"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, C.I., inzh.

Analysis of the designs of [illegible] snow cleaners of the ejective type. Nov. tekh.zhil.-kom.khoz.: Blagoustr.gor. no.2:40-[illegible] '62.

(MIRA 17:6)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

MURASHOV, M.V.; OREKHOV, G.I.

Selecting the working member of city rotary snowplows. Mekh. trudy AKKH no.32:50-68 '64. (MIRA 19:1)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, O.I.

Theory of the thrower mechanism of rotary snow removing machinery.
Nauch. trudy AKKH no.3? :?3-?3? [illegible]. ([illegible])

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

ORLKHOV, P.A.

Production cooperation of communication workers and builders. Avtom., telem. i sviaz' no.11:16 N '57. (MLRA 10:11)

1. Nachal'nik Tul'skoy distantsii signalizatsii i svyazi Moskovsko-Kursko-Donbasskoy dorogi.
(Railroads--Signaling)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, P.A.

Competition among the Tula communication workers. Avtom., telem.i sviaz' 3 no.7:13 Jl '59. (MIRA 12:12)

1. Nachal'nik Tul'skoy distantsii signalizatsii i svyazi Moskovsko-Kursko-Donbasskoy dorogi.
(Tula Province--Telecommunication--Employees)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, P.

Changing the design of welded-in sheet steel reinforcements for rectangular cutouts in the hull of a ship. Mor.i rech.flot 14 no.2:28-29 F '54. (MIRA 7:1)
(Hulls (Naval architecture))

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

A Weld-Cast Icebreaker Stem (

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

AUTHOR: Orekhov, P.A., Engineer [illegible]

TITLE: Non-Magnetic Stand with Flux Pads (Bezmagnitnyy stend s flyusovymi podushkami)

PERIODICAL: Svarochnoye proizvodstvo, 1958, Nr 9, pp 40-41 (USSR)

ABSTRACT: Detailed design and operation information is given on a new non-magnetic welding stand with flux pads for joining 6 metal sheets of 6.5 m length, 1,800 mm maximum and 700 mm minimum width into one panel, without bevelling the edges. This stand can replace the expensive electro-magnetic stands. Another such stand for welding sheets up to 8,500 x 18,000 mm is now being constructed. There are 2 diagrams.

1. Welding equipment--Design 2. Welding equipment--Operation

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APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

AUTHOR: Orekhov, P.A., Engineer SOV/135-59-1-13/18

TITLE: A Cast-Welded Sternpost of an Atomic Icebreaker (Svarno-litoy akhtershteven' atomnogo ledokola)

PERIODICAL: Svarochnoye proizvodstvo, 1959, Nr 1, pp 40-41 (USSR)

ABSTRACT: Information is given on the production of a cast welded sternpost for an atomic icebreaker, the first constructed in the USSR. It consists of nine parts cast in sand molds. Prior to heat treatment of the castings, whereby open-air chilling was replaced by furnace chilling, the welding-up of cracks and deficient portions was carried out. The information includes recommendations on the use of electrodes and a description of the assemby welding process consisting of 2 stages: 1) assembling of the separate parts, and 2) of the sternpost in the dockyard. Welding was

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A Cast-Welded Sternpost of an Atomic Icebreaker

performed in underneath, vertical and overhead positions. The quality of joints was checked by the gammagraphic method. There are 3 sets of diagrams.

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

25(1) SOV/145-59-3-14/14

AUTHOR: Orekhov, P.A., Engineer

TITLE: Welded Joints of "1Khl8N9T" and "Khl8N12M2T" Steel Pipes (Svarnyye soyedineniya trub iz staley 1Khl8N9T i Khl8N12M2T

PERIODICAL: Svarochnoye proizvodstvo, 1959, Nr 3, pp 48-50 (USSR)

ABSTRACT: Practical welded joint designs are suggested for the flangeless connection of stainless steel pipes for corrosive media pipelines, either to eliminate the use of the backing rings and the joint defects caused thereby, or to eliminate the pipe diameter reduction by the backing rings in case they are used. Two joints with the backing ring sunk into the pipe wall flush with the inner pipe diameter, one joint with an overlapping edge left on one pipe butt, and a joint for a short pipe end are shown (Fig. 1). There are 2 sets of diagrams.

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KLEBANOV, Boris Vladimirovich, inzh.; KUZ'MIN, Vladimir Grigor'yevich, inzh.; ORESHOV, Pavel Aleksandrovich, inzh.; PROSHIN, Georgiy Aleksandrovich, kand.tekhn.nauk; LEONOV, I.S., inzh.retsenzent; SOROKIN, A.A., inzh.retsenzent; SKRUYUK, V.K., inzh., glav.red. MAYEVSKIY, V.V., inzh. red.; GORNOSTAYPOL'SKAYA, S.M., tekhn. red.

[Repairing motor vehicles and tractors] Remont avtomobilei i traktorov. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit. lit-ry. Pt.1. 1961. 335 p.

(MIRA 14:5)

(Motor vehicles—Maintenance and repair) (Tractirs—Maintenance and repair)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

L 19917-63 EWP(k)/EWP(q)/EWT(m)/EWP(B)/BDS—AFFTC/ASD—Pf-4—JD/HM
ACCESSION NR: AP3006484 S/0135/63/000/009/0032/0033

AUTHORS: Orekhov, P. A. (Engineer); Kukushkin, V. I. (Engineer)

TITLE: Checking welded seams for leakage with a helium detector

SOURCE: Svarochnoye proizvodstvo, no. 9, 1963, 32-33

TOPIC TAGS: welded seam , helium detector, leakage

ABSTRACT: The authors designed and constructed an apparatus for checking fluid-tightness of seams in welded objects. The apparatus consists of helium detector (1) (see enclosures), vacuum pumps (2), collector (5), valves (11 and 15), thermocouples (14 and 16), helium tank (17), and nitrogen tank (19). The object to be tested is placed in a chamber that may be either evacuated or filled with helium under pressure. The object, too, may be either evacuated or filled with helium, so that either inflow or outflow through a leaking seam can be detected. The detector should be calibrated so that it does not register atmosphere helium. The entire apparatus must be checked for air-tightness and blown through with nitrogen. Even a minute leak will allow helium to flow into the evacuated zone and to be registered by the detector. The latter responds with a sound signal. The

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L 19917-63
ACCESSION NR: AP3006484

apparatus may test 3 objects at once, may be easily transported, and requires the services of a single operator. Orig. art. has: 1 figure.

ASSOCIATION: none

SUBMITTED: none	DATE ACQ: 30Sep63	ENCL: 02
SUB CODE: ML	NO REF SOV: 000	OTHER: 000

Card 2/4

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, P.A., [illegible]; KUKUSHKIN, V.I., [illegible]

Welded steel post. Svar. [illegible]

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

AUTHORS: Borovkov, K. A., Globa, G. F., Orekhov, P. D.

TITLE: The Work of the Fire-Clay Burning Plant of the Suvorovskoye Ore-Mine Management (Rabota shamotoobzhigatel'noy ustanovki Suvorovskogo rudoupravleniya)

PERIODICAL: Ogneupory, 1958, Vol 23, Nr 5, pp. 204-210 (USSR)

ABSTRACT: In order to supply the works for refractory products situated in the vicinity of Moscow with high-grade fire-clay, in the Suvorovskoye ore-mine management a fire-clay burning plant (Shamotnyy) was constructed. Its first part, consisting of a rotary kiln, was started at the end of 1956. The kinds of clay from the deposit Suvorovskoye, divided into groups, and kinds of corresponding to TUO 17-56 are named in the table. The projected capacity of the first part of the plant is 100000 t of fire-clay per year. The production process can be seen in figure 1 and is then described in detail. It is entirely mechanized. In figure 2 automatic scales are shown. The rotary burning kiln of 60 m length and 3 m diameter has an hourly output of 12.5 t of fire-clay (figure 3). From the burning kiln the fire-clay comes into a drum radiator of 25 m length and 2.5 m diameter, where it is cooled down to 60-80°C. At the end of the drum radiator there

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

The Work of the Fire-Clay Burning Plant of the Suvorovskoye 131-23-5-4/16
Ore-Mine Management

is a grid which sorts out the large pieces of fire-clay, which are carried to the crusher figure 4) The crushed fire-clay is brought to the magnet separators of the AM 410 type by means of bucket elevators of the TsB-350 type, in which magnet separaters metal inclusions coming in by accidant are separated The burning kiln is heated by powdered coal. By means of a feeder of the L-4 type the coal is brought to the crusher of the DVD-2 type. The coal from the Moscow coal-basin is dried, for which process the waste gases from the coal firings are used At the outlet of the coal rotary drier there is an exhaustor of the D-4 type which sucks the flue gases through 2 cyclons and an electrical precipitator of the UVP-9.9 type for the purpose of eliminating the coal dust. In figures 5 and 6 an aero-pulverizer for coal is shown Furthermore difficulties in the furnace lining are described. The plant is also equipped with a measuring control apparatus, which permits to control continuously the temperatures and atmospheric pressure Also an automatic regulation of the production processes is introduced. In 1957 in this plant 83.5 thousand tons of fire-clay were produced, the output in three months rising from 18.8 to 22,8 thousand tons The quality of the fire-clay according to

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The Work of the Fire-Clay Burning Plant of the Suvorovskoye Ore-Mine Management 131-23-5-4/16

TUO 45-57 is quoted in the table. The cost-price of 1 ton of fire-clay was reduced by 17.3% in the first year. Further reductions are expected. By this plant the works for refractory production in Moscow's neighbourhood have obtained a safe fundament for fire-clay supply and at prices which are lower than the cost-price of fire-clay which formerly was burned in annular kilns by the works themsleves. At the expense of the capacity of the annular kilns having become free the output of refractory products can be increased. Railway transport has been released by the transport of the quantity of water which is in the clay. There are 6 figures, 3 tables.

ASSOCIATION: Suvorovskoye rudoupravleniye(Suvorovskoye Ore-Mine Management)

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1. Refractory materials - Processes 2. Industrial plants - Work functions

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OREKHOV, P.M.

New standard regulations concerning the obligations and rights of organs of scientific and technological information. NTI no.3: 3-5 '63. (MIRA 16:10)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

MARGULIS, B.Ye. (Smolensk); MARNYANSKIY, I.A. (Rovno); OREKHOV, P.S. (Izhevsk); ZYABLITSKIY, V.V. (Kalinin)

Extracurricular work in mathematics. Mat. v shkole no.1:68-75 Ja-F '63. (MIRA 16:6)
(Mathematics--Study and teaching)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, P. V.

"Influence of the Geometry of the Receiver and Jet Apparatus of a Turbine on Distribution of Gas along Jets," a dissertation defended by P. V. Orekhov for the degree of Candidate of Technical Sciences on 18 May 1953 at the Moscow Order of Lenin Aviation Institute im. Sergo Ordzhonikidze (The Moskovskiy Ordena Lenina Aviatsionnyy Institut im. Sergo Ordzhonikidze), No 107, 8 May 53, p. 4, Vechernyaya Moskva.

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, P. V.

"On the Effect of the Geometry of a Receiver and Nozzle of a Turbine on the Distribution of Gas Along the Nozzles," by P. V. Orekhov, Candidate of Technical Sciences, Mekhanika, No 50, Oborongiz, Moscow, 1956, pp 124-181

The author develops a methodology for analyzing a turbine receiver. The experimental and theoretical investigations conducted by the author evidenced a considerable disparity between the distribution of speed CH_x and gas consumption through the turbine blade gap $\Delta G w_x$ and the asymmetrical flow of gas with a symmetrical receiver. The theoretical and experimental investigations explaining the laws governing the distribution of pressure, temperature, and gas flow velocity before the nozzles, along the receiver channel, as well as CH_x and $\Delta G w_x$ at the nozzle outlet, can lead to the development of a methodology for analyzing the receiver in which the distribution of CH_x and $\Delta G w_x$ would be uniform.

Sum 1617

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28(0); 10(2); 25(2) PHASE I BOOK EXPLOITATION SOV/2036

Moscow. Vyssheye tekhnicheskoye uchilishche imeni N. E. Baumana

Mekhanika; sbornik statey (Mechanics; Collection of Articles) Moscow, Oborongiz, 1959. 119 p. (Series: Its: Trudy vyp. 92) 3,400 copies printed. Errata slip inserted.

Ed. (Title page): V. V. Dobronravov, Doctor of Physical and Mathematical Sciences, Professor; Ed. (Inside book): Ye. V. Latynin, Engineer; Ed. of Publishing House: L. I. Sheynfayn; Tech. Ed.: V. P. Rozhin; Managing Ed.: A. S. Zaymovskaya, Engineer.

PURPOSE: This book is intended for scientific and research personnel, engineers, and students of advanced courses at instrument-making and machine design vuzes.

COVERAGE: This volume deals with problems frequently encountered in modern instrument making and in designing specialized machines and includes general theory of automatic congrol, vibrations, theoretical and applied gyroscopy, stability of motion, etc. Abstracts of the individual articles are given in the Table of Contents.

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previously neglected, and a more exact map of the operation of the gyro pendulum emerges. The results obtained will unconditionally be useful in producing gyroscopes, the operating-accuracy requirements for which are increasing all the time. References: 1 Soviet.

