27083 S/181/61/003/009/015/039
B102/B104

26.253 24.7600

AUTHORS: Mochan, I. V. and Smirnova, T. V.

TITLE: Study of the thermomagnetic and galvanomagnetic properties of p-type PbTe

PERIODICAL: Fizika tverdogo tela, v. 3, no. 9, 1961, 2659-2666

TEXT: The authors measured thermo-emf, electric conductivity, Hall effect, and transverse Nernst effect in 4 specimens of pure p-type PbTe. One specimen was coarse crystalline, the others were single crystals with different orientation. The impurity carrier concentrations were between $5 \cdot 10^{17}$ and $1 \cdot 10^{18}$ cm^{-3}. After heat treatment at 300°C to which all specimens were subjected, the carrier concentration slightly decreased. The measuring arrangement and the method employed were described already earlier (I. V. Mochan et al. FTT, I. 1351, 1959). The authors measured the temperature dependences of the thermo-emf (α), of the Hall constant (R), of the conductivity (σ), and of the transverse Nernst effect (Q), furthermore, the Hall mobility ($u_H = 0.85 R\sigma$), and the Nernst mobility

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Study of the thermomagnetic ...

($u_N = 16e\mathfrak{C}/3\pi k$). Specimen no. 1 was studied in a series of measurements made between room temperature and 460°K, in a second series between 90 and 530°K. The specimens 2-1, 2-2, 2-3 were studied only in the range 100-300°K. It was found that in the second series of measurements R was larger and σ smaller than in the first series which is ascribed to a decrease in the impurity carrier concentration. This is also indicated by the change of the sign of Q which took place at a temperature which was 10° lower than in the first series. In the range of mixed conductivity Q was determined from

$$Q = -\frac{3\pi}{16}\frac{k}{e}u_+\left\{\frac{1+\nu^2b^3-\left(\frac{2(\Delta E_0+\beta T)}{kT}+7\right)b(1+b)\nu}{(1+b\nu)^2}\right\}, \qquad (1)$$

where $\nu = n_-/n_+$ and $b = u_-/u_+$, ΔE_0 is the forbidden band width at 0°K, β is the temperature coefficient of ΔE. The values which hold in the impurity

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Study of the thermomagnetic ...

region were calculated by substitution of the Hall mobility of the holes and by extrapolation according to the law $u_H \sim T^{-2.5}$ ν was calculated with $\beta = 4 \cdot 10^{-4}$ ev and n_o, the concentration of the impurity carriers, was determined by relation $n_o = \frac{1-\nu}{\sqrt{\nu}} c \exp(-\Delta E/2kT)$. $c = 2(2\pi mkT)^{3/2}/h^3$. The irreversible change of all characteristic parameters, which occurred in specimen no 1 during the first series of measurements although it was less heated than during annealing, agrees with the results of T L Koval'chik and Yu P Maslakovets (ZhTF, 26, 2417, 1956). While $u_H \sim T^{-a}$ was well satisfied in the entire range, a deviation from the law $u_N \sim T^{-b}$ (a and b are given in the Table) was observed below 140°K An analysis of the results showed that the scattering from the impurity ions would be bound to distort the course of the Nernst mobility much more strongly than was observed experimentally This is explained by the assumption of an additional scattering mechanism, e g scattering from optical vibrations. The authors thank Yu N Obraztsov for revision of the manuscript and for discussions I M Tsidil'kovskiy, Ye D Devyatkova, and I A Smirnov

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Study of the thermomagnetic

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S/181/61/003/009/015/039
B102/B104

are mentioned. There are 4 figures, 1 table, and 15 references: 6 Soviet and 9 non-Soviet. The four most recent references to English-language publications read as follows: R. Allgaier, W. Scanlon. Phys. Rev., 111, 1029, 1958. R. Allgaier. Phys. Rev., 112, 929, 1958. W. Scanlon. Solid State Phys., 9, 83, 1959. R. Brebrick, R. Allgaier, Journ. Chem. Phys., 32, 1826, 1960.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors AS USSR, Leningrad)

SUBMITTED: April 6, 1961

Legend to the Table: (1), number of specimen, (2) orientation with respect to the axes x,y,z; (3), (4) R in cm^3/coul; (5), (6) n_o in cm^{-3}; (7), (8) $2u_H$ in cm^2/v sec; (9), (10) $2u_H$ in cm^3/v sec. (11) u_H/u_N, (12) a, (13) b. The values with * are mean values. (a) coarse crystalline specimen, (b) series II. The current or thermal flux were oriented in the X-direction, the magnetic field in the Z-direction, the voltage was measured in the Y-direction.

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36884
S/181/62/004/004/028/042
B102/B104

24.7000
26.2422

AUTHORS: Mochan, I. V., Obraztsov, Yu. N., and Smirnova, T. V.

TITLE: Determination of the effective electron mass in InSb from thermo-emf measurements in a strong magnetic field

PERIODICAL: Fizika tverdogo tela, v. 4, no. 4, 1962, 1071-1076

TEXT: It is proposed to determine the effective mass m* from the thermo-emf in strong magnetic fields, since, if the fields are strong enough, i.e., $\omega\tau \gg 1$, the emf is independent of the scattering mechanism, which is unknown in most cases. If the energy ε, is a quadratic function of the absolute value of the quasimomentum p, the thermo-emf is field-independent; if also electron and field quantization can be neglected ($\hbar\omega/kT \ll 1$), the thermo-emf can be given as $\alpha_\infty = \pm \frac{k}{e}(2F_{3/2}/3F_{1/2} - \eta^*)$; $F_{3/2}$ and $F_{1/2}$ are the Fermi integrals and $\eta^* = \eta/kT$ is the reduced chemical potential; ω is the cyclotron frequency and τ is the carrier mobility. In the case of non-degeneracy, $\alpha_\infty = k/e(5/2 - \eta^*)$ and $\eta^* = -\ln 2(2\pi m^* kT)^{3/2}/h^3 n$. For

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Determination of the effective...

InSb, the isoenergetic surfaces of the conduction band are spheres and $\varepsilon(p)$ is not quadratic. Then

$$a_\infty = \frac{k}{e}\left[\frac{\int_0^\infty r x_0^{s_1} \frac{\partial f_0}{\partial x}\,dx}{\int_0^\infty x_0^{s_2} \frac{\partial f_0}{\partial x}\,dx} - \mu^*\right]. \quad (7)$$

$$x = \frac{\varepsilon}{kT};\quad x_0 = \frac{p^2}{2m_0^* kT};\quad n = \frac{4}{\sqrt{\pi}}\left(\frac{2\pi m_0^* kT}{h^2}\right)^{3/2}\int_0^\infty \sqrt{x_0}\,\frac{dx_0}{dx} f_0(x)\,dx \quad (7a)$$

$$f_0 = \frac{1}{e^{x-\mu^*}+1}.$$

f_0 is the equilibrium distribution function. For Fermi degeneracy,

$$a_\infty = \frac{\pi}{2}\frac{k}{e}\frac{2m^*(p_F)}{p_F^2}kT. \quad (8)$$

where the quasimomentum $p_F = h\sqrt[3]{3n/8\pi}$. These relations can be used to

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Determination of the effective...

determine $\varepsilon(p)$ experimentally when measuring the thermo-emf and the Hall constant in completely degenerate samples of different concentrations. The authors used the relations to determine the effective mass on the bottom of the band when measuring the thermo-emf in non-degenerate samples: $a_\infty = f(m_0, E_g, \Delta)$, E_g being the forbidden-band width and Δ the spin-orbital splitting. The relations $a_\infty = \frac{k}{e}\left[\frac{5}{2} + \frac{15}{2}b_1\gamma - \frac{42}{4}a_1\gamma^2 - \mu_0^*\right]$, $b_1 = d_1 - d_2 + 1$; $a = 1 + \frac{5}{2}(d_2 - d_1) + d_1^2 + \frac{5}{2}d_2d_1 - \frac{5}{2}d_2^2$; $d_1 = E_g/(E_g + \Delta)$; $d_2 = 3E_g/(2\Delta + 3E_g)$; $\mu_0^* = -\ln 2(2\pi m_0' kT)^{3/2}/nh^3$; $\gamma = kT/E_g$, hold for arbitrary $\varepsilon(p)$. The measurements were carried out between 90 and 150°K with two n-type InSb single crystals of similar concentrations (1.05 and $1.15\cdot10^{15}$ cm^{-3}). Method and apparatus are described in FTT, 1, 1351, 1959. For E_g = 0.21 ev and Δ = 0.9 ev, the mean value obtained for m_0^*, temperature independent in the range 100-145°K, was (0.0143 ± 0.0007)m. With the Eqs. (4), (5) for $\varepsilon \sim p^2$, m^* = 0.0175 m. Within the limits of

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Determination of the effective... S/181/62/004/004/028/042
B102/B104

measuring error, the value for m_o^* obtained agrees with those obtained from measurements of α, from the Faraday effect, and the optical constants. A. I. Anselm, B. M. Askerov, and G. Ye. Pikus are thanked for discussions. There are 4 figures and 1 table.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors AS USSR, Leningrad)

SUBMITTED: December 20, 1961

Card 4/4

24(6,8)

S/181/62/004/009/025/045
B104/B186

AUTHORS: Dricnko, I. L., Mocnan, I. V., and Obraztsov, Yu. N.

TITLE: Investigation of the anisotropy in the electrical conductivity of tellurium

PERIODICAL: Fizika tverdogo tela, v. 4, no. 9, 1962, 2514-2520

TEXT: A method is presented for determining the anisotropy in the electrical conductivity of uniaxial tellurium single crystals cut out at an angle φ relative to the C-axis of the crystal. When a current flows along the X-axis of a specimen (Fig. 1), the equipotential surfaces will lie perpendicular to the plane of the figure. On account of the anisotropy in the electrical conductivity, the equipotential surfaces form the angle ψ with the Y-axis. ψ is determined with the fixed probe 3_1 and the mobile probe 3_2. In the apparatus, which is described in detail, the temperature is measured with thermocouples. The probe is moved by micrometer screws. The anisotropy is calculated from the measurements using

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$$n = \frac{\sigma_\perp}{\sigma_\parallel} = \frac{1 - \operatorname{tg}\psi \operatorname{tg}\varphi}{1 + \operatorname{tg}\psi \operatorname{ctg}\varphi} \qquad (2)$$

$$\sigma_\perp = \sigma_\varphi (\sin^2\varphi + \varkappa \cos^2\varphi) \qquad (3),$$

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where σ_φ is the electrical conductivity of the specimen cut out at the angle φ. The tellurium specimens were twice distilled in vacuo and melted in a hydrogen atmosphere. The single crystals were grown by slow cooling. It was found that $K = 2.0 \pm 0.1$ and that it was temperature-independent in the range 78 - 200°K. There are 6 figures and 2 tables.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad
(Institute of Semiconductors AS USSR, Leningrad)

SUBMITTED: May 5, 1962

Card 2/2

Investigation of the transverse and longitudinal Nernst effect in strong magnetic fields for samples of n-InSb. I. L. Drichko, I. V. Mochan, T. V. Smirnova.
(Presented by S. S. Shalyt--20 minutes).

Report presented at the 3rd National Conference on Semiconductor Compounds, Kishinev, 16-21 Sept 1963

DRICHKO, I. L.; MOCHAN, I. V.

"An experimental investigation of the thermoelectric power of n-In-Sb in high magnetic fields."

report submitted for Intl Conf on Physics of Semiconductors, Paris, 19-24 Jul 64.

DRICHKO, I.L.; MOCHAN, I.V.

