S/052/61/006/001/002/005
C 111/ C 333

Transient phenomena in ...

types is given by the vector $\mathfrak{m} = (m_1, \ldots, m_n)$ and the distribution at the moment t by the vector $\mathfrak{v} = (v_1, \ldots, v_n)$. Let $\mathfrak{y}_i^{(k)}$ be the vector which describes at the moment t the distribution of the descendants of k-th particle of type T_i. Let γ_j be the number of the vectors different from zero among the $\mathfrak{y}_j^{(1)}, \mathfrak{y}_j^{(2)}, \ldots, \mathfrak{y}_j^{(mj)}$. For $t \to \infty$ and $\lambda \to 0$ it holds

$$P\{\gamma_j = 0\} = (1 - Q_j)^{mj} \to e^{-\gamma_j},$$

$$M\,\gamma_j \sim \gamma_j = \frac{2m_j u_j e^{\lambda t}}{bg(\lambda, t)} \qquad j = 1, \ldots, n$$

$$M_j' = \frac{m_1 A_{1j} + \ldots + m_n A_{nj}}{P\{\nu > 0\}} \sim v_j(m_1 u_1 + \ldots + m_n u_n)\ \frac{e^{\lambda t}}{1 - e^{-\gamma}}$$

where

$\gamma = \gamma_1 + \ldots + \gamma_n$, $A_{kj}(t) = M\mu_{kj}(t)$ and $\nu = \sum_{j=1}^{n} \nu_j$.

Card 7/9

Transient phenomena in ...

Let $H_1(z_1,\dots, z_n)$ be the distribution function of the $\nu_j/\bar{M}_j^*$ if $\nu > 0$ and let $\Psi_1(t, \tau_1,\dots,\tau_n)$ be the corresponding characteristic function.

Theorem 3: If $m_k \to \infty$, $\lambda \to 0$, $t \to \infty$, where $0 < \gamma_k < \infty$ $(k = 1,\dots,n)$ then it holds uniformly relative to all $\{f_k\} \in K$:

$$\sup_z \left| H_1(z) - h_1(z, \gamma) \right| \to 0,$$

where the distribution function $h_1(z_1,\dots, z_n, \gamma_1,\dots,\gamma_n)$ has the characteristic function

$$\Psi_1(\tau_1,\dots,\tau_n; \gamma_1,\dots,\gamma_n) = \frac{1}{e^{\gamma}-1}\left\{\exp\left[\frac{\gamma^2}{\gamma - i\tau\,(1-e^{-\gamma})}\right] - 1\right\}$$

$(\tau = \tau_1 + \dots + \tau_n, \gamma = \gamma_1 + \dots + \gamma_n)$.

Let $h(z, \gamma) = h_1(z_1 + 1,\dots, z_n + 1, \gamma_1,\dots,\gamma_n)$, where

Card 8/9

Transient phenomena in ...

$\sigma^2 = \frac{2}{\gamma}(1 - e^{-\gamma}) - e^{-\gamma}$ are the second centered moments of $h_1(z,\gamma)$ and $H(z) = H_1(z_1\sigma^* + 1, \ldots, z_n\sigma^* + 1$, where

$$\sigma^{*2} = \frac{2-(2+w)e^{-w}}{w} \quad \text{and} \quad w = \frac{2e^{\lambda t}}{b\varepsilon(\lambda,t)} \sum_{j=1}^{n} m_j u_j .$$

Theorem 4: If $m_k \to \infty$ $(k=1,\ldots,n)$, $\lambda \to 0$, $t \to \infty$, then

$$\sup_z \left| H(z) - h(z,\gamma) \right| \to 0$$

uniform relative to all $0 \leq \gamma \leq \infty$ and $\{f_k(x)\} \in K$.

The author thanks B. A. Sevast'yanov for subject and advices.

There are 6 Soviet-bloc and 1 non-Soviet-bloc reference. The reference to English-language publication reads as follows: T.E. Harris, Some mathematical models for branching processes, Proceedings of the second Berkeley symposium, 1951.

SUBMITTED: November 18, 1959

Card 9/9

34774
S/052/62/007/001/004/005
16.6100 C111/C444

AUTHORS: Savin, A. A; Chistyakov, V. P.

TITLE: Some limit theorems for branching processes with a few types of particles

PERIODICAL: Teoriya veroyatnostey i yeye primeneniye, v. 7, no. 1, 1962, 95-104

TEXT: Let a particle of the type T_k change in the time $\Delta t \to 0$ with the probability $\delta_k^{\omega} + p_k^{\omega} \Delta t + 0(\Delta t)$, where $\delta_k^{\omega} = 1$ for $\omega_k = 1$, $\omega_i = 0$ $(i \neq k)$ and $\delta_k^{\omega} = 0$ in other cases, into the set of particles $\omega = (\omega_1, \ldots, \omega_n)$ of the types $T_1, \ldots, T_n$. Let $\mu_{kj}(t)$ be the number of the particles of the type T_j which in the time t originate from a particle of the type T_k. Let $f_k(x_1, \ldots, x_n) = \sum_{\omega} p_k^{\omega} x_1^{\omega_1} \ldots x_n^{\omega_n}$ and let exist

$$a_{ij} = \left.\frac{\partial f_i}{\partial x_j}\right|_{x=1}, \quad b_{ij}^{(k)} = \left.\frac{\partial^2 f_k}{\partial x_i \partial x_j}\right|_{x=1}, \quad c_{ijl}^{(k)} = \left.\frac{\partial^3 f_k}{\partial x_i \partial x_j \partial x_l}\right|_{x=1}.$$

Card 1/4

Some limit theorems for . . .

The class of the types and the degree of the class be defined as in (Ref. 1: B. A. Sevast'yanov, Teoriya vetvyashchikhsya sluchaynykh protsessov [Theory of the branching random processes], Uspekhi matem. nauk, VI, 6 (1951), 47-99). Let λ be the characteristic number of $\| a_{ij} \|$ with the largest real part.

Considered is a class sequence by which with positive probability one can obtain from particles belonging to the class with maximal degree r, particles of the class with degree 0. This class sequence is corresponding to a sequence of irreducible matrices with elements a_{ij}. Let k of these matrices have the characteristic number 0. Let $p = \max k$ with respect to all class sequences which lead from the class with degree r into the classes with degree 0. Let

$$Q_k(t) = P\left\{\sum_{j=1}^{n} \mu_{kj}(t) > \right\} .$$

Theorem 1: Let in a degenerated branching process with $\lambda = 0$ the a_{ij} and $b_{ij}^{(k)}$ (i,j,k = 1,...,n) are finite, then for the types T_k,

Card 2/4

Some limit theorem for . . .

belonging to the class with degree r, for $t \to \infty$ there holds

$$Q_k(t) \sim q_k t^{-2^{1-p}}$$

where the constants $q_k > 0$ are depending on a_{ij}, $b_{ij}^{(k)}$.

Theorem 2: If in a degenerated process with three types of particles

1.) the types T_1, T_2, T_3 belong to the classes with degree 2, 1, 0

2.) $b_{ij}^{(k)}$ $(i,j,k = 1,2,3$, $c_{333}^{(3)}$ exist

3.) $a_{11} < 0$, $a_{22} \leq 0$, $a_{33} = 0$, then for $t \to \infty$ the distributions

$$P\left\{ \frac{\mu_{k1}}{t} < y_1, \frac{\mu_{k2}}{t} < y_2, \frac{2\mu_{k3}}{b_{33}^{(3)} t} < y_3 \;\middle|\; \sum_{j=1}^{3} \mu_{kj}(t) > 0 \right\} \quad ,k = 1,2,3$$

converge to the distribution

Card 3/4

Some limit theorem for . . .

$$S(y_3) = \begin{cases} \frac{1}{2^{p-1}} \int_0^{y_3} e^{-z}\ {}_1F_1\left(1-2^{1-p},\ 2, z\right)dz, & \text{for } y_3 \geq 0 \\ 0 & \text{for } y_3 < 0 \end{cases}$$

where

$${}_1F_1(\alpha, \gamma, z) = 1 + \frac{\alpha}{\gamma}\frac{z}{1!} + \frac{\alpha(\alpha+1)z^2}{\gamma(\gamma+1)2!} + \ldots$$

$p \geq 1$ being the number of the zeros in the main diagonal of the matrix a.

The author mentions I. M. Samusenko.
There are 7 Soviet-bloc references and 1 non-Soviet-bloc reference.

SUBMITTED: September 9, 1960

Card 4/4

42700

16.6100

S/020/62/147/002/006/021
B112/B186

AUTHORS: Chistyakov, V. P., Markova, N. P.

TITLE: Certain theorems for unhomogeneous branching processes

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 2, 1962, 317-320

TEXT: A system of particles each of which decays into k particles during the time interval Δt with the probability $p_k(t)\Delta t + o(\Delta t)$ ($p_k(t) \geqslant 0$, $k \neq 1$, $p_1(t) \leqslant 0$, $\sum_{k=0}^{\infty} p_k(t) = 0$) is described by a function $F(s,t,x) = \sum_{n=0}^{\infty} P_n(s,t)x^n$ for the particle number at the instant t, the particle number at the instant s being equal to unity. This function satisfies the equation $-\partial F(s,t,x)/\partial s = f(s,F(s,t,x))$ with the initial condition $F(s,t,x)\big|_{s=t} \equiv x$ ($0 \leqslant s \leqslant t < \infty$). Here, $f(s,x) = \sum_{n=0}^{\infty} p_n(s)x^n$. The process is said to be degenerated if $\lim_{t\to\infty} P_0(s,t) = P_0(s) = 1$. It is demonstrated that D. G. Kendall's condition of degeneracy (Ann. Math. Statist., 19, No. 1, 1(1948))

Card 1/2

is sufficient in the general case, but not under certain restrictions. Some limiting theorems for processes of growth are derived.

PRESENTED: February 7, 1962, by A. N. Kolmogorov, Academician

SUBMITTED: February 7, 1962

Card 2/2

CHISTYAKOV, V.P.; MARKOVA, N.P.

On some theorems for inhomogeneous branching processes.
Dokl. AN SSSR 147 no.2:317-320 N '62. (MIRA 15:11)

1. Predstavleno akademikom A.N. Kolmogorovym.
(Limit theorems)

FADEYEV, A.D., kand. ist. nauk; YAKOVLEVA, A.P.; CHERNYKH, N.S., otv. red.; KALASHNIKOVA, P.I., red.; KOGAN, I.B., red.; KRASNUSHKIN, A.A., red.; CHISTYAKOV, V.P., red.; KOZHEVNIKOVA, V.A., red.; DURASOVA, V.M., tekhn. red.

[The V.I.Lenin Volga Hydroelectric Power Station, 1950-1958] Volzhskaia GES imeni V.I.Lenina (1950-1958 gg); dokumenty i materialy. Kuibyshev, Kuibyshevskoe knizhnoe izd-vo, 1963. 407 p. (MIRA 16:7)

1. Kommunisticheskaya partiya Sovetskogo Soyuza. Kuybyshevskiy oblastnoy komitet. Partiynyy arkhiv.. 2. Starshiy prepodavatel' kafedry istorii partii Kuybyshevskogo politekhnicheskogo instituta (for Fadeyev). 3. Nauchnyy sotrudnik partarkhiva Kuybyshevskogo oblastnovo komiteta Kommunisticheskoy partii Sovetskogo Soyuza (for Yakovleva).
(Volga Hydroelectric Power Station (Lenin))

CHISTYAKOV, V.P.