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

28574
S/145/60/00 /001/009/010
D221/D306

26.1910

AUTHOR: Orekhov, P.V., Candidate of Technical Sciences, Docent

TITLE: Gas flow in channels with constant discharge alor the length through grids with cross partitions

PERIODICAL: Izvestiya vysshykh uchebnykh zavedeniy. Mashinostroyeniye, no. 1, 1960, 139 - 148

TEXT: The author considers a stable state laminar flow in channel $A_oA_1B_oB_1$ of constant section, F, and a closed end, A_1B_1 (Fig. 1). Gas enters through A_oB_o with parameters v_o, γ_o and P_o, and flows out through a channel wall $B_oB_aB_1$ into the ambient surroundings, where pressure P_n is lower than the pressure P_x in the channel. The above wall of channel is in communication with ambient surroundings by an infinite amount of narrow cells formed by partitions. Theoretically, the angle of inclination of these partitions may vary from zero to almost 180°, and this system can imitate the boundary con-

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ditions in the plane nozzle grid of gas turbo-compressor (GTC) receiver. Distribution of gas parameters in this case will differ from the instance when gas is drawn through an aperture without partitions (blades). There will be a brake on the gas which will affect the distribution of speeds of its particles along the height of channel h, and in addition, gas will accelerate due to drop of pressure from P_x on B_0B_1 to P_n at C_0C_1. The real state can be theoretically described by replacing the laminar flow in the channel with an aperture without partitions by a turbulent flow without grids. In actual conditions it is necessary to take into account the inductive component of gas speed in channel, v_{iax} which should have an opposite direction to the speed of flow, v_{ax}. Projections on x and y axes of the inductive component of gas speed at an arbitrary point M,

$$c\, v^n_{iax} = \frac{d\Gamma_i}{2\pi} \frac{h}{(a - x)^2 + h^2} \qquad (1)$$

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Gas flow in channels with ...

and $$d v^{n}_{iay} = \frac{d\Gamma_i}{2} \frac{a - x}{(a - x)^2 + h^2} \qquad (2)$$

are deduced. Total inductive components are obtained by integration on all turbulent lines which can be solved when $dG_i = f_3(x)dx$ is known. For this purpose, calculation is made on elementary circulation along the contour of nozzle cell near $B_a A_a$ (Fig. 2). As $dx \rightarrow 0$, then the circulation of speed around the blade of the grid is given by

$$d\Gamma_c = (\psi v_{ax} - c_n \cos \alpha)dx + \int_0^b (v_b' - v_b'')\, db \qquad (7)$$

where ψv_{ax}; $c_n \cos \alpha$ are projections of speeds on x axis at the inlet of nozzle cell as well as at its outlet; v_b' and v_b'' are the speed of flow pass of gas around the blade, to the right and left side of latter. Calculation of $v_{ax} = f_1(x)$ and $v_b = f_2(b)$ based on

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experimental data demonstrate that changes in the speed of gas in the chamber and nozzle cell are close to the linear law, namely $v_{ax} = v_o - \frac{v_o}{l} x$, and $v_b = \frac{b_1 f_2(x)}{b}$, where $f_2 = (x) = c_n \frac{\psi v'_x}{(\cos \alpha)^{-1}}$ is the initial value of the speed during the approach to the blade from the right, and $f_2(x) = c_n - (\psi v'_x/(\cos \alpha)^{-1}$ is the initial speed when approaching the blade from the left. After mathematical treatment a set of equations is deduced for total inductive components of speed v_{ia}. The calculations reveal that through overlapping of curves of speeds obtained by the above mentioned equations with those resulting from blowing through the channel with a longitudinal slot without grid, a distribution of speeds was achieved that actually takes place in a channel with a nozzle grid. Taking into consideration the actual distribution of gas parameters in the chamber,

Card 4/8 $$\frac{G_o}{g} v_{ox} - \frac{G_a}{g} v_{ax} - \int_0^{G_c} \frac{dG_c}{g} v_{ax} = (P_x - P_o)F \qquad (17)$$

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Gas flow in channels with ...

where $\frac{G_o}{g} v_{ox}$ and $\frac{G_a}{g} v_{ax}$ are projections of quantities of gas on the x axis in sections A_oB_o and A_aB_a; $\int_0^{G_c} (dG_c/g)v_{ax}^{tr}$ is the projection of a quantity of gas on the x axis in the section B_oB_a; dG_c is the rate of gas flow through the element of nozzle grid on a length dx; $(P_x - P_o)F$ is the projection of force applied at the end of contour $A_oB_oA_aB_a$ on x axis. After transformations

$$F[(\ell, \alpha; F; b; \gamma_o; v_o; P_o)P_x; x] = 0 \qquad (20)$$

is deduced which when solved will determine pressure of gas, P_x, at any point of the chamber. Further calculations and equations demonstrate that distribution of gas pressure in the chamber depends on the latter's geometry, as well as the geometry of the nozzle grid and dynamic gas parameters. In particular the increase of angle of inclination of blades α, produces a drop of static gas pressure.

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Gas flow in channels with ...

This is due to a rise in intensity of elementary turbulences dG_i of each blade, and thus on account of higher speed v_y. To evaluate errors due to use of these equations comparison graphs were plotted, which indicate a good agreement between accurate and approximative expressions. Experimental data confirms to what extent the assumptions made during the construction of the theoretical model. The proposed equations describe the flow with a constant drain along the length of channel with sufficient accuracy. There are 7 figures and 5 Soviet-bloc references.

ASSOCIATION: MVTU im. Baumana (MVTU im. Bauman)

SUBMITTED: March 9, 1959

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

30323
S/145/61/000/009/002/003
D221/D301

26.2120

AUTHOR: Orekhov, P.V., Candidate of Technical Sciences, Docent

TITLE: On the problem of local redistribution of kinetic energy of a gas during its flow through a channel with continuous bleeding through a set of blades

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Mashinostroyeniye, no. 9, 1961, 71-78

TEXT: The author describes a transparent plastic model with exchangeable grids of various blades. It is provided with apertures for measuring static and total pressures, as well as the direction of gas flow at any point of the chamber. The experiments demonstrated that the static pressure over the greatest part of chamber height ($0.1 \leqslant \frac{h_x}{h_o} \leqslant 0.94$) remains constant within the specified length x/l and width of the chamber. The total pressure at a

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On the problem...

given distance from the inlet (Fig. 3), x/l , along the height of chamber h_x/h_o remains almost constant, and even increases close to the inlet. The graphs of static and total pressure along the length of chamber indicate that the former increases, whereas the latter drops. The first phenomenon is due to continuous bleeding of the gas, thus braking the flow, reducing the speed of gas and increasing its static pressure. The speed of gas flow in the chamber was calculated according to the difference between total and static pressures along the length of the chamber, $v_x = f(x/l)$. The drop of speed follows closely a linear law. Changes in pressure within the chamber for various initial pressures and speeds of gas at the inlet and different inclination angles, σ, were measured. The results permit the coefficient of pressure increase in the chamber to be calculated by

$$\mu = \frac{p_1 - p_o}{\gamma_o v_o^2 \sin^2 \sigma}$$

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On the problem...

where P_t is the total pressure at the end of the chamber; P_o is the static pressure at the inlet of the chamber; V_o is the gas speed at the chamber inlet. The curves of P_o, V_o demonstrate that these factors do not affect the value of μ for a given blade inclination α, and pitch of blades, b. The effect of α for a specified value of b is expressed by the empirical equation of

$$\mu = 0.367 + \frac{0.132\alpha}{360} .$$

A second series of tests was carried out to clarify the drop of total pressure at the end of the chamber. The experiments revealed that there is a local redistribution of the total energy of the gas in the contour AoAxAlClCxCoBo (Fig. 3). Over a part of CoCxCl at the inlet of grid there is a rise in the total pressure, compared to section AoBo, but it drops at the end of chamber. A comparison of curves of measured speed at the outlet with that obtained by calculation allows the following conclusion to be made. The inlet

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30323

S/145/61/000/009/002/003
D221/D301

On the problem...

speed of the gas for a fairly constant static pressure increases near the inlet, and, therefore, the gas expansion takes place with a higher starting speed. This causes a drop of the total pressure to exceed the flow losses. The above phenomenon can be explained by higher gas speeds near the inlet foils when compared to the stream that is above it. According to L.A. Vulis, when the Prandtl index is below unity, then there is enrichment of the high speed streams by the intake from upper streams that flow at lower speeds. There are 12 figures and 3 Soviet-bloc references.

Card 4/5

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On the problem...

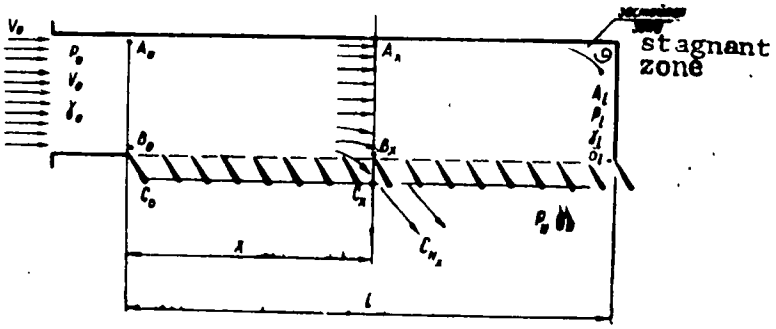

Fig. 3

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L 18227-63 EPA/EWT(m)/BDS AEDC/AFFTC/ASD/APGC Paa-4
ACCESSION NR: AT3001860 S/2909/62/000/006/0061/0075

AUTHORS: Orekhov, P.V.; Gavrikov, V. P.

TITLE: Contribution to the comparison of a radial centripetal and an axial turbine stage

SOURCE: AN SSSR. Institut Dvigateley. Trudy, no. 6, 1962, 61-75

TOPIC TAGS: turbine, gas turbine, axial, radial, centripetal, efficiency, controllable, nozzle, control

ABSTRACT: This theoretical paper endeavors to clarify the advantages of the radial centripetal turbine (RCT) by a comparative analysis of the stages of a radial and an axial turbine. Reference is made to the Swiss Escher-Wyss design project of a closed-cycle atomic gas-turbine powerplant of 20,000 hp employing two RCT's and to the Boeing-520 naval powerplant (500 hp) which has an RCT-type compressor turbine. The paper comprises a comparison of the temperature drop that can be utilized in a stage of a radial and an axial turbine. It is found that the temperature difference that can be handled by a single stage can be increased in an RCT not only by an increase in the load coefficient, but also by increasing the permissible peripheral speed of the wheel rim. In the mean, the peripheral of an

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ACCESSTIO NR: AT3001860

RCT can be some 40 percent greater than in axial turbines. Hence, an RCT stage can handle a temperature drop twice that of an axial stage, thanks to both the higher load coefficient and the greater permissible peripheral speed. In the design of high-power equipment, this results in a reduction in the number of stages, so that, for example, where an axial turbine requires 3 to 4 stages, an RCT can perform equally well with a single stage which results in a reduction in weight and size and in an improvement in dependability. With reference to efficiency, it is recognized that existing RCT's are less efficient than existing axial turbines, but this is attributed to the imperfection of the internal design of existing RCT's and is in contrast with the greater theoretical efficiency of RCT's which should be attainable with further development. Improvements in efficiency in RCT's are, therefore, anticipated. An analysis of the characteristics of a controllable-nozzle apparatus (CNA) shows that: (1) A CNA can maintain a radial turbine (by controlling the angle α_1) close to design efficiency throughout a broad range of loads and rpm. (2) A CNA can maintain the rpm of a turbocompressor reasonably constant throughout a range of non-design regimes without any additional transmission equipments and without decreasing the weight flow of gas. (3) Even though a power turbine may lose rpm (for example, during a climb of a locomotive or an automobile), a CNA can maintain the power of the turbine and maintain fully the power of the entire aggregate even under non-design regimes.

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ACCESSION NR: AT3001860

A separate Section discusses the design and manufacture of RCT wheels and the electric circuitry of the control of an experimental power aggregate. A comparison of the performance and efficiency of RCT's and axial turbines in operation with small discharge rates shows that the efficiency of an RCT is considerably superior. Orig. art. has 9 figures.

ASSOCIATION: none

SUBMITTED:	00	DATE ACQ:	11Apr63	ENCL:	00
SUB CODE:	PH, PR	NO REF SOV:	006	OTHER:	001

Card 3/3

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, P.V.; MURUGOV, V.S.; SAMOYLOV, V.V., otv. red.; GORSHKOV, G.B., red.izd-va; SIMKINA, G.S., tekhn. red.

[Controllable pitch propellers and their simultaneous operation with power units] Grebnye vinty reguliruemogo shaga i ikh sovmestnaia rabota s silovymi ustanovkami. Moskva, Izd-vo AN SSSR, 1963. 241 p. (MIRA 17:2)

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, S.V., DOGADKIN, B.A., ZAKHAROV, N.D.

Covulcanization of various polymers in the production of rubber and the non-uniformity of vulcanizates based on different rubber combinations.

