

SMIRNOV, N.S., prof. (Moskva)

Significance of gastroscopy in peptic ulcer. Klin.med. 37 no.10:  
45-47 0 '59. (MIRA 13:2)  
(PEPTIC ULCER diagnosis)  
(GASTROSCOPY)

SMIRNOV, Nikolay Sergeevich, prof.; VOLGAREVA, N.P., red.; BUL'DYAYEV,  
N.A., tekhn. red.

[Gastroscopy; method, technic, use, and clinical significance]  
Gastroskopiia; metodika, tekhnika primeneniia i klinicheskoe  
znachenie. Izd.2. Moskva, Medgiz, 1960. 210 p. plates.  
(MIRA 14:12)

(GASTROSCOPY)

SMIRNOV, N. S.

"On the Behavior of Copper, Lead, and Iron in Molten Tin During Tin Plating." Cand Tech Sci, Ural Polytechnical Inst imeni S. M. Kirov, Chair of the Metallurgy of Heavy Nonferrous Metals, Min Higher Education USSR, Sverdlovsk, 1955. (KL, No 9, Feb 55)

SO: Sum. No. 631, 26 Aug 55-Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (14)

SMIRNOV, N. S.

✓ An Investigation of the Processes taking place during Hot Tinning of Steel Sheets. I. A. Kakovskii and N. S. Smirnov. (Izvestiya Akademii Nauk SSSR, O.T.N., 1955, 12, 48-57). [In Russian]. It was shown that wetting of sheets by molten tin is the basic process on which all further effects (diffusion of tin into iron, uniformity of tin layer) depend. Lead was found to be a surface-active admixture in tin, it improves wettability of steel sheets by tin, and decreases the induction time. Copper and iron in tin (the latter as a suspension of crystals of  $FeSn_2$ ) have the opposite effect. Flux (a solution of zinc chloride) used in tinning has a deciding influence on the wettability of iron by tin, it decreases the induction time to below 0.2 sec.—V. O.

2

Metal

of

SMIRNOV

ZASUKHA, P.F., inzhener; SMIRNOV, N.S., kandidat tekhnicheskikh nauk.

Efforts to avoid copper impurities in the tinning pot. *Metiz.proizv.*  
no.1:105-111 '56. (MLBA 10:2)

1. Ural'skiy nauchno-issledovatel'skiy institut chernykh metallov i  
Severskiy metallurgicheskiy zavod.  
(Tin plating)

KIREYEVA, A.V.; KULIKOVA, I.M.; PLOTNIKOVA, K.G.; SMIRNOV, N.S., kandidat  
tehnicheskikh nauk

Preparing a ChM protective admixture for tin pickling. Metallurg  
2 no.1:31 Ja '57. (MLRA 10:4)

1. Severskiy metallurgicheskiy zavod.  
(Tin) (Metals--Pickling)

133-8-15/28

AUTHORS: Smirnov, N.S., Kireyeva, A.V. and Bokareva, T.B. (Technician).

TITLE: Methods of decreasing the need for retinning of tin plate.  
(Puti sokrashcheniya povtornogo luzheniya beloy zhesti).

PERIODICAL: "Stal'" (Steel), No.8, 1957, p.731 (USSR).

ABSTRACT: Causes of the formation of defects on a tinned surface were studied. It was established that the main cause of defects which require retinning of sheets, are impurities on the surface of sheets, namely pickling products (iron salts) and organic substances (lubricants, pickling additives). In order to decrease the proportion of defects an additional washing combined with the brushing of sheets (after the magnetic feeder) is proposed. I.M.Kulikova and R.G.Roze participated in the investigation.

ASSOCIATION: Severskiy Metallurgical Works. (Severskiy Metallurgicheskiy Zavod).

AVAILABLE: Library of Congress

Card 1/1

*Smirnov, N. S.*

24-11-5/31

AUTHORS: Kakovskiy, I. A. and Smirnov, N. S. (Sverdlovsk)

TITLE: On the solubility of iron in molten tin. (O rastvorimosti zheleza v rasplavlennom olove).

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1957, No.11, pp.44-51 (USSR)

ABSTRACT: The solubility was studied of iron in molten tin in the range of existence of  $FeSn_2$ , at the temperature range of tinning, which is 250 to 480°C. Formulae are derived for calculating the solubility of iron in the molten tin at these temperatures and the behaviour is explained of metallides in a molten metal, which is one of the components of metallide. According to available data, it can be assumed that the solubility of iron and tin is very limited and the iron usually detected in tin consists fundamentally of suspended  $FeSn_2$  crystals. Experimental results on the solubility of the system iron-tin, as well as of other analogous systems, have so far not been theoretically evaluated. This is due to the fact that the considered system, as well as similar systems, represent a particular case of metallic solutions which cannot be considered as an ideal nor as a regular solution. The authors believe

Card 1/3 that interpretation of experimental data in such systems



SMIRNOV, N.S.

FOMINA, O.A.; SMIRNOV, N.S.; YERMAKOVA, M.D.; YAKOVLEVA, Z.Ya.; GARVILOV, G.A.

Brief reports. Zav. lab. 23 no.5:593 '57. (MLBA 10:8)  
(Spectrum analysis) (Metallurgical analysis)

S. I. Popel, O. A. Esin, G. F. Kosova-

27

10  
1-452 C

Effects of sulfur on the phase boundary tension between metals and slags. S. I. Popel, O. A. Esin, G. F. Kosova-  
 loy and N. S. Smirnov (S. M. Kirov Leningrad Polytech. Inst.,  
 Sverdlovsk, ~~Doklady Akad. Nauk S.S.S.R.~~ *117*, 104-8  
 (1957). For the desulfuration of molten steel, and the  
 behavior of slag inclusion in lagot casts the surface tension  
 conditions on the phase boundary metal/slag are of primor-  
 dial importance. S is known to decrease considerably the  
 surface tensions, and to promote wetting characteristics on  
 solid surfaces (cf. Kozakevich, *et al.*, *C.A.* 49, 8063).  
 The authors used the same x-ray shadow-casting method  
 previously described (*C.A.* 45, 2743; 46, 8581), pure Fe,  
 FeS, and two synthetic slag compns., one similar to steel,  
 the other to blast-furnace slags (with 35% and 47% CaO,  
 27.3% and 1.0% FeO, resp.) were fused in MgO or Al<sub>2</sub>O<sub>3</sub>  
 crucibles. Dissolving of the crucible material did not af-  
 fect the phase-boundary phenomena. The shape of the  
 metal drops on the slag melts are considerably changed  
 (flattened) if the S content in the metal is increased, the  
 surface tension is decreased. At 1530° to 1570° the sur-  
 face tension of pure Fe to the slags is 1015, and 700 ergs/sq.  
 cm., and decreased to about 500 and 350 ergs/sq. cm., resp.,  
 if 2% S was added to the melt. The exptl. results are im-  
 portant for the study of the transition of S from the metal  
 melts into the slags, and explain the great stability of non-  
 metallic inclusions in steel if they contain much S and FeO  
 in the same time. Such emulsions do not easily coalesce  
 because the electrokinetic potential impeding this process is  
 considerably changed by the action of S (cf. Deryagin, *C.A.*  
 32, 3232\*).  
 W. Eitel

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*Handwritten initials and marks*

BOLOTOV, I.Yo.; SEREBRYAKOVA, I.B.; SMIRNOV, N.S.

Effect of ponderomotive forces on the formation of coating  
obtained by hot zinc plating [with summary in English]. Inzh.-fiz.  
zhur. no. 9:113-115 S '58. (MIRA 11:10)

1. Ural'skiy institut chernykh metallov, g. Sverdlovsk.  
(Zinc plating)

PERMINOV, A.A., inzh.; POPEL', S.I., kand. tekhn. nauk, dotsent;  
SMIRNOV, N.S., kand. tekhn. nauk.

Wettability of iron and its oxides by molten silicates.

Izv. vys. ucheb. zav.; chern. met. no.12:35-39 D '58.

(MIRA 12:3)

1. Ural'skiy nauchno-issledovatel'skiy institut chernykh metallov

i Ural'skiy politekhnicheskiy institut.

(Adhesion--Testing)

(Surface tension)

NS Smithson

15(2)  
AUBORA

SOV/72-36-12-24/23

Yargin, V.K.  
Conference on Enamels and Metal Enameling  
(Sovetskoye po emalyam i smaltirovaniyu ustalov)

PERIODICAL: Steklo i keramika, 1956, Nr 12, pp 47-48 (USSR)

ABSTRACT:

The organizers of the conference were Leningradskoye oblastnoye nauchno-tekhnicheskoye obshchestvo promyshlennosti stroitel'nykh materialov (Leningrad Oblast Scientific and Technical Society of the Industry of Building Materials), Leningradskiy sovetskoye (Leningrad Council of National Economy) and Leningradskiy tekhnologicheskii institut (Leningrad Institute of Technology). The program of the conference included the most important problems of enamel synthesis, enameling of metal products and industrial apparatus. About 250 experts took part in the conference, representatives from works in the USSR, Ural, Novosibirsk, Udmurt, Kazakhstan, Azerbaijan, as well as functionaries of the universities, of the scientific research and design institutes in Leningrad, Moscow, Novosibirsk, Muzhkovskoye, Svetlovskoye, Krasnodar, Khabarovsk, Yuzhnoye, Kiev, and other cities. The conference was organized by Professor V.S. Yargin, the director of the LTI Leningrad. In his opening speech stressed the great economic importance of the problem of enameling metal products and apparatus.

