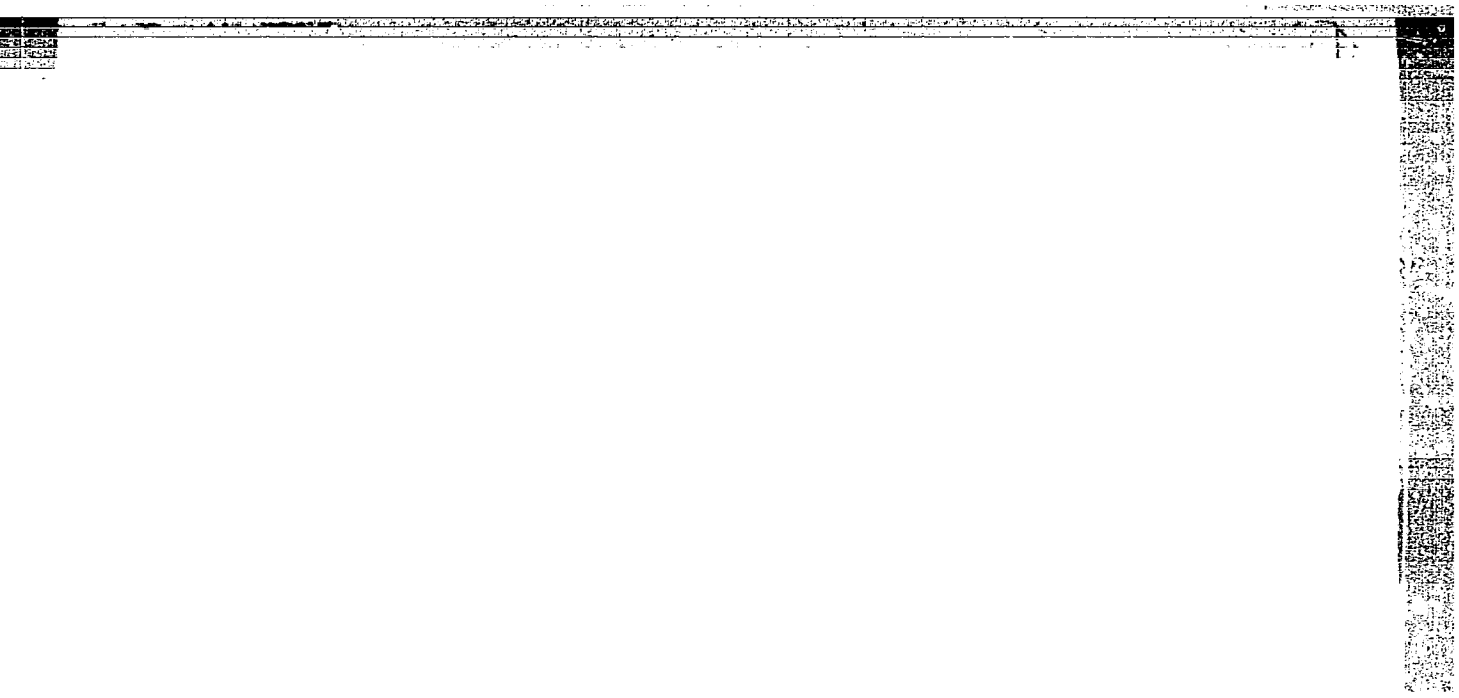
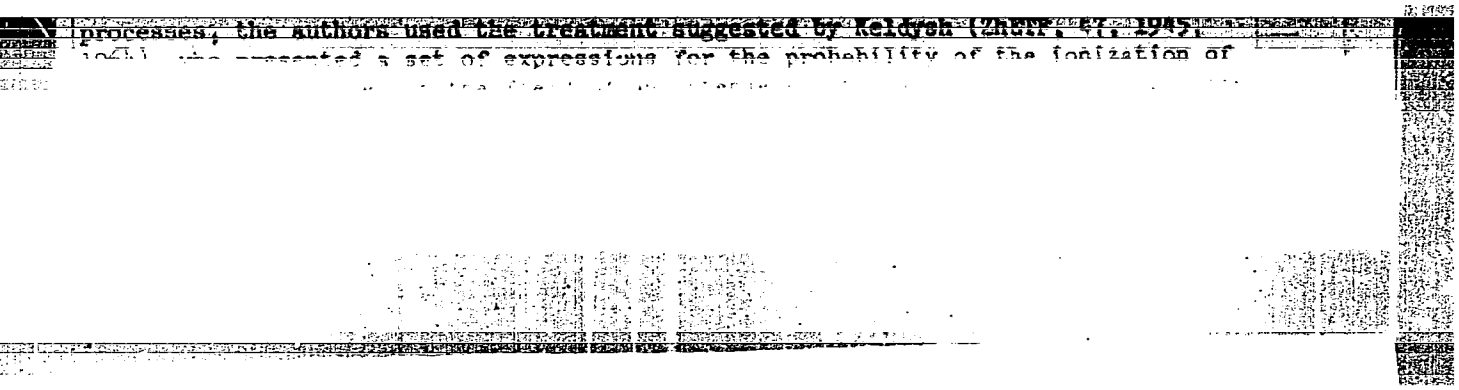
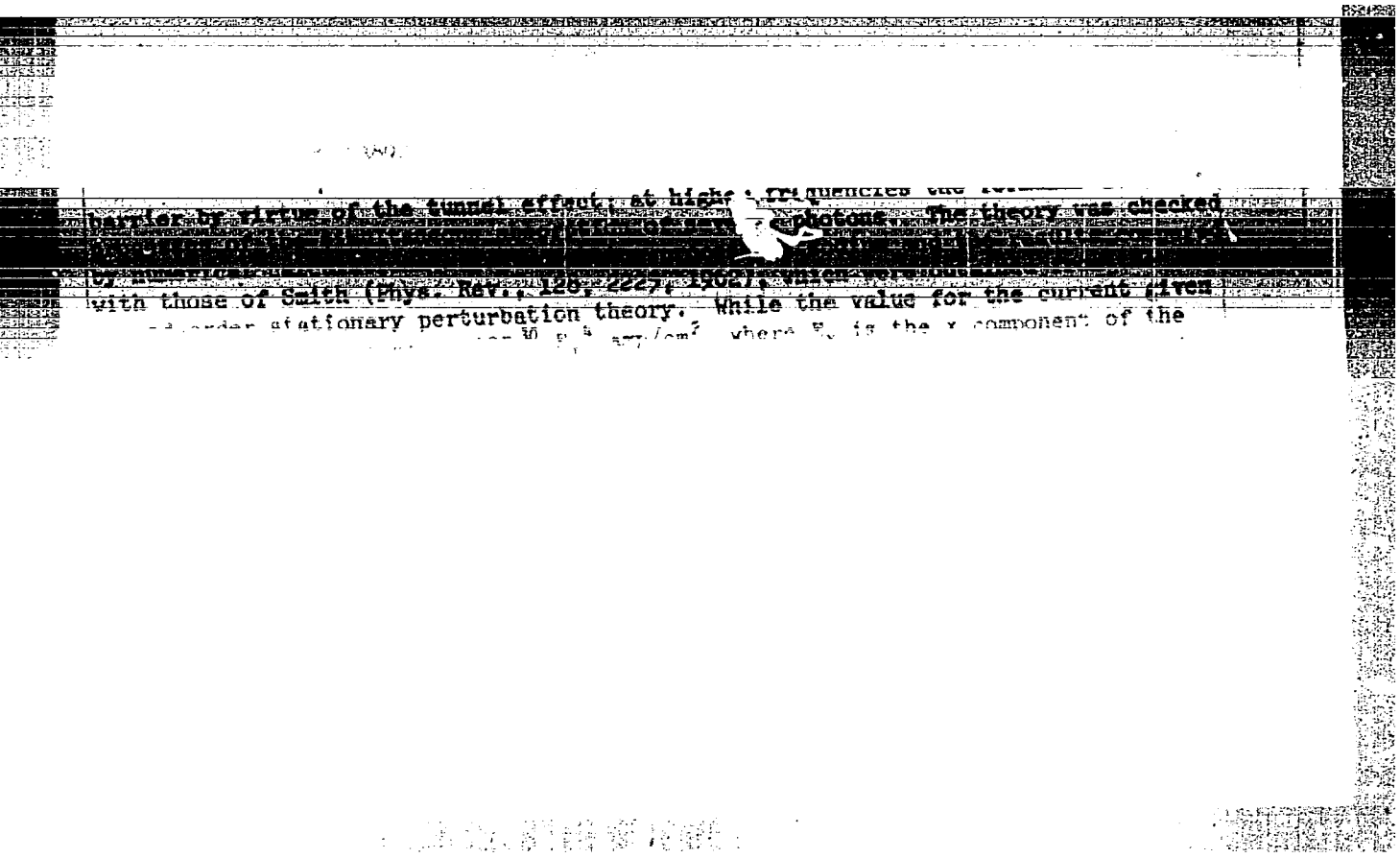


APPROVED FOR RELEASE: 03/20/2001 CIA-RDP86-00513R000412620014-1"



processes, the authors used the treatment suggested by Kellogg (Chem. Rev. 11, 323, 1932). [illegible] presented a set of expressions for the probability of the ionization of



barrier by virtue of the tunnel effect at high frequencies and [illegible] photons. The theory was checked

with those of Smith (Phys. Rev., 128, 2227, 1962), who [illegible] with stationary perturbation theory. While the value for the current given

L 7063-66 EWT(m) DIAAP

ACC NR: AP5026615 SOURCE CODE: UR/0056/65/049/004/1215/1221

AUTHOR: Bunkin, F. V.; Fedorov, M. V.

ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences SSSR (Fizicheskiy institut Akademii nauk SSSR) 40 Q3

TITLE: Bremsstrahlung effect in a strong radiation field

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 4, 1965, 1215-1221

TOPIC TAGS: bremsstrahlung, coulomb collision, high energy interaction, coulomb scattering, potential scattering

ABSTRACT: A method was developed for direct determination of the cross sections for multiple-photon bremsstrahlung emission and absorption of electrons scattered on arbitrary objects in the presence of a strong electromagnetic field. The bremsstrahlung effect for scattering on the Coulomb potential was investigated in detail. In extreme cases for small fields, the results obtained coincided with already known formulas of the perturbation theory. Asymptotic expressions for cross sections of the slowing-down effect in strong fields were derived for the cases of slow and fast electrons. In the first case there is no emission. In the second case the cross sections were calculated for arbitrary values of the angle θ_0 between the directions of electric field polarization and the momentum vector of the incident electron. When $\theta_0 = 0$, i.e.,

Card 1/2

L 7063-66

ACC NR: AP5026615

when the incident electrons are moving along the vector of the electric field, the induced bremsstrahlung prevails over the absorption. For $\theta_0 = \pi/2$, absorption and emission can take place. Orig. art. has: 22 formulas. [JA]

SUB CODE: NP/ SUBM DATE: 26Apr65/ ORIG REF: 005/ OTH REF: 008/ ATD PRESS: 4143

Card 2/2

PODKOSOV, L.G.; PODKOL'ZINA, Ye.P.; MAMINA, A.V.; YERSHOV, V.S.; FEDOROV, M.V.; RUZHITSKAYA, K.P.

New methods and apparatus for the dressing of titanium-zirconium sands. Min.syr'ia no.9:3-15 '63. (MIRA 17:10)

BUNKIN, F.V.; FEDOROV, M.V.

Braking effect in a strong radiation field. Zhur.eksp.i teor.fiz. 49 no.4:1215-1221 O '65. (MIRA 18:11)

1. Fizicheskiy institut imeni Lebedeva AN SSSR.

FEDOROV, N.

Drivers and pick-up stations. Za rul. 21 no.7:22 Jl '63.
(MIRA 16:8)

1. Metodist Leningradskogo kluba turistov.
(Transportation, Automotive)

FEDOROV, N.

Increasing the know-how of ship piloting is a guarantee of safe navigation. Mor. flot 15 no.6:7-8 Je '55. (MLRA 8:8)

1. Kapitan Kerchenskogo porta.
(Navigation)

FEDOROV, N., inzh.

Continuous production of large panels on conveying units. Stroitel' no.4:11 Ap '59. (MIRA 12:6)
(Concrete slabs) (Conveying machinery)

LIDIN, A., sterzhenshchik (Tambov); NEPROYKIN, V., tokar' (Tambov); FEDOROV, N., brigadir slesarey (Tambov)

The plant committee is responsible too! Sov. prcfsoiuzy 20 no.2:7-8 Ja'64. (MIRA 17:2)

1. Zavod "Tambovkhimmash."

FEDOROV, N. (KUYBYSHEV)

The whole group participates. Sov.profsoiuzy 7 no.8:28-30 Ap '59. (MIRA 12:7)

1. Predsedatel' zavkoma 4-go Gosudarstvennogo ordena Lenina podshipnikovogo zavoda.
(Bearing industry) (Industrial efficiency)

FEDOROV, N.; MALININ, V.; YEGORKIN, A.

