

USSR

UDC 543.545+546.719+546.881+546.77+546.78

GAYBAYAN, D. S., and SAGRADYAN, S. I., Yerevan State University, Yerevan

"Electrochromatography of Rare Elements. II. Separation of Rhenium (VII), Molybdenum (VI), Vanadium (V), and Tungsten (VI) in a Sulfuric Acid Solution on a Layer of Aluminum Oxide"

Yerevan, Armyanskiy Khimicheskiy Zhurnal, Vol 24, No 8, 1971, pp 668-672

Abstract: By applying electrochromatography on a thin layer of  $Al_2O_3$ , the separation and detection of microgram amounts of Re, Mo, V, and W were studied, using  $H_2SO_4$  solutions as an electrolyte. The optimum conditions for the quantitative separation of these elements in the form of  $ReO_4^-$ ,  $MoO_4^{2-}$ ,  $VO_3^-$ , and  $WO_4^{2-}$  were a potential of 400 V applied for 30 min, a current strength of 1-3 mA, and 0.1 mm thickness of the  $Al_2O_3$  layer, and an  $H_2SO_4$  concentration of 0.1 N. The electrochromatogram was developed by sprinkling with a 35%  $SnCl_2$  solution in HCl and then a 50% aqueous solution of K or Na thiocyanate, whereupon the spots corresponding to  $ReO_4^-$ ,  $MoO_4^{2-}$ ,  $VO_3^-$ , and  $WO_4^{2-}$  were colored orange, violet, yellow and yellow-green, respectively. The mobility toward the

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GAYBAKYAN, D. S., and SAGRADYAN, S. I., *Armyanskiy Khimicheskiy Zhurnal*,  
Vol 24, No 8, 1971, pp 668-672

anode decreased in the order  $Re > Mo > W > V$ , with V remaining at the start. The area of the Mo spot was proportional to the concentration of this element in the solution, so that a quantitative determination of Mo could be carried out on this basis. At  $H_2SO_4$  concentrations in the 0.05-0.5 N range, formation of two Mo spots was observed, one of which corresponded to  $MoO_2SO_4$  and remained at the start while the other corresponded to  $MoO_2(SO_4)_2$  and moved to the anode.

2/2

1/2 007

UNCLASSIFIED

PROCESSING DATE--23OCT70

TITLE--DETERMINATION OF THE COMPARATIVE STABILITY OF CITRATE, OXALATE, AND TARTRATE COMPLEXES OF VANADIUM BY AN ION EXCHANGE METHOD -U-  
AUTHOR--(02)-GAYBAKYAN, D.S., TERMENDZYAN, Z.Z.

G

COUNTRY OF INFO--USSR

SOURCE--ARM. KHIM. ZH. 1970, 23(1), 22-6

DATE PUBLISHED-----70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--VANADIUM COMPLEX, CITRIC ACID, OXALATE, TARTARIC ACID, ION EXCHANGE RESIN/(U)KUZ ION EXCHANGE RESIN

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAE--1995/1455

STEP NO--UR/0426/70/023/001/0022/0026

CIRC ACCESSION NO--AP0116892

UNCLASSIFIED

2/2 007

CIRC ACCESSION NO--AP0116892

UNCLASSIFIED

PROCESSING DATE--23OCT70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. OVER 90PERCENT OF THE V, PRESENT IN THE AMT. OF 1 MG-25 ML OF 0.0001-0.005N HCL WAS ADSORBED BY STRONGLY ACID CATIONIC ION EXCHANGER KU-2 IN THE H FORM. OVER 70PERCENT OF THE V BOUND WITH LIGANDS IN 0.001M SOLNS. OF OXALIC, CITRIC, AND TARTARIC ACIDS WAS ADSORBED BY KU-2 UNDER STATIC CONDITIONS. OXALIC ACID SOLNS. (0.01M) CAN ELUTE 80.4PERCENT OF THE V ADSORBED ON KU-2, WHILE CITRIC AND TARTARIC ACIDS OF THE SAME CONC. WERE INEFFECTIVE ELUENTS. FACILITY: EREVAN. GOS. UNIV., EREVAN, USSR.

UNCLASSIFIED

1/2 026

TITLE--THIN LAYER CHROMATOGRAPHY OF RARE ELEMENTS. VII. IDENTIFICATION AND SEPARATION OF RHENIUM,VII, MOLYBDENUM,VI, ANADIUM,V, AND TUNGSTEN,VI IN  
AUTHOR--GAYBAKYAN, D.S.

