28440
S/185/61/006/002/014/020
D210/D304

Absorption of waves of finite ...

(solut on periodical in space). In the first approximation (case a)

$$v_x = v_0 e^{-\xi x} \cos\left[\frac{kx}{1+\varepsilon q \frac{v_x}{v_0}} - \omega t\right], \qquad (12)$$

(case b)

$$v_x = v_0 e^{-\xi x} \cos\left[kx - \omega t\left(1+\varepsilon q \frac{v_x}{v_0}\right)\right], \qquad (13)$$

where

$$q = \frac{v_0 u^3}{u^2(u_0^2 + u_a^2 + u_a'^2) - 2u_0^2 u_a^2}\left\{\left(1-\frac{u_0^2}{u^2}\right)\left[\frac{u_0^2}{u^2}\left(1+\frac{\rho_0}{2u_0^2}\frac{\partial u_0^2}{\partial \rho}\right) + \frac{u^2}{2u_a'^2}\left(1-\frac{u_0^2}{u^2}\right)^2\right] + \left(1-\frac{u_0^2}{u^2}\right)\right\}, \qquad (14)$$

$$\xi = \frac{1}{2}\frac{u^2}{u^2(u_0^2 + u_a^2 + u_a'^2) - 2u_0^2 u_a^2}\left\{\left[\frac{\varkappa}{\rho_0}\frac{u_0^2}{u^2}\left(\frac{1}{c_v} - \frac{1}{c_p}\right) + \frac{1}{\rho_0}\left(\zeta + \frac{4}{3}\eta\right)\right]\left(1-\frac{u_a^2}{u^2}\right) + \left(1-\frac{u_0^2}{u^2}\right)\left(\frac{c^2}{4\pi\sigma} + \frac{u_a^2}{u^2}\frac{\eta}{\rho_0}\right)\right\} - \qquad (15)$$

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D210/D304

Absorption of waves of finite ...

$$u = \frac{1}{2}\left\{\sqrt{(u_0 + u_a)^2 + u_a'^2} \pm \sqrt{(u_0 - u_a)^2 + u_a'^2}\right\}^{1/2}. \quad (16)$$

u_0 is the velocity of sound, $u_a = H_{ox}/\sqrt{(4\pi\rho_0)}$, $u_a' = H_{oy}/\sqrt{(4\pi\rho_0)}$. Different points of the wave front move with different velocities which leads to rupture. Formulae for the moment of rupture in a perfectly conducting medium are deduced. Expressions for the density, the intensity of the magnetic field and temperature are obtained. An expression for the wave absorption coefficient δ is deduced (with accuracy up to ξ^2): where

$$\delta = \delta_0\left\{1 + \frac{\varepsilon^2}{4}\left[\left(1 + \frac{1}{A_1}\right)\frac{k^2q^2l^2}{12} + q^2 + \frac{u_0^2}{\rho_0^2T_0}\left(\frac{1}{c_v} - \frac{1}{c_p}\right)\frac{v_0^2}{u^2} - 16\frac{A_2}{A_1} + \frac{uu_a'}{\left(1 - \frac{u_0^2}{u^2}\right)}A_3\right]\right\}, \quad (24)$$

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$$2A_1 = 1 + \frac{u_0^2}{u^2} + \left(1 - \frac{u_0^2}{u^2}\right)^2 \left(\frac{u^2}{2u_a'^2} + \frac{u_a^2}{u_a'^2}\right),$$

$$A_2 = \frac{3}{8}\frac{v_0^2}{u^2}\left\{\frac{u_0^2}{u^2}\left(1 - \frac{qu}{2v_0}\right)^2 + \frac{u^2}{u_a'^2}\left[\frac{qu}{2v_0}\left(1 + \frac{u_0^2}{u^2}\right) - \left(1 + \frac{\rho_0}{2u_0^2}\frac{\partial u_0^2}{\partial \rho}\right)\frac{u_0^2}{u^2} - \right.\right.$$

$$\left.\left. - \frac{u^2}{2u_a'^2}\left(1 - \frac{u_0^2}{u^2}\right)\right]^2 + \frac{u^4}{u_a^2 u_a'^2}\left[\frac{qu}{v_0} - \frac{u^2}{2u_a'^2}\left(1 - \frac{u_0^2}{u^2}\right)^3 - \left(1 + \frac{\rho_0}{2u^2}\frac{\partial u_0^2}{\partial \rho}\right)\right]^2\right\},$$

$$A_3 = \left[\frac{qu}{2u_a'}\left(1 - 3\frac{u_0^2}{u^2}\right) + \frac{u^2 v_0^2}{2u_a'^3}\left(1 - \frac{u_0^2}{u^2}\right)^2 + \frac{u_0^2 v_0}{u^2 u_a'}\left(1 + \frac{\rho_0}{2u_0^2}\frac{\partial u_0^2}{\partial \rho}\right)\right]^2 +$$

$$+ \frac{u_0}{4\rho_0 \sqrt{T_0}}\sqrt{\frac{1}{c_v} - \frac{1}{c_p}}\,\frac{v_0}{u_a'^2}\left(1 - \frac{u_0^2}{u^2}\right)\left[\frac{qu}{2v_0}\left(1 - 9\frac{u_0^2}{u^2}\right) + \right.$$

$$\left. + \frac{u_0^2}{u^2}\left(1 + \frac{\rho_0}{2u_0^2}\frac{\partial u_0^2}{\partial \rho}\right) - \left(1 - \frac{u_0^2}{u^2}\right) + \frac{u^2}{2u_a'^2}\left(1 - \frac{u_0^2}{u^2}\right)^2\right]^2.$$

Card 5/6

δ_0 being the absorption coefficient for waves of infinitely small amplitude

$$\delta_0 = \frac{c^2 \omega k}{4\pi\sigma u^2 u_a'^2 \rho_0} \frac{1 - \frac{u_0^2}{u^2}}{1 + \frac{u_0^2}{u^2} + \left(1 - \frac{u_0^2}{u^2}\right)\left(1 + \frac{u^2}{2u_a'^2}\right)\frac{u_a^2}{u_a'^2}}.$$

It is stated that the contribution of non-linear effects to δ cannot be neglected. Z.A. Gol'dberg is mentioned for his contributions in this field. Some of his results are said to be erroneous. The author expresses his thanks to Professor V.L. Herman for proposing the subject of the paper. There are 5 Soviet-bloc references.

ASSOCIATION: Instytut radiofizyky ta elektroniky AN URSR, m. Kharkiv (Institute of Radio Physics and Electronics, AS UkrSSR, Khar'kov)

SUBMITTED: May 28, 1960

S/141/61/004/005/011/021
E025/E135

AUTHOR: Filippov, Yu.E.

TITLE: Magneto-sound oscillations in resonators

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, v.4, no.5, 1961, 924-935

TEXT: The dispersive equations for the self-oscillation of cylindrical resonators of arbitrary cross-section filled with a conducting medium in an external magnetic field are stated in general form. In the calculations the equations are linearized and the magnetic field assumed to be directed along the axis of the resonator and the dispersion of the medium assumed to be negligible. The equations of motion and the equations for the harmonic oscillations are derived. Solutions are found for the harmonic oscillations and for the velocity and intensity of the magnetic field involving constants obtained from the boundary conditions at the ends of the resonator. The dispersion equation is derived and the particular cases of zero magnetic field and negligible thermal effects are treated. The case when the amplitude of one component of the oscillation is much greater

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Magneto-sound oscillations in ... S/141/61/004/005/011/021
E025/E135

than the other is discussed for high frequencies with both high and low magnetic fields; new modes of oscillation arise in the latter case. The particular cases of a rectangular resonator and of toroidal resonators of both rectangular and circular sections are treated. In calculating the effects of dispersion, account is taken of absorption in the medium, in the boundary layer and that due to ohmic losses on the end walls. Acknowledgments are expressed to V.L. German for proposing the subject. In a post-script, written during proof-reading, the author mentions that a similar investigation was published by R. Gajewski and Mawardi (Phys. Fluids, v.3, 820 (1960)). There are 3 references: 1 Soviet-bloc, 1 Russian translation from non-Soviet publication and 1 non-Soviet. The English language reference reads:
Ref.1: R. Gajewski, Phys.Fluids, v.2, 633 (1959).

ASSOCIATION: Institut radiofiziki i elektroniki AN USSR (Institute of Radiophysics and Electronics, AS Ukr. SSR)

Card 2/2

SUBMITTED: September 20, 1960

S/141/61/004/005/012/021
E025/E135

AUTHOR: Filippov, Yu.F.

TITLE: On the absorption of magneto-sound waves in waveguides

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, v.4, no.5, 1961, 936-941

TEXT: The absorption coefficient of the waves on propagation in a viscous conducting medium is defined and an expression derived for the mean energy of the waves in the waveguide in terms of the constants of the medium, the velocity of motion and the magnetic field. Assuming the dissipative effects to be small the solution of the equations of magnetic hydrodynamics for an ideal medium is taken as a first approximation. A rectangular waveguide with ideally conducting walls is considered and an expression given [Abstractor's note: The derivation is omitted.] for the absorption coefficient of the mn-harmonic. A number of particular cases are given separately for both high and low frequencies. The absorption coefficient in the boundary layer is defined and an expression for a rectangular waveguide based on a method due to Landau and Lifshits given for it. Simplified forms given for a

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On the absorption of magneto-sound.. S/141/61/004/005/012/021
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number of particular cases show that the losses in the boundary layer are not negligible. Account is taken of the finite conductivity of the walls by the use of the approximate condition of Leontovich leading to additional damping of the waves. The absorption due to finite conductivity is determined for the same particular cases, as is that due to the medium and to the boundary layer. To determine the total absorption for any harmonic these three coefficients are additive.

There are 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc. The English language reference reads as follows:

Ref.1: R. Gajewski, Phys.Fluids, v.2, 633 (1959)

ASSOCIATION: Institut radiofiziki i elektroniki AN USSR
(Institute of Radiophysics and Electronics, AS UkrSSR)

SUBMITTED: September 20, 1960

Card 2/2

FILIPPOV, Yu.F.

