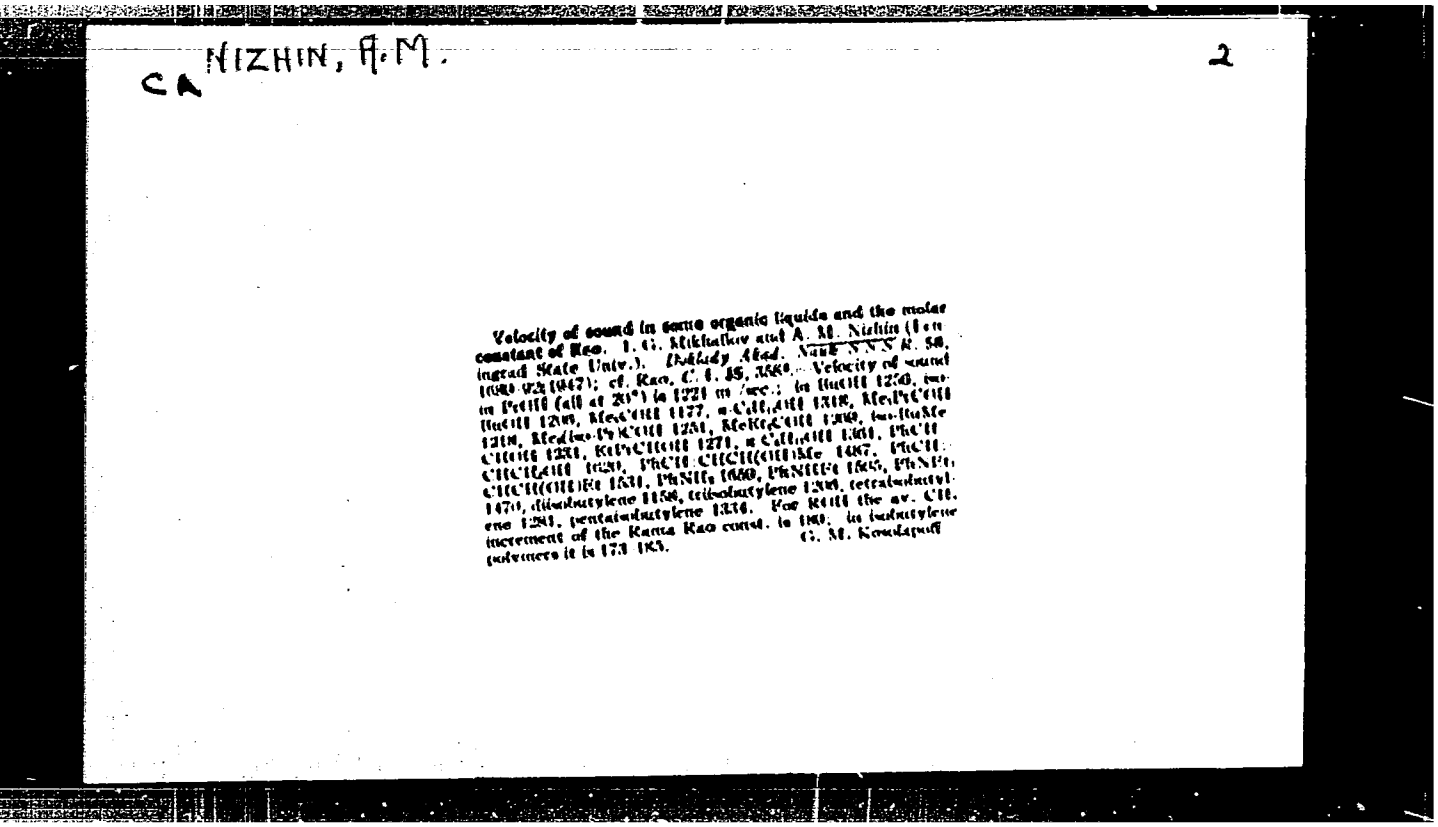
Investigating the causes of the breaking off of the pendulum bobbin holder from the friction cylinder on machines processing synthetic fibers. Izv.vys.ucheb.zav.; tekh.tekst.prom. no.5:123-129 '64. (MIRA 18:1)

1. Leningradskiy institut tekstil'noy i legkoy promyshlennosti imeni S.M.Kirova.

NIZHIBITSKIY, O.N.

Vibration and self-centering of the elastic support of pendulum bobbin holders. Izv. vys. ucheb. zav.; tekh. teks. prom. no.6: 118-123 '65. (MIRA 19:1)

1. Leningradskiy institut tekstil'noy i legkoy promyshlennosti imeni S.M. Kirova. Submitted May 11, 1965.



CA NIZHIN, A.M. 2

Velocity of sound in some organic liquids and the molar constant of Rao. I. G. Mikhailov and A. M. Nizhin (Ivanovo Inst. State Univ.). *Doklady Akad. Nauk SSSR* 58, 1649-52 (1947); cf. Rao, *C. A.* 35, 3569. Velocity of sound in PrOH (all at 20°) is 1221 m./sec.; in BuOH 1250, in BuOH 1240, MeCOEt 1177, n-C$_6$H$_{14}$ 1318, MeCH(OH)Et 1218, MeCOPr 1251, MeCH(OH)Et 1240, iso-BuOH 1231, MeCH(OH)Et 1271, n-C$_7$H$_{16}$ 1301, PhCH$_3$ 1330, PhCH$_2$CH$_2$OH 1431, PhNH$_2$ 1660, PhNHMe 1565, PhNMe$_2$ 1470, diisobutylene 1158, triisobutylene 1296, tetraisobutylene 1281, pentaisobutylene 1336. For BuOH the av. CH$_2$ increment of the Ramsa Rao const. is 180; in isobutylene polymers it is 173-183.

G. M. Kosolapoff

NIKHIN, A.M.; PEDOS, F.K.

