NO REF SOV 003 OTHER 003

ACCESSION NR: AT4013987 S/3070/63/000/000/0178/0181

AUTHOR: Volcynik, V. V.; Yelyutin, V. P.; Ly*sov, B. S.; Maurakh, M. A.

TITLE: Instrument for measuring electric resistance of solid and melted metals at temperatures up to 2000C

SOURCE: Novy*ye mashiny* i pribory* dlya ispy*taniya metallov. Sbornik statey. Moscow, Metallurgizdat, 1963, 178-181

TOPIC TAGS: conductance measurement, solid metal conductance, liquid metal conductance, high temperature conductance, non-electrode conductance measurement, conductance measuring equipment

ABSTRACT: Using a new instrument, which is described in detail in the text, conductance in solid or liquid metals can be measured over the range 20-2000C, hence even for Ti, V or Zr. The design is based on a non-electrode method of measuring conductance in terms of the moment of forces acting on a specimen in a rotating magnetic field. The instrument has stator coils 180 cm high and located inside the housing, hence the entire assembly can be made of common structural steel. The usual operation is in an atmosphere of inert gas (argon), although tests can be carried out in a $\sim 10^{-3}$ mm Hg vacuum. Dependence of the angle of twist on specimen height for a specimen diameter of 14 mm was plotted in a diagram (see

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ACCESSION NR: AT4013987

Fig. 1 in the Enclosure) which can be used to reduce all angles of twist to a uniform specimen height and to determine the conductance of a given material with the aid of a simple formula:

$$\sigma = K \frac{\Delta \varphi L}{i^2_{mean}}$$

where K is the instrument constant determined from the angle of twist of a uniform height standard, i_{mean} is the average current intensity in stator components in amps., $\Delta \varphi$, is the angle of twist reduced to uniform specimen height, in radians. Temperature was shown to have little effect on the value of K. Orig. art. has: 1 table, 2 formulas, 2 graphs.

ASSOCIATION: MOSKOVSKIY INSTITUT STALI I SPLAVOV (Moscow Steel and Alloy Institute)

SUBMITTED: 00	DATE ACQ: 20Feb64	ENCL: 01
SUB CODE: ML, SD	NO REF SOV: 003	OTHER: 001

Card 2/2

AUTHOR: Yelyutin, V. P.; Mezhuyev, Ye. I.; Artsiferov, V. N.;

APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001962620008-7"

have been cold rolled to not show a peak due to the

S/003/63/000/001/001/002
B117/B186

AUTHOR: Yelyutin, V. P., Corresponding Member AS USSR, Minister of Special Higher and Secondary Education

TITLE: New successes in schools of higher education

PERIODICAL: Vestnik vysshey shkoly, no. 1, 1963, 3-7

TEXT: This article is based on a speech made by the author on December 11, 1962 at the 2-ya sessiya Verkhovnogo Soveta SSSR 6-go sozyva (2nd Session of the Supreme Soviet of the USSR, 6th Convention) dealing with the problems of public education. He pointed out that the development of public education and science was given great attention in the budget and the plan for the development of national economy approved by the Supreme Soviet for 1963. At present, 9,400,000 graduated specialists are employed in all branches of national economy including 4 million with higher education (1,236,000 graduate engineers, i.e. twice as many as in the USA) and 5 million with special secondary education. At present there are 2,900,000 persons studying at schools of higher education and 2,700,000 at technical schools. For 1963, 1,700,000 persons are listed

Card 1/3

New successes in schools of ...

for admittance to schools of special higher and secondary education. This year, 320,500 specialists will graduate from schools of higher education. The party program set up at the XXII Congress of the CPSU confronted schools of higher and special secondary education with the following problems: Improvement and perfection of educational methods and programs; selection and promotion of especially gifted students; calling upon students for practical work; implement the "Law on closer relation between school and life, and on the further development of the public educational system in the USSR." In this context the author mentions the zeal of working students being stimulated by public scrutiny of successes some republics of the USSR, especially the Ukraine. The problem of working students has to be studied carefully from the aspect of the schools of higher education assigning students to appropriate places of work and also from the aspect of the demand by enterprises for students in certain fields of work. In this connection, the author recommended that a list of professions be set up showing clearly what jobs require a staff with higher or secondary education. Special attention should be paid to the training of agricultural personnel. This is particularly important since agriculture is short of engineers and technicians. Finally, the problem

of evening classes and correspondence courses is dealt with. According to the party program they should be developed rapidly within the next 20 years. This method of education allows anyone to improve his qualifications and helps in breaking down boundaries between manual and intellectual work.

Card 3/3

ACCESSION NR: AR4016318 S/0137/64/000/001/0037/0037

SOURCE: RZh. Metallurgiya, Abs. 1G268

AUTHOR: Yelyutin, V. P.; Mozshukhin, Ye. I.; Ragavan, R. V.

TITLE: Study of copper powder strengthened with aluminum oxide

CITED SOURCE: Tr. Kuyby*shevsk. aviats. in-t, vy*p. 16, 1963, 243-268

TOPIC TAGS: copper powder, aluminum oxide, copper alloy

TRANSLATION: Cu-Al_2O_3 alloys containing 1-10 vol. % Al_2O_3 were investigated. Powders of the mixture were obtained by two methods: (1) precipitation of Al salt on Cu oxide particles with subsequent reduction, and (2) mechanical stirring of Cu and Al_2O_3 powders in distilled water in a ball mill for 50 hr. In method 1, use was made of the $Al(NO_3)_3 \cdot 9H_2O$. The bulk density of the powders obtained by method 1 was less, and of those obtained by method 2, more than that of pure Cu. As the Al_2O_3 content was increased, compactibility of the powders was reduced and density of the sintered bars was decreased. Al_2O_3 introduced by method 1 has a more pronounced effect on shrinkage. The sintered specimens were compacted by hot pressing, then cold-worked by upsetting by 50%. Annealing of cold-worked specimens was carried out

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ACCESSION NR: AR4018318

at 200-700° for 15 to 60 min. H_V of Al_2O_3 materials was higher than that of pure Cu in all cases. Introduction of Al_2O_3 by method 2 promotes retention of greater hardness to higher temperatures than by method 1. Use of X-ray diffraction also showed higher recrystallization temperatures upon introduction of Al_2O_3. The activation energy of recrystallization for materials with varying content of Al_2O_3 was determined. A more uniform distribution of Al_2O_3 particles was observed metallographically in the case of method 2. X-ray diffraction analysis also established that in hot-pressed and cold-worked Cu-Al_2O_3, the submicrograins are smaller than in pure Cu treated under the same conditions. O. Padalko

SUB CODE: MM ENCL: 00

Card 2/2

YELYUTIN, V.P.; ANTSIFEROV, V.N.; MOZZHUKHIN, Ye.I.; NATANSON, A.K.

Investigating the effect of dispersed aluminum oxide inclusions on certain characteristics of sintered nickel. Porosh. met. 3 no.4:33-39 Jl-Ag '63. (MIRA 16:10)

1. Moskovskiy institut stali i splavov.
(Powder metallurgy)
(Nickel-aluminum alloys—Testing)

YELYUTIN, V.P.; ANTISIFEROV, V.N.; MOZZHUKHIN, Ye.I.

Effect of dispersed oxide inclusions on the recrystallization of sintered powder nickel. Izv. vys. ucheb. zav.; chern. met. 6 no.7:134-139 '63. (MIRA 16:9)

1. Moskovskiy institut stali i splavov.
(Powder metallurgy) (Recrystallization)

YELYUTIN, V.P.; PEPEKIN, G.I.; LYSOV, B.S.

Thermodynamic calculations of certain reactions occurring during the precipitation of titanium carbide from the gaseous phase. Izv. vys. ucheb. zav.; chern. met. 6 no.11:5-10 '63. (MIRA 17:3)

1. Moskovskiy institut stali i splavov.

L 18550-63 EWP(q)/EWT(m)/BDS AFFTC/ASD JD/JG
ACCESSION NR: AP3001701 S/0126/63/015/005/0748/0753

AUTHORS: Yelyutin, V.P.; Natanson, A.K.; Mozzhukhin, K.I.; Vasil'yev, O.A. 61

TITLE: Investigation of internal friction in tungsten VA-3 wire 17 60

SOURCE: Fizika metallov i metallovedeniye, v. 15, no. 5, 1963, 748-753

TOPIC TAGS: tungsten, internal friction, tungsten VA-3 wire

ABSTRACT: The internal friction in the four samples of the VA-3 wire (used in the production of electric bulb filament) has been studied at temperatures up to 2270K. The results obtained were compared with the internal structure of the wire and its residual elongation values obtained from the creep test. The wire was 1.25 mm in diameter, the load was 2 kg, and the time interval was 4 hours. Before the internal friction was measured the wire was drawn to a diameter of 0.52 mm. Measurements were taken twice--immediately after the drawing and again during the second annealing. Curves expressing relation of temperature to internal friction of the wire with a considerable residual elongation had a peak at 2100-2150K caused by recrystallization. This peak was absent in the case of small elongations because of its shift into the higher temperature region. The internal friction level at the second measurement was correlated to the sample behavior during the first measurement. Samples with the recrystallization process arrested during the

Card 1/2

L 18550-63

ACCESSION NR: AP3001701

first measurement had small friction values; those with a continued recrystallization had large friction values. Orig. art. has: 1 table and 4 figures.

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys)

SUBMITTED: 21Jun62 DATE ACQ: 11Jul63 ENCL: 00

SUB CODE: ML NO REF SOV: 002 OTHER: 003

Card 2/2

YELYUTIN, V.

Laureates in students' research and discoveries. Tekh.mol. 31 no.5:1 '63. (MIRA 16:6)

1. Ministr vysshego i srednego spetsial'nogo obrazovaniya SSSR.
(Technological innovations) (Students activities)

ACCESSION NR: AP4039271 S/0148/64/000/005/0017/0021

AUTHORS: Yelyutin, V.P.; Pavlov, Yu.A.; Manukhin, A.V.

TITLE: The effects of oxide impurities on the semiconductive and chemical properties of vanadium pentoxide

SOURCE: IVUZ. Chernaya metallurgiya, no. 5, 1964, 17-21

TOPIC TAGS: vanadium pentoxide, SiO sub 2, Cr sub 2 O sub 3, Cu sub 2 O, termal change, semiconduction, chemical activity, ZrO sub 2 crucible, ionization

ABSTRACT: There is a recent tendency of investigating the reduction - oxidation of metals from the viewpoint of semiconductive properties. Thus, the authors observed the effects of SiO_2, Cr_2O_3 and Cu_2O on the character of thermal changes in the electrical conductivity and chemical activity of vanadium pentoxide. Specimens were prepared by mixing V_2O_5 for 50 hrs. with a rated amount of additives and melting in ZrO_2 crucibles. The specimens were crushed and passed through a 120 mesh sieve. A load of 1.5 t/cm^2 was applied to produce 4 x 5 x 40 mm compacts which were sintered in an oxygen

Card 1/3

ACCESSION NR: AP4039271

stream at 600C for 7 hrs. Impurities exerted a considerable influence on the character of changes of the electrical resistivity of specimens according to temperature. They affected the initial temperature at which the conductivity of vanadium pentoxide began predominating over the conductivity of impurities. The higher the concentration of impurities, the greater the effect on the initial temperature at which the inflection on the conductivity curve appears. Low reducibility SiO_2 and Cr_2O_3 act in one direction while Cu_2O acts in the opposite direction. The authors contend that low reducibility oxides act as acceptors and high reducibility oxides as donors. As SiO_2 and Cr_2O_3 concentrations are heightened, the temperature of transition of the conductivity of impurities to that of V_2O_5 increases. Impurities with a low-temperature ionization were found to lower the temperature of initial oxide reduction and increase chemical activity. High-temperature ionization impurities act in the opposite direction. The authors believe that it may become possible to predict the character of the effect of impurities on the properties of oxide. The orig. art. has: 4 figures and 1 table.

Card 2/3

ACCESSION NR: AP4039271

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys)

SUBMITTED: 27Sep63 ENCL: 00

SUB CODE: MM NR REF SOV: 003 OTHER: 000

Card 3/3

ACCESSION NR: AP4039274 S/0148/64/000/005/0117/0121

AUTHORS: Yelyutin, V.P.; Maurakh, M.A.; Pugin, V.S.

TITLE: Surface tension of Ti-Sn-Al-Fe alloys

SOURCE: IVUZ. Chernaya metallurgiya, no. 5, 1964, 117-121

TOPIC TAGS: surface tension, Ti alloy, Sn alloy, Al alloy, Fe alloy, Segden test, iron carbonyl, graphite crucible, carburization, corundum mold, ethylsilicate bond

ABSTRACT: The scarcity of data on the surface tension of rare earth metals and the total lack of information on Ti inspired the investigation of the effects of Sn, Al and Fe on the surface tension of Ti. The Segden method of testing was used (maximum gas bubble pressure in two capillaries of a different diameter). Specimens were prepared from "TG-00" Ti, spectrally pure Sn and Al, and iron carbonyl. The surface tension of all Ti-Al-Fe alloys was measured at 1750C and of Sn specimens at 1750, 1850, and 1970C. High-density graphite crucibles were used. Sn was found to lower Ti surface tension more than Al and Fe. Evidently, an increase in the

Card

ACCESSION NR: AP4039274

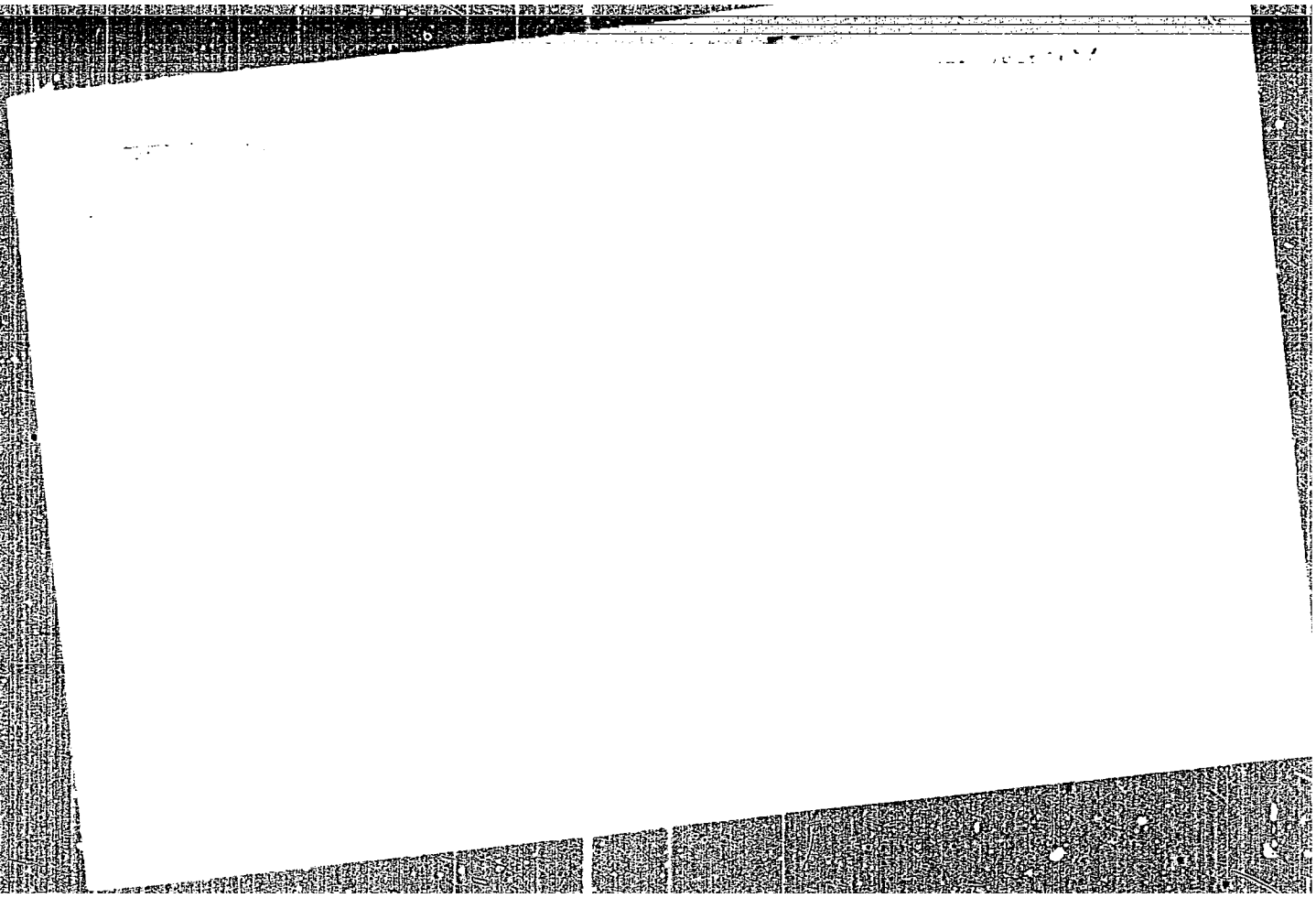
surface concentration of Sn and Al which react weakly to C would lower pickup. The least carburization was observed with 8 to 14% Al and 4% Sn cast in electrolytically produced white corundum molds with an ethylsilicate bond and coated with colloidal graphite; surface smoothness was good and all specimens were readily removed without pickup. Experimental data coincided with calculations. Ti density was lowered by Al and heightened by Sn additions at about the same rate. 20% Sn increases the density of hot Ti to 4.4 g/cm^2 while 20% Al decreases it to 3.8g/cm^3. The authors conclude that additions of Sn in excess of 8% and of Al in excess of 10% to cast Ti alloys have a beneficial effect on the surface tension of Ti. The orig. art. has: 5 figures

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys).