Thermo- e.m.f. of n-type indium antimonide in high magnetic fields. Fiz. tver. tela 6 no.6:1902-1905 Je '64.
(MIRA 17:9)

1. Institut poluprovodnikov AN SSSR, Leningrad.

L 5398-66 EWT(l)/EWT(m)/EWP(b)/EWP(t) IJP(c) AT/JD

ACC NR: AP5027403

SOURCE CODE: UR/0181/65/007/011/3260/3269

AUTHOR: Drichko, I. L.; Mochan, I. V.

ORG: Institute of Semiconductors, AN SSSR, Leningrad (Institut poluprovodnikov AN SSSR)

TITLE: Microscopic irregularities and the Nernst effect in InSb

SOURCE: Fizika tverdogo tela, v. 7, no. 11, 1965, 3260-3269

TOPIC TAGS: Nernst effect, indium compound, antimonide, semiconductor research

ABSTRACT: The Nernst effect is studied in *n*-InSb specimens with various impurity concentrations. According to theory, the Nernst constant *Q* should be proportional to the square of the magnetic field strength in strong magnetic fields in the classical region (where quantum effects may be disregarded). The experimental data do not coincide with this prediction. It was found that in magnetic fields of <3000 gauss, the magnitude and sign of the Nernst constant is considerably dependent on the purity of the specimen. *Q* is negative for specimens with high carrier mobility where acoustic scattering predominates, and becomes positive as mobility is reduced and ion scattering begins to be significant. The curves for all specimens

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ACC NR: AP5027403

converge for fields of 6-7 kilogauss where Q is positive with deviations of no more than 20%. It is shown that this behavior of Q is entirely due to the effect of microscopic irregularities in the InSb specimens. The data agree with the Kudinov-Moyzhes theory (V. A. Kudinov, B. Ya. Moyzhes, FTT, 7, 2309, 1965). The thermoelectromotive force in a strong magnetic field is only slightly affected by microscopic irregularities. This also confirms the theory which shows that the variation in concentration, which completely determines the Nernst effect, corrects the thermoelectromotive force independently of the magnetic field within the limits of measurement error. In conclusion, we thank S. S. Shalyt and R. V. Parfen'yev for giving us the results of $\frac{\Delta\rho}{\rho}$ measurements and for permission to publish them. We are grateful to L. L. Korenblit for giving us his calculations of the Nernst effect in strong magnetic fields during computation of zonal parabolic deviation and for consultation on numerical calculations. We thank V. A. Kudinov, B. Ya. Moyzhes, A. I. Ansel'm and Yu. N. Obraztsov for valuable discussions. Orig. art. has: 7 figures, 4 formulas, 2 tables.

SUB CODE: SS/ SUBM DATE: 03May65/ ORIG REF: 007 OTH REF: 006

Card 2/2

ACCESSION NR: AP4039690 S/0181/64/006/006/1902/1905

AUTHORS: Drichko, I. L.; Mochan, I. V.

TITLE: Investigation of the thermal emf of n-type indium-antimony in strong magnetic fields

SOURCE: Fizika tverdogo tela, v. 6, no. 6, 1964, 1902-1905

TOPIC TAGS: thermal emf, n type semiconductor, indium alloy, antimony, magnetic property, quantum effect

ABSTRACT: The thermal emf of n-type indium-antimony in strong magnetic fields was investigated in the quantum region, i.e., under the conditions $\frac{uH}{c} \gg 1$, where u is the electron mobility, and $\frac{\hbar\omega}{kT} \geqslant 1$, where the cyclotron frequency $\omega = \frac{eH}{m^* c}$ and m^* is the effective electron mass. The samples were cut from monocrystalline bars of a uniformity better than 5%. The quantity $\Delta\alpha = \alpha(H) - \alpha(0)$, where $\alpha(H)$ and $\alpha(0)$ are the thermal emfs with fields of H and 0 respectively, was measured as a function of H with sample temperatures of about 100K. There was a rapid increase of $\Delta\alpha$ with H up to saturation. However, a further increase of $\Delta\alpha$ with H above saturation was observed (caused by quantum effects). The

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ACCESSION NR: AP4039690

values of the quantum correction to the thermal emf $\delta\alpha$ satisfied very well the theoretical expression $\delta\alpha = \frac{k}{e}\frac{1}{24}\left(\frac{\hbar\omega}{kT}\right)^2 \sim \frac{H^2}{T^2}$, using $m^* = 0.013\ m_0$. The authors express their thanks to Yu. N. Obraztsov, whose theoretical work stimulated the investigation, and to A. I. Ansel'm and R. G. Tarkhanyan for discussions of the results. Orig. art. has: 8 equations, 2 diagrams, and 1 table.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors, AN SSSR)

SUBMITTED: 21Jan64 ENCL: 00

SUB CODE: MM, SS NO REF SOV: 005 OTHER: 001

Card 2/2

PA 37/49T25

USSR/Engineering Jul/Aug 48
Steam Boilers
Steam Engineering

"Plan for Organizing Intraboiler Processes With an Automatic Water Level in the Drum," S. I. Mochan, D. F. Peterson, Engineers Cen Sci Res Boiler and Turbine Inst imeni I. I. Polzunov, 4½ pp

"Kotloturbostroy" No 4

Examines some systems of boiler arrangement. Shows that wash-drum system can furnish pure steam under severe initial conditions. It is free from drawbacks of systems now used. Scheme has the merit of

[redacted] 37/49T25

USSR/Engineering (Contd) Jul/Aug 48

automatic control of water level in the drum feeding the circulation tubes. Includes five diagrams.

MOCHAN, S. I.

[redacted] 37/49T25

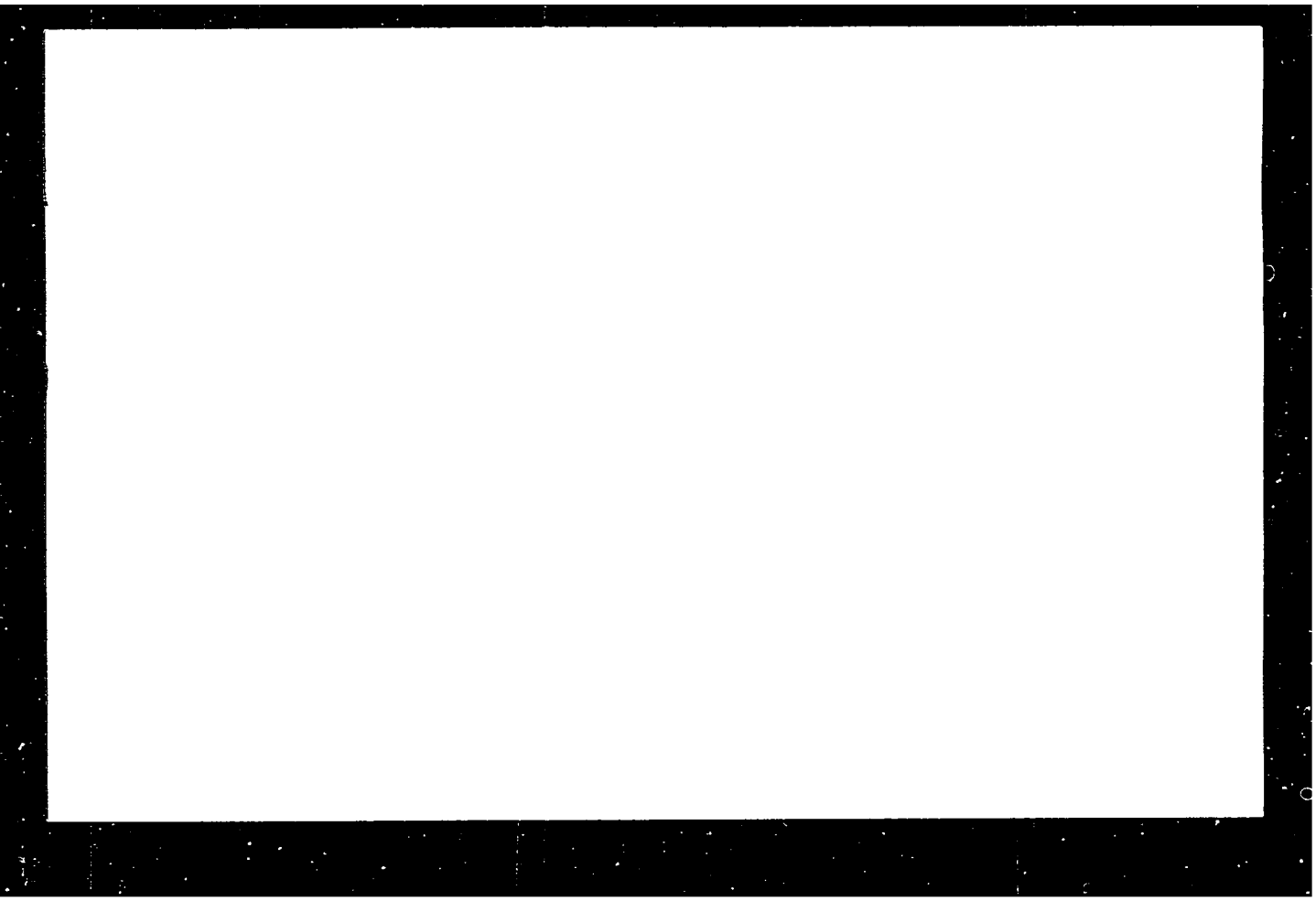
CA MOCHAN, S.I.

14

Investigation of water tube boiler characteristics

I. Machin and D. F. Peterson (Central Boiler and Turbine Research Inst., Leningrad). *Energ. and Boiler Constr. Rev.* **05**, 74-7, Sept. 1960. Various methods for securing min. steam contamination by appropriate design of the boiler circuit are discussed, and a description is given of a novel method of steam purification involving double washing of the boiler steam.

R. W. Ryan



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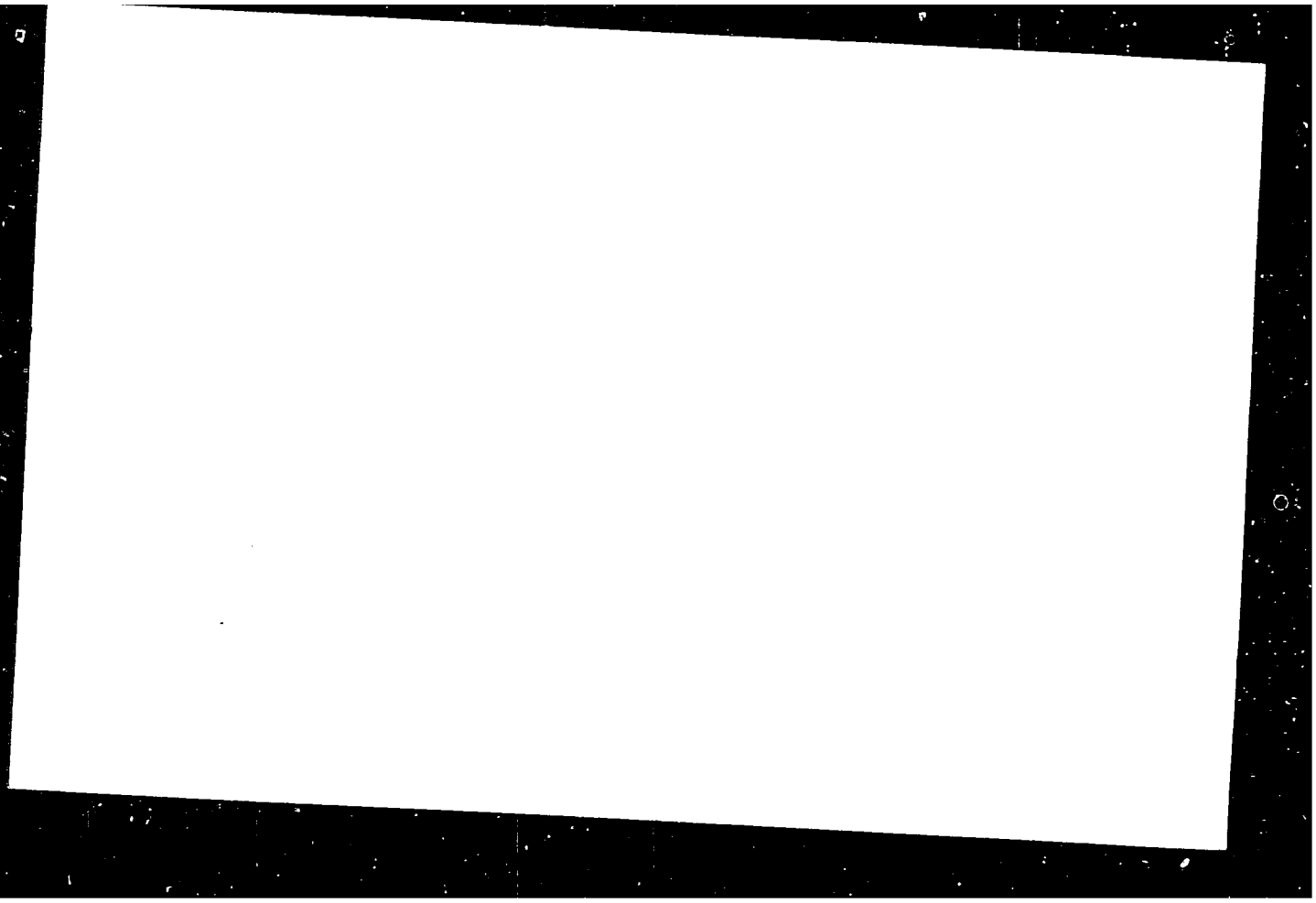


APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R001134820014-7"

MOCHAN, S. I. --

" Investigation of Collectors and Several Local Resistances in the Motion of Gas-Liquid Mixtures." Cand Tech Sci, Central Sci-Res Boiler and Turbine Inst, Leningrad, 1954. (RZhMekh, Oct 54)

Survey of Scientific an Technical Dissertations Defended at USSR Higher Educational Institutions (10)

SO: Sum. No. 81, 5 May 55

AID P - 1320

Subject : USSR/Engineering

Card 1/1 Pub. 110-a - 2/19

Author : Mochan, S. I., Kand. of Tech. Sci.

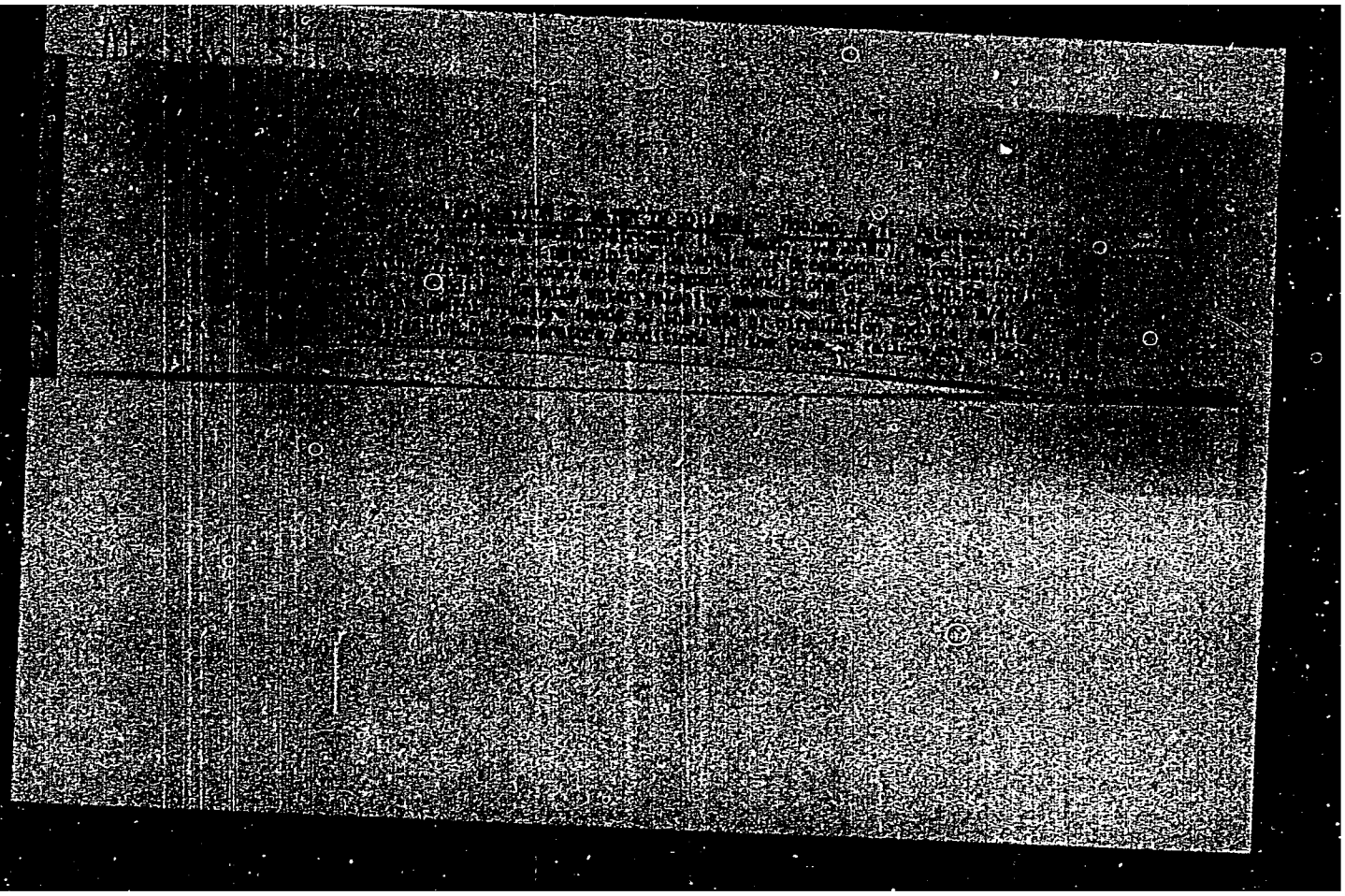
Title : Distribution of a two-phase mixture in horizontal headers

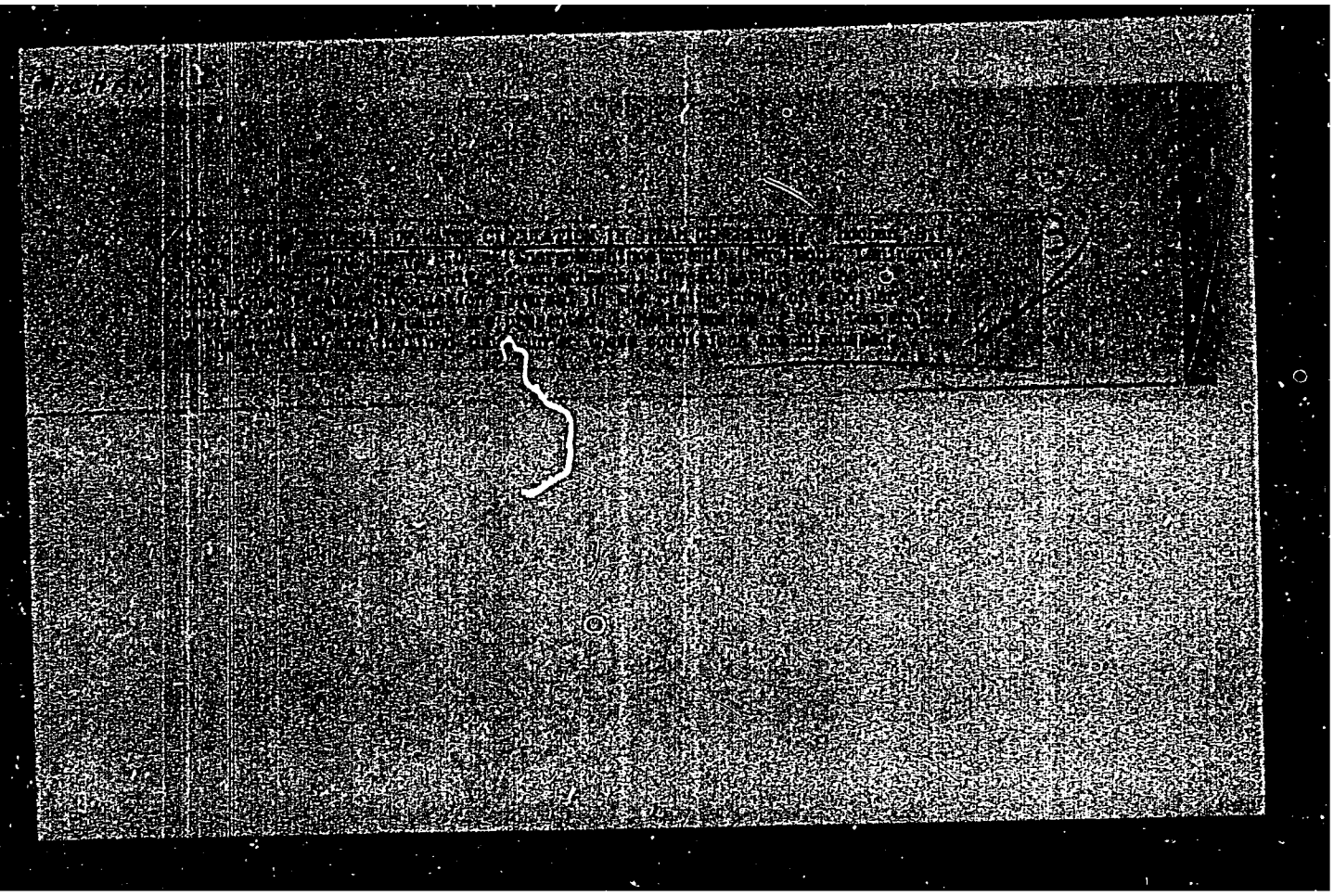
Periodical : Teploenergetika, 2, 10-15, F 1955

Abstract : This article brings the results of research tests concerning the study of conditions prevailing in the distribution of components of a gas-liquid mixture in the headers. Based on the analysis of those results, necessary recommendations are presented concerning the location and calculation of exhaust and recirculation pipes. Diagrams, charts.

Institution : Central Scientific Research Institute for Boilers and Turbines

Submitted : No date





AID P - 4376

Subject : USSR/Power Engineering

Card 1/1 Pub. 110 a - 2/17

Authors : Karasina, E. S., S. I. Mochan, Kand. Tech. Sci., and O. G. Revzina, Eng. All-Union Heat Engineering Institute and Central Boiler and Turbine Institute.

Title : On establishing the heat transfer ratio in boiler heating surfaces.

Periodical : Teploenergetika, 5, 8-13, My 1956

Abstract : The difference in the heat transfer ratio in laboratory experiments and that actually obtained in industrial installations is discussed. Causes, such as ratios of dirt, sediments, etc. are explained. The functions of one- and two-stage steam preheaters and economizers are described. Two diagrams, three tables.

Institution : None

Submitted : No date

MOCHAN, S.I.

AUTHOR: Mochan, S.I., Candidate of Technical Sciences and Revzina, O.G., Engineer. 114-8-3/16

TITLE: Test results and design procedure for surface steam coolers (atemperators). (Rezultaty ispytaniy i metodika rascheta poverkhnostnykh parookhladiteley)

PERIODICAL: "Energomashinostroyeniye" (Power Machinery Construction), 1957, Vol.3, No.8, pp. 11 - 15 (U.S.S.R.)

ABSTRACT: New sets mostly use water injection for the main atemperators, but surface types are still important for medium power sets and also as the first stage when two-stage control of the superheat temperature is used.