Copying diffraction gratings. Izv. AN SSSR. Ser. fiz. 19 no.1:35-36 Ja-F '55. (MIRA 8:9)

(Spectrum analysis) (Spectrometer)

SKRIPNIK, Yu.A.; NIZHENSKIY, A.I.

Selecting the power-supply frequency for an automatic quasi-balanced bridge with a differential indicator. Izv.vys.ucheb.zav.;prib. 7 no.5:14-21 '64. (MIRA 17:12)

1. Kiyevskiy politekhnicheskiy institut. Rekomendovano kafedroy izmeritel'nykh ustroystv.

NIZHINSKIY, M. [Nizhyns'kyi, M.], kand.pedagog.nauk

Moral code of a builder of communism. Nauka i zhyttia 11 no.12:39-40 D '61. (MIRA 15:2)
(Moral education)

NIZHIVENKO, L.N., aspirant

Copper content of the teeth under normal conditions and in alveolar pyorrhea. Stomatologiia 40 no.1:32-35 Ja-F '61. (MIRA 14:5)

1. Iz kafedry terapevticheskoy stomatologii (zav. - prof. Ye.Ye. Platonov) i kafedry obshchey khimii (zav. - dotsent A.A.Zats) Moskovskogo meditsinskogo stomatologicheskogo instituta (direktor - dotsent G.N.Beletskiy).

(COPPER IN THE BODY) (GUMS—DISEASES)

RAKHMAN, M.Z.; NIZHKOVSKIKH, N.N.; Prinimala uchastiye LATINA, L.S.

Effect of the conditions of mastication on the plastic-elastic properties of natural rubber. Kauch. i rez. 24 no.6:42-45 Je '65. (MIRA 18:7)

1. Orenburgskiy zavod rezino-tekhnicheskikh izdeliy.

NIZHNEV, Ye.P.

Raise the quality requirements for crossing installations under roads. Stroi. truboprov. 8 no.12:29 D '63. (MIRA 17:4)

1. Stroitel'noye upravleniye No.14 tresta Mosgazprovodstroy, Podol'sk.

MATSELINSKIY, R.N., kand. tekhn. nauk; TURKATENKO, O.D., inzh.; NIZHNICHENKO, I.K., inzh.

Making large precast reinforced concrete slabs in construction yards. Biul. stroi. tekh. 12 no.4:1-4 Ap '55. (MIRA 11:12)

1.TSentral'nyy nauchno-issledovatel'skiy institut promyshlennykh sooruzheniy.

(Concrete slabs)

BERDICHEVSKIY, G.I., kand.tekhn.nauk; DMITRIYEV, S.A., kand.tekhn.nauk; MIKHAYLOV, K.V., kand.tekhn.nauk; GVOZDEV, A.A., prof., doktor tekhn.nauk; MIKHAYLOV, V.V., prof., doktor tekhn.nauk; BULGAKOV, V.S., kand.tekhn.nauk; VASIL'YEV, A.P., kand.tekhn.nauk; YEVGEN'YEV, I.Ye., kand.tekhn.nauk; MULIN, N.M., kand.tekhn.nauk; SVETOV, A.A., kand.tekhn.nauk; FRENKEL', I.M., kand.tekhn.nauk; BELOBROV, I.K., inzh.; MATKOV, N.G., inzh.; MITNIK, G.S., inzh.; SKLYAR, B.L., inzh.; SHILOV, Ye.V., inzh.; MASENKO, I.D., inzh.; NIZHNICHENKO, I.P., inzh.; FILIPPOVA, G.P., inzh.; NIZERNYUK, B.N., kand.tekhn.nauk; SHEYNFEL'D, N.M., kand.tekhn.nauk; BALAT'YEV, P.K., kand.tekhn.nauk; BARBARASH, I.P., kand.tekhn.nauk; MITGARTS, L.B., kand.tekhn.nauk; SHIFRIN, M.A., kand.tekhn.nauk; PETROVA, V.V., red.izd-va; TEMKINA, Ye.L., tekhn.red.

[Temporary instruction on the technology of making prestressed reinforced concrete construction elements] Vremennaia instruktsiia po tekhnologii izgotovleniia predvaritel'no napriazhennykh zhelezobetonnykh konstruktsii. Moskva, Gos.izd-vo lit-ry po stroit., arkhit. i stroit.materialam, 1959. 255 p. (MIRA 12:12)

(Continued on next card)