SUBMITTED: 25Dec63 ENCL: 00

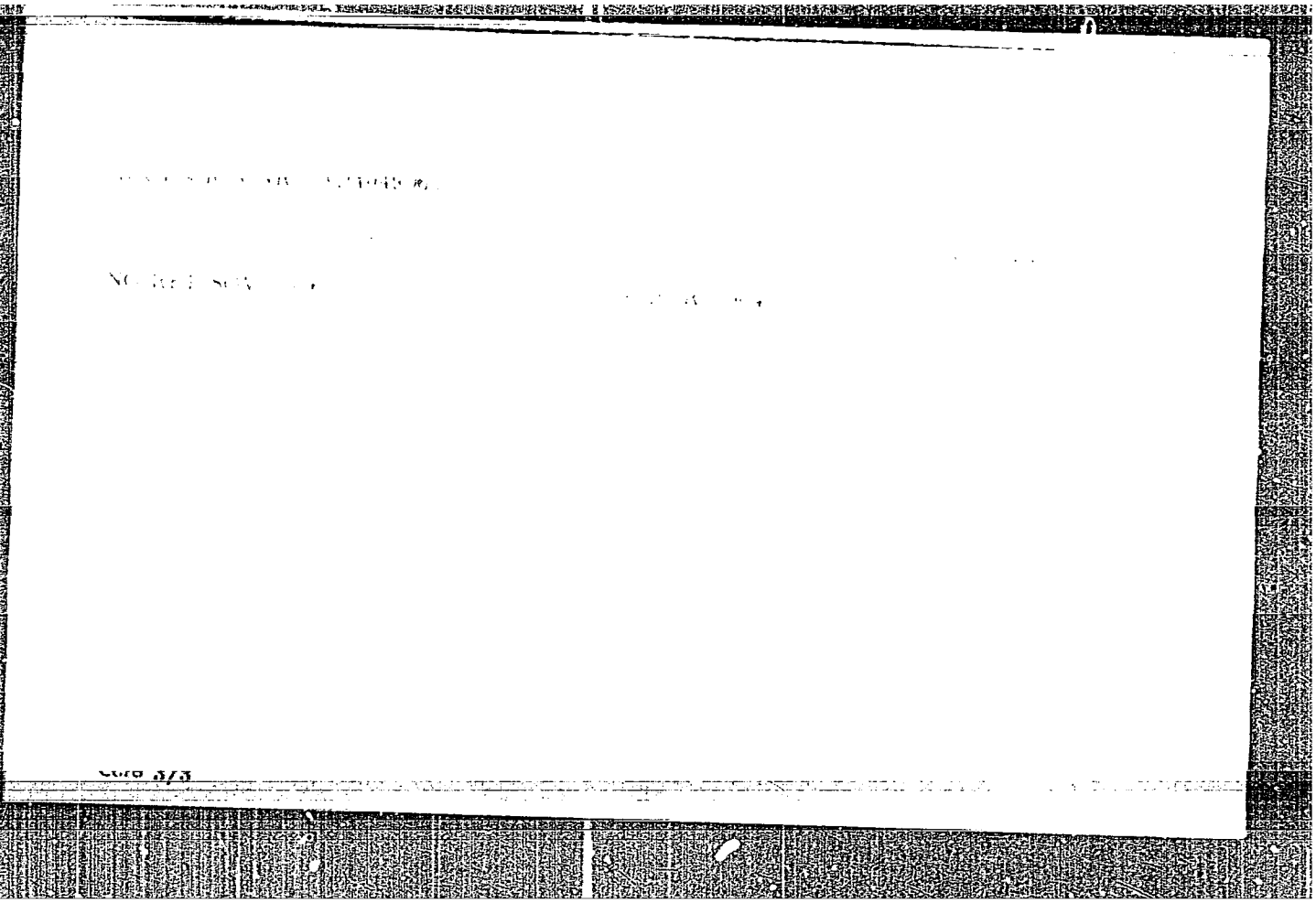
SUB CODE: MM NR REF SOV: 006 OTHER: 004

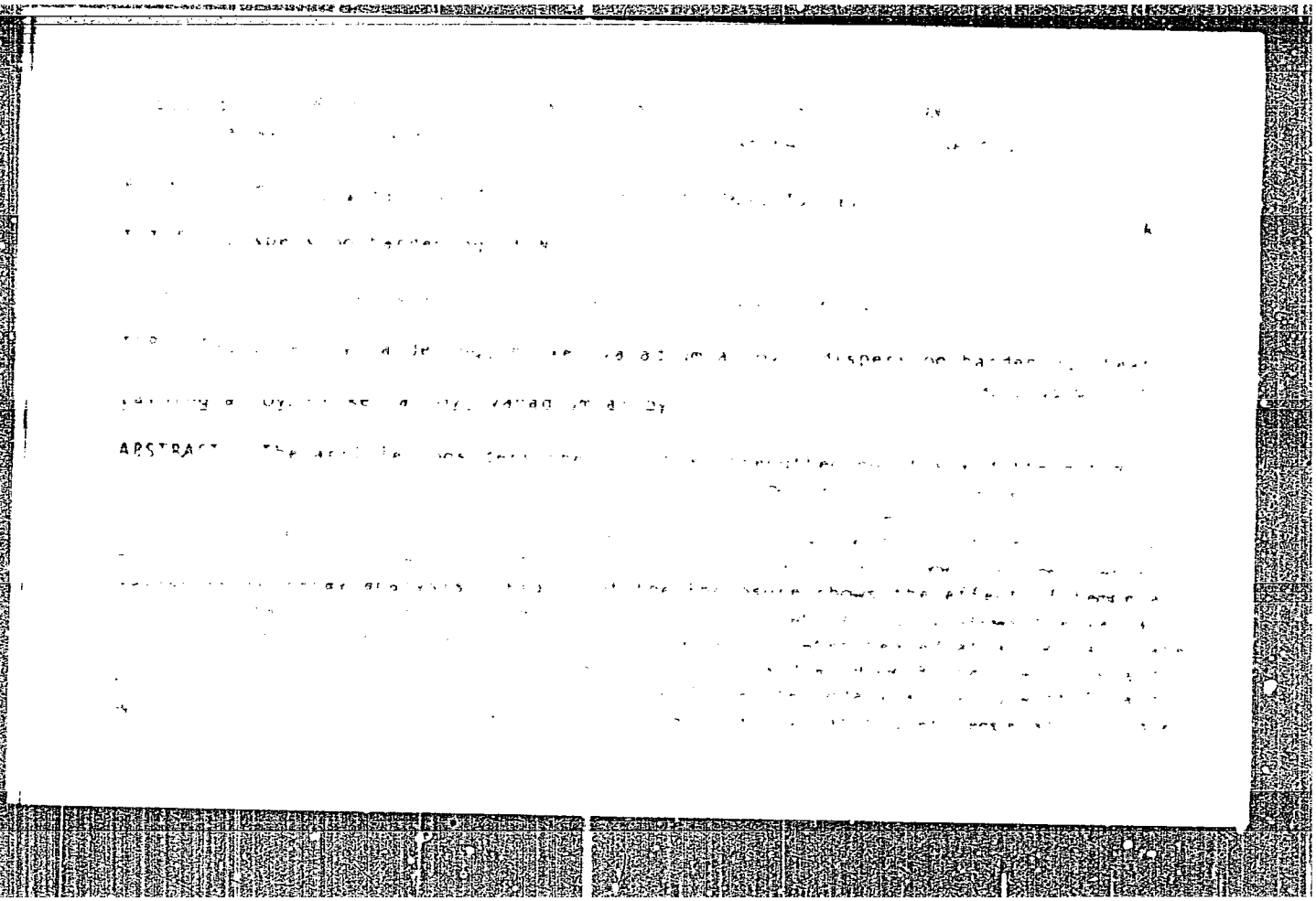
Card 2/2



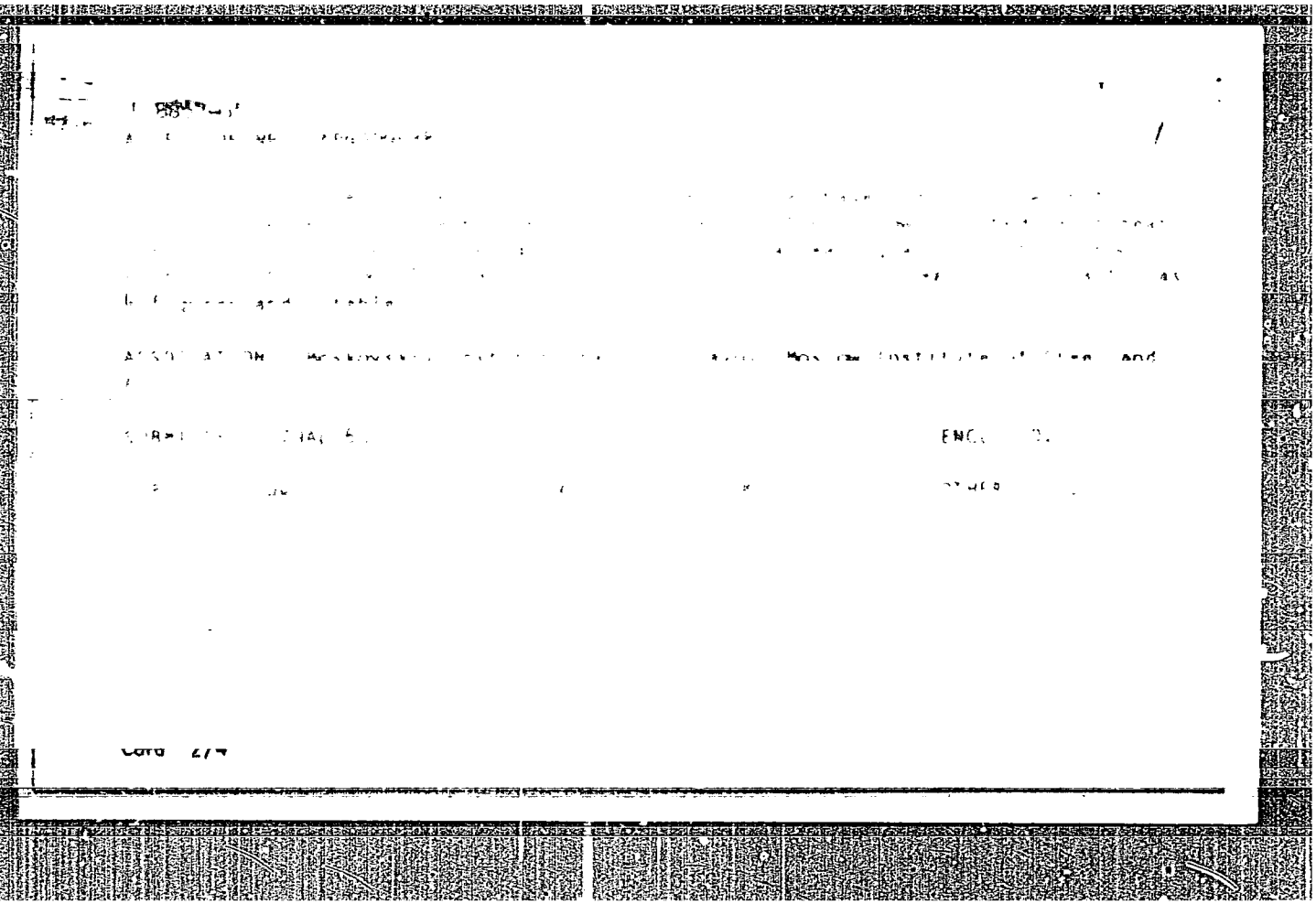
APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001962620008-7"

where m = mass of the drop, $\Delta\sigma$ = "drawing" force, ρ = density, x = coefficient depending on the shape of the drop, V_0 = kinematic viscosity of pure titanium, A = coefficient depending on the properties of graphite and its interaction with titanium, r = radius of the drop, and t = time. Experimental verification of the equation was then provided. Titanium of 99.55% purity was placed on a graphite sup[illegible]





ABSTRACT



ACCESSION NR: AP4022897 S/0148/64/000/003/0124/0130

AUTHORS: Yelyutin, V.P.; Pepekin, G.I.; Ly*sov, B.S.

TITLE: Investigation of the titanium carbide formation process precipitated from the gaseous phase

SOURCE: IVUZ. Chernaya metallurgiya, no.3, 1964, 124-130

TOPIC TAGS: titanium carbide, titanium tetrachloride, methane dissociation, vapor pressure, hydrogen, titanium tetrachloride

ABSTRACT: Although the method of precipitating titanium carbide is well known, the mechanism of the formation of high-melting carbides remains to be studied. For that purpose, the authors observed the process of titanium carbide precipitation from a mixture of titanium tetrachloride, methane and hydrogen. The process took place in the gas flow (hydrogen, helium) at atmospheric pressure. The possibility of forming metallic titanium under conditions of a substantial excess of hydrogen was investigated by holding an incadescent titanium filament in a gas flow consisting of titanium tetrachloride and hydrogen vapors. In all tests the titanium filament was dissolved which co-

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ACCESSION NR: AP4022897

inoides with available thermodynamic data. The authors attribute the precipitation of titanium carbide to the reaction of elementary decomposition of methane that occurs on the hot surface. This reaction has been studied in great detail by many authors and the thermodynamic as well as the kinetic constant are well known. Methane was found to be thermically unstable dissociating at temperatures above 1000C. Therefore, the processes of the formation of a carbide film on the carbon surface differ only in that the carbon is provided by the diffusion of the carbon base or as a result of the decomposition of methane by the gaseous phase. In the latter case, the rate of titanium carbide formation is affected by the partial pressure of methane in the initial mixture. The increase in the partial pressure was accompanie by an increase in the rate of titanium carbide formation. However, above $1.4 \cdot 10^{-2}$ atm, partial pressure either accelerates the formation very little or not at all. Titanium tetrachloride was not affected by the partial pressure of methane. The authors account for the precipitation of metal by the reducing effect of hydrogen on titanium tetrachloride. Orig. art. has 5 figures and 3 tables.

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys)

Card 2/3

ACCESSION NR: AP4022897

SUBMITTED: 21Jun63 DATE ACQ: 10Apr64 ENCL: 00

SUB CODE: ML, CH NR REF SOV: 003 OTHER: 004

Card 3/3

YELYUTIN, V.P.; PAVLOV, Yu.A.; SHEBOLDAYEV, S.B.; MANUKHIN, A.V.

Initial stages of the interaction of V_2O_5 with carbon. Izv. vys. ucheb. zav.; chern. met. 7 no.7:5-9 '64 (MIRA 17:8)

1. Moskovskiy institut stali i splavov.

ACCESSION NR: AP4042547 S/0148/64/000/007/0159/0161

AUTHOR: Yelyutin, V. P.; Maurakh, M. A.; Pugin, V. S.

TITLE: Fluidity of binary alloys of titanium with tin, aluminum, and molybdenum

SOURCE: IVUZ. Chernaya metallurgiya, no. 7, 1964, 159-161

TOPIC TAGS: titanium tin alloy, titanium aluminum alloy, titanium molybdenum alloy, binary alloy, binary alloy fluidity

ABSTRACT: The fluidity of titanium-tin (up to 20% Sn), titanium-aluminum (up to 10% Al), and titanium-molybdenum (up to 10% Mo) alloys has been investigated. The alloys, melted in an induction furnace from titanium sponge and spectrally pure alloying metals, were poured at a constant temperature $T_p = 1.0\ T_m$ (where T_p is pouring temperature and T_m is melting temperature) into graphite molds with a spiral channel. These experiments showed that tin and aluminum improved and molybdenum reduced fluidity at all investigated contents. The tin and aluminum reduce the surface tension of the titanium, which in turn decreases the tendency of the metal to adhere to the

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ACCESSION NR: AP4042547

walls of ceramic or graphite molds. Titanium alloys with Al or Sn can be recommended for intricately shaped castings; molybdenum is undesirable as an alloying metal for cast titanium alloys because it decreases fluidity and greatly increases the specific weight of the castings. Orig. art. has: 5 figures.