Present methods of designing atemperators is complicated and not well supported by experimental data. This article describes work on simplification of the procedure and on making it more accurate by analysis of available experimental data. Doctor of Technical Sciences, Professcr S.S. Kutateladze participated in this work. Data on the testing of horizontal atemperators cooled by feed water are given in a table. The table includes test results obtained by A.P. Baranov, I.K. Barshteyn, I.E. Belinskiy, S.G. Beskin, G.A. Burgvits, I.E. Dubovskiy, E.M. Kazarnovskiy, N.V. Mishin, M.B. Patronova, M.M. Rubin, I.E. Semenovker, I.P. Shapiro and P.A. Shemyakin.

Card 1/5

Test results and design procedure for surface steam coolers. 114-8-3/16
(Cont.)

Most of the data relate to atemperators located in a chamber of saturated steam. Tests were also made on atemperators of boiler H[illegible]-C-60-34 located in a steam dome and of the atemperator of boiler KO-IV-200 located in the intermediate collector. Cross-sections of the atemperator tested are shown in Fig. 1 and experimental values of the heat transfer coefficients for all the tested units in a saturated steam chamber are shown in Fig.2A.

For water speeds above 2 m/sec the scatter of the experimental points increases and many of them lie below the straight line corresponding to lower water speeds. Because of the unusual nature of the changes in the experimental values of the heat transfer coefficients they are compared with calculated values by determining the coefficient of utilisation. Values of this coefficient for the tests plotted in 2A are plotted in Fig.2B. Over a large part of the range there is an obvious tendency for the utilisation coefficient to increase with water speed. This indicates the presence of circumstances which cause important changes in the operating conditions of atemperators compared with those assumed for the purposes of calculation. Possible causes

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Test results and design procedure for surface steam coolers. (Cont.) 114-8-3/16

of this are considered and rejected in turn, namely: leakage through separating barriers, contamination.

A formula is given for the theoretical coefficient of heat transfer from the walls to the water. The existing procedure for determining this coefficient is based on Nusselt's formula assuming laminar flow of the condensate film. Correction factors are introduced because of wave formation in the films and for oxidation of the steel tubes. In the existing procedure the governing film temperature is the mean temperature arrived at by successive approximations. The data of K.D. Voskresenskiy have been used to construct a graph of the ratio of the heat transfer coefficient determined when the physical constants are related to the film temperature, to that related to the saturation temperature, as functions of the pressure. This graph shows the advisability of using the saturation temperature. Various other corrections to the usual formula are considered including a velocity correction and a correction for the number of rows of tubes. Finally a much simplified formula is obtained for determination of the coefficient of heat transfer during the condensation of moving steam in a bundle of tubes. Analysis

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Test results and design procedure for surface steam coolers. (Cont.)
114-8-3/16

shows that the procedure of calculation used does not have very great errors, and they cannot be the cause of the observed differences between experimental and theoretical values of the heat transfer coefficient.

On examination of possible causes of this difference it seems most likely that they result from special features of the hydro-dynamics in the steam collector. This is confirmed by the results given in Fig.5 relating to determinations of heat transfer coefficient in boilers which, unlike modern patterns, use nigh steam speeds. For these atemperators the experimental values of the heat transfer coefficients at low loads are much higher than those given in Fig. 2. Special tests should be carried out to confirm the hypothesis that hydro-dynamics in the chamber has a marked influence on heat transfer in atemperators. Until such a verification has been made there is no need to correct the design procedure of such atemperators.

Vertical atemperators are then considered; in their design it would be necessary to verify whether the pipe works under conditions of laminar or of turbulent flow. A brief examination of this question shows that turbulent film flow predominates. A formula is recommended for the determination of the heat

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Test results and design procedure for surface steam coolers. (Cont.)
114-8-3/16

transfer coefficient from the steam to the wall in vertical atemperators.

Atemperators cooled by boiling water are then considered: they have special features when determining the coefficient of heat transfer from the wall to the water. Heat transfer on unoxidised tubes was investigated in a number of experimental works. Values of the heat transfer coefficient calculated by various formulae are given in Fig.6 which was constructed by Candidate of Technical Sciences V.M. Borishanskiy and Engineer V.N. Golovin. Finally, a formula is recommended for calculating heat transfer from unoxidised tubes and a design formula is given for determinations when the walls of the tubes are oxidised.

There are 6 figures, 1 table and 5 Slavic references.

AVAILABLE: Library of Congress
Card 5/5

KOCHAN, S.I., kandidat tekhnicheskikh nauk.

Permissible error in rating air temperature. Teploenergetika 4 no.1:54 Ja '57. (MLRA 10:3)

1. TSentral'nyy kotloturbinnyy institut.
(Boilers)

KUTATELADZE, Samson Semenovich; BORISHANSKIY, Veniamin Mironovich; MOCHAN, S.I., RED.: ARMAND, A.A., retsenzent; BERMAN, L.D., retsenzent; DOROSHCHUK, V.Ye., retsenzent; LEL'CHUK, V.S., retsenzent; PIROGOV, M.S., retsenzent; RYVKIN, S.A., retsenzent; SOKOLOV, Ye.Ya., retsenzent; ZABRODINA, A.A., tekhn.red.; LARIONOV, G.Ye., tekhn.red.

[Handbook on heat transmission] Spravochnik po teploperedache. Leningrad, Gos. energ. izd-vo, 1958. 414 p. (MIRA 12:1)
(Heat--Transmission)

SOV/96-59-7-25/26

AUTHOR: Mochan, S.I., Candidate of Technical Sciences

TITLE: Some remarks on the book 'Thermal Design of Boilers (Standard Method)' Gosenergoizdat, 1957. (Nekotoryye zamechaniya po knige 'Teplovoy raschet kotel'nykh agregatov (normativnyy metod)', Gosenergoizdat, 1957)

PERIODICAL: Teploenergetika, 1959, Nr 7, p 95 (USSR)

ABSTRACT: Two misprints in formulae in the book are pointed out.

Card 1/1

ZAKHAROV, A.A., kand.tekhn.nauk; MOCHAN, S.I., kand.tekhn.nauk; SHCHERBAKOV, V.A., kand.tekhn.nauk; BRAUDE, I.Ye., inzh.; IVYANSKIY, S.I., inzh.; MODEL', Z.G., inzh.

Reliability of steam superheaters. Elek.sta. 30 no.1:91-94 Ja '59. (MIRA 12:3)

(Superheaters)

AUTHORS: Mochan, C. I., Candidate of Technical Sciences, and Revzina, O. G., Engineer SOV/96-60-2-6/24

TITLE: Calculation of the Aerodynamic Resistance of Heating Surface Elements

PERIODICAL: Teploenergetika, 1960, Nr 2, pp 34-40 (USSR)

ABSTRACT: Previous work on calculation of the aerodynamic resistance of tube bundles is reviewed. The methods of the 1949 Standard do not cover the necessary range of tube bundle geometry nor, of course, do they include more recent published work. Alternative formulae were proposed by the All-Union Thermo-Technical Institute and published in Teploenergetika, Nr 9, 1954. These formulae have a better experimental basis; the method of selecting the determining temperature is the same as in thermal calculations. However, a number of defects of the 1954 formulae are pointed out. Moreover, since they were published further experimental work has been done, particularly that of Kays, London, and Lo, Trans. ASME, 1954, on the resistance of closely-packed bundles of tubes. It was, therefore, decided to attempt to formulate simpler and more convenient design formulae

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for practical conditions. The governing temperature was taken to be the flow temperature, and as in the 1954 formulae the influence of the number of rows on the resistance was taken from the 1949 standards. After the new formulae had been derived and a draft standard method had been drawn up, further results were published by Kazakevich in Teploenergetika Nr 8, 1958, for tubes in the honeycomb arrangement, including closely packed bundles. Kazakevich offered corrections to the 1954 formulae and his results covered a hitherto neglected range of great interest. An approximate comparison made between the draft standard formulae and Kazakevich's experimental data showed that the new test results make little difference to the formulae over the ranges which are of practical interest. It was accordingly decided not to hold up the draft standard method, but to make corrections later if necessary, when tabulated data had been obtained from Kazakevich for tubes in the honeycomb arrangement. This article gives the formulae finally recommended for making the calculations, and in the case of the honeycomb arrangement of tube bundles gives a

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comparison with formulae included in the draft standard method. The method of working out the experimental data is explained and it is shown that there is considerable scatter in the experimental results, which may reach 10% for low values of Reynolds number. The selection of constants to be used in Eq (1) when using bundles of tubes in the honeycomb arrangement is first considered. The choice of coordinates used in Fig 1 to compare experimental and recommended values for the constant K in Eq (1) is explained. The solid lines in Fig 1 show the relationship finally recommended for the standard method, allowing for Kazakevich's experimental data; the dotted lines correspond to formulae included in the first draft standard method. The difference is small in regions of practical importance and is greatest for close tube bundles. The great scatter of the points when calculated by the formulae of the All-Union Thermo-Technical Institute and Kazakevich is confirmed by Fig 3 which plots the difference between the calculated and experimental values

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of Euler's criterion. Thus, the new recommended formulae ensure good agreement with experimental data when making use of the most convenient determining parameter. Therefore, the values of resistance coefficient for tubes in the honeycomb arrangement given by Eqs (2) are recommended for the standard method. The field of application of the recommended formulae is greater than that of the formulae of the All-Union Thermal Technical Institute and Kazakevich. Formulae (2) was used to construct the nomogram of Fig 4 which provides direct determination of the pressure drop in tube bundles of honeycomb arrangement. Tubes in the square arrangement are then considered. It is stated that a convenient determining parameter is the ratio of the transverse gap to the longitudinal. A graph of the exponent n in formula (1) as a function of this parameter is plotted in Fig 5; the scatter of experimental values is very great. However, certain values are recommended for n and were used to determine the coefficient K_1, which is plotted in Fig 6. Finally, formulae (3) are recommended

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for calculating the resistance coefficient of tube bundles in the square arrangement. The range of validity of the formulae is wide enough for practical purposes. The agreement between experimental and calculated values of resistance coefficients for tube bundles in the square arrangement will be seen from the graph in Fig 3. Clearly the accuracy is as good as that obtained with the formulae of the All-Union Thermo-Technical Institute, and the procedure is much more simple. A nomogram for determining the resistance coefficient of tube bundles in the square arrangement constructed from formulae (3) is given in Fig 7. Most of the experimental work on the resistance of tube bundles has been carried out at Reynolds numbers ranging from $5 - 15 \times 10^3$ to $30 - 60 \times 10^3$, and only a few tests have been made at lower values. The rates of gas and air flow over heating surfaces in modern boilers usually correspond to Reynolds numbers of $3 - 5 \times 10^3$. A special check was therefore made of the agreement between the experimental and calculated values within the range

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of Reynolds number of 3 - 20 x 10^3. The origins of the data used are stated. Existing formulae for calculating the frictional resistance during flow in tubes and ducts are of limited validity and inconvenient in use. In making aerodynamic calculations on boilers it is necessary to have a reasonably accurate knowledge of the frictional resistance in the air heaters, whilst approximate calculations usually suffice for the other parts. The resistance of tubular-and plate-type air heaters usually lies in the transitional zone. The approximate formulae (4) may be used for calculating the frictional coefficient for values of Reynolds number corresponding to the flow of air and flue gases at rates of 5 - 30 m/sec for low temperatures (up to 300°C) and up to 45 m/sec for higher temperatures. The values of the coefficient of friction as a function of the Reynolds number calculated by the present simplified procedure are compared graphically with previously published data of Murin in Fig 9. Fig 10 gives a nomogram for the approximate calculation of the pressure drop in pipes and ducts; it is derived from formula (4).