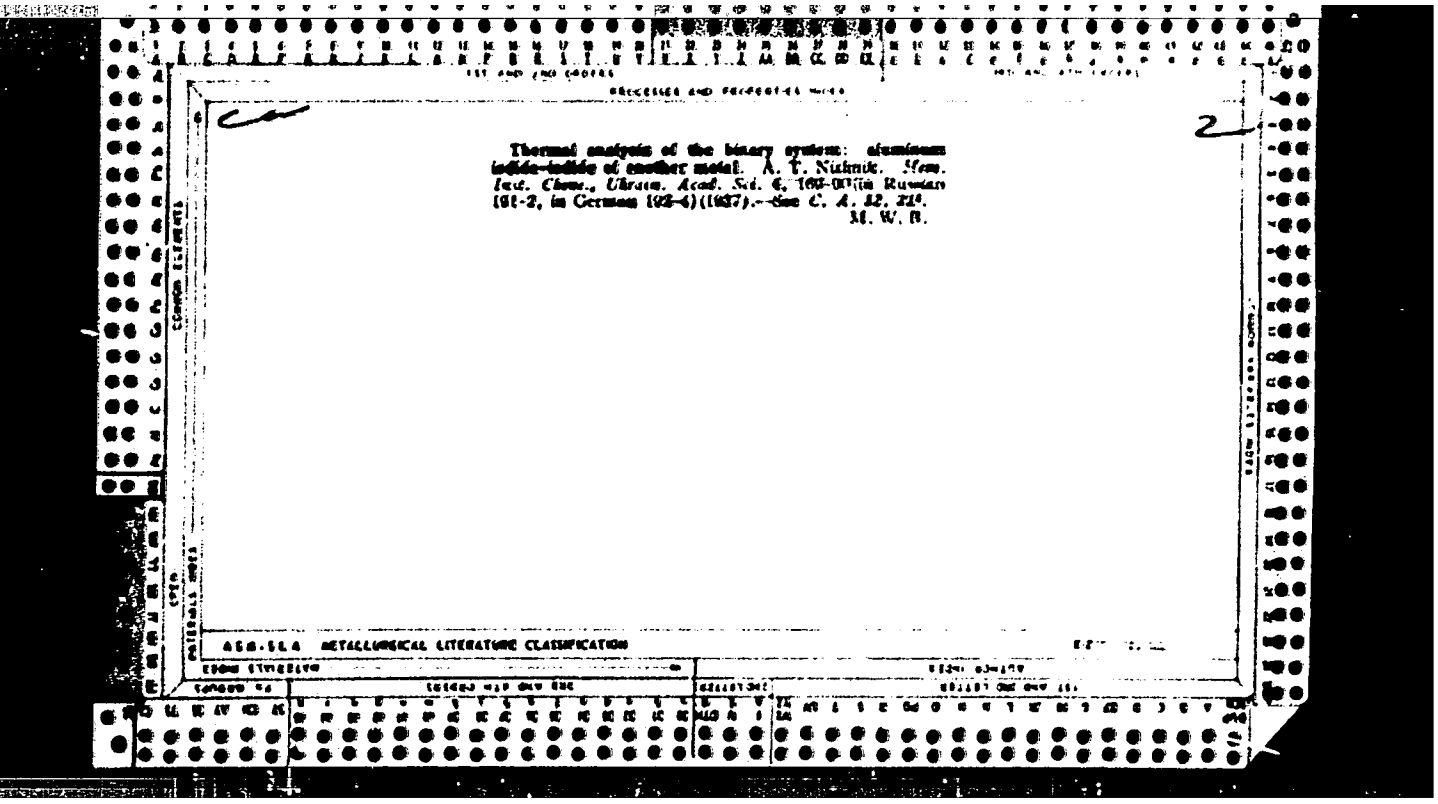
BERDICHEVSKIY, G.I.---(continued) Card 2.

1. Akademiya stroitel'stva i arkhitektury SSSR. Institut betona i zhelezobetona, Perovo. 2. Nauchno-issledovatel'skiy institut betona i zhelezobetona Akademii stroitel'stva i arkhitektury SSSR (for Gvozdev, V.V.Mikhaylov, Berdichevskiy, Bulgakov, Vasil'yev, Dmitriyev, Yevgen'yev, K.V.Mikhaylov, Mulin, Svetov, Frenkel', Belobrov, Matkov, Mitnik, Sklyar, Shilov). 3. Nauchno-issledovatel'skiy institut organizatsii, mekhanizatsii i tekhpomoshchi Akademii stroitel'stva i arkhitektury SSSR (for Kadenko, Nizhnichenko, Filippova, Mizernyuk, Sheynfel'd). 4. Nauchno-issledovatel'skiy institut Glavmospromstroymaterialov (for Balat'yev, Barbarash). 5. Nauchno-issledovatel'skiy institut po stroitel'stvu Minstroya RSFSR (for Mitgarts, Shifrin). 6. Deystvitel'nyye chleny Akademii stroitel'stva i arkhitektury SSSR (for Gvozdev, V.V.Mikhaylov).

(Prestressed concrete)

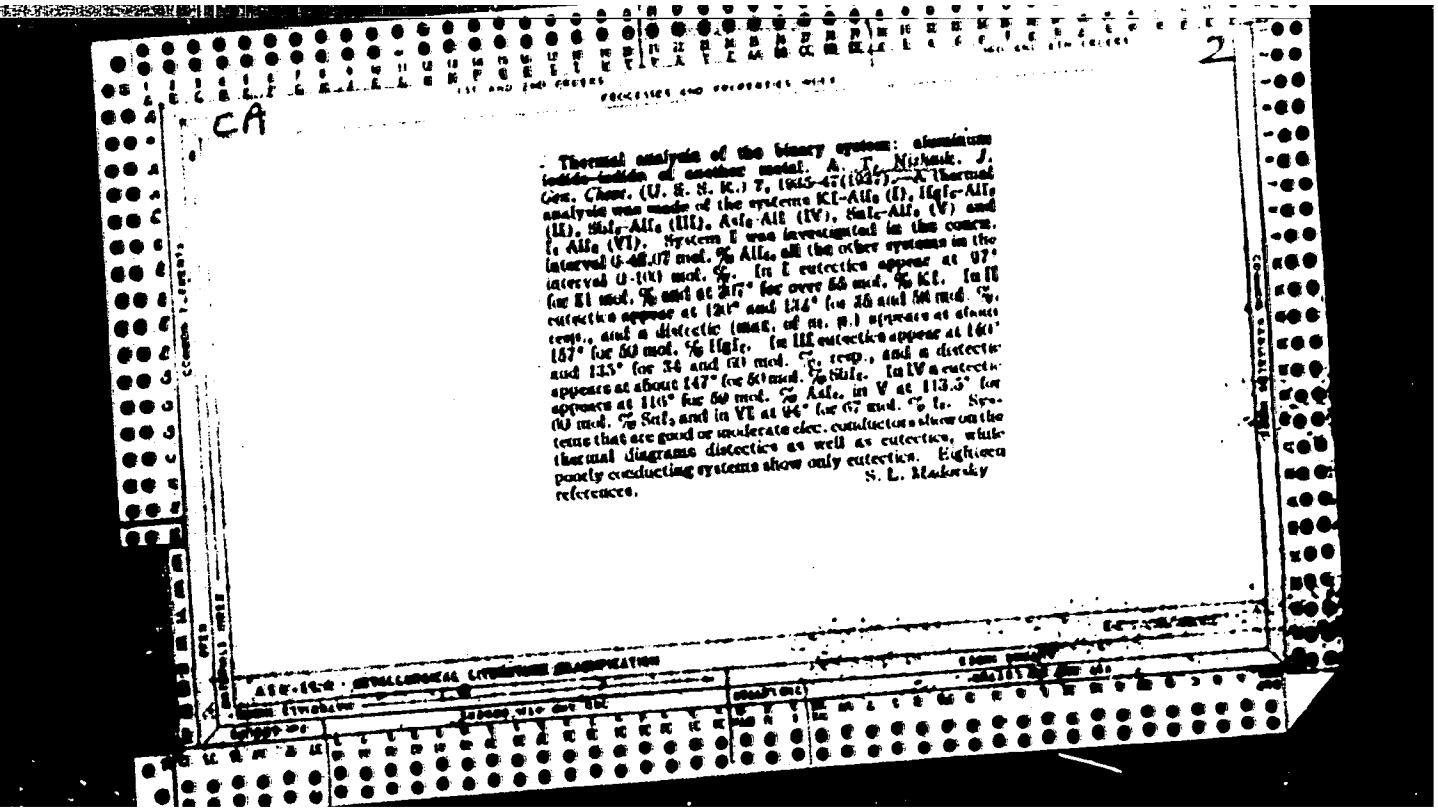
SERGINOVICH, P.F.; NIZHNIK, S. V., red.