Letter to the editor. Teor. veroiat. i ee prim. 10 no.3:597-598 '65. (MIRA 18:9)

IVANTSOV, G.P., kandidat tekhnicheskikh nauk; SOBAKIN, M.P., kandidat tekhnicheskikh nauk; CHISTYAKOV, V.S., inzhener.

Best thermal conditions for smelting using oxygen. Sbor.trud. TSNIICHM no.13:153-170 '56. (MLRA 9:11)
(Zaporozh'ye--Smelting)
(Oxygen--Industrial applications)

25(5) 06224
AUTHORS: Radun, D. V., Candidate of Technical Sciences, Levachev, A. G., Chistyakov, V. S., Teper, M. Ye., Lurda, A. K. SOV/64-59-6-16/28

TITLE: Automatic Control of the Work of Evaporating Apparatus for Electrolytic Lyes

PERIODICAL: Khimicheskaya promyshlennost', 1959, Nr 6, pp 516 - 521 (USSR)

ABSTRACT: An automatic control of the lye level in all evaporators, the removal of the lye and caustics by means of a pump with an automatic concentration control, and the salt separation by means of automatic centrifuges of the type "AG" permit continuous evaporation and the full automation of the evaporator. The lye concentration can be measured and controlled by determining the temperature of depression, i. e. the temperature difference between the boiling solution and the steam. The temperature of the boiling lye should be measured in an apparatus with forced circulation in the discharge flow, in apparatus with natural circulation and a suspension chamber between chamber and apparatus wall, and where the lye is

Card 1/2

ACCESSION NR: AP4042864 S/0114/64/000/007/0038/0041

AUTHOR: Preobrazhenskiy, V. P. (Candidate of technical sciences); Buvin, N. P. (Candidate of technical sciences); Pinskiy, F. I. (Engineer); Solon'ko, L. G. (Engineer); Chistyakov, V. S. (Engineer)

TITLE: Measuring temperatures of a pulsating gas stream

SOURCE: Energomashinostroyeniye, no. 7, 1964, 38-41

TOPIC TAGS: gas stream, pulsating gas stream, pulsating gas stream temperature, diesel engine

ABSTRACT: A method for measuring variable temperatures by a low-inertia temperature sensor (resistance thermometer) whose readings are interpreted by a computer on the basis of known dynamic characteristics of the sensor is offered. The temperature of the sensor is connected with that of the gas stream by this equation: $T\frac{dt_t}{d\tau}+t_t=t_n$, where t_n and t_t are the temperatures of the gas stream and the sensor, respectively, T is the sensor time constant, and τ is time. The method was used at Kolomna Diesel-Locomotive-Building Plant for

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ACCESSION NR: AP4042864

measuring temperatures of YaAZ-204-diesel-engine exhaust gases; a sensor with 0.03—0.05-mm-diameter, 5—9-mm-long Pt wire was employed. The error involved is claimed to be 2—3C with the measurand temperature within 600—750C. The difficulty in assessing possible additional errors is held as the main drawback of the method; in high-speed gas streams, the sensor will measure the impact temperature rather than the thermodynamic temperature; in a pulsating-speed variable-temperature stream, an additional error may arise due to a variation in the time constant of the sensor. (V. A. Tomel'gas, V. I. Spiridonov, and A. I. Ryabitsev took part in this work.) Orig. art. has: 4 figures and 12 formulas.

ASSOCIATION: Moskovskiy energeticheskiy institut (Moscow Power-Engineering Institute)

SUBMITTED: 00 ENCL: 00

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

Card 2/2

MUSHCHININ, A.A., master; CHISTYAKOV, V.T., elektromonter.

Bench lathe for sharpening cores. Energetik 4 no.6:30 Je '56.
(MLRA 9:8)

(Grinding and polishing) (Electric instruments)

L 41932-66 EWT(m)/T WE

ACC NR: AP6029039 (A) SOURCE CODE: UR/0413/66/000/014/0055/0055

INVENTOR: Chertkov, Ya. B.; Zrelov, V. N.; Shchagin, V. M.; Fel'dshteyn, M. S.; Rybakov, K. V.

ORG: none

TITLE: Method of removing minute contaminants from [jet] fuels. Class 23, No. 183859

SOURCE: Izobret prom obraz tov zn, no. 14, 1966, 55

TOPIC TAGS: jet fuel, fuel additive, fuel contamination, ~~coagulant additive~~ coagulation

ABSTRACT: An Author Certificate has been issued for a method of removing minute contaminants from [jet] fuels as per Author Certificate No. 173363 but involving sulfenamide derivatives [unspecified] of 2-benzothiazole as the coagulating additive. [Author Certificate No. 173363 concerned a method of removing minute contaminants by filtration, featuring the addition to the fuel of octadecylamidoxylbutyric acid [sic] as a coagulating additive to increase the speed and degree of purification].[SM]

SUB CODE: 21/ SUBM DATE: 02Nov63/ ATD PRESS: 5061

Card 1/1 UDC: 665.541

CHISTYAKOV, YE. A. Cand Tech Sci -- (diss) "Investigation of the bearing capacity of ductile reinforeced concrete pillars functioning according to the first case of eccentric compression," Moscow, 1960, 13 pp, 150 cop. (All-Union Sci Res Institute of Transport Construction - TsNIIS) (KL, 45-60, 127)

CHISTYAKOV, Ye.A., inzh.

Bearing capacity of elastic eccentrically compressed reinforced concrete columns. Bet. i zhel.-bet. no.2:75-82 F '60. (MIRA 13:6)
(Columns, Concrete)

TAL', K.E., kand.tekhn.nauk; CHISTYAKOV, Ye.A., kand.tekhn.nauk

Study of the bearing capacity of bent reinforced-concrete columns functioning according to the first case of eccentric compression. Trudy NIIZHB no.23:127-195 '61. (MIRA 14:12)
(Columns, Concrete)

TAL', K.E., kand.tekhn.nauk; CHISTYAKOV, Ye.A., kand.tekhn.nauk;
KOLOMENSKIY, A.P., inzh.

Unit for testing flexible columns with protracted loading. Trudy NIIZHB no.26:21-29 '62. (MIRA 15:7)
(Columns, Concrete--Testing)

TAL', K.E., kand.tekhn.nauk; CHISTYAKOV, Ye.A., kand.tekhn.nauk

Experimental study of flexible reinforced concrete rods under protracted loading. Trudy NIIZHB no.26:30-58 '62. (MIRA 15:7)
(Columns, Concrete--Testing)

TAL', K.E., kand. tekh. nauk; LESSIG, N.N., kand. tekhn. nauk; Prinimali uchastiye: GVOZDEV, A.A.; ALEKSANDROVSKIY, S.V.; BORISHANSKIY, M.S.; DMITRIYEV, S.A.; KRILOV, S.M.; MIKHAYLOV, K.V.; MULIN, N.M.; NEMIROVSKIY, Ya.M.; CHISTYAKOV, Ya.A.; VASIL'YEV, B.F.; BOGATKIN, I.L.; ZALESOV, A.S.; NIKITIN, I.K.

New standards SNiP II-V. 1-62 for the design of concrete and reinforced concrete elements. Bet. i zhel.-bet. 9 no.3:97-102 Mr. '63. (MIRA 16:4)

1. Nauchno-issledovatel'skiy institut betona i zhelezobetona Akademii stroitel'stva i arkhitektury SSSR (for all except Vasil'yev, Bogatkin, Zalesov, Nikitin). 2. Gosudarstvennyy institut tipovogo proyektirovaniya i tekhnicheskikh issledovaniy (for Vasil'yev, Bogatkin, Zalesov, Nikitin).

CHISTYAKOV, Ye. A., kand. tekhn. nauk

Determining flexure of elastic reinforced concrete elements.
Transpstroi 13 no. 11:57-[redacted] N '63. (MIRA 17:5)

83686

S/135/60/000/010/008/015
A006/A001

1.2300 only 2208

AUTHORS: Yershov, L. K., Chistyakov, Ye. N., Engineers, Kutkovskiy, S. I., Candidate of Technical Sciences

TITLE: Comparative Durability of Electrode Alloys in Spot Welding

PERIODICAL: Svarochnoye proizvodstvo, 1960, No. 10, pp. 24-26

TEXT: The manufacture of electrodes for spot welding by the method of cold heading is employed to eliminate waste of non ferrous metals occuring at the manufacture by mechanical treatment. When producing electrodes of heat treated chrome bronzes, the process of cold heading replaces hardfacing of the hardened alloy, necessary to raise the effect of subsequent aging. At the Moscow Automobile Plant imeni Likhachev tests were performed with cold headed Бр.Х-0.7 (Br.Kh-0.7) chrome bronze electrodes with different Cr content and МЦ-4 (MTs-4) alloy electrodes containing aluminum and magnesium. The chemical composition is given in Table 1. The electrodes are prepared by quenching the blank, cold heading, tempering, etching and machining of burrs. Cold heading was carried out on a 80-ton crank press by a method developed by L. K. Yershov and T. V. Demchenkov. Br.Kh-0.7 electrodes with different Cr content were quench-hardened

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Comparative Durability of Electrode Alloys in Spot Welding

at 980°C and MTs-4 electrodes at 1,000°C. The electrodes were tempered for 5 hours at 450°C and air cooled. Hardness of Br.Kh-0.7 electrodes was HB 136 - 140, and 140 - 148 kg/mm^2 for MTs-4 electrodes. Comparative tests were made by welding hinges of hood sides on a ATA-40-8 spot welding machine. Br.Kh-0.7 electrodes with a medium Cr content which were not subjected to heat treatment were also tested. It was established that chrome bronze electrodes that were not heat-treated were less durable than heat-treated alloy electrodes. A Cr content of 0.44 - 0.72% in the latter did not considerably affect their durability. Heat treated MTs-4 electrodes proved to be less durable than Cr bronze electrodes. This result is not in agreement with data given by Zakharov (Ref. 1, 2) and Usherov-Marshak (Ref. 3) establishing a higher durability of MTs-4 alloy electrodes. Comparative tests of electrode alloys were also made (with the participation of L. M. Mirkina, engineer) in spot welding truck longerous using Br.Kh-0.7, MTs-4 and MŪ-5B (MTs-5B) electrodes. Br.Kh-0.7 and MTs-4 electrodes were water quenched at 1,000°C, cold deformed by 30 - 40% and tempered for 5 hours at 450°C. The hardness of Br.Kh-0.7 electrodes in treated state was HB 126 - 127 kg/mm^2; that of MTs-4 electrodes was HB 137 - 143 kg/mm^2. Chrome-

83686

S/135/60/000/010/008/015
A006/A001

Comparative Durability of Electrode Alloys in Spot Welding

cadmium bronze MTs-5B electrodes were water quenched at 960°C, tempered at 450°C for 5 hours, and subjected to reduction by 20 - 30%, and their hardness was HB 121 - 129 kg/mm^2. The tests proved that the durability of Br.Kh-0.7 and MTs-4 electrodes was practically the same. Durability of MTs-5B electrodes was by 25 - 50% higher. There are 2 figures 4 tables, and 3 Soviet references.