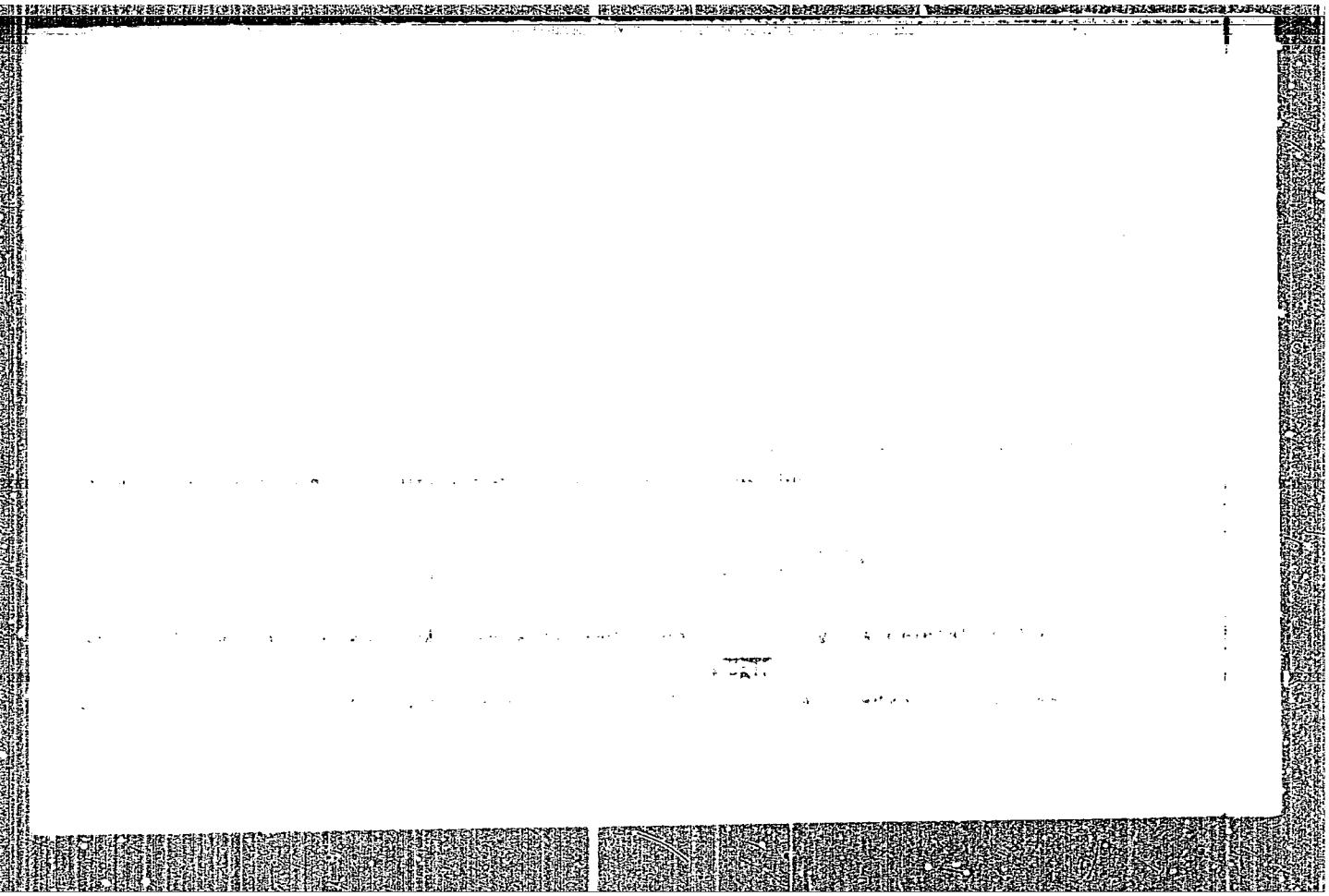
ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steels and Alloys)

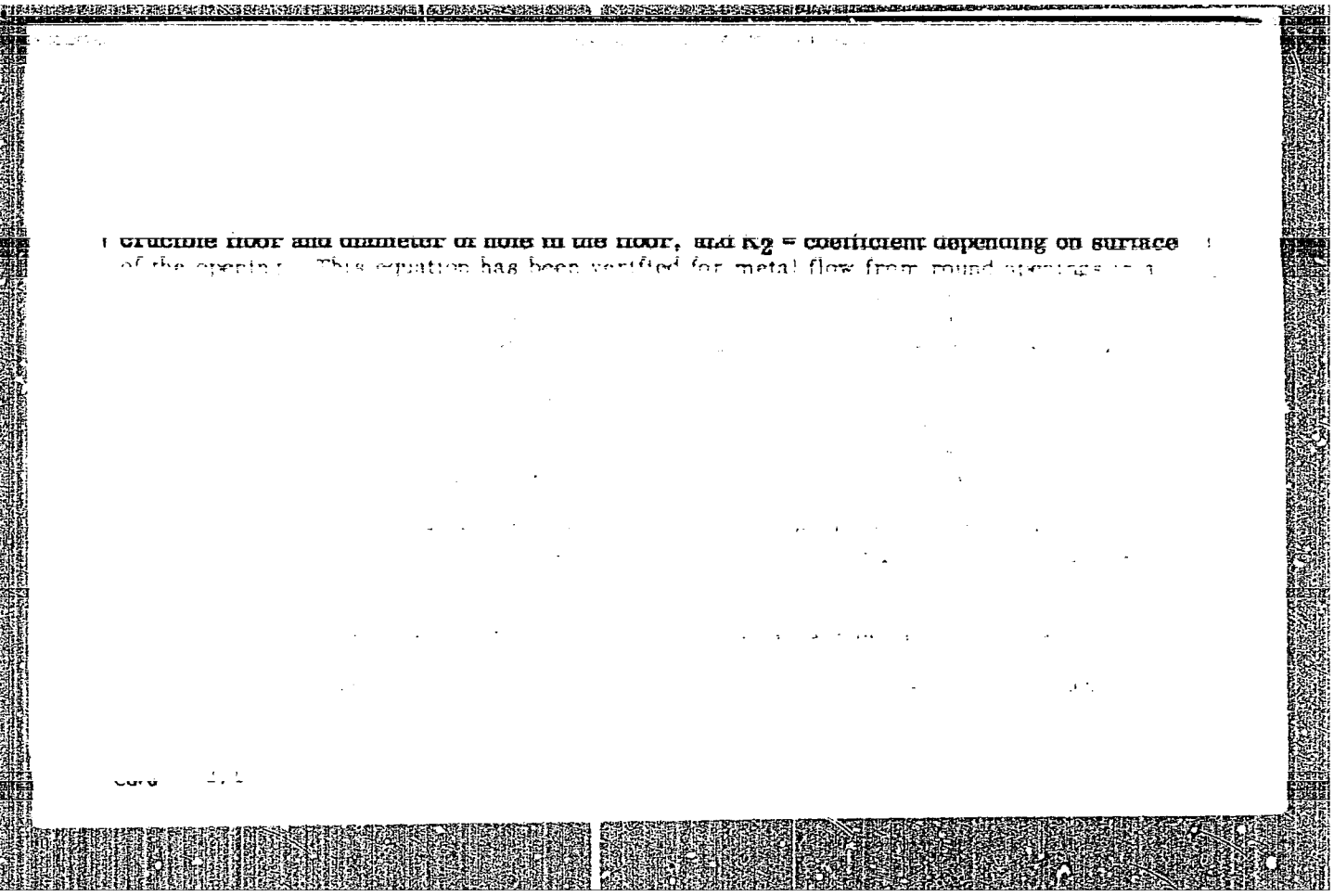
SUBMITTED: 06Dec63 ATD PRESS: 3071 ENCL: 00

SUB CODE: MM NO REF SOV: 004 OTHER: 001

Card 2/2

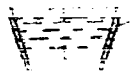
contacts measuring the potential are the crucible bottom and a thin tungsten needle





crucible floor and diameter of hole in the floor, and K_2 = coefficient depending on surface

Schematic for the measure-
ment of the electrical



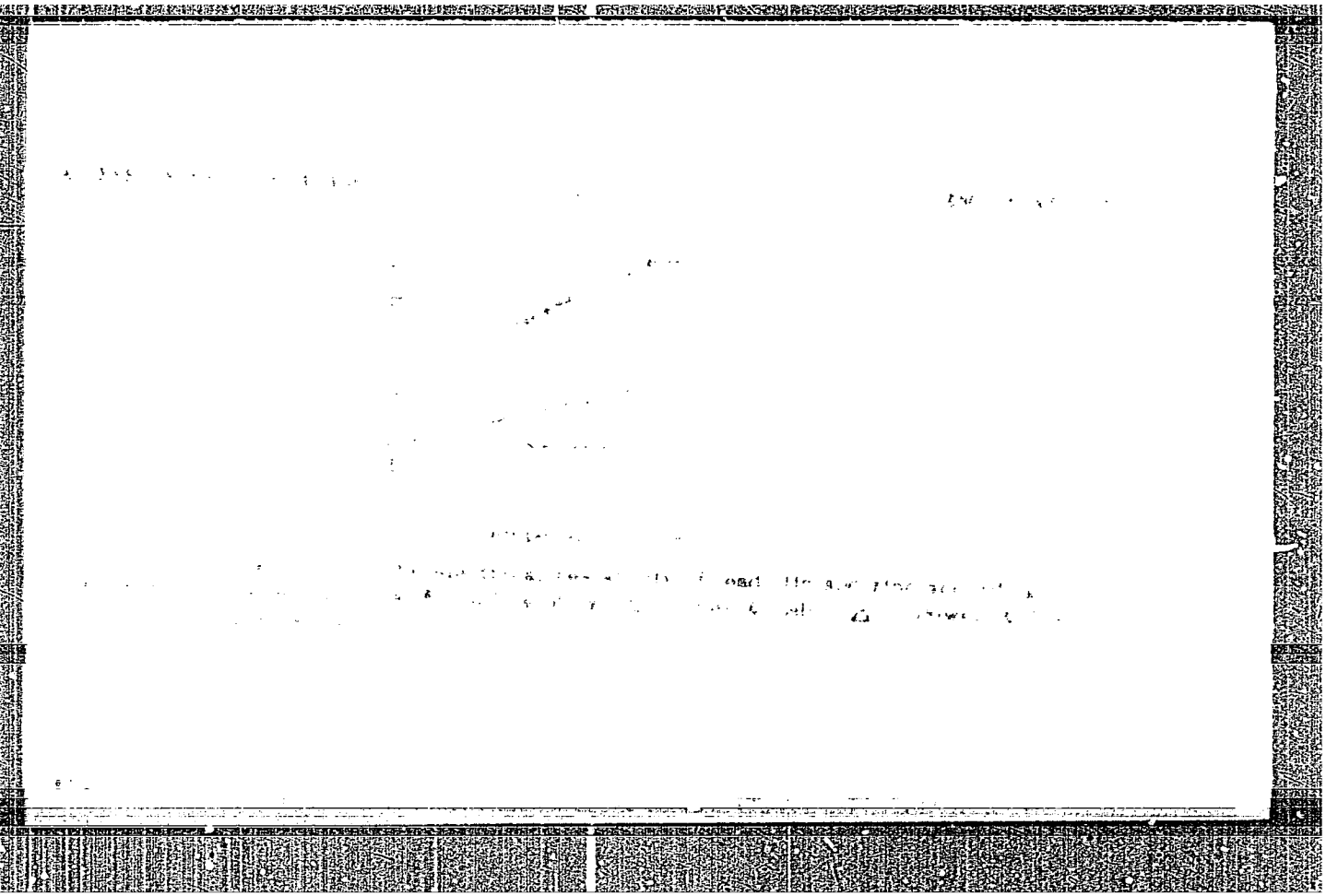
4 - rectifier

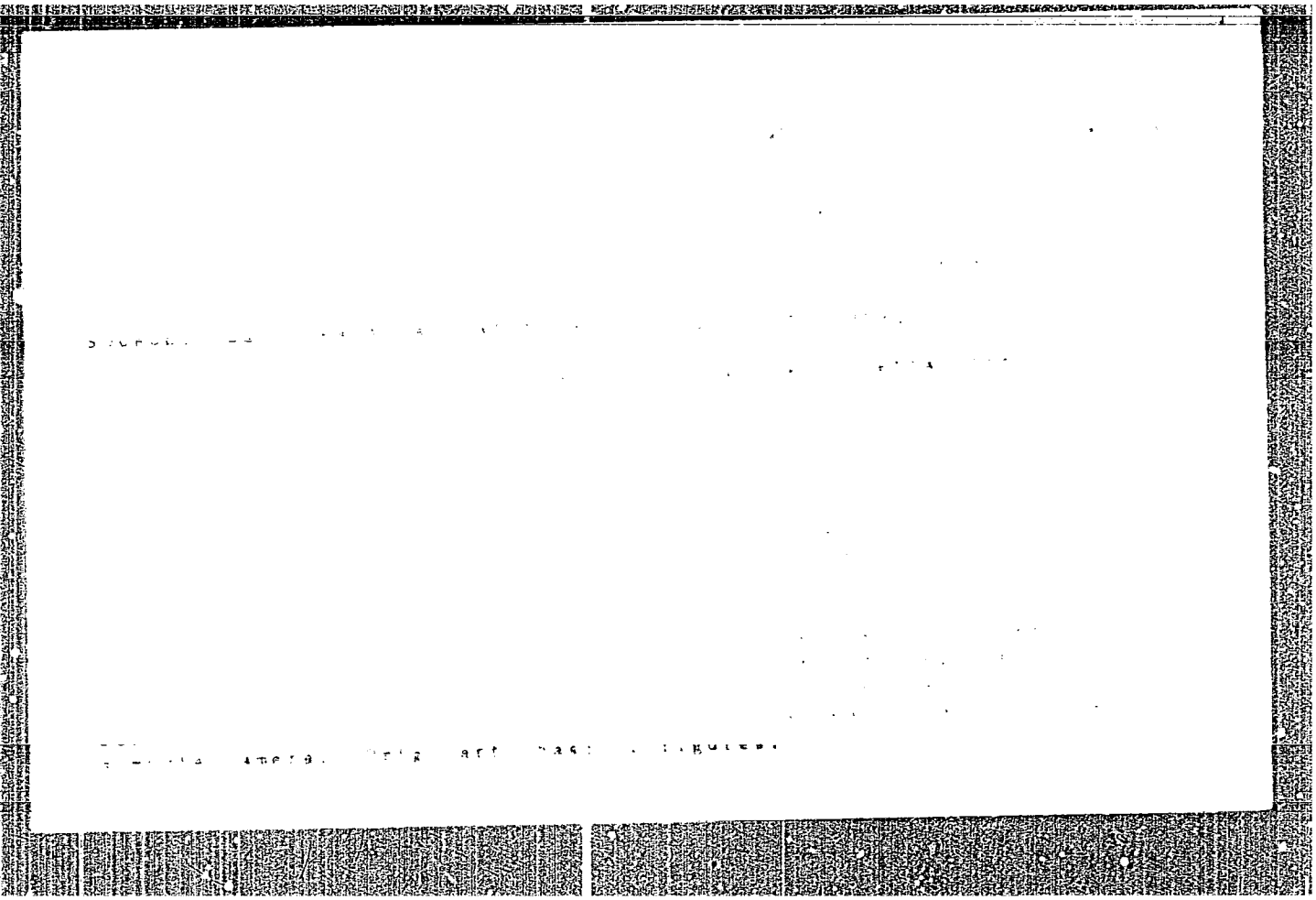
6 - lower current connection;