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Calculation of the Aerodynamic Resistance of Heating Surface Elements

The nomogram is valid for air and flue gases under the same conditions as Eq (4). Corrections to the pressure drop to allow for changes in the temperature of the flow are then considered and expression (5) is recommended. The additional acceleration that results from expansion of the gas when it is heated was discussed. In practically all cases the corrections to the pressure on this account do not exceed 10% of the bundle resistance, and are usually much less. Accordingly, in making calculations on the resistance of boilers and ordinary heat exchangers it is seldom necessary to correct for the difference in losses due to acceleration and change of velocity head. There are 10 figures and 7 references, 5 of which are Soviet and 2 English.

ASSOCIATION: Tsentral'nyy kotloturbinnyy institut (Central Boiler Turbine Institute)

Card 7/7

MOCHAN, S.I., knad.tekhn.nauk

Outlook for the development of Russian boiler-making industry. Bezop.truda v prom. 6 no.11:8-10 N '62. (MIRA 16:2)

1. TSentral'nyy kotloturbinnyy institut im. I.I.Polzunova, g. Leningrad.
(Boiler-making industry)

MITROV, Vyacheslav Vladimirovich; POMERANTSEV, V.V., prof., doktor tekhn. nauk, retsenzent; MOCHAN, S.I., kand. tekhn. nauk, red.; VASIL'YEVA, V.P., red.izd-va; BARDINA, A.A., tekhn. red.; PETERSON, M.M., tekhn. red.

[Heat exchange in the furnaces of steam boilers] Teploobmen v topkakh parovykh kotlov. Moskva, Mashgiz, 1963. 179 p. (MIRA 16:8)

(Steam boilers--Firing)

ZYKOV, S.A., doktor tekhn. nauk; MOCHAN, S.I., kand. tekhn. nauk

Features of using the condensing block for covering peak loads and creation of auxiliary power supply in electric power systems. Teploenergetika 10 no.12:14-20 D '63. (MIRA 17:8)

1. TSentral'nyy kotloturbinnyy institut.

KOCHAN, S.I.

[Aerodynamical design of boiler systems; standard method] Aerodinamicheskii raschet kotel'nykh ustanovok; normativnyi metod. S prilozheniem al'boma grafikov dlia raschetov. Pod red. S.I.Kochana. Izd.2. Moskva, Energiia, 1964. 147 p. (MIRA 17:5)

1. Leningr. Tsentral'nyy nauchno-issledovatel'skiy kotloturbinnyy institut.

ZYKOV, S.A., doktor tekhn. nauk; MOCHAN, S.I., kand.tekhn.nauk

Features of using the condensing block for covering peak loads and creation of auxiliary power supply in electric power systems. Teploenergetika 10 no.12:14-20 D '63. (MIRA 17:8)

1. TSentral'nyy kotloturbinnyy institut.

BORISHANSKIY, V.M., red.; PALEYEV, I.I., red.; MOCHAN, S.I., nauchn. red.

[Convective heat transfer in two-phase and single-phase flows] Konvektivnaia teploperedacha v dvukhfaznom i odnofaznom potokakh; sbornik statei. Moskva, Energiia, 1964. 447 p. (MIRA 18:4)

MOCHAN, S.I., kand. tekhn. nauk; APATOVSKIY, L.Ye.; KOMISARCHIK, I.N., inzh.

Selection of air heating temperatures taking into account unification demands. Teploenergetika 12 no.4:37-42 Ap '65. (MIRA 18:5)

1. TSentral'nyy kotloturbinnyy institut.

MOCHAN, S.I., kand.tekhn.nauk; REVZINA, O.G., inzh.

Choice of gas and air speeds and possibilities for standardizing the dimensions of gas pipes. Teploenergetika 12 no.10:32-37 O '65. (MIRA 18:10)

1. TSentral'nyy kotloturbinnyy institut.

MOCHANOV, Pavel Nikolayevich; POMOMAREV, Ivan Makarovich; ANIKIN, Vladimir Alekseyevich; SEMENOVA, M.M., redaktor izdatel'stva; TIKHONOVA, Ye.A., tekhnicheskiy redaktor

[Steam ejector fume pressure apparatus] Paroezhektornaia dymonagnetatel'naia stantsiia. Moskva, Izd-vo "Morskoi transport," 1956. 31 p. (MLRA 9:11)

(Marine engineering)

ANIKIN, V., inzhener; MOCHANOV, P., inzhener.

Repair works with use of an open flame and without cleaning of tank vessels. Mor. flot 16 no.10:14-16 O '56. (MLRA 9:11)

1. Proyektno-konstruktorskoye byuro Kaspiyskogo reydovogo parokhodstva.

(Tank vessels--Repairing)

MOCHANOV, P.

New aerated foam fire-extinguishing installation. Mor. flot 16 no.12:24-25 D '56. (MLRA 10:2)

1. Nachal'nik Proyektno-konstruktorskogo byuro Kaspiyskogo reydovogo parokhodstva.
(Ships--Fires and fire prevention)

MOCHANOV, P.; AKSENOV, Yu., inzh. sluzhby sudovogo khozyaystva

New propeller system for motor-tugboats. Mor. flot 23 no.1: 25-27 Ja '63. (MIRA 16:4)

1. Glavnyy inzh. Astrakhanskogo upravleniya Kaspiyskogo parokhodstva (for Mochanov).
(Tugboats) (Propellers)

L 40324-65 EWT(d)/EWT(m)/T/EWP(t)/EWA(c) IJP(c) JD
ACCESSION NR: AP4046053 S/0052/64/009/003/0523/0528

AUTHOR: Mochanov, S. A.

14
B

TITLE: On a problem in the theory of diffusion processes

SOURCE: Teoriya veroyatnostey i yeye primeneniya, v. 9, no. 3, 1964, 523-528

TOPIC TAGS: diffusion process, Markov process, Euclidean space, Cauchy problem, nonclassical boundary condition

ABSTRACT: In the paper some Markov processes associated with diffusion processes are discussed. A diffusion process x_t defined on l-dimensional Euclidean space E_l is considered only at moments when its trajectory belongs to a given set S (a new time is introduced which changes only when the process is in S). If S is a domain with differentiable boundary, the generator Π of the new process y_t is the same as for x_t at all interior points of S. On the boundary of S non-classical boundary conditions are obtained. These boundary conditions are described in theorem 1. If S is an $(l-1)$-dimensional surface, we obtain on S a discontinuous

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L 49324-65

ACCESSION NR: AP4045053

process of the Cauchy type. The generator of this process is investigated in theorem 2. [1]

ASSOCIATION: None

SUBMITTED: 22Nov63 ENCL: 00 SUB CODE: MA

NR REF SOV: 002 OTHER: 002

Card 2/2

FD-1538

USSR/Medicine - Rural Practice

Card 1/1 . Pub 102-9/14

Author : *Mochanova, Ye S. (Astrakhan')

Title : Assistance to rural rayons in the conduct of education in sanitation

Periodical : Sov. zdrav , 6, 41-43, Nov-Dec 1954

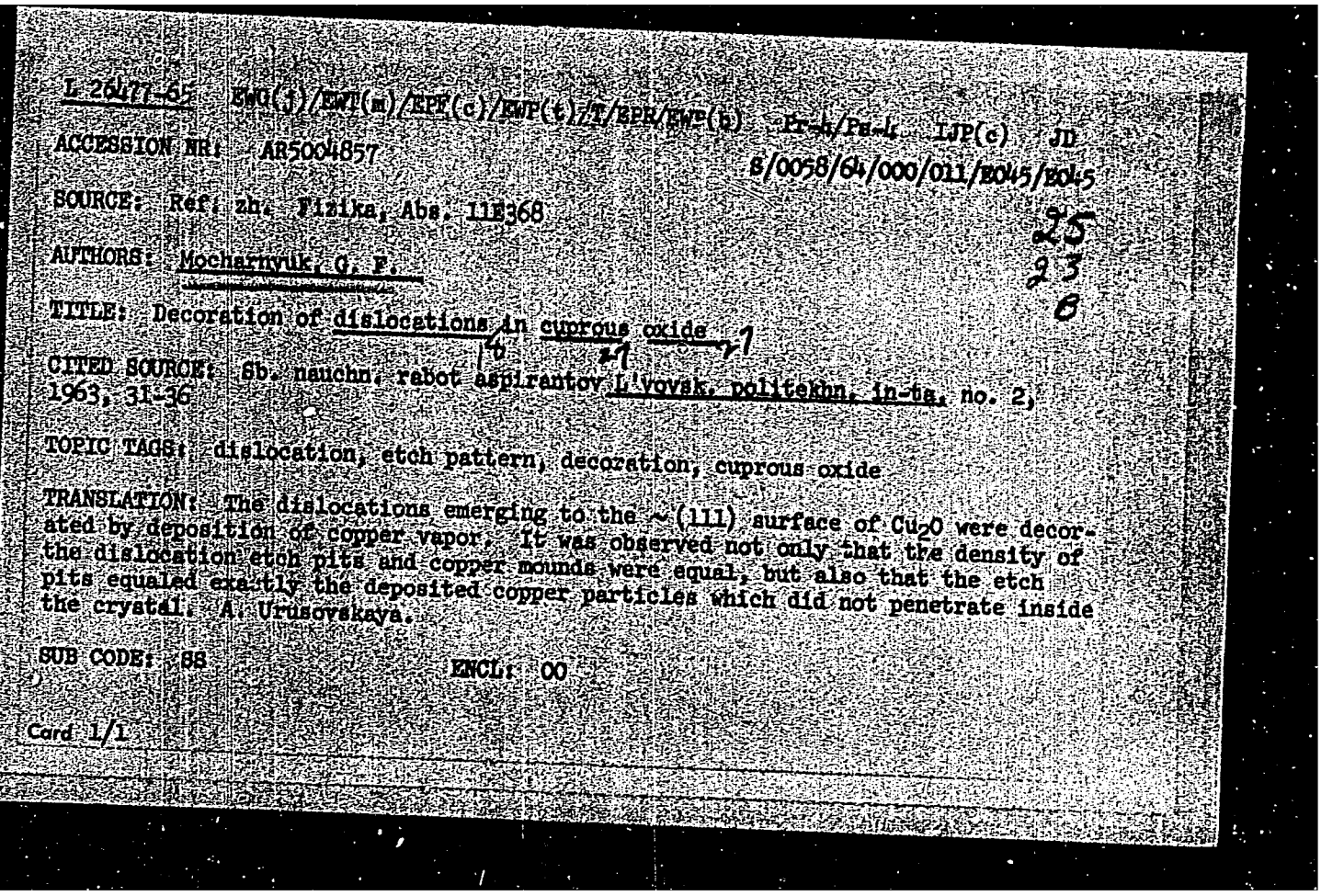
Abstract : The consultants of the Astrakhan' Oblast Clinical Hospital have recognized that preventive measures could greatly contribute to the effort of improving medical service to rural population. They prevailed, therefore, upon specialists of rayon hospitals and upon physicians of sanitary-epidemiological stations to coordinate their educational activities and propaganda in the field of hygiene and sanitation. Improvement in the quality of medical service to the rural population can be achieved by expanding the dispensary system of medical service and extending the latest achievements in Soviet medicine to villages.

Institution : (*Chief) Office of Organization and Methods, First Oblast Clinical Hospital

Submitted :

MOCHAR, L.I., inzhener; TOPIL'SKIY, N.A., inzhener.

Erecting electric transmission line supports by preliminary hoisting with a pipe layer. Elek.sta. 25 no.2:46 F '54.
(MLRA 7:2)
(Electric lines--Poles)



L 26477-65 EWG(j)/EWT(m)/EPF(c)/EWP(t)/T/EPR/EWP(b) Pr-4/Pa-4 IJP(c) JD

ACCESSION NR: AR5004857 S/0058/64/000/011/E045/E045

SOURCE: Ref. zh. Fizika, Abs. 11E368

AUTHORS: Mocharnyuk, G. F.