ASSOCIATION: ZIL (Yershov and Chistyakov)

Card 3/3

BOCHVAR, G.A.; CHISTYAKOV, Ye.P.

Certain characteristics of the structure and properties of cast titanium alloys. Issl. splav. tsvet. met. no.4:249-256 '63. (MIRA 16:8)

(Titanium alloys—Metallography)
(Titanium founding)

VEREZUB, V.N., kand.tekhn.nauk; POTAPENKO, A.Ye., starshiy prepodavatel'; CHISTYAKOV, Ye.S., inzh.

Using the method of ultrasonic waves for making chip breakers. Izv.vys.ucheb.zav.; mashinostr. no.8:115-119 '60. (MIRA 13:9)

1. Khar'kovskiy aviatsionnyy institut.
(Metal cutting)
(Ultrasonic waves—Industrial applications)

28158
S/122/61/000/003/012/013
D241/D302

1.1110

AUTHORS: Verezub, V.N., Candidate of Technical Sciences, Potapenko, A. Ye., and Chistyakov, Ye.S., Engineers

TITLE: Investigating the ultrasonic grinding of the cutting tool

PERIODICAL: Vestnik mashinostroyeniya, no. 3, 1961, 67-69

TEXT: The article examines ultrasonic grinding of ceramic and carbide tips. The equipment used consisted of a generator and a magnetostrictive head, with a power of 600 wt and a range of frequencies 16 - 30 Kc. The circuit of the generator has special features. The RC exciter permits a stepless variation of frequency. The output of the generator is amplified in 3 cascades, and is fed to the output power amplifier which incorporates 4 valves, GK-71. There is a common coil for excitation and magnetization of the vibrator. The magnetostrictive head contains the transformer, exponential concentrator and the working tool which is threaded into the concentrator. The transformer represents a packet of nickel

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Investigating the ultrasonic ...

plates. A selection of weights ensure a static pressure from 500 to 800 g. A dial indicator is used to measure the infeed. Boron carbide suspension in water as well as silicon carbide were employed as abrasives. Tips made of ceramic ЦМ (TsM)-332 and carbide T15K6 were ground by ultrasonics. The process consisted of removing a thin layer from a small area as well as the formation of shallow grooves with various shapes. Stringent requirements were imposed on the form of the grooves, and their surface finish. The shapes of tools used in the experiments are illustrated. The investigation concerned the effect of depth of machining, area and shape of tool, as well as the size of grain and the material of abrasive on the grinding of ceramic and carbide tips. The results reveal that the ceramics are machined faster than the carbide tips. The length of the tool has little effect on the duration of machining. The intensity of ultrasonic machining depends upon the material of the abrasive and the size of its grains. The surface finish is of the 7th- 8th class. The profile of the cutting edge of carbide tips is of better finish than in the case of ceramics. The ultrasonic method eliminates the most laborious operation of

Card 2/3

Investigating the ultrasonic ...

lapping. Output on ceramic tips when using boron carbide is 75 - 90 mm^3/min, whereas in the case of carbide tips it reaches 11 - 14 mm^3/min. According to the data of VNII, the wear of the grinding wheel as a percentage of material removal of a carbide tip is 400 - 500; it is only 100 in the case of ultrasonic machining. Tests were carried out on the stability of tips which were clamped in the holders and consisted of turning steel 40. There are 6 figures and 1 table.

Card 3/3

CHISTYAKOV, Yu.A.

Operative roentgenomanometry of the bile ducts in the experiment. Eksp. khir. i anest. 6 no.5:48-52 S-O '61. (MIRA 15:3)

1. Iz fakul'tetskoy khirurgicheskoy kliniki II Moskovskogo meditsinskogo instituta imeni N.I. Pirogova (dir. - prof. A.N. Bakulev).

(BILE DUCTS—SURGERY)
(BILE DUCTS—RADIOGRAPHY)

CHISTYAKOV, Yu.A.

Perforation of a pancreatic cyst in a 1-year-and-5-month-old infant. Khirurgiia 37 no.3:123-124 Mr '61. (MIRA 14:3)

1. Iz kliniki obshchey khirurgii (zav. - prof. V.A. Ivanov) lechebnogo fakul'teta II Moskovskogo gosudarstvennogo meditsinskogo instituta imeni N.I. Pirogova.
(CYSTS) (PANCREAS--TUMORS)

CHISTYAKOV, Yu.A.

Operative roentgenomanometry of the biliary tract. Khirurgiia 38 no.10:74-81 O '62. (MIRA 15:12)

1. Iz 2-y fakul'tetskoy khirurgicheskoy kliniki imeni S.I. Spasokukotskogo (zav. - akad. A.N. Bakulev) II Moskovskogo gosudarstvennogo meditsinskogo instituta imeni N.I. Pirogova.
(BILIARY TRACT--RADIOGRAPHY) (MANOMETER)
(ANGIOGRAPHY)

Chistyakov, Yu. A

AID P - 2710

Subject : USSR/Mining

Card 1/1 Pub. 78 - 7/27

Author : Chistyakov, Yu. A.

Title : The sizes of manufactured bits must be adjusted to the new standard casings

Periodical : Neft. khoz. v. 33, #6, 21, Je 1955

Abstract : In the Ukhta Kombinat, the bits sent by the Verkhne-Serginsk plant were found to be too large for the present newly-adopted standard diameter of oil well casings.

Institution : None

Submitted : No date

KOPYLOV, V.Ye.; CHISTYAKOV, Yu.A.

Using drill-pipe lubricant in the diamond drilling of structural-prospecting wells. Izv. vys. ucheb. zav.; neft' i gaz 7 no.9:27-31 '64. (MIRA 17:12)

1. Tyumenskiy industrial'nyy institut i Sverdlovskiy gornyy institut.

S/145/60/000/008/006/008
D211/D304

A 1260

AUTHORS: Verezub, V.N., Candidate of Technical Sciences, Potapenko, A.Ye., Senior Lecturer, and Chistyakov, Ye.S., Engineer

TITLE: An ultrasonic method of forming chip-breakers

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Mashinostroyeniye, no. 8, 1960, 115 - 119

TEXT: Chip-breakers on tools made of ceramics and hard alloys are usually produced by abrasive or electric spark methods. The author recommends the method of ultrasonic vibrations. This method eliminates thermal stresses in the tip, during the formation of the chip-breaker. Experiments were carried out with an installation containing a magnetostriction vibrator which is described. Power was supplied by a УЗГ (UZG) 600 watt generator, with a frequency range of 60 - 30 Kc/s. The required static pressure between the vibrating tool and the tip to be treated (500 - 800 g) was caused by weights. The abrasive was either boron carbide or silicon carbide. Experiments on ЦМ 332 (TsM 332) ceramic and Т15К6 (T15K6) hard alloy

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were carried out in order to investigate the effect of size and shape of the tool and the grain size of the abrasive on the time required to reach certain depths of penetration. The maximum depth of penetration did not exceed 1 mm. Up to 0.6 mm the 'depth of penetration required' relationship was independent of the size and shape of the tools used. The time required to reach a certain depth of penetration was considerably less with the ceramic tip. The operation was slowed down by a factor of 1.6 - 1.8 when silicon carbide was used instead of boron carbide. The minimum working time was obtained by choosing the grain size of the abrasive and the amplitude of vibrations 63 - 85 μ and 25 - 30 μ respectively, at a working frequency of 20 Kc/s. For ceramic and hard alloy materials the productivity was 75 - 90 mm^3/min and 11 - 14 mm^3/min respectively. The author concludes that the ultrasonic method is particularly suitable for hard and brittle materials. It facilitates the formation of chip-breakers of any desired shape having no microscopic cracks on its surface. The surface purity achieved was 7 - 8 class. There are 8 figures.

ASSOCIATION: Khar'kovskiy aviatsionnyy institut (Kharkov Aviation Institute)

SUBMITTED: December 21, 1959

APPROVED FOR RELEASE: 06/12/2000 CIA-RDP86-00513R000308910013-6"

S/762/61/000/000/009/029

AUTHORS: Chistyakov, Ye. P., Bochvar, G.A., Legkodukh, A.M.

TITLE: Determination of the crystallization interval of titanium alloys by means of vacuum etching in a variable temperature field.

SOURCE: Titan v promyshlennosti; sbornik statey. Ed. by S.G. Glazunov Moscow, 1961, 107-111.

TEXT: The paper describes preliminary determinations by the authors, under the guidance of V.I. Dobatkin, of the solidus (S) temperature (T) of a number of Ti alloys by a high-temperature (HT) determination of the microstructure of a polished section in a vacuum. Determination of the liquidus (L) was made by the breaking-off of a drop from the end of the specimen. Binary Ti-Ni alloys (with up to 10% Ni), Ti-Mn alloys (up to 15% Mn) and several industrial Ti alloys were investigated. The tests were performed in a resistance-type TBB-2A (TVV-2A) vacuum furnace which exhibited vertical temperature variations, but only a small sectionwise T gradient. Tests were performed in a portion of the furnace cavity in which the T decreased linearly with height. The specimen was 170 mm long and had an 8-mm square section. One long face was ground to permit structural determination by vacuum etching. One tip was sharpened to a 20-mm long frustum of a cone. This specimen rod was suspended so that the sharpened tip hung down into the max-T zone, whereas the upper end reposed in the less hot upper region of the furnace. Three thermocouples covered the length of the rod. Vacuum: 10^{-4} to 10^{-5} mm Hg. The rod was

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"homogenized" at 1400-1500°C for 30 min, whereupon the furnace T was raised until a drop broke off the bottom cone (end of test). The T reading of the bottom thermocouple was taken to be the L T, an approximation which failed to take the surface tension into account and did not eliminate the possibility that a break-off of the drop at T's somewhat below the L T could occur in alloys that crystallize over a broad T interval. 70- to 100-x microscopic study of the cooled specimen, after vacuum etching, permitted determination of the S boundary from the inception of the grain-boundary disintegration or the appearance of the liquid phase within the grains. The distance between the S boundary on the specimen and the break-off point of the drop, plotted on the vertical T distribution in the furnace as obtained from the 3 sets of thermocouples on the rod, yielded the T at which the liquid phase first appears, i.e., the S T. Microstructural photographs of the various regions of a rod are shown. Test data obtained on systematic series of the above-cited Ti-Ni and Ti-Mn alloys are plotted versus %Ni and %Mn. The resulting curves are lower than those of H. Margolin and D.J.Maykuth (J. of Met., v.5, no.2, 1953) obtained in the graphite crucible which were less accurate in the determination of the appearance of the liquid phase and more susceptible to errors due to undesirable impurities. Similar S and L T determinations were performed and are tabulated for the alloys OT4, BT3-1 (VT3-1), BT5-1 (VT5-1), and BT6 (VT6). There are 4 figures, 1 (unnumbered) table, and the 1 English-language U.S. reference cited above.

ASSOCIATION: None given.

CHISTYAKOV, YU. D. (Чистяков Ю.Д.)