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Ye.I. Ilyinova (LTI Leningrad) reported on the influence of metal quality on the enamel coating of "fish-scale" in enameling. A.A. Zhelez, with his khimii silikato AN SSSR (Institute of Silicate Chemistry of the USSR), spoke on the present stage of the problems concerning the properties of glass and enamels according to their composition.

M.V. Serebryakova (LTI Leningrad) gave a survey of foreign literature of enamel and metal enameling.

M.S. Lifshits, Nauchno-issledovatel'skiy institut sanitarnoy tekhniki (Scientific Research Institute of Sanitary Engineering) reported on the enameling of products in the electric field of a corona discharge.

I.G. Patrulya, Leningradskiy issledovatel'skiy institut (Leningrad Institute of Research) reported on the character of interaction between metals and melted enamel.

M.S. Seimov, Ural'skiy nauchno-issledovatel'skiy institut khimiy polimerov (Ural Institute of Chemical Research Institute of Polymer Chemistry) reported on the influence of the condition of the steel surface on the formation of the enamel coat.

A.I. Borisenko, Institute of Silicate Chemistry of the AN USSR, spoke on the new method of obtaining thin silicate coats of enamel solutions.

Ye.M. Fudateyev spoke on a new enameling method with heating of the products by high frequency electric fields.

P.M. Kuznetsov, Ural'skiy nauchno-issledovatel'skiy institut khimiy metallov (Ural Institute of Chemical Research Institute of Metallurgy) gave information on new enamels used by the factory.

T.I. Polyubash, Novosibirskiy tekhnologicheskii issledovatel'skiy institut metallurgicheskoye (Novosibirsk Institute of Metallurgical Research) reported on the dependence of the wetting angle and the enamel deliquescence on the correlation of boric acid and boric salts.

Card 2/6

SOV/81-59-16-56921

Translation from: Referativnyy zhurnal. Khimiya, 1959, Nr 16, pp 136-137

AUTHORS: Fomina, O.A., Smirnov, N.S.

TITLE: The Spectral Method of Determining Admixtures in the Tin of Tinning Pots

PERIODICAL: V sb.: Materialy 1-go Ural'skogo soveshchaniya po spektroskopii, 1956.  
Sverdlovsk, Metallurgizdat, 1958, pp 68-69

ABSTRACT: The spectra are excited in a discharge of a condensed spark from an IG-2 generator at a capacitance of 0.01  $\mu$  farad and a self-induction of 0.55 millihenry and are photographed with an ISP-22 spectrograph. The sample in the form of rods is cast into a chill mold; the butts of the rods are carefully leveled to a plane. A Ni-electrode sharpened to a cone with an area of 1 mm in diameter is used as a permanent electrode. The value of the operation gap is 2 mm, of the auxiliary gap 2.5 mm; the preliminary spark treatment for Pb, Cu and Bi is 5 sec at an exposure of 1 min. The determination of As, Te, Sb, Al and Zn is carried out without spark treatment by the superposition of the spectra with a double exposure in the

Card 1/2

PERMINOV, A.A., inzh.; POPEL', S.I., kand.tokhn.nauk dots.; SMIRNOV,  
N.S., kand.tokhn.nauk; ZHUKOVA, V.P., inzh.

Adhesion of molten silicates to low-alloy steels. Izv.vys.  
ucheb.zav.; chern.met. 2 no.10:3-7 0 '59. (MIRA 13:3)

1. Ural'skiy politekhnicheskii institut. Rekomendovano kafe-  
droy teorii metallurgicheskikh protsessov Ural'skogo  
politekhnicheskogo instituta.

(Steel--Metallurgy) (Silicates)

S/133/61/000/001/016/016  
A054/A033

AUTHORS: Serebryakova, I. B., Engineer, Men'shikova, Z.P., Engineer, and Smirnov, N. S., Candidate of Technical Sciences

TITLE: Effects of Impurities in Zinc on its Fluidity During the Galvanization of Steel

PERIODICAL: Stal', 1960, No. 1, pp. 92 - 94

TEXT: Studies of the behaviour of zinc coatings during the galvanization process of steel revealed that the longer zinc is kept fluid (under the influence of metalostatic pressure) the less zinc will be carried off by the galvanized steel product. Since the flowability of zinc greatly depends on its composition, experiments were carried out to establish the flowability of zinc with various iron, lead, tin and aluminum additions. It was found that about 0.05 - 0.07% iron in the alloy does not modify its flowability considerably; an iron content of about 0.075% even improves it, but larger percentages of iron reduce the flowability of the zinc alloy. A lead-content under 0.5% reduces the flowability of the zinc-alloy; when added in larger amounts, however, it improves the fluidity, because in this case, the alloy divides into two non-miscible

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S/133/61/000/001/016/016  
A054/A033

Effects of Impurities in Zinc on its Fluidity During the Galvanization of Steel

Zinc consumption,  
kg/t of product

197 231 344 307 217 209 178

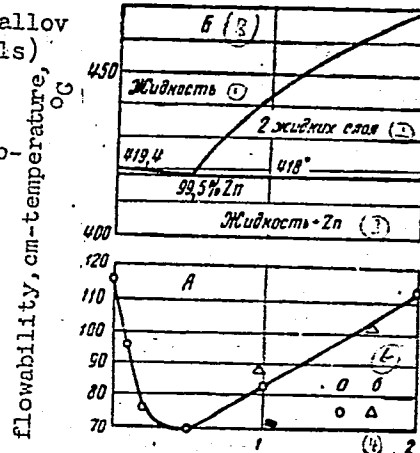
There are 5 figures and 15 references, 7 Soviet and 8 non-Soviet.

ASSOCIATION: Ural'skiy institut chernykh metallov  
(Ural Institute of Ferrous Metals)

Figure 3:

The dependence of the zinc flowability on its Pb-content (A) and the corresponding sector of the constitutional diagram of the Zn-Pb system (B)

a - electrolyte zinc; b - distillation zinc  
1 - liquid; 2 - 2 liquid layers; 3 - liquid + Zn; 4 - lead content, %



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*Smirnov, N.S.*

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82110  
S/184/60/000/02/02/006

AUTHORS: Svetlov, V.A., Engineer, Smirnov, N.S., Candidate of Technical Sciences, Kakovskiy, I.A., Doctor of Technical Sciences, Professor

TITLE: To the Study of Acid Resistance of Enameled Chemical Equipment

PERIODICAL: Khimicheskoye mashinostroyeniye, 1960, No 2, pp 27 - 30

TEXT: The authors describe methods of determining and improving the acid resistance of enamels. In the USSR and abroad (Refs 1 - 7), enamels have been developed which do not lose more than 0.1 - 1.0% of weight when boiled in hydrochloric acid during four hours. Nevertheless, there are failures of equipment due to an insufficient resistance of enamel coatings. The destruction of coatings does not appear over the entire surface, but only in some places. One of the reasons for failures of enameled chemical equipment are pores and microcracks which originate during the manufacturing process and during the operation of the equipment under the influence of an aggressive medium, especially at great temperature differences. The existing method of studying the acid resistance of enamel coatings by determining the amount of enamel components leached out by an aggressive solution from a surface unit

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To the Study of Acid Resistance of Enameled Chemical Equipment

where  $K = \frac{1}{\sqrt{\chi^2 + \frac{\omega^2 \epsilon^2}{1296 \cdot 10^{22} \pi^2}}}$  ;

$l$  - thickness of enamel layer;  $S$  - surface of coating;  $\chi$  - specific conductivity of enamel;  $\omega$  - a.c. frequency;  $\epsilon$  - dielectric constant of enamel. The resistance changes of an enamel coating due to the solution of enamel components can be represented graphically by a straight line with a gradient  $\frac{K}{S}$ . For the case of pores and microcracks formed in the enamel coating the resistance of the coating is:

$$z_2 = \frac{l}{\sqrt{\mu^2 \left(\frac{q}{n_u}\right)^2 + 2 \mu \chi S \left(\frac{q}{n_u}\right) + \frac{S^2}{K^2}}} \quad (2)$$

where  $q$  - summary surface of the equivalent section of pores and microcracks;  
 $\mu$  - specific conductivity of the aggressive medium;  $n_u$  - coefficient of sinuosity of pores, approaching one. The resistance change of an enamel

Card 3/6

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S/184/60/000/02/02/006

To the Study of Acid Resistance of Enameled Chemical Equipment

coating due to pores and microcracks is represented by an hyperbola equation. The following values determine the accuracy of the method. Enamels have a dielectric constant of about 10. Specific active electric conductivity of enamel can be determined by the tangent of the dielectric loss angle which is  $10^{-1}$  at a temperature of 100 - 150°C. The specific electric conductivity of an aggressive medium (hydrochloric acid) has a value of about 1/ohm·cm. The resistance of 1 cm<sup>2</sup> of a 1 mm enamel coating is about 10<sup>8</sup> ohms. Calculations show that the resistance of an enamel coating is 10<sup>7</sup> ohms, i.e., it decreases by a factor of 10 if the total surface of pores and microcracks is 10<sup>-8</sup> cm<sup>2</sup>, (equivalent diameter of 1 micron). Such a resistance change can be easily recorded by modern instruments. Figures 3 and 4 show the circuit for measuring the resistance of an enamel coating exposed to 20% boiling hydrochloric acid and the measuring cell, respectively. The resistance was measured by comparing the voltage drop in the measuring cell with that in the entire electric circuit consisting of the measuring cell and of a noninductive resistance box. A "BKC-7B" (VKS-7B) cathode voltmeter (3 Megohms) was used. The tests were carried out as follows. Drosses of "Э-1" (E-1) and No "2237" and "2235" acidproof enamels (rated composition: SiO<sub>2</sub> - 58.13%; Al<sub>2</sub>O<sub>3</sub> - 2.14%; B<sub>2</sub>O<sub>3</sub> - 1.94%; Na<sub>2</sub>O -

Card 4/6

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S/184/60<sup>82110</sup>/02/02/006

To the Study of Acid Resistance of Enameled Chemical Equipment

An attempt was made to preserve the protective properties of the film by a 3-hour heat-treatment at 200° and 400°C. The film was fused with the adjoining enamel layer at 1,000 - 1,100°C and was treated with molten paraffin at 230°C for 0.5 hours. In all cases a noticeable electric resistance increase was achieved which remained constant for a long time. The methods of increasing the acid resistance of enamel coatings were tested under industrial conditions (distillation of germanium tetrachloride from a boiling hydrochloric acid solution containing aggressive components). As a result the life of the enamel coating increased by a factor of 7, compared with other enameled chemical equipment.