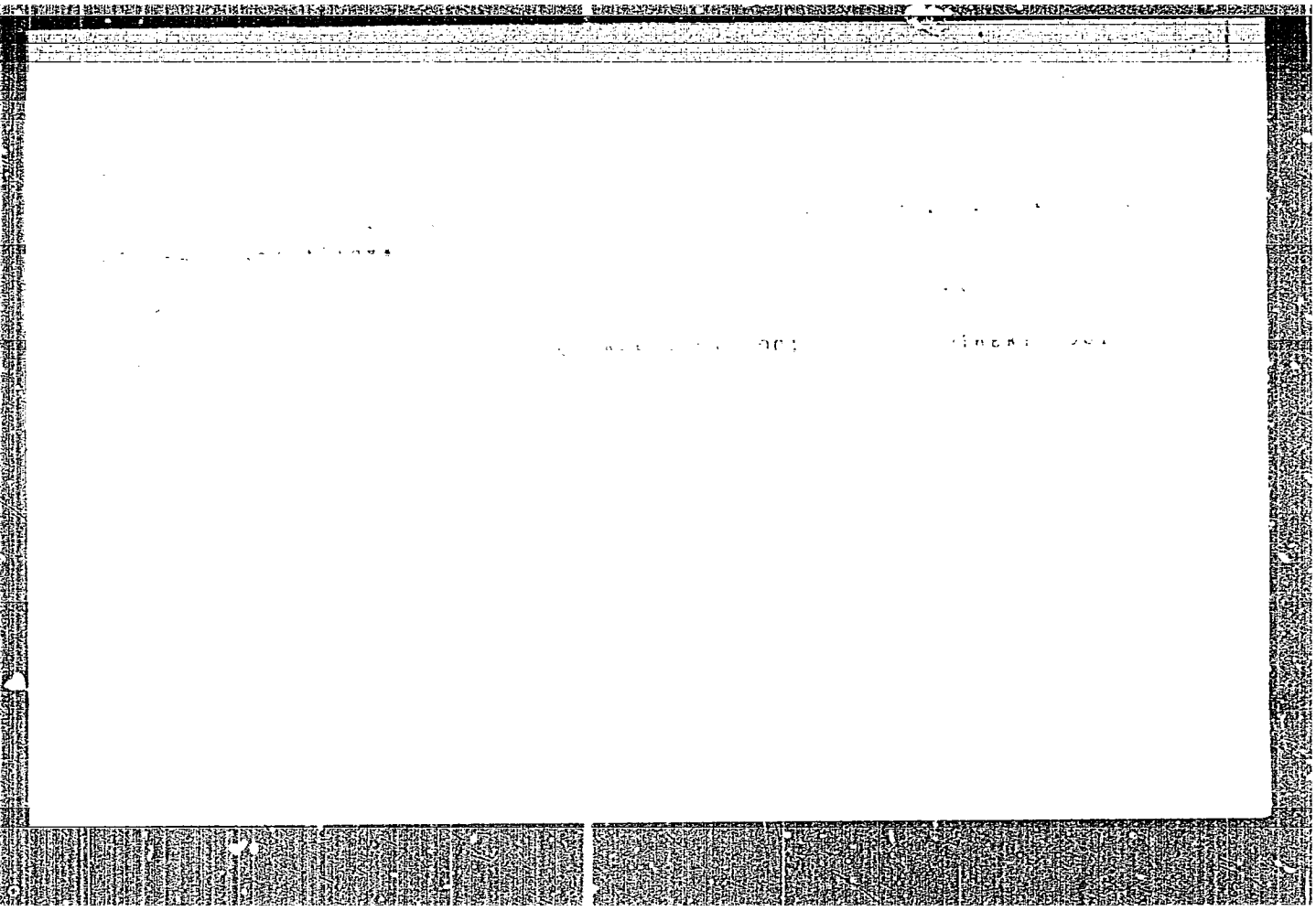
diameter of opening, mm

Relationship between length of solid part of flow (T) and diameter of discharge opening

Card







YELYUTIN, V.P.; MAURAKH, M.A.; TUROV, V.D.

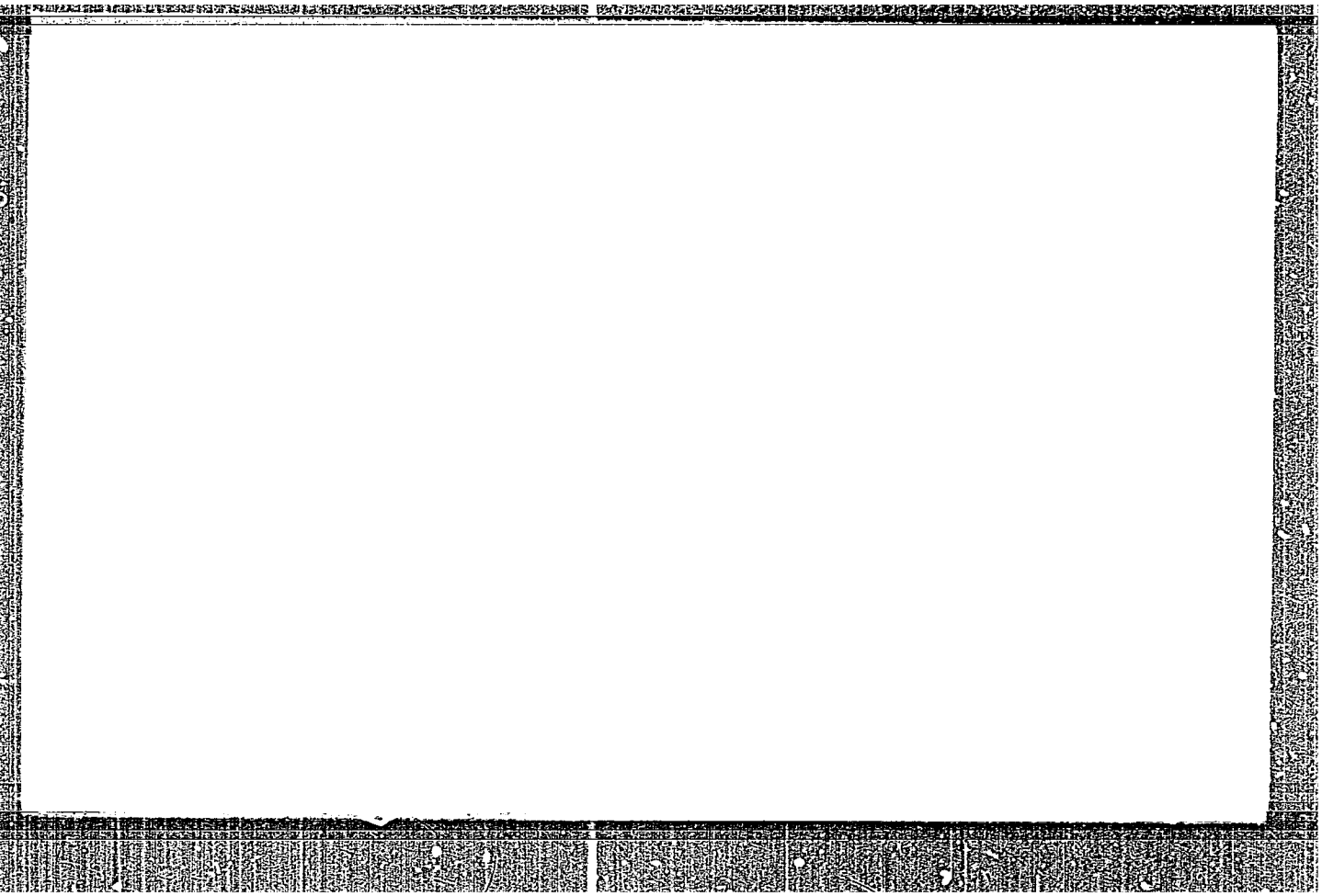
Apparatus for measuring the electric conductivity of liquid chemically active refractory metals. Zav. lab. 30 no.11: 1401-1403 '64 (MIRA 18:1)

1. Moskovskiy institut stali i splavov.

YELYUTIN, V.P.

Schools of higher learning and the progress of science and technology. Vest. AN SSSR 34 no.5:27-37 My '64. (MIRA 17:6)

1. Ministr vysshego i srednego spetsial'nogo obrazovaniya SSSR; chlen-korrespondent AN SSSR.



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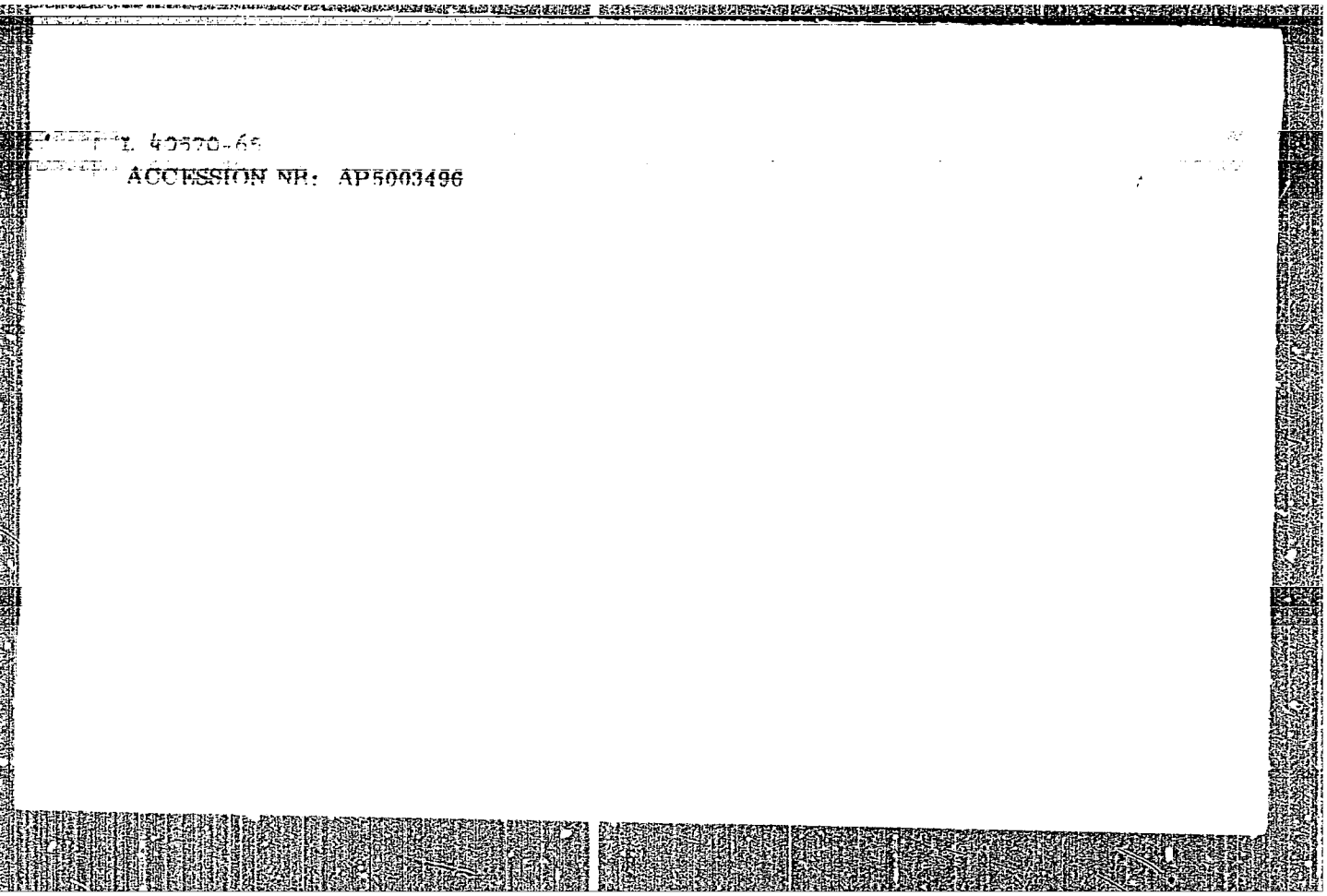
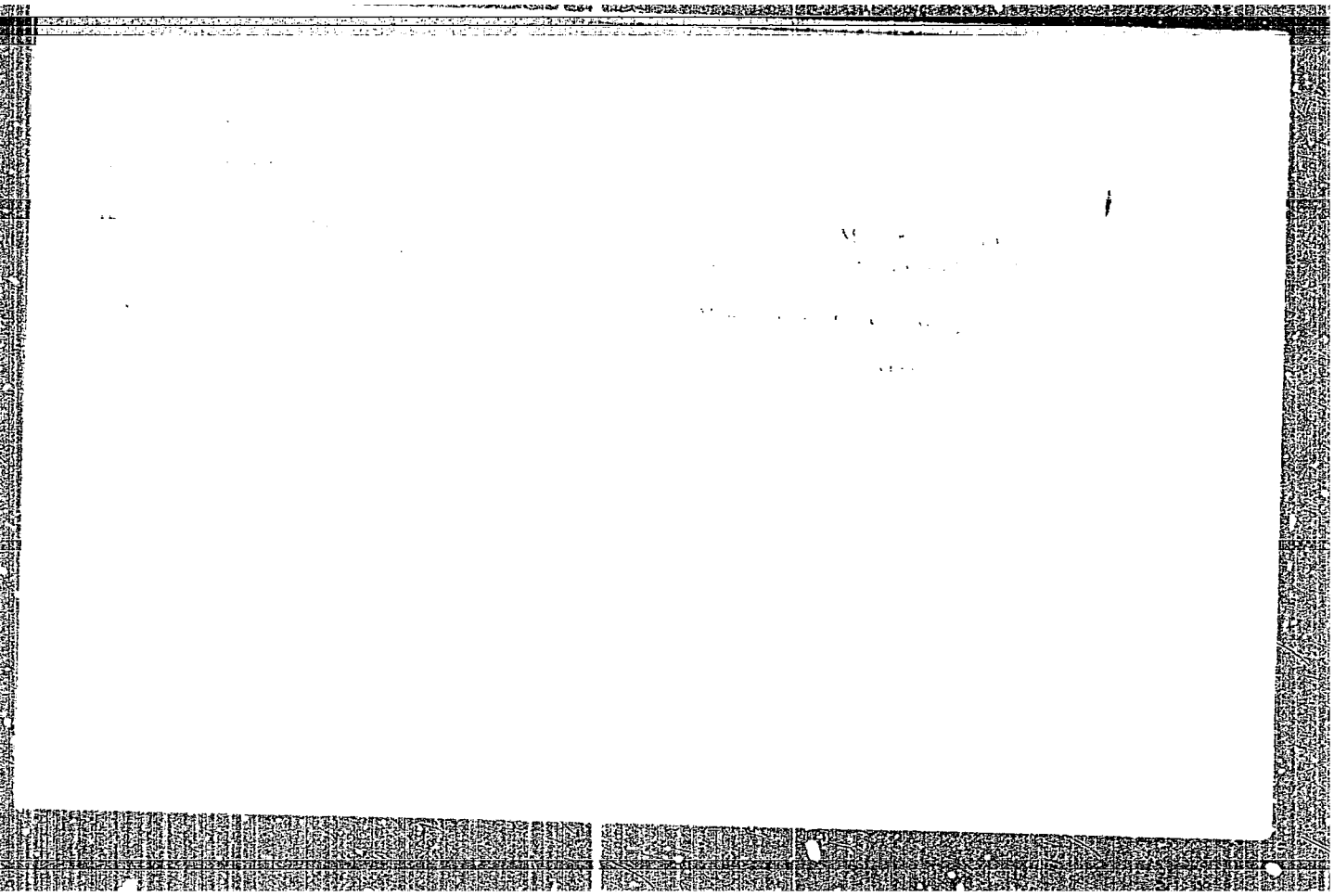


TITLE: Changes in electroconductivity at the 3d transition, metals when melted

TOPIC TAGS: solid conductors, molten conductors, transition metals, 3d electron shell,



L 13561-66 EWT(m)/EWP(t)/EWP(b) IJP(c) JD/JG/WB

ACC NR: AP6001238 SOURCE CODE: UR/0363/65/001/012/2208/2211

AUTHOR: Yelyutin, V. P.; Kostikov, V. I.; Levin, V. Ya.; Maurakh, M. A.; Mitin, B. S.