USSR/ Chemistry - Physical chemistry

Card 1/1 Pub. 22 - 38/56

Authors : Mal'tsev, M. V.; Chistyakov, Yu. D.; Tsypin, M. I.

Title : Structure of oxide films on liquid aluminum and its alloys

Periodical : Dok. AN SSSR 99/5, 813-814, Dec 11, 1954

Abstract : The structure of oxide films forming at different temperatures on melted Al, its binary Al - Mg, Al - Cu, Al - Zn, Al - Fe alloys and certain more complex industrial alloys, e.g., AMg, AMg5, AMg7, AMz, duralumin and certain cast alloys, was investigated. Results show that an oxide film formed on pure Al at a temperature of 690 - 700° has an amorphous structure; at 700 - 710° the amorphous state changes into crystalline. The oxide film, formed on the surface of melted binary Al-alloys, was found to consist of pure gamma-Al_2O_3. The tendency of oxide layers to form thin Al-dendrites, with a specific orientation, is explained by the crystallo-chemical and the dimensional characteristics of the crystalline lattice of the Al and its oxide. Five references: 3-USSR and 2-USA (1934-1953). Illustrations.

Institution: The M. I. Kalinin Institute of Non-Ferrous Metals and Gold, Moscow

Presented by: Academician A. A. Bochvar, June 18, 1954

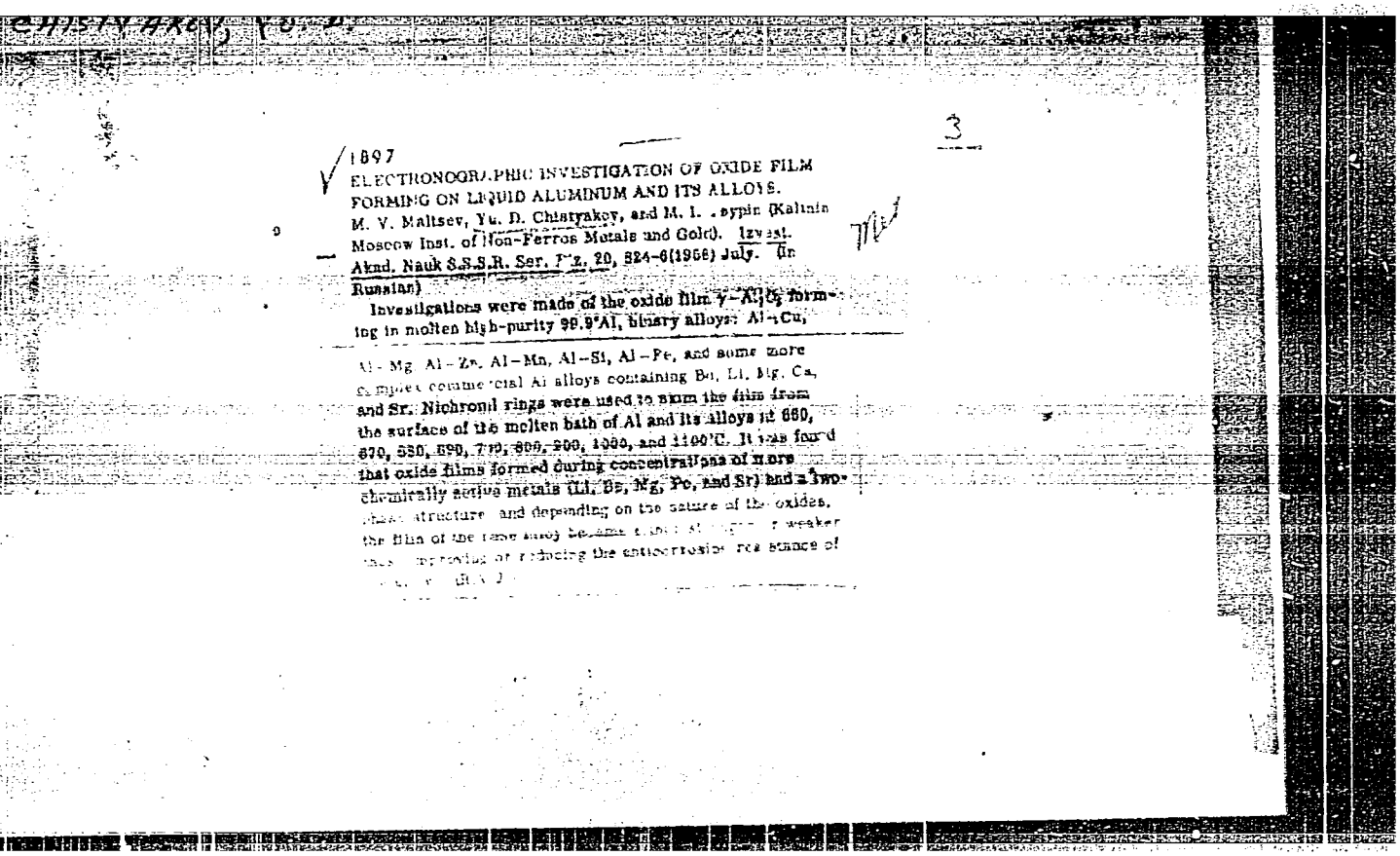
CHISTYAKOV, Yu.D.

Laboratory machine for semicontinuous ingot casting. Issl. splav. tsvet. met. no.1:126-129 '55. (MLRA 9:10)

(Metallurgical laboratories--Equipment and supplies)
(Die casting)

"Investigation of the Dependence of the Microhardness of Solid Solutions of Aluminum Copper Alloys [illegible] A. [illegible] Akad. Nauk S.S.S.R., 1955, [illegible] (In Russian). Data for the solid [illegible] microhardness data agree very well with [illegible] from X-ray analysis. At 20° C., after passing through the line of limiting solubility, the microhardness remains const. up to ~2% Cu. This plateau [illegible] const. microhardness) moves to the right with temp. increase, as does the curve for limiting solubility. The constancy of the size of the plateau for varying temp. shows that an equal amount of the second component is always necessary for the formation of the initial network of the second phase throughout the solid. The increase of microhardness of solid soln. crystals follows the concentration of [illegible]

[illegible] microhardness [illegible] shown to have a more complicated structure [illegible] owing to the presence of a [illegible]



1897

ELECTRONOGRAPHIC INVESTIGATION OF OXIDE FILM FORMING ON LIQUID ALUMINUM AND ITS ALLOYS.

M. V. Maltsev, Yu. D. Chistyakov, and M. I. Lypin (Kalinin Moscow Inst. of Non-Ferrous Metals and Gold). Izvest. Akad. Nauk S.S.S.R. Ser. Fiz. 20, 824-6(1956) July. (In Russian)

Investigations were made of the oxide film γ-Al_2O_3 forming in molten high-purity 99.9%Al, binary alloys: Al-Cu, Al-Mg, Al-Zn, Al-Mn, Al-Si, Al-Fe, and some more complex commercial Al alloys containing Be, Li, Mg, Ca, and Sr. Nichromil rings were used to skim the film from the surface of the molten bath of Al and its alloys at 660, 670, 680, 690, 700, 800, 900, 1000, and 1100°C. It was found that oxide films formed during concentrations of more chemically active metals (Li, Be, Mg, Fe, and Sr) and a two-phase structure and depending on the nature of the oxides, the films of the same alloy become [illegible] weaker [illegible] impeding or reducing the anticorrosion resistance of [illegible]

CHISTYAKOV, Yu.D.; GOLUBTSOV, I.V.; PRISELKOV, Yu.A.

Meter for recording torsional and oscillatory movements of a viscosimeter pendulum. Zav.lab.22 no.7:876-877 '56. (MLRA 9:12)

1. Moskovskiy institut tsvetnykh metallov i zolota imeni M.I.Kalinina.
(Viscosimeter) (Recording instruments)

CHISTYAKOV, Yu. D.

PHASE I BOOK EXPLOITATION SOV/3602

Akademiya nauk SSSR. Institut metallurgii

Issledovaniye splavov tsvetnykh metallov; sbornik 2 (Analysis of Nonferrous Metal Alloys; Collection of Articles, [No.] 2) Moscow, Izd-vo AN SSSR, 1960. 204 p. Errata slip inserted. 2,800 copies printed.

Ed.: I.A. Oding, Corresponding Member, USSR Academy of Sciences; Ed. of Publishing House: V.S. Rzhevnikov; Tech. Ed.: T.P. Polenova; Editorial Board: A.A. Bochvar, Academician; M.Ye. Drits, Candidate of Technical Sciences (Deputy Resp. Ed.); M.V. Zakharov, Professor, Doctor of Technical Sciences; E.S. Kadaner, Candidate of Technical Sciences (Resp. Secretary); A.M. Korol'kov, Doctor of Technical Sciences; M.V. Mal'tsev Professor, Doctor of Technical Sciences; and Z.A. Sviderskaya, Candidate of Technical Sciences.

PURPOSE: This collection of articles is intended for workers in scientific research institutes, metal and machine works, for teaching personnel, and for students attending schools of higher education.

COVERAGE: This is the second volume in a series of works on nonferrous and [illegible] metal alloys prepared by the Institut metallurgii imeni A.A. Baykova AN SSSR (Institute of Metallurgy imeni A.A. Baykov of the Academy of Sciences USSR), and the Moskovskiy institut tsvetnykh metallov i zolota imeni M.I. Kalinina (Moscow Institute of Nonferrous Metals and Gold imeni M.I. Kalinin). The problems discussed concern the casting and physical metallurgy of nonferrous alloys. The effect of alloying and deformation on the properties of various alloys, and the problems connected with the study of the casting properties and with the plotting of phase diagrams for nonferrous alloys are discussed. No personalities are mentioned. References accompany most of the articles.

CHISTYAKOV, Yu. D. and SAMSONOV, G. V.

"Metal-Reduction ('Metallothermic') Methods in Chemistry and Technology," by G. V. Samsonov and Yu. D. Chistyakov, Uspekhi Khimii, Vol 25, No 10, Oct 56, pp 1223-1248

Work on the reduction of metals and some nonmetals (Si) with metals is reviewed. Reference is made to the use of metal hydrides as reducing agents in processes of this type. The physicochemical aspects of the processes involved are discussed in detail. The heats of formation of some oxides and halides (including $CdCl_2$, $ZrCl_4$, UCL_4, $RaCl_2$, LiCl, CeF_3, LaF_3, and LiF) are listed. The free energies of formation of halides including CeF_3, ThF_4, Zr F_4, Ce Cl_3, Th Cl_4, and Zr Cl_4 are given. Practically applied reduction processes are listed under the subdivisions of processes conducted in vacuum, processes carried out under atmospheric pressure, and processes conducted in an atmosphere of inert gases or reducing gases. The authors say that methods of this type are extensively used at present for the production of pure metals, primarily Ba, Cr, Mn, and some light and rare metals (e.g.. Li, Be, Ti, Zr, and Va).