There are: 3 circuit diagrams, 1 diagram, 2 graphs and 13 references: 11 Soviet, 1 American and 1 Czech.

UH

Card 6/6

Podkletnov, Ye. N., Stalin Prize Winner, ed.

Emal' i protsessy emalirovaniya (Enamels and Enameling Processes) Moscow, Mashgiz, 1961. 113 p. 4,000 copies printed.

Sponsoring Agency: Gosudarstvennyy nauchno-tekhnicheskiy komitet Soveta Ministrov UkrSSR. Institut tekhnicheskoy informatsii.

Ed.: N. P. Onishchenko; Tech. Ed.: M. S. Gornostaypol'skaya; Chief Ed.: Mashgiz (Southern Dept.): V.K. Serdyuk, Engineer.

PURPOSE: This book is intended for engineering and technical personnel concerned with the research, production, and uses of enamel.

COVERAGE: This collection of articles on enamels and enameling processes is based on material presented at the first Ukraine-wide conference on the production of enamel and enameled equipment, organized by the State Scientific Technical Committee of the Ukrainian SSR, the Kiyev Sovnarkhoz, Chemical

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Enamels and Enameling Processes		SOV/5583
Vargin, V. V. Some Problems Regarding the Composition, Properties, and Technology of Enamels for Chemical Equipment		15
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Svetlov, V. A., N. S. Smirnov, and I. A. Kikovskiy. Increasing the Chemical Stability of Enamel Coatings		44
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S/081/63/000/004/025/051  
B187/208

AUTHORS: Smirnov, N. S., Zhukova, V. P., Ovchinnikova, V. I.

TITLE: Effect of decarbonization of a steel surface on the stability of an enamel coating

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 4, 1963, 440, abstract 4M146 (Tr. Uralskogo n.-i. in-ta chern. metallov, v. 1, 1961, 211 - 219)

TEXT: The authors study the factors that influence the adhesiveness of an enamel coating on steel. The optimum adhesiveness of the enamels on the metal is obtained at an oxidation rate of the steel in air corresponding to an increase in weight of 5 - 7 mg/cm<sup>2</sup> per 10 min at 860 - 900°C. Alloying of low-carbon steel with metals which reduce its oxidation rate to an optimum value improves the adhesiveness of the enamels on the metal. An analogous effect is achieved by the strong reducers aluminum and silicon. The adhesiveness of the enamels decreases with increasing carbon content of the steel. Alloying of the steel with those metals that form more stable carbides than iron carbide (titanium, vanadium, chromium)

Card 1/2

Effect of decarbonization of a ...

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B187/B208

results in a better adhesiveness of the enamels on steel up to a certain limit. This limit corresponds to the complete binding of the total carbon contained in the steel to the most readily formed carbides of these metals. Removal of grease in the upper layers of the steel increases the adhesiveness of the enamels on the steel base. [Abstracter's note: Complete translation.]

Card 2/2



S/137/62/000/003/063/191  
A006/A101

1.1605

AUTHORS: Nikitin, Yu. P., Smirnov, N. S.

TITLE: On the part of electrochemical interaction in sintering processes of metals and oxides

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 3, 1962, 41, abstract 3G282 ("Poroshk. metallurgiya", 1961, no. 4, 26 - 30, English summary)

TEXT: The authors studied the rate of ion exchange between some metals (Fe, Ni, Cu, W) and molten enamels of various composition. The activation energy of this process was 25 - 30 kcal/g-atom. The rate of ion exchange depends slightly on the metal nature, but changes substantially with temperature. The diffusion coefficients of Fe-ions in enamels at 1,040°C were evaluated.

R. Andriyevskiy

[Abstracter's note: Complete translation]

Card 1/1

2005

Reaction of enamel melt with steel

S/153/61/004/004/010/013

E111/E555

reactance, the equivalent circuit of which is shown in Fig.1. The resistance at a constant temperature depends on the speed of the ion exchange (resistance of the reaction  $R_1$ ) and on the speed of diffusion and concentration of ions in the electrolytes (diffusion resistance  $R_2$ ). The capacitances are determined by the structure of the division boundary between the metal and the electrolyte,  $C_1$ , and by the diffusion capacitance,  $C_2$ . Equations are set up and solved for this equivalent circuit. The practical realization is shown in Fig.2, where 3 is an audio oscillator, 0 - oscillograph; 1 - electrodes; 2 - corundum tube, 3 - asbestos filling, 4 - corundum crucible, 5 -  $Al_2O_3$  paste, 6 - fused enamel. The experiments were carried out at 900 and 1040°C with electrodes of 0.5 mm thick type 08KP (08KP) steel (0.08% C). Enamels were made from chemically pure materials. Two series of experiments were made. In the first the influence on the exchange current of various additions ( $CaF_2$ ,  $Co_2O_3$ ,  $Ni_2O_3$ ,  $MnO_2$ ,  $TiO_2$ ) to a basic formulation of 20%  $Na_2O$ , 47%  $SiO_2$ , 19%  $B_2O_3$ , 8%  $Al_2O_3$  was studied a formulation of 21%  $Na_2O_3$ , 50%  $SiO_2$ , 20%  $B_2O_3$ , 9%  $Al_2O_3$  was also

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Reaction of enamel melt with steel

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S/153/61/004/004/010/013  
E111/E535

tested). It was found that the current increased with temperature and with increasing additions of cobalt, nickel and manganese oxides and  $\text{CaF}_2$ ;  $\text{TiO}_2$  had the opposite effect. In the second series of experiments the effect of preliminary oxidation on the exchange-current was studied. A tendency was found for the current first to increase with increasing duration of preliminary oxidation and then to decrease; this effect became more pronounced at higher temperatures. The capacitance component of the cell resistance remained practically constant with the various enamels and at the two temperatures, indicating (Ref.8: A. N. Frumkin, V.S. Bagotskiy, Z. A. Iofa, B. N. Kabanov. Kinetics of Electrode Processes. Izd. NGU, M., 1952) that the structure of the double layer is also unchanged. Further study of the influence of temperature, enamel composition and pre-treatment of the metal surface on the exchange current is needed to find exactly what role ion exchange plays in the formation of an enamel coating. There are 2 figures, 3 tables and 9 references: 6 Soviet and 3 non-Soviet.

ASSOCIATION: Kafedra teorii metallurgicheskikh protsessov,  
Ural'skiy nauchno-issledovatel'skiy institut chernykh  
Card 3/4 metallov i Ural'skiy politekhnicheskiy institut imeni

Reaction of enamel melt with steel

28115  
S/153/61/004/004/010/015  
E111/E535

S. M. Kirova  
(Department of the Theory of Metallurgical Processes,  
Ural Scientific Research Institute for Ferrous Metal  
and the Ural Polytechnical Institute imeni S.M.Kirov)

SUBMITTED: June 22, 1959

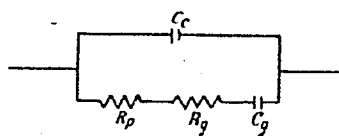


Fig.1

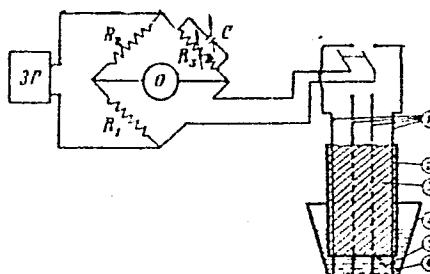


Fig.2

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L 19198-63 EWP(j)/EWP(q)/EWT(m)/BDS AFFTC/ASD/ESD-3 Pc-l/Pq-l RM/WH/  
MAY

ACCESSION NR: AR3004196

S/0276/63/000/005/B131/B132 71

SOURCE: RZh. Tekhnologiya mashinostroyeniya, Abs. 5B675

AUTHOR: Zhikova, V. P.; Svetlov, V. A.; Smirnov, N. S.

TITLE: Determination of mechanical strength of enamel coating on the inner surface of pipes

CITED SOURCE: Tr. Ural'skogo n.-i. in-ta chern. metallov, v. 1, 1961, 302-303

TOPIC TAGS: mechanical strength, enamel coating, enamel peeling, enamel breaking, liquid contact material

TRANSLATION: A method has been developed for determining the mechanical strength of enamel<sup>1</sup> glass<sup>2</sup> and other electrically non-conductive coatings of the inner surface of seamless welded steel pipes of various diameters. The mechanical strength of coatings is characterized by the magnitude of loading (applied to the investigated pipe perpendicular to its axis), at which the coating uniformity is affected. The moment of coating violation (peeling or breaking of enamel, etc.) is determined by a measuring device, connected to the electric circuit in series with the vessel. Solution of sodium chloride in the vessel serves as a liquid contact with the

Card 1/2

L 19198-63

ACCESSION NR: AR3004196

metallic pipe material when the coating is damaged. Five simultaneous measurements are required for obtaining results with up to 10% accuracy. L. Kamionskiy.