ORG: Institute of Steel and Alloys (Institut stali i splavov)

TITLE: Wetting of tungsten with liquid aluminum oxide

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 12, 1965, 2208-2211

TOPIC TAGS: tungsten, aluminum oxide, silicon dioxide, molybdenum, METAL FINISHING

ABSTRACT: The wetting of tungsten and molybdenum with liquid Al_2O_3 and of tungsten with a liquid Al_2O_3-SiO_2 mixture was studied by placing a drop of the liquid oxide or mixture on a plate of rolled W or Mo. The drop was allowed to spread, the temperature was quickly lowered, and the area covered by the oxide was measured. A formula was derived for the dependence of this area on the mass of the drop in the absence of interaction between the liquid and solid and for small equilibrium contact angles:

$$m = \rho\pi r^3 \overline{\gamma k \cos\theta - 2}$$

$$m = \frac{\rho}{\gamma\pi} \overline{\gamma k \cos\theta - 2} \cdot S^{3/2},$$

where S is the area of spread. S was calculated from this formula for the systems W-Al_2O_3, W-Al_2O_3-SiO_2 and Mo-Al_2O_3, and was compared with the measured values. It was shown that

Card 1/2

UDC: 546.78:532.64

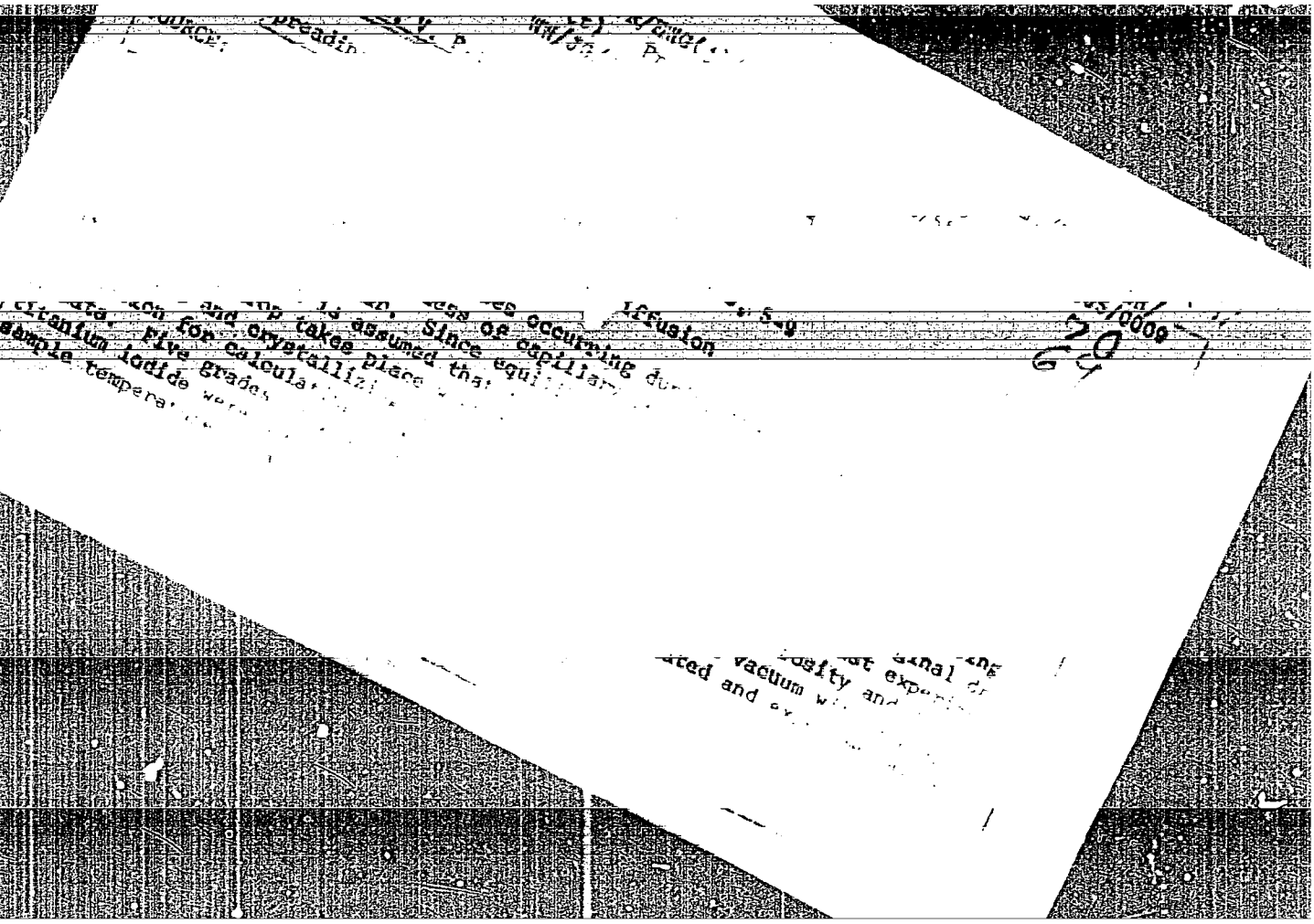
L 13561-66

ACC NR: AP6001238

as the interaction between the solid and liquid increases, the discrepancies between the two sets of values become more appreciable: in the case of Mo-Al_2O_3, the deviations from the calculated curve were much greater than in the case of W-Al_2O_3, because the effective charge of Mo is greater than that of W. Orig. art. has: 3 figures and 6 formulas.

SUB CODE: 11 / SUBM DATE: 05Jul65 / ORIG REF: 002 / OTH REF: 001

Card 2/2



sults was satisfactory, the deviation ranging from 5 to 40%. It is assumed that some constant was overlooked, possibly the deviation of the true graphite structure from the calculated model. Orig. art. has [illegible]

NO REF SOV: 005 OTHER: 000

L 13533-66 EWT(m)/EPF(n)-2/T/EWP(t)/EWP(b)/EWA(h)/EWA(c) IJP(c) JD/JW/JG

ACC NR: AP5028978 SOURCE CODE: UR/0149/65/000/004/0090/0096

AUTHOR: Yelyutin, V. P.; Pepekin, G. I.; Lysov, B. S.

ORG: Moscow Institute of Steel and Alloys, High-Temperature Materials Dept (Moskovskiy institut stali i plavov, Kafedra vysokotemperaturnykh materialov)

TITLE: Dissociation on niobium pentachloride on niobium and carbide surfaces

SOURCE: IVUZ. Tsvetnaya metallurgiya, no. 4, 1965, 90-96

TOPIC TAGS: niobium compound, chlorine compound, metal deposition, thermodynamic property, activation energy

ABSTRACT: Nb and NbC were experimentally deposited on Nb thread and graphite thread, respectively, from $NbCl_5$ in a helium current. The rate of formation of the solid products was determined by weighing the thread before and after the process of deposition, at periodic intervals of time, and the composition of the coating was radiographically analyzed. On this basis, the following empirical equation was derived for the rate of Nb deposition as a function of the partial pressure of $NbCl_5$ in the vapor-gas phase

$$W = 1.6 \cdot 10^{-3} p^{0.7}$$

UDC: 669.293

Card 1/3

and for the rate of deposition

$$W = 1.88 \cdot 10^{-3} P^{0.8}$$

where W is the rate of Nb deposition, g-atom/cm^2-0.5 hr and P is the partial pressure of $NbCl_5$, atm. In the latter formula the slightly higher order of magnitude with respect to the concentration of $NbCl_5$ at which the activation energy of the process markedly decreases with decomposition of $NbCl_5$ on NbC surface, as compared with Nb surface, may be attributed to the virtually total absence of inhibition of the reaction by Cl in the case of deposition of NbC. It appears that the reason for this lies in the different catalytic properties of Nb and NbC. A comparison of the findings on specific weight gain within 0.5 hr indicates that in the presence of partial pressures of $NbCl_5$ amounting to $0.78 \cdot 10^{-2} - 6 \cdot 10^{-2}$ atm the deposition rate of NbC is time-independent. This, as well as the sufficiently high activation energy of the total process (33 kcal/mole) shows that in the 1500-1800°K temperature range the rate of the total process is limited by the surface chemical reactions. Thus, a comparison of the kinetic laws of the processes of deposition of Nb and NbC is of interest only in conditions when the rates of these processes are determined by the rates of the surface chemical reactions. For deposition of NbC on a graphite substrate, such conditions are observed only in the presence of small concentrations of $NbCl_5$ in the vapor-gas phase (less than $6 \cdot 10^{-2}$) and comparatively low temperatures (1500-1800°K) close to the initial temperature of the formation of Nb_2C. The unfavorable thermody-

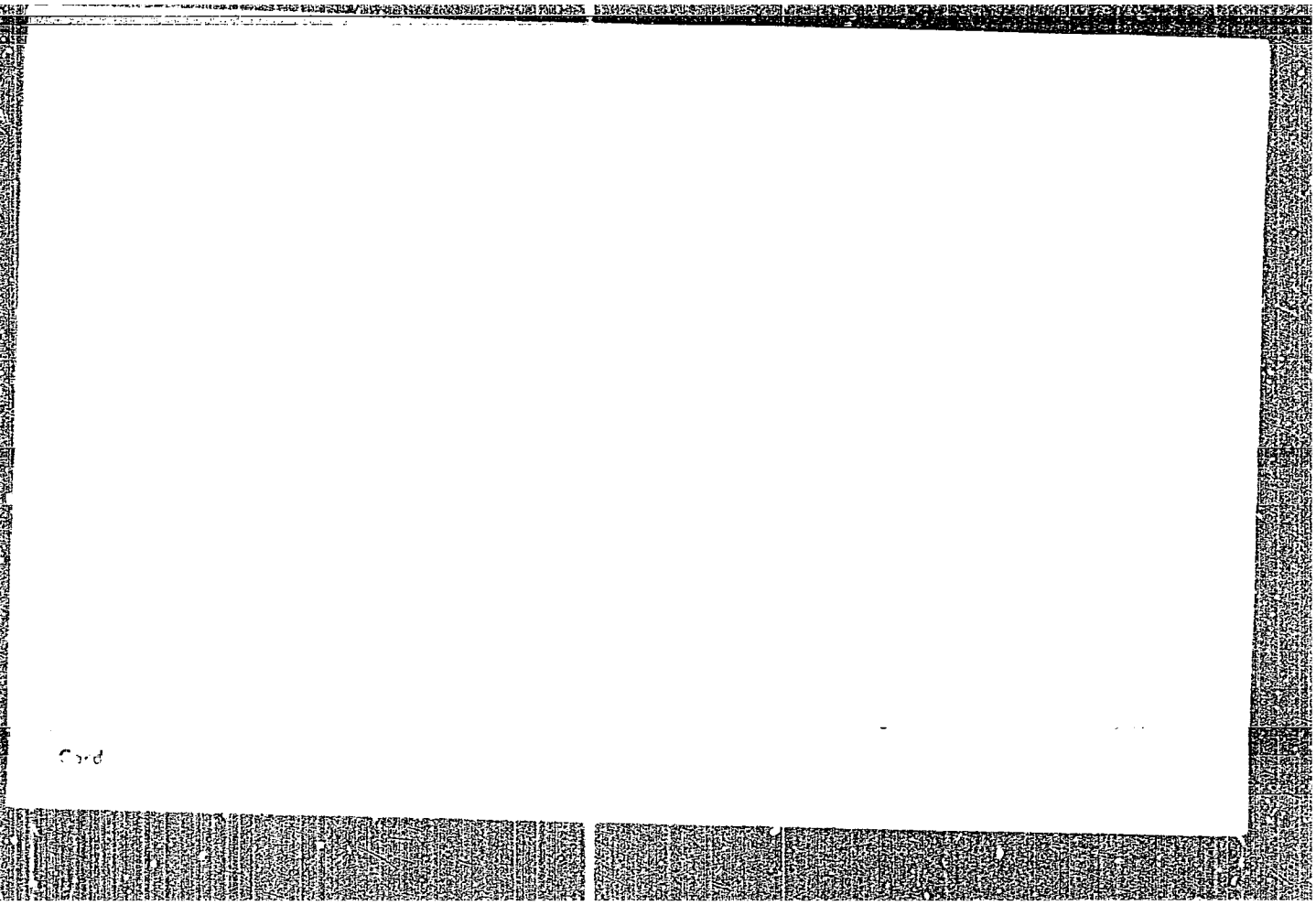
L 13533-66

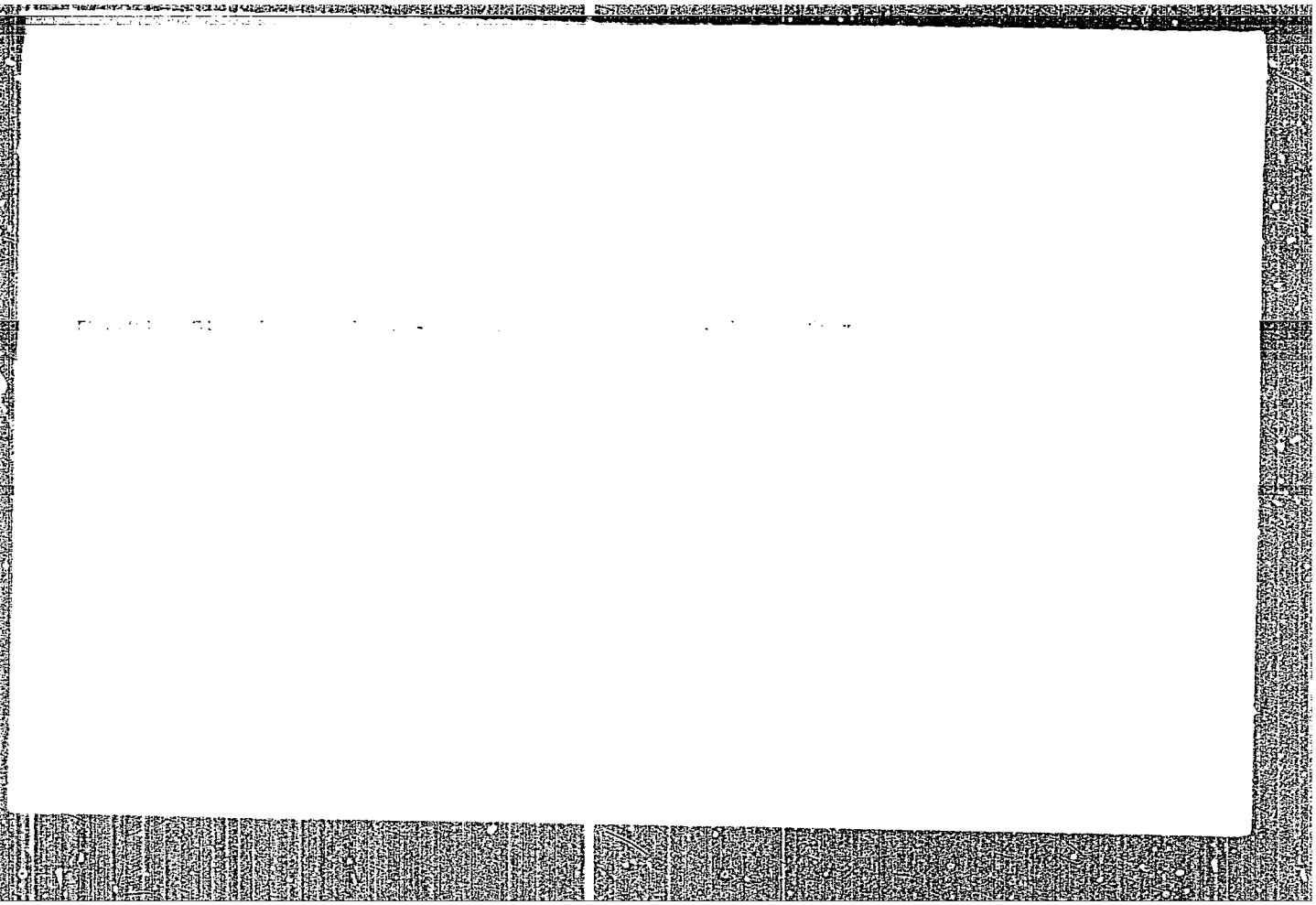
ACC NR: AP5028978

namic conditions for the reduction of $NbCl_5$ with carbon (graphite wire), on the one hand, and the similarity between the kinetic equations of the dependence of the decomposition rate of $NbCl_5$ on the concentration of $NbCl_5$ in the vapor-gas phase for decomposition into both Nb and Nbc, on the other, indicate that the mechanism of segregation of the metal from $NbCl_5$ is the same in both cases. In other words, when $NbCl_5$ is decomposed in the presence of carbon, even under conditions thermodynamically unfavorable to the deposition of Nb, the function of carbon consists solely in carburizing the metal released in the process of the thermal dissociation of $NbCl_5$. Orig. art. has: 4 tables, 3 figures, 5 formulas.