[Physics in construction; a manual for improving the qualifications of engineers and technicians by correspondence courses] Stroitel'naia fizika; uchebnoe posobie dlia zaochnogo povysheniia kvalifikatsii inzhenerno-tekhnicheskikh rabotnikov. Moskva, Vses. zaochnyi stroitel'nyi tekhnikum, 1963. 59 p.
(MIRA 17:9)



Thermal analysis of the binary system: aluminum iodide–iodide of another metal. A. V. Nikitin. *Mem. Inst. Chem., Ukrain. Acad. Sci.* 6, 105-07 (in Russian 101-2, in German 103-4)((1937).—See *C. A.* 32, 214.
M. W. B.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



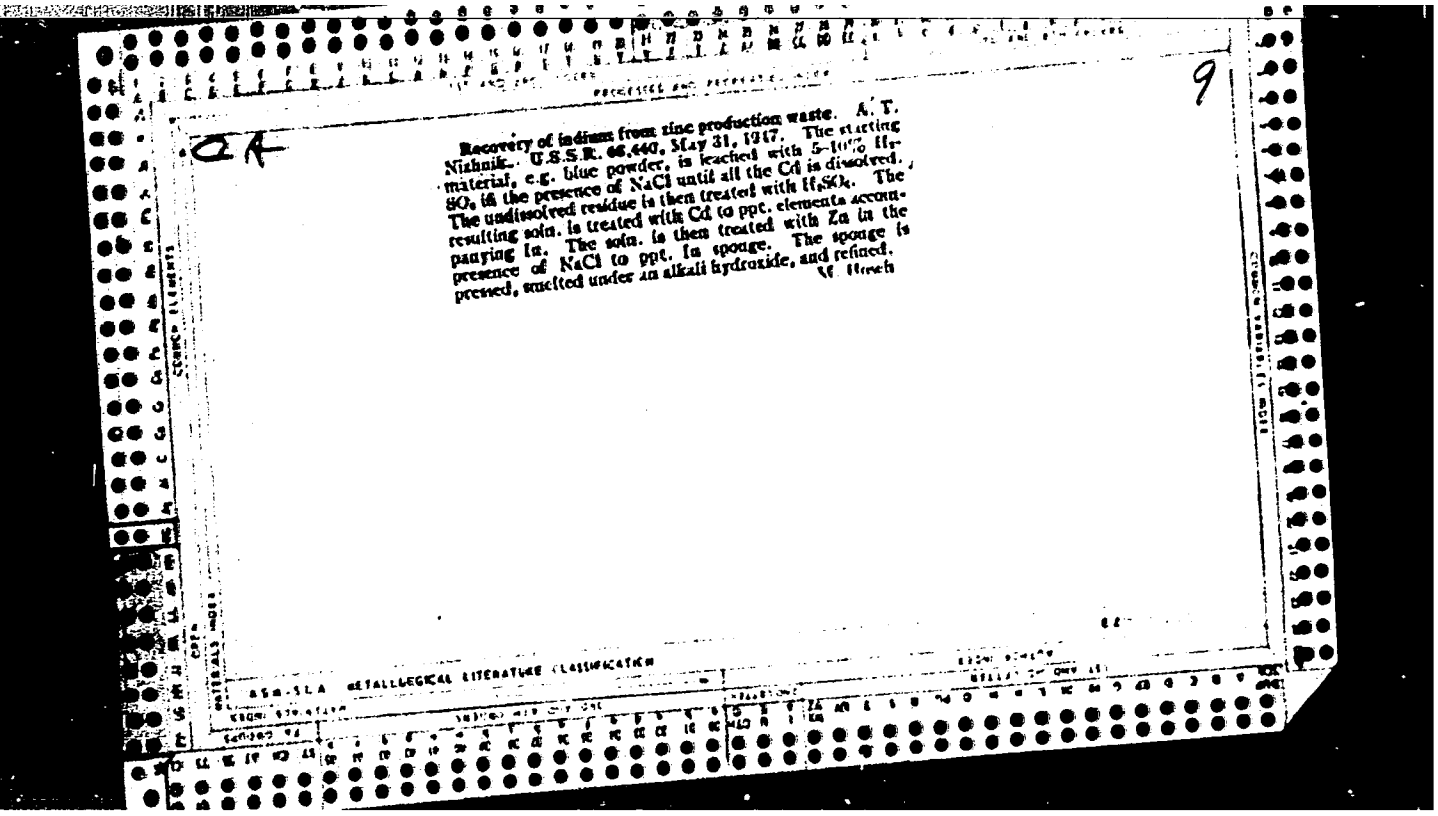
CA

Thermal analysis of the binary system: aluminum iodide–iodide of another metal. A. F. Nizhnik. J. Gen. Chem. (U. S. S. R.) 7, 1945–47 (1937).—A thermal analysis was made of the systems KI-AlI$_3$ (I), HgI$_2$-AlI$_3$ (II), NaI$_2$-AlI$_3$ (III), AsI$_3$-AlI$_3$ (IV), SnI$_4$-AlI$_3$ (V) and I$_2$-AlI$_3$ (VI). System I was investigated in the concn. interval 0–48.17 mol. % AlI$_3$, all the other systems in the interval 0–100 mol. %. In I eutectics appear at 97° for 81 mol. % and at 217° for over 55 mol. % KI. In II eutectics appear at 121° and 124° for 35 and 50 mol. % resp., and a dielectic (max. of m. p.) appears at about 157° for 50 mol. % HgI$_2$. In III eutectics appear at 161° and 135° for 34 and 81 mol. % resp., and a dielectic appears at about 147° for 50 mol. % NaI$_2$. In IV a eutectic appears at 116° for 50 mol. % AsI$_3$, in V at 113.5° for 70 mol. % SnI$_4$, and in VI at 96° for 67 mol. % I$_2$. Systems that are good or moderate elec. conductors show on the thermal diagrams dielectics as well as eutectics, while poorly conducting systems show only eutectics. Eighteen references.

S. L. Madorsky

NIZHNIK, A.T.

Separation of indium from waste products of zinc production. II. Hydrochemical beneficiation of indium raw material. A. T. Nizhnik. *Zapiski Inst. Khim., Akad. Nauk. Ukr. R.S.R.* 8, No. 2: 71-82; in Russian, 83; in English, 84(1940).—The extn. of In from waste products of zinc refining requires extensive prepn., but eventually the waste can be developed in a continuous source of In. Digestion of waste products with H_2SO_4 and subsequent pptn. of In with other colored metals on metallic zinc appears to be the most favorable method. In leaching of the material with insufficient amounts of 10% H_2SO_4, In goes in soln. even in presence of metallic Zn and losses of up to 35% In into soln. have been observed. Use of a 20 to 30% soln. of H_2SO_4 and material of less than 50 mesh (U.S. Standard) assures complete extn. of In. The content of In in the concentrate is about 6 times that of the raw material. The soln. can be used for commercial recovery of In, Cd, and other elements. M. O. Holowaty



Recovery of indium from zinc production waste. A. T. Nizhnik. U.S.S.R. 66,440, May 31, 1917. The starting material, e.g. blue powder, is leached with 5-10% H_2SO_4 in the presence of NaCl until all the Cd is dissolved. The undissolved residue is then treated with H_2SO_4. The resulting soln. is treated with Cd to ppt. elements accompanying In. The soln. is then treated with Zn in the presence of NaCl to ppt. In sponge. The sponge is pressed, melted under an alkali hydroxide, and refined.