Thousands of new clubs! Sov. profsoiuzy no.17:29 S '61.
(MIRA 14:8)

1. Zaveduyushchiy lektorskoy gruppoy Bashkirskogo oblsovprofa, g. Ufa (for Malinin). 2. Chlen domovogo komiteta domoupravleniya No.16 Elektrostal'skogo zavoda tyazhelogo mashinostroyeniya, g. Elektrostal' (for Yegorkin).
(Community centers)

POLEVODA, G.; KRUTYPOROKH, F., kand.sel'skokhoz.nauk; FEDOROV, N.; VOLODIN, I.

Letters to the editor. Sel'.stroi. 15 no.9:30 S '60. (MIRA 13:9)

1. Direktor Udmurtskoy shkoly stroitel'nykh masterov (desyatnikov) (for Polevoda). 2. Direktor Penzenskogo lespromkhoza (for Fedorov). 3. Sekretar' partorganizatsii Penzenskogo lespromkhoza (for Volodin).

(Building)

FEDOROV, N., inzh.

Construction of apartment houses in Astrakhan. Zhil. stroi. no.5:10-11 '62. (MIRA 15:6)
(Astrakhan--Apartment houses)

L 28858-66 EPF(n)-2/EWT(m)/ETC(f)/EWG(m)/T/EWP(e)/EWP(t)/ETI IJP(c) WH/DS/WW/
ACC NR: AP6010408 JW/JD/JG SOURCE CODE: UR/0126/66/021/003/0409/0413 69
66
B

AUTHOR: Palatnik, L. S.; Fedorov, G. V.; Bogatov, P. N.

ORG: Khar'kov Polytechnic Institute im. V. I. Lenin (Khar'kovskiy politekhnicheskiy institut)

TITLE: Patterns of evaporation of alloys

SOURCE: Fizika metallov i metallovedeniye, v. 21, no. 3, 1966, 409-413

TOPIC TAGS: evaporation, lead containing alloy, cadmium containing alloy, zinc, bismuth, magnesium, argon, temperature dependence, vapor condensation, vapor pressure

ABSTRACT: The investigation of these patterns in the presence of inert atmospheres is of interest in connection with the research into the processes of the volume condensation of metals. Pb-Bi, Pb-Sb, Zn-Cd, and Mg-Cd alloys were accordingly evaporated in a vacuum apparatus which was evacuated to a pressure of $1 \cdot 10^{-3}$ mm Hg, washed with argon and then evacuated to the specified pressure of argon (0.1-10 mm Hg). The metals were evaporated from alundum crucibles with the aid of tungsten or nichrome heaters. The resulting powdery condensates were investigated by methods of spectral and x-ray phase analysis. For uniform evaporation during spectral analysis the powdery condensate was mixed with graphite powder (1:4); the mixture was evaporated from a cylindrical recess in a graphite electrode. Pb-Sb and Pb-Bi alloys were evaporated at

Card 1/3 UDC: 536.422:669.018

T_{ev} of from 800 to 1300°C, condensation temperature T_c = 80°C and argon pressure p = ≈3 mm Hg. Findings: at T_{ev} = 800°C a marked selective evaporation of Sb takes place, since the vapor pressure of Sb is roughly 3.5 times as high as that of Pb. With increasing T_{ev}, however, the Pb content of the condensates increases and for $T_{ev} \geq$ ≥ 1200°C the composition of the condensate is identical with that of the initial alloy. The same pattern of evaporation is observed for alloys of the Pb-Bi system, where also Pb is the less volatile component; in this case too the evaporation rates of the components of the Pb-Bi alloys become equalized when $T_{ev} \geq 1200$°C. Zn-Cd alloys were evaporated at argon pressure 10 mm Hg, T_c = 80°C and T_{ev} = 400-900°C, and Mg-Cd alloys, at p_{Ar} = 10 mm Hg, T_c = 80°C and T_{ev} = 500-1000°C. In both alloy systems Cd is the more volatile component and thus is the first to evaporate. The vapor pressure of Cd is 13 times higher than that of Zn (at 400°C) and the content of the less volatile component (Zn) increases with increasing T_{ev}. Hence the temperature at which the composition of the condensate is the same as that of the initial alloy can be estimated (by extrapolation) at 1500±100°C for Zn-Cd. By analogy, for Cd-Mg (p_{Cd}/p_{Mg} = 170) we extrapolate $T_{ev.cond.}$ = 2200±200°C. These experiments give reason to believe that the greater is the difference in the vapor pressures of alloy components the higher is the evaporation temperature of condensate $T_{ev.cond.}$ at which the condensate's composition approaches that of the initial alloy and the evaporation rates of both components become the same. Thus, T_{ev} markedly affects the composition

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L 28858-66

ACC NR: AP6010408

of volume condensates. At relatively low T_{ev} of alloys containing components with sharply different vapor pressures, their condensates differ considerably in composition from the initial alloys; as T_{ev} increases, this difference diminishes.

Orig. art. has: 6 figures, 1 table.

SUB CODE: 11, 20/ SUBM DATE: 27Apr65/ ORIG REF: 008/ OTH REF: 001

Card 3/3

L 40956-66 EWT(m)/EWP(k)/EWP(e)/EWP(t)/ETI IJP(c) JH/JG/WW/JD

ACC NR: AT6024930 SOURCE CODE: UR/2981/66/000/004/0202/0207

AUTHOR: Palatnik, L. S.; Fedorov, G. V.; Klyagina, N. S.; Krivenko, R. A.; D'yachenko, S. S.; Fridlyander, I. N. (Doctor of technical sciences)

ORG: none

TITLE: Obtaining highly dispersed metal powders by vaporization in argon

SOURCE: Alyuminiyevyye splavy, no. 4, 1966. Zharoprochnyye i vysokoprochnyye splavy (Heat-resistant and high-strength alloys), 202-207

TOPIC TAGS: metal powder, ultra fine powder, powder production, VAPOR CONDENSATION, ALUMINUM POWDER

ABSTRACT: Certain processes associated with the condensation of metal vapors in an inert-gas atmosphere have been investigated. It was found that in the argon atmosphere, condensation of metal vapors takes place in a limited space-condensation zone. The size of the condensation zone decreases with increasing vaporization rate and inert-gas pressure. On an experimental scale, ultrafine powders of several metals were obtained. The magnesium, cadmium, and zinc powders had an average particle size of 0.001 mm; the particle size of copper and aluminum powders was 0.00005. The size of copper and aluminum particles does not depend very greatly on the variation in the rate of vaporization and the pressure of inert gas. Orig. art. has: 7 figures. [TD]

SUB CODE: 11 / SUBM DATE: none/ ORIG REF: 004/ ATD PRESS: 5057

Card 1/1 bs

ACC NR: AP6032618 SOURCE CODE: UR/0126/66/0022/003/0400/0403

AUTHOR: Fedorov, G. V.; Palatnik, L. S.; Dudkin, V. A.

ORG: Kharkov Polytechnical Institute im. V. I. Lenin (Khar'kovskiy politekhnicheskiy institut)

TITLE: The effect of the type of vaporization on the structure and properties of Al and Cu vacuum condensates

SOURCE: Fizika metallov i metallovedeniye, v. 22, no. 3, 1966, 400-403

TOPIC TAGS: aluminum plating, copper coating, metal vapor deposition, metal physical property, metal recrystallization

ABSTRACT: The authors carried out comparative tests on copper and aluminum vacuum condensates made by the crucible and noncrucible methods. It was shown that the method of vaporization has a considerable effect on the structure and properties of the condensates. Rapid recrystallization occurs at room temperatures in copper condensates made by the noncrucible method. Recrystallization is retarded by impurities in crucible-produced condensates. The noncrucible method consisted of using the electrodynamic interaction effect of induced eddy currents with a high frequency field in the vaporized metal. The microstructure and microhardness of the condensates was studied under various loads and the width of interference lines (400) Cu and (420) Al

Card 1/2 UDC: 669.31.71:536.423.1

ACC NR: AP6032618

was measured on the DRON-1 unit. It was shown that the physico-mechanical properties of the condensates are a function both of block recrystallization and of variations in relaxation of the crystal substructure. Orig. art. has: 2 figures.

SUB CODE: 11, 07/ SUBM DATE: 23Feb66/ ORIG REF: 009/ OTH REF: 004

Card 2/2

L 11737-66 EWT(1)/EWT(m)/T/EWP(t)/ETI IJP(c) JD/JG

ACC NR: AP6020204 SOURCE CODE: UR/0056/66/050/006/1505/1509

AUTHOR: Volkenshteyn, N. V.; Grigorova, I. K.; Fedorov, G. V.

ORG: Institute of Physics of Metals, Academy of Sciences, SSSR (Institut fiziki metallov Akademii nauk SSSR)

TITLE: On the anisotropy of the Hall effect in gadolinium

SOURCE: Zh eksper i teor fiz, v. 50, no. 6, 1966, 1505-1509

TOPIC TAGS: gadolinium, Hall effect, magnetic anisotropy, rare earth metal, magnetic structure, temperature dependence

ABSTRACT: To obtain additional information on the magnetic anisotropy of rare-earth metals, the authors investigated the Hall effect in single-crystal samples of gadolinium ($\rho(292K)/\rho(4.2K) = 20$) in the temperature interval 4.2 - 370K. The measurements were made with crystals cut in two mutually perpendicular directions. In the first the primary current was directed along the a_0 axis and the magnetic field along the c_0 axis, and the Hall field was measured in the b_0 direction. For the second sample the primary current was along a_0, the magnetic field along b_0, and the Hall field along c_0. The authors have published elsewhere the procedure used to measure the Hall emf (FMM v. 2, 377, 1956) and the data reduction procedure (FMM v. 18, 26, 1964). The dependence of the Hall effect on the field in gadolinium exhibits noticeable anisotropy. The Hall emf at temperatures below the Curie point depends on the induction in the sample linearly, but the temperature at which the linearity begins

Card 1/2

L 11737-66

ACC NR: AP6020204

differs with the sample. The Hall voltage and the spontaneous Hall coefficient exhibit a noticeable temperature dependence, similar to that previously observed by N. A. Babushkina (FTT v. 7, 3026, 1965). It is thus demonstrated that even in gadolinium, which has a simpler magnetic structure than other rare-earth metals, the Hall effect has noticeable anisotropy, due to the difference in the magnetic properties in different crystallographic directions. The authors thank L. V. Smirnov and Ye. P. Romanov for supplying the single-crystal gadolinium, and T. V. Ushkova and L. V. Puzanova for x-ray determinations of the orientation and of the crystallographic perfection of the samples. Orig. art. has: 5 figures and 4 formulas.

SUB CODE: 20// SUBM DATE: 22Jan66/ ORIG REF: 005/ OTH REF: 001

Card 2/2 af

L 09838-67 EWT(l)/EWT(m)/EWP(t)/ETI IJP(c) JD/JG

ACC NR: AP6032474 SOURCE CODE: UR/0056/66/051/003/0780/0785

37

AUTHOR: Volkenshteyn, N. V.; Grigorova, I. K.; Fedorov, G. V.

ORG: Metal Physics Institute, Academy of Sciences SSSR (Institut fiziki metallov Akademii nauk SSSR)

TITLE: Anisotropy of the Hall effect in dysprosium

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 51, no. 3, 1966, 780-785

TOPIC TAGS: Hall effect, dysprosium, dysprosium single crystal, anisotropy, dysprosium anisotropy

ABSTRACT: The Hall effect is measured in single crystals of dysprosium ($\rho(294K)/\rho(4.2K) = 10$) at temperatures between 4.2 and 350K. An anisotropy of the field and temperature dependence of the Hall emf is found in the temperature range of existence of the magnetic ordered structure. An anisotropy of the Hall coefficient above the Neel temperature has also been observed. Orig. art. has: 5 figures. [Authors' abstract]

SUB CODE: 20/ SUBM DATE: 22Apr66/ ORIG REF: 007/ OTH REF: 007

Card 1/1 5/10

TVERSKOY, P.N.; MILIN, V.B.; FEDOROV, G.Ye.

Studying the vertical intensity profile of the electric field in the lower atmosphere. Vest. LGU 8 no.5:83-90 My '53. (MIRA 12:7)

(Atmospheric electricity)

SOV/124-57-5-5774

Translation from: Referativnyy zhurnal. Mekhanika, 1957, Nr 5, p 105 (USSR)

AUTHOR: Fedorov, G. Ye.