TITLE: Decoration of dislocations in cuprous oxide

CITED SOURCE: Sb. nauchn. rabot aspirantov L'vovsk. politekhn. in-ta, no. 2, 1963, 31-36

TOPIC TAGS: dislocation, etch pattern, decoration, cuprous oxide

TRANSLATION: The dislocations emerging to the ~(111) surface of Cu_2O were decorated by deposition of copper vapor. It was observed not only that the density of the dislocation etch pits and copper mounds were equal, but also that the etch pits equaled exactly the deposited copper particles which did not penetrate inside the crystal. A. Urusovskaya.

SUB CODE: SS ENCL: 00

Card 1/1

L 18117-63 EWP(q)/EWT(m)/BDS AFFTC/ASD JD

ACCESSION NR: AP3003902 S/0181/63/005/007/2007/2009

AUTHORS: Andriyevskiy, A. I.; Mocharnyuk, G. F.; Pidorya, M. M.

TITLE: Thermal vacuum etching of single cuprous oxide crystals

SOURCE: Fizika tverdogo tela, v. 5, no. 7, 1963, 2007-2009

TOPIC TAGS: etching, thermal etching, vacuum etching, crystal, Cu, O, dislocation structure, edge dislocation, etch pit

ABSTRACT: The authors have studied dislocations on the (100) and (111) faces of cuprous oxide crystals after heating them in a vacuum. The initial samples were obtained from cupric oxide at high temperatures. Plates of mineral specimens were placed in a quartz tube in which the temperature and pressure were chosen to allow heat treatment in the enivronments in which copper and cuprous oxide exist. The experiments were thus carried out under two different sets of conditions: 1) a temperature of 1000C and an oxygen pressure of 10^{-4} mm Hg (the environment of Cu), and 2) a temperature of 800C and an oxygen pressure of 1 mm Hg (the environment of Cu_2O). Heating of samples up to 8 hours under the first set of conditions produced only insignificant changes on the surfaces of the samples, but prolonged heating produced etch figures on both the (111) and (100) faces, reminiscent of chemical

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L 18117-63
ACCESSION NR: AP3003902

etching. The figures on the (100) face were characteristic of edge dislocations. Etching under the second set of conditions produced three-sided pyramidal pits with well-defined peaks, corresponding to dislocations emerging on the (111) face. The thermal etching of cuprous-oxide crystals makes it possible to study dislocation structure of these crystals at high temperature. Together with this, vacuum etching may prove to be an aid in this process of studying the mechanism by which the concentration of oxygen changes during the heat treatment of cuprous oxide. Orig. art. has: 2 figures.

ASSOCIATION: L'vovskiy politekhnicheskiy institut (Lvov Polytechnical Institute)

SUBMITTED: 02Jan63 DATE ACQ: 15Aug63 ENCL: 00

SUB CODE: PH, ML NO REF SOV: 004 OTHER: 005

Card 2/2

S/070/63/008/001/023/024
E132/E460

AUTHORS: Andriyevskiy, A.I., Mocharnyuk, G.F.

TITLE: The observation of dislocations in single crystals of cuprous oxide

PERIODICAL: Kristallografiya, v.8, no.1, 1963, 120-122

TEXT: Plates of Cu, 0.5 to 1 mm thick, vacuum treated, were oxidized at 1040°C and consisted of groups of single crystals emerging at the surface with different faces. There was a certain amount of preferred orientation. The most interesting plane is (111) and this occurred most frequently when the crystallites were not too large (0.2 to 5 mm). Copper was dissolved in 25% nitric acid until half the acid was expended and the resulting solution was used as a selective etch for the Cu_2O. The usual etching time was 10 to 60 sec. If there was a layer of CuO then another etch of composition 30% HCl, 30% NaCl and 30% $FeCl_3$ in equal quantities was first applied. After etching the (111) and (110) planes of the Cu_2O remain shining, but microscopic examination shows that they carry etch figures. (100) Planes look dark. Laue photographs show that (111) planes

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The observation of ...

S/070/63/008/001/023/024
E132/E460

were only rarely exactly parallel to the surface but were usually 1 to 2° away. On (111) faces the etch pits are sharp-edged triangular pyramids which are characteristic for pits formed on dislocations. The dislocation density on Cu_2O was estimated at 10^6 to 10^8 / cm^2. To check the correspondence of pits with dislocations, the surfaces at various depths through a crystal were compared. The dislocation density estimated from the etch pits corresponded with that estimated from the line width in X-ray diffraction. The dislocations are thought to arise from the volume change on oxidation, which causes strains and from thermal strains on cooling from the temperature of oxidation. There are 3 figures.

ASSOCIATION: L'vovskiy politekhnicheskiy institut
(L'vov Polytechnical Institute)

SUBMITTED: April 2, 1962

Card 2/2

ANDRIYEVSKIY, A.I.; MOCHARNYUK, G.F.

Appearance of dislocations on the cleavage planes of cuprous oxide. Kristalografiia 8 no.5:793-795 S-O '63. (MIRA 16:10)

1. L'vovskiy politekhnicheskiy institut.

L 42962-66 EWP(e)/EWT(m)/T/EWP(t)/ETI IJP(c) JD/JG/AT/WH
ACC NR: AR6024985 SOURCE CODE: UR/0081/66/000/007/B066/B066

AUTHOR: Pidorya, M. M.; Kocharnyuk, G. F.

TITLE: Some aspects of the growing of cuprous oxide single crystals

SOURCE: Ref. zh. Khimiya, Part I, Abs. 7B449

REF SOURCE: Sb. Materialy radioelektron. i elektr. mashiny. L'vov, L'vovsk. un-t, 1964, 19-21

TOPIC TAGS: cuprous oxide, single crystal growing

ABSTRACT: Cu_2O single crystals were grown by oxidizing Cu at 1060° for 10-40 hr. Cooling was accomplished in superheated steam at 150-200°. Etching on the (111) plane and x-ray diffraction (Laue method) showed that coarse Cu_2O crystals grown in an oxidized plate have several preferred directions of growth, (112), (113), (110). The (111) direction is generally parallel to the outer surface of the plates, or makes a 20° angle with it. L. Dem'yanets. [Translation of abstract]

SUB CODE: 20

Card 1/1

L 1351-66

ACCESSION NR: AP5021933

UR/0126/65/020/002/0216/0220
538.245:539.261

AUTHOR: Andriyevskiy, A. I.; Mocharnyuk, G. F.; Yuskevich, Yu. G.

33
B

TITLE: X-ray study of certain mixed ferrite cores

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 2, 1965, 216-220

TOPIC TAGS: ferrite core, stoichiometry, ceramic product, zinc, copper, crystal lattice parameter, solid solution

ABSTRACT: The authors present the results of a X-ray study of the phase composition and lattice parameter of Cu-Mn and Cu-Zn ferrite cores of different stoichiometric composition, synthesized by techniques used in the production of semiconductor ceramics. Pure oxides of iron, copper, and zinc, and magnesium peroxide were finely pulverized, mixed in the required proportions, compression-molded, and fired at 700-1250°C and investigated by X-ray and metallographic techniques. The cubic phase was found in all the specimens corresponding to copper ferrite and obtained from CuO + Fe_2O_3 and 1/2 Cu_2O + Fe_2O_3. Tetragonal modification could not be detected in any one of the specimens. Measurements of lattice parameter as a

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L 1351-66

ACCESSION NR: AP5021933

function of composition for a series of specimens of different ferrites revealed that the parameter continually varies with the composition, e.g. increasing with increasing content of zinc ferrite ($ZnFe_2O_4$) in copper ferrite ($CuFe_2O_4$). Thus, a continuous series of solid solutions exists in the system of Cu-Zn ferrites with different stoichiometric compositions, which is in agreement with the findings of other investigators. Continuous mutual solubility has also been established for the system of Cu-Mn ferrites. The lattice parameter depends on the ferritization temperature and, given a fixed firing time, increases with this temperature until it reaches a maximum at 1100°C. It is shown that the Curie temperature of Cu-Zn ferrites decreases with increasing lattice parameter. The curve of Curie point as a function of this constant may be represented by two rectilinear segments. Orig. art. has: 3 figures.

ASSOCIATION: L'vovskiy politekhnicheskiy institut (L'vov Polytechnic Institute)

SUBMITTED: 13Jul64 ENCL: 00 SUB CODE: MM, SS

NO REF SOV: 012 OTHER: 005

Card 2/2

MOCHARNYUK, R. F.

"Viscosity and Structure of Solutions of Alcohols and Acids in Acetone", a paper presented at the second conference on the Liquid State of Matter, Kiev, 30 May to 3 June 1955, Usp. Fiz. Nauk, April 1955

KOCHARNYUK, R. F.

"Physical Properties and Structure of Solutions of Alcohols and Acids in Benzene." Acad Sci Ukrainian SSR, Inst of Physical Chemistry Imeni L. V. Pisarzhevskiy, Kiev, 1955 (Dissertation for the Degree of Candidate of Chemical Sciences)

SO: Knizhnaya Letopis', No. 42, 6 Aug 55

MOCHARNYUK, R.F.

GOLIK, A.Z.; MOCHARNYUK, R.F.

Physical properties and structure of normal alcohol solutions in acetone. Ukr. khim. zhur. 24 no.1:29-32 '58. (MIRA 11:4)

1.Kiyevskiy gosudarstvennyy universitet im. T.G. Shevchenko.
(Alcohols) (Acetone) (Solution (Chemistry))

AUTHORS: Mocharnyuk, R. F., Lavrenko, V. A. [illegible]

TITLE: On the Method of Determining the Constants of the Logarithmic Equation for the Rate of Alloy Oxidation (O metodike rascheta konstant logarifmicheskogo zakona skorosti okisleniya splavov)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 6, pp. 1429-1430 (USSR)

ABSTRACT: For the description of the experimental curve showing corrosion versus time usually one of the four mentioned equations is used; two of them are suited for high temperatures and the third is given for low temperature. The fourth equation is rarely used, e. g. on certain conditions for iron and zinc and especially for aluminium and its alloys. Tamman and Köster (Ref 5) represented the logarithmic law of the rate of oxidation by means of an equation; the same was done by other authors, however, direct calculation of the constants is possible only according to the method employed by Champion and Whyte (Ref 7), and only this way a sufficient agreement with the data of the experiments is obtained. Until now this

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On the Method of Determining the Constants of the SOV/76-32-6-42/46
Logarithmic Equation for the Rate of Alloy Oxidation

method has, however, not been employed sufficiently. A derivation of the third of the four given equations is carried out; according to this method of calculation the curves showing corrosion versus time in the oxidation of iron-copper (30% Cu) at 300-400°C were analysed. The oxidation was carried out according to the usual method of continuous weighing. The results of the calculation are given. There are 1 figure and 7 references, 0 of which is Soviet.

ASSOCIATION: Akademiya nauk USSR, Institut metallokeramiki spetsplavov, Kiyev (Kiyev, Institute of Powder Metallurgy of Special Alloys, AS Ukr SSR)

SUBMITTED: September 27, 1957

1. Iron alloys--Oxidation 2. Aluminum alloys--Oxidation
3. Zinc alloys--Oxidation 4. Mathematics

Card 2/2

MOCHARNYUK, R F

PHASE I BOOK EXPLOITATION SOV/3559

Akademiya nauk SSSR. Institut metallurgii. Nauchnyy sovet po probleme zharoprochnykh splavov

Issledovaniya po zharoprochnym splavam, t. 5 (Investigations of Heat-Resistant Alloys, Vol 5) Moscow, Izd-vo AN SSSR, 1959. 425 p. Errata slip inserted. 2,000 copies printed.

Ed. of Publishing House: V.A. Klimov; Tech. Ed.: I.F. Kuz'min; Editorial Board: I.P. Bardin, Academician, G.V. Kurdyumov, Academician, N.V. Ageyev, Corresponding Member, USSR Academy of Sciences (Resp. Ed.), I.A. Oding, I.M. Pavlov, and I.F. Zudin, Candidate of Technical Sciences.