MITYUREVA, T.T.; NIZHNIK, A.T.

Faster method for determining gallium in the by-products of zinc production. Ukr.khim.zhur. 24 no.6:790-793 '58. (MIRA 12:3)
(Gallium--Analysis) (Polarography) (Rhodamine)

5(2),5(4)
AUTHORS: Nizhnik, A. T., Chaus, I. S. SOV/75-14-1-6/32

TITLE: On the Question of a Polarographic Method for the Determination of Indium (K voprosu o polyarograficheskom metode opredeleniya indiya)

PERIODICAL: Zhurnal analiticheskoy khimii, 1959, Vol 14, Nr 1, pp 37-40 (USSR)

ABSTRACT: Among the methods for the quantitative determination of indium, the polarographic method is now the most widely employed. This method calls for the complete separation of copper and cadmium, as the half-wave potentials of these elements are very near to that of indium. For the determination of indium in industrial products containing one-hundredth percentages of indium or more, the authors suggest the amalgam method for the preparation of the solutions. The initial solution, which besides indium contains 20% of free sulfuric acid or an equivalent quantity of other sulfates, is worked up with zinc amalgam at normal temperature. All elements causing disturbance to the polarographic determination of indium are removed from the solution, while indium is maintained in the latter.

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On the Question of a Polarographic Method for the Determination of Indium

SOV/75-14-1-6/

Sodium chloride or another soluble chloride (about 10% of weight of solution) is added to the purified solution, and indium is then polarographed. The addition of NaCl effects the normal reduction of indium ions in sulfuric acid solutions, in which the polarographic wave of indium does not take place without the chloride addition (Refs 13-16). The cause for the retarded reduction of indium ions in sulfuric acid solutions lies in the formation of complex anions of indium. This process is independent of the nature of the cation of the sulfates introduced (hydrogen or metal). The half-wave potential of indium in hydrochloric acid solution amounts to -0.597 V (with respect to a saturated calomel electrode), whereas it is -1.06 V in sulfuric acid solution, and that of cadmium in sulfuric acid solution is -0.642 V. The great difference in the potential values permits the complete separation of indium and cadmium in sulfuric acid solutions by the aid of zinc amalgam. As, Sb, Bi, Cu, Tl, Se, Sn, Ti, Fe(III) and some other elements are reduced by zinc amalgam. Higher valency elements are reduced

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On the Question of a Polarographic Method for the Determination of Indium

SOV/75-14-1-6/32

to lower ones. (Fe(III), V(V), Cr(VI), Ti(IV)). The new method elaborated is accurately described. It was tested on several indium-containing raw materials. The results are described. There are 1 figure, 2 tables, and 20 references, 16 of which are Soviet.