TITLE: The Effect of Turbulent Mixing on the Potential Gradient of the Electrical Field of the Atmospheric Surface Layer (Vliyaniye turbulentnogo peremeshivaniya na napryazhennost' elektricheskogo polya v prizemnom sloye atmosfery)

PERIODICAL: Uch. zap. Kirovskogo gos. ped. in-ta, 1954, Vol 1, Nr 8, pp 61-66

ABSTRACT: A description is given of the results obtained from experiments conducted by the author in the summer of 1952 for the investigation of the relationships existing between the profile of the vertical potential gradient of the electrical field and the degree of turbulent mixing in the atmospheric surface layer. A series of observations (43 in all) were carried out, consisting of the potential gradient measurements at levels of 1, 3, 5, 7, and 10 meters, polar-conductivity measurements at the 1-m level, and observations of the gradient according to which the eddy-diffusivity coefficient at the 1-m level was calculated. Very close agreement was discovered between the values of

Card 1/2

The Effect of Turbulent Mixing on the Potential Gradient of the Electrical (cont.)

the vertical-potential profile obtained by the measurements and those calculated according to the theoretical formula of V. B. Milin (RZhMekh, 1954, abstract 3377). It is shown that the character of the potential-gradient profile varies in accordance with the variation in the degree of turbulent mixing. Moreover, with an increase in turbulent exchange there is a regular decrease of the absolute values of the potential gradient of the electrical field of the atmospheric surface layer. The results are illustrated by the inclusion of 7 nomograms. Bibliography: 8 references.

L. S. Gandin

FEDOROV, G.Ye., inzhener.

Mechanical blocking of circuit breakers with PS-10 drive and disconnectors with PR-1 drive. Energetik 5 no.6:21-22 Je '57. (MIRA 10:7)

(Electric cutouts)

SOV/169-59-7-7159

Translation from: Referativnyy zhurnal, Geofizika, 1959, Nr 7, p 100 (USSR)

AUTHOR: Fedorov, G.Ye.

TITLE: The Experience of Measuring the Conductivity of Air Near the Earth Surface in Summer Time

PERIODICAL: Uch. zap. Kirovskiy gos. ped. in-t, 1958, Nr 15, pp 66 - 72

ABSTRACT: The author expounds the results of measuring the conductivity of air at altitudes of 0, 1, 2, 3m above the earth surface with two Gerdien devices. The duration of exposition in measuring one polar conductivity varies in dependence on the atmosphere conditions: when cloudiness exists, the conductivity increases with the altitudes; when the cloudiness decreases and the wind increases, the conductivity drops. When the weather was cloudless and windless, a sharp increase of conductivity at an altitude of 1 m is observed. Basing on the comparison of the results of measuring the conductivity with the density of light ions at the

Card 1/2

SOV/169-59-7-7159

The Experience of Measuring the Conductivity of Air Near the Earth Surface in Summer Time

same altitudes, the author draws the conclusion that the obtained experimental data indicate in the main correctly the variation of the conductivity with the altitude.

N.V. Krasnogorskaya

Card 2/2

FEDOROV, I.

Water tanks built of bricks and clay. Sel'. stroi. 9 no.5:12 Ag '54. (MIRA 13:2)

1.Nachal'nik otdela po stroitel'stvu v kolkhozakh Peskovskogo rayona Balashovskoy oblasti.
(Tanks)

22(1) SOV/27-59-4-10/28

AUTHORS: Fedorov, I., Chief Technologist, and Sidorkin, V., Deputy School Director

TITLE: A Training Ground for the Overhead Network System

PERIODICAL: Professional'no-tekhnicheskoye obrazovaniye, 1959, Nr 4, pp 15-16 (USSR)

ABSTRACT: During the beginning 7-Year Plan, huge main lines will have to be electrified. The problem of expanding the training of electricians by the system of State Labor Reserves is, therefore, one of special significance. The author points out the difficulty of organizing the practical training of overhead network electricians which primarily takes place on the electrical installation trains of the Vsesoyuznyy montazhnyy trest elektrifikatsii zheleznodorozhnogo transporta (All-Union Installation Trust for the Electrification of Railroads). The present curricula, composed by the Glavnoye upravleniye trudovykh rezervov (Main Administration of Labor Reserves), provide that practical training in the 2nd class take place every other day, which complicates

Card 1/2

A Training Ground for the Overhead Network System

training. Moreover, the electrical installation trains perform their work at great distance from the school, which means sending the students away for several months on practical training. This, and other difficulties, prompted the schools to establish special training grounds with an overhead network. The "Transelektromontazh" Trust in cooperation with the Zheleznodorozhnoye uchilishche Nr 6 Moskovskoy oblasti (Railroad School Nr 6 of the Moscow Oblast') have planned a standard training ground for overhead networks. It was built by the school and serves for carrying out practical exercises on the basic themes of industrial training. Such a ground can be erected by every school at a minimum cost. The article contains a plan of the training ground and a specification of the anchor sections. There are 2 tables and 1 diagram

ASSOCIATION: Trest "Transelektromontazh" ("Transelektromontazh" Trust), Zheleznodorozhnoye uchilishche Nr 6 (Moskovskaya oblast')

 (Railroad School Nr 6 - Moscow Oblast').

FEDOROV, I.

A useful manual ("The study of machines in grades 8-10 of the urban secondary school" by M.A.Zhidelev. Reviewed by I.Fedorov). Politekh.obuch. no.8:87-89 Ag '57. (MIRA 10:9)

1. Prepodavatel' mashinovedeniya sredney shkoly No.80, Novosibirsk. (Mechanical engineering--Study and teaching) (Zhidelev, M.A.)

FEDOROV, I.

Packings for the heat exchanger for the solution of monoethanolamine.
Khol.tekh. 35 no.5:62 S-O '58. (MIRA 11:11)
(Heat regenerators) (Packing (Mechanical engineering))

FEDOROV, I. and NIKITIN, N.

"BAIR 5P", published by the State Publishing House for Geographical Literature, in Moscow 1953.

SO: TABCON, sum. of context, D-83950, 6 Oct 1954.

KHOKHLOV, A., dotsent; MAUCHIGIN, D., vetvrach; FEDOROV, I., rentgenotekhnik

Roentgenoscopic control of meat products. Mias.ind.SSSR 31 no.5:29-30 '60. (MIRA 13:9)

1. Leningradskiy veterinarnyy institut (for Khokhlov).
2. Leningradskiy myasokombinat (for Fedorov).
(Meat inspection)

FEDOROV, I.

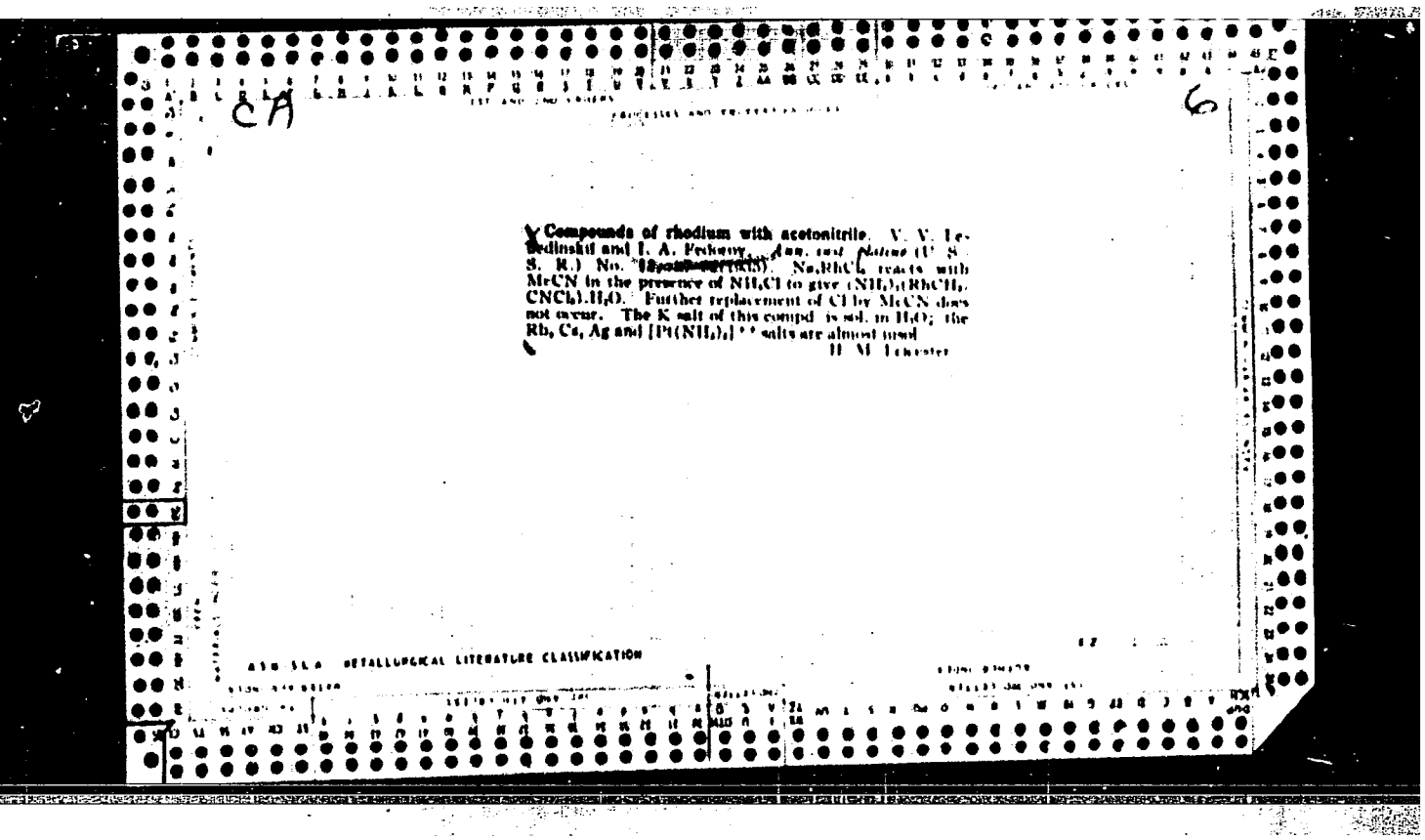
Stretch to strengthen. Znan. sila 37 no.1:20-22 Ja '62.
(MIRA 15:1)
(Prestressed concrete construction)

FEDOROV, I.

"Stone" machine tools. Znan.-sila 37 no.6:9-11 Je '62.
(MIRA 15:9)
(Machinery industry) (Reinforced concrete construction)

FEDOROV, I.A.

Selvage catching device with photoelectric control. Tekst.prom. 14 no.8:53-54 Ag '54. (MLRA 7:10)
(Textile machinery)



CA

6

Compounds of rhodium with acetonitrile. V. V. Lebedinskii and I. A. Perkova. *Zhur. neorg. khimii* (U. S. S. R.) No. "[illegible]". Na_3RhCl_6 reacts with MeCN in the presence of NH_4Cl to give $(NH_4)_2[RhCl_4(CNCl_3).H_2O]$. Further replacement of Cl by MeCN does not occur. The K salt of this compd is sol. in H_2O; the Rb, Cs, Ag and $[Pt(NH_3)_4]^{++}$ salts are almost insol.