DATE ACQ: 21Jun63

SUB CODE: IE, MA

ENCL: 00

Card 2/2

PERMINOV, A.A.; POPEL', S.I.; SMIRNOV, N.S.

Surface tension of melts and their adhesion to low-carbon steel.  
Izv. **vys.** uchet. zav.; chern. met. 4 no.8:5-8 '61. (MIRA 14:9)

1. Ural'skiy nauchno-issledovatel'skiy institut chernykh metallov i  
Ural'skiy politekhnicheskii institut.  
(Surface tension) (Oxides) (Steel)

S/148/61/000/012/001/009  
E040/E435

AUTHORS: Perminov, A.A., Popel', S.I., Smirnov, N.S.  
TITLE: Effect of substituting sodium oxide by the oxides of other metals on the surface tension of silicate melts and their adhesion to solid steel

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya; no.12, 1961, 5-7

TEXT: A study was made of the effect of replacing 20 mol % sodium oxide by the oxides of Li, K, Mg, Ca, Sr, Ba, Mn, Fe, Ti and B in silicate enamels (64% SiO<sub>2</sub>, 36% Na<sub>2</sub>O) for steel containing 0.084% C, 0.04% Si, 0.038% Mn, 0.037% S, 0.028% P, 0.14% Cr, 0.046% Ni, 0.002% Al and 0.09% Cu impurities. The tests were made at the temperature of 1100°C, the adhesion of the enamel being evaluated in terms of the surface tension and contact angle of the molten enamel. The highest increase in the energy of the interparticle bonds in the melt (cohesion) and the highest strength of adhesion to metal was found for the addition of 20% of Fe<sub>2</sub>O<sub>3</sub> when the adhesive strength rose from 465 erg/cm<sup>2</sup> (starting silicate melt) to 625 erg/cm<sup>2</sup>. The effect of other oxides is much less pronounced, MnO, BaO and SrO producing some

Card 1/2



Effect of substituting sodium ...

S/148/61/000/012/001/009  
E040/E435

improvement in the adhesion and  $B_2O_3$  even reducing it. The oxides of Li, K, Mg, Ca and Ti have no significant effect on the adhesion of silicate enamels to low carbon steel surfaces. There are 1 table and 10 references: 9 Soviet-bloc and 1 non-Soviet-bloc. The reference to an English language publication reads as follows: Ref.10: B.W.King, H.P.Tripp, W.H.Duckworth. J. Amer. Ceramic Society, v.42, no.11, 1959, 6-26.

ASSOCIATIONS: Ural'skiy nauchno-issledovatel'skiy institut  
chernykh metallov i Ural'skiy politekhnicheskiy  
institut (Ural Scientific Research Institute  
of Ferrous Metals and Ural Polytechnical Institute)

SUBMITTED: December 25, 1960

Card 2/2  
\*

SEREBRYAKOVA, I.B., inzh.; MEN'SHIKOVA, Z.P., inzh.; SMIRNOV, N.S.,  
kand.tekhn.nauk

Effect of impurities in zinc on its fluidity in the zinc coating  
of steel. Stal' 21 no. 1:92-94 Ja '61. (MIRA 14:1)

1. Ural'skiy institut chernykh metallov.  
(Zinc plating)

88281

S/032/61/027/001/009/037  
B017/B054

5.5400

AUTHORS: Zhukova, V. P., Ovchinnikova, V. I., and Smirnov, N. S.

TITLE: Determination of the Cohesion of Enamel Coats to Metals

PERIODICAL: Zavodskaya laboratoriya, 1961, Vol. 27, No. 1, pp. 43-45

TEXT: A new method of determining the cohesion of enamel coats to metals has been developed. A simple attachment to the ПТЛ (PTL) apparatus is used to determine the area of free metal surface formed in the destruction of the enamel by the punch, by measuring the amperage. The area is calculated from the equation:

$$S = \frac{\rho q I}{V - IR},$$

where  $\rho$  = electrolyte resistivity,  $q$  = thickness of the enamel layer in cm,  $I$  = amperage in a,  $V$  = terminal voltage of the transformer in v,  $R$  = resistance of the external circuit in ohms. Three types of specimens were examined. The first and second types consisted of cold- and hot-rolled steel which had subsequently been enameled. The third type consisted of cold-rolled steel with acidproof enamel coat. Maximum error of the method  
Card 1/2

X

88281

Determination of the Cohesion of Enamel Coats  
to Metals

S/032/61/027/001/009/037  
B017/B054

✓

is  $\pm 2.4\%$ . An apparatus of similar mode of operation from Novocherkasskiy politekhnicheskiy institut (Novocherkassk Polytechnic Institute) is mentioned. There are 2 figures and 6 references: 2 Soviet and 4 US.

ASSOCIATION: Ural'skiy institut chernykh metallov (Ural Institute of Ferrous Metals)

Card 2/2

MIRONOV, L.V.; DUBROV, N.F.; GUTERMAN, S.G.; GOL'DSHTEYN, M.I.;  
SMIRNOV, N.S., red.; CHAPAYKINA, F.K., red. izd-va; KOROL',  
V.P., tekhn. red.

[Phase transformations and properties of electrical steel]Fazo-  
vye prevrashcheniia i svoistva elektrotekhnicheskikh stalei. Sver-  
dlovsk, Metallurgizdat, 1962. 34 p. (MIRA 15:12)

(Steel alloys--Magnetic properties)

(Phase rule and equilibrium)

SMIRNOV, N. S.

PHASE I BOOK EXPLOITATION

SOV/6060

Vargin, V. V., Professor, ed.

Emalirovaniye metallicheskikh izdeliy (Enameling of Metal Articles). Moscow, Mashgiz, 1962. 546 p. Errata slip inserted. 7500 copies printed.

Reviewer: A. S. Ragozin, Engineer; Ed.: M. V. Serebryakova, Engineer; Eds. of Publishing House: I. A. Borodulina, A. I. Varkovetskaya, and T. L. Leykina; Tech. Ed.: L. V. Shchetinina; Managing Ed. for Literature on Machinery Manufacture (Leningrad Division, Mashgiz): Ye. P. Naumov, Engineer.

PURPOSE: This book is intended for specialists in enameling, technical personnel of plants, and personnel of scientific research laboratories and institutes. It can also be used by teachers and students of schools of higher education.

COVERAGE: The book provides a brief discussion on raw materials and processes for melting enamels, describes in detail furnaces for melting enamels,

Card 1/4

20

SOV/6060

Enameling of Metal Articles

and offers some recommendations for selection and calculation of furnaces. A special section [Ch. IV, sect. 8] on heat-resistant coatings is included. A flowsheet is given for centralized production of enamels. The properties and preparation of slips are also comprehensively described. The production of new enameled products such as pipelines, architectural and building materials, and aluminum articles is described. Individual chapters were written both by plant personnel and by technical personnel of scientific research institutes and schools of higher education. [See: Table of Contents.] No personalities are mentioned. There are 638 references, mainly Soviet, with many English and some German.

TABLE OF CONTENTS [Abridged]:

Foreword

3

Card 2/4

Enameling of Metal Articles

SOV/6060

13

PART I. ENAMELING TECHNOLOGY

- Ch. I. Raw Materials and Batch Preparation (V. Ya. Senderovich) 5
- Ch. II. Melting of Enamels (V. A. Kuzyak, V. V. Vargin, and V. P. Vaulin) 23
- Ch. III. Grinding of Enamels and Slip Preparation (L. D. Svirskiy, and B. Z. Pevzner) 93

PART II. THE TECHNOLOGY OF ENAMELING METAL ARTICLES

- Ch. IV. Enameling of Steel Articles (N. S. Smirnov, N. N. Zelenskiy, Ye. M. Oshurkov, B. Z. Pevzner, Ye. A. Antonova, V. V. Luchinskiy, V. P. Vaulin, L. V. Purin, V. V. Vargin, M. M. Karabachinskaya, A. A. Appen, and V. Ya. Lokshin) 102

Card 3/4



S/129/62/000/002/009/014  
E073/E335

Influence of .....

0.015 - 0.046% S, 0.029 - 0.19% Cr, 0.04 - 0.084% Ni, 0.10 - 0.20% Cu, 0.004 - 0.048% Al. The quantity of alloying elements did not exceed 1%. The steel was rolled into 0.5-mm thick sheet. The specimens (25 x 40 mm) were annealed at 700 °C for 2 minutes, degreased in a solution of sulphuric acid (80 g/litre) for 10 minutes at 60 °C, washed in water, neutralized in a solution of Na<sub>2</sub>CO<sub>3</sub> (5 g/litre) and Na<sub>3</sub>PO<sub>4</sub> (4 g/litre) for 3 minutes at 50 °C and dried at 110 - 120 °C. The speed of oxidation was determined by continuous weighing. Oxidation was at 860 °C for 10 min, the specimens being weighed every two minutes. The mean square error  $\sigma$  of the measurement for various oxidation times (2 - 10 min) was, on the average, 3.06%. It was determined by statistical analysis with the result that an accuracy of  $\pm 3\%$  could be achieved by carrying out at least three parallel measurements, whereby the magnitude  $\sigma$  should have a maximum error of  $3\sigma/\sqrt{n}$ . The obtained data show that, with the exception of Mn, all the investigated alloying elements reduce oxidation of low-carbon steel, even if added in insignificantly small quantities. By comparing the

Card 2/4

S/129/62/000/002/009/014  
E073/E335

Influence of ....

rates of oxidation of low-carbon steels alloyed with various elements it was found that Ti, Co, Al and Si slowed down appreciably the speed of oxidation. V, Cu, Cr and Ni slowed down the oxidation process to a lesser extent. Mn brought about a slight increase in the speed of oxidation of low-carbon steel. The surface oxide films of the oxidized specimens were subjected to electron-diffraction investigation (carried out by G.D. Susloparov and I.Ye. Bolotov). For this purpose specimens were subjected to oxidation in a furnace at 860 °C for 30 sec and then immediately dropped into cold water for freezing the thus-formed oxides. It was found that the external layer of the oxide film consisted of magnetite; this layer did not contain alloying elements. The here given data explain the improvement in quality of enamel coatings of Ti-containing steels, as well as the improvement in quality obtained by treating low-carbon steels with solutions containing Ni and Co prior to enamelling.