Interaction of magnetoacoustic waves. Izv. vys. ucheb. zav.; radiofiz. 6 no.5:932-940 '63. (MIRA 16:12)

1. Institut radiofiziki i elektroniki AN UkrSSR.

L 60159-65 EWD-2/EWT(1)

ACCESSION NR: AP5014505 UR/0141/65/008/002/0292/0300
538.245

AUTHOR: Filippov, Yu. F.

TITLE: Contribution to the theory of propagation of stationary waves of finite amplitude in ferrites

SOURCE: IVUZ. Radiofizika, v. 8, no. 2, 1965, 292-300

TOPIC TAGS: ferrite, stationary wave, ferrite wave propagation, dispersion, ferrite nonlinearity

ABSTRACT: In view of the increasing interest in the propagation of electromagnetic waves of finite amplitude in ferrite materials, the author points out that the neglect of dispersion in earlier investigations of such waves is unjustified, since the presence of dispersion plays the same role in a ferrite as dissipation in gas dynamics, and limits the distortion of the front of the wave propagating in the ferrite. By means of an analysis of Maxwell's equations it is shown that the frequency of the stationary wave produced as a result of dispersion depends not only on the properties of the medium and the angle between the magnetic field and the direction of propagation of the wave, but also on the amplitude of the wave. In addition, the dc component of the ferrite magnetization is changed by dispersion. The stationary pulses can propagate in the ferrite if a definite ratio

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L 60159-65

ACCESSION NR: AP5014505

exists between its parameters and the amplitude of the wave. Orig. art. has: 5 figures and 14 formulas.

ASSOCIATION: Institut radiofiziki i elektroniki AN UkrSSR (Institute of Radiophysics and Electronics, AN UkrSSR)

SUBMITTED: 10Dec63 ENCL: 00 SUB CODE: GP, EM

NR REF SOV: 005 OTHER: 001

KC
Card 2/2

FILIPPOV, Yu.G., inzhener.

Flexible plastic pipe used in foreign agriculture. Gidr.i mel. 9 no.7:58-60 Jl '57. (MLRA 10:8)
(Pipe, Plastic)

DERBENEV, S.I., kand. tekhn. nauk; MIRONOV, K.M.; FILIPPOV, Yu.G., red.

[New developments in the techniques of mill retting of flax and hemp in the socialist countries of Europe] Novoe v tekhnike zavodskoi mochki l'na i konopli v sotsialisticheskikh stranakh Evropy. Moskva, 1963. 13 p. (MIRA 17:9)

1. Moscow. TSentral'nyy institut nauchno-tekhnicheskoy informatsii legkoy promyshlennosti.

L 10890-66 EWT(m)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b) IJP(c) MJW/JD

ACC NR: AP5028566 SOURCE CODE: UR/0126/65/020/005/0770/0774

AUTHOR: Pavlov, V. A.; Filippov, Yu. I.; Frizen, S. A.

ORG: Institute of Metal Physics, AN SSSR (Institut fiziki metallov AN SSSR)

58
B

TITLE: Strengthening AV and V95 aluminum alloys by thermomechanical treatment

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 5, 1965, 770-774

TOPIC TAGS: aluminum, aluminum alloy, annealing, solid mechanical property, mechanical heat treatment, metal aging/AV aluminum alloy, V95 aluminum alloy

ABSTRACT: AV and V95 aluminum-alloy bars 12 mm in diameter were solution annealed, water quenched, and then subjected to low temperature thermomechanical treatment (LTTMT): preheated to 100—300C, rolled in one pass with a reduction of 20%, and water quenched. LTTMT was followed by aging at 150C (AV alloy) or 120C (V95 alloy). LTTMT with rolling at 150C significantly improved the strength characteristics of AV alloy (see Fig. 1). After LTTMT and aging for 6 hr at 150C the alloy had a tensile strength of 41.3 kg/mm^2, a yield strength of 34 kg/mm^2, an R_B hardness of 70, a work-hardening factor of 0.7, and an elongation of 15%, compared to 32.5 kg/mm^2, 26.0 kg/mm^2, 70, 0.4, and 22% for conventionally treated alloy. LTTMT also accelerated the decomposition of

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UDC: 669.715:539.?43

ACC NR: AP5028566

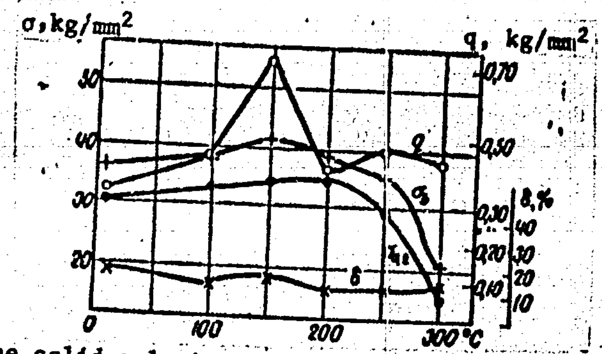

Fig. 1. Deformation temperature dependence of tensile strength (σ_B), yield strength ($\sigma_{0.2}$), elongation (δ), and work-hardening factor (q) of AV alloy aged at 150C for 6 hr

the solid solution. Conventionally treated alloy required 12 hr aging at 150C while thermomechanically treated alloy required only 6 hr. Alloy V95 exhibited similar behavior but was much less responsive to LTTMT. After LTTMT and aging at 120C for 6 hr, V95 had a tensile strength of 60.3 kg/mm^2, a yield strength of 47.5 kg/mm^2, an R_B hardness of 83, a work-hardening factor of 1.0, and an elongation of 7.8% compared to 57.6 kg/mm^2, 42.2 kg/mm^2, 82, 0.92, and 9% for conventionally treated alloy. Orig. art. has: 7 figures and 2 tables. [DV]

SUB CODE: 11, 13/ SUBM DATE: 29Jan65/ ORIG REF: 003/ ATD PRESS: 4170

HW

Card 2/2

ACC NR: AP7002741 SOURCE CODE: UR/0126/66/022/006/0904/0908

AUTHOR: Belousov, N.N.; Miheyeva, Ye.N.; Pavlov, V.A.; Filippov, Yu.I.; Frizen, S.A.

ORG: Institute of the Physics of Metals, AN SSSR (Institut fiziki metallov AN SSSR)

TITLE: Effect of plastic deformation and aging on mechanical properties of Al-Mg alloys

SOURCE: Fizika metallov i metallovedeniye, v. 22, no. 6, 1966, 904-908

TOPIC TAGS: metal aging, ~~aluminum~~ magnesium containing alloy, plastic deformation, ~~alloy thermo~~mechanical heat treatment, aluminum base alloy, mechanical property, ~~aluminum alloy~~ corrosion resistance, AMg11 alloy

ABSTRACT: A series of specimens of AMg11 aluminum-magnesium alloy (10.7% magnesium) was solution annealed at 460C for 2 hr, water quenched and subjected to thermomechanical treatment, rolled with a reduction of 20% in one pass or 40% in two passes with reheating at 20, 100, 200, 300 or 400C, and then aged at 175—200C for 1—10 hr. The best combination of mechanical properties was shown by specimens rolled with 40% reduction at 200C,

Card 1/2 UDC: 669.715:539.37

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000413120012-7"

ACC NR: AP7002741

which had a tensile strength of 56.2 or 55.5, and a yield strength of 41.5 or 33.0 kg/mm^2, and an elongation of 10% in the as-rolled or aged (1 hr at 200C) condition. Corresponding figures for the specimens rolled at 200C and aged at the same temperature for 1 hr were 51.5 kg/mm^2, 31.0 kg/mm^2, and 10%. As a rule, aging lowered the yield strength without affecting the elongation. The increase in deformation temperature slightly lowered the hardness. Aging at 100—200C at first lowers the hardness but subsequently raises it, but not over the level attained by deformation. In stress-corrosion tests, specimens rolled at 200C with 20% reduction, as-rolled or aged at 200C for 1, 5 or 10 hr, withstood 90 day tests without cracking but showed some signs of intergranular corrosion. Specimens rolled with a reduction of 40% showed a susceptibility to exfoliation. [ND]

SUB CODE: 11, 13/ SUBM DATE: 13Jun66/ ORIG REF: 005/ OTH REF: 006
ATD PRESS: 5114

Card 2/2

ACC NR: AR6035393 (N) SOURCE CODE: UR/0398/66/000/009/V023/V023

AUTHOR: Nikiforov, Yu. F.; Filippov, Yu. M.

TITLE: Determination of dimensions of the range and bearing strobes in the case of automatic operation of a radar station with a digital computer

SOURCE: Ref. zh. Vodnyy transport, Abs. 9V166

REF SOURCE: Sb. Vychisl. tekhn. na morsk. transp. M., Transport, 1966, 62-66

TOPIC TAGS: navigation radar, digital computer, gate signal

ABSTRACT: During automatic tracking of the target with the aid of circular-scan radar, an increase in the strobe dimension leads to an increase in the probability of obtaining the vessel and simultaneously to an increase in the probability of a false signal, and also to a decrease of the resolution of the radar. To increase the probability of correct observation of the target, the strobe should include both the last determined point and the extrapolated point. The dimensions of the strobe are determined by the semi-axis of the overall error ellipse of the measurements, equal to the sum of the measurement-error ellipses between the point of the last observation and the extrapolated point during one revolution of the antenna. After choosing the coordinate system, one records the measurement-error tensor (ellipse) in the form of a matrix, in which the bearings of the last determined point still remain unknown, and the semi-axes of the error ellipses remain constant. We calculate the values of the major and minor semi-axes of the error ellipse, characterizing the position and dimensions of the

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ACC NR: AR6035393

strobe relative to the last determination of the ship position. We then determine the initial and final limits in bearing, the initial and final limits in range, the number of added error ellipses, and the length of the radius vector in the direction of relative motion. 1 illustration. Bibliography, 2 titles. V. Makarov [Translation of abstract]

SUB CODE: 09, 17

Card 2/2

FILIPPOV, Yu.M.

Vitamin C index and the early diagnosis of pesticide poisoning. Veterinariia 42 no.9:69-70 S '65.