PURPOSE: This book is intended for metallurgical engineers, research workers in metallurgy, and may also be of interest to students of advanced courses in metallurgy.

COVERAGE: This book, consisting of a number of papers, deals with the properties of heat-resisting metals and alloys. Each of the papers is devoted to the study of the factors which affect the properties and behavior of metals. The effects of various elements such as Cr, Mo, and W on the heat-resisting properties of various alloys are studied. Deformability and workability of certain metals as related to the thermal conditions are the object of another study described. The problems of hydrogen embrittlement, diffusion and the deposition of ceramic coatings on metal surfaces by means of electrophoresis are examined. One paper describes the apparatus and methods used for growing monocrystals of metals. Boron-base metals are critically examined and evaluated. Results are given of studies of interatomic bonds and the behavior of atoms in metal. Tests of turbine and compressor blades are described. No personalities are mentioned. References accompany most of the articles.

AVAILABLE: Library of Congress

Card 9/9

VK/jb
[illegible]

S/137/61/000/010/046/056
A006/A101

AUTHOR: Mocharnyuk, R.F.

TITLE: The effect of cinder components of liquid fuel on the failure of gas turbine materials. Review.

PERIODICAL: Referativnyy zhurnal. Metallurgiya, no. 10, 1961, 48, abstract 10I336 ("Byul. In-t metallokeram. i spets. splavov AN UkrSSR, 1959, no. 4, 96 - 107)

TEXT: Fe, Co, Ni and Cr base alloys with admixtures of Mo, W, Nb, V and Ti are used as heat resistant metals for gas turbines. Rapid breakdown of the gas turbines is caused by the presence of V, S and alkaline components in the fuel whose combustion produces V_2O_5, Na_2SO_4 and Na_2S. At temperatures $> 650^{\circ}C$ corrosion proceeds at a high rate as a result of low-melting compounds or eutectics originated from the cinder-forming oxides (V_2O_5, Al_2O_3, CaO) and oxides of the initial material. The failure caused by Na_2SO_4 is obviously due to its reduction to Na_2S and the formation of metal-sulfide eutectics, which penetrates through the protective oxide film of the metal and spreads along its grain boundaries. The metal thus dissolved in the eutectics becomes very capable of reacting. Na_2SO_4 reduces the melting point of V_2O_5 and thus promotes a stronger breakdown

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A006/A101

of the material. Breakdowns are also caused by mixtures of alkaline metal sulfates and chlorides contained in the fuel. It was found that among the types of material investigated, Ni-base alloys proved to be most resistant against oxidation by the liquid fuel cinder. In this case relatively high-melting compounds are formed of Ni-oxides and cinder-forming oxides. However, in the presence of substances, containing S, the Ni-alloys lose these properties. Sharp oxidation in air was performed with alloys having such alloying admixtures as V, Mo and W, whose higher oxides have low melting points. The problem of preventing the accelerated failure of materials by liquid fuel cinder may be approximately solved by using different admixtures in the fuel, which form with the cinder-forming components of the fuel high-melting, stable compounds, and by employing enamel-type coatings. There are 32 references.

Ye. Layner

[Abstracter's note: Complete translation]

FRANTSEVICH, I.N., MOCHARNYUK, R.F.

Investigating the kinetics of high-temperature oxidation of iron-copper alloys. Vop. por. met. i prochn. mat. no.8:69-74 '60.
(MIRA 13:8)
(Iron-copper alloys--Corrosion)
(Metals at high temperatures)

FRANTSEVICH, I.N., MOCHARNYUK, R.F.

Investigating the kinetics of high temperature oxidation of Fe-Cu-Ti alloys. Vop. por. met. i prochn. mat. no.8:75-80 '60. (MIRA 13:8)

(Iron-copper-titanium alloys--Corrosion)
(Metals at high temperature)

MOCHARNYUK, R. F.

Studying the erosive deterioration of materials. Vop. por. met. i protekn. mat. no.9:81-86 '60. (MIRA 13:8)
(Materials--Deterioration)

88709

S/076/61/035/001/007/022
B004/B060

54160 1273

AUTHOR: Mocharnyuk, R. F. (Kiyev)

TITLE: Zirconium oxidation in work-hardened and recrystallized condition at high temperatures

PERIODICAL: Zhurnal fizicheskoy khimii, v. 35, no. 1, 1961, 112-117

TEXT: According to Ref. 1, the affinity of a metal toward oxygen is influenced by its deformation. According to Ref. 2, the formation of oxide layers on the metal surface at high temperatures is based on an electrochemical process taking place in the galvanic cell: metal - scale (oxide) - oxygen. The effect produced by upsetting of the metal (99.99% Zr) on this process has been studied with recrystallized and cold-worked specimens. Cylindrical specimens (h = 7.5 mm, d = 4-5 mm) were upset by 60%, by cold working at 280 kg/mm^2. Rockwell hardness rose from 12.92 to 48.92. The oxidation process was studied by continuous weighing for 50 hr. Figs. 1 and 2 show kinetic curves for normal (recrystallized) and upset Zr. The following equations were obtained for the increase in weight y:

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Zirconium oxidation in work-hardened ...

1) for normal Zr at 250°C: $y = 0.33 \cdot 10^{-3} \ln(0.057t+0.946)$ + $0.143 \cdot 10^{-3} \ln(0.091t+0.0648)$; at 300°C: $y = 0.145 \cdot 10^{-3} \ln(0.223t+1)$ + $0.2 \cdot 10^{-3} \ln(10.082t+0.287)$; at 400°C: $y = 0.90 \cdot 10^{-3} \ln(0.0515t+0.927)$ + $0.51 \cdot 10^{-3} \ln(0.051t+1)$; 2) for upset Zr at 200°C: $y = 0.56 \cdot 10^{-3} \ln(0.055t+0.055)$; at 300°C : $y = 0.8 \cdot 10^{-3} \ln(0.224t+0.697) + 0.4 \cdot 10^{-3} \ln(0.0523+1)$; at 350°C: $y = 0.625 \cdot 10^{-3} \ln(0.118t+1) + 1.6 \cdot 10^{-3} \ln(0.0275t+0.617)$; at 400°C: $y = 2.35 \cdot 10^{-3} \ln(0.03t+0.987) + 1.09 \cdot 10^{-3} \ln(0.063t+0.517)$. The first term of the equation characterizes the thickness of the thin oxide layer with n-type conductivity which is due to tunnel transition of electrons from the metal into the conductive layer of the oxide. The transition is caused by the tunnel effect. The second term holds for thicker oxide layers formed by ionic diffusion. Above 400°C, the formation of scales follows a parabolic law. The constant of the parabolic equation is given as $k = (E_c - E_a - P)Md/zF\varsigma$. ς = resistivity of the oxide; d = specific gravity

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of the oxide film; P = degree of polarization; z = valency; $(E_c - E_a - P)$ = emf of the cell. Table 1 gives the ratio $(E_c - E_a - P)_{cold\text{-}hard} / (E_c - E_a - P)_{norm} = R$:

Temperature	R
500°C	7.48
550°C	5.58
560°C	4.85
650°C	1.23

On the basis of experimental data, the following values were obtained for 500-650°C: $k = 1.35\exp(-29800/RT)$ for normal metal, and $k = 3.19\exp(-19870/RT)$ for upset metal. The temperature dependence of the electrical resistance of the oxide layer was determined on the basis of the electrochemical theory of oxidation. Fig. 5 shows the resistivity for upset and normal Zr as a function of temperature. The following values were obtained for 500-650°C: $H = 0.11 \exp(-24800/RT)$ for normal Zr, $H = 10^{-2}\exp(-19900/RT)$ for cold-hardened Zr. Fig. 6 shows the equilibrium

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Zirconium oxidation in work-hardened ...

constants of the reactions $Zr + O_2 \rightleftharpoons ZrO_2$ (1) and $Zr + 0.5N_2 \rightleftharpoons ZrN$ (2). The results obtained are in agreement with the basic principles of the electrochemical theory of oxidation. B. D. Grozin is mentioned. There are 6 figures, 2 tables, and 10 references: 3 Soviet-bloc and 7 non-Soviet-bloc.

ASSOCIATION: Institut metallokeramiki i spetssplavov, Akademiya nauk USSR (Institute of Powder Metallurgy and Special Alloys, Academy of Sciences UkrSSR)

SUBMITTED: April 27, 1959

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Zirconium oxidation in work-hardened ...

Legend to Fig. 1: a) time, hours
b) $g \cdot cm^{-1}$;

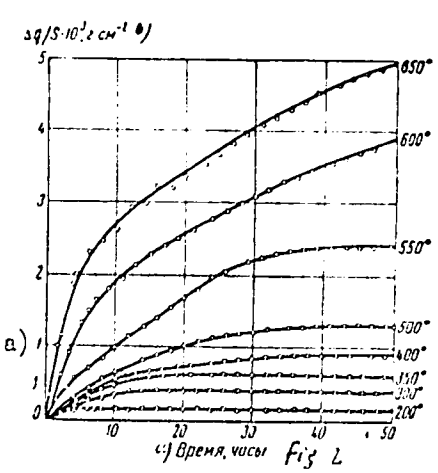

Fig. 2

Legend to Fig. 2: a)
b) $g \cdot cm^{-1}$;
a) time, hours

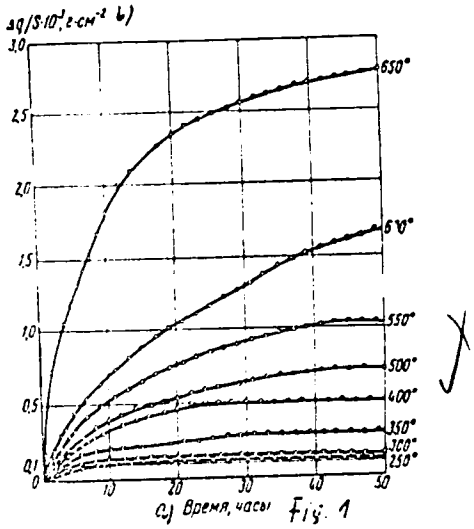

Fig. 1

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Zirconium oxidation in work-hardened ...

Legend to Fig. 5: 1: normal Zr;
2: upset Zr

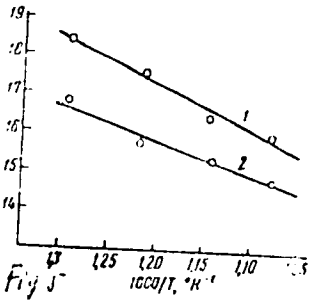

Fig 5

Legend to Fig. 6: a) temperature

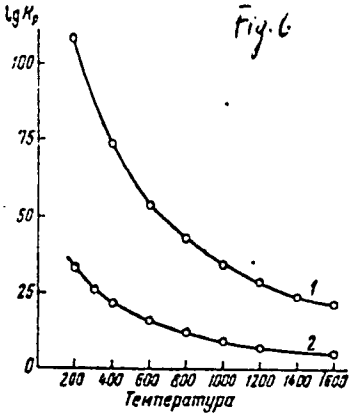

Fig. 6

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SOV/58-59-5-10598

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 5, pp 107 - 108 (USSR)

AUTHORS: Mocharnyukh, G.F., Bushuyev, S.S.

TITLE: The Sequence of Phase Formation in the Systems: Ag-Zn, Cu-Zn and Ni-Zn

PERIODICAL: Nauk. zap. Chernivets'k.un-t, 1955, Vol 12, pp 159 - 166 (Ukr.; Russ. résumé)

ABSTRACT: In the practice of metallurgical production and various technological applications of metallic objects, cases are encountered where two different metals or alloys are in direct contact. In this case conditions may be such that mutual diffusion becomes possible, leading to the formation of intermediate layers with properties other than those characteristic of the metals in contact. Particular interest attaches to the study of the rate of phase growth in intermediate layers and the sequence of their emergence under various conditions.