The following processes are described, among others: production of lithium by the reduction of lithium oxide or of spodumene in vacuum with Al, Si, or Mg; production of Be by reduction of BeF_2 in vacuum with Ca or Mg; production of Ti, Zr, Ta, and other metals by the reduction of their halides with Mg or Na; and production of Zr, Ti, and Ta by the reduction of their complex fluorides. The use of oxidizing agents to raise the temperature during the process is mentioned and the properties of some oxidizing agents including $Ba(NO_3)_2$, $Sr(NO_3)_2$, KNO_3, $NaNo_3$, $KClO_3$, $Ba(ClO_3)_2$, $KClO_4$, BaO_2, Na_2O_2, $CaSO_4$, and Na_2SO_4 are discussed from this standpoint. In conclusion the application of metal-reduction processes in pyrotechnics, specifically in military pyrotechnics, is discussed on the basis of information given in two USSR handbooks on the subject.

The section on pyrotechnics includes the following passage:

"Among metals which can be potentially applied as metal fuels one may mention Be, Al, B, Li, Mg, Ca, Si, Ti, V, Zr, and their alloys. The highest temperatures during combustion must be developed by Zr, Al, Ca, and Mg. At present, no metals except Mg, Al, and their alloys are applied for this purpose, although some metals which are extensively used in contemporary metallurgy would be suitable for this application either in the pure state or in the form of their alloys.

"To obtain the maximum effect from a metal entering into the composition of a pyrotechnic mixture, the oxidant must be appropriately selected.

"While in the metal-reduction processes described above the oxide of the metal being reduced functions as the oxidant, oxidants in pyrotechnics are selected on the following basis: (a) the oxidant must contain the maximum quantityof oxygen and furnish it readily during the combustion of the mixture, and (b) the oxidant must represent a relatively stable, nonhygroscopic compound, at least in the temperature range minus 60° – plus 60°."

The subject matter of the article is based to a considerable extent on data taken from USSR publications: out of 45 references in the bibliography, 26 are USSR.

[Comment: Some of the information given in this article has a bearing on the production of materials that are of importance in nuclear technology (e.g., U, Th, Li, Cd, Be, Zr). The discussion of the properties of metal fuels used in pyrotechnics is of importance from the standpoint of the potential use of such fuels as propellants in reaction motors.]

Sum 1274

AUTHORS: Chistyakov, Yu.D. and Mal'tsev, M.V. 70-5-10/31

TITLE: An Electronographic Investigation of the Processes of Oxidation of Aluminium Alloys (Elektronograficheskoye izucheniye protsessov okisleniya alyuminiyevykh splavov)

PERIODICAL: Kristallografiya, 1957, Vol.2, No.5, pp. 628-633 (USSR).

ABSTRACT: The rate of oxidation of aluminium alloys depends greatly on the nature of the alloying elements. It has been found by electronographic analysis of solid and liquid alloys that 4 groups are sufficient to characterise the processes. The classification depends on the Mg content: - (I) Containing no Mg. Oxide film on the liquid metal contains only Al_2O_3 (gamma alumina. (II) Containing 0.01 to 0.05 % Mg. Oxide film consists of a mixture of gamma alumina and $MgO.Al_2O_3$. (III) Containing 0.05 to 1.5% Mg - most industrial alloys - the surface film consists of a mixture of MgO and $MgO.Al_2O_3$. (IV) Containing more than 1.5% Mg (certain duralumins, magnaliums, etc.) Oxide layer consists of MgO. A graph shows the relationship between the rate of oxidation and the Mg content for Al-Mg alloys at 500 °. The rate of oxidation, very low for pure Al, increases very rapidly with Mg content.

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70-5-10/31

A Electronographic Investigation of the Processes of Oxidation of Aluminium Alloys.

The effect of the addition of certain more active metals has been tried. These elements are characterised by high heats of formation of their oxides and low vapour pressures of the metals. Be was the most effective additive found and Ca, Li and Sr were somewhat less efficient. For an alloy of Al + + 5.0% Mg + 0.05% Be the oxide layer was heterogeneous and consisted of a mixture of MgO and BeO but for the surface of the liquid alloy Al + 5.0% Mg + 0.5% Be the oxide layer was entirely BeO. The rate of oxidation of alloys containing various quantities of Mg plus about 0.5% BeO was compared with the previous set of measurements for the same alloys without Be. The rates in this case were 50-100 times less. One of the conditions for rapid oxide production appears to be the capability of forming a spinel-type of compounds ($MeO.Al_2O_3$) at small concentrations of Me in the alloy. There are 8 figures and 10 references, 8 of which are Slavic.

ASSOCIATION: M.I. Kalinin Institute of Non-ferrous Metals and Gold, Moscow. (Moskovskiy Institut tsvetnykh metallov i zolota im. M.I. Kalinina)

Card 2/3

2/2

SOV/137-58-10-20782

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 10, p 62 (USSR)

AUTHORS: Chistyakov, Yu.D., Mal'tsev, M.V.

TITLE: Some Steps to be Taken in Combatting Contamination of Aluminum Alloys by Oxide Inclusions (O nekotorykh merakh bor'by s zagryazneniyem alyuminiyevykh splavov okisnymi vklyucheniyami)

PERIODICAL: V sb.: Legkiye splavy. Nr 1. Moscow, 1958, pp 289-297

ABSTRACT: The contamination of metal by oxide inclusions is affected by the methods employed for melting and refining (flux treatment, blowing with reductant or inert gas, etc.) and the methods of protecting the metal from oxidation during standing periods and subsequent pourings. Oxide films formed on the surface of molten metal protect it from further oxidation. Contamination of the metal with oxide inclusions depends upon the nature of this film and its properties. For Al-Mg alloys, films consisting of Mg oxide in conjunction with Be, Ca, or Li oxide provide the best protective properties. In alloys of elevated Mg contents (D16, AMr, AL8, etc.), the addition of slight amounts of Be (0.0005-0.005%) results in elimination of blackness in the

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Some Steps to be Taken in Combatting Contamination of Aluminum (cont.)

castings and improvement of surface quality. Such films also have a favorable influence upon the quality of the surfaces of the ingots and the finished products in subsequent heatings for purposes of heat treatment, prior to rolling, forging, etc. For example, sheets of Al alloy with 7-8% Mg, containing 0.0005-0.005% Be as an addition, retain a bright surface when heated for 50-60 hours at 500°, while under the same conditions sheets of alloy to which no additions have been made become covered with a thick dark tarnish even after a short period of heating.

G.N.

1. Aluminum alloys--Impurities 2. Aluminum alloys--Oxidation 3. Oxide films --Metallurgical effects 4. Oxides--Metallurgical effects

Card 2/2

AUTHOR: Chistyakov, Yu.D. 26-58-2-15/48

TITLE: Pure Metals and Semiconductor Materials (Chistyye metally i poluprovodnikovyye materialy)

PERIODICAL: Priroda, 1958, Nr 2, p 70 (USSR)

ABSTRACT: In October 1957, the Moscow Institute for Non-Ferrous Metals and Gold imeni M.I. Kalinin held the first Inter-vuz Conference on Pure Metals, Metallic Compounds and Semiconductor Materials. A total of 360 delegates took part in the conference and 35 reports were read. Professor N.N. Murach read a paper on "The Problems of Obtaining Pure Metals and Their Economic Importance". Other problems dealt with were: future development of the chemistry and metallurgy of pure metals and semiconductors; methods of obtaining halogenides of various metals and their use in the extraction of superpure materials - silicon, hafnium, chromium, molybdenum, aluminum, etc.; methods of separating the compounds of metals and their purification; obtaining very pure metals by electrolysis of their compounds.

Card 1/2 Moscow Inst. Non-Ferrous Metals and Gold im M. I. Kalinin

SOV/24-58-7-30/36

AUTHORS: Glazov, V.M. and Chistyakov, Yu.D. (Moscow)

TITLE: Temperature Dependence of the Viscosity of Aluminium (O temperaturnoy zavisimosti vyazkosti alyuminiya)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, 1958, Nr 7, pp 141 - 143 (USSR)

ABSTRACT: Published results on the temperature-dependence of the viscosity of aluminium are both qualitatively and quantitatively divergent (Refs 1-5). Nevertheless, some interesting features have been reported (Refs 2,3), suggesting transformations in the liquid metal. The best results (Ref 4) relate to temperatures too far apart for this to be checked: this was the object of the investigation by the present authors. Two previously described (Refs 6,7) types of viscosimeters (cylinders in graphite crucibles) were used. In one, grade AV000 aluminium (99.996% Al) was tested in an atmosphere of purified argon; in the other grade AV0000 (99.998% Al) in a vacuum of 10^{-4} mm Hg. Density determinations were also made by a method described by Chistyakov (Dissertation, Moskovskiy institut tsvetnykh metallov i zolota -

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Temperature Dependence of the Viscosity of Aluminium

Moscow Institute of Non-ferrous Metals and Gold, 1956). Figure 1 shows kinematic viscosity (centistokes), density (g/cm^3) absolute viscosity (centipoise), as functions of temperature for 650-950 °C; the curves are smoothly descending. Figure 2 shows that there is a linear relation between the logarithm of absolute viscosity and the inverse of the absolute temperature. A linear relation was also found between fluidity and density (Figure 3), in accordance with A.I.Bachinskiy's equation. Values of the free energy of activation of viscous flow of aluminium calculated from Eyring's equation (Ref. 3) were linearly related (Figure 4) to temperature (°C). The above results all indicate the absence of polymorphic changes in liquid aluminium and of any substantial structural changes in the pre-crystallisation period. The authors conclude that previous

Temperature Dependence of the Viscosity of Aluminium

evidence for such changes (Ref 3) is due to experimental errors arising from the use of a coaxial type of apparatus for aluminium which easily form an oxidised surface. There are 4 figures and 9 references, 6 of which are Soviet, 2 English and 1 German.

SUBMITTED: February 25, 1958

81494

SOV/137-59-5-10187

18.1210

Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 5, p 105 (USSR)

AUTHORS: Mal'tsev, M.V., Chistyakov, Yu.D., Rogel'berg, L.N.

TITLE: A Method of Obtaining Finer Grains in Aluminum Alloy Ingots

PERIODICAL: Sb. nauchn. tr. Nauchno-tekhn. o-vo, tsvetn. metallurgii, Mosk. in-t tsvetn. met. i zolota, 1958, Nr 29, pp 54 - 71

ABSTRACT: To obtain finer grains and to increase the technological and mechanical properties of ingots produced by semi-continuous casting, modificators, such as Ti, Zr, V, Ta, Nb, Cr, Mo, W and B, were introduced into commercial Al-basis alloys (AMts, D16, AM10). The investigations were carried out under laboratory and industrial conditions. Admixtures were added in the form of binary Al alloys (with a content of the given element in the alloy as high as 3 - 6%) in amounts of 0.005, 0.01, 0.05, 0.1 and 0.2%. Laboratory experiments showed that the admixtures of Ta, B, Ti and Zr were most effective for AMts alloys; Ta, Ti, B, V and Mo for D16 alloys, and Ti, V, B for AM10 alloys. AMts and D16 alloys were investigated under industrial conditions. After modification the

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SOV/137-59-5-10187

A Method of Obtaining Finer Grains in Aluminum Alloy Ingots

alloys were cast by the semicontinuous method into ingots of 170 and 410 mm diameter. It was established that considerably improved technological characteristics were observed in the modifications, together with much finer grains and improved mechanical properties. The proneness of the alloys to crack formation during the casting process was sharply reduced; segregational phenomena diminished; deformability improved, and the proneness to crack formation in rolling, forging and stamping was reduced. When casting the non-modified D16 alloy at a speed of 35 - 44 mm/min, 30 and 100% respectively of the ingots of 410 mm diameter showed deep surface cracks. On the other hand, modified ingots had no cracks, even at a casting speed of 50 mm/min. The introduction of modificators will increase the casting speed by 40 - 50% over the existing speeds.