Report submitted for the 4th Scientific research conference on the chemistry and technology of synthetic and natural rubber, Yaroslavl, 1962

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

ACCESSION NR: AP4026364 S/0138/64/000/003/0012/0015

AUTHORS: Zakharov, N. D.; Orekhov, S. V.; Dogadkin, B. A.; Tyuremnova, Z. D.; Bogdanovich, N. A.; Glavina, V. S.

TITLE: Effect of covulcanization on the properties of mixes of nairit with other rubbers

SOURCE: Kauchuk i rezina, no. 3, 1964, 12-15

TOPIC TAGS: rubber, nairit, SKS 30, SKN 18, SKN 26, vulcanization, covulcanization, rubber compatibility, optical density, butadiene nitrile rubber, butadiene styrene rubber, additive property, vulcanization rate synchronization

ABSTRACT: The covulcanization of nairit with butadiene-styrene (SKS-30) and butadiene-nitrile rubbers (SKN-18 and SKN-26) was studied. As a preliminary step, the compatibility of these rubbers was investigated by three methods. The first method consisted of mixing 2.5% and 5.0% chloroform solutions of the rubbers, allowing them to stand up to 6 months, then recording their tendency to separate out. Secondly, measurements were made of the optical density of various mixtures of chloroform solutions of the rubbers. The third method determined the tensile strength of nonvulcanized plasticized rubber mixtures containing 50% lampblack.

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ACCESSION NR: AP4026364

The system nairit + SKN-18 proved to be the most compatible by all three methods. It was found that an optimum vulcanization system for a mixture of two rubbers cannot be prepared by just putting together the ingredients which show the best performance in each, since they do not necessarily cross-link and bind the structure of one rubber to that of the other. Thus, it was found that in the case of nairit + SKN-18 the use of metal oxides and sulfur was rather harmful, yielding poor quality vulcanizates, while the incorporation of thiuram and metal oxides without sulfur was beneficial. This was in accord with the finding that in the absence of sulfur, the optimum vulcanization time was the same for a compound on a nairit base and for one on an SKN-18 base. The importance of synchronization of the rate of vulcanization of each rubber component in order to obtain vulcanizates with optimum properties is stressed. Orig. art. has: 4 figures and 1 table.

ASSOCIATION: Yaroslavskiy tekhnologicheskiy institut (Yaroslav Technological Institute); Moskovskiy institut tonkoy khimicheskoy tekhnologii im. M. V. Lomonosova (Moscow Institute of Fine Chemical Technology); Yaroslavskiy zavod rezinovy*kh tekhnicheskikh izdeliy

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

ACCESSION NR: AP4026364

(Yaroslav Plant of Rubber Technical Products)

SUBMITTED: 00	DATE ACQ: 17Apr64	ENCL: 00
SUB CODE: GC, MT	NO REF SOV: 009	OTHER: 001

Card 3/3

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

ACC NR: AP7000911 (A) SOURCE CODE: UR/0[illegible]

AUTHOR: Kolesnovich, Yo. B.; Eoshtoyn, V. O.; Zakharov, N. D.; Pol[illegible] A.; Oreknov, S. V.; Murashova, L. A.; Dokiyenko, A. K.

CRG: Yaroslavl Technological Institute (Yaroslavskiy tekhnologicheskiy institut)

TITLE: Use of an SKD rubber-Nairit combination in the manufacture of commercial rubber products

SOURCE: Kauchuk i rezina, no. 12, 1966, 11-13

TOPIC TAGS: butadiene rubber, chloroprene rubber, synthetic rubber

ABSTRACT: The possibility of [illegible]ctions of cis-1,4-butadiene rubber (SKD) with Nairit (chloroprene [illegible] production of commercial rubber products was investigated by int[illegible] Nairit-base mixtures for V-belts, compression layers of V-bel[illegible]s to be used for injection molding. SKD was found to impart a [illegible] moldability, improve the calenderability, and markedly decrease the adhe[illegible]ss of the mixtures. Nairit vulcanizates combined with SKD have a high ozone r[illegible]stance. SKD lowers the brittleness temperature of the vulcanizates, substantially decreases their residual compressive strain, and lowers the heat production. V-belts prepared by using SKD in the compression layer were found to have longer service lives than ordinary mass-produced V-belts. Orig. art. has: 2 tables.

SUB CODE: 11/ SUBM DATE: 10Jun66/ ORIG REF: 001/ OTH REF: 004

Card 1/1 UDC: 678.762.2-678.763.2):678.05:62,002.2

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

CREMC [illegible]

Chem Abs V48
1-25-54
mineralogical chemistry

Mineralogical characteristics of quaternary loess loam, and their marine analogs in the Lower Don and Volga Basins. I A Shaumyan and S Ya. Orekhov. *Doklady Akad Nauk S S S R* 85 417-20(1952). The petrographic character of widespread loess deposits in S. Russia is given by a surprising abundance of light and heavy minerals of relatively unstable minerals, e g the easily weathering feldspars (15 to 20% in light fractions), mica, chalcedony, glauconite, calcite, diatomaceous earth, besides quartz. In the heavy fractions are ilmenite, less magnetite, leucoxene, Fe_2O_3 hydrates, epidote, zoisite, clinozoisite, further particularly characteristic green and basaltic hornblende, but rare actinolite and tremolite. Epidote and amphibole minerals occur in larger amts. in the north-south direction of the deposition in the loess, but quartz, garnet, kyanite, staurolite, and sillimanite decrease. Below the loess occur red-colored clayish rocks, which differ from the loess especially by their low contents of feldspar; epidote, amphibole, and pyroxenes are absent, whereas zircon, rutile, kyanite, and staurolite are distinctly enriched. Between the loess loams and these red rocks are brownish transitional horizons which combine the characteristics of both. The older (Upper-Tertiary and Palaeogenic) sediments also do not contain amphiboles and garnet, but some feldspar. All these sediments are typically terrigenous (continental), but analogous loesslike rocks occur in the basin of the Caspian Sea, of Old-Tertiary origin, and in beds of 100 m. thickness. They are pelitic or psammitic, and siallitic in chem. character. The quartz-feldspar content may be 15 to 20%, and chalcedony and micas are also abundant. In their heavy fractions, epidote and amphiboles a characteristic, but black, basaltic hornblende is absent. The partial or complete disappearance of unstable minerals by weathering and mech. decay is observed in the alluvions. There is a close analogy of these marine layers, especially in the varieties of the Baku and Khazaura region with true loess. W Eitel

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OREKHOV, S.Ya.

OREKHOV, S.Ya.; SEDLETSKIY, I.D.

Colloid-dispersion minerals of Quaternary clay deposits in the lower Volga region. Dokl.AN SSSR 96 no.1:181-184 My '54. (MLRA 7:5)

1. Rostovskiy gosudarstvennyy universitet im. V.M.Molotova. Predstavleno akademikom D.S.Belyankinym. (Volga Valley--Clay) (Clay--Volga Valley)

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, S.Ya.; SHAMRAY, I.A.

Tertiary phosphorites of the eastern Donets Basin and their petrographic characteristics. Dokl. AN SSSR 106 no.3:529-532 Ja '56.
(MLRA 9:6)
1.Rostovskiy na Donu gosudarstvennyy universitet imeni V.M.Molotova.
Predstavleno akademikom N.M.Strakhovym.
(Donets Basin--Apatite)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, S. Y. a.

AUTHOR SHAMRAY, I.A., OREKHOV S.Ya. 20-1-48/64

TITLE The Monolithicly Plastical Phosphorite Ores at the Periphery of the South-Eastern Donets Basin: the Deposit Near Nesvetayev.
('Plastovo-monolitnyye fosforitovyye rudy na periferii yugovostochnogo Donbassa (Nesvetayevskoye mestorozhdeniye) - Russian)

PERIODICAL Doklady Akademii Nauk SSSR, 1957, Vol 114, Nr 1, pp 176 -179 (U.S.S.R.)

ABSTRACT During the course of recent geological investigations in the above area, the monolithicly plastical type of the phosphorite ore was found. Examination of the ore led to the important conclusion that this kind of ore is of relatively high quality. Further explorations of the area have already been decided. It is assumed that there exist in the southeastern Donets Bassin many more such deposits - not only in area of Nesvetayev.
(1 Drawing, 1 chart, references: G.I.Bushinski, Izv.An.SSR, ser.geol.Nr 1, 1954 B.T.Vasiliev, Izv. Donsk.PolitekhnInst. 4, 3, 1915, S.Y.Orekhov, DAN 106, Nr 3, 1956).

ASSOCIATION Not Given.
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ORLKHOV, S.Ya.; DZHUMAYLO, V.I.; KOKHANOVSKIY, P.P.; GRISHINA, Ye.A.

Mineralogical features of Quaternary sediments in the lower Kama and Vyatka Valleys. Uch. zap. RGU 44:75-84 '59. (MIRA 14:1)
(Kama Valley—Sediments (Geology))
(Vyatka Valley--Sediments (Geology))

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

SHAMRAY, I.A.; ORLEKHOV, S.Ya.

New phosphate occurrences in the Cretaceous and lower-Paleogene sediments in the Belaia Basin of the Northern Caucasus. Uch. zap. RGU 44:165-170 '59. (MIRA 14:1)
(Belaya Valley (Northern Caucasus)--Phosphates)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

BLINOV, Yu.I.; OREKHOV, S.Ya.; SHAMRAY, I.A.

Garnet placer in Tuapse. Priroda 50 no.8:108-109 Ag '61. (MIRA 14:7)

1. Rostovskiy-na-Donu gosudarstvennyy universitet.
(Tuapse region--Garnet)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, V.A.

Stratigraphy of Aptian and Albian deposits of the Gyaursdag. Izv. AN Turk. SSR. Ser. fiz.- tekh., khim. i geol. nauk no.1:78-84 '65. (MIRA 18:7)

1. TSentral'naya kompleksnaya tematicheskaya ekspeditsiya Upravleniya geologii i okhrany nedr pri Sovete Ministrov Turkmenskoy SSR.

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, V.G.; PYSTOGOV, V.I.; DADIANI, M.K.

Investigating the effect of incision joints on the stressed state of high arched dams. Soob. AN Gruz. SSR 39 no.1:123-128 Jl '65. (MIRA 18:10)

1. Institut stroitel'noy mekhaniki i seysmostoykosti AN GruzSSR. Submitted January 19, 1965.

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

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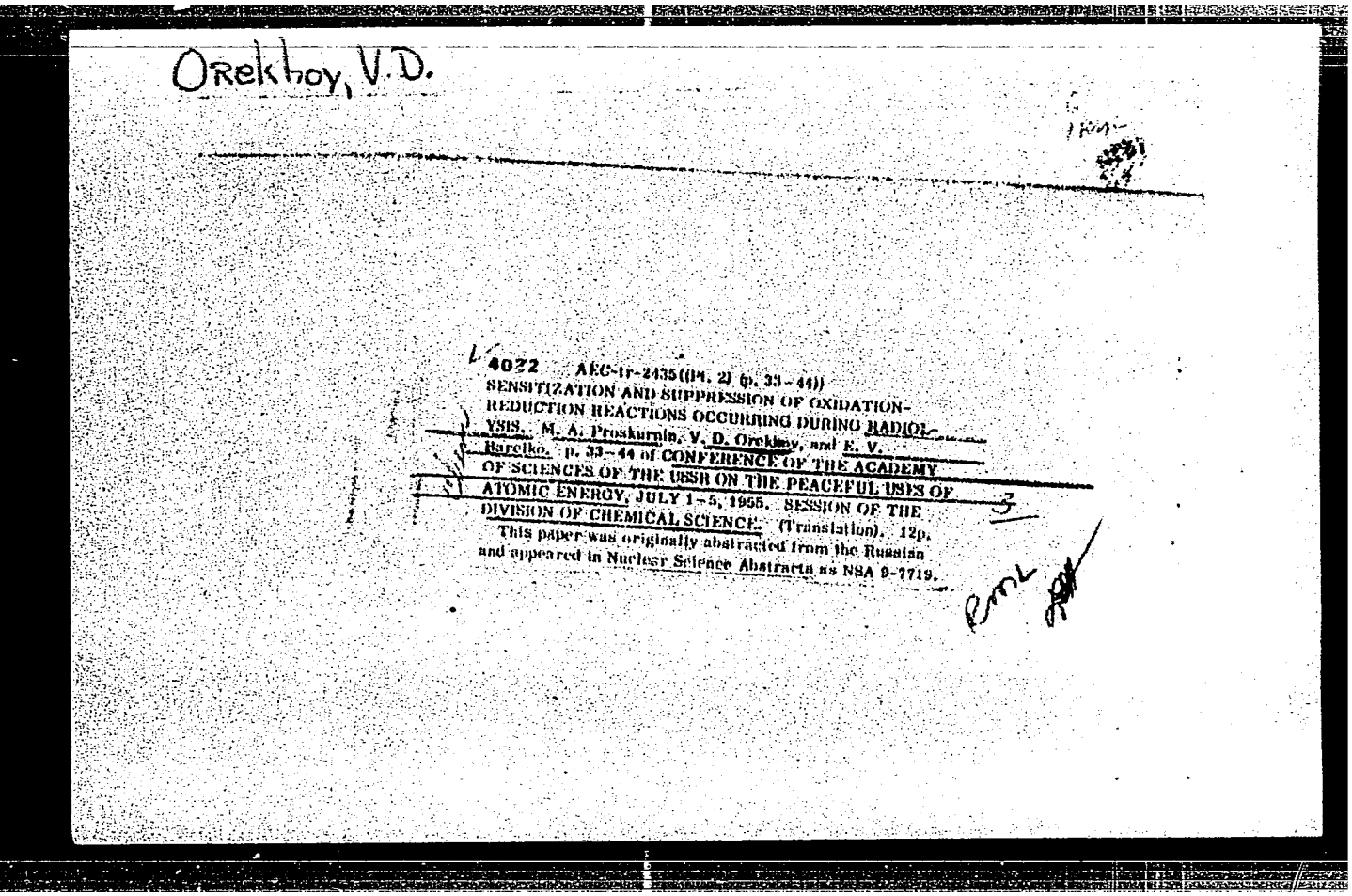

Orekhov, V.D.