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SOV/58-59-5-10598

The Sequence of Phase Formation in the Systems: Ag-Zn, Cu-Zn and Ni-Zn

In experiments on the sequence of phase formation in the Ag-Zn, Cu-Zn, and Ni-Zn systems, powders of these metals were used at a 50% concentration. As a result of this study, it was established that in all cases the first phase to be detected by X-ray analysis is the γ -phase.

The authors' résumé

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BARSEGYAN, A.; MOCHARNYY, F.; SHEFTELEVICH, S.

New techniques in the haulage of containers. Avt.transp. 38 no.6:15-17 Je '60. (MIRA 14:4)
(Moscow--Truck trailers)

SHEFTELEVICH, S.S., inzh.; MOCHARNYY, F.A., inzh.

Efficient organization of transportation in containers. Zhel.dor. transp. 42 no.6:69-70 Je '60. (MIRA 13:7)
(Moscow--Railroads--Freight)

Mocharyan N. M.

C-3

USSR/Nuclear Physics - Elementary Particles

Abst Journal : Referat Zhur - Fizika, No 12, 1956, 33922

Author : Mocharyan, N. M., Saakyan, G. S., Ayvazyan, M. D., Kirakosyan, Z. A., Aleksanian, A. S.

Institution : Institute of Physics, Academy of Sciences Armenian SSR

Title : Nuclear Interaction of π^--Mesons in Copper

Original Periodical : Dokl. AN SSSR, 1955, 105, No 6, 1204-1207

Abstract : A magnetic spectrometer was used to study the spectra of creation of π^--mesons, generated in copper absorbers at an altitude of 3,250 m. Approximately 500 π^--mesons with a total energy exceeding 510 Mev were recorded. The energy spectrum of the resulting π^--mesons can be approximated by a power law with an index $\gamma = 2.2$. The magnitude of the interaction cross section of π^--mesons with copper nuclei turned out to be weakly dependent on the energy and close to its geometrical value.

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32949

IC CCCO 2917

AUTHOR: Mochek, P., Engineer

TITL:

SOURCE: Grazhdanskaya ...

TEXT: The design and performance ... Ил-18 (Il-18) ... are described. The ... sion of the Ил-18 (Il-18) aircraft, ... stop flying range of 6,500 km, can carry a payload of ... kg, and can seat 119 - 125 passengers. The design modifications include: The length of the pressurized part of the fuselage has been increased from ... to 32 ... heads, the rear baggage hold has been eliminated, and the turbo-prop motor plant driving the АИ-20 (AI-20) engines has been moved from the rear baggage hold to a special bay in the center of the fuselage. The wing has four sections consisting of five parts: two center sections in the inner wing and one on the inner wing, and two detachable cantilever sections. On the wing there are 22 flexible and 4 integral fuel tanks. Two of the integral fuel tanks are fixed to the outer center-sections, and the remainder to the cantilever sections. Thus, without altering the wing dimensions, the total wi-

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Flight range - 6[illegible]00

[illegible]me of the fuel system of the aircraft has been increased by 8[illegible]. There are provisions for overwing or underwing refueling. A 2,[illegible]-long runway [illegible] standard weather conditions are necessary if the aircraft is to [illegible] with a maximum loaded weight of 6[illegible] tons. Take-off speed is [illegible] 210 - 215 km/hr. The Il-18I successfully underwent tests on [illegible] on the Moscow-Irkutsk, Moscow-Vladivostok, Khabarovsk-Tashkent, Irkutsk-Moscow-Leningrad-Moscow, and Tashkent-Arkhangel'sk-Moscow [illegible]. In flight range and load capacity, the Il-18I is considered second only to the Tu-114 (Tu-114) amongst aircraft serving Aeroflot. In efficiency and transport costs, it is considered the best Soviet heavy transport aircraft now in operation. There are 3 figures.

[illegible]

L 2461-66 EWT(d)/EWT(m)/EWP(w)/FA/T-2/EWP(h) EM
ACCESSION NR: AP5024301 UR/0084/65/000/010/0020/0020

AUTHOR: Kochek, D. (Engineer)

TITLE: New Soviet IL-18 modification

SOURCE: Grazhdanskaya aviatsiya, no. 10, 1965, 20

TOPIC TAGS: aircraft industry, civil aircraft data, aircraft, aircraft fuel system, aircraft specification, aircraft performance/ Il-18D aircraft, Il-18 aircraft

ABSTRACT: Under the supervision of Designer-in-Chief S. V. Il'yushin, the Il-18D, a new 65—122 passenger version of the Il-18, has been developed. The new model features an increased fuel capacity, from 23,700 to 30,000 liters, thus extending its nonstop range to 6500 km. The extra fuel is carried in an auxiliary tank section in the underbelly of the wing center section. The tank section has two transfer pumps and is filled through the other tanks adjacent to the inboard ribs of the wing center section. The tank section is protected against fire, and its fuel is pumped first to the left and right wing tanks. The rest of the fuel system is the same as on the Il-18. For economy on 6500-km nonstop flights at a cruising speed of 625 km/hr, the maximum take-off weight

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has been increased by 3800 kg to a total of 64,000 kg.

The Il-18D has 4 AI-20M engines, each developing the equivalent of 4250 hp at take-off. The take-off run at maximum take-off weight is 1350 m; under normal conditions, the distance required in case of an aborted take-off is 2000 m. The first production models are undergoing tests and it is expected that Il-18D's will go into service in the Soviet Union and abroad in 1966.

ASSOCIATION: Gosudarstvennyy nauchno-issledovatel'skiy institut Grazhdanskoy aviatsii (State Research Institute of Civil Aviation)

SUBMITTED: 00 ENCL: 00 SUB CODE: AC

NO REF SOV: 000 OTHER: 000 ATD PRESS: 4098-F

EVK

Card 2/2

BICH, N., podpolkovnik; BOGDANOV, N., gvardii kapitan; MOCHENEV, A., kapitan

Life demands. Voen.vest. 41 no.12:60-62 D '61. (MIRA 15:3)
(Russia---Army--Personnel records)

BRAVO-SHIVOTOVSKIY, D.M.; YEREMIN, B.G.; ZAGRYADSKIY, Ye.V.; MILLER, M.A.; Mochenev, S.B.

Experimental study of electron-beam motion in slightly inhomogenous high-frequency fields. Izv.vys.ucheb.zav.; radiofiz. 2 no.1:94-100 '59. (MIRA 12:10)

1. Issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete.

(Electron beams)

45629

S/141/62/005/006/014/023
E192/E382

24.2500

AUTHOR: Mochenev, S.B.

TITLE: Characteristics of a parallel electron gap in the presence of an external field

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, v. 5, no. 6, 1962, 1171 - 1174

TEXT: The gap is formed by an "input" plane and a collector with a high-frequency potential barrier between them. If the amplitude r_1 of the oscillations of the particles satisfies the inequality (M.A. Miller, Izv. vyssh. uch. zav. - Radiofizika, 2, 456, 1959):

$$r_1 \ll L_o, \quad \frac{r_1}{L} \sim \frac{r_1}{L_o} \frac{E_o}{E} \ll 1 \qquad (1),$$

the oscillatory motion of the particle is independent of the static field E_o and the averaged equation of motion is:

$$\ddot{\underline{r}}_o = -\eta \nabla (V + \Phi) \qquad (2).$$

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Characteristics of ....

In Eq. (1) L_o and L are the characteristic distances at which φ and the high-frequency field E change substantially. The electrostatic potential V and the high-frequency potential Φ in Eq. (2) are expressed by:

$$E_o = -\nabla V, \qquad \Phi = \eta |E|^2/4\omega^2 \qquad (3) .$$

The electrostatic potential can be determined from the Poisson equation:

$$\frac{d^2V}{dx^2} = \frac{j}{\varepsilon_o v(x)} \qquad (4)$$

where j is the current density and the velocity $v(x)$ of the particles is given by:

$$v(x) = \dot{x} = \sqrt{2\eta(V + \Phi)} \qquad (5) .$$

In order to solve the system it is assumed that the potential barrier is parabolic:

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Characteristics of ....

$$\Phi = \Phi_o \left(\frac{x}{d}\right)^2 - 2\Phi_o \frac{x}{d} \qquad (6)$$

The general solution for this case is:

$$\xi = \frac{2y}{9\psi_o^{1/2}} \left\{ 2\sqrt{w(w+1)} + C - \ln\left[2\sqrt{w(w+1)} + C + 2w + 1 \right] \right\} \qquad (9)$$

where:

$$\xi = \frac{x}{d}, \quad \eta = \frac{V + \Phi}{V_o}, \quad \psi = \frac{\Phi}{V_o} \left(\psi_o = \frac{\Phi_o}{V_o} \right), \quad y = \frac{j/\epsilon_o \sqrt{2\eta}}{4V_o^{3/2}/9d^2} \qquad (7)$$

and:

$$w = \frac{9\psi_o \sqrt{\eta}}{4y} .$$

The integration C in Eq. (9) is zero if the system has a cathode of unlimited emissivity or contains a virtual cathode. The

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Characteristics of ....

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distribution of the total potential $V + \varphi$ in the vicinity of the virtual cathode is similar to that of the normal parallel diode. There are 2 figures.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radiophysics Institute of Gor'kiy University)

SUBMITTED: April 17, 1962

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L 10365-63
ACCESSION NR: AP3002732 S/0120/63/000/003/0108/0112

AUTHOR: Yeremin, B. G.; Mochenov, S. B. 44

TITLE: Power measurement at shf by means of a probing electron beam

SOURCE: Pribory i tekhnika eksperimenta, no. 3, 1963, 108-112

TOPIC TAGS: shf waveguide channels, pulse power measurements

ABSTRACT: A method for measuring pulse power in an shf waveguide channel, which utilizes the phenomenon of electron reflection from hf potential barriers, was experimentally investigated by means of a model for measuring pulse power in the 3-cm wavelength band. The device consisted of the vacuum section of a waveguide channel, a source of accelerating pulse voltage, and a null indicator for collector circuit current. Fig. 1 of Enclosure is a schematic diagram of the vacuum section, which is a rectangular waveguide section 10 x 23 mm in cross section closed at the ends with mica windows that by continuous evacuation insure a vacuum of not less than 10 sup -6 mm Hg and a standing wave ratio of not more than 1.1. The axis of the electron beam passes through the electric field maximum of the waveguide. Exponentially decreasing waves are excited within the apertures made in the wide waveguide walls, so that the hf potential along the axis of the apertures has the

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ACCESSION NR: AP3002732

shape of a smooth potential barrier with its maximum in the waveguide center and its zero points in the apertures. The electron beam is shaped by a gun consisting of an oxide-coated cathode with an emitting spot 1 mm in diameter and an accelerating electrode in the form of a grid placed at a distance of 0.3--0.4 mm from the cathode. In order to obtain a working current of approximately 1 microamp, a longitudinal focusing magnetic field of about 200 oe is applied. The potential of the collector is made somewhat higher than that of the waveguide. The velocity of the beam electrons entering the interaction space is determined by the difference between the cathode and grid potentials of the gun. The 25-I pulse oscillograph serves as the null indicator. The results obtained have been compared with the data determined by the calorimetric method; it is concluded that the error in determining cutoff voltage is approximately + or - 1 v. At low power (20 kw), the relative error of measuring power increases to + or - 50%, at approximately 200 kw it is only + or - 5%. These data show that within an accuracy of + or - 1 v for cutoff voltage and + or - 10 kw for power measurements of pulse power by means of the investigated model may be carried out without preliminary calibration. Orig. art. has: 5 figures and 7 formulas.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut GGU (Scientific Research Institute of Radiophysics GGU)

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APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R001134820014-7"