N.N.

Card 2/2

Chistyakov, Yu.D.

S/070/60/005/03/002/008
E132/E360

AUTHORS: Cruceanu, Ye. and Chistyakov, Yu.D.

TITLE: Certain Peculiarities of the Structure of Crystals of Zinc Selenide

PERIODICAL: Kristallografiya, 1960, Vol. 5, No. 3, pp 364-368

TEXT: ZnSe was obtained by heating the elements in an evacuated quartz ampule at 1380 °C. Single crystals of this material were obtained by growth from the vapour phase in a current of hydrogen. X-ray photographs showed that they had the wurtzite structure. Growth defects were found leading to the local appearance of the sphalerite-type cubic structure. The ZnSe obtained by reacting the spectroscopically pure elements (Se 99.992% and Zn 99.9996%) nevertheless showed a red fluorescence in UV light (3650 Å). The powder initially obtained was heated at 950 °C in a current of H_2 (4 litres/h) and condensed in a cooler part of the muffle tube. This purified material did not fluoresce. To grow crystals the method of Reynolds and Czizek was used. This had been applied by Hamilton (Brit. J. App.Phys., 1958, Vol. 9, No. 3) for growing ZnS, CdS and HgS. The use of H_2Se as a transporting gas was

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S/070/60/005/03/002/008
E132/E360

Certain Peculiarities of the Structure of Crystals of Zinc Selenide

precluded by its toxicity and H_2 was again used as a growing medium. The evaporating region was at 1 100°, the crystallising region at 930° with a temperature gradient of 17 °/cm. In one run about 20 small crystals were obtained. Some were in the form of hexagonal prisms or pyramids with more or less good faces. The remainder of the material grew as dendrites of lengths 5-6 mm and very small cross-section. Both Laue and Debye X-ray diffraction photographs were taken using an URS-70-type apparatus. Cu radiation filtered through Ni foil was used. No difference between the purified and the unpurified ZnSe was found in powder photographs. Lines corresponding to the sphalerite-type structure were sharp and those corresponding to the wurtzite type were very weak. Some lines overlap, for example 111 and 0002 . The cell size of the hexagonal modification was found to be $a = 3.98$ and $c = 6.55$ Å . For the cubic form a was found to be 5.67 Å. Single-crystal pictures were obtained with W-radiation in a KRON-2 camera. In a Laue photograph taken with the beam along the [0001] axis there were some spots which did not conform to the hexagonal symmetry.

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S/070/60/005/03/002/008
E132/E360

Certain Peculiarities of the Structure of Crystals of Zinc Selenide

The hexagonal structure of ZnSe has not been definitely established before. The tendency to a disordered, mixed hexagonal and cubic structure seems quite strong. The cubic regions seem to exist as terraces on the basal planes of the hexagonal form. This dimorphism is common in the other compounds (Zn, Cd)(S, Se, Te). The particular structure which results depends on the method of preparation and on the temperature. Others (Hamilton, loc, cit) applied the reaction $(Na_2SO_3)_2Se + ZnSO_4 + H_2O = ZnSe + 2NaHSO_4 + Na_2SO_3$ in an acid medium in which the ZnSe was precipitated in the cubic form. The purity may also influence the relative stability of the forms. Acknowledgments to Academician N.V. Belov. There are 2 figures and 18 references: 3 Soviet, 2 international, 1 Swiss, 3 German, 1 Spanish and 8 English.

ASSOCIATION: Krasnoyarskiy institut tsvetnykh metallov im. M.I. Kalinina (Krasnoyarsk Institute for Nonferrous Metals im. M.I. Kalinin)

SUBMITTED: November 24, 1959

Card 3/3

S/081/62/000/009/003/075
B177/B138

AUTHORS: Chistyakov, Yu. D., Krucheanu, Ye.

TITLE: The crystal structure of zinc telluride

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 9, 1962, 29, abstract 9B175 (Rev. phys. Acad. RPR, v. 6, no. 2, 1961, 211-217)

TEXT: Monocrystals of ZnTe (I) were synthesized and subjected to X-ray investigation (powder, Laue and rotation methods, λ Cu). The specimen used was the powder I, obtained either by pulverizing the direct product of the synthesis or hexagonal crystals grown from the gaseous phase. In the former case, calculation of the Debyegrams showed that the structure of I belongs to the sphalerite type with a lattice parameter of 6.089 Å. In the latter case weak reflections from the hexagonal phase were detected on the Debyegrams, having a lattice of the würtzite type and periods: a=4.27, c=6.99 Å. It was thus established that I is characterized by dimorphism. Consequently this compound does not form an exception to the

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B177/B138

The crystal structure of zinc telluride

general series of compounds of the type $A^{II}B^{VI}$. The reason for the presence of only very weak hexagonal type reflections on the Debyegrams is that pulverization of crystals of the hexagonal modification of I converts them to the cubic modification (by analogy with ZnS). It is suggested that the formation of a particular modification is determined by the method used for obtaining the crystals, in particular by the temperature at which the process occurs, and also by the purity of the constituent elements. [Abstracter's note: Complete translation.]

Card 2/2

also 1583

22792
S/070/61/006/003/003/009
E021/E435

24,7100 (1160, 1136, 1142)

AUTHORS: Zelikman, A.N., Chistyakov, Yu.D., Indenbaum, G.V. and Kreyn, O.Ye.

TITLE: Study of the crystal structure of molybdenum disulphide prepared by different methods

PERIODICAL: Kristallografiya, 1961, Vol.6, No.3, pp.389-394

TEXT: The crystal structure of powdered MoS_2 prepared by five different methods has been investigated by X-ray analysis. Sample one was formed by the interaction of molybdenum trioxide with sulphur in fused soda; sample two by the interaction of calcium molybdenate with sulphur in fused soda; sample three by the interaction of molybdenum pentachloride with hydrogen sulphide; sample four by the interaction of molybdenum trioxide with sulphur vapour and sample five by the interaction of molybdenum with sulphur vapour. Further samples were also tested - sample six obtained by the thermal dissociation of molybdenum trisulphide and sample seven obtained by the interaction of molybdenum and sulphur and hot-pressed at 1200 to 1300°C. The X-ray photographs of these samples show that the structure of all the synthetic samples is a

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S/070/61/006/003/003/009
E021/E435

Study of the crystal ...

new type different from both hexagonal α-MoS_2 and rhombohedral β-MoS_2. Fig.3 is a comparison of the results of X-ray studies for the three types of structure (a - α-MoS_2, б - β-MoS_2, в and г new structural type). Since the interplanar distance is the same in going from one form to another, it can be assumed that the layered lattice and the disposition of the sulphur atoms around the molybdenum is retained. It is proposed that the new form is hexagonal with c greater than in the lattice of β-MoS_2. Changes can be seen in the new structure depending on its method of preparation. This is explained by statistical interchanging of hexagonal and rhombohedral packing. The lubricating properties of the artificial MoS_2 are not different from those of natural MoS_2. There are 3 figures, 1 table and 11 references: 2 Soviet-bloc and 9 non-Soviet-bloc. The two references to English language publications read as follows: S.S.Berzelius. Pogg. Ann., 7, 261, 1826; R.E.Bell, R.Herfert, J.Amer.Chem.Soc., 19, 13, 3351, 1957.

ASSOCIATION: Krasnoyarskiy institut tsvetnykh metallov im.M.I.Kalinina
(Krasnoyarsk Institute of Non-Ferrous Metals imeni M.I.Kalinina)

SUBMITTED: September 5, 1960

Card 2/4

32655
S/126/61/012/005/014/028
E073/E535

18.9500

AUTHORS: Indenbaum, G V., Novikov, I.I. and Chistyakov, Yu.D.

TITLE: Recrystallization and polygonization during annealing of dendritic single crystals of pure aluminium

PERIODICAL: Fizika metallov i metallovedeniye, v.12, no.5, 1961, 728-731

TEXT: In the case of dendritic recrystallization, single crystals with an imperfect structure are produced. The branches of the growing dendrite are very fine and can easily be deformed and, therefore, the individual areas of the single crystal are considerably disoriented relative to each other. Also the content of soluble admixtures is lower in the axes than in the spaces between the axes of the dendrites even in the case of pure aluminium. The authors studied the processes taking place during annealing of dendritic single crystals of 99.994 wt.% purity aluminium by means of microscopic investigation of the etch patterns. The dendritic structure was produced by heating the single crystals to 2-3°C above the melting point, followed by cooling with the furnace, during which the temperature gradient

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Recrystallization and ... S/126/61/012/005/014/028
E073/E535

along the specimens did not exceed 1°C. The specimens were on a flat base and during the heating above the fusion point and after recrystallization their surface remained almost entirely planar. The etch patterns revealed that annealing of dendritic single crystals of aluminium of 99.994 wt.% purity at 500°C produced seedless recrystallization (recrystallization in situ), in addition to equalizing diffusion. At 600°C polygonization was observed in the "recrystallized" dendritic single crystals. The distribution and the magnitude of the etch patterns enable estimating the relative speeds of the two processes which occur simultaneously during annealing, namely, polygonization and equalizing diffusion. There are 6 figures and 4 references: 1 Soviet-bloc and 3 non-Soviet-bloc. The English-language references read as follows: Ref.3: Lacombe P., Beauiard L.J.Inst. Metals, 1948, 74, 1; Ref.4: Guinier A., Tennevin J.Progr.Metal Physics, 1950, 2.

ASSOCIATION: Krasnoyarskiy institut tsvetnykh metallov im. M. I. Kalinina
(Krasnoyarsk Institute of Non-Ferrous Metals imeni M.I.Kalinin)

Card 2/2

SUBMITTED: May 10, 1961

INDENBAUM, G.V.; TIRASPOL'SKIY, V.I.; CHISTYAKOV, Yu.D.

Distribution of etch figures in single pure aluminum crystals (99.994 weight %) following their fusion. Fiz. met. i metalloved. 12 no.5:759-761 N '61. (MIRA 14:12)

1. Krasnoyarskiy institut tsvetnykh metallov.
(Aluminum crystals)
(Metallography)

S/032/63/029/002/013/028
B101/B186

AUTHORS: Indenbaum, G. V., and Chistyakov, Yu. D.