4022 AEC-tr-2435(Pt. 2) (p. 33-44)
SENSITIZATION AND SUPPRESSION OF OXIDATION-REDUCTION REACTIONS OCCURRING DURING RADIOLYSIS. M. A. Proskurnin, V. D. Orekhov, and E. V. Barelko. p. 33-44 of CONFERENCE OF THE ACADEMY OF SCIENCES OF THE USSR ON THE PEACEFUL USES OF ATOMIC ENERGY, JULY 1-5, 1955. SESSION OF THE DIVISION OF CHEMICAL SCIENCE. (Translation). 12p.
This paper was originally abstracted from the Russian and appeared in Nuclear Science Abstracts as NSA 9-7719.

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, V. D.

Sensitization and suppression of oxidation-reduction reactions in radiolysis. M. A. Proskurnin, V. D. Orekhov, and E. V. Barelko. *Sessiya Akad. Nauk S[illegible] mirnu Ispol'zovaniyu Atomnoi Energii* 1955, *Zasedaniya Otdel. Khim. Nauk*, 41–61 (English summary, 62–3).—A review dealing with effects of radiation on oxidation-reduction reactions is supplemented by brief reports of new work. In the reduction of nitrates at. H is relatively inefficient; the initial efficiency is about 2 mols./100 e.v. and is essentially independent of pH. Introduction of HO radical acceptors leads to a conjugated reaction of reduction of nitrate with oxidation of the addend, such as glucose, in which case the efficiency of nitrate reduction reaches 6.7 mols./100 e.v., or participation of 13.5 atoms of H. Temp. over 35° also increases the efficiency by involvement of activated H_2O mols. Sensitization of oxidation of Fe^{++} with participation of O with greater participation at greater acidity is also observed; the max. efficiency of 80 equivs./100 e.v. for this reaction was attained independently of the nature of the acid used or of O pressure. Radiation-induced loss of color in aq. solns. of methylene blue can proceed either by reduction to the leuco form with yields of 1.5 mols./200 e.v. or by irreversible oxidation with yields of 1.0 mols./100 e.v. It is generally shown that HO_2 radical cannot oxidize aromatic compds. without oxidation promoters or carriers. Oxidation of anhyd. $PhCH_2OH$ appears to be a chain reaction with a strong post-radiation effect. 39 references. G. M. K.

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Orekhov, V. D.

3 8

The oxidation reaction of bivalent iron ions in aqueous sulfuric acid solution under the influence of γ-radiation. M. A. Proskurnin, V. D. Orekhov, and A. I. Chernova. Symposium on Radiation Chem. Moscow 1955, 63-7 (Engl. translation). — See C.A. 50, 9101d. B. M. R.

Chem

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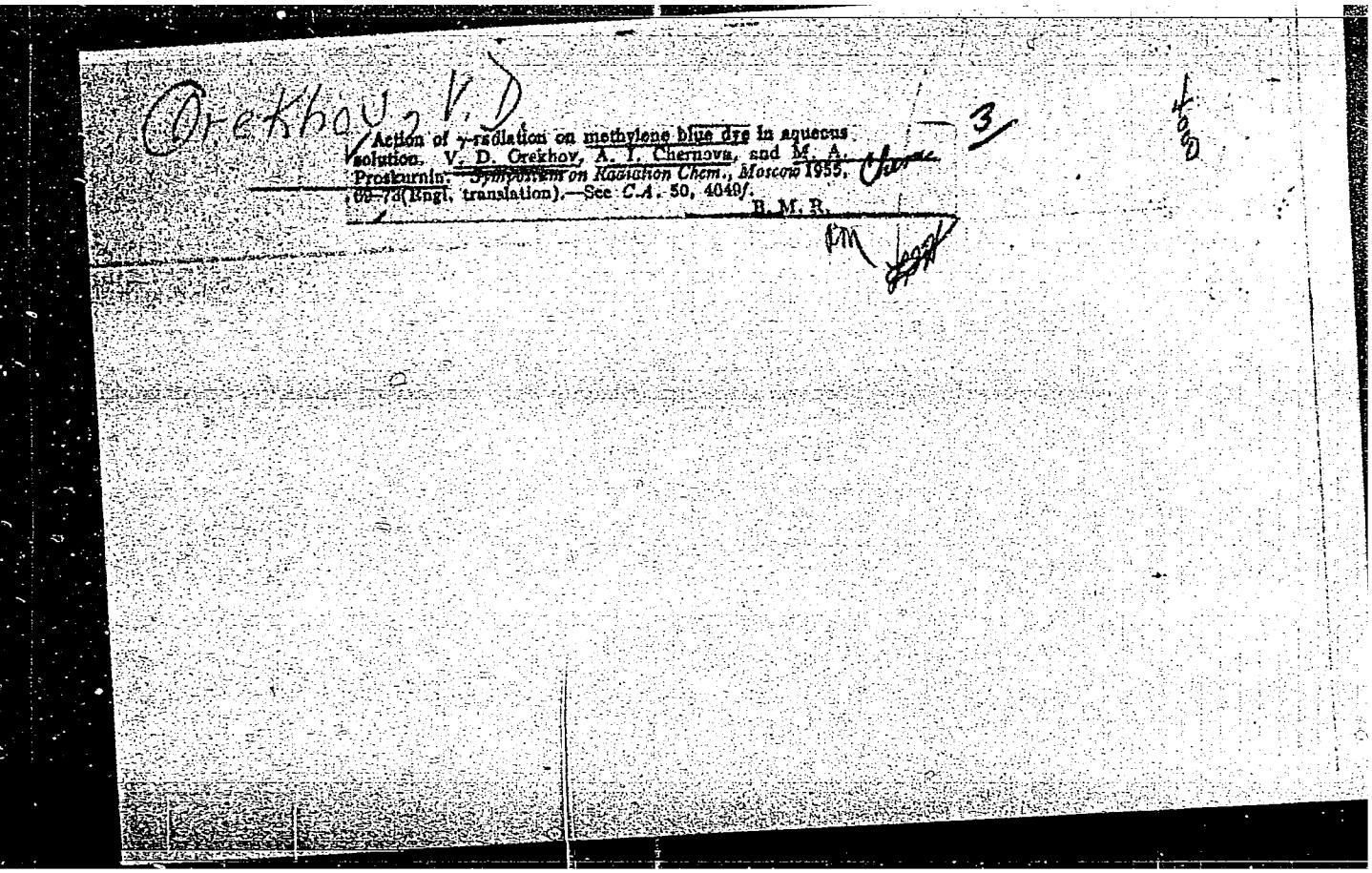

Grekhov, V. D.

Action of γ-radiation on methylene blue dye in aqueous solution. V. D. Grekhov, A. I. Chernova, and M. A. Proskurnin. *Symposium on Radiation Chem., Moscow* 1955, 68–73(Engl. translation).—See *C.A.* 50, 4049*f*.

B. M. R.

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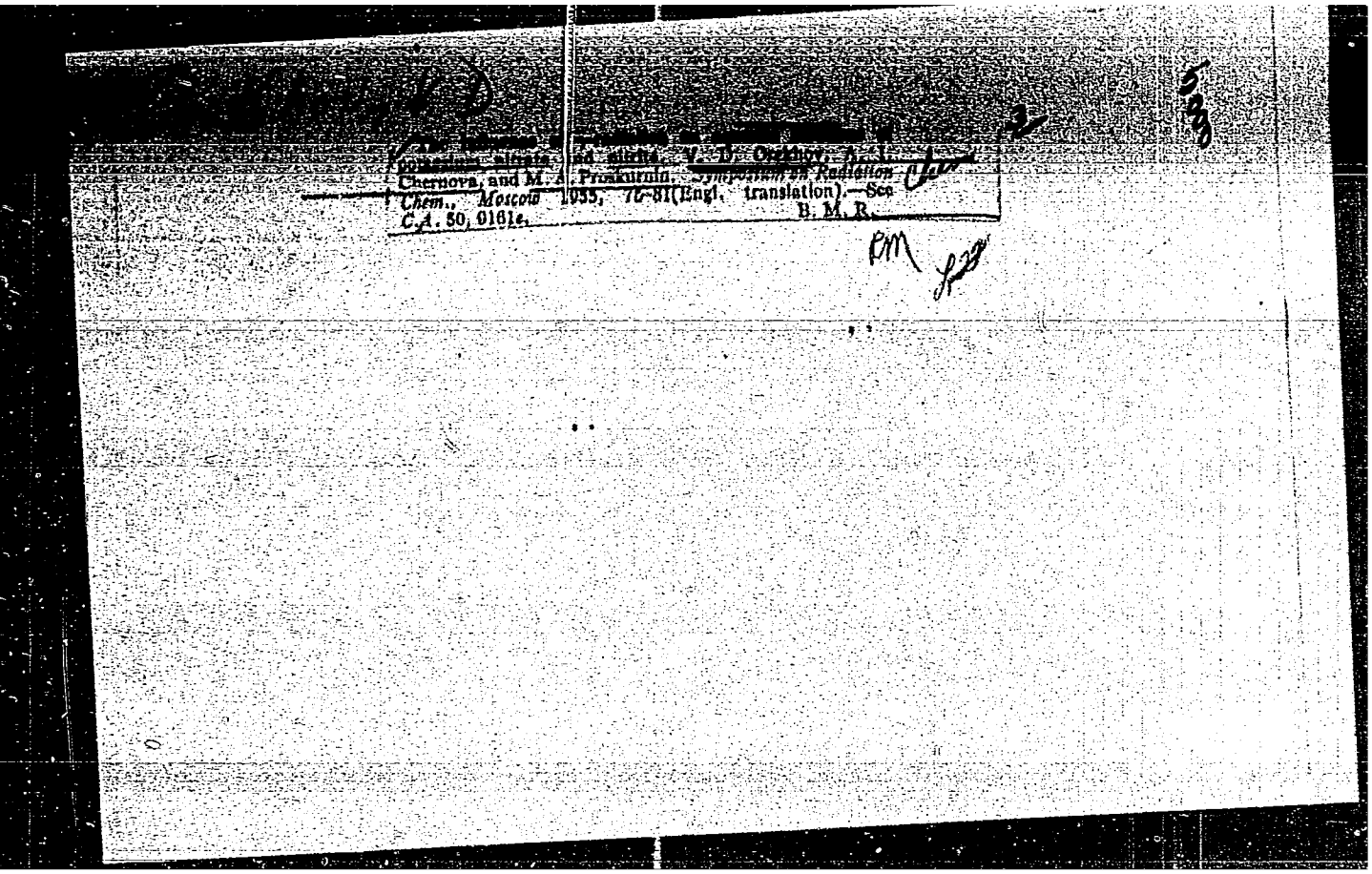
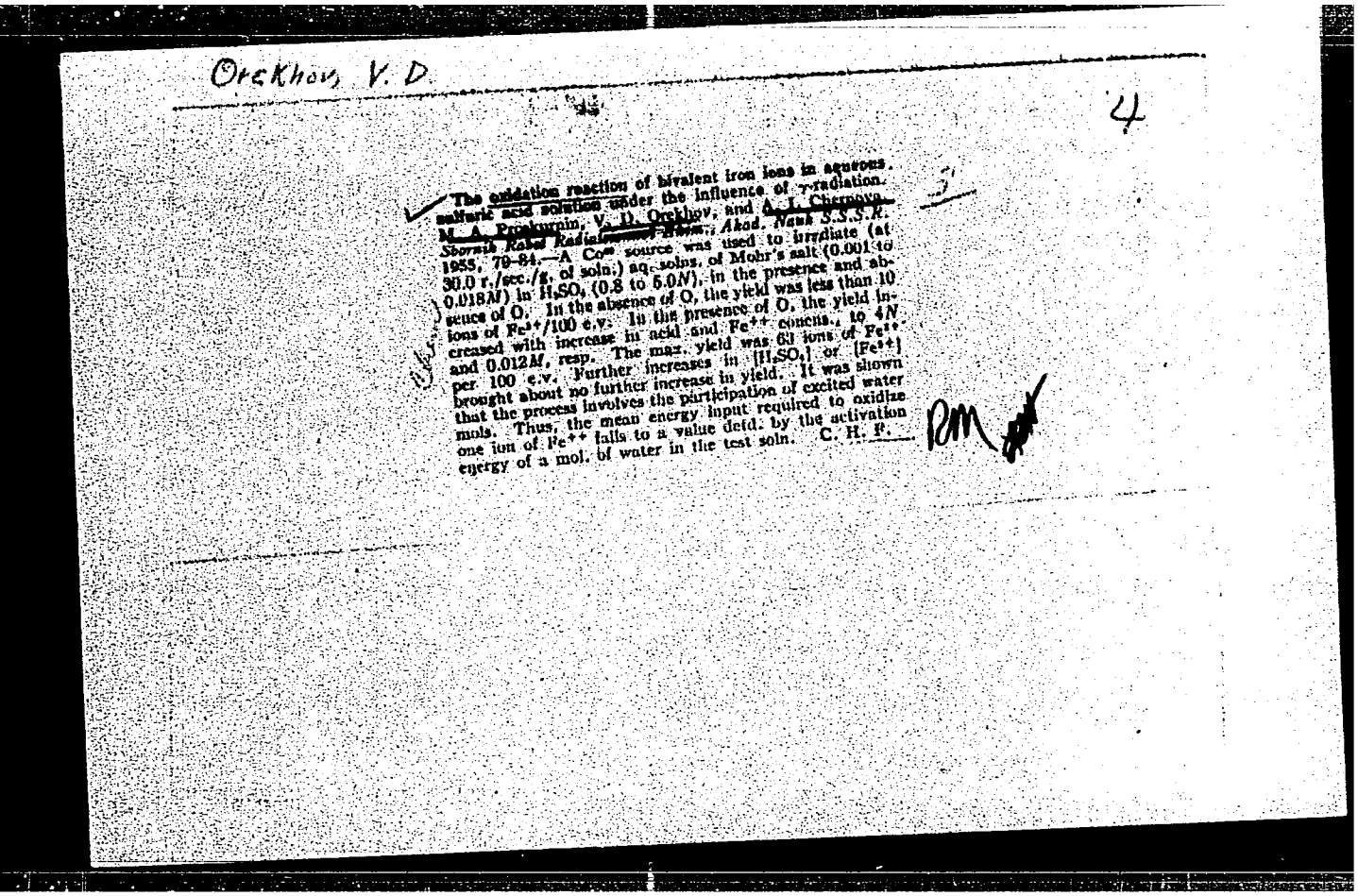