[Abstracter's note: this is a slightly abridged translation.]

Card 3/4

S/148/62/000/011/008/013

Adhesion of very simple boric enamels .. E111/E435

for oxidized (A) and unoxidized (B) steel. The effect of  $Fe_2O_3$  found does not agree with some published observations. It is recommended that iron-oxide concentration should be increased to 10 to 15% for ground enamels for parts subjected to vibration and impact loading. There are 2 figures and 2 tables.

ASSOCIATION: Ural'skiy nauchno-issledovatel'skiy institut  
chernykh metallov, Ural'skiy politekhnicheskii  
institut (Ural Scientific Research Institute,  
Ural Polytechnic Institute)

SUBMITTED: March 21, 1961

Card 2/3

S/133/62/000/012/005/012

A054/A127

AUTHOR: Smirnov, N.S., Candidate of Technical Sciences

TITLE: At the Ural'skiy nauchno-issledovatel'skiy institut chernykh metallov (Ural Scientific Research Institute of Ferrous Metals)

PERIODICAL: Stal', no. 12, 1962, 1,107

TEXT: In cooperation with the Pervoural'skiy starotrubnyy zavod (Pervoural'skiy Starotrubnyy Plant) the technology of seamless tubes with enameled inner surface has been improved: the metal is annealed in a shielding atmosphere to prepare the tube surface for the enamel coating. New methods of connecting the enameled tubes have also been developed, without the tube ends being flanged. Deburring did not affect the structure of the welded seam, neither had it any effect on the density and the mechanical properties of the enamel coating. If the tube surface is processed more carefully, an enamel coating can also be applied with creased burrs. Pilot plant scale tubes produced by the new method are successfully used for transferring hot acids under pressure. The Nizhne-Tagil'skiy zavod plastmass (Nizhne-Tagil'sk Plastics Plant) has practiced a similar process for the past two years.

Card 1/1

PERMINOV, A.A.; POPEL', S.I.; SMIRNOV, N.S.

Adhesion of simplest silicate melts to oxidized and unoxidized steels. Zhur.prikl.khim. 35 no.2:271-275 F '62.

(MIRA 15:2)

1. Ural'skiy nauchno-issledovatel'skiy institut chernykh metallov  
i Ural'skiy politekhnicheskii institut imeni S.M.Kirova.  
(Silicates) (Metallic oxides) (Adhesion)

OSHURKOV, Ye.M., inzh.; SMIRNOV, N.S., kand. tekhn. nauk

Vitreous prime enamels made from metallurgical slag. Stek.  
i ker. 20 no.7:19-22 JI '63. (MIRA 17:2)

1. Ural'skiy nauchno-issledovatel'skiy institut chernykh  
metallov.

ACCESSION NR: AR4015697

s/0081/63/000/023/0400/0400

SOURCE: RZh. Khimiya, Abs. 23M164

AUTHOR: Zhukova, V. P.; Kolmogorov, V. L.; Svetlov, V. A.; Smirnov, N. S.

TITLE: Investigation of the mechanical durability and thermal stability of enamel and glass coatings on the inner surface of steel pipes

CITED SOURCE: Tr. Ural'skogo n.-i, in-ta chern. met., v. 2, 1963, 248-259

TOPIC TAGS: enamel, glass, enamel coating, glass coating; steel pipe, pipe lining

ABSTRACT: It was established that with a decrease in the coefficient of thermal expansion of enamels and glass which are utilized in the coating of the inner surface of steel pipes, the mechanical durability and thermal stability of the coatings significantly increase. Addition of Fe oxides (up to 10%) to prime enamel and the use of frittered ground glass, the properties of which are close to those of the glass coatings, as the prime coating also have a favorable effect on the properties of the enamel and glass coatings studied. A method is developed for calculating the stresses which appear in the coating under the influence of forces which deform the pipe. Authors' summary

Card 1/1

DATE ACQ: 09Jan64

SUB CODE: MI

ENCL: 00

NIKITIN, Yu.S.; SMIRNOV, N.S.; OCHERNIKOVA, V.I.; FISHMAN, S.L.

Behavior of iron oxides during the interaction of iron with  
an enamel melt. Sbor. nauch. trud. Ural. politekh. inst. no.126:  
59-67 '63 (MIRA 17:8)

3. Redaktor zhurnala "Sbornik nauchnykh trudov Ural'skogo poli-  
tekhnicheskogo instituta imeni S.M. Kirova" (for Nikitin).



L 32908-65 EWT(m)/EWA(d)/EWP(t)/EWP(k)/EWP(b) Pf-l MJW/JD/HW  
ACCESSION NR: AP5000561 S/0133/64/000/012/1127/1128

AUTHOR: Korobka, B. A.; Ovchinnikova, V. I.; Smirnov, N. S.; Serebryakov,  
G. V.; Til'k, V. T.

TITLE: Ultrasonic surface cleaning of hot-rolled transformer steel

37  
35  
8

SOURCE: Stal', no. 12, 1964, 1127-1128

24-

10

TOPIC TAGS: ultrasonic surface cleaning, atmospheric corrosion, magnetostrict-  
ion generator, transformer steel

ABSTRACT: Annealed and pickled hot rolled sheets made of E41-E43 transformer  
steel display a tendency to form a silicon, aluminum, oxide, magnesium and cal-  
cium oxide surface film. An ultrasonic cleaning generator was designed by the  
authors with the help of the engineers A. G. Leskin, V. V. Mikhaylov, O. F.  
Biber, V. V. Morogov and V. A. Mitkevich and initially tested in 1961. An indus-  
trial 30 kW generator was installed in 1962 and it proved satisfactory in removing  
scale from 750 mm wide and 0.5 mm thick sheets fed at a rate of 22 m/min.

Card 1/2

L 32908-65

ACCESSION NR: AP5000561

2

However, the wet surface of the sheets is subject to rapid oxidation requiring an immediate protective coating. Furthermore, across the width of the sheets the surface cleaning lacks uniformity. Therefore, the authors suggest the development of 50 to 10000 kW generators and magnetostriction transformers having a uniform field of acoustical emission. Orig. art. has: 1 figure.

ASSOCIATION: Ural'skiy n. -i. institut chernykh metallov. (Urals Scientific Research Ferrous Metallurgy Institute); Verkh-Iset'skiy metallurgicheskiy zavod (Upper Iset' Metallurgical Plant)

SUBMITTED: 00

ENCL: 00

SUB CODE: MM

NR REF SOV: 001

OTHER: 000

Card 2/2

SMIRNOV, Nikolay Sergeevich; PROSTAKOV, Maksim Yefimovich

[Steel surface cleaning] Ochistka poverkhnosti stali.  
Moskva, Metallurgiya, 1965. 215 p. (MIRA 18:3)

L 1385-66 EWP(e) EPA(s)-2/EWT(m)/EPF(c)/EWP(i)/EPA(w)-2/EWP(t)/EWP(k)/EWP(b)/

EWA(c)/ETC(m) J, /HW/HV/NB/WH  
ACCESSION NR: AP5013231

UR/0133/65/000/005/0441/0445

621.774 : 621.792.4

AUTHOR: <sup>44,55</sup> Grinberg, Z. A. (Engineer); <sup>44,55</sup> Smirnov, N. S. (Candidate of Technical Sciences) <sup>67</sup> <sup>61</sup> <sup>B</sup>

TITLE: Experience in the production of pipes with glazed enamel coatings <sup>10</sup> <sup>1544</sup>

SOURCE: Stal', no. 5, 1965, 441-445 <sup>25</sup>

TOPIC TAGS: pipe, metal coating, glass to metal seal, glass coating, corrosion protection <sup>18</sup> <sup>17</sup> <sup>18</sup> <sup>44,55</sup>

ABSTRACT: The authors describe methods and equipment developed at the Ural Institute of Ferrous Metals and the Old Ural Pipe Plant for mass production of enamelled and glazed pipes. These pipe coatings can withstand temperatures down to -70°C and will take sharp temperature drops of up to 420°. Some of the more important parameters of the coatings are given. The equipment is briefly described and surface treatment for the pipes is explained. After application of the glass or enamel slip to the pipe surface, the pipe is fed to an electric drying kiln where a temperature of 160-200°C is maintained. Cold air is continuously circulated to remove the vapors which are formed. The drying period is 10 minutes. The coating

Card 1/2

L 1385-66

ACCESSION NR: AP5013231

6

is then annealed in an electric furnace. The pipes are then cooled on rollers to prevent warping and the whole process is repeated until the required number of layers has been applied. The compositions of the glazes and enamels used are described. Operational tests have shown this method of pipe protection to be satisfactory with respect to strength and reliability. Orig. art. has: 2 figures, 2 formulas.