(MIRA 18:11)

FILIPPOV, Yu.M.

Effect of small doses of DDT on the biosynthesis of ascorbic acid in rat organs. Vop. pit. 23 no.1:70-73 Ja-F '64. (MIRA 17:8)

1. Kafedra gigiyeny pitaniya (zav. - prof. F.Ye. Badagyan) TSentral'nogo instituta usovershenstvovaniy vrachey, Moskva.

SOKOLOV, Petr Vladimirovich; FILIPPOV, Yu.M., inzh., retsenzent;
SERGOVSKIY, P.S., red.

[Designing drying and heating machines for wood] Proektirovanie sushil'nykh i nagrevatel'nykh ustanovok dlia drevesiny. Moskva, Lesnaia promyshlennost', 1965. 330 p. (MIRA 18:9)

L 10358-66 EWT(1)/EWA(j)/EWA(b)-2 RO

ACC NR: AP5028198 SOURCE CODE: UR/0346/65/000/009/0069/0070

AUTHOR: Filippov, Yu. M.

ORG: none

TITLE: Vitamin C as an early diagnostic sign in poisoning by pesticides

SOURCE: Veterinariya, no. 9, 1965, 69-70

TOPIC TAGS: ascorbic acid, pesticide, toxicology, organosphorus compound, organochlorine compound

ABSTRACT: Sublethal doses of DDT (10-200 mg/kg), chlorophos (150 mg/kg), and methylnitrophos (25 mg/kg) markedly suppressed the biosynthesis of ascorbic acid in the liver, spleen, brain, kidneys, and other organs of rats. Smaller doses, on the other hand, intensified the production of ascorbic acid, apparently due to the defense reaction of the body (compensatory increase in response to the toxic action of the pesticides). Still smaller doses administered over 30 days significantly affected the synthesis of ascorbic acid in most of the organs. The vitamin C test is thus a highly sensitive toxicological indicator. The author notes that the minimum doses of the pesticides tested cannot be regarded as safe, judging from body weight changes following repeated internal administration of small doses of the compounds. Rats which

UDC: 619 : 615.19 : 616-07

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L 10358-66

ACC NR: AP5028198

received hexachlorane and chlorophos lagged appreciably behind the control animals in growth. Orig. art. has: 1 table.

SUB CODE: 06/ SUBM DATE: 00/ ORIG REF: 000/ OTH REF: 000

Card 2/2

KOSTYUCHENKO, A.D.; LISTVIN, K.S.; FILIPPOV, Yu.N., red.; ROZHDAYKINA, V.K., tekhn.red. [redacted]

[The use of fertilizers on leading collective farms of the Kalinin Province] Primenenie udobrenii v peredovykh kolkhozakh Kalininskoi oblasti. [Kalinin] Kalininskoe knizhnoe izd-vo, 1957. 41 p. (MIRA 11:1)

(Kalinin Province--Fertilizers and manures)

FILIPPOV, Yu.N., nauchnyy sotrudnik

Hygiene evaluation of gamma ray radiating sources on railroad tracks. Avtom., telem. i sviaz' 5 no.6:12-13 Je '61. (MIRA 14:9)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut zheleznodorozhnoy gigiyeny.

(Railroads--Track)
(Gamma rays--Industrial applications)
(Railroads--Brakes)

FILIPPOV, Yu.N.

Group method of wax patternmaking. Lit. proizv. no.8:35-36
Ag '63. (MIRA 16:10)

FILIPPOV, Yu.N.

Various stages of inhibition of oxidative processes by tissue lipids. Radiobiologiia 4 no.4:493-497 '64. (MIRA 17:11)

ZHURAVLEV, A.I.; FILIPPOV, Yu.N.; SIMONOV, V.V.

Chemiluminescence and antioxidative properties of human lipids. Trudy MOIP. Otd. biol. 21:75-89 '65. (MIRA 18:6)

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000413120012-7"

ZHURAVLEV, A.I.; FILIPPOV, Yu.N.; SIMONOV, V.V.

Chemiluminescence and antioxidizing properties of human lipids.
Biofizika 9 no.6:671-677 '64. (MIRA 18:7)

1. Institut biofiziki Ministerstva zdravookhraneniya SSSR, Moskva.

ZHURAVLEV, A.I.; FILIPPOV, Yu.N.; SIMONOV, V.V.

Mechanism of chemiluminescence of lipids in man. Biofizika 10 no.2: 246-251 '65. (MIRA 18:7)

VYATKIN, G.P.; OSTROUKHOV, M.Ya.; Prinimali uchastiye: KHOLZAKOV, V.I.; KOPYRIN, I.A.; TARASHCHUK, N.T.; FILIPPOV, Yu.P.; NIKOL'SKIY, M.A.; CHISTYAKOV, A.Ye.; PIMENOV, L.I.

Investigating the process of blast furnace smelting for the production of nickel matte. [Sbor. trud.] Nauch.-issl.inst.met. no.4:71-81 '61. (MIRA 15:11)

(Nickel—Metallurgy)
(Blast furnaces)

OSTROUKHOV, M.Ya.; TARASHCHUK, N.T.; FILIPPOV, Yu.P.; KHOLZAKOV, V.I.

Blast furnace smelting of oxidized nickel ores for the production of matte. TSvet.met. 34 no.9:82-83 S '61. (MIRA 14:10)
(Nickel—Metallurgy)

FILIPPOV, Yu. S.; TSARFIN, Ya. A.

Simple preparative chromatographic apparatus. Zav. lab. 28 no.12:1507-1508 '62. (MIRA 16:1)

1. Vladimirskiy nauchno-issledovatel'skiy institut sinteticheskikh smol.

(Gas chromatography)

3(2)

AUTHOR: Filippov, Yu. S. SOV/6-59-9-13/19

TITLE: Determination of Geographical Names and Collection of Data for the Topographic Map

PERIODICAL: Geodeziya i kartografiya, 1959, Nr 9, pp 52-55 (USSR)

ABSTRACT: At the Yakutskoye aerogeodezicheskoye predpriyatiye (Yakutiya Aerogeodetic Service), the geographical names in the topographic survey are determined on the basis of data obtained from the natives. The natives are either consulted, or they are asked to identify the corresponding objects (on photoplans or maps). The latter method is preferred. Practice has also shown that always two natives have to be consulted, and not at the same time. In the case of contradiction, a third native is called. On some photoplans, several objects bore the name "byl'bapyn". It was found that this word means "I do not understand" in the Yakutian language. The author demands the development of a specification for determining and transcribing the Yakutian geographical names. This is also necessary because at present - instead of the phonetic transcription - the Yakutian letters are represented by Russian ones, and thus the names are unintelligible not only for the Russians

Determination of Geographical Names and Collection of Data for the Topographic Map SOV/6-59-9-13/19

but also for the Yakutians.- Some measuring methods of determining the height of river banks, trees and shrubs are pointed out, and the determination of river widths and depths is described in brief. Some recommendations for surveying blockhouses, roads, footpaths, and bridges are given. There are 2 figures.

Card 2/2

FILIPPOV, Yu.V.

The twenty-fifth anniversary of the Scientific-Editorial Cartographical Board. Izv. AN SSSR. Ser. geog. no.5:155 S-O '63. (MIRA 16:10)

FILIPPOV, Yu.V.; VENDILLO, V.P.

Electrosynthesis of ozone. Part 7. Zhur. fiz. khim. 36 no.9: 1987-1992 S '62. (MIRA 17:6)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

VENDILLO, V.P.; FILIPPOV, Yu.V.

Electrical theory of ozonizers. Part 10. Zhur. fiz. khim. 36 no.9:2058-2061 S '62. (MIRA 17:6)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

YEMEL'YANOV, Yu.M.; FILIPPOV, Yu.V.

Electrosynthesis of ozone. Part 9. Zhur.fiz.khim. 36 no.10: 2263-2267 O '62. (MIRA 17:4)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

SAMOYLOVICH, V.G.; FILIPPOV, Yu.V.

Electrosynthesis of ozone in a cycling system. Part 7. Zhur.fiz.khim. 37 no.1:23-29 Ja '63. (MIRA 17:3)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

L 17818-65 SSD/ASD(a)-5/AFWL
ACCESSION NR: AP4044079 S/0189/64/000/004/0030/0032

AUTHORS: Popovich, M.P.; Samoysovich, B. G.; Filippov, Yu. V.

TITLE: Rotator temperature on electric discharge in the ozonizer

SOURCE: Moscow. Universitet. Vestnik. Seriya 2. Khimiya, no. 4, 1964, 30-32

TOPIC TAGS: ozonizer, electric discharge, rotator temperature, spectroscopic determination, ozone synthesis, glow discharge, spark discharge

ABSTRACT: The rotator temperature upon discharge of the ozonizer under various conditions was studied spectroscopically to determine means of increasing the efficiency of ozone synthesis. The rotator temperature of the ozonizer (fig. 1) was determined under static conditions at 4-10 kv, 2000 hertz frequencies, 0.5-3 hours exposure, using (1) 95% He + 5% N_2 mixtures at 750, 400, 100 and 2 mm Hg pressure, (2) N_2+O_2 mixtures containing 10, 21 and 50% O_2, at 700 mm

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L 17818-65
ACCESSION NR: AP4044079

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Hg; (3) air, at 40 mm Hg. 4, 6, 8 and 10 kv and 1.5, 2.6, 3.0 and 4.5 ma current, respectively, and (4) moist air at 400, 100, 20 and [illegible] mm Hg. In the He-N_2 mixture and in moist air the rotator temperature was independent of pressure; the average temperature of the [illegible] was [illegible]K, and of the moist air, [illegible] mixtures the temperature increased slightly with increase in O_2 content. The temperature increased with increase in voltage and consequently with [illegible] in current and ozonizer discharge. Thus a relationship between the rotator temperature and ozonizer discharge, and temperature [illegible] dry and moist gases was established. Previously obtained values (Yemel'yanov Yu. M, Fillipov, Yu. V., Zh. fiz. khimii, 36, [illegible] (1962)) for the average temperature of the gas were lower than the values obtained spectroscopically. This was explained in that the latter measurements were of temperatures of the gas in the discharge channel, and not of the averaged temperatures. Examination [illegible] spectra of the ozonizer discharge between glass and iron electrodes (the iron lines detected) led to the conclusion that the individual local discharges were glow discharges and not spark discharges. [illegible] I thank Prof. V. M. Tatevsk[illegible] [illegible] and [illegible] interest in the work." Orig. art. has: 1 equation, 2 figures and [illegible] tables.