UNCLASSIFIED  
PROCESSING DATE--04DEC70

COUNTRY OF INFO--USSR

SOURCE--ARM. KHIM. ZH. 1970, 23(1), 93-4

DATE PUBLISHED-----70

SUBJECT AREAS--CHEMISTRY, MATERIALS

TOPIC TAGS--RARE EARTH METAL, THIN LAYER CHROMATOGRAPHY, RHENIUM, MOLYBDENUM, VANADIUM, TUNGSTEN, AMMONIA, ALCOHOL, KETONE, QUANTITATIVE ANALYSIS

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAME--3003/1373

STEP NO--UR/0426/70/023/001/0093/0094

CIRC ACCESSION NO--AP0130331

UNCLASSIFIED

2/2 026

CIRC ACCESSION NO--AP0130331  
ABSTRACT/EXTRACT--(U) GP-0-

UNCLASSIFIED

PROCESSING DATE--04DEC70

ABSTRACT. R SUBF VALUES OF RE(VII) IN MEOH, ETOH, AND PROH WERE 0.26, 0.28, AND 0.08, RESP. THE VALUES WERE INCREASED BY THE ADDN. OF NH SUB4 OH. FOR THE DEVELOPMENT OF MO(VI) A 25PERCENT SOLN. OF NH SUB4 OH IN THE ALC. WAS NECESSARY, WITH V(V) AND W(VI) REMAINING AT THE ORIGIN. ADDING NH SUB4 OH TO ME SUB2 CO SIGNIFICANTLY INCREASES THE R SUBF OF RE(VII). IN ME SUB2 CONH SUB4 OH (1:1), MO(VI) STARTS TO DEVELOP. FOR THE QUANT. DETN. OF 0.2-4 MU G RE(VII), BUOH-MEOH-NH SUB4 OH (3:1:1) OR PROH-NH SUB4 OH (3:1) WAS USED. FACILITY: EREVAN. GOS. UNIV., EREVAN, USSR.

UNCLASSIFIED

1/2 024

UNCLASSIFIED

PROCESSING DATE--04DEC70

TITLE--THIN LAYER CHROMATOGRAPHY OF RARE ELEMENTS. VI. IDENTIFICATION AND SEPARATION OF RHENIUM,VII, MOLYBDENUM,VI, VANADIUM,V, AND TUNGSTEN,VI IN

AUTHOR--GAYBAKYAN, D.S.

COUNTRY OF INFO--USSR

SOURCE--ARM. KHIM. ZH. 1970, 23(1), 91-2

DATE PUBLISHED-----70

SUBJECT AREAS--CHEMISTRY, MATERIALS

TOPIC TAGS--THIN LAYER CHROMATOGRAPHY, CHEMICAL ANALYSIS, RHENIUM, MOLYBDENUM, VANADIUM, TUNGSTEN, ALCOHOL, KETONE, QUANTITATIVE ANALYSIS, CHEMICAL SEPARATION, RARE EARTH METAL

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAE--3003/1374

STEP NO--UR/0426/70/023/001/0091/0092

CIRC ACCESSION NO--AP0130332

UNCLASSIFIED

2/2 024

CIRC ACCESSION NO--AP0130332

UNCLASSIFIED

PROCESSING DATE--04DEC70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. RE(VII), MO(VI), V(V), AND W(VI) ADSORBED ON AL SUB2 O SUB3 CAN BE SEPD. BY USING VARIOUS ME SUB3 CO-H SUB2 O MIXTS. AS DEVELOPING AGENTS. IF ME SUB2 CO ONLY IS USED, ONLY RE(VII) IS DEVELOPED (R SUBF EQUALS 0.25). IN ME SUB2 CO-H SUB2 O (1:3), MO(VI) STARTS TO DEVELOP WHILE V(V) AND W(VI) REMAIN AT THE ORIGIN. ADDING HOAC TO ME SUB2 CO GREATLY INCREASES THE R SUBF VALUES OF ALL 4 IONS, WHILE THE PRESENCE OF HCL INCREASES THE R SUBF VALUES OF RE(VII), MO(VI), AND V(V). FOR THE QUANT. DETN. OF 0.2-4 MU G OF CO-NH SUB4 OH (9:8:3) DEVELOPING PHASE IS RECOMMENDED. FACILITY: EREVAN. GOS. UNIV., EREVAN, USSR.

UNCLASSIFIED



GAYDADYMOV, V. B.