H. M. Leicester

ASM SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

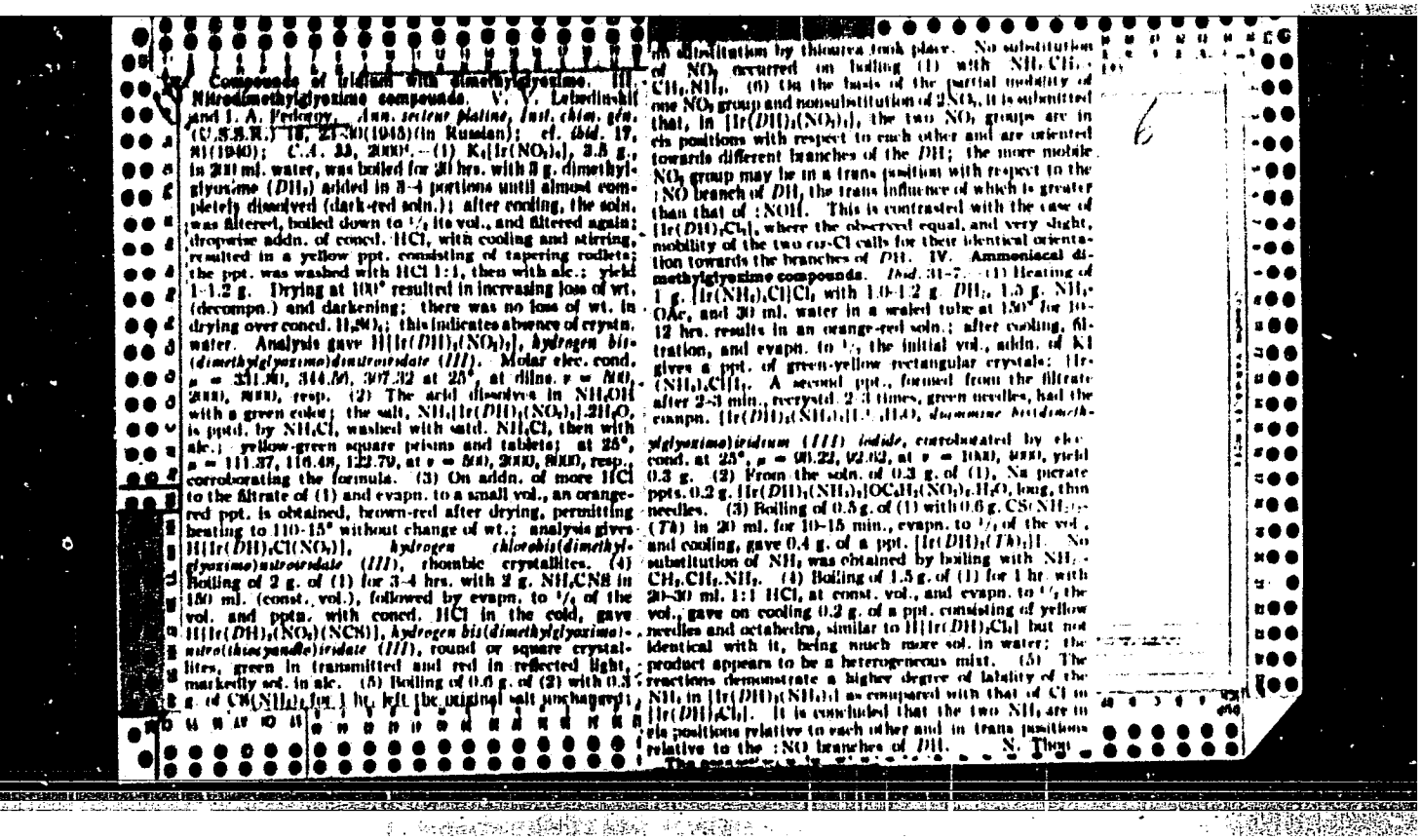
B-1

New compounds of (A) rhodium, (B) iridium, with dimethylglyoxime. V. V. Lebedinski and I. A. [illegible] (Ann. Sect. Platine, 1938, No. 15, [illegible]—(A) (CMe:N·OH)₂ (I) and aq. Na₃[Rh(NO₂)₆] are boiled, for [illegible] excess of [illegible] R (R = ·O·N:CMe·CMe:N·OH) crystallises. The corresponding guanidine and [Pt4NH₃] salts are described.

(B) [illegible] and (I) yield the acid H[IrR₂Cl₂] [illegible] guanidine, K (+ 2H₂O) and [Pt4NH₃] salts are described.

R. T.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



Compounds of iridium with dimethylglyoxime. III. Nitrodimethylglyoxime compounds. V. V. Lebedinskii and I. A. Perfilov. *Ann. secteur platine, Inst. chim. gén. (U.S.S.R.)* 13, 21-30(1940)(in Russian); *cf. ibid.* 12, 81(1940); *C.A.* 35, 2000.—(1) $K_3[Ir(NO_2)_6]$, 3.8 g., in 200 ml. water, was boiled for 20 hrs. with 3 g. dimethylglyoxime (DH_2) added in 3–4 portions until almost completely dissolved (dark-red soln.); after cooling, the soln. was filtered, boiled down to ½ its vol., and filtered again; dropwise addn. of concd. HCl, with cooling and stirring, resulted in a yellow ppt. consisting of tapering rodlets; the ppt. was washed with HCl 1:1, then with alc.; yield 1–1.2 g. Drying at 100° resulted in increasing loss of wt. (decompn.) and darkening; there was no loss of wt. in drying over concd. H_2SO_4; this indicates absence of crystn. water. Analysis gave $H[Ir(DH)_2(NO_2)_2]$, *hydrogen bis(dimethylglyoximo)dinitroiridate (III)*. Molar elec. cond. μ = 351.80, 344.56, 307.32 at 25°, at dilns. v = 800, 2000, 8000, resp. (2) The acid dissolves in NH_4OH with a green color; the salt, $NH_4[Ir(DH)_2(NO_2)_2].2H_2O$, is ppd. by NH_4Cl, washed with satd. NH_4Cl, then with alc.; yellow-green square prisms and tablets; at 25°, μ = 111.37, 116.48, 122.79, at v = 500, 2000, 8000, resp., corroborating the formula. (3) On addn. of more HCl to the filtrate of (1) and evapn. to a small vol., an orange-red ppt. is obtained, brown-red after drying, permitting heating to 110–15° without change of wt.; analysis gives $H[Ir(DH)_2Cl(NO_2)]$, *hydrogen chlorobis(dimethylglyoximo)nitroiridate (III)*, rhombic crystallites. (4) Boiling of 2 g. of (1) for 3–4 hrs. with 2 g. NH_4CNS in 150 ml. (const. vol.), followed by evapn. to ½ of the vol. and ppta. with concd. HCl in the cold, gave $H[Ir(DH)_2(NO_2)(NCS)]$, *hydrogen bis(dimethylglyoximo)nitro(thiocyanido)iridate (III)*, round or square crystallites, green in transmitted and red in reflected light, markedly sol. in alc. (5) Boiling of 0.6 g. of (2) with 0.3 g. of $CS(NH_2)_2$ for 1 hr. left the original salt unchanged; no substitution by thiourea took place. No substitution of NO_2 occurred on boiling (1) with NH_2CH_2-$CH_2.NH_2$. (6) On the basis of the partial mobility of one NO_2 group and nonsubstitution of 2 NO_2, it is submitted that, in $[Ir(DH)_2(NO_2)_2]$, the two NO_2 groups are in cis positions with respect to each other and are oriented towards different branches of the *DH*; the more mobile NO_2 group may be in a trans position with respect to the :NO branch of *DH*, the trans influence of which is greater than that of :NOH. This is contrasted with the case of $[Ir(DH)_2Cl_2]$, where the observed equal, and very slight, mobility of the two ex-Cl calls for their identical orientation towards the branches of *DH*. IV. **Ammoniacal dimethylglyoxime compounds.** *Ibid.* 31–7.—(1) Heating of 1 g. $[Ir(NH_3)_5Cl]Cl_2$ with 1.0–1.2 g. *DH*, 1.5 g. NH_4OAc, and 30 ml. water in a sealed tube at 150° for 10–12 hrs. results in an orange-red soln.; after cooling, filtration, and evapn. to ½ the initial vol., addn. of KI gives a ppt. of green-yellow rectangular crystals: $[Ir(NH_3)_5Cl]I_2$. A second ppt., formed from the filtrate after 2–3 min., recrystd. 2–3 times, green needles, had the compn. $[Ir(DH)_2(NH_3)_2]I$. *Diammine bis(dimethylglyoximo)iridium (III) iodide*, enrelocated by elec. cond. at 25°, μ = 90.22, 92.02, at v = 1000, 4000, yield 0.3 g. (2) From the soln. of 0.3 g. of (1), Na picrate ppts. 0.2 g. $[Ir(DH)_2(NH_3)_2]OC_6H_2(NO_2)_3.H_2O$, long, thin needles. (3) Boiling of 0.5 g. of (1) with 0.6 g. $CS(NH_2)_2$ (*Th*) in 20 ml. for 10–15 min., evapn. to ½ of the vol., and cooling, gave 0.4 g. of a ppt. $[Ir(DH)_2(Th)_2]I$. No substitution of NH_3 was obtained by boiling with NH_2-$CH_2.CH_2.NH_2$. (4) Boiling of 1.5 g. of (1) for 1 hr. with 20–30 ml. 1:1 HCl, at const. vol., and evapn. to ½ the vol., gave on cooling 0.2 g. of a ppt. consisting of yellow needles and octahedra, similar to $H[Ir(DH)_2Cl_2]$ but not identical with it, being much more sol. in water; the product appears to be a heterogeneous mixt. (5) The reactions demonstrate a higher degree of lability of the NH_3 in $[Ir(DH)_2(NH_3)_2]$ as compared with that of Cl in $[Ir(DH)_2Cl_2]$. It is concluded that the two NH_3 are in cis positions relative to each other and in trans positions relative to the :NO branches of *DH*. N. Thon

CA

6

Compound of rhodium with dimethylglyoxime. V. V. Lebedinskii and I. A. Fedorov. *Izvest. Sektora Platiny i Drugikh Blagorod. Metal., Inst. Obshchei i Neorg. Khim., Akad. Nauk S.S.S.R.* No. 21, 157-63(1948). When $NH_4[Rh(dmg)_2Cl_2]$ (dmg is the dimethylglyoxime radical) soln. was boiled with NH_4I for 1 1/5 hrs. the product was $NH_4[Rh(dmg)_2ClI].0.5H_2O$, with NH_4Br the product was $NH_4[Rh(dmg)_2ClBr].2H_2O$, with NH_4CNS the product was $NH_4[Rh(dmg)_2ClCNS]$; with thiourea, [Rh(dmg)_2ClCS(NH_2)_2], a nonelectrolyte. The ClI complex was boiled with thiourea with displacement of Cl but not I. Similarly with the ClCNS complex CNS is replaced by thiourea. M. Hosch

Analyse

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•Quantitative Separation of Iridium from Rhodium by the Gibbs Method. N. K. Pshenitsyn, L. A. Fedorov, and P. V. Rimarevsky (*Izvest. Sekt. Platiny*, 1948, [22], 22–27; *C. Abs.*, 1950, 44, 10583).– [In Russian]. The proposed method is a modification of the Gibbs method (*Chem. News*, 1863, 7, (169)). Ir is precipitated with Na_2S from its hexanitrite soln. The precipitate is ignited, the Ir reduced in a current of H_2, cooled in CO_2, and weighed. In the filtrate Ir is re-oxidised with HNO_3 or H_2O_2 to the quadrivalent state. Then Ir is determined either by the bromide-bromate method (Meuer and Harkhofer, *Monatsh.*, 1932, **60**, 45; *Met. Abs.* (*J. Inst. Metals*), 1932, **50**, 300) or by the $Hg(CN)_2$–$2HgO$ method. In the latter case Ir precipitates as a black or blue-black hydroxide. A scheme for determining Pt, Pd, Au, Rh, and Ir in precious-metal concentrates is given.

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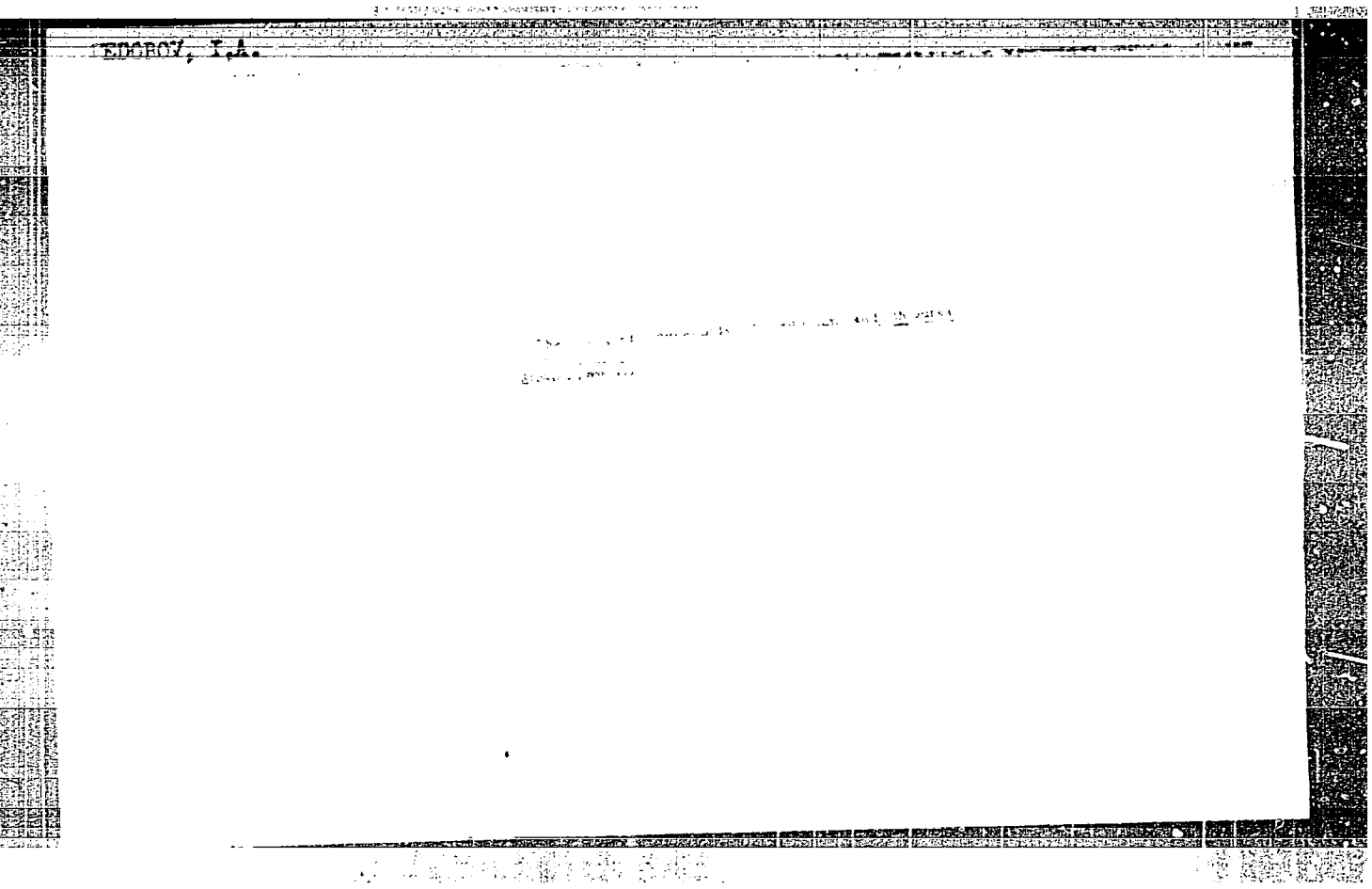
7