Chernova, and M. A. Prokurnin. *Symposium on Radiation Chem., Moscow* 1935, 76-81 (Engl. translation).—See C.A. 50, 9161e.

B. M. R.

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238



Orekhov, V. D.

4

The oxidation reaction of bivalent iron ions in aqueous sulfuric acid solution under the influence of γ-radiation. M. A. Proskurnin, V. D. Orekhov, and A. I. Chernova. *Sbornik Rabot Radiatsionnoi Khim., Akad. Nauk S.S.S.R.* 1955, 79–84.—A Co^{60} source was used to irradiate (at 30.0 r./sec./g. of soln.) aq. solns. of Mohr's salt (0.001 to 0.018*M*) in H_2SO_4 (0.8 to 5.0*N*), in the presence and absence of O. In the absence of O, the yield was less than 10 ions of Fe^{3+}/100 e.v. In the presence of O, the yield increased with increase in acid and Fe^{++} concns., to 4*N* and 0.012*M*, resp. The max. yield was 61 ions of Fe^{++} per 100 e.v. Further increases in $[H_2SO_4]$ or $[Fe^{++}]$ brought about no further increase in yield. It was shown that the process involves the participation of excited water mols. Thus, the mean energy input required to oxidize one ion of Fe^{++} falls to a value defd. by the activation energy of a mol. of water in the test soln. C. H. F.

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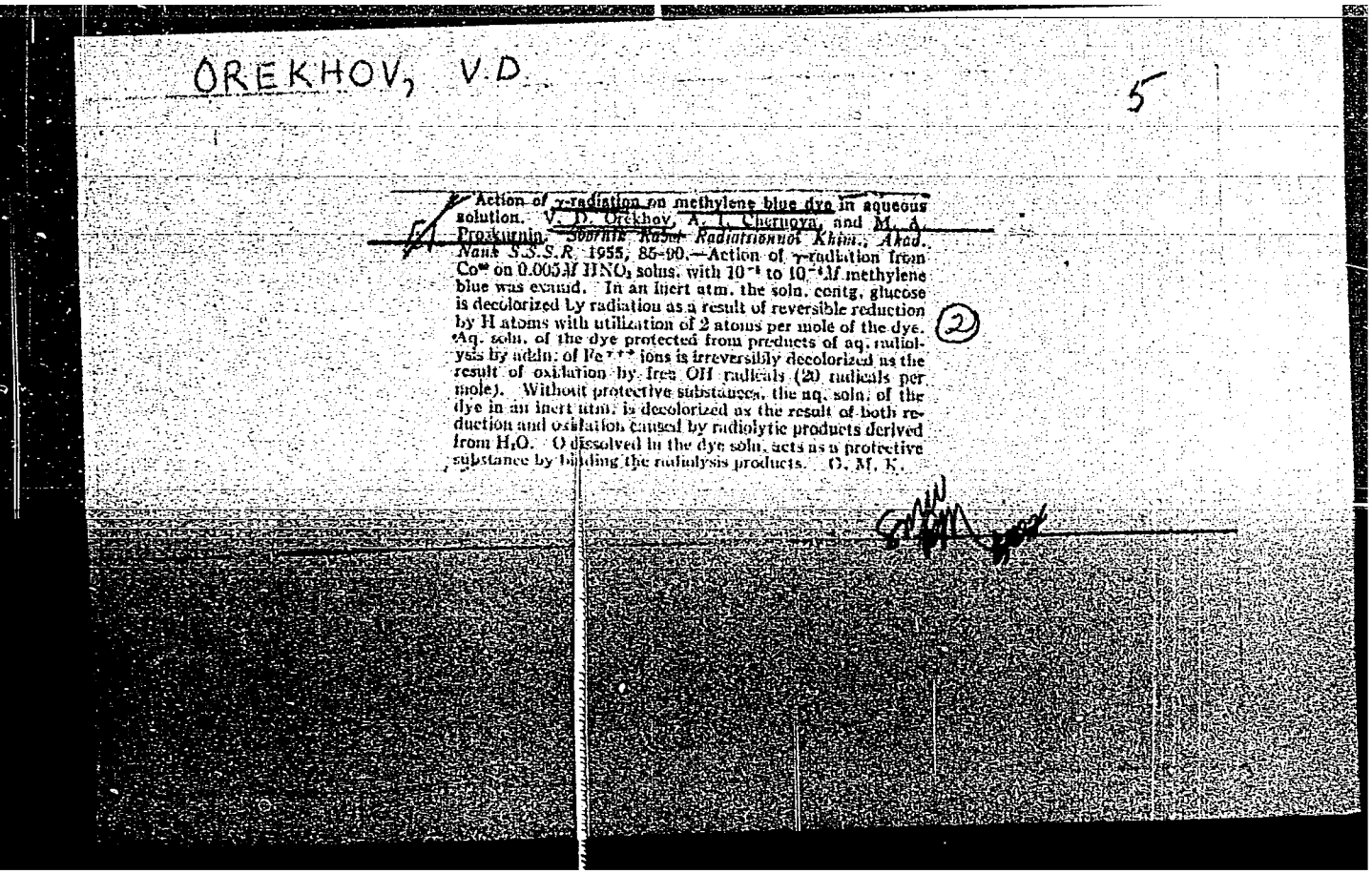

OREKHOV, V.D.

5

Action of γ-radiation on methylene blue dye in aqueous solution. V. D. Orekhov, A. I. Chernova, and M. A. Proskurnin. *Sborník Rabot Radiatsionnoi Khim., Akad. Nauk S.S.S.R.* 1955, 85-90.—Action of γ-radiation from Co^{60} on 0.005*M* HNO_3 solns. with 10^{-4} to 10^{-5}*M* methylene blue was examd. In an inert atm. the soln. contg. glucose is decolorized by radiation as a result of reversible reduction by H atoms with utilization of 2 atoms per mole of the dye. Aq. soln. of the dye protected from products of aq. radiolysis by addn. of Fe^{+++} ions is irreversibly decolorized as the result of oxidation by free OH radicals (20 radicals per mole). Without protective substances, the aq. soln. of the dye in an inert atm. is decolorized as the result of both reduction and oxidation caused by radiolytic products derived from H_2O. O dissolved in the dye soln. acts as a protective substance by binding the radiolysis products. G. M. K.

(2)

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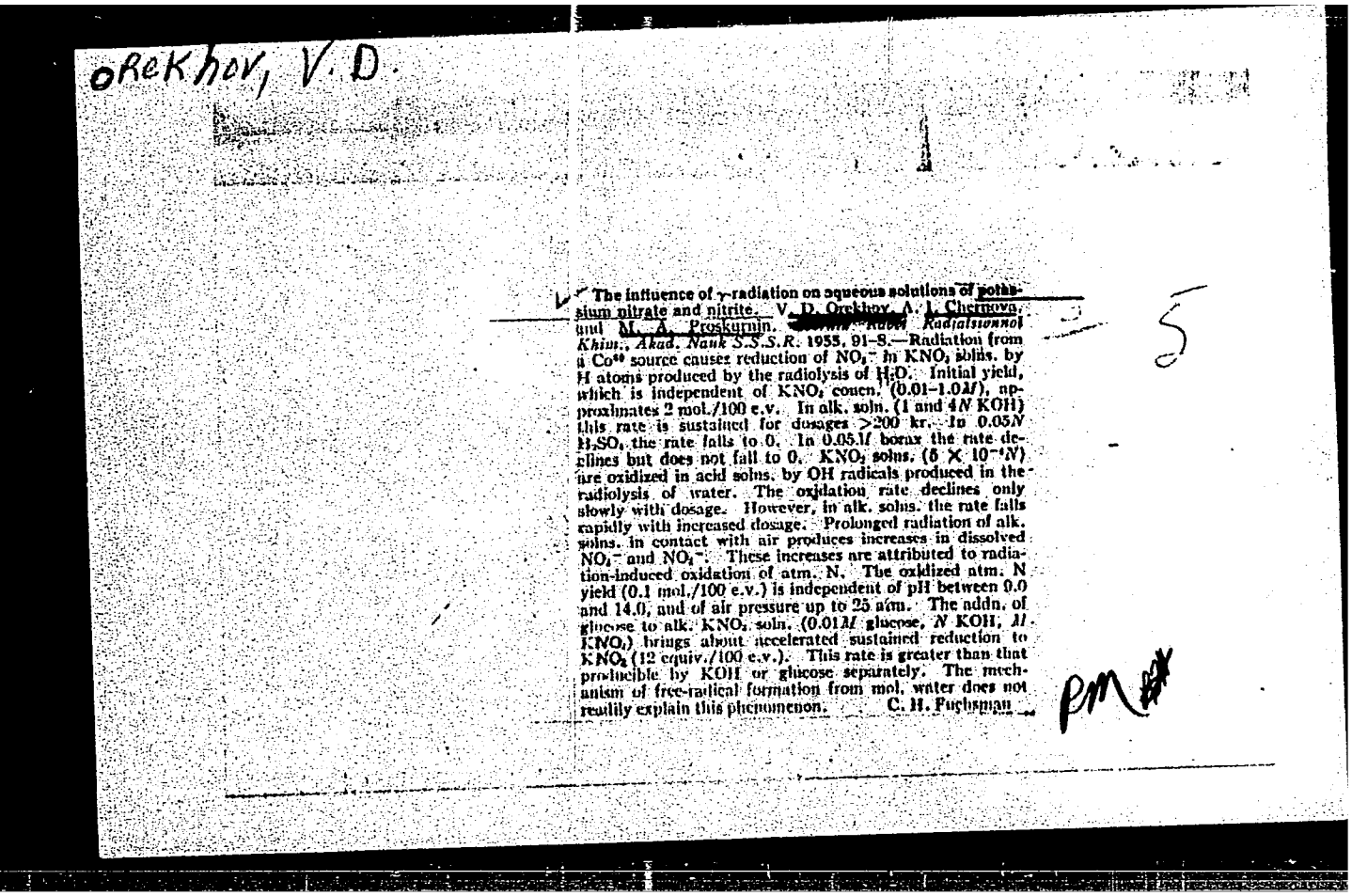
"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238



Orekhov, V. D.

The influence of γ-radiation on aqueous solutions of potassium nitrate and nitrite. V. D. Orekhov, A. I. Chernova, and M. A. Proskurnin. [illegible] *Radiatsionnoi Khim., Akad. Nauk S.S.S.R.* 1955, 91–8.—Radiation from a Co^{60} source causes reduction of NO_3^- in KNO_3 solns. by H atoms produced by the radiolysis of H_2O. Initial yield, which is independent of KNO_3 concn. (0.01–1.0*M*), approximates 2 mol./100 e.v. In alk. soln. (1 and 4*N* KOH) this rate is sustained for dosages >200 kr. In 0.05*N* H_2SO_4 the rate falls to 0. In 0.05*M* borax the rate declines but does not fall to 0. KNO_2 solns. (5×10^{-4}*N*) are oxidized in acid solns. by OH radicals produced in the radiolysis of water. The oxidation rate declines only slowly with dosage. However, in alk. solns. the rate falls rapidly with increased dosage. Prolonged radiation of alk. solns. in contact with air produces increases in dissolved NO_2^- and NO_3^-. These increases are attributed to radiation-induced oxidation of atm. N. The oxidized atm. N yield (0.1 mol./100 e.v.) is independent of pH between 0.0 and 14.0, and of air pressure up to 25 atm. The addn. of glucose to alk. KNO_2 soln. (0.01*M* glucose, *N* KOH, *M* KNO_2) brings about accelerated sustained reduction to KNO_2 (12 equiv./100 e.v.). This rate is greater than that producible by KOH or glucose separately. The mechanism of free-radical formation from mol. water does not readily explain this phenomenon. C. H. Fuchsman

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV V. D.