ASSOCIATION: Pervoural'skiy starotrubnyy zavod (Old Ural Pipe Plant); Ural'skiy nauchno-issledovatel'skiy institut chernykh metallov (Ural Scientific Research Institute of Ferrous Metals)

44, 55

SUBMITTED: 00

ENCL: 00

SUB CODE: IE, MM

NO REF SOV: 009

OTHER: 000

Card <sup>ka</sup> 2/2

SEREBRYAKOVA, I.B., inzh.; SMIRNOV, N.S., kand.tekhn.nauk

Iron content in molden zinc during hot galvanizing. Stal' 25  
no.5z478-479 My '65. (MIRA 18:6)

1. Ural'skiy nauchno-issledovatel'skiy institut chernykh metallov.

GALOREV, Ye.M., inzh.; SMIRNOV, N.S., kand. tekhn. nauk; ANTONOVA, S.N., inzh.

Applying slag enamel coatings on chemical apparatus. Kalm. I  
naft. mashinostr. no. 8:27-29 Ag '65.

(MIR: 18:12)

PA 60T107

SMIRNOV, N. [S.]

USSR/Physics  
Aerosols  
Atmosphere - Measurements

Dec 1947

"New Methods for Producing Aerosols," N. Smirnov, Lab  
Atmospheric Optics, Inst Geophys, Acad Sci, 2½ pp

"Dok Akad Nauk SSSR, Nova Ser" Vol LVIII, No 7

Complexities and difficulties of old methods for the  
production of aerosols led author to develop this new  
method, which forms aerosols in a vapour medium. With  
new process it is possible to produce water aerosols  
with previously determined characteristics. Now pos-  
sible to make tests in laboratories to determine aero-  
sol state in the atmosphere. Submitted by Academician  
S. I. Vavilov, 24 Jun 1947.

60T107



PROCESSING AND PROPERTIES NOTES

2

The methods of preparing highly concentrated aerosols. N. S. Smoluchovskii. *Kolloid. Zhur.* 10, 448-54(1948). — A high-boiling liquid *A* is kept at a temp. *T* at which its vapor pressure is considerable, and a liquid *B*, whose b.p. is much below *T*, is poured onto *A*. *B* assumes the spheroidal state (sep. droplets moving about), and a mist of *A* fills the container. E.g. Hg at 282° covered with liquid air gave a mist constg. 27 mg./l. Aerosols of oleic acid and salol, thus prepd., contained fewer electrically charged particles (13-15%) than aerosols prepd. by usual condensation of vapor or by spraying of oleic acid or of salol sols. in EtOH. The percentage of neg. charges was independent of the method of prepd. (25-30%). The rate of coagulation of a machine oil aerosol agreed with Smoluchovskii's equation. J. J. Bikerman

METALLURGICAL LITERATURE CLASSIFICATION

SUBJECT INDEX

AUTHOR INDEX

CA

Sergei Vasil'evich Lebedev. K. B. Piotrovskii and N. Smirnov. *Zhur. Priklad. Khim.* (J. Applied Chem.) 22, 917-20(1949).—Summary of scientific work, biography, and portrait. G. M. Kosolapov

USSR/Geophysics - Condensation nuclei

Card 1/1

Author : Smirnov, N. S., Tantsova, N. N., and Shaposhnikova, I. I.

Title : Problem of the origin of condensation nuclei

Periodical : Izv. AN SSSR, Ser. geofiz. 3, 293-298, May/June 1954

Abstract : Present the results of systematic measurements of content of ultramicroscopic particles in the air. Show that in the supplying of the atmosphere with condensation nuclei a large role is played by the productive activity of people, but the main factors cleansing the atmosphere of condensation nuclei are precipitation, fogs and high humidity of the air. 5 references-3 Soviet.

Institution : Geophysics Institute, Acad Sci USSR

Submitted : Dec 12, 1952

SMIRNOV, N. S. and KRASIKOV, F. N.

"Use of Smoke for Protection of Citrus Cultures From Frost".  
Tr. Geofiz. in-ta AN SSSR, No 23, pp 134-151, 1954

For massive plant protection over wide areas the method of smoke production is the most efficient, because of its heat insulating properties and its low costs. In the case of advective frost, low clouds, and high wind velocity, the efficiency of smoke is lowered. (RZhFiz, No 9, 1955)

SO Sum No 812, 6 Feb 1956

Smirnov, N. S.

Smirnov, N. S. K voprosu o vliianii atomnogo vzyryva na sostoianie atmosfery. [Problem of the influence of an atomic explosion on the state of the atmosphere.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz., No. 10:1227-1231, 1956.* DLC—The author reviews briefly various American, Western European and Japanese studies dealing with the effect of atomic explosions upon the state of atmosphere. He then considers the possible changes in the radiation radio-active properties of the atmosphere that can be caused by the explosion of one atomic bomb, how the increase in radioactivity can influence the radiation balance of the earth, the effect of atomic explosions upon the dust, ion and aerosol content of the atmosphere and the meteorological effects of atomic explosions such as the occurrence of fogs, etc. *Subject Heading:*  
 1. Atomic explosion effects on the atmosphere.—I.L.D.

19

3

1/2

USSR/Colloid Chemistry. Dispersion Systems

B-14

Abs Jour : Ref Zhur - Khimiya, No 8, 1957, 26427

Author : K.M. Merzhanov, N.I. Peterimova, N.S. Smirnov

Title : Influence of Ionization of Air on Dispersion Phase of  
Aerocolloids.

Orig Pub : Kolloid. zh., 1956, 18, No 5, 574-577

Abstract : The influence of the ionization of air on the dispersion phase of a natural aerocolloid was studied. Ultraviolet and x-rays and  $\beta$ -particles served as sources of ionization. The irradiation of air was carried out in chambers, the volume of which was from 0.8 to 2 cub.m. The concentration of particles was determined ultramicroscopically in a flow. At the concentration of up to  $10^5$  or  $10^7$  pairs of ions per cub-cm in ordinary air with the relative humidity up to 100%, the concentration of ultramicroscopic particles increased 3 to 4 times, and the number of nuclei of condensation increased over 10 times. The concentration of particles rises together with the irradiation duration and the ionization degree; the size of particles increases together with the concentration rise.

Card : 1/1

Stirkov, N.S.

21

Effect of the ionization of air on the disperse phase of  
aerocolloids. I. I. Belvaev, A. R. Mikhov, and N. S.  
Stirkov (Geophys. Inst., Acad. Sci. U.S.S.R., Moscow).  
Izv. Akad. Nauk SSSR, 19, 24-8 (1957); dt. C.A. 51, 5502d. *Obs*  
The light scattering by satd. H<sub>2</sub>O vapor was increased by 42%  
when the vapor was irradiated by 0.2 curie of Po<sup>210</sup> for 65  
min., weaker sources of a particles caused a less dense fog.  
The fogs persisted for several hrs. I. I. Bikerman

pm day  
KLS

SMIRNOV, N.,<sup>S.</sup> kand. khim. nauk, starshiy nauchnyy sotrudnik.

Artificial rainfall. Tekh. mol. 25 no.9:24 3 '57.  
(Rain making)

(MLRA 10:9)



5(4)

SOV/69-21-4-2/22

AUTHOR: Belyayeva, I.I. and Smirnov, N.S.

TITLE: Precipitation of Artificial Fogs

PERIODICAL: Kolloidnyy zhurnal, 1959, Vol XXI, Nr 4, pp 385-387 (USSR)

ABSTRACT: The authors report on the results of an investigation of the precipitation of artificial fogs. The article continues former publications of the authors (references 1 and 2), in which they describe the formation of these fogs by means of treatment of common air (relative humidity not exceeding 100%) with ionizing rays. The precipitation was carried out with the aid of  $\alpha$  and  $\beta$  particles and  $\gamma$ -quanta Co 60. For the first series of experiments, the authors used the device described in figure 2. For the second and third series, cylindrical glass vessels (volume=4.4 l) were used. With the introduction of a radioactive source, fog development could be observed. Fog droplets precipitated on small thin glass plates. The precipitation was microphotographed (Figure 1). Photographs 1-6 show that precipitation formed as a result

Card 1/3

SOV/69-21-4-2/22

Precipitation of Artificial Fogs

of treatment with  $\alpha$  and  $\beta$  particles, become more coarsely dispersed in dependence on the duration of the treatment. Photographs 7-10 (treatment with  $\gamma$ -quanta Co 60) show that the dispersion of the precipitation depends on the intensity of ray treatment. The higher the intensity the greater the number of droplets and their size. In order to investigate the precipitation process also with regard to time, the authors developed a quartz microbalance suitable for this purpose. The balance was put into a cylindrical glass vessel (volume = 4.4 l). The measurements were carried out with a horizontally installed microscope. Prior to the introduction of a radioactive source ( $\alpha$ -particles) no deformation of the quartz thread with the plate for the precipitate could be observed. After introduction of the source fog formed and precipitated on the plate. The results of the experiments are illustrated by a graph (Figure 4). Curve I shows that the fog precipitates continuously during the ray treatment of the air. For the sake

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SOV/69-21-4-2/22

Precipitation of Artificial Fogs

of comparison, curve 2 shows the precipitation of red phosphorus. The phosphorus was burnt in a small electric furnace, which had been substituted to the radioactive source. On the whole, the experiments have shown that the treatment of common moist air with ionizing rays increases the number and size of the particles of its disperse phase. As a result of this the formation of fog can be observed. Fog formation and precipitation during ray treatment continue without interruption and with constant speed. The quantity of precipitated fog and its dispersion are dependent on the intensity and duration of ray treatment. There is 1 set of photographs, 2 diagrams, 1 graph and 3 Soviet references.