Card 2/4

L 17818-65
ACCESSION NR: AP4044079

ASSOCIATION: MGU Kafedra fizicheskoy khimii (Moscow State University, Department of Physical Chemistry)

SUBMITTED: 03Mar64 ENCL: 01

SUB CODE: IC, EE NR REF SOV: 003 OTHER: 000

Card 3/4

L 17318-65
ACCESSION NR: AP4044079

ENCLOSURE: 01

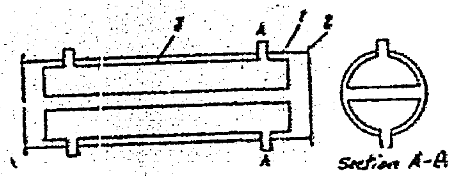

Figure 1
Ozonizer design: 1-glass tube; 2--quartz windows; 3--glass electrodes

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SAMOYLOVICH, V.G.; FILIPPOV, Yu.V.

Electrosynthesis of ozone. Part 10. Zhur.fiz.khim. 38 no.11:2712-2714 N '64. (MIRA 18:2)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

POPOVICH, M.P.; FILIPPOV, Yu.V.

Spectroscope study of a discharge in an ozonizer. Vest. Mosk. un. Ser. 2: Khim. 20 no.1:3-4 Ja-F '65. (MIRA 18:3)

1. Kafedra fizicheskoy khimii Moskovskogo universiteta.

L 34377-66 EWT(m)/EWP(t)/ETI IJP(c) JD/WW/JW

ACC NR: AP6010743 SOURCE CODE: UR/0076/66/040/003/0531/0536

AUTHOR: Samoylovich, V. G.; Popovich, M. P.; Yemel'yanov, Yu. M.; Filippov, Yu. V.

ORG: Moscow State University im. M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet)

TITLE: The electrical theory of ozonizers. XII. Burining voltage in oxygen-ozone mixtures

SOURCE: Zhurnal fizicheskoy khimii, v. 40, no. 3, 1966, 531-536

TOPIC TAGS: electric theory, gas discharge, oxygen, ozone

ABSTRACT: The authors used a flat ozonizer (discharger) to measure the burning voltage of a discharge in oxygen and oxygen-ozone mixtures at various gas pressures and with various discharge intervals. The value of the field applied to the oxygen and the oxygen-ozone mixtures is determined. In order to avoid any gradient in ozone concentration, the ozone was produced externally and introduced. Discharge gaps from 0.1 to 4.0 mm were used, with pressures from 50 to 750 mm Hg. The ozone concentration was 0.65 to 7.0% by volume. The ratio of the elemental reaction constants of ozone and oxygen upon collision with electrons was determined. It was established by the experiments that the curve of the burning

Card 1/2 UDC: 541.13

L 34377-66

ACC NR: AP6010743

voltage as a function of ozone concentration is linear. Orig. art. has: 6 tables, 4 figures, and 4 formulas.

SUB CODE: 07,20/ SUBM DATE: 07Dec64/ ORIG REF: 006/ OTH REF: 005

Card 2/2

L 35809-66 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP6014899 SOURCE CODE: UR/0076/65/039/012/3092/3095

AUTHOR: Samoylovich, V. G.; Popovich, M. P.; Yemel'yanov, Yu. M.; Filippov, Yu. V.

60
B

ORG: Moscow State University im. M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet)

TITLE: Electric theory of ozonizers XI. Discharge in helium at various pressures and discharge gaps

SOURCE: Zhurnal fizicheskoy khimii, v. 39, no. 12, 1965, 3092-3095

TOPIC TAGS: ozone, electric theory, helium, circuit design, gas discharge

ABSTRACT: The equipment used in the experiments (illustrated in a figure) consisted basically of an upper aluminum electrode with a diameter of 15 mm and a height of 50 mm and a lower aluminum electrode with a diameter of 10 mm, pressed into a base made of organic glass. The article gives also a diagram of the electric circuit. Using this equipment, measurements were made by the oscillographic method of the combustion pressure during a discharge in helium. Measurements of the combustion pressure in helium were made at gas pressures of 750, 600, 400, 200, 100, and 50 mm Hg for discharge gaps of 0.45, 1.0, 2.0, 3.0,

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L 35809-66

ACC NR: AP6014899

4.0, 5.0, and 7.0 mm. The value of E/p was found to remain constant and to be equal to 1.4 volts/cm-mm Hg for discharge gaps from 2 to 7 mm and for pressures not less than 200 mm Hg. An evaluation of the electron temperature gave a value of 2.7 electron volts. Orig. art. has: 5 figures and 1 table.

SUB CODE: 20/ SUBM DATE: 23Nov64/ ORIG REF: 004/ OTH REF: 001

Card 2/2

C.A. FILIPPOV, Yu. V.

Synthesis and decomposition of ammonia in electrical discharges. I. Sensitized decomposition of ammonia in a glowing discharge. V. P. Lebedev, Yu. V. Filippov, and N. I. Kobozev (Lomonosov State Univ., Moscow). *Zhur. Fiz. Khim.* **24**, 845-52(1950). The decompn. of NH_3 in a glowing discharge in the presence of Hg and Na vapor was studied in connection with the theory of "energetic catalysis." Hg has a pos. and Na a neg. catalytic effect. The sensitizing effect of Hg was similar to that found in the photochem. decompn. of NH_3. P. W. H.

CA FILIPPOV, YU. V.

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Synthesis and decomposition of ammonia in electrical discharges. II. Sensitized synthesis of ammonia in a glow discharge. Yu. V. Filippov, V. P. Lebedev, V. V. Zalaman, and N. I. Kobozev (Lomonosov State Univ., Moscow). *Zhur. Fiz. Khim.* 24, 1009-15(1950); cf. *C.A.* 45, 433e.—The synthesis of NH_3 in the presence of vapors of Hg, Zn, and Cd in a glow discharge was studied. The effect of Hg was pos., while Zn and Cd gave neg. effects. An empirical equation was derived from the data, defining the intensity of the effect of the additive. An explanation of the observed phenomena was offered on the basis of the energies of the reacting mol. and radicals. A mechanism, occurring by means of excited N and at. H, was proposed for the electrosynthesis of NH_3.

Paul W. Howerton

Filippov, Yu.V.

USSR/Physical Chemistry - Electrochemistry. B-12

Abs Jour: Referat. Zhurnal Khimiya, No 2, 1958, 3982

Author : Yu.V. Filippov, Yu.M. Yemel'yanov.

Inst :

Title : Electrical Theory of Ozonizers. I. Static Volt-Ampere Characteristics of Ozonizers.

Orig Pub: Zh. fiz. khimii, 1957, 31, No 4, 896-903.

Abstract: The study of static volt-ampere characteristics (SVC) of ozonizers (O) with spark gaps of 1.0, 2.1, 2.9 and 4.2 mm was carried out. It was found that the SVC may be represented in the first approximation as two straight segments, the slant of which is determined correspondingly to the total electric capacity and the capacity of the dielectric barriers. Basing on the examination of the SVC, it was concluded that the voltage on the spark gap of the O remains constant during the discharge burning and does not depend on the intensity of the

Card : 1/2 -23-

Moscow State Univ

FILIPPOV Yu. V.

YEMEL'YANOV, Yu.M.; FILIPPOV, Yu.V.

The electrical theory of ozonizers. Part 2: The theory of dynamic characteristics of ozonizers (with summary in English). Zhur.fiz.khim.31 no.7:1628-1635 Jl '57. (MIRA 10:12)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Ozone) (Chemical apparatus) (Equations)

5(4)

AUTHORS: Filippov, Yu. V., Yemel'yanov, Yu. M. SOV/76-32-12-25/32

TITLE: The Electrical Theory of Ozonators (Elektricheskaya teoriya ozonatorov) III. Electric Current in Ozonators (III. Elektricheskiy tok v ozonatorakh)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol 32, Nr 12, pp 2817-2823 (USSR)

ABSTRACT: Based on a previously outlined theory (Refs 1 and 2), the expressions for the dependence of the actual and average values of the current passing through the ozonator on the terminal voltage of the ozonator and its constructive parameters are calculated. The static actual volt-ampere characteristic of an ozonator below the critical voltage is represented by a straight line passing through the origin of coordinates (as is the case with all condensers); the inclination of this straight line is determined by the aggregate electric capacity of the ozonator. If the voltage exceeds the critical value, the characteristic takes the form of an asymptote, again approaching the straight linge passing through the origin of coordinates. The inclination of the straight line is now only determined by the dielectric barriers of the ozonator. Accordingly, the entire volt-ampere

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The Electrical Theory of Ozonators. III. Electric Current in Ozonators SOV/76-32-12-25/32

characteristic is S-shaped. The static volt-ampere characteristic for the average values of the current consists of two straight lines intersecting at the point of critical voltage. There are 2 figures and 5 references, 2 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: June 15, 1957

Card 2/2

AUTHOR: Filippov, Yu.V.