AID P - 3169

Subject : USSR/Chemistry

Card 1/1 Pub. 119 - 4/8

Authors : Proskurnin, M. A., V. D. Orekhov, and Ye. V. Barelko (Moscow)

Title : Induction and inhibition of oxidation-reduction reactions during radiolysis

Periodical : Usp. khim., 24, 5, 584-597, 1955

Abstract : Pure organic substances, usually not affected by radiation, undergo radiolysis when carbon tetrachloride, tetrachloroethylene or carbon tetrabromide are added. The addition of CCl_4 to styrene during polymerization results in a higher yield of the polymer due to formation of free radicals (CCl_3). On addition of glucose or glycerol to an oxygen-containing solution of methylene blue exposed to radiation, no change in the concentration (color) of the dye takes place. Eight tables, 4 diagrams, 26 references, 10 Russian (1905-1955).

Institution : None

Submitted : No date

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKhov, V.D

Conjugated radiation-chemical reactions in aqueous solutions. M. A. Proskurnin, V. D. Orekhov, and E. V. Barelko. *Doklady Akad. Nauk S.S.S.R.* 100, 651–3(1955).—The oxidation of Fe^{++} ions in the presence of Co^{III} (with an av. radiation intensity of 30 r./sec. g.) in a water soln. satd. with air was studied as a typical conjugated radiation-chem. reaction. The acidity of the soln. was 0.8*N*, the concn. of the Mohr salt 10^{-3}*M*, and the Fe^{+++} yield was close to 16 equiv./100 e.v. and was unaffected by a higher acid concn. (Hochanadel and Ghormley, *C.A.* 47, 7913d). At higher initial Mohr's salt concn., and an acidity of 4*N*, the highest Fe^{+++} yield obtained exceeded 60 ions/100 e.v., if sufficient O was present. Results of a similar order were obtained in a reaction initiated by γ-radiation in the reduction of $NaNO_3$ to $NaNO_2$ in an alk., glucose-contg. soln. Glucose acts as an acceptor of the oxidizing fraction of the radiolysis water products. The irreversible oxidation of methylene blue in an acid soln. (pH > 2) can be carried out in a 10^{-4}*M* concn. of the dye with γ-radiation, and with a reduction of 10^{-3}*M* of Fe^{+++}. The dye was oxidized by the free OH radicals with a yield of about 1.6 mole/100 e.v. of energy absorbed by the soln. W. M. Sternberg

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, V. D.

1/912

CONJUGATED REACTIONS DURING γ RADIATION ON AQUEOUS METHYLENE BLUE SOLUTIONS. A. I. Chernova, V. D. Orekhov, and M. A. Proskurnin (Karpov Moscow Inst. of Physical Chemistry). Zhur. Fiz. Khim. 30, 1343-6(1956) June. (In Russian)

Investigations are made of radiochemical reaction (γ radiation from Co^{60}) of methylene blue decolorization. Reversible reduction of the dye in the presence of 1M glucose in a N_2 atmosphere yielded 5.2 ml/100 ev. Oxidation of the dye by Fe^{3+} produced the maximum yield of 7.8 eg/100 ev. The high yield can be explained by the participation in the process of excited water molecules. The additions of Mohr salts in concentration of 1×10^{-1}M prevented the dye from decolorization in strong solutions of sulfuric acid. (tr-auth)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

PROSKURNIN, M. A., OREKHOV, V. D., BARELKO, Ye. V. and CHERNOVA, A. I.,
(Physicochemical Inst im L. Ya. Karpov)

"Sensitization of Rad. -chemical Processes in Water S[illegible]"

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, V.D.

USSR/Physical Chemistry - Radiation Chemistry, Photochemistry, Theory of Photographic Process. B-10

Abs Jour: Referat. Zhurnal Khimiya, No 2, 1958, 3908.

Author : V.D. Orekhov, A.I. Chernova, M.A. Proskurnin.
Inst :
Title : Action of Ultraviolet Radiation on Aqueous Solutions of Ferrous Oxide Salts.

Orig Pub: Zh. fiz. khimii, 1957, 31, No 3, 673-681.

Abstract: Photochemical processes in air saturated 0.01 M aqueous solutions of Fe^{2+} were studied in presence of 0.2 to 5.0 n. H_2SO_4 or HCl. A Hg-quartz high pressure tube PRK-2 served as the source of ultraviolet radiation. The dosimetry was carried out by a chemical method based on the separation of I_2 from $6 \cdot 10^{-2}$ M KI solution acidified with H_2SO_4. The rate of the Fe^{2+} concentration decrease (Δ Fe^{2+}) as the irradiation rises with the rise of the acid content in the solution and reaches its border

-1-

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APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

CHERNOVA, A. I., OREKHOV, V. D. and PROSKURIN, M. A.

"Formation and Transformation of Oxygen Compounds of Iron in the Main Cycle of Water Solutions" p.5.

Trudy Transactions of the First Conference on Radioaction Chemistry, Moscow, Izd-vo AN SSSR, 1958. 330pp.
Conference -25-30 March 1957, Moscow

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, V. D., PROSKURNIN, M. A., SHARPATYY, V. A. and ZANSOKHOVA, A. A.

"Conjugate Oxidati.-Reducti.. Reac[illegible] in the Radiolysis [illegible] Wa[illegible] 3 [illegible] p.100

Trudy Transact[illegible] the First Conference on Radiation Chemistry, Moscow. Izd-vo AN SSSR, [illegible]
Conference [illegible] Moscow

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

AUTHORS: Sharpatyy, V. A., Zansokhova, A. A., Orekhov, V. D. SOV/76-32-7-41/45

TITLE: The Action of γ-Radiation on the Aqueous Solutions of Ammonia and Sodium Nitrate (Deystviye γ-izlucheniya na vodnyye rastvory ammiaka i nitrata natriya)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol 32, Nr 7, pp 1686 - 1687 (USSR)

ABSTRACT: The investigations carried out by Rigg, Scholes and Weiss (Ref 1) showed that in an x-ray irradiation of aqueous ammonia solution saturated with oxygen an oxidation of the NH_3 takes place; no hydrazine or hydroxylamine formation was found, for which reason a direct participation of oxygen in the reaction was assumed. In the present paper this oxidation mechanism is investigated with nitrate ion and molecular oxygen having been used as acceptor and Co^{60} as γ-source. The solutions were saturated with oxygen or an inert gas, and the method of irradiation as well as the method of analysis were carried out as already described. From the experimental results obtained the authors concluded that the molecular oxygen in the solution

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does not take part directly in the oxidation of ammonia, but that it only **sensitizes** the reaction as acceptor of the H-atoms, similar to the nitrate ion. The influence exerted by the oxygen on the yield of NO_2^- observed in the case of high pH values is explained by its inhibiting effect on the reduction of the nitrate ion. The reducing component of the water radiolysis in the oxidation of ammonia in the presence of nitrate ions is represented according to the equation $9H+4,5NO_3^- = 4,5NO_2^- + 4,5H_2O$. Finally the authors thank M A. Proskurnin. There are 1 figure and 3 references, 2 of which are Soviet.

ASSOCIATION: Fiziko-khimicheskiy institut im.L.Ya.Karpova, Moskva (Moscow, Physicochemical Institute imeni L.Ya.Karpov)

SUBMITTED: December 9, 1957

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

5(4)

AUTHORS: Chernova, A. I., [illegible] Proskurnin, M. A.

TITLE: On the Primary Formation of H_2 and H_2O_2 Under the Action of γ-Rays in Aqueous Solutions of Mohr's Salt (O pervichnom obrazovanii H_2 i H_2O_2 pri deystvii γ-izlucheniya [illegible] rastvorakh soli Mora)

PERIODICAL: Zhurnal fizicheskoy khimii, [illegible]
(USSR)

ABSTRACT: In a paper by E. [illegible] Hart and [illegible] Walsh [illegible] $2H_2O \rightarrow H_2 + H_2O_2$ was mentioned as the most probable primary [illegible] among the possible formulae for the radiolysis [illegible] water forming H_2 and H_2O_2. The present paper [illegible] repetition and an extension of these experiments. The source of radiation was Co^{60} with a dosage of 70r/sec. The effect of the γ-rays on 10^{-3}m solutions of $FeSO_4$ in sulfuric acid (10^{-2} [illegible]) at an ion content of 10^{-6} to 1m Cu^{++} was

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On the "Primary" Format[illegible] Under the [illegible] Action of γ-Rays on A[illegible] Solutions of [illegible] Salt

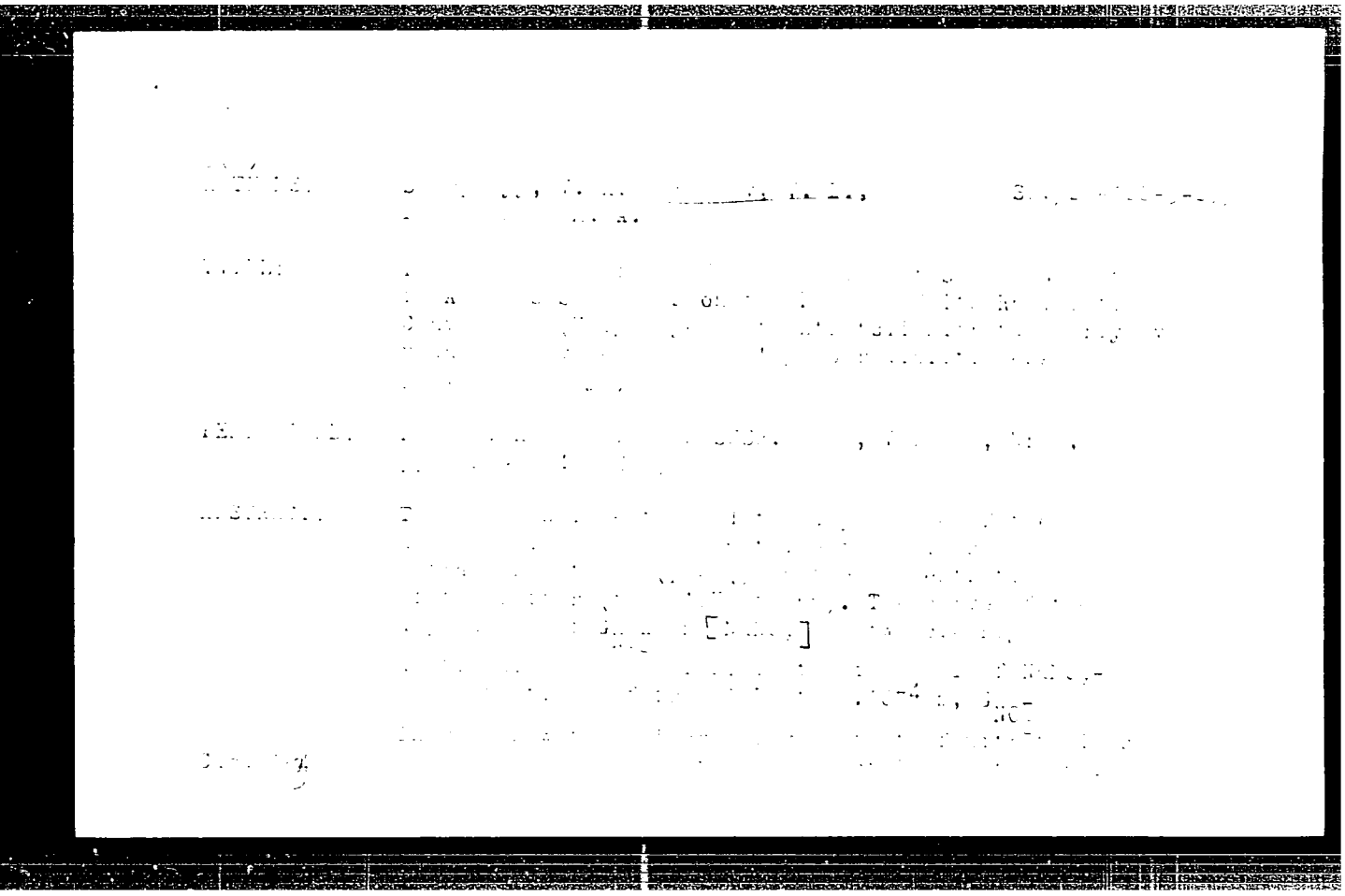
investigated. The Fe^{+++}-ion [illegible] and [illegible] hydrogen yields were measured. The [illegible] results may also be explained by [illegible] of the [illegible] (radicals) and cannot be [illegible] of the primary formation of H_2 and H_2O_2. There are [illegible] and [illegible], 4 of which are Soviet.