TITLE: Cutting of aluminum single-crystals without deformation

PERIODICAL: Zavodskaya laboratoriya, v. 29, no. 2, 1963, 189-193

TEXT: The cutting of aluminum single crystals by chemical etching with HF and with the aid of a reciprocating "Ftorlon" (fluoro ethylene) twisted thread, 0.12 - 0.17 mm thick, is described. The mechanism for the thread motion was designed according to R. W. Armstrong, R. A. Rapp (Rev. Sci. Instrum., 29, no. 5, 433 (1958)). Depending on the composition of the etching agent the thread was usable for 1.5 - 3 hrs. Dissolution proceeded very slowly in 40% HF and produced a rough surface. A smooth surface and faster cutting were obtained with 60 ml concentrated HF + 0.5ml concentrated HCl + 1.6 g $FeCl_3 \cdot 6H_2O$. The surface was not deformed. After additional electropolishing the crystal substructure could be studied metallographically and by x-ray analysis. Deficiencies of the apparatus led to a lateral shift of the thread, thus slightly corrugating the surface. To obtain plane surfaces, single crystals were cut mechanically

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Cutting of aluminum single-crystals ...

by 0.5 mm thick corundum disks on a soft vulcanite base. The disk diameter was 100-125 mm, the speed of rotation 6500 rpm, the feed 1100, 272, 58, or 17 μ/min. At 1100 and 272 μ/min, a polycrystalline layer was formed which was only 50-60 μ thick at a feed rate of 272 μ/min and which could be removed by electropolishing. The apparatus described permits of cutting platelets only 1 mm thick and, with the aid of two corundum disks, plane-parallel platelets as thin as 2 mm. There are 4 figures and 1 table.

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

INDENBAUM, G.V.; CHISTYAKOV, Yu.D.

Cutting aluminum single crystals without deformation. Zav.lab. 29 no.2:189-193 '63. (MIRA 16:5)

1. Institut stali i splavov.
(Aluminum crystals) (Nondestructive testing)

PALATNIK, Lev Samoylovich; PAPIROV, Igor' Isaakovich; LEMMLEYN, G.G., prof., retsenzent; CHERNOV, A.A., kand. fiz.-mat. nauk, retsenzent; MAL'TSEV, M.V., prof., retsenzent; CHISTYAKOV, Yu.D., dots., kand. tekhn. nauk, nauchn.red.

[Oriented crystallization] Orientirovannaia kristallizatsiia. Moskva, Metallurgiia, 1964. 407 p. (MIRA 17:12)

L 13742-65 EWT(m)/EPF(n)-2/EWP(t)/EWP(b) Pu-4 JD/JG
ACCESSION NR: AP4047496 S/0149/64/000/004/0147/0149

AUTHOR: Pekarev, A. I.; Chistyakov, Yu. D. 8

TITLE: Attachment to a metal microscope for direct observation of the process of electrical polishing and etching of microsections 14

SOURCE: IVUZ. Tsvetnaya metallurgiya, no. 4, 1964, 147-149

TOPIC TAGS: metal microscope, electrical polishing, electrical etching, alloy microstructure

ABSTRACT: Several devices and installations exist for electrical polishing and etching of microsections, which help to check and control the amperage, voltage, electrolyte temperature, electrolyte flow rate and other features. The "Elipowist" installation made in East Germany performs electrical polishing and etching of 6 mm diameter microsections under a special metal microscope. The installation facilitates the selection of electrical polishing rates and the exposure of microstructural elements such as the grain boundary, spots, etching, etc. However, this installation is not always available and may be replaced by a standard metal microscope with an attachment designed in the

Card 1/4

authors' laboratory (Fig. 1 of the Enclosure). The metal is observed through a plane-parallel glass plate. The attachment is placed on the specimen table instead of the replaceable metal washer. The MIM-7 and MIM-8 microscopes with 0E-23 and 0E-14 objectives have magnifications from 70 to 270, with the possibility of taking photographs with a magnification of 300. Polarized light may be used for observations. Even greater mangification is possible with the MVT microscope. The attachment was used to examine the microstructure of mono- and polycrystalline tungsten. The electrolyte was a 10% aqueous solution of sodium hydroxide. The attachment may be used for preparing micro-sections and observing the structure of tungsten and molybdenum, and other electrolytes may be used for other metals. Orig. art. has: 3 figures.

ASSOCIATION: Kafedra proizvodstva chisty*kh metallov i poluprovodnikovy*kh materialov, Moskovskiy institut stali i splavov (Department for the Production of Pure Metals and Semiconductor Materials, Moscow Institute of Steel and Alloys)

L 13742-65
ACCESSION NR: AP4047496

SUBMITTED: 10Oct63 ENCL: 01 SUB CODE: MM

NO REF SOV: 002 OTHER: 001

Card 3/4

L 13742-65
ACCESSION NR: AP4047496

ENCLOSURE: 01

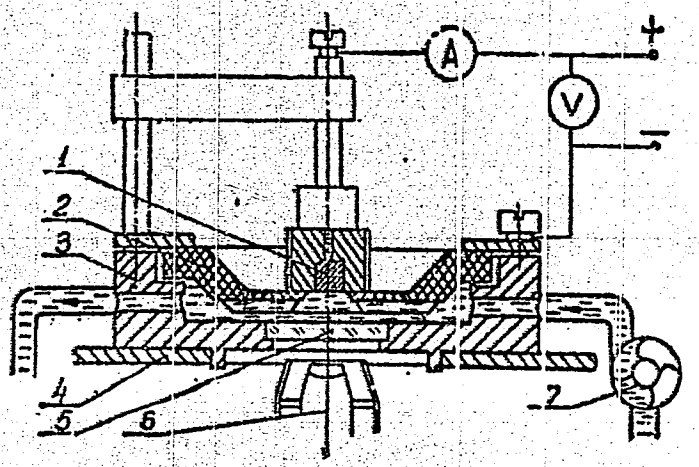

Fig. 1. Attachment to a microscope for electrical polishing and etching of metal microsections (cross section): 1 -- sample; 2 — teflon cover; 3 — chamber; 4 — specimen table; 5 — glass plate; 6 — objective; 7 — pump

Card 4/4

CHISTYAKOV, Yu.D.; LAYNER, B.D.

Oriented growth of crystalline substances (epitaxy). Rost krist. 4:209-221 '64. (MIRA 17:8)

L 00090-66 EWT(m)/T/EWP(t)/EWP(b)/EWA(c) JD

ACCESSION NR: AP5022336 UR/0149/65/000/003/0065/0072
669.28

AUTHOR: Pekarev, A. I.; Chistyakov, Yu. D.; Shchirenko, G. N.

TITLE: Statistical analysis of the direction of preferential growth of single crystals of molybdenum obtained by electron bombardment zone recrystallization without a crucible

SOURCE: IVUZ. Tsvetnaya metallurgiya, no. 3, 1965, 65-72

TOPIC TAGS: single crystal growth, molybdenum, metal zone refining, electron beam melting

ABSTRACT: The starting material was 99.8% pure molybdenum in the form of a forged and polished rod 5 mm in diameter with an overall length of 200 mm. By four passes through the zone, a monocrystal 130 mm long was obtained. The vacuum during zone melting was better than $4 \cdot 10^{-4}$ mm Hg. Final purity of the molybdenum reached 99.96%. The orientation of the single crystals obtained was determined by an X-ray method with an accuracy of ±1C. The most objective criterion of the preferntial direction of growth of the single crystals is the direction or region with a maximum density of orientations. This direction has the

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L 00090-66
ACCESSION NR: AP5022336

coordinates: $\hat{X}$ = 23.6C and $\hat{Y}$ = 1.8C, where the density of the orientations with $\hat{Y}$ = 1.8C considerably exceeds the proportional distribution with respect to the directions of the axes. Consequently, in this case there is obtained a narrow region with a preferential direction of growth located close to the zone with the axis $\{010\}$. To verify the hypothesis of the connection between the preferential direction of growth of the single crystals and the density packed faces, a statistical analysis was made of five regions of a stereographic triangle with the centers (001), (101), (111), (113), and (103). Using the Pearson chi-square compatibility test, it was shown that the region of the direction of preferential growth has the centers (001) and (103). Orig. art. has: 3 figures and 2 tables

ASSOCIATION: Moskovskiy institut stali i splavov. Kafedra proizvodstva chistykh metallov i poluprovodnikovykh materialov (Moscow Steel and Alloy Institute. Department for Production of Pure Metals and Semiconductor Materials) 74,55

SUBMITTED: 04Mar64 ENCL: 00 SUB CODE: MM, SS

NR REF SOV: 006 OTHER: 009

Card 2/2

L 00085-66 EWT(m)/EPF(c)/EWP(v)/T/EWP(t)/EWP(k)/EWP(b)/EWA(c) JD/HM/WB

ACCESSION NR: AP5022341 UR/0149/65/000/003/0127/0130
669.718

AUTHOR: Chistyakov, Yu. D.; Mendelevich, A. Yu.

TITLE: Mechanism of the disintegration of the oxide film on aluminum during high temperature oxidation

SOURCE: IVUZ. Tsvetnaya metallurgiya, no. 3, 1965, 127-130

TOPIC TAGS: aluminum oxide, oxide formation, high temperature oxidation, crystal structure, chemical decomposition

ABSTRACT: Test samples were of polycrystalline AV000 (99.996% pure) aluminum 7x5x25 mm, deformed and annealed (at 630±5C for five hours), and castings cut from an ingot. In addition, monocrystalline samples with dimensions of 8x10x20 mm were cut from zone refined aluminum. After preliminary preparation of the surface, all the samples were annealed at 630±3C for three hours in a vacuum of 10^{-5} mm Hg. The surface of the samples was further prepared by electropolishing. After preliminary annealing, all samples were cleansed in a 20% solution of sodium hydroxide and were again electropolished to eliminate the

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L 00085-66

ACCESSION NR: AP5022341

oxide film. Oxidation was done in a tubular electric resistance furnace, in an air atmosphere at normal pressure and in an atmosphere of dry oxygen. Oxidation temperatures were 470, 550, 600, and 640 C and oxidation times were 0.5, 1, 4, and 8 hours. Results of oxidation were observed with a MIM-7 metallographic microscope and with an electron microscope. Determination of the crystallographic orientation of the surface of the samples was done by the method of selective etching. The mechanism of the regular disintegration of the oxide film on aluminum is closely bound up with its oriented growth on the surface of the grains of metal. The process of orientated growth starts with the transition of the oxide film from an amorphous to a crystalline state - the gamma oxide, which takes place at the metal-oxide boundary at a temperature above 550C. The moving force of the process of epitaxis is the energy field of the crystal lattice of the metal and the diffusion of hydrogen atoms from the metal into the oxide film, without which the metastable gamma phase of aluminum could not exist. The high corrosion resistance of aluminum cannot be attributed to the close agreement between the structure of the metal and that of the gamma oxide. The high protective properties below 550C are due only to the oxide film which is in an amorphous state. The regular disintegration of the oxide film is the reason

Card 2/3

CHISTYAKOV, Yu.D.; MENDELEVICH, A.Yu.

Regularities in the cracking of the oxide film on aluminum in high-temperature oxidation. Izv. vys. ucheb. zav.; tsvet. met. 8 no.3:127-130 '65. (MIRA 18:9)

1. Moskovskiy institut stali i splavov, kafedra proizvodstva chistykh metallov i poluprovodnikovykh materialov.

PEKAREV, A.I.; CHISTYAKOV, Yu.D.; SHCHIRENKO, G.N.

Statistical analysis of the direction of preferred growth of single crystals of molybdenum obtained by electron beam non-crucible zone recrystallization. Izv. vys. uchsb. zav.; tsvet. met. 8 no.3:65-72 '65. (MIRA 18:9)

1. Moskovskiy institut stali i splavov, kafedra proizvodstva chistykh metallov i poluprovodnikovykh materialov.

CHISTYAKOV, Yu.D.; PEKAREV, A.I.