Determination of ruthenium in copper-nickel slimes. N. K. Pshenitsyn and I. A. Fedorov. *Izvest. Sektora Platiny i Drugikh Blagorod. Metal., Inst. Obshchei i Neorg. Khim., Akad. Nauk S.S.S.R.* No. 22, 70-9(1948). —Treat sample with hot 10% H_2SO_4 to remove most of Cu and Ni; remove Pb by boiling in NH_4OAc. Ignite, treat with HF to remove SiO_2, and fuse with KOH and KNO_3 in a Ag crucible with sample 1, KOH 8, and KNO_3 2.5 parts. Dissolve the fusion in H_2O and filter. Fuse the residue again and proceed as before. Fuse the 3rd time if necessary. Combine filtrates and residues (if any) and heat with alc. to reduce Ru. Filter, wash, ignite ppt. (Ru, Pd, Ir, Pt, Ag), reduce in a stream of H, and cool in CO_2. Treat with 1:3 HNO_3, filter, and wash. The residue contains Ru, Pt, and Ir. Ash, filter, and fuse with 10 times of Na_2CO_3 in a Pt crucible at approx. 900°. Treat fusion with dil. HCl, heat, and filter. Residue contains Ir and possibly Ru, fuse again with Na_2CO_3, dissolve, and filter. Combine filtrates, reduce with Zn and Mg, filter, wash, dry, ignite, reduce in H, and cool in CO_2. The product comprises Ru possibly contaminated by Pt. Treat with 1:4 aqua regia, filter, wash, dry, ash, filter, ignite, reduce in H, cool in CO_2, and weigh Ru. M. H.

C. A.

Interaction of complex amines of rhodium with dimethylglyoxime. V. V. Lebedinskii and I. A. Feiorov. *Inst. Sektora Platiny i Drugikh Blagorod. Metal., Akad. Nauk S.S.S.R.* No. 22, 158-67(1948); cf. *C.A.* 44, 10665e.—$NH_4[RhNH_2Cl_4]$ 0.6 g., dimethylglyoxime (DMG) 0.5 g., H_2O 50 ml., and concd. HCl 2.5 ml. after 30 min. formed a yellow ppt. of $H[Rh(DMG)_2Cl_4]$. $K[Rh(NH_3)_2(NO_2)_4]$ 1 g. and DMG 1.5 g. boiled for 1.5-2.0 hrs. in 100 ml. of H_2O gave 1-2-mm. yellow needles of a new nonelectrolyte $[Rh(DMG)_2NH_3NO_2].^1/_2H_2O$. $[Rh(NH_3)_5(NO_3)_3]$ and DMG 3.4 g. each boiled for 10-12 hrs. in 300 ml. of H_2O yielded the same compd. as small yellow prisms. Boiling the same quantities of triammino chloride and DMG yielded a nonelectrolyte $[Rh(DMG)_2NH_3Cl].H_2O$. $[RhPy_2Cl_4]Cl$ 0.3 and DMG 0.2 g. boiled in 50 ml. of H_2O for 30-35 hrs. produced a nonelectrolyte $[Rh(DMG)_2PyCl]$.

M. Hosch



FEDOROV, I.A.

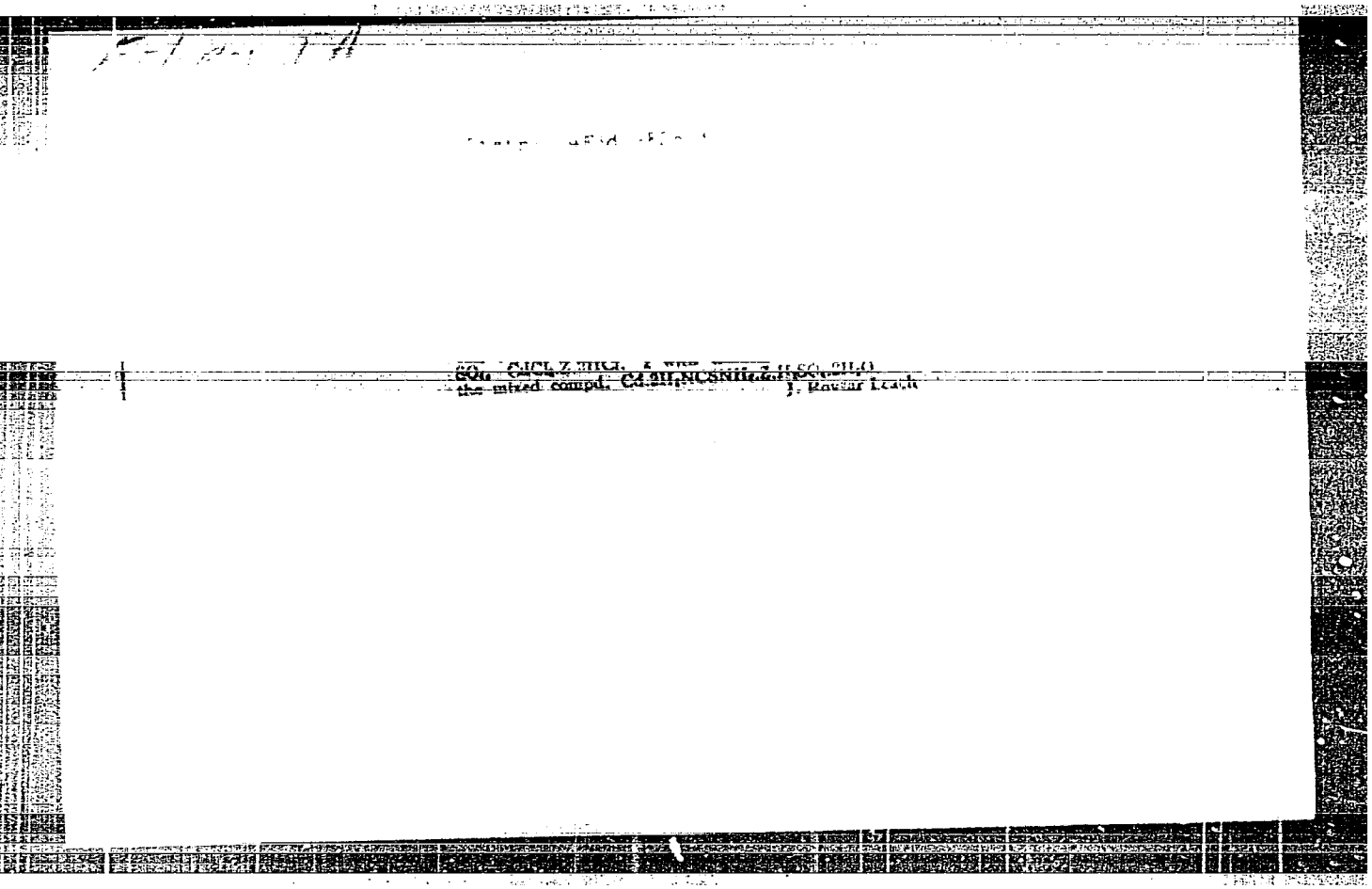
GRINBERG, A.A. (Leningrad); BABAYEVA, A.V.(Moscow); YATSIMIRSKIY, K.B. (Ivanovo); GOREMYKIN, V.I. (Moscow); BOLIY, G.B. (Moscow); FIALKOV, Ya.A. (Kiyev); YAKSHIN, M.M. (Moscow); KRDROV, B.M. (Moscow); GEL'MAN, A.D. (Moscow); FEDOROV, I.A. (Moscow); MAKSIMYUK, Ye.A. (Leningrad); VOL'KENSHTEYN, M.V. (Leningrad); ZHDANOV, G.S. (Moscow); PTITSYN, B.V. (Leningrad); ABLOV, A.V. (Kishinev); VOLSHTEYN, L.M. (Dnepropetrovsk); TROITSKAYA, A.D. (Kazan'); KLOCHKO, M.A. (Moscow); BABAYEVA, A.V.; TRONEV, V.G. (Moscow); RUBINSHTEYN, A.M.(Moscow) CHERNYAYEV, I.I.; GRINBERG, A.A.; TANANAYEV, I.V.

Explanation of the transeffect. Izv.Sekt.plat.i blag.met. no.28: 56-126 '54. (MLRA 7:9)

(Compounds, Complex) (Platinum)

USSR.

Compounds of cadmium with o-phenylenediamine. I. A. Fedorov, *Izvest. Sektora Platiny i Drug. Blagorod. Metallov Inst. Obshchei Neorg. Khim., Akad. Nauk S.S.S.R.* 28, 180–82 (1954).—The following compds. were formed: $CdC_6H_4(NH_2)_2Cl_2$, $CdC_6H_4(NH_2)_2I_2$, $Cd(C_6H_4(NH_2)_2)Cl_2$, $(C_6H_4(NH_2)_2)_2Br_2$, $Cd(C_6H_4(NH_2)_2)I_2$, $Cd(C_6H_4(NH_2)_2)SO_4.H_2O$, $Cd(C_6H_4(NH_2)_2)_2(CNS)_2$, $Cd(C_6H_4(NH_2)_2)(NO_3)_2$, and $Cd(C_6H_4(NH_2)_2)_2SO_4.H_2O$. o-$C_6H_4(NH_2)_2$ is readily replaced either partially or completely by CH_3NH_2, NH_4, or thiourea. Mol. elec. cond. and av. wt. of compds. in H_2O were detd.; the data indicated that Cd phenylenediamine did not form stable compds. in H_2O. H. W. L...



FEDOROV, I.A.; ZAYTSEV, L.M.

Investigating the thermal properties of cadmium phenylenediamines. (MIRA 11:3)
Zhur. neorg. khim. 2 no.8:1812-1828 Ag '57.
(Cadmium compounds) (Phenylenediamine) (Thermal analysis)

5(2)

AUTHOR: Fedorov, I. A.