ASSOCIATION: [illegible] im. L. Ya. Karpova, [illegible] (The Moscow Institute of Physical Chemistry imeni L. Ya. Karpov Moscow)

SUBMITTED: [illegible]

Card 2/2

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238



APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

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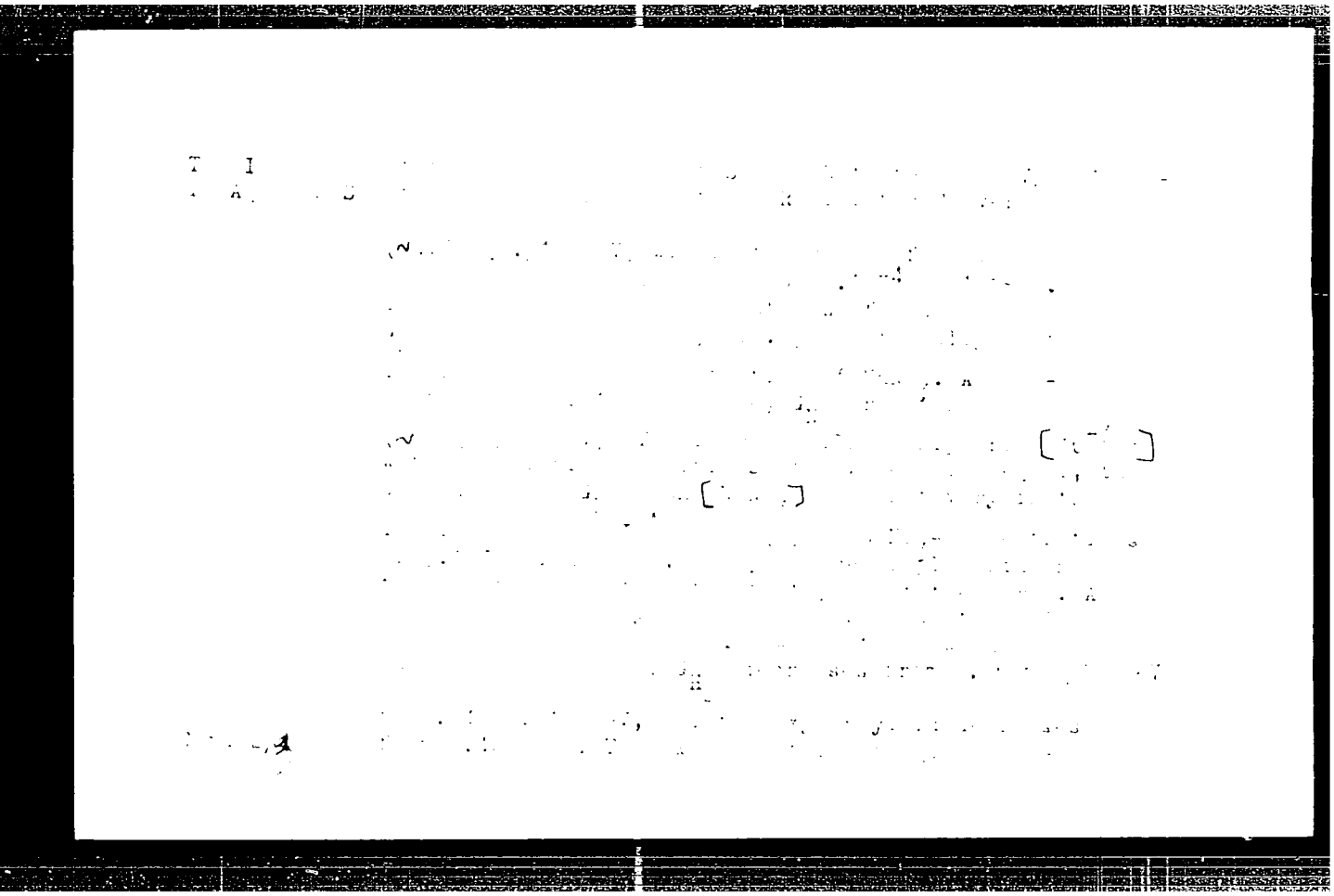

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

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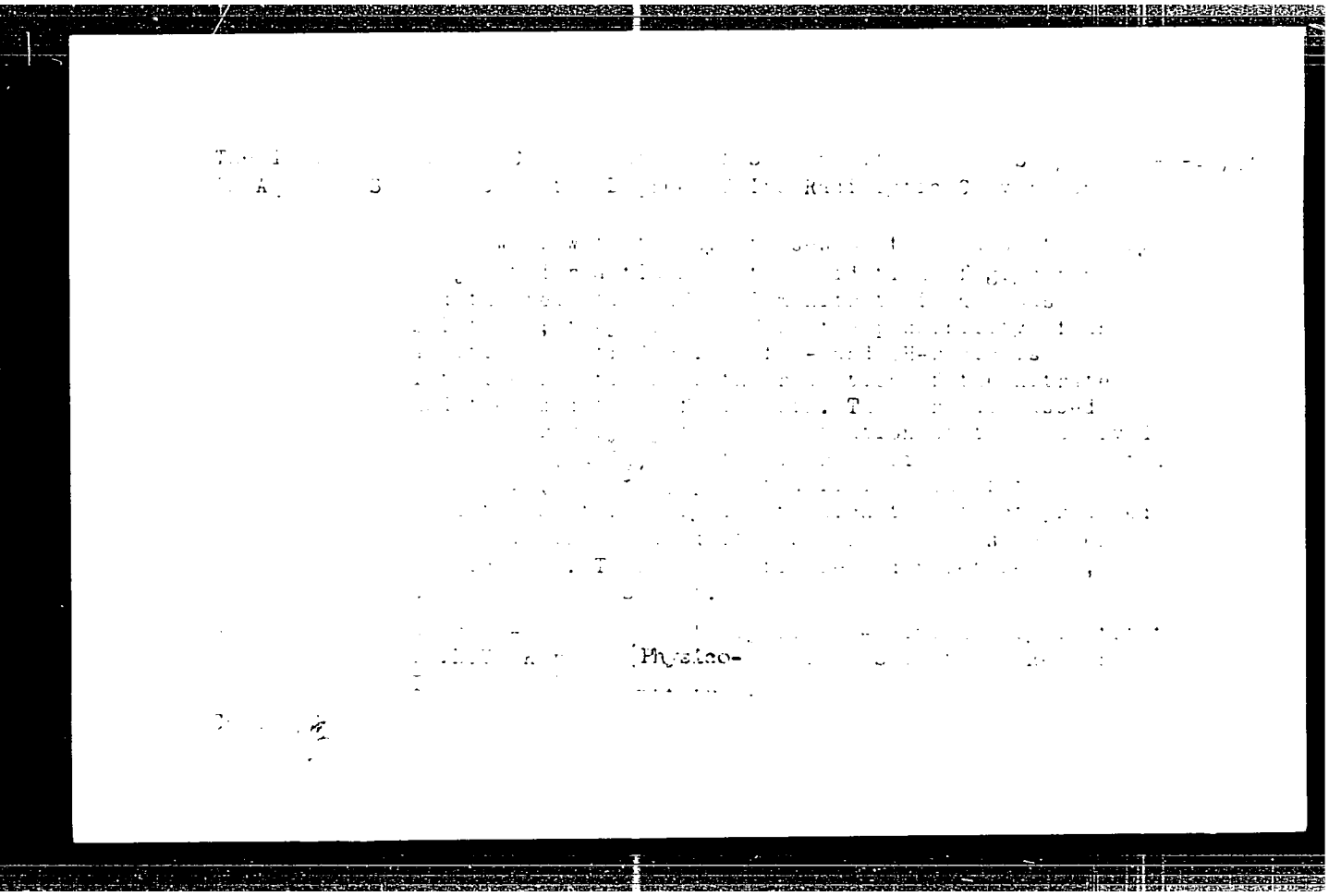

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

ORĖKHOV, V.D.

PHASE I BOOK EXPLOITATION SOV 4309

Moscow. Fiziko-khimicheskiy institut

Problemy fizicheskoy khimii, trudy, vyp. 2 (Problems in Physical Chemistry; Transactions of the Institute, no. 2) Moscow, Goskhimizdat, 1959. 202 p. 1,000 copies printed.

Editorial Board: Ya. M. Varshavskiy, Doctor of Chemical Sciences, G. S. Zhdanov, Doctor of Chemical Sciences, V. A. Kargin, Academician; Ya. M. Kolotyrkin, Doctor of Chemical Sciences (Resp. Ed.), S. S. Medvedev, Academician, S. Ya. Pshezhetskiy, Doctor of Chemical Sciences, V. M. Cheredinichenko, Candidate of Chemical Sciences, V. S. Chesalova (Editorial Secretary), Candidate of Chemical Sciences; Ed.: I. A. Kyasnikov, Tech. Ed.: Ye. G. Shpak.

PURPOSE: This collection of articles is intended for physical chemists.

COVERAGE: The collection is the second issue of the Transactions of the Scientific Research Institute of Physical Chemistry imeni L. Ya. Karpov. It contains 17 articles which review

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APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, V.D.; ZANSOKHOVA, A.A.

Sensitization of the radiolytic oxidation of leuco forms of dyes. Probl.fiz.khim. no.2:194-202 '59. (MIRA 13:7)

1. Laboratoriya radiatsionnoy khimii Nauchno-issledovatel'skogo fiziko-khimicheskogo instituta imeni L.Ya.Karpova.
(Dyes and dyeing) (Radicals(Chemistry))
(Radiation)

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

OREKHOV, V. D. and SHARPATYY, V. A.

"On the Radiolytic Reduction of Aqueous Sodium Nitrate Solutions Saturated with Hydrogen." Nukleonika, Vol. 4, No. 5, 1959. (Polska Akad Nauk)

The radiolitic reduction of the nitrate-ions in the hydrogen and nitrogen saturated aqueous solutions has been investigated over the wide range of pH (1-to 14). It has been found that under this conditions the ;nitrite yields are independent of the dissolves gas nature (N_2 or H_2). On this basis it is suggested that the reaction $H_2 + OH \rightarrow H + H_2O$, plays no marked role in the sutdied process occurence.

Fiziko khimicheskiy Institut im. L . Ya. Karpov, Moscow.

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

SOV/20-124-6-27/55

5(4)

AUTHORS: Sharpatyy, V. A., Orekhov, V. D., Proskurnin, M. A.

TITLE: On the Character and the Role of Intermediate Products in the Radiolytic Reduction of a Nitrate (O kharaktere i roli promezhutochnykh produktov pri radiolitičeskom vosstanovlenii nitrata)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 6, pp 1279 - 1281 (USSR)

ABSTRACT: The authors investigated the dependence of the nitrite yield on the dose rate in a 1 m solution of nitrite and in a 1 m solution of NaOH in the case of dose rates of 1000 r/sec. In air-saturated solutions the nitrite yield remains constant within the entire interval of dose rates; it amounts to ~ 3 equivalents/100 ev. In the case of lacking oxygen (the solution is saturated with nitrogen), the nitrite yield within the range of dose rates of 0.5 - 1000 r/sec is considerably greater (~ 8 equivalents/100 ev). With an oxygen content of 2.5% in an oxygen-nitrogen mixture above the solution, G_{NO_2} is directly proportional to the logarithm of the dose rate. These results are an indirect confirmation of the hypothesis on the congruence

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of the disproportionation of the ion of nitric acid and its oxidation to a nitrate-ion by oxygen. For the purpose of explaining the influence exercised by intermediate products on the reduction of nitrate several experiments were carried out concerning the irradiation of solutions at different temperatures. A temperature variation (within the temperature interval of 20 - 90°) apparently exercises only little influence on the formation of the final products NO_3^- and NO_2^- according to the disproportionation reactions (G_{NO_2} = 8-8.5 equivalents/100ev).

Irradiation of the solutions at low temperatures (down to -25°) reduces G_{NO_2} to ~ 2.5 equivalents/100 ev. In the case of a further reduction of the temperature of the solution down to the temperature of liquid nitrogen G_{NO_2} remains practically constant. In oxygenous solutions (which are saturated with air) decrease of the yield begins at high temperatures and is also due to the interaction between O_2 and the intermediate products of the reduction of the nitrate. By applying paramagnetic

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

electron resonance to the system nitrate-water during irradiation with accelerated electrons it was possible to detect several radicals as intermediate products of nitrate reduction and also atomic hydrogen at temperatures of from -196 to -70°. As soon as irradiation is stopped these intermediate products vanish quickly, i.e. they vanish all the more rapidly the higher the temperature of the solidified solution becomes. From the above the following conclusions may be drawn: 1) The main processes of the reduction of nitrate in the solidified solutions occur before thawing. Besides the direct action of γ-radiation upon NO_3^- a reduction of the nitrate by radicals occurs in the solidified solutions. Finally, the authors suggest a closer investigation of the properties of the intermediate products of the system by the method of paramagnetic resonance. The authors thank the collaborators of the Institut khimicheskoy fiziki (Institute of Chemical Physics) N. Ya. Buben, A. T. Koritskiy, Yu. N. Molin, and V. N. Shamshev for carrying out several experiments. There are 2 figures and 6 references, 5 of which are Soviet.