ASSOCIATION: Institut obshchey i neorganicheskoy khimii AN USSR, Kiyev (Institute of General and Inorganic Chemistry of the AS UkrSSR, Kiyev)

SUBMITTED: July 24, 1957

Card 3/3

NIZHNIK, A.T.

Amalgamation method for the production of spectrally pure, highly dispersed zinc sponge. Ukr.khim.zhur. 25 no.1:138-140 '59. (MIRA 12:4)

1. Institut obshchey i neorganicheskoy khimii AN USSR.
(Amalgamation) (Zinc--Electrometallurgy)

NIZHNIK, A.T.; ZVAGOL'SKAYA, Ye.V.

Solubility and electrode potentials in the system gallium - mercury. Zhur.neorg.khim. 6 no.4:1006-1008 Ap '61. (MIRA 14:4)

(Gallium) (Mercury)

21878
S/073/61/027/002/003/004
B101/B208

1 18.3100 1087

AUTHORS: Nizhnik, A. T. and Bykova, M. I.

TITLE: Electrochemical study of indium-bismuth amalgam

PERIODICAL: Ukrainskiy khimicheskiy zhurnal, v. 27, no. 2, 1961, 171-175

TEXT: The problem of the present paper is the extraction of indium from tailings of non-ferrous metallurgy in the form of amalgam in the presence of bismuth. For this purpose, the behavior of In in the ternary system In-Bi-Hg was studied. The equilibrium potential of In-Bi-Hg amalgam was first measured at 0.5 a/m^2, 18°C. The amalgam surface was 2.6 cm^2; platinum was used as cathode; the electrolyte consisted of 55 g/l $InCl_3$ and 10 g/l HCl. The maximum solubility of Bi in Hg being 1.49 wt%, amalgam was prepared in different In/Bi ratios in such a way that the total concentration of the two metals was 1.4%. Fig. 2 shows the change of the potential as a function of the In/Bi ratio. Minima were observed at atomic ratios of 2 : 1 and 1 : 1, corresponding to the compounds In_2Bi and InBi. An examination with pure indium amalgam and In-Bi amalgam with the same indium content confirmed this result. As the maximum deviation of the potential of In-Bi amalgam as com-

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Electrochemical study .....

pared to pure In amalgam was 0.022 v, it was assumed that the interaction between In and Bi in Hg would not considerably influence the electrodeposition of indium. This was studied experimentally with amalgam having a ratio of 47 : 53, corresponding to In_2Bi, and 65 : 35, corresponding to InBi. A 15×4 mm platinum plate served as a cathode. The current density was 0.04 a/cm^2, and the terminal voltage 4 v. Amalgam and electrolyte (10 g/l $InCl_3$, 75 g/l HCl) were stirred with 250-300 rpm. Fig. 5 shows the change of the anode potential. It could be seen from this and from the analysis (determination of In in amalgam and electrolyte polarographically, and of Bi by spectrum analysis) that about 99% In may be obtained from an In-Bi amalgam. Electrolysis was finished as soon as the thiourea added to the electrolyte indicated the dissolution of Bi in the electrolyte by a yellow ccloring. The electrodeposited indium was investigated by spectrum analysis. It contained 0.018-0.020 wt% of Bi. Fig. 4 illustrates the effect of Bi on the limiting of a 1% In amalgam. The reduction of the limiting current in the presence of Bi may be explained by impeded diffusion of the indium atoms in In-Bi-Hg. There are 5 figures, 1 table, and 9 references: 6 Soviet-bloc and 3 non-Soviet-bloc. The 2 references to English-language publications read as follows: Ludwick Maria Thompson, Indium, New York,

Card 2/6

21678

Electrochemical study .....

S/073/61/027/002/003/004
B101/B208

1950, 20; W. M. Spicer, G. I. Banick, J. Am. Chem. Soc., 75, 9, 2268, (1953).

ASSOCIATION: Institut obshchey i neorganicheskoy khimii AN USSR
(Institute of General and Inorganic Chemistry, AS UkrSSR)

SUBMITTED: August 7, 1959

Card 3/6

54700 1043, 1087, 1208

22434
S/080/61/034/007/009/015
D223/D305

AUTHORS: Nizhnik, A.T., and Bykova, M.I.

TITLE: Electrochemical investigation of the system of gallium-zinc-mercury

PERIODICAL: Zhurnal prikladnoy khimii, v. 34, no. 7, 1961, 1554 - 1561

TEXT: Metallic gallium obtained from residues during Pb and Zn production always contain the latter as an impurity. The difference in the potential of zinc (-0.76 v) and gallium (-0.52 v) suggest the possibility of electrolytic separation of the two metals. The present work deals with the possibility of electrolytically separating zinc and gallium and also with the optimum conditions under which this separation can take place. To carry out the investigation metallic Ga, Zn and Hg were used of following purities: Ga = 99.99 % with trace impurities of Al, Zn, Pb and Cu: Zn - 99.999 %; mercury was purified by method employed in polarography (polaro-

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Electrochemical investigation ...