SOV/78-4-4-1/44

TITLE: Mikhail Mikhaylovich Yakshin Deceased

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 4, pp 705-708 (USSR)

ABSTRACT: M. M. Yakshin was born on September 23, 1891, in the city of Belozersk in Vologodskaya oblast'. After the High-school (1908) he finished his University education in 1915 in the physical-mathematical faculty of the University of St. Petersburg. Here he began his scientific career with the study of the hydrazine oxalates. In 1915 he began working in an explosives factory. In 1921 he became a member of the Komissiya po razvitiyu v RSFSR kanifol'noy promyshlennosti (Commission for the Development of the Resin Industry in the RSFSR). As docent he was given the chair for agricultural chemistry in 1930 and he gave lectures there on the production of resin and turpentine while at the same time giving lectures on qualitative and quantitative analysis at the Voyenno-inzhenernoy akademii RKKA (Military Engineers Academy RKKA) and other institutes of higher schools in

Card 1/3

Moscow. In 1935 he became a member of the Academy of Sciences, USSR and worked in the Institut obshchey i neorganicheskoy khimii im. N. S. Kurnakova (Institute for General and Inorganic Chemistry imeni N. S. Kurnakov), division for the complex compounds of platinum. Here he and Academician I. I. Chernyayev carried out investigations on the reaction rates in the hydration of various platinum complexes. In 1938 he became a candidate of the chemical sciences and in 1940 he became the first-ranking scientific co-worker. In 1944 he successfully presented his dissertation "O dielektricheskoy postoyannoy nekotorykh kompleksnykh soyedineniy platiny" ("Concerning the Dielectric Constants of Several Complex Compounds of Platinum"). Mikhail Mikhaylovich Yakshin first introduced into the chemistry of the complex compounds the concept of "coordinative refraction". The nature of the water in the crystalline complex compounds of platinum and the meaning of the atomic polarization in particular platinum compounds was investigated by him. He held several kinds of teaching positions. He was a member of the board of editors for the periodical "Izvestiya Sektora platiny i drugikh

Mikhail Mikhaylovich Yakshi (Deceased) SOV/78-4-4-1/44

blagorodnykh metallov" (News of Platinum and Other Noble Metals"). A list of his scientific works is given. Mikhail Mikhaylovich Yakshin died on July 5, 1958, after a severe illness. There is 1 figure.

Card 3/3

SHEVCHENKO, V.B.; FEDOROV, I.A.; AGUREYEV, Yu.P.

[Temperature effect on the extraction of the nitrates of uranyl, plutonium, and nitric acid with tributyl phosphate] Vliianie temperatury na ekstraktsiiu tributilfosfatom nitratov uranila, plutoniia i azotnoi kisloty. Moskva, Glav. upr. po ispol'zovaniiu atomnoi energii, 1960. 19 p. (MIRA 17:1)
(Uranyl nitrate) (Plutonium nitrates)
(Butyl phosphates)

S/186/60/002/001/002/022
A057/A129

21.3200

AUTHORS: Shevchenko, V.B.; Fedorov, I.A.

TITLE: Effect of the temperature on the extraction of uranyl-, plutonium-, ruthenium-, and zirconium-nitrates with tributyl phosphate

PERIODICAL: Radiokhimiya, v. 2, no. 1, 1960, 6 - 12

TEXT: In the present paper an attempt was made to determine basic conditions concerning the temperature effect on tributylphosphate (TBP) extraction of uranyl-, plutonium-, ruthenium-, or zirconium-nitrate. Literature data regarding this problem are incomplete or not systematic. Nevertheless the knowldge of the temperature effect on extraction is important for the separation of uranium and plutonium from fission products. The present experiments were carried out with initial solutions of uranyl nitrate in concentrations of 0.01, 0.2 and 0.8 M, while solutions with other elements contained just tracer amounts of these. The tributylphosphate concentration varied from 0.3 to 3.67 M, using as diluent a mixture of saturates hydrocarbons (boiling at 182 - 222°C). During the extraction the temperature was kept with an accuracy of ± 0.1°C at 5, 10, 20, 30, 40, 60, or 80°C. Initial volumes of 10 - 20 ml were used, equilibrium was reached in

Card 1/8

S/186/60/002/001/002/022
A057/A129

Effect of the temperature on the extraction of....

5 - 10 min, and the samples were allowed to stand for 30 - 40 min (with 3.67 M TBP for several hours). The acidity of the initial solutions was determined by potentiometry, uranium was determined by gravimetry (or colorimetry with Na-diethyl dithiocarbamate), while Zr, Ru, and Pu were determined by radiometry. The distribution coefficient K_p was calculated from the ratio (C_o/C_{aq}) of the concentration in the organic and aqueous phase. Experimental data (Fig. 1) demonstrate that with increasing temperature the distribution coefficient for HNO_3 between water and 1.43 M TBP decreases. By increasing HNO_3 concentration a decrease in the effect of the temperature on K_p can be observed. Thus an increase from 5°C to 80°C decreases K_p twice for extractions from 0.5 N HNO_3 solutions, 1.7 times for 1.72 N HNO_3, and 1.3 times for 3 N HNO_3 solutions. Apparently, constancy of $K_{p\ HNO_3}$ [observed by B. Weaver et al, Ref. 5: J. Am. Chem. Soc., 75, 16, 3943 1953)] with changing temperature is valid only for lower acidities (from 5 N HNO_3). With increasing concentration of uranyl nitrate in TBP the effect of temperature on the extraction decreases. Thus $K_p\ UO_2(NO_3)_2$ for extraction of an initial solution containing 0.21 M uranium in 1.7 HNO_3 is at 5°C 2.1 times greater than at 80°C using 1.47 M TBP as extractant, while using 0.36 M TBP the value changes 1.6 times. Extractions from 0.01 M uranium solutions are even more sensitive for changes in temperature. The curves for the dependence of log K_p on

Card 2/8

1/T (Figs. 2, 3) demonstrate that the extraction of uranyl nitrate with TBP occurs according to the Van't Hoff equation. The reaction is isothermal and controls principally the decrease of the distribution coefficient of uranium with temperature. The temperature effect of plutonium on extraction was investigated in solutions containing and not containing uranium. The distribution coefficient of Pu^{4+} increases with temperature from 10 to 40°C (Fig. 4) and drops then with a further temperature increase. Solutions with an initial HNO_3 concentration of 0.5 N (not containing uranium) show that extractability of Pu^{4+} decreases continuously with increasing temperature (Fig. 4, curve 1). The effect of acidity on the change of the distribution coefficient with temperature interval from 10 - 40°C and is not so evident between 40 - 80°C. The present authors discuss statements of some other investigators [Ref. 8: D.W. Okendi, J. Chem. Soc., 3358 (1956); Ref. 9: G. Seaborg, J.Katz, Actinides, N.N.E.S.; Ref. 10: H.H. Anderson, The Transuranium Elements, 2, 964 (1949); Ref. 11: J.A. Brothers, R.G. Hart, W.C. Mathers, J. Inorg. Nucl. Chem., 7, 85 (1958)] concerning the state of plutonium in solutions and assume the following equilibrium in solutions with an acidity between 0.5 and 4 N HNO_3:

$$Pu^{4+} \rightleftarrows Pu(NO_3)^{3+} \rightleftarrows Pu(NO_3)_2^{2+} \rightleftarrows Pu(NO_3)_3^{+} \rightleftarrows$$
$$\rightleftarrows Pu(NO_3)_4 \rightleftarrows Pu(NO_3)_5^{-} \rightleftarrows Pu(NO_3)_6^{2-}$$
$$\updownarrow$$
$$HPu(NO_3)_5$$

Card 3/8

22453

Effect of the temperature on the extraction of....

With increasing acidity the amount of $Pu(NO_3)_5^-$ increases. Supposing the whole equilibrium system is exothermic [according to Ref. 12: R.E. Connick, W.H. McVey, J. Am. Chem. Soc., 71, 3182 (1949) $Pu^{4+} + NO_3^- \rightarrow Pu(NO_3)^{3+}$ is exothermic] the present authors consider that the increasing number of nitrate groups in the plutonium nitrate complex is an exothermic process. The observed dependence of the extractability of plutonium on the temperature could thus be explained by the effect of principally two factors: 1) the shift of the equilibrium of Pu^{4+} nitrate complexes in aqueous solutions with increasing temperature, and 2) the exothermic formation of the $Pu(NO_3)_4 \cdot 2$ TBP complexes, which can be extracted into the organic phase. In solutions with an acidity above 1.7 N HNO_3 the first factor prevails until 40°C, while above 40°C the second factor is predominant. The continuous decrease of K_p with increasing temperature in solutions with an acidity below 0.5 N HNO_3 is to be explained by the summary effect of both factors. Extractability of zirconium nitrate decreases with increasing temperature (Fig. 5) between 10 and 30°C. Above 30°C the extractability increases with temperature. The effect of temperature is more pronounced in solutions at lower HNO_3 concentration. Discussing the state of zirconium in the present investigations the authors assume, based on observations in sulfate complexes of zirconium [Ref. 15: W.B. Blumenthal, Ind. Eng. Chem., 46, 528 (1954)], that with increasing temperature the

Card 4/8

S/186/60/002/001/002/022
A057/A129

Effect of the temperature on the extraction of....

equilibrium between nitrate and basic zirconium salts shifts towards the formation of the latter. Thus the amount of extractable nitrate complexes decreases and accordingly also the extractability of zirconium. Increase in zirconium extractability above 30°C can be explained by the effect of some other factors, like an increase in the solubility of the zirconium solvate complex, and increasing concentration of dibutyl phosphate. Extractability of ruthenium decreases with increasing temperature (Fig. 6). The existence of the following equilibrium is assumed by D.M. Fletcher and F.S. Martin, Chemistry of Nuclear Fuels: $[RuNO(NO_3)_3(H_2O)_2] \rightleftarrows [RuNO(NO_3)_2OH(H_2O)_2] \rightleftarrows [RuNO(NO_3)(OH)_2(H_2O)_2]$. The trinitrate complex is easily extractable. With increasing temperature equilibrium shifts towards the formation of the difficultly extractable di- and mono-hydrate complexes. Thus extractability of ruthenium decreases. The maintenance of definite temperature conditions in each step of the extraction process of nuclear fuels can improve the separation of uranium and plutonium from fission products. There are 6 figures and 18 references: 1 Soviet and 17 non-Soviet.

SUBMITTED: May 20, 1959

Card 5/8

S/078/60/005/007/030/043/XX
B004/B060

AUTHORS: Fedorov, I. A., Balakayeva, T. A.

TITLE: Compounds of Cadmium With Glycocoll

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 7, pp. 1522-1532

TEXT: In their study of glycocoll - cadmium compounds, the authors established two types. In the first one, glycocoll (GlH) occupies one coordination site (binding to Cd by means of nitrogen) to form salts which readily dissociate in water. The second type consists of cyclic chelates, in which GlH is bound to Cd both with nitrogen and with oxygen, and occupies two coordination sites. The article under consideration is concerned only with the study of compounds belonging to the former type: $Cd(GlH)X_2$. They were obtained by reaction of GlH with aqueous solutions of Cd salts in neutral or poorly acid medium. The number of GlH molecules entering into the compound depends on the anion X. Thus, only one chloride compound, $Cd(GlH)_2Cl_2$ was obtained, as against three bromides:

Compounds of Cadmium With Glycocoll

S/078/60/005/007/030/043/XX
B004/B060

$Cd(GlH)_2Br_2$, $Cd(GlH)_3Br_2$, and $Cd(GlH)_6Br_2$. The latter was precipitated after separation of the Di-GlH compound by addition of acetone to the filtrate. The iodine compounds could not be synthesized. $Cd(GlH)SO_4$ and $Cd(GlH)_3SO_4$ were obtained with $CdSO_4$. All the compounds are well soluble in water. The determination of their molecular electrical conductivity revealed that all halogen compounds are three-ion electrolytes, while sulfate compounds are two-ion ones. The Van t'Hoff number i is about equal to the number of components forming the compound. When the acid-reacting (pH about 5) aqueous solutions of these compounds are titrated with alkali, less alkali is used than would correspond to the glycocoll content, because the ring is closed, and compounds of the type $Cd(Gl)_2MeX$ are formed (Me = Na, K, NH_4). GlH can be displaced from the complex by ethylene diamine and aniline. In thiourea (thio), displacement depends on the anion of the compounds. In the case of chlorides, GlH is completely dislocated by thio, but is displaced only partially from sulfates to form $CdSO_4$Thio6GlH and $2CdSO_4$3Thio26GlH. The authors determined density and

Card 2/4

molecular volume of some salts (Table 3). The volume of GlH-Cd compounds is 10-12% smaller than the total volume of the components. The thermograms taken by L. M. Zaytsev of $Cd(GlH)_2Cl_2$, $Cd(GlH)_2Br_2$, and $Cd(GlH)SO_4$ (Figs. 1-3, Tables 6-8) revealed that the two halogen compounds melt at 210-240°C without a change in composition, and that decomposition sets in only at 280-300°C. In the sulfate compound, decomposition without melting sets in only at 350°C. With NH_3, the compounds react under ring closure and the formation of complexes. $Cd(Gl)_2NH_4Cl.H_2O$ and $Cd(Gl)_2NH_4Br.H_2O$ were synthesized. It may be seen from the conductivity and the cryoscopic data (Tables 3,4) that these compounds dissociate according to the equation: $Cd(Gl)_2NH_4Br \rightleftharpoons Cd(Gl)_2 + NH_4^+ + Br^-$. The displacing action of ethylene diamine (En) was proved by synthesis of the $Cd(En)_2I_2$ compound. The reaction with pyridine (Py) was studied in two ways: 1) reaction of GlH with $CdPyCl_2$, and 2) reaction of Py with $Cd(GlH)_2Cl_2$. $CdPy_2Cl_2$ and $Cd(GlH)_2Cl_2$ were obtained in both cases. The authors assume an unstable $CdPy(GlH)Cl_2$

compound, decomposing according to the equation: $2CdPy(GlH)Cl_2 \longrightarrow CdPy_2Cl_2 + Cd(GlH)_2Cl_2$. A conversion of $CdPyCl_2$ to $CdPy_2Cl_2$ does not take place in the absence of GlH. The thermographic curves were plotted by means of N. S. Kurnakov's pyrometer. There are 3 figures, 8 tables, and 10 references: 6 Soviet, 1 British, and 3 German.