SUB CODE: 07, 11/ SUBM DATE: 10Jul64/ ORIG REF: 003/ OTH REF: 003

Card 3/3





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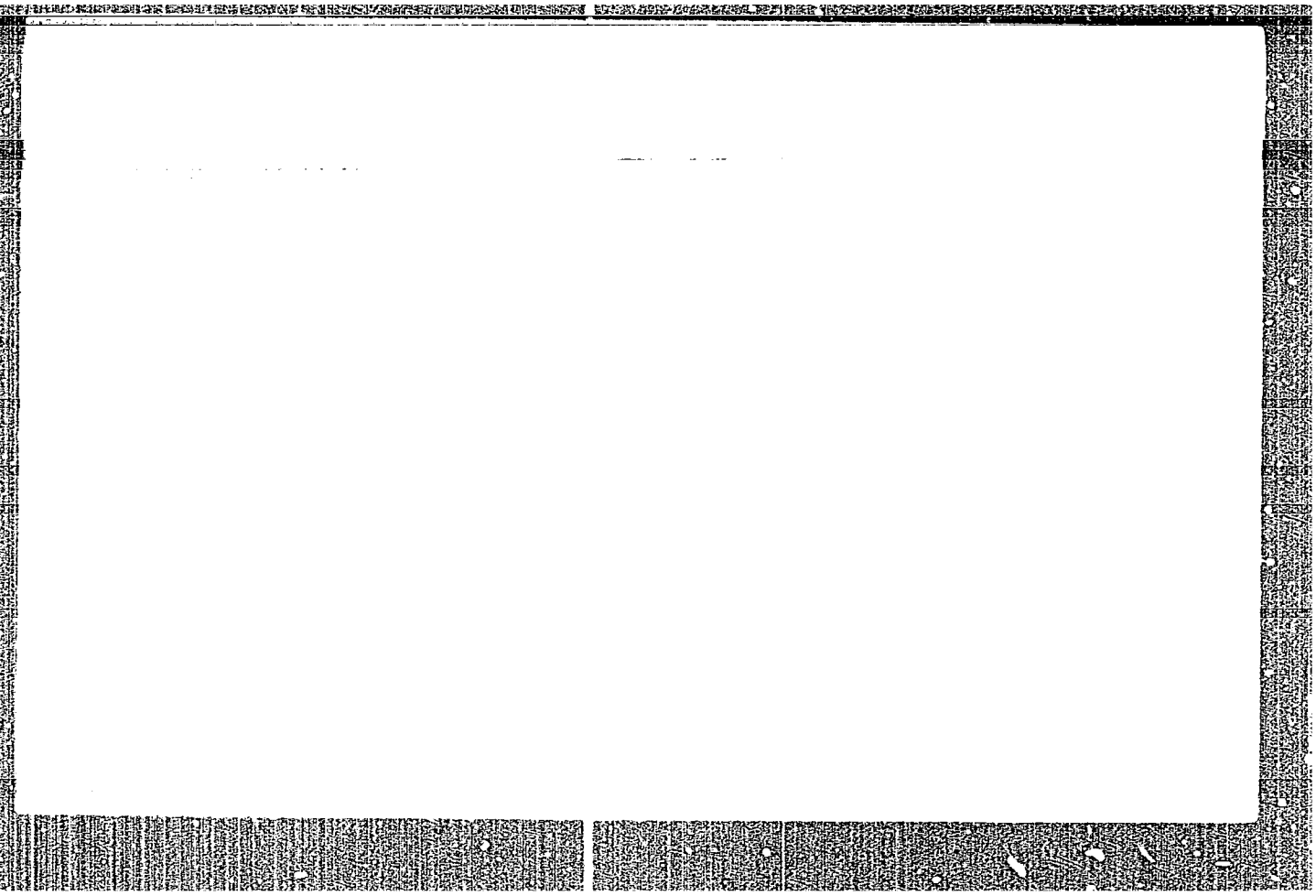

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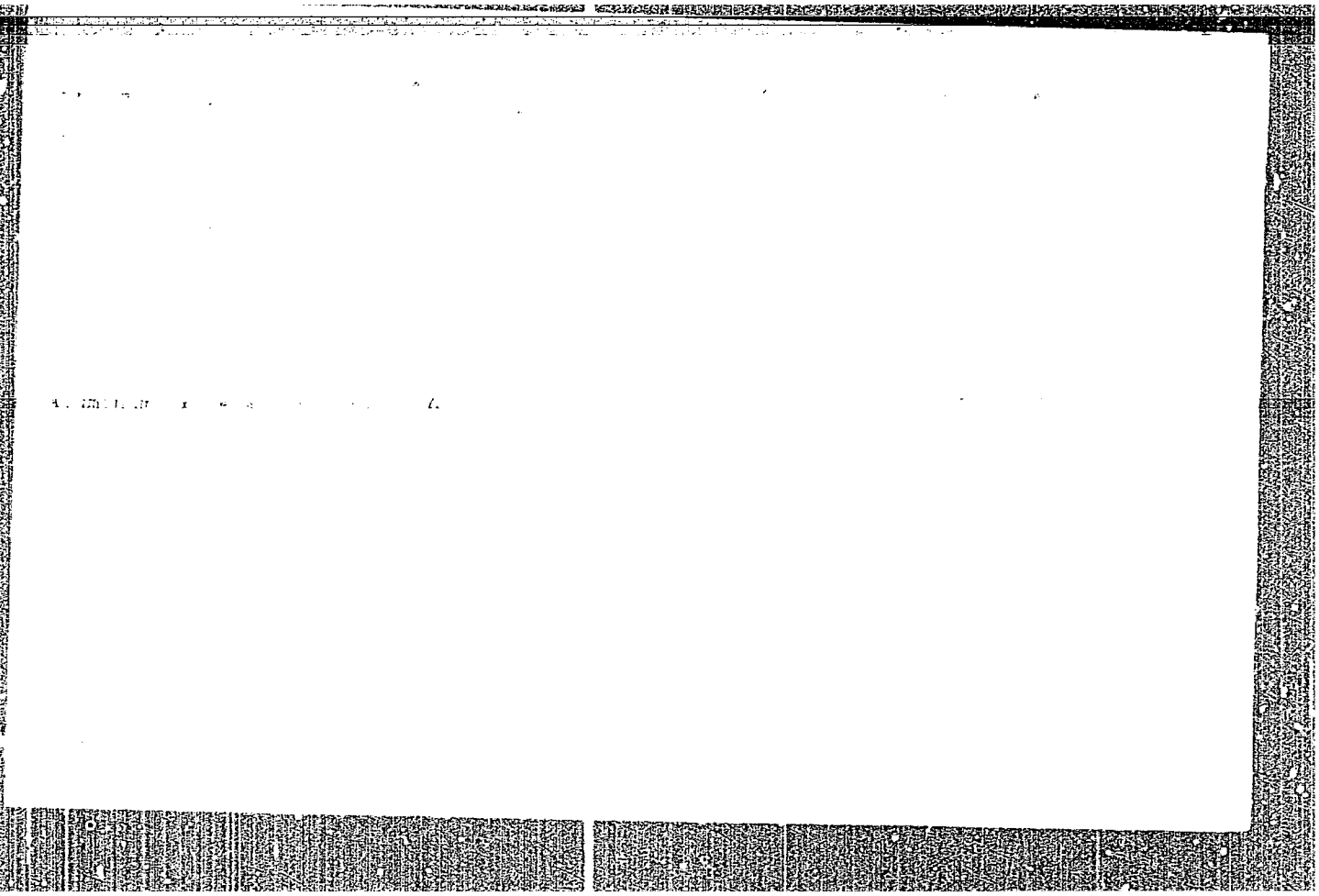
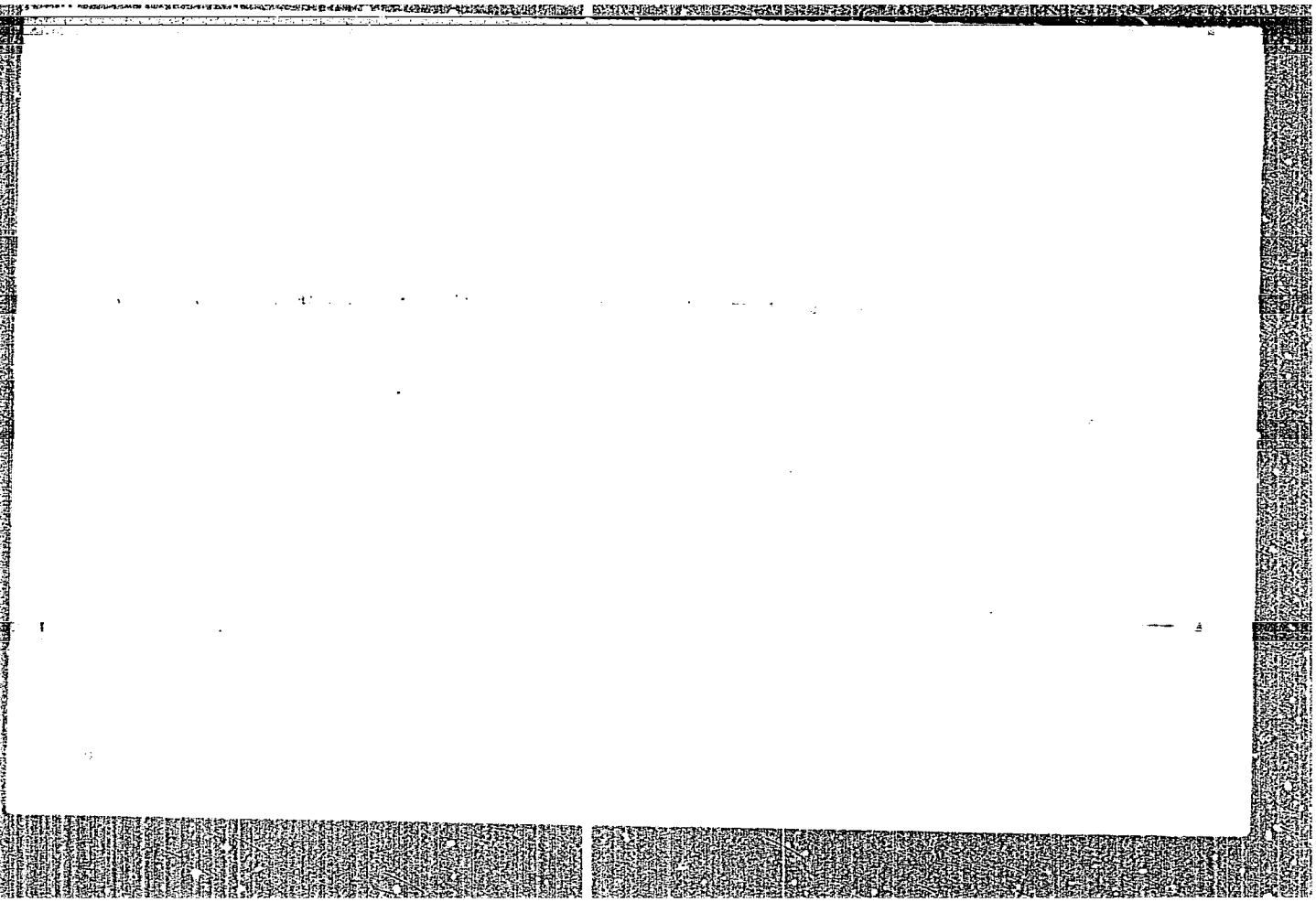




YELYUTIN, V.P.; MURAKH, M.A.; PEN'KOV, I.A.

Viscosity of liquid zirconium. Izv. vys. ucheb. zav.; chern. met. 8 . no.7:128-132 '65. (MIRA 18:7)

1. Moskovskiy institut stali i splavov.

/V JD/KW/JG

ACC NR: AP5028576 SOURCE CODE: UR/0148/65/000/011/0110/0116

AUTHOR: Yelyutin, V. P.; Maurakh, M. A.; Turov, V. D.

ORG: Moscow Institute of Steel and Alloys (Moskovskiy institut stali i splavov)

TITLE: Viscosity and electric conductivity of molten alloys of zirconium with aluminium, silicon and niobium

SOURCE: IVUZ. Chernaya metallurgiya, no. 11, 1965, 110-116

TOPIC TAGS: molten metal, zirconium base alloy, aluminum, silicon, niobium, viscosity, electric conductivity, electric resistance

ABSTRACT: Electric conductivity was investigated by the rotating magnetic field method (for description of the experimental setup cf. V. V. Voleynik et al. Sb. statey: Novyye Mashiny i pribory dlya ispytaniya metallov. Metallurgizdat, 1963, 178) over a broad range of temperatures (293-2350°K) in both solid and liquid states, while viscosity was investigated in the range of temperatures 200-400° above the liquidus, for molten state zirconium iodide and its alloys with aluminum [15, 29.5, and 30.3% (at.) Al], silicon [4.92, 9.82 and 15% (at.) Si] and niobium [5, 10, 15 and 20% (at.) Nb]. Findings: the electric resistance of Zr increases to 1.3 when this metal is in molten state but is reduced when Al, Si or Nb are added. Further, the alloying of Zr with Al, Si and Nb causes a marked decrease in its viscosity. The

Card 1/2 UDC: 669.296'715'782'293-154:532.13:537.311

ACC NR: AP5028576

strongest effect is produced by Si [to 9% (at.)] and the weakest by Nb. In systems of the eutectic type containing Zr a maximum or minimum of viscosity may appear in the eutectic on the viscosity isotherm; this is apparently due to the differences in the interaction between components. The transeutectic alloy [40.3% (at.) Al] displays an anomalous increase in electric resistance at temperatures above 2000°K, which may be attributed to the particular nature of the melting of this alloy, which is of a composition very close to that of the chemical compound Zr_5Al_3 which remains stable until melting point: this phenomenon may be due to the continuing "association" rather than "dissociation" of this compound. On the whole these findings indicate that the investigated Zr-base alloys retain a "quasicrystalline" short-range-order structure in molten state within the range of from 100 to 150°C above the liquidus line. Orig. art. has: 3 tables, 5 figures.

SUB CODE: 11, 20/ SUBM DATE: 12Jun64/ ORIG REF: 006/ OTH REF: 008

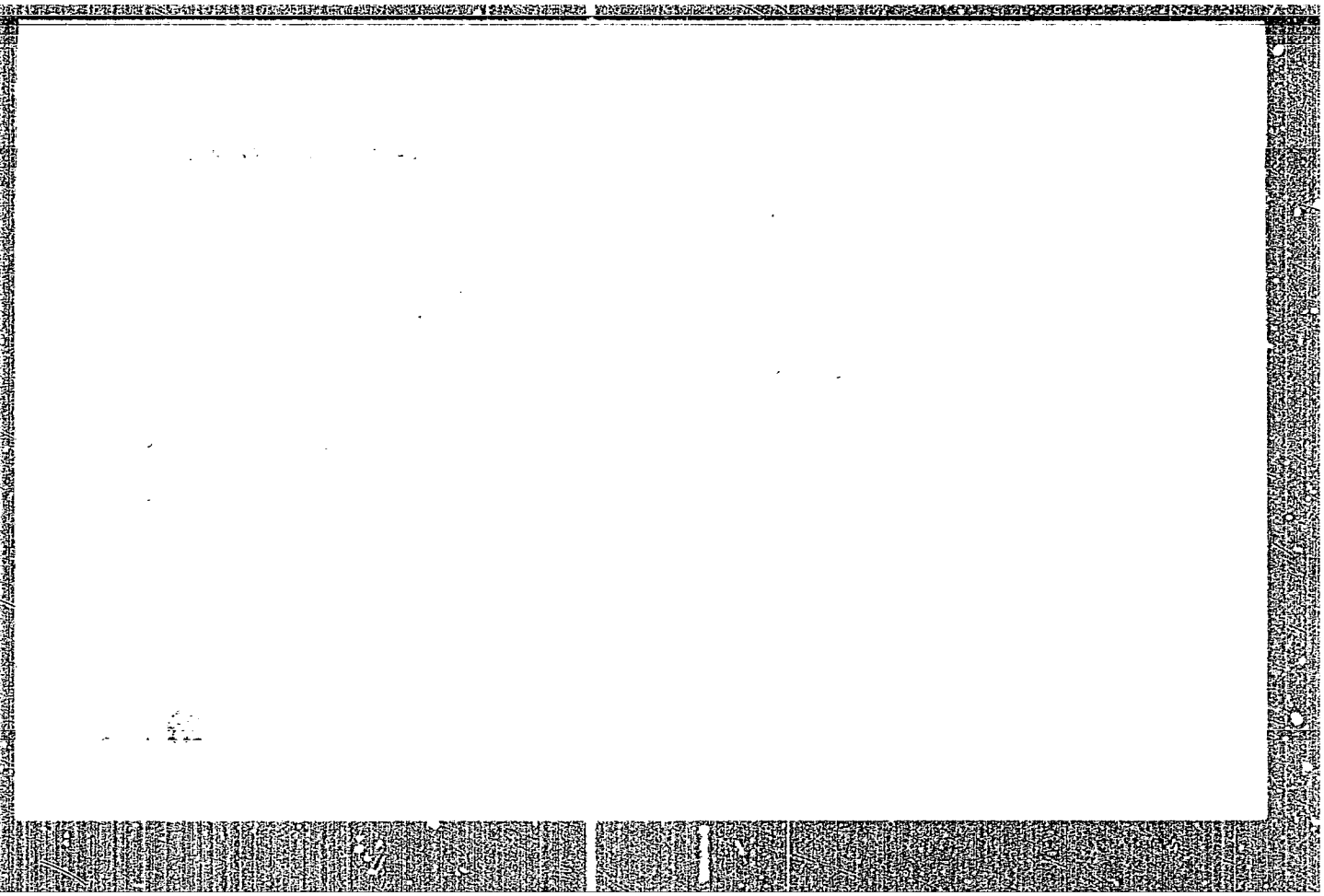
Card 2/2 HW

TITLE: Self-diffusion of cobalt in specimens of cobalt and a Co + Al_2O_3 composition prepared by powder metallurgy methods

SOURCE: Fizika metallov i metallovedeniye, v. 19, no. 3, 1965, 389-396

TOPIC TAGS: cobalt, self diffusion, alumina, powder metallurgy

and dense cobalt decreases with temperature. The temperature dependence of the ef-



APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001962620008-7"

L 27824-66 EPF(n)-2/EWT(m)/ETC(F)/EWG(m)/EWP(t)/ETI WW/JG/JD

ACC NR: AP6015731 (A) SOURCE CODE: UR/0032/66/032/005/0626/0627

AUTHOR: Yelyutin, V. P.; Kostikov, V. I.; Levin, V. Ya.; Maurakh, M. A.; Mitin, B. S.