S/055/59/000/04/017/026
B004/B007

TITLE: The Electrosynthesis of Ozone

PERIODICAL: Vestnik Moskovskogo universiteta. Seriya matematiki, mekhaniki, astronomii, fiziki, khimii, 1959, Nr 4, pp 153-186 (USSR)

ABSTRACT: This is a summarizing report on the work carried out by the author in cooperation with Yu.M. Yemel'yanov, V.P. Vendillo, Yu.N. Zhitnov, and V.G. Samoylovich at the laboratoriya kataliza i gazovoy elektrokhimii MGU (Laboratory for Catalysis and Gas Electrochemistry of Moscow State University). The author refers to N.I. Kobozev, S.S. Vasil'yev, and Ye.N. Yeremin (Ref 1), according to whom the kinetics of chemical reactions in electric discharges may be expressed by the kinetic equation if time is substituted by u/v, the factor of the specific discharge energy (u = active power of the discharge, v = volume velocity of the gas flow). Figure 1 shows the construction of the ozonizer used, and figure 2 the experimental device. In the individual sections the author deals with the following subjects: 1) The electrical theory of ozonizers: figure 3 (static volt-ampere characteristic), figure 4 (oscillogram of the dynamic characteristic), figure 5 (simulating scheme of an ozonizer), figure 6 (theoretical dynamic characteristic). Herefore, equations (2) and (3) are derived. Figure 7 (oscillogram amperage - voltage),

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The Electrosynthesis of Ozone

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figure 8 (dependence of the voltage in the discharge gap on the ozone concentration), figure 9 (dependence of active power on voltage), figure 10 (dependence of the coefficient η of the power of discharge on voltage), figure 11 (dependence of voltage on gas pressure), figure 12 (dependence of voltage on the length of the discharge gap). The author discusses the kinetics of the electrosynthesis of ozone, the dependence on the diffusion coefficient D, and derives equation (15). Figure 13 shows the kinetic curve according to equation (15) as well as according to equations (8) ($D = 0$) and (10) ($D = \infty$). Figure 14 shows the dependence of the fictitious decay coefficient on the gas velocity. 2) The action of several ozonizers connected in parallel as well as in series and the influence of the length of the reaction zone. 3) The influence of temperature: figure 15 (influence of the logarithm of the decay- and formation coefficients on 1/T). The author discusses the low activation energy of 1700 cal/mole. Figure 16 (dependence of ozone concentration on u/v). The temperature dependence of the decay coefficient is discussed. 4) The influence of the length of the discharge gap: Figure 17 (kinetic curves for discharge gaps of different length, figure 18 (dependence of the specific power of discharge on the length of the discharge gap at constant voltage), figure 19 (dependence of equilibrium concentra-

Card 2/3

tion on the length of the discharge gap at constant amperage), figure 20 (dependence of the power of discharge on the length of the discharge gap at constant voltage), and figure 21 (dependence of equilibrium concentration on the length of the discharge gap at constant voltage). 5) The influence exerted by gas pressure: Figure 22 (kinetic curve at decreased pressure). The course of this curve is analyzed mathematically. 6) Ozone synthesis from gas mixtures: figures 23 and 24 (mixtures of oxygen and argon), figures 25 and 26 (mixtures of oxygen and nitrogen). Mention is also made of the mixture $O_2 + CO_2$. In conclusion, the author deals with the chemical mechanism of ozone formation, the interaction of elements, and the reaction in the presence of nitrogen. On the strength of these results ozonizers with the required efficiency as well as the optimum operational conditions may be calculated. There are 26 figures and 35 references, 20 of which are Soviet.

ASSOCIATION: Kafedra fizicheskoy khimii (Chair of Physical Chemistry)

SUBMITTED: April 4, 1959

VENDILLO, V.P.; YEMEL'YANOV, Yu.M.; FILIPPOV, Yu.V.

Laboratory apparatus for producing ozone. Zav.lab. no.11:1401-1402 '59. (MIRA 13:4)

1.Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Ozone)

FILIPPOV, Yu.V.

Electrosynthesis of ozone. Vest.Mosk.un.Ser.mat., mekh.,astron., fiz.,khim. 14 no.4:153-186 '59. (MIRA 13:8)

1. Kafedra fizicheskoy khimii Moskovskogo universiteta.
(Ozone)

SOV/32-25-4-52/71

28(4)

AUTHORS: Yemel'yanov, Yu. M., Filippov, Yu. V.

TITLE: Automatic Pressure and Gas Consumption Regulating System (Sistema avtomaticheskogo regulirovaniya davleniya i raskhoda gaza)

PERIODICAL: Zavodskaya Laboratoriya, 1959, Vol 25, Nr 4, pp 490 - 491 (USSR)

ABSTRACT: A setup has been designed which can be used to maintain automatically a constant gas pressure in laboratory plants (Fig). Basically, it consists of two manostats and a contact manometer. The working principle on which it is based is that of a mercury manometer closing an electric circuit as soon as the pressure in the plant increases. The electric contact actuates a water jet pump produce a vacuum in one of the manostats, which in turn causes the pressure in the plant to diminish. As soon as the pressure desired is produced the mercury in the manometer sinks to such a point as to break the electric circuit, so that the vacuum pump is de-energized. If the pressure is to be adjusted to very small pressure differences a contact manometer with several contacts is required.

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SOV/32-25-4-52/71

Automatic Pressure and Gas Consumption Regulating System

The apparatus described could be used for stabilizing gas consumption within a range of 2-350 l per hour. The power source consisted of two batteries ZS-L-30 with a capacity of 30 a/hour and 1.5 v. There is 1 figure.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

Card 2/2

SOV/76-33-5-13/33

5(4)

AUTHORS: Yemel'yanov, Yu. M., Filippov, Yu. V. (Moscow)

TITLE: The Electrical Theory of Ozonizers (Elektricheskaya teoriya ozonatorov). 4. On the Active Energy of Ozonizers (4.Ob aktivnoy moshchnosti ozonatorov)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 5, pp 1042 - 1046 (USSR)

ABSTRACT: The formula for the energy of the ozonizer is derived from the assumptions of the passage of the current through an ozonizer maintained in a previous paper (Ref 2). It can be physically interpreted in the simple form $U=V_z(I_c - I_b)$ as the difference of the Coulomb current I_c passing through with the ignition voltage V_z in 1 sec and the reactive current I_r. The energy is a linear function of the voltage on the ozonizer. The experimental aftertest was carried out by means of the calorimetric passage method. This method consists in measuring the temperature increase of the cooling liquid of the ozonizer and comparing it to an equivalent energy by which temperature increase is not brought about by discharge but in a way by which measurement is rendered possible. A figure shows the

Card 1/2

The Electrical Theory of Ozonizers. 4. On the Active Energy of Ozonizers

SOV/76-33-5-13/33

agreement of the measuring values with the values determined, especially in the case of ozonizers with a small spark gap. Longer spark gaps (2.5 - 4.2 mm) show deviations from the linear connection because of complications already mentioned in reference 5. There are 1 figure and 7 references, 5 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: October 10, 1957

Card 2/2

5 (4)

AUTHORS: Filippov, Yu. V., Yemel'yanov, Yu. M. SOV/76-33-8-17/39

TITLE: Electrical Theory of Ozonizers. V. On the Problem of the Power Coefficient of Ozonizers

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 8, pp 1780 - 1787 (USSR)

ABSTRACT: Publications contain different data regarding the power coefficient (PC) of ozonizers (O), i.e. the ratio between the active power (AP) of the (O) and the voltampere power (VP), as well as regarding the dependence of (PC) on different parameters. Usually, (VP) is considered the product of the effective current- and voltage values; here, however, a complex expression (1) is obtained for the (PC) η of (O) which is very inconvenient in practice. A simpler expression for the determination of the (PC) η' is obtained if (VP) is regarded as the product of the amplitude value of the voltage and the mean current value. Both ways of determination are considered, and from the equations obtained it is found that η does not depend on the current frequency, and increases rapidly to a maximum at voltages above the critical voltage, and approaches asymptotically the zero point (at a voltage tending to ∞). Considerations of the simplified

Card 1/3

Electrical Theory of Ozonizers. V. On the Problem of the Power Coefficient of Ozonizers SOV/76-33-8-17/39

equation (3), i.e. the (PC) η', resulted in an equation (8) for η'_{max} which contains no expressions other than the capacity of the discharge space (DS) and the dielectric barriers of (O). Thus, the maximum of (PC) does not depend on the electrical properties of the gas in (O) but on the dimensions of (O) only. Experimental determinations regarding the dependence of η' on the voltage were carried out for (O) of different (DS) values (1.0, 2.1, 2.9 and 4.2 mm) at different rates of oxygen flow (3 - 340 l per hour). The unit has already been described (Ref 9), the (AP) was determined calorimetrically (Ref 7). The amplitude values of the voltage were calculated from the effective values determined by means of a static kilovoltmeter FS-15. The mean current value was measured by a milliammeter (with a cuprous oxide rectifier Ts-41). The measurement results of the (PC) (Table 1) show, in accordance with the theoretical considerations made above, that the (PC) passes through a maximum as the voltage increases. The voltages at η'_{max} - V_{max}, as well as the value η'_{max} itself, increase at an increase in the (DS). The

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Electrical Theory of Ozonizers. V. On the Problem of the Power Coefficient of Ozonizers SOV/76-33-8-17/39

(PC) depends on the rate of oxygen flow, which will be explained in a future paper, where it is shown as well that this is due to a change in the gas composition in the course of ozone formation. There are 3 figures, 2 tables, and 9 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: January 27, 1958

Card 3/3

05840

SOV/76-33-10-38/45

5(4)

AUTHORS: Filippov, Yu. V., Vendillo, V. P.

TITLE: Electrical Theory of Ozonizers. VI. Effect of the Length of the Discharge Gap on the Electrical Characteristics of Ozonizers

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 10, pp 2358 - 2364 (USSR)

ABSTRACT: The electrical theory of ozonizers allows for an explanation of some rules governing the variation in the electrical characteristics of ozonizers in dependence on the size of the discharge gap. The authors made investigations by means of ozonizers (Fig 1) with discharge gaps ranging from 0.5 to 1.25, 2.0, 2.3, 3.0, 3.5 and 4.0 mm (Table: geometrical dimensions of these ozonizers). The apparatus used has already been described (Ref 2). The volt-ampere characteristics of the ozonizers (Fig 1) indicate that the length of the discharge gap has different effects on the characteristics at potentials above and below the critical value. At potentials below the critical value, the slope of the volt-ampere characteristic varies, while above the critical potential it is shifted along the potential ordinate in connection with a variation in the discharge potential. The discharge potential

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Electrical Theory of Ozonizers. VI. Effect of the Length 05840
of the Discharge Gap on the Electrical Characteristics of Ozonizers SOV/76-33-10-38/45

of currents of almost critical potential (spark-over potential) is a linear function of the discharge gap. This indicates that Paschen's law is satisfied here. Equations are then deduced for the dependence of the active ozonizer capacity on the length of the discharge gap (at constant potential and amperage). When the discharge gap extends, the active ozonizer capacity passes through a maximum (at constant potential) the position of which is in principle determined by the ozonizer potential. At constant amperage, the active capacity has no extreme values and rises uniformly with an extension of the discharge gap. There are 6 figures, 1 table, and 5 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: April 3, 1958

Card 2/2

5(4)

S/076/60/034/01/034/044
B004/B007

AUTHORS: Filippov, Yu. V., Zhitnev, Yu. N.