Methods of metallographic study of cast and deformed tungsten; review. Zav. lab. 31 no. 12:1467-1473 '65 (MIRA 19:1)

PEKAREV, A.I.; CHISTYAKOV, Yu.D.

Attachment to a metallomicroscope for the direct observation of the electrolytic polishing and etching of sections. Izv. vys. uchob. zav.; tsvet. met. 7 no. 4:147-149 '64
(MIRA 19:1)

1. Moskovskiy institut stali i splavov, kafedra proizvodstva chistykh metallov i poluprovodnikovykh materialov.

PEKAREV, A.I.; CHISTYAKOV, Yu.D.

Attachment to microscopes for the observation of electropolishing and etching processes. Zav.lab. 31 no.10:1272 '65. (MIRA 19:1)

1. Moskovskiy institut stali i splavov.

L 23529-66 EWP(k)/EWT(d)/EWT(m)/EWP(h)/T/EWA(d)/EWP(l)/EWP(v)/EWP(t) IJP(c) JD/JG

ACC NR: AP6008069 SOURCE CODE: UR/0032/66/032/002/0228/0231

AUTHOR: Pekarev, A. I.; Gartman, M. V.; Chistyakov, Yu. D. 61 B

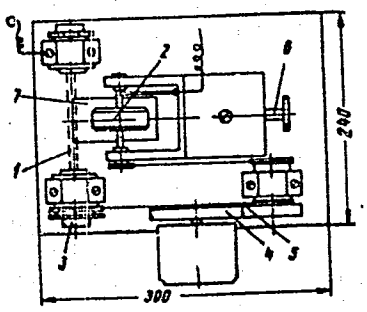
ORG: Moscow Institute of Steel and Alloys (Moskovskiy institut stali i splavov)

TITLE: A method for tensile testing of tungsten and molybdenum single crystals 27 14,55 1,27 18

SOURCE: Zavodskaya laboratoriya, v. 32, no. 2, 1966, 228-231

TOPIC TAGS: tungsten, molybdenum, single crystal, tensile test, finishing machine, metal polishing

ABSTRACT: The authors describe a special machine designed for preparing single crystal specimens to be used in tensile tests (see figure). The process reduces to electrolytic polishing of the rotating single crystal 1 by shaper cathode 2 in the form of a specially shaped polished disc. The cylindrical single crystal is held by two collets 3 and turned at a rate of 20 rpm by an SD-2 motor through a gear box 4 and belt drive 5. Stainless steel disc 2, which rotates at a speed of 15 rpm, is fed 1.0-0.2 mm toward the surface of the single crystal by lead screw 6 in such a way that the electrolyte from container 7 located beneath the disc wets the surface of the single crystal for normal electrolytic polishing.



UDC: 620.172

Card 1/2

L 23529-66

ACC NR: AP6008069

The disc moves closer as electrolytic dissolution proceeds until the test specimen has the proper dimensions. The installation may be used for making tungsten and molybdenum specimens. The electrolyte used for tungsten is a 5% solution of caustic soda, while that used for molybdenum is a 10% solution of sulfuric acid in methyl alcohol. Orig. art. has: 4 figures.

SUB CODE: 11,13/ SUBM DATE: 00/ ORIG REF: 002/ OTH REF: 001

Card 2/2

ACC NR: AP6031521 SOURCE CODE: UR/0292/66/000/009/0014/0017

AUTHOR: Tikhonov, Yu. N. (Engineer); Chistyakov, Yu. D. (Candidate of technical sciences)

ORG: none

TITLE: Silicon auto-epitaxial layers for power semiconductor devices

SOURCE: Elektrotekhnika, no. 9, 1966, 14-17

TOPIC TAGS: semiconductor device, silicon semiconductor, silicon diode

ABSTRACT: A method of depositing and doping auto-epitaxial Si-layers is described; $SiCl_4$ is reduced by hydrogen in the vapor-gas phase (W. G. Pfann, Trans. AIME, 1952, v. 194). A Si backing was placed in a vacuum chamber and heated to 1290C in the H_2 atmosphere to remove traces of oxide film (J. J. Kleimack et al., Bell Lab. Rec., 1962, no. 40). Repeated experiments permitted

Card 1/2

UDC: 621.314.632.4.001.5

ACC NR: AP6031521

finding optimal process parameters: duration of deposition; backing temperature ensuring molar relations $SiCl_4/H_2$, BBr_3/H_2, PCl_3/H_2; rate of gas flow; the best temperature range proved to be 1200—1275C; optimal gas flow, 0.8—1.2 lit/min. The desirable layer thickness was attained by controlling time at a constant deposition rate of 1 μ/min. The layout of the epitaxial-process outfit is shown. Orig. art. has: 2 figures and 10 formulas.

SUB CODE: 09 / SUBM DATE: none / ORIG REF: 001 / OTH REF: 002

Card 2/2

CHISTYAKOV, Yu. N.

"The First Results of Research with the Equipment in Pulkovo for Thermo-Electrical Temperature Measurements of Narrow Strips of the Surface of the Moon."

Report presented at the Plenary Meeting of the Committee of Planetary Physics, Council of Astronomers, Khar'kov, 20-22 May 1958.
(Vest. Ak Nauk SSSR, 1958, No. 8, p. 113-114)

S/751/60/000/002/002/002

AUTHOR: Chistyakov, Yu. N.

TITLE: Experience in determining the temperature of individual parts of the moon's surface.

SOURCE: Akademiya nauk SSSR. Komissiya po fizike planet. Izvestiya. no. 2. 1960. 46 - 54.

TEXT: Preliminary results are reported on the measurements of the temperature of 1.5' by 1.5' areas of some of the moon's surface, obtained with a vacuum thermocouple of 10 V/W sensitivity, placed in the Newtonian focus of the 13" reflector of the Abastumani observatory. The purpose of the investigation was to detect inhomogeneities in the surface structure of the moon and to determine more accurately the heat conduction of the moon's crust (by compariosn with radio methods) and present a more detailed picture of the structure of the moon's outer layers. The data reduction was by the method of Menzel (Ap. J. 58, 65, 1923), somewhat modified by the author. Bad weather prevented accumulation of extensive material, so that the results are merely tentative. Equations are derived for the temperature in terms of the reflected energy, the

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distance to the sun, the albedo, and the absolute black-body temperature, as well as the thermocouple galvanometer readings. The amount of water vapor determining the absorption of planetary heat in the atmosphere was found by using the absolute humidity at the earth's surface. The temperature of the subsolar point near full moon (phase angle +17.2) was found to be 400 + 30° K. The temperatures of the seas were higher than those of the continents. The ratio of the radiometric albedo to the visual one is the same for individual areas and for the average over the disk. The filters used were obtained from the laboratory of Prof. B. P. Kozyrev, who also developed and furnished the thermocouples. Doctor of Mathematical-Physical Sciences A. V. Markov is credited with guidance of the project. There are 4 figures and 1 table.

88940

S/035/61/000/001/016/019
A001/A001

3,1550 (1057,1062,1129)

Translation from: Referativnyy zhurnal, Astronomiya i Geodeziya, 1961, No. 1, p. 62, # 1A434

AUTHORS: Markov, A.V., Chistyakov, Yu.N.

TITLE: The Temperature of Zones on the Lunar Surface at Full Moon

PERIODICAL: "Izv. Gl. astron. observ. v Pulkove", 1960, Vol. 21, No. 4, pp. 166-179 (Engl. summary)

TEXT: Thermoelectric observations were performed at Pulkovo during full moon of April 25 and September 18, 1956, and April 4, 1958, in order to compare average temperatures obtained by simultaneous determinations with a radio telescope and a radiometer for narrow zones of the lunar surface 3' wide and up to 31' long; a special radiometer was employed. The measurement data were processed using the modified formula of D.Menzel. Atmospheric absorption was calculated for the Moon's proper radiation from simultaneous determinations of water vapor quantity in the line-of-sight. The measurements showed a dependence of temperatures on the phase angle within the limits of its variation from -15 to +10°. The average temperature of the zone passing across the center of the lunar disk proved to be 358°K accord-

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88940
S/035/61/000/001/016/019
A001/A001

The Temperature of Zones on the Lunar Surface at Full Moon

ing to observations on April 25, 1956 (phase angle $2^{\circ}8$), which agrees with theoretical calculations. Dispersion of temperature measurements in different nights, depending on the accuracy of allowance for atmospheric absorption for the long wavelength radiation, was of the order of $\pm 18^{\circ}$, and that for the same night $\pm 4^{\circ}$. The values of infrared albedo of the Moon, average for the zones, were obtained; they were confined within the limits of 0.12 - 0.15 depending on the relative areas of seas and continents. The results obtained indicate the possibility of using observations of the type described, in combination with the data of radioastronomical measurements, for determining heat conductivity of the lunar crust. There are 8 references.

From authors' summary

Translator's note: This is the full translation of the original Russian abstract.

Card 2/2

40461
S/035/62/000/009/027/060
A001/A101

3.2500

AUTHOR: Chistyakov, Yu. N.

TITLE: The temperature of individual parts of the lunar surface

PERIODICAL: Referativnyy zhurnal, Astronomiya i Geodeziya, no. 9, 1962, 68, abstract 9A480 ("Izv. Gl. astron. observ. v. Pulkove", 1961, v. 22, no. 4, 82 - 88, English summary)

TEXT: The analysis of the data permits the following conclusions to be drawn. The results of repeated temperature measurements performed in the same night differ by no more than a few degrees, the values observed at different lunations - differ by up to 10°C. The true rms error of temperatures amounts to ± 30°C. The minimum temperature measured amounts to 215°C which is the lower limit for the given equipment. The temperature near the under-Sun point is 30°C lower than that measured by other observers; being extrapolated to the full moon, it amounts to 375°C which coincides whith the theoretical value. The temperature of seas is higher than that of adjoining continents. The curves of dependence of temperature on distance to the under-Sun point have been studied. There are 10 references.

I. Lebedeva

[Abstracter's note: Complete translation]

Card 1/1

L 06319-67 EWT(1) GW

ACC NR: AR6016295 SOURCE CODE: UR/0269/66/000/001/0065/0065

AUTHOR: Chistyakov, Yu. N.

TITLE: Bolometric measurements of the temperature of the moon

SOURCE: Ref. zh. Astronomiya, Abs. 1.51.514

REF SOURCE: Izv. Gl. astron. observ. v Pulkove, v. 24, no. 2, 1965, 175-181

TOPIC TAGS: lunar temperature, lunar crater

ABSTRACT: The technique is described and results are presented for a determination of the temperature of the lunar surface with telescopes of average dimensions (D = 350--700 mm). The minimum dimensions of the measured portion on the moon are 45 x 15 km^2. Maps of the temperature distribution over the lunar disk are constructed for values of the lunar phase angle. Isotherms for the craters Copernicus, Tycho, and Langrenus are obtained for the phase angle -26°. Detailed investigations carried out for the crater Alphons show no anomalies of temperature. Bibliography of 7 citations. I. K. [Translation of abstract]

SUB CODE: 03

Card 1/1 MLS UDC: 523.32