SUBMITTED: March 20, 1959

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B004/B060

5.3700 1282, 1318, 2209

AUTHORS: Fedorov, I. A., Balakayeva, T. A.

TITLE: Chelates of Cadmium With Glycocoll

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 7, pp. 1533-1543

TEXT: A previous article (Ref. 1) gave a description of compounds of the type $Cd(GlH)_nX_2$ (GlH = CH_2NH_2COOH, X = anion), which completely decompose into their components in water. The present article deals with compounds in which the glycocoll cyclizes and is bound to Cd with its N and one O of the carboxyl group to occupy two coordination sites: $Cd(Gl)_2H_2O$ and $Cd(Gl)_22H_2O$. The bond between Gl and Cd is stronger here, so that only ethylene diamine is able to displace both glycocoll radicals (Gl) from the complex, while the mixed compound $Cd(Gl)(CNS).H_2O$ is formed with CNS^-. Thiourea (thio) is added under formation of $2Cd(Gl)_2Thio.2H_2O$. The aqueous

Card 1/4

Chelates of Cadmium With Glycocoll

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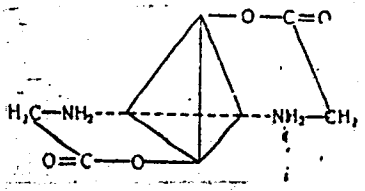
solution of $Cd(Gl)_2$ has an alkaline reaction (pH about 9), and can be titrated by an acid, in which connection Cd(Gl)(GlH)X results with an acid equivalent, $Cd(GlH)_2X_2$ is formed with an excess acid, and the ring is split. The low molar electrical conductivity (15 - 19 $ohm^{-1}.cm^2$) of the aqueous solutions corresponds to a nonelectrolyte. The cryoscopic measurements yielded a Van t'Hoff number i near 1. The molecular volume of $Cd(Gl)_2$ is 20.1% smaller than the total volume of the components. $Cd(Gl)_2$ is decomposed at 210-225°C to form a compound in which the ratio Cd : N = 1 : 1. A complete decomposition under formation of CdO sets in at 340-360°C. The authors discuss the structure of $Cd(Gl)_2$. They point to the possibility of a plane structure with cis- and trans-forms; but on the basis of analogy with cadmium ammoniacates, they assume the following tetrahedral structure:



Card 2/4

Chelates of Cadmium With Glycocoll

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Cd is placed in the center of the tetrahedron. In a similar way as thiourea, also NaCl, NH_4Cl, KCl, $CaCl_2$, and guanidine chloride are added to $Cd(Gl)_2$ under the action of the respective salts upon $Cd(Gl)_2$. The following compounds were synthesized: $Cd(Gl)_2 \cdot NH_4Cl$; $Cd(Gl)_2 \cdot NH_4Br$, $Cd(Gl)_2 NaCl \cdot 2.5H_2O$, $Cd(Gl)_2 GunHCl$ (Gun = $C(=NH)(NH_2)_2$), $Cd(Gl)_2 KCl \cdot H_2O$, $Cd(Gl)_2 BaCl_2 \cdot 2H_2O$, $Cd(Gl)_2 \cdot CaCl_2 \cdot 3H_2O$, and $Cd(GlH)_2 2K_2SO_4 \cdot 1\frac{1}{2}H_2O$. The molecular conductivity of these compounds corresponds to that of the halogen compounds: $Cd(Gl)_2 Me^{I}X$ has two ions, $Cd(Gl)_2 Me^{II}X_2$ has three. The thermograms taken by L. M. Zaytsev showed that decomposition sets in already at 200-220°C. It follows that these addition products are real compounds, not merely mixtures. After discussing their structure, the authors reach the conclusion (basing on the Van t'Hoff

Card 3/4

Chelates of Cadmium With Glycocoll

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number) that all added molecules have to be situated in the outer sphere. Analytical and physical data are given. There are 4 figures, 4 tables, and 2 Soviet references.

SUBMITTED: March 20, 1959

IX

Card 4/4

22485
S/186/61/003/003/003/018
E071/E435

21.3200

AUTHORS: Shevchenko, V.B., Fedorov, I.A. and Smelov, V.S.

TITLE: The Influence of Temperature on Extraction With Mixed Solvents of Uranyl Nitrate and Tetravalent Plutonium

PERIODICAL: Radiokhimiya, 1961, Vol.3, No.3, pp.256-260

TEXT: The influence of temperature on the extraction of uranyl nitrate and tetravalent plutonium from 2M nitric acid solution with a mixture of diisoamyl ester of phosphoric acid (DAPh) and tertiary butyl ester of phosphoric acid (TBPh) in xylene was investigated. In the case of extraction of uranyl nitrate, the concentration of DAPh in the mixture was 1.9×10^{-3} M and that of TBPh was 6.3×10^{-3} M; and for extraction of $Pu^{(IV)}$, 2.1×10^{-4} M and 2.1×10^{-2} M respectively. The concentration of uranyl nitrite in the starting solution was 3.15×10^{-4} M, of $Pu^{(IV)}$, 1.05×10^{-4} M. The concentration of nitric acid in starting solutions was 2M. The limits of concentrations of TBPh and DAPh in the organic solvent and of nitric acid in water were chosen in order to obtain a maximum synergetic effect. The extraction experiments were done in thermostatically controlled (± 0.1°C) separating funnels with

Card 1/4

10 ml starting volumes of phases and within the temperature range of 10 to 60°C. Uranium and plutonium were determined in both phases by the radiometric method. The valency state of plutonium was spectrophotometrically controlled. The coefficient of distribution α was determined as the ratio of analysed concentrations of the substance investigated in the organic and aqueous phases. The synergetic effect of the mixture was defined as a ratio of the coefficient of distribution on extraction with a mixture to the sum of coefficients of distribution of the substance investigated on extraction with each individual solvent. The temperature dependence of the distribution of uranyl nitrate and tetravalent plutonium on extraction with the mixture of DAPh and TBPh (curve 1), with DAPh (curve 2) and TBPh (curve 3) is shown in Fig.1 (for uranyl nitrate) and Fig.2 (for tetravalent plutonium). Using determined values of coefficients of distribution on extraction with individual and mixed solvents, the equilibrium constants for the reaction of formation of respective mixed complexes were determined. On the basis of the experimental results obtained, it is concluded that the extractability of uranyl nitrate and plutonium (IV) with a mixture

of DAPh and TBPh in xylene decrease with increasing temperature from 10 to 60°C. With increasing temperature from 10 to 60°C, the equilibrium constant for the formation of mixed complex $UO_2[(C_5H_{11}O)_2POO]_2TBPh$ decreased from 2.20×10^4 to 0.87×10^4, while the constant for the mixed complex $PU[(C_5H_{11}O)_2POO]_4TBPh$ changes only a little. There are 2 figures, 2 tables and 8 references: 5 Soviet-bloc and 3 non-Soviet-bloc. The three references to English language publications read as follows: H.Irving, D.Eddington, Proc.Chem.Soc., 11, 360 (1959); T.Sato, Gall.Bull.Inst.Nucl.Sci., 7, 43 (1957); Z.Disdar, J.Inorg.Nucl.Chem., 6, 334 (1958).

SUBMITTED: May 31, 1960

Card 3/4

GOLOVNYA, Valentina Arkad'yevna; FEDOROV, Igor' Alekseyevich; CHERNYAYEV, I.I., akademik, otv. red.; DRAGUNOV, E.S., red. izd-va; YEGOROVA, N.F., tekhn. red.

[Basic principles of the chemistry of complex compounds] Osnovnye poniatiia khimii kompleksnykh soedinenii. Moskva, Izd-vo Akad. nauk SSSR, 1961. 133 p. (MIRA 14:11)
(Complex compounds)

ZVYAGINTSEV, O.Ye.; FEDOROV, I.A.

In memory of N.K.Pshenitsyn; obituary. Zhur.neorg.khim. no.9: 1981-1989 S '61. (MIRA 14:9)
(Pshenitsyn, Nikolai Konstantinovich, 1891-1961)

FEDOROV, I.A.

Determining stresses in rods of a flat statically determinate truss. Sbor. nauch. trud. KGRI 18:50-[illegible] '62.

Conditions for minimum size frames with specified strains. Sbor. nauch. trud. KGRI 18:75-88 '62. (MIRA 17:5)

FEDOROV, I.A.; BALAKAYEVA, T.A.

Compounds of cadmium with alanine and norleucine. Zhur.neorg. khim. 7 no.2:312-319 F '62. (MIRA 15:3)
(Cadmium compounds) (Alanine) (Norleucine)

FEDOROV, I.A.; BALAKAYEVA, T.A.

Compounds of cadmium with glutamic acid. Zhur.neorg.khim. 7 no.2:320-324 F '62. (MIRA 15:3)
(Cadmium compounds) (Glutamic acid)

AVTOKRATOVA, T.D.; ANDRIANOVA, O.N.; BABAYEVA, A.V.; BELOVA, V.I.; GOLOVNYA, V.A.; DERBISHER, G.V.; MAYOROVA, A.G.; MURAVEYSKAYA, G.S.; NAZAROVA, L.A.; NOVOZHENYUK, Z.M.; ORLOVA, V.S.; USHAKOVA, N.I.; FEDOROV, I.A.; FILIMONOVA, V.N.; SHENDERETSKAYA, Ye.V.; SHUBOCHKINA, Ye.F.; KHANANOVA, E.Ya.; CHERNYAYEV, I.I., akademik, otv. red.

[Synthesis of complex compounds of platinum group metals; a handbook] Sintez kompleksnykh soedinenii metallov platinovoi gruppy; spravochnik. Moskva, Izd-vo "Nauka," 1964. 338 p. (MIRA 17:5)

1. Akademiya nauk SSSR. Institut obshchey i neorganicheskoy khimii. 2. Institut obshchey i neorganicheskoy khimii AN SSSR (for all except Chernyayev).

POZHARSKIY, B.G.; FEDOROV, I.A.; SHEVCHENKO, V.B.

Effect of temperature on the complex formation of plutonium (IV) in nitric acid solutions. Zhur. neorg. khim. 9 no.2:279-282 F'64. (MIRA 17:2)

FEDOROV, I.A.; BALAKAYEVA, T.A.

Scandium oxalate-carbonate compounds. Zhur. neorg. khim. 10 no.5:1258-1259 My '65. (MIRA 18:6)

FEDOROV, I.A.; BALAKAYEVA, T.A.

Oxalatosulfate compounds of scandium. Zhur. neorg. khim. 10 no.9: 2006-2010 S '65. (MIRA 18:10)

FEDOROV, Igor' Borisovich; OZEROV, V.S., red.; TIKHONOVA, I.M., tekhn. red.

[For the good of man] Na blago cheloveka. Leningrad, Lenizdat, 1964. 57 p. (MIRA 17:1)
(Chemical industries)

FEDOROV, I.D.

Semihot welding of the cracks in piston inserts. Elek. i tepl.tiaga 7 no.11:20 N '63. (MIR 17:2)

1. Starshiy inzh.-tekhnolog depo Kartaly Yuzhno-Ural'skoy dorogi.

FEDOROV, I.F.

AID P - 397

Subject : USSR/Aeronautics

Card 1/1 Pub. 135, 11/18

Author : Fedorov, I., Col.

Title : The first air combat

Periodical : Vest. vozd. flota, 8, 55-57, Ag 1954

Abstract : Narration of Nestorov's first air combat and his death at the beginning of World War I.

Institution : None

Submitted : No date

AID P - 2205

Subject : USSR/Aerodynamics

Card 1/1 Pub. 135 - 6/18

Authors : Fedorov, I., Col., Hero of the Soviet Union and Vazhin, F., Guards Maj.

Title : Know how to hit air targets at short range

Periodical : Vest. vozd. flota, 6, 34-39, Je 1955

Abstract : The authors discuss the probability of hitting air targets under various conditions of relative velocities of aircraft, targets, and bullets and at various distances.

Institution : None

Submitted : No date

FEDOROV, I.F.

AID P - 4767

Subject : USSR/Aeronautics - bibliography

Card 1/1 Pub. 135 - 25/31

Author : Fedorov, I. F., Col.