TITLE: Ozonizers Made From Plastics

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol 34, Nr 1, pp 209 - 210 (USSR)

ABSTRACT: The authors point out the use of plastics, which are more easily workable as dielectric layer of the ozonizer instead of glass. They describe such an ozonizer, which they produced from viniplast (Fig 1). Viniplast has good electric breakdown strength (15 - 35 kv/mm), a sufficient dielectric constant (ε = 4), and is resistive both to ozone and to the electric discharge. The characteristic features of the ozonizer produced were: Operating voltage 8 kv, frequency 1500 cps, temperature of cooling water 20°, oxygen pressure 780 torr, amperage 6.5 ma, power 14 w. Figure 2 shows the dependence of the ozone concentration on the factor U/V (Power of the ozonizer: gas velocity). There are 2 figures.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: September 16, 1959

Card 1/1

S/076/60/034/05/24/038
B010/B002

5.1330

AUTHORS: Yemel'yanov, Yu. M., Filippov, Yu. V.

TITLE: Electrical Theory of Ozonizers. VII. The Effect of the Formation of Ozone on the Current-voltage of Ozonizers

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 5, pp. 1083-1087

TEXT: The authors of the present paper carried out special investigations of the effect of the concentration of ozone on the current-voltage characteristics and capacity of the ozonizer. They used a device described in Ref. 1. The concentration of ozone was iodometrically determined, and the capacity of the discharge was measured by means of a calorimeter and an oscilloscope. The static current-voltage characteristics, the discharge capacities at different voltages, the concentration of ozone, and the burning voltages of the discharge at different rates of oxygen passage are given in Tables 1-3. It was found that the burning voltage of the discharge in the ozonizer rises linearly with increasing concentration of ozone. The effective capacity of the barriers of the ozonier (calculated from the dynamic charge-voltage characteristics) depends on the terminal

Card 1/2

Electrical Theory of Ozonizers. VII. The Effect of the Formation of Ozone on the Current-voltage of Ozonizers

S/076/60/034/05/24/038
B010/B002

voltage of the ozonizer. This may be explained by a successive propagation of the discharge on the surface of the electrode. The active capacity of the ozonizer may be calculated with sufficient accuracy if the dependence of the burning voltage of the discharge on the ozone concentration and the change in the effective capacity of the barrier of the ozonizer are taken into account. There are 4 figures, 3 tables, and 9 references: 5 Soviet, 2 German, and 2 Swiss.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 21, 1958

Card 2/2

S/076/60/034/05/37/038
B010/B003

AUTHORS: Vendillo, V. P., Yemel'yanov, Yu. M., Filippov, Yu. V.

TITLE: Calculation of Laboratory Ozonizers

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 5, pp. 1145-1147

TEXT: The electrical theory of ozonizers (Ref. 3) and experimental results on the kinetics of the ozone synthesis obtained in the laboratoriya kataliza i gazovoy elektrokhimii MGU (Laboratory of Catalysis and Gas Electrochemistry of MSU) permit the calculation of ozonizers having the necessary capacity for a certain concentration of ozone. The calculation method described is suitable for any ozonizer. Proceeding from the curves of dependence (Fig. 1) for the concentration of ozone on the factor u/v (u = capacity of the ozonizer, v = consumption of gas) the equations for the calculation of ozonizers are derived. The calculation method is illustrated by an example. It is recommended to use a working voltage of 8-9 kv. For feeding the ozonizer, machine generators

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or vacuum-tube generators of different types may be used (ЗГ-2А (ZG-2A), ЗГ-10 (ZG-10), ЗГ-11 (ZG-11), and others) along with the corresponding amplifiers (У-300 (U-300), У-500 (U-500), У-600 (U-600) and ТУ-5 (TU-5)). In order to raise the voltage (to 8-9 kv), transformers of the types НОМ-10 (NOM-10), ОМ-0.5/10 (OM-0.5/10) and ОС-5/10 (OS-5/10) may be used. The voltage may be regulated by laboratory autotransformers of the types ЛАТР-1 (LATR-1) and ЛАТР-2 (LATR-2). The transformer operation may be controlled by means of kilovoltmeters of the types С-96 (S-96) and ВКС-7Б (VKS-7b), voltage dividers of the types ДНЕ-1 (DNYe-1) and ДНЕ-2 (DNYe-2), or by means of milliammeters with rectifiers (of the types Ц-312 (Ts-312), Ц-41 (Ts-41) and others). There are 2 figures and 4 Soviet references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: September 30, 1959

S/076/60/034/012/024/027
B020/B067

AUTHORS: Yemel'yanov, Yu. M., Filippov, Yu. V.

TITLE: Equivalent Electric Circuit of Ozonizers (Reply to the Article by V. V. Yastrebov "On the Problem of an Equivalent Electric Circuit of Ozonizers")

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 12, pp. 2841-2843

TEXT: In the article by V. V. Yastrebov (Ref. 1) a number of objections are made to the equivalent electric circuit of the ozonizer. A new equivalent ozonizer circuit is suggested which consists of an electric system of three series-connected condensers, the central one of which is shunted by two thyrotrons and a resistor. The authors point to the fact that V. V. Yastrebov has not observed the principal difference between the equivalent circuit of the apparatus and its model. The equivalent circuit should be a combination of simple elements of the electric system which in the calculations replaces part of the actual electric system. Furthermore, it replaces any device only as source or consumer of electric

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000413120012-7"

Equivalent Electric Circuit of Ozonizers (Reply to the Article by V. V. Yastrebov "On the Problem of an Equivalent Electric Circuit of Ozonizers")

S/076/60/034/012/024/027
B020/B067

energy, it can, however, not be regarded as its model. The equivalent circuit suggested corresponds to these three requirements: it allows the theoretical calculation of the most important electric characteristics of ozonizers, i.e., of the external static and dynamic volt-ampere characteristics, of the active power and the power factor. The authors refute V. V. Yastrebov's opinion that the ozonizer circuit suggested by the authors (Fig. 1) does not allow the interpretation of other types of current curves which are obtained when studying real ozonizers. The electric system suggested by V. V. Yastrebov is only one of the possible ozonizer models and cannot be regarded as equivalent circuit since it contains also thyratrons besides simple elements. The results obtained by V. V. Yastrebov when studying the qualitative dependence of the shape of the current curve of the ozonizer on the lumped voltage in the thyratron system and the magnitude of the shunt do not correspond to the facts. Fig. 2 shows the oscillogram of the voltage curve in the discharge interval which was experimentally obtained by the authors. The shape of this curve corresponds to the theory of electric ozonizers. The flat

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Equivalent Electric Circuit of Ozonizers (Reply to the Article by V. V. Yastrebov "On the Problem of an Equivalent Electric Circuit of Ozonizers")

S/076/60/034/012/024/027
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peaks of this curve confirm the voltage regulation in the discharge interval during the ignition of discharge. Hence, the following may be concluded: 1) the objections made by V. V. Yastrebov against the equivalent ozonizer circuit are not substantiated and do not take account of the principle difference between the equivalent circuit and a model, 2) the electric system suggested by V. V. Yastrebov is no equivalent circuit of ozonizers but only its faulty model. There are 2 figures, and 7 Soviet references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: October 7, 1959

Card 3/3

88711

S/076/61/035/001/015/022
B004/B060

11.1120

AUTHORS: Samoylovich, V. G. and Filippov, Yu. V.

TITLE: Electrical theory of ozonizers. VIII. Effect of frequency upon the electrical characteristics of ozonizers

PERIODICAL: Zhurnal fizicheskoy khimii, v. 35, no. 1, 1961, 201-205

TEXT: The problem of increasing the power of ozonizers by an increase of frequency is dealt with here. A report is given of the effect of frequencies between 300 and 3000 cps upon the course of the voltampere characteristics $I_m = f(V_{0_{eff}})$ for an ozonizer with a 1-mm discharge gap. ($I_m = I_{mean}$). The measurements were made on electrodes cooled down to 25°C, 600 mm Hg, the throughput rate of O_2 being 100 l/h. The frequency was obtained by means of a ЗГ-10 (ZG-10) sound generator with a ТУ-5 (TU-5) amplifier. Fig. 1 shows the v-a characteristics for the various frequencies. It was noted that a change of frequency did not cause any change of voltage V_g in the discharge gap. The critical voltage V_{cr} also

X

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remained constant. According to Ref. 4 the v-a characteristics are described by the equations $I_m = (2/\pi)V_o C_{total}\omega$ for $V_o \leqslant \sqrt{2}V_{cr}$ (1); $I_m = (2/\pi)(V_o - V_g)C_g\omega$ for $V_o \gg \sqrt{2}V_{cr}$ (2). [Abstracter's Note: C_g is not defined]. In both cases, the course of the curves as a function of frequency was found to fit the theory. The critical current $I_{cr} = (2/\pi)C_{total}V_{cr}\omega$ is also a linear function of frequency. As regards the effective energy U of the ozonizer it is noted that measurements must be made under conditions, where U remains constant. From $U = V_g(I_m - I_{cr})$ (5) and $I_m - I_{cr} = I_a$, the active current, this was observed to be the case, when I_a = const. As is shown by the table, this has been confirmed by experiments. For I_a = const, U does not depend on the frequency. The linear relationship between $1/\eta$ and $1/\omega$ was confirmed experimentally for the power coefficient η in accordance with the theoretical findings. There are 6 figures, 1 table, and 7 references: 6 Soviet-bloc and 1

88711

Electrical theory of ozonizers. ...