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

On the Character and the Role of Intermediate Products in the Radiolytic Reduction of a Nitrate

SOV/20-124-6-27/55

ASSOCIATION: Nauchno-issledovatel'skiy fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-chemical Scientific Research Institute imeni L. Ya. Karpov)

PRESENTED: November 11, 1958 by S. S. Medvedev, Academician

SUBMITTED: November 11, 1958

Card 4/4

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

5 (4)

AUTHORS: Zansokhov, . A., Drekhov, V. D., Proskurnin, A. A. SOV/...

TITLE: On the Rôle of Oxygen in the Radiolytic Bleaching of Aqueous Solutions of Indigo Carmine (O roli kisloroda v radioliticheskom obestsvechivanii vodnykh rastvorov indigokarmina)

PERIODICAL: Doklady Akademii nauk SSSR, 19.., Vol ..., Nr ., pp 577-579 (USSR)

ABSTRACT: In order to explain the rôle specified in the title, the authors used the method of conjugate acceptors ... of the variation of the ... (pressure of hydrogen, ... sol... . From methodical point of view, the present paper is ... previously published papers, ... emphasize the special importance ... used. Indigo carmine was two times recrystallized from water. The irradiation of ... (2.10^{-4}...) (which do not contain oxygen ... γ-r... simultaneously causes a reversible ...

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

On the Rôle of Oxygen in the Radiolytic Bleaching
of Aqueous Solutions of Indigo Carmine

bleaching, which corresponds to
of the pigment. The absolute
yields of these two processes
power of the radiation. The
in a small range of dose powers
up to the most favorable
change of the intermediate
p-isatosulphonic acid in the case of oxid
leuco base in the case of reduction. If
increases, the recombination
products and radicals predominate and
radiolysis increases. Due to
less intense (

the oxidation of indigo carmine
by means of various admixtures, formanilid
sufficiently highly concentrated ions
protective influence on the pigment.
acceptors of the oxidizing component of
benzene, formic
of

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

On the Rôle of Oxygen [illegible] leaching [illegible]
of Aqueous Solutions of Indigo Carmine

0.1 mol/l[illegible] to 0.5 ; 1; and 1.7 mol/100 cc, respectively. The blowing of oxygen through such solutions after an irradiation restores the original coloration. The irreversible effect is very insignificant in such systems. The sensitization of the oxidation of indigo carmine is brought about by introducing acceptors of atomic hydrogen. Besides OH-radicals, also hydrogen peroxide takes part in the oxidation of indigo carmine. This hydrogen peroxide is produced according to the equation $H + O_2 \rightarrow HO_2$, $HO_2 + HO_2 \rightarrow H_2O_2 + O_2$. The authors' experiments concerning the oxidation of H_2 showed that this reaction is a slow one. The rate of the reaction decreases with the increase of pH of the solution. This fact explains also the presence of an aftereffect in solutions which contain sulphuric acid. An increase of the hydrogen pressure in the solution eliminates the dependence of the yield of the process on the dose rate. According to the results of the present paper, the chain mechanism of the radiation chemical oxidation seems to have a low probability.

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

On the Rôle of Oxygen in the Radiolytic Bleaching [illegible]
of Aqueous Solutions of Indigo Carmine

There are 2 figures and 5 references, 1 of which are Soviet.

PRESENTED: December 20, 1958, by V. A. Kargin, Academician

SUBMITTED: December 15, 1958

Card 1/1

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0012381

"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

5(4)

AUTHORS: Zansokhova, A. A., Orekhov, V. D. SOV/20-125-4-42/74

TITLE: The Sensibilized Oxidation of the Leuco Base of Methylene Blue During Radiolysis in an Aqueous Solution (Sensibilizirovannoye okisleniye leykoosnovaniya metilenovogo golubogo pri radiolize v vodnom rastvore)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 4, pp 838-840 (USSR)

ABSTRACT: The present paper investigates the conditions of the sensibilization of the oxidation of the "leuco-form" (leykoform) of the dye by carrying out conjugate redox-radiolysis reactions. This method has already been described (Refs 3,6), it makes it possible to attain a value of nearly 12 equivalents/100 ev for the yield of the reduction or oxidation of the substance by the products of water radiolysis. The object of oxidation was the "leuco-form" of the methylene-blue dye. The transition of this dye into the intermediary form (semiquinone) under the action of radiation was found by A. J. Swallow (Ref 7) for solutions of high acidity, and in aqueous solutions of medium acidity a reduction to leuco base usually occurs. The advantages offered by this dye are the high molar extinction of its

Card 1/4

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The Sensibilized Oxidation of the Leuco Base of Methylene Blue During Radiolysis in an Aqueous Solution

SOV/20-12[illegible]-4-42[illegible]

colored form and the good solubility of its leuco base. This makes it possible to attain concentrations which are sufficiently high for carrying out sensibilization. The inertness (inactivity) of the nitrate ion with respect to the leuco base is determined within the range of pH values investigated (with lacking radiation) by selection of this substance as a conjugate acceptor. In connection with the sensitivity of the solutions of the leuco base of methylene blue and of the nitrate ion to light and vestiges of oxygen, the samples to be irradiated were produced in red light in a chamber filled with nitrogen. The optical densities were measured by means of a photoelectrocalorimeter of the type FEK-M. Laboratory devices with Co^{60} with 0.1 to 30 gram equivalents radium were used as the γ-radiation source. All experiments were carried out in glass ampoules. In the case of the absence of any kind of reactive substances, the yield of the colored form of methylene blue is low. The initial value of the yield is not more than 1 molecule/ /100 ev, and with an increasing dose it rapidly decreases towards zero. The introduction of a sufficiently high concentration of sodium nitrate (2 Mol/l) into the solution produces a

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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001238

The Sensibilized Oxidation of the Leuco Base of Methylene Blue During Radiolysis in an Aqueous Solution

SOV/20-125-4-42/74

considerable sensibilizing effect. In this case the yield depends to a considerable extent on the pH-value of the solution, and it attains its maximum value of about 9 molecules/100 ev within the range of high concentrations (pH< 2.5). With increasing pH the yield of the colored form decreases sufficiently. An increase of the dose rate in pH<< 2.0-solutions reduces the yield to 5.0 molecules/100 ev. Also under these conditions an after-effect is observed. In solutions with pH> 3 the dose rate exercises no influence, nor is there any after-effect. The results obtained by the present investigation may be interpreted as follows: The low yield of the colored form in the case of irradiation of leuco base of solutions containing no sensibilized substances is due to the development of inverse reactions and to the recombination of radicals. The sensibilizing effect produced by the nitrate ions is reduced above all to the binding of hydrogen atoms with formation of less reactive products. This facilitates the conjugate oxidation process of the "leuco-form" of the dye by free hydroxyls. The authors thank M. A. Proskurnin for valuable advice and remarks. There are 3 figures and 8

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The Sensibilized Oxidation of the Leuco Base of Methylene Blue During Radiolysis in an Aqueous Solution

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references, 4 of which are Soviet.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-chemical Institute imeni L. Ya. Karpov)

PRESENTED: December 15, 1958, by A. N. Frumkin, Academician

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B149/B102

AUTHORS: Proskurnin, M. A., Orekhov, V. D., Chernova, A. I.

TITLE: Transformation of dissolved substances on radiolysis of aqueous solutions

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 2, 1962, 79, abstract 2B568 (Tr. Tashkentsk. konferentsii po mirn. ispol'zovaniyu atomn. energii, 1959. v. I. Tashkent, AN UzSSR, 1961. 339 - 347)

TEXT: The amount of Fe^{3+} reduced during radiolysis of aqueous solutions rises with increasing pH and Fe^{3+} concentration. In the presence of glycerol, the yield approaches 10 (pH 3). A significant effect on the yield is produced by addition of Na_2SO_4. Experimental data obtained from solutions of Fe^{2+} revealed a considerable dependence of $G(Fe^{3+})$ on the concentration of Fe^{2+}. The maximum yield was 10.5 M. The experimental results in both systems are explained by the involvement of radicals from excited water molecules in the radiochemical reactions; this effect is

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26.2510

AUTHORS: Proskurnin, M. A., Orekhov, V. D., and Chernyak, A. I.

TITLE: Conversion of dissolved substances in the radiolysis of aqueous solutions

PERIODICAL: Zhurnal fizicheskoy khimii, v. 35, no. 4, 1961, 920 - 925

TEXT: A study has been made of the dependence of the rates of radiation-chemical processes taking place in aqueous medium on the concentration of the dissolved substance and on the pH value of the solution. Three categories of chemically active intermediates of radiolytic decomposition of water were assumed to exist in this connection: 1) H and OH radicals arising at a large distance from one another by ionization of water molecules:

$H_2O \rightsquigarrow H_2O^+ + e^-$; $H_2O^+ + H_2O \longrightarrow H_3O^+ + OH$;

$e^- + H_2O \longrightarrow H_2O^-$; $H_2O^- + H_2O \longrightarrow OH^- \cdot aq + H$;

2) H and OH radicals formed by the dissociation of excited water molecules

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having no sufficiently high excess of kinetic energy to leave the solvent cell. These free radicals are formed together in one cell. 4) Excited water molecules with an excitation energy of about 5 ev. This excitation does not take place under the action of light, but is possible by electron impact. The radicals of the first two categories react with the same acceptors contained in the solution, which, however, in the case of radicals of the second category, should exhibit high concentrations (up to 4 M). Excited water molecules can react with stable free radicals having the ability to absorb both components (H and OH) of the excited molecule, or with two different substances dissolved in water, one of which absorbs H radicals, and OH radicals the other. Each of these three categories arises with the radiolysis of water in a yield of about 4 pairs of free radicals per 100 ev of the energy absorbed by the solution. Thus, the total radiochemical yield of the decomposition of liquid water amounts to 12 molecules per 100 ev, which fits the results obtained from the radiolysis of water vapor. The readiest to react are the radicals of the first category with a dissolved substance. The authors proceeded from the assumption of the probability of such a reaction of a free radical being proportional to the

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concentrations of reacting particles and the reaction cross section to derive the following equation for yield G of the reaction products as a function of the acceptor concentration in the solution:

$$G = G_H \sum' \eta c_{ac} \sigma_{ac+H} / c_{ac} \sigma_{ac+H} + c_{OH} \sigma_{OH+H} + c_H \sigma_{H+H} \quad (1)$$

(c_{ac}, c_H, c_{OH} denoting the mean concentrations of the acceptor and of radicals H and OH; G_H the yield of radicals H or OH; σ the reaction cross section; η the part of all radicals, that reacts at the given mean concentration). The equation was derived by using a simplified diffusion model of the path of the ionizing particle, with the aid of which the mean concentrations of the radicals in the path were calculated. The calculation revealed that the first quarter of all resulting free radicals reacts at a mean concentration $c_1 = 1.5 \cdot 10^{-5}$ M, the second quarter at $c_2 = 3 \cdot 10^{-6}$ M, the third quarter at $c_3 = 3 \cdot 10^{-7}$ M, and the rest at $c_4 = 6 \cdot 10^{-8}$ M. The summation sign in Eq. (1) unites four terms which correspond to the four mean concentrations of the free radicals. η has, therefore, the value 0.25 in this example. Eq.(1)

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served as a basis for drawing the theoretical curves of the yield of radiation-chemical conversions as a function of the acceptor concentration in the solution. It was assumed in this connection that radicals of the first category and 30% of the second category take part in the reaction, and a distant effect was excluded. These curves are presented in Fig. 1. The experimental data obtained by the authors in the study of several radiation-chemical processes fitted these curves well (radiation-chemical reduction of nitrates in alkaline aqueous solutions; reduction of Fe^{3+} by radiolytically prepared H atoms). Several examples show that the free radicals arising in the radiolysis of water do not exist in free form, but immediately form complex compounds with the substances that are present in the solution (in electrolyte solutions, e.g., with anions and cations). These complex compounds have different degrees of stability and are destroyed when meeting more efficient acceptors for the free radicals. There are 5 figures and 15 references: 6 Soviet-bloc and 9 non-Soviet-bloc. The three most recent references to English language publications read as follows: R. F. Firestone, J. Amer. Chem. Soc., 79, 5993, 1957; R. F. Noyes, J. Amer. Chem. Soc., 77, 2042, 1959; F. S. Dainton, Trans. Faraday

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Soc., 53, 333, 1957.

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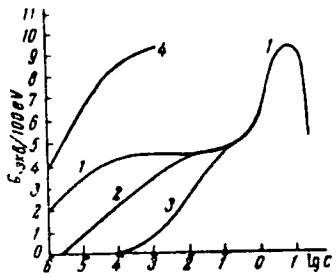
Fig. 1



Legend to Fig. 1: Ordinates - G, equiv./100 ev; 1 - most efficient acceptor, G_{ac+H}, G_{H+OH}, and G_{H+H} are of the same order of magnitude; 2 - less efficient acceptor, G_{ac+H} amounts to 0.01 of G_{H+OH} or G_{H+H}; 3 - effect of a competing acceptor; 4 - effect of an acceptor that transforms the radicals.

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