Title : On the Pad' Zelenaya airfield

Periodical : Vest. vozd. flota, 8, 82-84, Ag 1956

Abstract : Critical review of the book Na Dal'nem Vostoke (In the Far East), by Anatoliy Ivanov, Minsk, 1956, 386 p. One photo.

Institution : None

Submitted : No date

FEDOROV, I. F.

AID P - 5555

Subject : USSR/Aeronautics - Armament

Card 1/1 Pub. 58 - 14/20

Author : Fedorov, I.

Title : Rocket weapons carried by the airplanes

Periodical : Kryl. rod., 1, 22-24, Ja 1957

Abstract : A cursory description of a series of rockets of various types in use in the armed forces of Western powers (chiefly American: Mighty Mouse, Sparrow, Firebird, Falcon), and of the different methods of guiding these rockets towards the targets. The article is said to be based on information gathered from foreign publications.

Institution : None

Submitted : No date

FEDOROV, I.F.

"In yesterday's skies" by ([inzh.] K. A. Gil'zin. Reviewed by I.F. Fedorov. Vest.Vozd.Fl. no.12:79 D '60. (MIRA 14:5)
(Aeronautics)
(Gil'zin, K.A.)

FEDOROV, I.G.

Experimental investigation of heat transfer and resistance of slotted channels with an unstaggered arrangement of stamped conic grooves. Trudy KAI no.66:83-90 '61. (MIRA 16:10)

(Heat exchangers--Testing)

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26.5500

S/147/61/000/004/015/021
E194/E135

AUTHORS: Fedorov, I.G., Shchukin, V.K., Mukhachev, G.A., and Idiatullin, N.S.

TITLE: Heat transfer and hydraulic resistance of channels with pressed spherical projections

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Aviatsionnaya tekhnika, no.4, 1961, 120-127

TEXT: Plate type heat exchangers are particularly suitable for aviation because of their small size and weight. Sheets with pressed projections are particularly useful because the projections increase the strength and improve the cooling. V.G. Fastovskiy and Yu.F. Petrovskiy (Ref.4: Teploenergetika, no.1, 1959) made an experimental study of a heat exchanger in which the rectangular ducts had spherical projections on the air side and hollows on the steam side. The work showed that the heat transfer coefficient of such surfaces was greater by a factor of 2.5-2.8 than for smooth surfaces. The improvement is attributed to increased turbulence of the flow. The work described here was

Card 1/5

carried out on rectangular ducts consisting of two plates with spherical projections. The projections were of various transverse pitch and were located both in honeycomb and straight line order. The main characteristics of the ducts are given in the table. The relationship Nu = f(Re) was investigated in the range of Reynolds numbers 1000 to 16500, and ζ = f(Re) in the range Re = 500 to 18000. The experimental rig is described. The water sides of the heat exchangers were filled to one third of their height with distilled water and electric heaters were installed to evaporate the water. The water vapour condensing on cooling surfaces gives up its latent heat of vapourisation to a flow of air passing through the ducts of the heat exchanger. The usual measurement arrangements were made. Each of the four bundles described in the table was investigated under about twenty conditions with different rates of air flow covering the Reynolds number range from 500 to 18000; in each case the measurements were repeated after 15-20 minutes. A procedure was worked out and the operation of the equipment was checked by using a smooth-walled plate-type heat exchanger. Further tests

showed that the heat balance error calculated from the input to the internal heater and from the change in enthalpy of the cooling air is about 6-10%. The r.m.s. error of the determination of air flow, and of the Re and Nu numbers and of the resistance coefficient are, respectively, 2.2, 2.5, 4.5 and 5%. Heat transfer results are well represented by the following equations.

With honeycomb arrangement:

$$Nu_f = 0.54 \times 10^{-4} Re_f^{1.55} \quad (Re = 1000\text{-}2300), \qquad (3)$$

$$Nu_f = 0.95 \times 10^{-3} Re_f^{1.17} \quad (Re = 2300\text{-}10000), \qquad (4)$$

$$Nu_f = 0.0276 Re_f^{0.8} \quad (Re = 10000\text{-}16500). \qquad (5)$$

With the In-Line arrangement:

$$Nu_f = 0.44 \times 10^{-4} Re_f^{1.55} \quad (Re = 1000\text{-}2300), \qquad (6)$$

$$Nu_f = 0.8 \times 10^{-3} Re_f^{1.17} \quad (Re = 2300\text{-}10000). \qquad (7)$$

$$Nu_f = 0.0248 Re_f^{0.8} \quad (Re = 10000\text{-}16500). \qquad (8)$$

The results show that for given values of the Reynolds number the Nu criterion is 15-20% higher in bundles with honeycomb arrangement of projections than those with the in-line arrangement. The Nu criterion of the bundles is greater by a factor of 2.1-1.65 than the Nu criteria for a bundle of flat sheets in the Re number range 2500-16500. These results are not entirely in line with those given in Ref.4, and the reasons for this are discussed. The following expressions adequately represent the results of resistance tests:

$$\xi = \frac{A}{(Re_f^{0.30})} \quad (Re = 500\text{-}2300), \qquad (9)$$

$$\xi = \frac{B}{Re_f^{0.089}} \quad (Re = 2300\text{-}18000). \qquad (10)$$

Card 4/ 6

The values of the coefficients A and B in Eqs (9) and (10) are given in the table. The results show that ducts with spherical projection have higher resistance than do smooth ducts, the actual amount depending upon the pitch and arrangement of the projections. There are 3 figures and 1 table.

ASSOCIATION: Kafedra teplovykh dvigateley, Kazanskiy aviatsionnyy institut (Department of Heat Engines, Kazan' Aviation Institute)

SUBMITTED: March 10, 1961

Key to Table Headings: (1) Number of bundle; (2) Arrangement of projections; (3) Shape of duct; (4) Length of bundle, mm; (5) Height of bundle, mm; (6) Equivalent diameter $d_{эк}$ mm; (7) Transverse pitch S_1, mm; (8) Longitudinal pitch S_2, mm; (9) Coefficient A; (10) Coefficient B.

Card 5/6

ACCESSION NR: AT4024398 S/2529/61/000/066/0083/0090

AUTHOR: Fedorov, I. G.

TITLE: The experimental investigation of heat transfer and flow resistance in narrow channels with in-line arranged conical dimples

SOURCE: Kazan. Aviatsionny*y institut. Trudy*, no. 66, 1961. Aviatsionny*ye dvigateli (Aircraft engines), 83-90

TOPIC TAGS: heat exchange, heat transfer, flow resistance, conical dimple heat transfer coefficient, hydraulic resistance, temperature, turbulence, flow channel, heat resistance, thermal resistance, air pressure, Reynolds number, Nusselt number

ABSTRACT: In a number of cases the presently used heat exchangers do not satisfy the industrial needs with regard to their compactness, values of heat transfer coefficients, and hydraulic resistance, particularly in the aircraft industry where small frontal area and weight are of primary importance. The demand for compactness is best achieved by ribbed heat transfer surfaces. However, manufacture of ribbed surfaces encounters considerable difficulties; also, the temperature gradient along the height of the ribs causes

Card 1/ 7

ACCESSION NR: AT4024398

a decrease of heat-transfer efficiency. Of great practical interest are heat exchangers with dimpled surfaces which intensify the heat exchange by turbulence. Besides, the dimples stiffen the flow channels, permitting working conditions with considerable differential pressures across the wall. The use of thin sheet metal (0.5 to 0.8 mm thick) also causes a sharp decrease of thermal resistance of the wall. Investigation by V.M. Antuf'yev, E.I. Vol'per, and V.G. Fastovskiy confirms the high compactness, small weight, and effectiveness of such heat exchange surfaces. An investigation was performed by the author on heat transfer and resistance in narrow, rectangular, cross-section channels made of 0.5 mm sheet metal with conical dimples arranged in line (see Fig. 1 of the Enclosure). Air was used as a heat transport medium and six configurations were investigated. The experimental set-up and test method have been described elsewhere by the author et al. The experiments were conducted at 111C wall temperature and with air temperature at the channel inlet varying between 16.7 and 24.8 C. The other parameters had the following values: air outlet temperature 89.1 to 106.8 C; mean air pressure in channel 1.011 to 1.197 kg/cm^2; flow rate 4.72 to 113.5 kg/hr; Reynolds number 987 to 23000; heat load (specific) (0.616 to 14.9)x10^3 kcal/m^2-hr°C. The correlation of Nusselt and Reynolds numbers for heat transfer was found

Card 2/ 7

for the channels, with a 10 % scatter, as follows:

for Re=1000-3000 $Nu=0.7341\times10^{-3}Re^{1.21}$;

for Re=3000-10000 $Nu=2.717\times10^{-3}Re^{1.05}$;

for Re=10000-22000 $Nu=0.0274\ Re^{0.8}$.

For the last range of Re a more exact expression was suggested: $Nu = C\ Re^{0.8}$, where C varies from 0.0294 to 0.0251, depending on the configuration. Hydraulic resistance of all channels with in-line arranged dimples was found to be characterized by the following correlations of Euler and Reynolds numbers:

for Re=1000-3000, $Eu=\frac{A}{Re^{0.30}}$;

for Re=3000-23000, $Eu=\frac{B}{Re^{0.09}}$

where A and B are empirical coefficients depending on the channel configuration. A varies from 58.66 to 32.64, and B from 11.380 to 6.131. Analysis of the obtained results was conducted with respect to the economic advantage of the channel. At the same

ACCESSION NR: AT4024398

film coefficient, a heat exchange surface with a smaller hydraulic resistance, and, consequently, requiring a smaller pumping power, was found to be more advantageous economically. Fig. 2 of the Enclosure shows the film coefficients versus the pressure drop for various channel configurations. As a result of the analysis, it was concluded that: (1) at the same transfer surface and other equal conditions, dimpled surfaces exhibit a greater rate of heat transfer than plain surfaces; (2) at equal film coefficients, conical dimples create less hydraulic resistance then spherical dimples; (3) at equal hydraulic resistance, dimples arranged in line permit one to achieve greater film coefficients than at a staggered arrangement; (4) increasing of the transverse pitch in the dimple pattern brings about a greater reduction of the pumping power than a similar increase of the longitudinal pitch. Orig. art. has: 4 figures and 6 formulas.

ASSOCIATION: Aviatsionny*y institut, Kazan (Kazan Aviation Institute)

SUBMITTED: 10Oct61 DATE ACQ: 15Apr64 ENCL: 03

SUB CODE: AC, MM NO REF SOV: 004 OTHER: 000

Card 4/ 7

S/096/62/000/006/009/011
E194/E454

24.5200

AUTHORS: Fedorov, I.G., Engineer, Idiatullin, N.S., Engineer, Shchukin, V.K., Candidate of Technical Sciences, Mukhachev, G.A., Candidate of Technical Sciences

TITLE: Heat transfer and hydraulic resistance of slot shaped ducts with conical indentations in honeycomb arrangement

PERIODICAL: Teploenergetika, no.6, 1962, 57-60

TEXT: Heat transfer and air resistance tests were made on a plate type heat exchanger with ducts 3 mm wide, 145 mm high and 475 mm long. The ducts were made of 0.5 mm sheet in which had been pressed indentations in the shape of truncated cones with a base diameter of 6.5 mm, cone angle of 30° and height of 1.5 mm, arranged in honeycomb order at various pitches. The tips of the cones of one plate were in contact with the corresponding tips of indentations in the opposite plate of the duct. Two such sheets soldered together at the edges and with fixing flanges attached formed the test bundles. Electrically heated water supplied heat to the test bundle and it was removed by a flow of air. The test arrangements are described. The tests were carried out with a

Card 1/3

Heat transfer and hydraulic ,...

constant wall temperature of 110°C with an inlet air temperature of 22 to 23.5°C and a discharge air temperature ranging from 91 to 106°C, the mean air pressure in the duct was 1.01 to 1.23 kg/cm^2, the air flow 2 to 92 kg/hour and the specific thermal loading (0.18 to 11.6) x 10^3 kcal/m^2 hour. The difference between the heat input to the heaters and the heat gained by the air was 6 to 10%. The methods used to check the equipment are described. For all the investigated ducts the experimental points lie within ± 6% of three straight lines of various slopes. The following equation applies for Reynolds numbers Re = 750 to 2500

$$Nu_f = 0.155 \times 10^{-3} Re_f^{1.41} \quad (1)$$

for Re = 2500 to 10000

$$Nu_f = 1.017 \times 10^{-3} Re_f^{1.17} \quad (2)$$

and for Re = 10000 to 18000

$$Nu_f = 0.0315 Re_f^{0.8} \quad (3)$$

Card 2/3