ASSOCIATION: institut goryuchikh iskopayemykh AN SSSR, Moskva  
(Institute of Mineral Fuels of the AS USSR, Moscow)

SUBMITTED: 5 February, 1958.

Card 3/3

5(4)

SOV/69-21-4-11/22

AUTHOR: Dunskiy, V.F. and Smirnov, N.S.

TITLE: Concerning the Influence of Ionizing Radiation on the Dispersion of Aerosols

PERIODICAL: Kolloidnyy zhurnal, 1959, Vol XXI, Nr 4, pp 436-441 (USSR)

ABSTRACT: This is a study of the effect of ionizing radiation ( $\gamma$ -quanta of radioactive cobalt, Co60) on the dispersion of aerosols formed by condensation. Figures 1 and 2 (diagrams) give the scheme of the experimental installation. The aerosol was prepared by mixing a heated (400°C) air-vapor mixture with air at a temperature of 17°C. The vapor component was obtained from a high-boiling ( $\geq 320^\circ\text{C}$ ) fraction of transformer oil. The authors first carried out a series of experiments intended to determine the time needed for charging the particles of the aerosol under natural conditions, i.e. without the aid of ionizing radiation. Figures 3 and 4 (graphs) show that the particles of aerosols, which were obtained by condensation, are electrically charged

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SOV/69-21-4-11/22

Concerning the Influence of Ionizing Radiation on the Dispersion  
of Aerosols.

only to a limited extent (up to 10%). Ionization under natural conditions develops slowly, particularly in clean air. Tables 3 and 4 show the results of the study of the dispersion of the particles under the effect of ionizing radiation. For the sake of comparisons, data obtained without radiation were added. The change in the dispersity of microscopic fog particles was determined by the number of droplets, which settled on 1 cm<sup>2</sup> of surface. Table 3 shows that irradiation gives rise to a coarse-disperse fraction ( $r > 2 \mu$ ), which could not be observed prior to the treatment. The changes in the fractions of ultramicroscopic and submicroscopic particles, which were retained in a cotton wool filter, are shown in table 4. As a result of the treatment with ionizing rays, the number of these particles in the filter increased by ~40% as compared with the number of particles obtained without ray treatment. The evaluation of the experiments can be summarized as follows: under natural conditions of air ionization, the charging of fogs

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SOV/69-21-4-11/22

Concerning the Influence of Ionizing Radiation on the Dispersion of Aerosols.

obtained by condensation develops very slowly. As a result of the treatment with  $\gamma$ -quanta Co 60, the dispersion of the microscopic fractions of the fog decreases, whereas there is an increase (40-45%) of the weight of particles of smaller fractions ( $r < 7.5 \cdot 10^{-5}$  cm) in the filter. The rate of ionization under the effect of the ray treatment can be evaluated at  $5 \cdot 10^7 - 3 \cdot 10^8 \pm$  ions/cm<sup>3</sup>.sec.. The results of the experiments have confirmed the authors' previous investigations of the effect of varying air ionization on the disperse phase of highly-dispersed aerosols. There are 4 tables, 2 graphs, 2 diagrams and 11 Soviet references.

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*Inst. of Mineral Fuels AS USSR*

L 52636-65 EWT(1)/ENG(v)/FCC/ERC(t) Po-4/Pe-5/Pq-4/Pt-7/P1-4 GS/GW

ACCESSION NR: AT5012355

UR/0000/65/000/000/0063/0070

AUTHOR: Smirnov, N. S.

TITLE: Relative position of current S sub D eddies and of the main auroral zone

46  
BTI

SOURCE: AN SSSR. Kcl'skiy filial. Polyarnyy geofizicheskiy institut. Issledovaniye polyarnykh siyaniy, geomagnitnykh vozmushcheniy i ionosfery v vysokikh shirotakh (Investigation of aurorae, geomagnetic disturbances, and the ionosphere at high latitudes). Moscow, Izd-vo Nauka, 1965, 63-70

TOPIC TAGS: aurora, S sub D eddy, geomagnetic field, auroral ring, corpuscular penetration

ABSTRACT: The authors constructed the current system responsible for the average  $S_D$  variation and compared the position of the central current stream of this system with the position of the auroral zone obtained from observations of polar auroras during the same period. The data used were from magnetic observations made in December 1957 by 16 magnetic observatories located in the auroral zone, in its vicinity, and on the polar cap. It was found that the daily and nightly  $S_D$  eddies existed simultaneously, at least statistically, during the period considered, and had a comparable intensity; the central current streams of the  $S_D$  eddies were located along the ring envelope coinciding with the auroral zone or with the zone of corpuscular penetrations. It is concluded that, statistically, there exists a  
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L 52636-65

ACCESSION NR: AT5012355

penetration zone which coincides with the envelope of the closed auroral rings and which is rigidly bound to the earth's surface. The various portions of this zone differ only in the probability and intensity of the corpuscular penetrations. The geomagnetic data did not reveal any closed current ring corresponding to the closed auroral ring. Orig. art. has: 5 figures and 1 formula.

ASSOCIATION: None

SUBMITTED: 27Nov64

ENCL: 00

SUB CODE: ES, EM

NO REF SOV: 004

OTHER: 008

*2/2*  
Card



L 23812-65 EWT(1)/EEC(b)-2/EWA(h) Feb

ACCESSION NR: AP5000841

S/0057/64/034/012/2160/2170

AUTHOR: Butusov, M.M. / Smirnov, N.S. / Sologub, V.V. / Fridrikhov, S.A.

TITLE: Investigation of the properties of the space charge in a magnetron diode

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.12, 1964, 2160-2170

TOPIC TAGS: magnetron, space charge, microwave tube, noise spectrum, secondary emission

ABSTRACT: The tendency to self-oscillation, characteristic of space charge in magnetrons, is well known; some of the oscillation effects, however, are associated (by some authors) with the influence of the resonator system. Hence in the present work there were investigated the properties of the space charge in a magnetron diode, i.e., a system devoid of a cavity component. There were studied the oscillations generated by the space charge under different conditions of operation of the tube, the relative secondary emission of the cathode, and the intensity (power) of back bombardment of the cathode. In some ways the present study was an extension of the earlier comprehensive work of J.Yasuoka (Proc.Phys.Soc.Japan 10,1102,1955), D.Glass, G.Sims & A.G.Stainsby (Proc.IEE(B) 102,81,1955) and R.L.Jepson & M.W.Muller

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L 23812-65

ACCESSION NR: AP5000841

(J.Appl.Phys.22,1196,1951).. Some of the experimental measurements were performed on the equipment described by two of the authors earlier (M.M.Butusov and S.A.Fridrikhov,ZhTF 34,288,1964). A diagram of the main measurement setup is given in a figure, as is a sectional view of the magnetron diode. The results are presented in the form of curves and some reproductions of oscillograms. The principal conclusions are: 1. At appreciable plate voltages there is a magnetic field region in which the electrons returned to the cathode have considerable energies, which gives rise to secondary emission. 2. In the same region there is observed intense emission by the space charge of high-frequency noise at discrete frequencies; analysis of this noise radiation indicates that part of the space charge oscillations are of the rotary wave type. 3. The fraction of the power dissipated at the cathode by the back-bombardment electrons, referred to the input power, increases with the strength of the magnetic field (at a constant plate voltage). 4. The mechanism leading to intense energy exchange in the electron cloud at the magnetron diode is probably similar in many respects to secondary-electron resonance in crossed fields. "In conclusion, the authors express their gratitude to Prof.A.R.Shul'man for his attention to the work." Orig.art.has: 9 figures.

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L 23812-65

ACCESSION NR: AP5000841

ASSOCIATION: Leningradskiy politekhnicheskii institut im.M.I.Kalinina (Leningrad  
Polytechnical Institute)

SUBMITTED: 12Dec63

ENCL: 00

SUB CODE: EC

NR REF SOV: 010

OTHER: 012

3/3

SMIRNOV, Nikifor Sergeyevich; LEVIN, Isay Yefimovich; KATSNEI'SON,  
S.M., red.; ATROSHCHENKO, L.Ye., tekhn.red.

[Objectives of technical progress in agriculture in the light  
of the resolutions of the June Plenum of the Central Committee  
of the Communist Party of the Soviet Union] Zadachi tekhnicheskogo progressa v sel'skom khoziaistve v svete reshenii Iiun'skogo Plenuma TsK KPSS. Moskva, Izd-vo "Znanie," 1959.  
31 p. (Vsesoiuznoe obshchestvo po rasprostraneniu politicheskikh i nauchnykh znani. Ser.5, Sel'skoe khoziaistvo, no.31) (MIRA 12:11)

(Farm mechanization)

SINYAGIN, Irakliy Ivanovich, akademik; SMIRNOV, Nikifor Sergeevich, kand. sel'khoz.nauk; LEONOVA, T.S., red.; ATROSHCHENKO, L.Ye., tekhn. red.

[In an important direction; ways of raising agricultural standards during the next twenty years] Na glavnom napravlenii; puti pod"ema sel'skogo khoziaistva v dvadtsatiletii. Moskva, Izd-vo "Znanie," 1962. 39 p. (Novoe v zhizni, nauke, tekhnike. V Serii: Sel'skoe khoziaistvo, no.9)  
(MIRA 15:7)

1. Vsesoyuznaya akademiya sel'skokhozyaystvennykh nauk im. V.I.Lenina (for Sinyagin).

(Agriculture)

ROMANOV, V.S.; SMIRNOV, N.S.