S/076/61/035/001/015/022
B004/B060

non-Soviet-bloc.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: May 21, 1959

Legend to the Table. 1: U, w, for current strength: ; 2: ν, eps; 3: U_{mean}; 4: U_{calcul}

2 ν, гц	1 U, вт при силе тока 2,5 mA	5 mA	10 mA	15 mA	2 ν, гц	1 U, вт при силе тока 2,5 mA	5 mA	10 mA	15 mA
300	7,5	14,0	31	47	2500	7,6	14,1	31	47
600	7,6	14.1	28	46,5	3000	7,5	14,3	31,5	47
900	7,7	14,0	32	48,0	3 $U_{ср}$	7,6	14,1	30,8	47,0
1500	7,8	14,1	31	46,5	4 $U_{расч.}$	7,75	15,5	31,0	46,5

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89575

S/076/61/035/002/012/015
B107/220

11.1120

AUTHORS: Filippov, Yu. V. and Yemel'yanov, Yu. M. (Moscow)

TITLE: Electrosynthesis of ozone.
I. Kinetics of ozone synthesis under flow conditions

PERIODICAL: Zhurnal fizicheskoy khimii, v. 35, no. 2, 1961, 407-415

TEXT: The paper is mainly a theoretical study of the kinetics of ozone synthesis in the ozonizer under flow conditions. The investigation is substantiated by some experimental data. For the kinetics of ozone synthesis, the equation

$\frac{dx}{dt} = k'_o - k'_1 x$ (1), where x is the ozone concentration, t the time, k'_o and k'_1 constants, has been derived by S. S. Vasil'yev, N. I. Kobozev, and Ye. N. Yeremin (Zh. fiz. khimii, 7, 619, 1936). When t is replaced by U/v, the solution of the equation will be $x = x_p(1 - \exp(-k_1\frac{U}{v})$ (2); $x_p = k_o/k_1$ is the equilibrium concentration of the ozone, U/v is the ratio of capacity to volume rate of the gas flow. A further equation for the kinetics of ozone

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B107/B220

Electrosynthesis of ozone ...

synthesis has been derived by H. Becker (Wiss. Veröff. Siemens Konz., 1, 76, 1920; 3, 242, 1923/1924): $x = \frac{a\,U/v}{1 + b\,U/v}$ (3), where a and b are constants. The investigation has shown that these equations correspond to the critical cases of ozone transport in a gas flow. (3) holds for the case of ideal mixing, and (2) for the case of ideal displacement, i.e., in the absence of diffusion. For the general case, the differential equation $D\frac{d^2x}{dl^2} - v_L\frac{dx}{dl} - k_1'x + k_0' = 0$ (8) has to be solved, where D is the diffusion coefficient, l the coordinate along the axis of the ozonizer, and v_L the linear flow velocity. In equation (8), the change of volume is not considered. As G. M. Panchenkov has shown (Uch. zap. MGU, no. 174, 53, 1958), this may have a substantial influence upon kinetics under flow conditions. Because of the slight conversion, the volume change in the electrosynthesis of ozone amounts to 3% only. Under the boundary conditions, where the ozone is removed from the reaction space merely by mass transfer, the equation for the ozone concentration at the outlet of the ozonizer (l = L) is solved as follows:

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$$x = x_p\left[1 - \frac{a_1^2 - a_2^2}{a_1^2\exp(-a_2L) - a_2^2\exp(-a_1L)}\right] \quad (9), \text{ where } a_{1,2} = \frac{v_L}{2D} \pm \sqrt{\frac{v_L^2}{4D^2} + \frac{k_1'}{D}}.$$

The direct calculation of the kinetic constants from this equation is very complicated. The following indirect solution is possible:

$$\overline{k_1} = \frac{v_L}{L}\ln\frac{x_p}{x_p - x} = \frac{v_L}{L}\ln\frac{a_1^2\exp(-a_2L) - a_2^2\exp(-a_1L)}{a_1^2 - a_2^2} \quad (10).$$

Here, the left-hand side is the decomposition "constant" of ozone, calculated from the equation for ideal displacement: $x = x_p(1 - \exp(-k_1L/v_L))$. Fig. 1 shows the good agreement of the theoretical curve with experimental data. For the tests, an ozonizer of L = 35 cm was used; the external and internal diameters were 41.9 and 39.7 mm, respectively, for the outer electrode, and 35.6 mm and 33.0 mm, respectively, for the inner electrode; discharge capacity was about 120 w. The apparatus is described in detail in a previous paper of the authors (Zh. fiz. khimii, 31, 896, 1957). As a table shows, the decomposition constant of the ozone increases with increasing flow velocity and tends toward the critical value 0.340 sec^{-1}. Using this value for $\overline{k_1}$, the curves for several values of D were calculated (Fig. 2). In most cases, equation (10) can be reduced. Thus,

$$\overline{k_1} = \frac{v_L}{L} \ln \frac{x_p}{x_p - x} = v_L a_2 \quad (11)$$

holds for higher flow velocities. As to the accuracy of this approximation see Legend to Fig. 2. Equation (9) may be reduced to $x = x_p(1 - \exp(a_2 L))$ (14). Calculation shows that the error is below 1% under the above-described experimental conditions; for industrial conditions where the reaction space is considerably longer than 35 cm, the range of application of equation (14) is extended significantly. Furthermore, the usefulness of the equations (1) set up by S. S. Vasil'yev, N. I. Kobozev, Ye. N. Yeremin and (2) by H. Becker for an approximate calculation was examined. Their comparison with experimental data shows clearly that the former is more suitable. There are 5 figures, 1 table, and 10 references: 9 Soviet-bloc and 1 non-Soviet-bloc.

89575

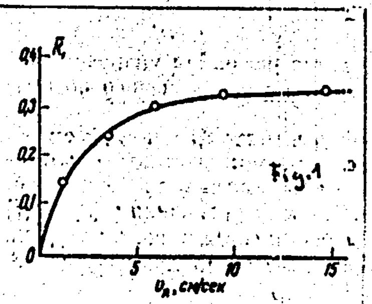
S/076/61/035/002/012/015
B107/B220

Electrosynthesis of ozone ...

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: June 16, 1959

Legend to Fig. 1: Dependence of $\overline{k_1}$ on the flow velocity of oxygen; the points represent experimental values, the curve is theoretically calculated for $D = 15\ cm^2/sec$.



Card 5/6

S/076/61/035/003/015/023
B121/B206

11,1120

AUTHORS: Filippov, Yu. V. and Vendillo, V. P.

TITLE: Electrosynthesis of ozone. II. Synthesis of ozone from oxygen-argon mixtures

PERIODICAL: Zhurnal fizicheskoy khimii, v. 35, no. 3, 1961, 624-628

TEXT: The kinetics of the synthesis of ozone from oxygen-argon mixtures has been studied for a wide range of compositions. Experiments were conducted with an apparatus described already previously (Ref. 1: V. P. Vendillo, Yu. M. Yemel'yanov, Yu. V. Filippov, Zavodsk. Laboratoriya, no. 11, 1401, 1959). The synthesis of ozone was made in a glass ozonizer with a-c of 1250 cps and a constant voltage of 8 kv. The flow rate of the reaction gas through the ozonizer was varied between 10-200 l/hr. The analysis of the reaction products for ozone was made iodometrically. Mixtures of the following argon content were used for the synthesis of ozone: 4, 9.5, 18, 30, 37, 48, 62, 70, 80, and 90% by volume of A. It was established that the equilibrium concentration of ozone decreases linearly with an increase of the argon content in the mixtures, a reaction of first order existing therefore. For the

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equilibrium concentration x_{eq} of the ozone, the equation $x_{eq} = \frac{a\, k_o}{k_o + k_1}$ (2) holds (a = initial concentration of oxygen in the mixture; k_o = constant of formation of ozone; k_1 = constant of decomposition of ozone). The constants of decomposition and formation of ozone increase with rising argon content of the reaction mixtures, while the ratio $k_o/(k_o+k_1)$ is independent of the argon content of the mixture and equals 0.0506. This increase of the kinetic constants with an increase of the argon content is explained by the uneven energy distribution of the electric discharge among the components of the mixture. In the formation and decomposition reactions of the ozone, argon remains inactive, since the degree of conversion of oxygen to ozone is independent of the composition of the mixture. S. S. Vasil'yev, N. I. Kobozev, and Ye. N. Yeremin are mentioned. There are 3 figures, 1 table, and 5 Soviet-bloc references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 9, 1959

27684
S/076/61/035/009/007/015
B106/B110

11.1120

AUTHORS: Filippov, Yu. V., and Kobozev, N. I.