CFR 8 58684  
12/19/72

UDC 612.461.21+629.78.048:628.312.2:547.495.2:563  
DETERMINING UREA IN WATER-BEARING WASTES USING N-DIMETHYLAMINOENZALDEHYDE  
(Article by V. A. Uspenskaya and V. B. Gaydadymov; Moscow, Kosmicheskaya Biologiya i Meditsina, Russian, Vol. 6, No. 4, pp. 86-88, 1972, submitted for publication 27 January 1971)

Analysis of urine components is becoming particularly timely in relation to the development of systems for regenerating drinking water from the products excreted in the urine. As is well known, among the metabolic body wastes (lithium, uric acid, urea), whose content in the end product of protein metabolism commonly accepted methods for a quantitative determination of urea in the urine are the urease method (Conway's method), hypobromite method (Horodn's method), and colorimetric method (Conway's method), hypobromite method (Horodn's method), and colorimetric method with the use of diacetyliminoxime and n-dimethylaminoenzaldehyde.

In the standard determination of the urea content in the samples it is necessary to use a sufficiently sensitive and precise analytical method requiring an insignificant time expenditure. In this case it is colorimetric analytical methods which are most suitable. However, determination of urea using diacetyliminoxime does not satisfy the imposed requirements due to an instability of the forming color complex, which has a negative effect on the reproducibility of the results.

The spectrophotometric method based on the use of n-dimethylaminoenzaldehyde proposed by Watt and Chrisp for determining urea in pure solutions, was later used by Brown in developing a blood analysis method. Thereafter this method for determining urea in the blood and urine was modified by Levine, et al., and by a number of other researchers (With, et al.; Roijer and Tax; Yatidid, et al.). Griegel demonstrated that the presence of uric acid, creatinine, hippuric acid, ammonium salts, and amino acids does not hinder determination of urea with the use of n-dimethylaminoenzaldehyde.

The mentioned authors employed different methods in deproteinizing and bleaching samples. Only Geiger excluded these procedures because he determined urea in the urine of human subjects taking sulfa drugs.

USSR

UDC 621.039.543.4:621.039.544.57

VOLOSHCHUK, A. I., GAYDACHENKO, G. S., GOLOVCHENKO, YU. M.,  
ZELENSKIY, V. F., IVANOV, V. YE., and KONOTOP, YU. F.

"Uranium Hardened With Beryllium Oxide Particles"

Moscow, Atomnaya Energiya, Vol 29, No 3, Sep 70, pp 178-183

Abstract: The article describes results of a study of uranium hardened with beryllium oxide particles. Compositions were prepared by mixing uranium hydride and beryllium oxide powders. Several types of beryllium oxide powder were used, viz. ordinary commercial BeO and BeO obtained from beryllium acetate by the Funston method. The results indicate that the strengthening of uranium with dispersed beryllium oxide particles significantly increases its heat resistance. The creep rate declines with a drop in the annealing temperature of beryllium oxide during its preparation. The creep rate is highly sensitive to load. At 600° C the creep rate of precipitation-hardened uranium is the same as or below that of unalloyed uranium at 500° C and under the same stresses. The creep activation energies calculated

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VOLOSHCHUK, A. I., et al., Atomnaya Energiya, Vol 29, No 3, Sep 70, pp 178-183

from the slope of the curves  $\ln \dot{\epsilon} = f\left(\frac{1}{T}\right)$  for the most heat-resistant compositions are considerably less than the self-diffusion activation energy and the creep activation energy of unalloyed commercial uranium. High-temperature softening in precipitation-hardened uranium is delayed 50-100° C as compared to unalloyed commercial uranium. Preliminary radiation test results indicate the high radiation resistance of precipitation-hardened uranium.

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GAY DAMAK, V.

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*Amf/STC/INT-2000-001*

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In Reply Refer to:  
AFSC/INT-23362-71  
DIA Task No. 770-23-01

Date: 20 June 1972

TRANSLATION

ENGLISH TITLE: How to use the Filter-Absorber

*filter-absorber*

FOREIGN TITLE: Kak Eksplozitivny' Fil'try-Pobloctitel

*H. Little  
D. Galt/STC*

AUTHOR: ~~V. Gaydamak~~

LANGUAGE: Russian

SOURCE: Not Available

TRANSLATOR: ACSJ J-9316

REQUESTOR: ANXST-ID, Nise Perkins

This translation was accomplished from a xerox manuscript. The Graphics were not reproducible. An attempt to obtain the original Graphics yielded negative results. Thus, this document was published as is, in order to make it available on a timely basis.

GRAPHICS NOT REPRODUCIBLE

HOW TO USE THE FILTER-ABSORBER

V. Gaydama

In order to allow human beings to stay for a long period of time in a shelter, it is necessary to supply them with pure air. This is accomplished by using filtration-ventilation assemblies (FVA, see the figure). An assembly of this kind consists of a dual hermetic valve, filter-absorbers (FA), a fan, flow-meter, connecting tubing and other fittings, brackets and sealing parts.