Giant trees of the Belovezhskaya Pushcha. Bot.; Issl. Bel.  
otd. VBO no. 7: 118-124 '65.

(MIRA 18:12)

SMIRNOV, N. T.

"Felling Maintenance of Natural and Artificial Pine Forests on the Kadadin Training-Experimental Tree Farm." Cand Agr Sci, Saratov Agricultural Inst, Saratov, 1953. (RZhBiol, No 7, Dec 54)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (12)  
SO: Sum. No. 556, 24 Jun 55

K

Country : USSR  
Category: Forestry. Forest Management.

Abs Jour: RZhBiol., No 11, 1958, No 48738

Author : Smirnov, N.T.  
Inst : Saratov Agricultural Institute  
Title : Characteristics of Maintenance Cuttings in the Pine Cultures by Areas.

Orig Pub: Tr. Saratovsk. s.-kh. in-ta, 1957, 10, 237-248

Abstract: In 1951-1955, at the Kadadin study and experiment forest management unit of the Saratov Institute of Agriculture, observations were conducted on the 12-27 year old pine mono-cultures of the I and II locality grades which were subjected to improvement cuttings of various intensities. The article describes changes in the increment with regard to

Card : 1/3

Abs Jour: RZhBiol., No 11, 1958, No 48738

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001651530006-4"

diameter, height, reserves and other measurements indices, the degree of wind-firmness of the plantations and resistance to the piling up of snow in relation to the degree of thinning. The article gives recommendations on the schedules of cuttings and their intensity. The article also gives criteria for the selection of the trees for cutting in relation to the conditions of sprouting, to the method, age and the original density of the cultures. It is pointed out that the improvement cuttings should be more intensive and frequent in the cultures of the grade I sowing. Prior to canopy closing, it is recommended that one select for cutting those trunks found in

Card : 2/3



SMIRNOV, N.T.

Establishment of forest plantations in the Il'men' Preserve region.  
Trudy Inst. biol. UFAN SSSR no. 25:105-113 '61.  
(Il'men' Preserve--Afforestation)

SMIRNOV, N.T.

Some aspects of the relationship between pine and birch  
in the young growths of Il'men Preserve. Trudy Inst. biol.  
UFAN SSSR no. 43:271-278 '65 (MIRA 19:1)

1. Ussuriyskiy sel'skokhozyaystvennyy institut.

SMIRNOV, N.V., gornyy inzh.; KARMAZIN, V.V., gornyy inzh.; SUKHAREV, V.I.,  
tekhnik-obogatitel'

Industrial experience in using 2VK-5V separators. Gor. zhur.  
no.4:43-44 Ap '60. (MIRA 14:6)

1. Tsentral'naya obogatitel'naya fabrika rudoupravleniya im.  
40-letiya Oktyabrya, trest Nikopol'-Marganets.  
(Separators(Machines))

BELITSIN, N.M., doktor tekhnicheskikh nauk, professor; ~~SMIRNOV, N.V.~~  
doktor fiziko-matematicheskikh nauk, professor; BATOR, Ferents.

Brief responses to F.A. Afonchikov's article "Errors in instructions  
on technical control." Tekst.prom. 16 no.6:53-54 Je '56.  
(MLRA 9:8)

1. Rukovoditel' Instituta po kontrolyu kachestva produkcii  
tekstil'noy promyshlennosti v Budapeshte (for Bator).  
(Textile fibers--Testing)

ZERNOV. Lev Semenovich; OSTRINSKAYA, Tsetsiliya Romanovna;  
POSTNIKOVA, Galina Valentinovna; ~~SMIRNOV, N.V.~~, otv.  
red.; MAZURKEVICH, M., red.izd-va; LEBEDEV, A.,  
tekh. red.

[Analysis of the managerial operations of enterprises]  
Analiz khoziaistvennoi deiatel'nosti predpriatii. Mo-  
skva, Gosfinizdat, 1963. 167 p. (MIRA 16:12)  
(Finance)

SMIRNOV, N.V., inzh.

Data on the inspection of precast tunnel linings. Transp.  
stroil. 10 no.5:43-45 My '60. (MIRA 13:7)  
(Precast concrete construction)  
(Tunneling)

SOV/96-59-5-10/19

AUTHOR: Smirnov, N.V. Engineer

TITLE: The Causes of Crack Formation in the Rising Tubes of the Right-Hand Side Screen of a Babcock and Wilcox Boiler (Prichiny obrazovaniya treshchin na pod'yemnykh trubakh pravogo bokovogo ekrana kotla Babkok-Vil'koks)

PERIODICAL: Teploenergetika, 1959, Nr 5, pp 56-59 (USSR)

ABSTRACT: A Babcock and Wilcox boiler of 110 tons per hour output at 35 atm and 395°C has been operating in a heat and electric power station since 1948; the boiler is described and illustrated diagrammatically in Fig 1. In August, 1946 cracks like those photographed in Fig 2 and 3 were found in four of the rising tubes of the right-hand side screen. By the end of 1957 the number of damaged tubes was ten. Deposits up to 1 mm thick were found inside the damaged tubes; the analysis which is given showed the deposits to include considerable amounts of iron and copper. The water conditions in the boiler are described. An analysis of the tube metal is also given. The micro-structure of the metal of the damaged, heated side of the tube consists of granular pearlite, ferrite and large graphite inclusions,

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SOV/96-59-5-10/19

The Causes of Crack Formation in the Rising Tubes of the Right-Hand Side Screen of a Babcock and Wilcox Boiler

there is a constant varying temperature-difference, which can be as much as 240°C. This temperature-difference sets up thermal stresses, which may be determined approximately. A formula is given and stresses calculated thereby are tabulated. With wall temperatures above 400°C, it will be seen from the table that in places the temperature difference between the hot and cold walls is greater than 160°C the thermal stresses exceed the yield point. As the stresses are continually varying they can cause fatigue cracks. It has been observed that the centre of the flame of the lower right-hand burner is approximately opposite the region of damage and that the flame licks the tube. There are 8 figures and 1 table and 2 Soviet references.

ASSOCIATION: Yuzhnoye otdeleniye ORGRES (Southern Division of ORGRES)

Card 3/3



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155.13  
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Organizatsiya Gruzovoy i Kommercheskoy Raboty Na Zhelezodorozhnom  
Transporte (Organization of Freight Traffic in Railway Transport, by)  
K. V. Glinkov i N. D. Boshkin. Moskva, Transportnoye Izdat, 1957.  
311 s. Ilus., Mapy, Tables.

AVC

SMIRNOV, N.V.

Basal metabolism change under the influence of a neuroplegic mixture  
in toxic goiter. Vest.khir. no.6:23-27 '61. (MIRA 15:1)

1. Iz 2-y khirurgicheskoy kliniki usovershenstvovaniya vrachey  
(nach. - prof. I.D. Zhitnyuk) Voenno-meditsinsoy ordena Lenina  
akademii im. S.M. Kirova.

(ARTIFICIAL HIBERNATION) (GOITER) (BASAL METABOLISM)

SMIRNOV, N.V.

Analytic solution of the problem of supersonic gas flow about a cascade of conic blades [with summary in English]. Vest. LGU no. 13:146-156 '61. (MIRA 14:7)  
(Aerodynamics, Supersonic)

SMIRNOV, N.V.---

Analytic solution of the problem of supersonic gas flow about a  
cascade of conic blades. Vest.LGU 16 no.7:105-116 '61.

(MIRA 14:5)

(Aerodynamics, Supersonic)  
(Cascades (Fluid dynamics))

CHERNOV, N. V.

Conical flows of an ideal incompressible fluid. Vest. LGU  
19 no.7:107-115 '64. (MIRA 17:7)

SMIRNOV, N.V.

Division of Kashka-Dar'ya Province into economic geographical  
districts. Trudy SAGU no 28:3-31 '51. (MLRA 9:5)  
(Kashka-Dar'ya Province--Economic geography)

SMIRNOV, N.V.

Economic geographical characteristics of Fergana. Trudy SAGU  
no.31:13-31 '52. (MLRA 9:5)  
(Fergana (City)--Economic geography)





SMIRNOV, N.V.

Development and distribution of agriculture in Kashka-Darya Province  
of the Uzbek S.S.R. Trudy SAGU no.70:49-71 '55. (MLBA 9:8)  
(Kashka-Darya Province--Agriculture)

BABUSHKIN, L.N., prof., otv.red.; GAL'KOV, Ch.V., red.; LOBACH, Kh.S., red;  
SMIRNOV, N.V., red.; TSAPENKO, N.G., red.

[Kashka-Darya Province] Kashka-Dar'inskaia oblast'. Tashkent, Izd-vo  
SAGU, Vol.2. [Economic-geography] Ekonomiko-geograficheskaiia  
kharakteristika. 1959. 242 p. (Tashkent. Universitet. Trudy  
Sredneaziatskogo gosudarstvennogo universiteta, no.156). (MIRA 14:5)  
(Kaska-Darya Province—Economic geography)

SMIRNOV, N.V.

The economic and geographic position of Tashkent. Nauch. trudy  
TashGU no. 193:193-200 '62. (MIRA 16:7)

(Tashkent—Economic geography)

3 7 17, 1917-1957, 1959.

On the probability of large deviations (O veroyatnostykh bol'shikh ukloneniy),  
Matematicheskii sbornik 40(1933), pp. 443-454.

80: Matematika v SSR za sorok let, 1917-1957, Moscow, 1959.