ORG: Moscow Institute of Steel and Alloys (Moskovskiy institut stali i splavov)

TITLE: Unit for studying the wetting of solids with liquid refractory metals or compounds

SOURCE: Zavodskaya laboratoriya, v. 32, no. 5, 1966, 626-627

TOPIC TAGS: wetting, refractory metal, liquid metal

ABSTRACT: A unit for studying the wetting of solids with liquid refractory metals such as titanium, zirconium, vanadium, chromium, niobium, molybdenum, rhenium, tantalum, and tungsten has been designed and built. The spreading of a molten metal droplet on the solid, the contact angle, and other parameters are recorded by a high-speed motion-picture camera and can also be observed by television. The unit has a water-cooled vacuum chamber where the tested specimen (150 mm long and 50 mm wide) is placed and heated by the electric current to the desired temperature, up to 3000C. At the top of the vacuum chamber, a tiny arc furnace melts the tested metal, a droplet of which is dropped on the tested solid. A shielding gas atmosphere may be used in testing, and the vacuum in the chamber may be varied from $5 \cdot 10^{-5}$ mm Hg at room tempera-

Card 1/2 UDC: 532.23.07

L 27824-66

ACC NR: AP6015731 O

ture to $1 \cdot 10^{-3}$ mm Hg at 3000C. The specimen temperature is measured by an electron pyrometer. Orig. art. has: 1 figure. [ND]

SUB CODE: 11/ 11/ SUBM DATE: none/ ORIG REF: 001/ ATD PRESS: 5003

Card 2/2 RB

ACC NR: AR6035413 SOURCE CODE: UR/0137/66/000/009/A013/A013

AUTHOR: Yelyutin, V. P.; Kostikov, V. I.; Maurakh, M. A.

TITLE: Investigation of contact interaction between liquid titanium with graphite

SOURCE: Ref. zh. Metallurgiya, Abs. 9A81

REF SOURCE: Sb. Poverkhnostn. yavleniya v rasplavakh i voznikayushchikh iz nikh tverd. fazakh. Nal'chik, 1965, 345-351

TOPIC TAGS: titanium, liquid metal, graphite, carburization, titanium alloy, temperature dependence, porosity, surface tension

ABSTRACT: When liquid titanium comes in contact with graphite, carburization takes place, leading to solidification. The authors investigated carburization of Ti and its alloys by melting and soaking the liquid metal in the graphite crucibles under different conditions. On the basis of an analysis of the isothermal carburization curves, they determined the influence of the temperature, the porosity of the graphite, the atmosphere of the furnace, and of the alloying on the carburization process. A logarithmic equation for the kinetics of the carburization is obtained by trial and error. The viscosity of the liquid titanium increases with increasing carbon concentration, first slowly and then rapidly, this being connected with the release of carbide-phase particles from the liquid. Data are obtained on the viscosity of alloys of titanium with Fe, Si, Ni, Al, Mo, Zr, Cu, and Co. The surface tension σ of Ti was measured by the method of maximum pressure in the bubble. The carbon increases the σ

UDC: 669.295.154: [532.13 + 532.69]

Card 1/2

ACC NR: AR6035413

of titanium. An equation is obtained for the capillary penetration of liquid titanium under conditions when it interacts chemically with the graphite. The carburization process is determined by the initial stage of the external mass transfer. An equation relating the mass of the drop with the area on which it spreads is obtained. The results of the calculation by means of this equation are compared with the experimental data on the spreading of liquid titanium and alloys over graphite with different properties. Sufficiently good agreement between the calculated and the experimental data is obtained. 6 illustrations. M. Krasheninnikov [Translation of abstract]

SUB CODE: 11

Card 2/2

ACC NR: AR6035105 SOURCE CODE: UR/0137/66/000/008/E003/E003

AUTHOR: Yelyutin, V. P.; Kostikov, V. I.; Maurakh, M. A.

TITLE: Determining the spreading rate of molten titanium over a graphite surface

SOURCE: Ref. zh. Metallurgiya, Abs. 8E15

REF SOURCE: Sb. Poverkhnostn. yavleniya v rasplavakh i voznikayushchikh iz nikh tverd. fazakh. Nal'chik, 1965, 352-357

TOPIC TAGS: titanium, graphite, molten metal, fluid kinetics

ABSTRACT: A device has been developed for investigating the kinetics of spreading of molten metal, in which the graphite and the metal are heated separately, this prevents their interaction during the heating and permits the introduction of a drop of the molten metal into contact with surface of the specimen. The kinetics of spreading of the drop was analyzed with the aid of motion-picture filming through portholes. The data on the spreading kinetics of molten titanium are presented graphically. The necessity is established for taking into account the

Card 1/2 UDC: 621.791.011:669.295+669.194

ACC NR: AR6035105

drop's force of gravity and its chemical reaction with graphite. V. Fomenko. [Translation of abstract] [NT]

SUB CODE: 11/

Card 2/2

ACC NR: AN7006539 SOURCE CODE: UR/9030/67/000/008/0004/0004

AUTHOR: none YELYUTIN, V. P.

ORG: none

TITLE: New Institutes of Higher Education

SOURCE: Nedelya, no. 8, 12-18 Feb 67, p. 4, col. 1

TOPIC TAGS: education, education institute, scientific organization, scientific program

ABSTRACT: The Minister of Higher and Secondary Special Education of the USSR, V. P. Yelyutin, states that the USSR has 767 higher schools with 4,122,000 students enrolled. This year, more than 430,000 students will be graduated. In 1970, there will be 940,000 beginning students, which will be achieved by a further increase in the number of such institutes. In 1968 there will be two national-economy institutes organized in Sverdlovsk and Novosibirsk. Another current trend is the utilization of mathematics in the national economy. Among the new specialities arising therefrom are those dealing with the basic processes of chemical preparations and chemical cybernetics, economic cybernetics, computing devices and installations, automation and mechanization of methods for

Card 1/2 UDC: none

ACC NR: AN7006539

processing and distributing information, and mechanization of economic-information processing. In addition, specialists on the scientific organization of labor are being trained. The three largest structures to be built during the 1967—1970 period consist of a university in Kuybyshev (opening in 1969), a polytechnic institute in Tol'yatti in the Kuybyshev region (opening this autumn), and an architectural-construction institute in Samarkand (to be established in 1967—1968). [NC]

SUB CODE: 05/ SUBM DATE: none/ ATD PRESS: 5115

Card 2/2

ACC NR: AT6026548 SOURCE CODE: UR/2776/66/000/046/0041/0049

AUTHOR: Teymer, D. A.; Afonina, V. M.; Yelyutina, G. I.

ORG: Central Scientific Research Institute of Ferrous Metallurgy, Moscow (Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii)

TITLE: Research and development of properties of the new low-magnetic Kh18G14AN4 (EP197) stainless steels

SOURCE: Moscow. Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii. Sbornik trudov, no. 46, 1966, Spetsial'nyye stali i splavy (Special steels and alloys) 41-49

TOPIC TAGS: stainless steel, alloying, manganese, chromium, nitrogen, austenite, martensite, plastic deformation, corrosion resistance, magnetic permeability, mechanical property / Kh18G14AN4 stainless steel, EP197 stainless steel, 2Kh20N13 steel, Kh19G14AN4 steel, Kh19G12N4 steel, 1Kh18N9T steel

ABSTRACT: New Kh18G14AN4 stainless steels with nitrogen additions were developed in order to reduce Ni contents for economy purposes. Ten grades of these steels containing 17 to 19% Cr, 2 to 5% Ni, 0.05 to 0.2% C, 8.5 to 15% Mn and 0.2 to 0.45% N_2 were melted. Compositions of each heat were chosen so as to produce austenitic structures. Wire samples ranging in diameter from 1.35 to 0.6 mm were reduced from 1.55 mm for the

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ACC NR: AT6026548

study of the influence of chemical composition on magnetic permeability as a function of cold deformation. Tests were also made for corrosion stability in synthetic "Black Sea" water and for intercrystalline corrosion tendencies in a H_2SO_4 + $CuSO_4$ solution. Steels containing 0.07 to 0.11% C, 9.5 to 14% Mn, 3.5 to 4.5% Ni, 17 to 19% Cr and 0.24 to 0.32% N_2 were very stable in the sea water and the steels containing 17 to 19% Cr, 3.5 to 4.5% Ni, 9.5 to 14.5% Mn and 0.24 to 0.32% N_2 did not exhibit intercrystalline corrosion tendencies. Magnetic permeability measurements showed that steels containing 0.10% C, 12 to 14% Mn, 17 to 19% Cr and 0.24 to 0.32% N_2 retained their austenitic structures after extensive plastic deformations at room temperature. At -196°C, all of the steels transformed into martensite (as much as 37%) with deformation. At -76°C, the most stable steel was 2Kh20N13, while the next best steels were Kh19G14AN4 and Kh19G12N4 with 14 and 12% Mn. Below 12% Mn the percentage of martensite and the magnetic permeability increased. By tempering Kh18G14AN4 steel wires up to 600°C, the strength increased from 1880 to 2050 MN/m^2 while the plasticity dropped slightly. Cold worked sheets of Kh18G14AN4 gave similar results. It was concluded that Kh18G14AN4 steel could replace 1Kh10N9T in many applications. Orig. art. has: 1 figure, 5 tables.

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 003/ OTH REF: 002

Card 2/2

YELYUTINA, V.I., kandidat tekhnicheskikh nauk; UMANSKIY, Ya.S., professor, doktor.

Peculiarities of age hardening in beryllium bronze. Sbor.Inst. stali no.33:96-102 '55. (MLRA 9:6)

1.Kafedra rentgenografii.
(Copper-beryllium alloys) (X rays--Industrial applications)

YELYUTINA, V.I.

70-4-9/16

AUTHOR: Umanskiy, Ya., Yelyutina, V., Kagan, A. and Pivovarov, L.

TITLE: X-ray analysis of the changes in the mosaic structure during ageing of beryllium bronze. (Rentgenoanaliz izmeneniy mozaichnoy struktury pri starenii berilliyevoy bronzy)

PERIODICAL: "Kristallografiya" (Crystallography), 1957, Vol.2, No.4, pp. 503 - 507 (U.S.S.R.)

ABSTRACT: Disintegration of supersaturated solid solutions, as shown by means of X-rays, is followed by changes in mosaic structure, maximum hardness corresponding to minimum size of mosaic blocks.

A study of the disintegration of supersaturated solid solution of tungsten carbide in titanium carbide carried out by one of the authors showed that this process in its early stage is accompanied by an increase in the intensity of the (200) diffraction line of the solid solution. This increase could only be interpreted as caused by a decrease in the size of mosaic blocks of titanium carbide due to the influence of particles of precipitating phase. A similar increase of intensity was observed by other investigators after decrease of block dimensions caused by plastic deformation.

In the present investigation this assumption was studied

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X-ray analysis of the changes in the mosaic structure during ageing of beryllium bronze. (Cont.)

on Ni-Be and Cu-Be alloys containing 2.28% and 2.40% Be, respectively. Nickel content in the latter alloy was about 0.37%.

The intensity of the (111) diffraction line was measured. It was proved that the disintegration of solid solution after an isothermal annealing of quenched Ni-Be alloys at 630 C and a similar annealing of quenched Cu-Be alloys at 250 and 320 C is followed in its early stages by an increase in the intensity of this diffraction line. The corresponding curve for Ni-Be alloy has a sharp maximum after 10 min. annealing at 630 C, that for Cu-Be alloy has a sloping maximum after 10 hours annealing at 320 C.

Calculations based on the equation $I'/I = th(nq)/nq$ (i.e. taking into account only primary extinction) yielded the following data on the hardness and the block dimensions of heat-treated alloys at various break-up stages:

X-ray analysis of the changes in the mosaic structure during ageing of beryllium bronze. (Cont.)

	Block dimensions			Vickers hardness		
	As quenched	Minimum	Over-aged	As quenched	Maximum	Over-aged
Ni-Be	1.2	0.3[1]	1	170	310[1]	260
Cu-Be	0.7	0.2[2]	0.5	100	380[2]	230

[1] 10 min. [2] 15 hr.

Minimum dimensions of solid solution micromosaic correspond in both cases to maximum hardness. Coagulation of the precipitate leads to an increase in size of the blocks with corresponding decrease in hardness. According to the hypothesis suggested by one of the authors age-hardening is caused to a great extent by the decrease in the size of solid-solution blocks, whereas the decrease of hardness after over-ageing is due to their coagulation.

There are 4 figures, two tables and 7 references, 5 of which are Slavic.

ASSOCIATION: Moscow Institute of Steel im. I.V. Stalin (Moskovskiy Institut Stali im. I.V. Stalina)

Card 3/4

70-4-9/16

X-ray analysis of the changes in the mosaic structure during ageing of beryllium bronze. (Cont.)

SUBMITTED: February 28, 1957,

AVAILABLE: Library of Congress.

Card 4/4

SOV/163-58-1-41/53

AUTHORS: Gimmel'farb, A. I., Yelyutina, V. I., Mozzhukhin, Ye. I.

TITLE: Some Data on the Pseudo-Binary Phase Diagrams of NiAl and TiC (Nekotoryye dannyye k psevdobinarnoy diagramme sostoyaniya NiAl-TiC)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 1, pp 222-225 (USSR)

ABSTRACT: In special investigations the initial and end temperatures of the melt of alloys containing up to 50% TiC were determined. The alloys of NiAl and TiC were produced by the method of powder metallurgy. The results obtained made it possible to represent liquidus and solidus lines in NiAl and TiC.
The radiographic analyses of the samples showed that all alloys investigated consisted of two phases. No solubility of TiC in NiAl was found.
The metallographical analyses proved the presence of the bi-phase NiAl and TiC in these alloys.
To produce the liquid phase in the alloys NiAl and TiC at the sintering temperature the sintering has to be carried out at a higher temperature.

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SOV/163-58-1-41/53

Some Data on the Pseudo-Binary Phase Diagrams of NiAl and TiC

To produce alloys of the system TiC and NiAl of greater strength and density a sintering temperature higher than 2000°C is necessary.
The eutectic temperature of the system TiC-NiAl was determined (1580°C).
There are 2 figures, 1 table, and 4 references, 1 of which is Soviet.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: October 1, 1957

Card 2/2

85459

S/149/60/000/005/011/015
A006/A001

15.2200 2808, 1142, 1411, 1439

AUTHORS: Gorelik, S.S., Mozzhukhin, Ye.I., Yelyutina, V.I.