graphic analysis). The polarization curves were obtained by the usual compensating method, the measurements taken on the potentiometer system M-1. The proportional volume ratio of amalgam and solution was 1:10. All measurements were done at room temperature ($\sim 20^{\circ}C$). The gallium estimation was done colorimetrically. The data obtained on current density and its effect on the cathodic and anodic potential of zinc and gallium amalgam in 1 N H_2SO_4 is given in Fig. 1 of 1N HCl in Fig. 2. From this data it may be seen that the polarization curves of zinc and gallium amalgam in H_2SO_4 and HCl solutions are similar. Zn is seen to be more positive than gallium on the cathodic side and the cathodic potential of Zn/Hg at current density of 100 mA/cm^2 is equal to -1.5 v while Ga/Hg potential was -1.6 v (in respect of N.K.C.). Similar relations hold for the anodic process where for the same current density, the zinc potential was 0.74 v and gallium -0.47 v (in respect of N.K.C.). Here zinc is seen to be more electronegative than gallium. These relations suggested the possibility of electrolytical separation of two metals. The author then briefly describe their in-

Electrochemical investigation ...

vestigation on stability of Zn and Ga amalgams in respect of H_2SO_4. The results show that the gallium amalgam is more stable than zinc. After 3 hours the transfer of gallium into 2N H_2SO_4 solution is 0.5 % hence the small solubility of Ga amalgam in H_2SO_4 explains the absence of gallium on the Hg cathode. Composite polarization curves, of Zn and H_2 and Ga and H_2 were recorded as well as the individual curves. This is done by association of part of the total current with the deposit of one of the elements under investigation, and the current density is worked out from the material balance of cathode and the composition of products. This approach is adopted when there are several elements present and current is associated with each one. As long as experiments for the potential determination and electrode balance are carried out under same conditions, the above approach is valid. The electrolyte used was a 1N. H_2SO_4 solution containing 3.33 g/l of Zn and 2.33 g/l of Ga. The results indicate that the maximum quantity of gallium on cathode was 0.4 wt. %. From the individual polarization curves of zinc and gallium, it was shown that Zn emerges at potential - 1.1v

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Electrochemical investigation ...

and gallium at -1.45 v giving a difference of 0.35 v which is sufficient for the complete separation of the metals. The actual separation experiment was investigated on a solution of 50 mls containing 0.05 gr Ga and 0.5 gr Zn; cathode 4 mls of Hg with surface 8 cm^2; Anode Pf foil with surface 48 mm^2; stirring rate 200 revs/min; temperature 20°C. The results obtained are given in tabulated and graphic form. With the increase in acidity, starting with 2N H_2SO_4 and higher, the codeposition of Ga with Zn in an amalgam falls sharply. A similar process occurs in the HCl solution. The best conditions for separating were found to be: Minimum current density with maximum acidity, i.e. D_k = 0.03 - 0.05 A/cm^2 and 2N sol. of H_2SO_4. The time effect on the cathode potential is also shown. The deposition of Zn proceeded initially at potential 1.29-1.32 v and after 62 mins. the entire Zn was deposited and immediately followed by a vigorous evolution of hydrogen with traces of Ga. Practically 100 % of the Zn was deposited using 2N H_2SO_4, 0.03 A/cm^2 Zn: Ga = 50:1 giving a current yield of Zn 65-70 % and the

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Electrochemical investigation ...

amalgam contained only 15γ/50 mls of Ga. There are 6 figures, 3 tables and 12 references: 8 Soviet-bloc and 4 non-Soviet-bloc. The references to the English-language publications read as follows: L. Dennis, A. Bridgeman, J.Am.Chem. Soc., 40, 15, 31, 1918; T. Richards, A. Bojer, J. Am. Chem. Soc., 43, 275, 1921; W.M. Latimer, The oxidation States of the Elements and their Potentials in Aqueous Solutions, N.Y., 1938.

SUBMITTED: July 4, 1960

Fig. 1. Effect of current density on anodic and cathodic potentials of Zn and Ga amalgams in 1N solution of H_2SO_4.

Legend: A - current density (mA/cm^2); B - potential (v); 1,2,3 - anodic curves corresponding to 1,2,3 gr.atoms met/l of Hg 4,5,6 - cathodic curves corresponding to 1,2,3 gr. atom/l Hg. I - gallium, II - zinc.

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20741

S/020/61/137/002/015/020
B103/B215

18.3100

AUTHOR: Nizhnik, A. T.

TITLE: Amalgam method for the recovery of rare dispersed metals

PERIODICAL: Doklady Akademii nauk SSSR, v. 137, no. 2, 1961, 366-368

TEXT: The author suggests an amalgam method of extracting and refining high-purity indium and gallium to eliminate difficulties in conventional methods. The extraction of thallium was discussed by M. T. Kozlovskiy et al. (Ref 11: Tsvetnyye Metally, 1, 30, 1958), and A. A. Shokol, L. F. Kozin (Ref. 12: Ukr. khim. zhurn., 25, no. 2, 249, 1959. The principles of the author's method are such: a) considerable solubility of these metals in mercury (In ≈75, Tl 45, Ga ~2%; b) stability of their amalgams in aqueous solutions; c) no chemical interaction between these metals and mercury; d) overvoltage of hydrogen in amalgams, whereby reactions in sufficiently acid solutions become possible; e) intensive diffusion in amalgams allowing the application of considerable current densities; f) strictly observed order of transition from the metals of solutions into amalgam, and vice versa; g) homogeneous

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S/020/61/137/002/015/020
B103/B215

Amalgam method for the...