TITLE: Electrosynthesis of ozone. III. Effect of temperature of ozonizer electrodes on ozone synthesis

PERIODICAL: Zhurnal fizicheskoy khimii, v. 35, no. 9, 1961, 2078 - 2082

TEXT: The cooling of electrodes during electrosynthesis of ozone is very important since in high-frequency discharges in ozonizers considerable amounts of energy are set free which cause strong heating of the gas in the discharge chamber and of the electrodes themselves. The authors experimentally studied the effect of electrode temperature on ozone synthesis since publication data on this problem are insufficient and partly contradictory. The experimental installation was similar to a previously described apparatus (Ref. 8: Yu. V. Filippov, Yu. M. Yemel'yanov, Zh. fiz. khimii 31, 896, 1957; Ref. 9: V. P. Vendillo, Yu. M. Yemel'yanov, Yu. V. Filippov, Zavodsk. laboratoriya 25, 1401, 1959), and differed only by the device for cooling the electrodes of the ozonizer and keeping their temperature constant. Fig. 1 shows this device. It consists of two

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B106/B110

Electrosynthesis of ozone ...

electrically isolated parts serving for the separate cooling of the inner and outer electrodes. Each part contains a spiral cooler (1, 6) which is immersed in a Dewar vessel filled with a mixture of acetone and dry ice and attached to a jack-screw for temperature control, a rotary pump (2, 5), and an alcohol thermometer (3, 4). All experiments were conducted at an oxygen pressure of 770 mm Hg, with current of a frequency of 1500 cps, and at temperatures of -40°, -20°, -10°, 0°, 10°, and 20°C. Rates of oxygen flow ranged from ... to 125 l/hr for all these temperatures (except for 20°C). At 20°C, the equilibrium concentration of ozone was only determined. Table 1 shows electrical data during the operation of the ozonizer. The investigations showed that (1) only at relatively high values of the ratio F/v (F = volume of the discharge zone of the ozonizer, v = rate of oxygen flow by a volume) temperature strongly affects the ozone concentration; (2) concentrations of ozone up to 16 % can be obtained by cooling the electrodes and maintaining large U/v values. From Eq. (1) derived by S. S. Vasil'yev, N. I. Kobozev, and Ye. N. Yeremin (Ref. 12: Zh. fiz. khimii, 10, 619, 1936) the authors calculated the kinetic constants for formation and decomposition of ozone in the electric discharge:
$k_o + k_1 = v\ln(x_G/x_G - x)/U$, $k_o = x_G(k_o + k_1)/a$ (1) (k_o = constant of

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ozone formation; k_1 = constant of ozone decomposition; a = initial concentration of oxygen; x_G - equilibrium constant of ozone; x - ozone concentration for a given U/v; U = active discharge power). The value for U was calculated theoretically (Ref. 13: Yu. M. Yemel'yanov, Yu. V. Filippov, Zh. fiz. khimii, 33, 1042, 1959). The calculation of the kinetic constants showed that $k_o + k_1$ increases with increasing v. This indicates the effect of ozone diffusion along the gas current on the kinetics of ozone synthesis. A comparison of the mean values of the kinetic constants for various temperatures showed that the temperature only affects the decomposition constant of ozone which rises with temperature. The constant of ozone formation, however, does not change with temperature according to a law. k_1 obeys Arrhenius' law. From the inclination of the straight line in a diagram (log k_1, 1/T) a value of 1800 cal/mole results for the activation energy of ozone decomposition. This small value indicates that the decomposition is not a thermal but a photochemical reaction. The diffusion processes may be another reason for the low value of the activation energy. A decision between these two possibilities may only be made by a

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Electrosynthesis of ozone ... S/076/61/035/009/007/015
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detailed investigation of the mechanism of ozone electrosynthesis. The fact that, within the error limit of the experiment, k_o does not depend on temperature, undoubtedly proves that the activation of chemical reactions in electric discharges has a nonthermal character. N. Pushin and M. Kaukhcheva (Ref. 6: ZhRFKhO, 46, 576, 1914) are mentioned. There are 4 figures, 2 tables, and 17 references: 10 Soviet and 7 non-Soviet. The reference to the English-language publication reads as follows: I. Devins, J. Electrochem. Soc., 103, 400, 1956.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: February 4, 1960

Fig. 1. Scheme of the cooling system for the ozonizer electrodes. Legend: See text of the abstract.
Legend to Table 1: * experiment conducted at v = 79 l/hr; ** experiment conducted at v = 29 l/hr; *** experiment conducted at v = 9 l/hr.

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S/189/62/000/001/001/002
D227/D302

11.1120

AUTHORS: Samoylovich, V.G. and Filippov, Yu. V.

TITLE: Mechanism and kinetics of ozone synthesis in the electric discharge

PERIODICAL: Moscow, Universitet. Vestnik. Seriya II. Khimiya, no. 1, 1962, 44-48

TEXT: In the present work the authors studied the effect of oxygen pressure and strength of current on the synthesis of ozone in a circulating system. It was first confirmed that the equilibrium ozone concentration is independent of current. The effect of pressure and rapid decrease of ozone concentration at low pressure are considered and expressions for the equilibrium ozone concentrations are given, showing that the ozone concentration is (a) independent of pressure when the latter is high and (b) proportional to the 4th power of the total pressure when the latter is low. The kinetics of ozone synthesis are represented by a first order reaction and the decomposition of ozone by Eq. (3a)

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Mechanism and kinetics of ... S/189/62/000/001/001/002
D227/D302

$$\frac{[O_3]}{[O_2]}\% = 100\frac{K^0_0}{K^0_1}(1 - e^{-K^0_1 \cdot t}) \quad (3,a)$$

where K^o_0 = constant of formation and K^o_1 = constant of O_3 decomposition. On the basis of the proposed reaction mechanism, the kinetics of ozone synthesis are described and discussed. There are 5 figures and 3 references, 2 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: Devins, J. Electrochem. Soc. 103, no. 8, 460 (1956).

SUBMITTED: January 3, 1961

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32640
S/076/62/036/001/012/017
B124/B110

11.1120

AUTHORS: Filippov, Yu. V., and Yemel'yanov, Yu. M.

TITLE: Electrosynthesis of ozone. IV. Effect of discharge power (ozonizer with 1 mm discharge gap)

PERIODICAL: Zhurnal fizicheskoy khimii, v. 36, no. 1, 1962, 181-188

TEXT: Five series of tests were performed at various rates of oxygen flow to study the effect of the discharge power on the ozone yield in electrosynthesis. The equipment used for ozone synthesis has been described earlier by the authors (Ref. 6: Zh. fiz. khimii 31, 896, 1957; Ref. 8: Zavodsk. laboratoriya 25, 1401, 1959). The gas pressure was automatically maintained at 775 ± 0.1 mm Hg. Tetrachloromethane was used as a coolant for the electrodes, the temperature of which was kept constant at 20.0 ± 0.05°C. The current frequency was 1350 cps. The discharge power was measured with a flow calorimeter described by the authors in Ref. 9 (Zh. fiz. khimii 33, 1042, 1959). The ozone content in the gas was determined iodometrically. As is evident from Fig. 1, the factor U/v, U being the discharge power and v the volume rate of oxygen flow through

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the ozonizer, is not the only parameter determining the ozone concentration. One of the additional factors is the temperature in the reaction zone which depends on the discharge power. The mean temperature in the reaction zone of the ozonizer can be calculated by allowing for the effects of the temperature differences between the gas in the reaction zone and the cooling liquid which, in turn, involve the gas temperature drop in the reaction zone, at the walls of the glass electrode, and at the interface between the cooling-liquid film and the electrode surfaces. The relation

$$t^{o}_{max} = \frac{q_o a^2}{2\lambda_g} + t^{o}_{el} \qquad (9),$$

where q_o = amount of heat evolved per sec in the volume unit of the reaction zone, a = distance between the electrode surface and the center of the discharge gap, λ_g = heat-transfer coefficient of the gas, and t_{el} = surface temperature of the electrode, holds for the maximum temperature of the gas layer in the central part of the reaction zone. For the mean gas temperature in the ozonizer, the relation

$$t^{o}_{g} = \frac{q_o a^2}{3\lambda_g} + t^{o}_{el} \qquad (10)$$

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Electrosynthesis of ozone...

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B124/B110

is valid. By comparing these two equations, one obtains

$$t^o_g - t^o_{el} = \frac{2}{3}(t^o_{max} - t^o_{el}) \qquad (11).$$

λ_g was calculated from experimental data to be $14 \cdot 10^{-5}$ cal/cm·sec·deg. Thus, the temperature difference between the gas in the reaction chamber and the cooling liquid is a linear function of the discharge power. Mathematical evidence is given for the fact that equilibrium concentration (i.e., 12.5 % by volume) of ozone is the maximum yield which can be obtained in the given ozonizer with a constant coolant temperature of 20°C. The ozone concentration can be increased by improving the cooling of the electrodes. S. S. Vasil'yev, N. I. Kobozev, and Ye. N. Yeremin (Ref. 4: Zh. fiz. khimii 7, 619, 1936) are mentioned. There are 3 figures, 1 table, and 11 references: 8 Soviet and 3 non-Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: June 8, 1960

Card 3/3

37629
S/076/62/036/005/004/013
B101/B110

11.1120

AUTHORS: Samoylovich, V. G., Vendillo, V. P., and Filippov, Yu. V.

TITLE: Electrosynthesis of ozone. V. Synthesis of ozone in a flow under reduced pressure

PERIODICAL: Zhurnal fizicheskoy khimii, v. 36, no. 5, 1962, 989 - 992

TEXT: To clarify the kinetics of ozone formation, the synthesis of ozone was studied at reduced pressures in a device described earlier (Zavodsk. laboratoriya, 25, 1401, 1959; Zh. fiz. khimii, 33, 2358, 1959). Three ozonizers, length 250 mm, diameter 35 mm, discharge space 0.5 (1); 2.0 (2), and 4.0 mm (3) were used, the amperage in ozonizers 1 and 2 being 44.4 ma and in ozonizer 3 being 30 ma, the electrodes with water at 22.5°C, frequency 1250 cps, flow rate of oxygen $5 \leqslant V \leqslant 500$ liters/hr, pressure 160 - 760 mm Hg. At falling pressure, the curves for O_3 yield (% by volume) versus u/V showed increasingly distinct maxima (Fig. 1). It is discussed whether these maxima are caused (a) by decomposition of ozone before the ozonizer on counter-current diffusion of ozone, or (b) by decomposition of ozone after the ozonizer. The case (a) is possible since

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B101/B110

PV_{max} = const. has been found experimentally. For the case (b), PV_{max} = const. has also been found on the basis of the equation $dx/dt = k_1'x$ (x = O_3 concentration, t = time, k_1' = decomposition constant of O_3 after the ozonizer). It is assumed that in practice the two processes are combined. There are 3 figures and 2 tables.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 20, 1960

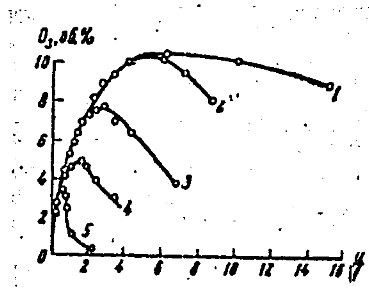

Fig. 1. Ozone concentration versus u/V for ozonizer with 0.5 mm discharge space. (1) 780 mm Hg; (2) 620 mm Hg; (3) 440 mm Hg; (4) 320 mm Hg; (5) 160 mm Hg.

Legend: Ordinate O_3, % by volume.