TITLE: Radiographic Investigation of Recrystallization Processes and Release of a Carbide Phase of Hard Alloys Containing Tungsten, Titanium and Tantalum Carbides

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, 1960, No. 5, pp. 121-125

TEXT: The authors used the X-ray method to investigate recrystallization processes and release of a carbide phase in hard alloys containing tungsten, titanium and tantalum carbides, and in solid solutions on tungsten and tantalum carbide base. The compositions of carbide components of the alloys investigated are plotted on a WC-TiC-TaC diagram (Figure 1). The alloys investigated were obtained from the following initial materials: tungsten carbide obtained by tungsten carburization, reduced with hydrogen at 1,350-1,400°C; titanium carbide obtained from a TiO_2 and carbon black mixture by roasting at 2,200°C in hydrogen atmosphere; tantalum carbide obtained by carburization of tantalum metal at 1,600°C. The alloys were carburized with cobalt powder reduced by hydrogen from Co_2O_3. The

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85459

S/149/60/000/005/011/015
A006/A001

Radiographic Investigation of Recrystallization Processes and Release of a Carbide Phase of Hard Alloys Containing Tungsten, Titanium and Tantalum Carbides

carbide and cobalt powders were mixed in alcohol, dried and screened. Specimens of 5 x 5 x 40 mm were pressed and sintered in a tubular furnace with a graphite heater in hydrogen atmosphere at 1,600°C. The specimens were then deformed by stripping on an abrasive disk and annealed in argon atmosphere. After annealing the specimens were cooled and radiograms were taken using chrome anode irradiation. Annealing was repeated until the appearance of interference spots indicated the formation of 1-2μ grains of carbides. The temperature of the last annealing stage was considered as recrystallization temperature. Temperatures of initial recrystallization (t^{in}_r) and of intensive recrystallization (t_r) for carbide components of 9 alloys investigated were determined as follows:

Alloy	1	2	3	4	5	6	7	8	9
t^{in}_r	1250	1350	1350	1500	1350	1350	1400	1450	1500
t_r	1300	1400	1400	1550	1400	1400	1450	1500	1550

Card 2/6

851459

S/149/60/000/005/011/015
A006/A001

Radiographic Investigation of Recrystallization Processes and Release of a Carbide Phase of Hard Alloys Containing Tungsten, Titanium and Tantalum Carbides

To check the assumption that a decomposition of oversaturated solid carbide solutions during annealing takes place, lattice parameters were determined for the solid solution of TiC-TaC-WC carbides of alloy No. 8 after one-hour-sintering of the specimens at 1,600°C and one-hour-annealing at 1,100, 1,200, 1,300 and 1,450° C. Radiographs were taken with a Kross camera using chrome anode irradiation. The authors investigated moreover release phenomena occurring when annealing alloys 3, 7 and 8. The changes in the width of lines (222) of the radiograms obtained with chrome anode irradiation, were studied. The experiments yielded the following results: From the three mostly used WC, TiC and TaC carbides, tungsten carbide has the lowest (1,250°C), tantalum carbide the highest (1,500°C) and titanium carbide an intermediate temperature of recrystallization (1,440°C). When dissolving WC in a solid TiC-TaC solution, in TaC and TiC, the temperature of initial recrystallization of the solution decreases until a concentration is attained corresponding to saturation. In the bi-phase range the recrystallization temperature of carbide solid solutions does not change with varying compositions of the carbide component of the alloy and of the quantitative phase ratio. At an equal

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85459 S/149/60/000/005/011/015
A006/A001

Radiographic Investigation of Recrystallization Processes and Release of a Carbide Phase of Hard Alloys Containing Tungsten, Titanium and Tantalum Carbides

content of WC in the carbide solid solution, oversaturated solid solutions have highest recrystallization temperatures. The decomposition of the carbide solid solutions raises the recrystallization temperature on account of the inhibited growth of recrystallization nuclei by particles of the dispersed phase. The magnitudes of substructure domains in deformed surfaces are very close for various compositions of solid solutions of TiC-TaC-WC and for the solid solution of WC in TiC. The decomposition of the solid solution TiC-TaC-WC exerts an inhibiting effect on the growth of substructural domains during release.

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85457

3/149/60/000/005/009/015
A006/A001

Investigation Into Conditions of Titanium-Niobium Carbide Chlorination

The operating chamber of the furnace represents a vertical graphite cylindrical tube with an expanding top pressed into a metallic housing with external heat insulation. A graphite grid is mounted in the chamber bottom. Carbide feed is performed with the aid of a screw feeder. Chlorination process can be conducted at levels of 280 to 420 mm due to the arrangement of discharge pipes at different heights. The furnace is heated with a digitate quartz heater having two heating zones. Chlorides are collected with the use of a condensation system developed by Giredmet. During the chlorination process the graphite accumulates in the bed, concentrates on its surface and is partially eliminated by the gas flow. To bind the carbon and eliminate it in a gaseous state preliminary tests of carbide chlorination were made with a chlorine-oxygen mixture, to form CO or CO_2. The rate of chlorine feed was 2.8 cm/sec for carbide of -100 μ -89%. After the onset of reaction at 200°C, the temperature in the bed raised spontaneously and the lower heater was automatically switched off. The top heater was switched-off at 450°C. When operating with a chlorine-oxygen mixture, the latter was supplied to the furnace at 600°C. At the beginning of the experimental investigation carbide was supplied to the furnace periodically through a funnel and later-on continuously by the screw feeder. Preheated carbide of the following composition was used:

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Investigation Into Conditions of Titanium-Niobium Carbide Chlorination

52.40% Ti; 8.85% Nb; 4.67% Si; 0.24% Fe; 0.07% Ca; 12.17% C_{bound}; 11.10% C_{free}; 2.90% N; 7.60% O; etc. The experiments proved the possibility of continuous powder carbide chlorination in a fluidized bed with chlorine or a chlorine-oxygen mixture. The main advantage of the latter method is the elimination of C in the form of CO or CO_2. The process can be conducted in a fluidized bed on account of the reaction heat without an external heat supply even in a small-scale furnace (0.0177 m^2 floor surface). Fluidized-bed chlorination is characterized by a high output (300 kg/hr per m^2 of furnace floor), a high degree of utilization of raw materials (98-99%), and a fairly high purity of the products obtained. These values exceed considerably the efficiency of direct chlorination of ore concentrates in the form of briquets mixed with coal. There are 2 tables, 7 figures and 5 references: 4 Soviet and 1 English.

ASSOCIATION: Krasnoyarskiy institut tsvetnykh metallov (Krasnoyarsk Institute of Non-Ferrous Metals) Kafedra metallurgii redkikh metallov (Department of Metallurgy of Rare Metals)

SUBMITTED: December 10, 1959

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L 07985-67 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AR6017481 SOURCE CODE: UR/0137/66/000/001/B016/B016

AUTHOR: Neustroyev, A. A.; Khodorovskiy, G. L.; Yelyzhenkov, Ye. D.

22
B

TITLE: Preheating in slag melting 18

SOURCE: Ref. zh. Metallurgiya, Abs. 1B96

REF SOURCE: Elektrotermiya. Nauchno-tekhn. sb., vyp. 45, 1965, 58-59

TOPIC TAGS: slag, vapor pressure, metal melting

ABSTRACT: An analysis of analytical solutions derived in this paper shows that preliminary heating of the slag and crucible not only reduces the stabilized thickness of the slag but also has a considerable effect on its behavior during melting. It is shown that the preliminary heating operation requires a vacuum system which provides a residual pressure level in the melting chamber no greater than the pressure of the saturated vapor above the solid phase of the metal to be melted in the furnace. 3 illustrations. V. Pryanikova. [Translation of abstract]

SUB CODE: 13

Card 1/1 gd

UDC: 669:621.365

YEL'ZON, L.

Polyethylene pipes. Na stroi. Ros. 4 no.5:14 My '63. (MIRA 16:5)

1. Zamestitel' glavnogo inzhenera Tambovskogo kotel'no-mekhanicheskogo zavoda.

(Pipe, Plastic)

YEM, A.F.

Dissertation: "Investigation of the Kinetics of Reduction of Iron Ores in an Individual Lump and in Layers." Cand Tech Sci, Dnepropetrovsk Metallurgical Inst, Dnepropetrovsk, 1953. (Referativnyy Zhurnal, Khimiya, Moscow, No 15, Aug 54)

SO: SUM 393, 28 Feb 1955

USSR

Kinetics of low-temperature reduction of iron ores. B. T. Rostovtsev and A. P. Em. *Doklady Akad. Nauk S.S.S.R.* 93, 131-4(1953).—The reduction rates of Fe oxides were studied at 1 min. time intervals in an app. with 2 pairs of burets (compensating and measuring). Either pair could be connected to the circulation system of the unit without interrupting the expt. With one pair in operation, the compensating buret of the second pair became filled with the reducing gas. In this way the reduction rate was measured at 275°, and in 20° intervals between 300 and 400°, (1) with Fe_2O_3, and (2) Fe ores. The compressed tablets of the powd. oxides were reduced with H. The kinetics of the process could be studied with a max. tablet wt. of 3 g., thickness of 2 mm., formed under pressure of 100 kg./sq. cm. and with a min. H_2 circulation of 40 cc./sec. The results are presented graphically as the total reduction/min. at the temps. given above, and as changes in the reaction rates with the progress of reduction. Minima on the second rate were obtained at the conclusion of the $Fe_2O_3 \rightarrow Fe_3O_4$ reduction step and of the $Fe_3O_4 \rightarrow FeO$ step. The results were confirmed by x-ray detns. The av. activation energy R was found to be 17,700 cal. for the step 1, 15,450 cal. for step 2, and 14,200 cal. for step 3. W. M. Sternberg

IE M, M.F.

Journal of the Iron and Steel Inst.
June 1954
Blast-Furnace Practice and Production of Pig Iron

Kinetics of Low-Temperature Reduction of Iron Ores.—The Reduction of Synthetic and Natural Iron Ores with Hydrogen. S. T. Rostovtsev and A. P. Em. (*Doklady Akademii Nauk S.S.S.R.*, 1953, 93, (2), 329–334). [In Russian]. Kinetics of the low-temperature reduction of samples of (*a*) natural high-grade iron ore (Krivoi Rog), cut into slabs, (*b*) the same ore crushed and compressed into slabs, (*c*) chemically pure Fe_2O_3 heated before reaction to various temperatures, and (*d*) synthetic ores containing various gangue materials were investigated. The kinetics of reduction of finely crushed rich ore do not differ from that of chemically pure ferric oxide. At temperatures below the point of eutectoid decomposition of FeO, the reduction proceeds in three stages through the metastable ferrous oxide phase. During the reduction of ore in its natural crystalline state the kinetics of the process are different. On the curve for the dependance of reduction rate on time or degree of reduction, the sign of the existence of three separate stages of the process are absent. This apparent change in the kinetics of reduction is explained by the low adsorption capacity of the ore. Fine crushing of ore with subsequent briquetting considerably increases the velocity of reduction. The presence of gangue materials (SiO_2, Al_2O_3, and CaO) only slightly decreases the velocity of reduction without changing the character of the process. —V. O.

18 (3)

SOV/163-59-2-2/48

AUTHORS: Rostovtsev, S. T., Yem, A. P.

TITLE: Some Kinetic Rules in the Reduction of Ferric Oxide With Hydrogen in Layers (Nekotoryye kineticheskiye zakonomernosti vosstanovleniya okislov zheleza vodorodom v sloye)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1959, Nr 2, pp 9-14 (USSR)

ABSTRACT: The reduction of the iron ores in layers has a complicated kinetics. The rate of the reduction process depends on the crystalline transformation of the ferric oxide in the layers. The degree of reduction is detected by a gravimetric determination of the ore or by the measurement of the vapor developed. The dependence of the reduction process on temperature was investigated and is shown in figure 1. The curves in figure 1 show the course of a reduction in the case of a temperature rise which is expressed by the dependence $U = H:w_o/k$. The kinetics of a reduction process of the iron in layers was investigated at 400° and 800° and given in figure 2 (a - b). The influence of the rate of flow of the reduction gas on the reduction of ferric oxide was investigated

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in the course of 30 minutes at 800° and is given in figure 3. It was found that a loss of unused reduction gases occurs with the rise of the rate of flow. Thus an experimental detection of the optimum rate of flow of the reduction gas is apparently necessary. There are 3 figures and 2 Soviet references.

ASSOCIATION: Dnepropetrovskiy metallurgicheskiy institut (Dnepropetrovsk Metallurgical Institute)

SUBMITTED: May 19, 1958

DEKHANOV, N.M., inzh., otv. red.; KRAVCHENKO, V.A., inzh., zames. otv. red.; RAGULINA, R.I., inzh., red.; YEM, A.P., kand. tekhn. nauk, red.; GASIK, M.I., assisten, red.; ZEL'DIN, V.S., inzh., red.; SAKHAROV, R.S., red.; BELIKOV, Yu.V., inzh., red.; KOCHERGA, N.T., ved. red.; SYCHUGOV, V.G., tekhn. red.

[Development of the iron alloy industry in the U.S.S.R.] Razvitie ferrosplavnoi promyshlennosti SSSR. Kiev, Gos. izd-vo tekhn. lit-ry, USSR, 1961. 243 p. (MIRA 15:4)

1. Ukraine. Gosudarstvennyy nauchno-tekhnicheskiy komitet. Institut tekhnicheskoy informatsii. 2. Zaporozhskiy zavod ferrosplavov (for Dekhanov, Kravchenko, Ragulina). 3. Dnepropetrovskiy metallurgicheskiy institut (for Gasik, Belikov). (Iron industry)

KONOVALOV, B.S.; LAPITSKIY, V.I.; YEM, A.P.; KHITRIK, S.I.

Use of exothermic three-component ferroalloys as addition elements in 14KhGS steel. Izv. vys. ucheb. zav.; chern. met. 4 no.12:45-49 '61. (MIRA 15:1)

1. Dnepropetrovskiy metallurgicheskiy institut.
(Steel alloys--Metallurgy) (Iron alloys)

KHITRIK, S.I.; VLASENKO, V.Ye.; GASIK, M.I.; YEM, A.P.; NEFEDOV, Yu.A.

Refining 75-per cent ferrosilicon from aluminum. Izv.vys.ucheb. zav.; chern.met. 5 no.4:45-53 '62. (MIRA 15:5)

1. Dnepropetrovskiy metallurgicheskiy institut.
(Ferrosilicon--Metallurgy) (Aluminum)

S/133/62/000/007/003/014
A054/A127

AUTHORS: Goncharov, I.A.; Yem, A.P.; Konovalov, V.S.; Lapitskiy, V.I.; Marakhovskiy, I.S.; Filonov, V.A.; Khitrik, S.I.; Yaitskiy, A.K.

TITLE: Determination of the optimum composition of silico-chromane and its application in alloying 14 ХГС (14KhGS) grade steel

PERIODICAL: Stal', no. 7, 1962, 615 - 616

TEXT: Tests were carried out (with the cooperation of A.S. Rabinovich, G.T. Duzenko, N.V. Pal'chik, M.I. Vaynshtok, P.L. Konstantinov, et al.) on the application of silicochromane (with 15 - 18% Si, 25 - 40% Mn and 25 - 35% Cr) in alloying 14KhGS grade steel. (The application of this ternary alloy was proposed by V.F. Mazov, I.S. Marakhovskiy, I.M. Leykin, A.A. Khomutov, A.A. Podgorodetskiy.) Silicochromane for the tests was produced from ferromanganese, ferrochrome, ferrosilicon, etc.; the test steel was smelted in a 10-kg induction furnace and in 15-ton and 220-ton open-hearth furnaces. Besides testing ferrochromane with various percentages of the main components, the investigations also covered the possibility of adding this alloy to the steel without its previous

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Determination of the optimum composition ....

reduction. When ferrochromane was added to the bath without previous reduction, the burning out of manganese was 35%, that of silicon 80 - 85%, while, when it was added to the reduced bath the corresponding values were not more than 4 - 5 and 45 - 50%. The burning loss of chrome is not greatly affected by the degree of bath-reduction. By reference to laboratory tests, silicochromane with 32 - 34% Mn, 35 - 36% Si and 18 - 19% Cr was used in the pilot plant tests with a 15-ton open-hearth furnace. In these tests silicochromane replaced silicomanganese in preliminary reduction and ferrochrome + ferromanganese in alloying. The burning loss of manganese was 5 - 7%, that of silicon 50 - 55% and of chrome 16 - 18% in this test series. When 50% of silicochromane was added in the furnace and 50% in the ladle, the losses of silicon were decreased to 42% and the total amount of the alloy required for reduction and alloying dropped by 10%. The loss of manganese increased to 15%, while the burning loss of chrome remained unchanged (15%). Similar results were obtained for the 220-ton furnace. The optimum composition for silicochrome was found to be 35 - 38% Mn, 32 - 35% Si and 21 - 23% Cr. The distribution of the main elements in the height of the ladle was more uniform than with reduction according to the conventional methods. The amount of gases also decreased when silicochromane was used. As to nonmetallic inclu-

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Determination of the optimum composition ....

sions the metal reduced by silicochromane showed silicate inclusions mainly in the skin of the ingot bottom, evidently because they could not float due to the lower liquidity of the metal caused by the addition of great amounts of ferro-alloys in the ladle. This, however, can be corrected by using exothermic ferro-alloys. There is 1 figure.

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S/764/61/000/000/003/003

AUTHORS: Khitrik, S.I., Doctor of Technical Sciences; Volkov, V.F., Nikolayev, V.I., Engineers; Yem, A.P., Candidate of Technical Sciences; Gasik, M.I., Assistant; Yemlin, B.I., Engineer.

TITLE: Industrial experience with the vacuum treatment of iron alloys.

SOURCE: Razvitiye ferrosplavnoy promyshlennosti SSSR. Ed. by N.M. Dekhanov and others. Kiyev, Gostekhizdat USSR, 1961, 231-240.

TEXT: The paper describes experimental vacuum techniques applied by the School of Electrometallurgy of the Dnepropetrovsk Institute of Metallurgy, jointly with the Zaporzh'ye Iron-Alloys Plant, for the making of dense ingots free of gas blowholes of C-free ferrochrome and metallic Mn. The work was begun in 1953, and the present paper describes the improved vacuum chamber and pumping system developed since 1955 and 1956 (schematic cross-section shown). The vacuum chamber comprises a metallic container with an internal lining of a single row of firebrick. The removable cover is water-cooled and, while not protected by a lining, is shielded from the heat radiation of the liquid metal by means of a sheet-metal screen. The pumping plant, which is connected to the chamber by means of a large-diam conduit, is placed at a distance of 25 m from the chamber. A multiple-

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