(ideally smooth) amalgam surface, and small interface separating the solution, thus eliminating side reactions (absorption, passivation, formation of galvanic elements, etc) and guaranteeing stable potential of the system; h) high specific gravity of mercury and amalgams, which may lead to the accumulation of considerable quantities of metal in a small volume of amalgam (~10 kg In in 1 l of Hg). The production of In and Ga is based upon their transfer from solutions into amalgams by cementing on amalgams of metals which are more strongly electronegative than rare metals, e.g., Tl on Zn|Hg or Cd|Hg; In on Zn|Hg and Ga on Na|Hg. The metals are extracted from the developed amalgams by electrolytic (anodic) dissolution, the rare metal is simultaneously deposited on the cathode. Fig. 1 shows the sulfide separation of indium from heavy metals. Bi, Cu Sb, As, et al. are first deposited; by ZnS additions, after that In is bound. The extraction of indium by Zn|Hg, and of gallium by Na|Hg are illustrated in Figs. 2 and 3 (T.T.Mityureva, I.S.Chaus and Z.V.Shekhter assited). Cd is cemented together with In, as their potentials are so close to each other ($\pi_{1/2}$ In= -0.58, $\pi_{1/2}$ Cd= -0.60 v). In and Cd, however, can be quantita-

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S/020/61/137/002/015/020
B103/B215

Amalgam method for the ...

tively separated from sulfates containing an excess of sulfate ions. The indium potential is shifted by the formation of an indium complex anion $(In(SO_4)_2)^-$. Ye. V. Zvagol'skaya proved that hydrochloric media are most suitable for the selective transfer of indium from amalgam. 90% of spectroscopically pure indium is obtained on the cathode at a current density between 0.05 and 0.1 a/cm^2. Further experiments of the author showed that under an electrolyte layer mercury starts evaporating from indium amalgam after 5 hr at 50°C so that mercury impurities in indium are eliminated. Table 3 gives the purity of indium refined by this method, and other types of indium. The purity was tested by B. I. Verkin and B. N. Aleksandrov by physical methods. Hence, the author concludes that the indium he refined is one of the purest types. There are 3 figures, 3 tables, and 19 references: 12 Soviet-bloc and 7 non-Soviet-bloc. The reference to the English-language publication reads as follows: Ref. 18: H. Meissner, R. Zdanis, Phys. Rev., 109, no. 3, 681 (1958).

Card 3/8

20741
S/020/61/137/002/015/020
B103/B215

Amalgam method for the...

ASSOCIATION: Institut obshchey i neorganicheskoy khimii Akademii nauk USSR (Institute of General and Inorganic Chemistry of the Academy of Sciences UkrSSR)

PRESENTED: November 3, 1960 by A. N. Frumkin, Academician

SUBMITTED: October 13, 1960

Card 4/8

S/081/62/000/011/015/057
E111/E152

AUTHORS: Nizhnik, A.T., and Chaus, I.S.

TITLE: Method for the polarographic determination of indium

PERIODICAL: Referativnyy zhurnal, Khimiya, no.11, 1962, 140, abstract 11 D 85. (In the Symposium: 'Khim. fiz.-khim.. i spektr. metody issled. rud. redk. i rasseyan. elementov' ('Methods of chemical, physico-chemical and spectral investigation of rare and dispersed ore elements'), M. Gosgeoltekhizdat, 1961, 92-95)

TEXT: A simplified method is described for the determination of small quantities of In in industrial products and wastes. This is based on preliminary separation of the interfering elements (As, Sb, Bi, Cu, Tl, Se, Te, Mo, Ti(4+), Fe^{3+}, Cd, Cr(6+), V(5+)), by reduction with Zn amalgam in a sulphuric-acid medium and subsequent polarography of In in the purified solution. 1-3 g of sample are decomposed by heating with a mixture of HNO_3 and H_2SO_4, the liquid is evaporated till evolution of H_2SO_4 fumes,

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on cooling the residue is treated with water (with filtration when there is a large precipitate), H_2SO_4 is added to give a final concentration of 20% and cementation with Zn amalgam is carried out with stirring (250-300 rev/min) for 40-50 min at room temperature. When cementation is finished the solution is filtered, about 10 wt.% NaCl is added and polarography is carried out. The method developed for the determination of In is considerably shorter than those which have been described in the literature.

[Abstractor's note: Complete translation.]

S/080/62/035/002/007/022
D235/D302

AUTHORS: Nizhnik, A. T. and Shekhter, Z. V.

TITLE: Study of the effect of certain impurities on the cementation of gallium with sodium amalgam

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 2, 1962, 295-300

TEXT: Dependence of the rate of separation of Ga into the amalgam on the temperature, rate of stirring and on alkali concentration was first studied. The degree of cementation increased with an increase in the speed of stirring and with rising temperature; the optimum conditions were a temperature of 50°C, a speed of stirring of 400 rpm and an alkali concentration of 50 g/l. In order to investigate the effect of impurities small amounts of Zn, Al, As, Sb and Mo were added to a solution containing 50 g NaOH and 0.4 g Ga per liter. Under the optimum conditions 10 ml of 1% Na amalgam were added to 50 ml of solution and cementation was allowed to proceed for 90 minutes. Al and As^{5+} were not reduced by sodium amalgam; zinc, like Ga, was reduced by the amalgam to the metal and easily

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Study of the effect ...

dissolved in the mercury. As^{3+} and Sb^{3+} were reduced to the element, but did not dissolve in mercury and in the case of As, AsH_3 was evolved. Mo and V were energetically reduced to the lower valency state. The consumption of sodium amalgam during the cementation of gallium in the presence of the studied additions increases in the series $Zn < Sb^{3+} < Mo^{4+} < As^{3+} < V^{5+}$. The presence of such elements does not effect the degree of Ga cementation and only in the presence of V does the rate of cementation decrease by 10 - 20%. The reduction of V to a lower valency state is accompanied by a sharp increase in the breakdown of the sodium amalgam, but the authors established that cementation of gallium is possible even in the presence of large quantities of vanadium provided there is an excess of the amalgam. There are 2 figures, 2 tables and 16 references: 8 Soviet-bloc and 8 non-Soviet-bloc. The references to the English-language publications read as follows: P. de la Breteque, C. R., 243, 14, 958, (1956); R. MacMullen, Chem. Eng. Progr., 46, 9, 20, (1950); A. Angel and T. Lunden, Electroch. Soc., 99, 11, 435 (1952).

SUBMITTED: October 24, 1960

Card 2/2