How does the FVA operate? Through a main or emergency air intake channel, the fan draws in the outside air, which is cleaned to remove dust in a gravel wave damper and dust-removing oil filter, but more completely so with filter-absorbers. Air tubes run from the fan to sections which have exhaust openings through which the air enters the shelter.

The reliability of the air supply to shelters depends largely on the correct operation of the filter-absorbers. Therefore the personnel in charge of the shelter must be very familiar with the rules of their operation and with the factors that could reduce the protective properties of the FA. The most dangerous of these are moisture and vibration as well as damage caused by careless maintenance of filter-absorbers.

The development of moisture in the shelter unavoidably leads to corrosion of metal parts. With time, even light pressure will cause to decrease in the adsorbent properties of the activated charcoal and harm the dust filter. The filter-absorbers are moistened when the protective

USSR

UDC 547.412+661.718.1

KOZLOV, E. S., GAYDAMAKA, S. N., SOYFER, G. B., GACHEGOV, YU. N., and  
GORIYEV, A. D., Institute of Organic Chemistry, Academy of Sciences Ukraine SSR  
and Perm State University

"Stereochemistry of the Trichloromethyl Derivatives of Pentavalent Phosphorus"

Leningrad, Zhurnal Obshchey Khimii, Vol 42 (104), Vyp 4, 1972, pp 756-759

Abstract: Nuclear magnetic resonance -- in particular the P-Cl, N<sup>15</sup>-H, and C-Cl interactions -- was used to determine the geometry of (trichloromethyl)-tetrachlorophosphorus (I), bis(trichloromethyl)trichlorophosphorus (II), and bis(trichloromethyl)amidodichlorophosphorus (III). Spectra were taken at 77°K and 300°K. The distribution and intensity of the peaks indicate a covalent bipyramidal structure, the trichloromethyl group occupying an axial position. The nature of the hybridization of the nitrogen in III was determined from the value of the spin-spin interaction  $J(N^{15}-H): \chi_{2S} = 0.43J(N^{15}-H)-6$ .

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KOZLOV, E. S., and GAYDAMAKA, S. N.; Institute of Organic Chemistry,  
Academy of Sciences Ukrainian SSR, Kiev

"Concerning the Communication of A. S. Tarasevich and Yu. P. Yegorov on "The  
Determination of the Bond Order of P = N in Phosphazo Derivatives by the  
Method of  $P^{31}$  NMR"

Kiev, Teoreticheskaya i Eksperimental'naya Khimiya, Vol 8, No 3, 1972,  
pp 420-421

Abstract: The article contradicts the communication of Tarasevich and  
Yegorov [Teoreticheskaya i Eksperimental'naya Khimiya, 7, 828, 1971] which  
asserts that they have determined chemical shifts  $\delta_p$  of the series of tri-  
chlorophosphazoperhaloidalkanes  $Cl_3P = NR_{Hal}$  and bistrichloromethylchloro-  
phosphazoalkanes  $(CCl_3)_2ClP = NAlk$ . These shifts have been already determined  
by D. P. Khomenko, E. S. Kozlov, and G. G. Dyadyusha [Spectroscopy Lett., 3,  
129, 1970], and by E. S. Kozlov, S. N. Gaydamaka, Yu. Ya. Borovikov, V. T.  
Tsyba, and A. V. Kirsanov [Zhurnal Obshchey Khimii, 40, 2549, 1970], which has  
been overlooked by the authors of the above communication. Tarasevich and  
Yegorov make also use of the erroneous theory of Letcher and Van Wazer on the  
 $P^{31}$  chemical shift [Topics in Phosphorus Chemistry, 5, 75, 1967] which  
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KOZLOV, E. S. and GAYDAMAKA, S. N., Teoreticheskaya i Eksperimental'naya  
Khimiya, Vol 8, No 3, 1972, pp 420-421

however, they unwittingly disprove themselves by their data; therefore, their  
conclusions are invalid.

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USSR

UDC 547.241

KOZLOV, E. S., GAYDAMAKA, S. N.

"Synthesis and Infrared Spectra of Derivatives of bis-trichloromethylchlorophosphazohydride"

Leningrad, Zhurnal Obshchey Khimii, Vol XLII (CIV), No 1, 1972, pp 106-110

Abstract: On interaction with chlorine or N,N-dibromobenzenesulfaride, bis-trichloromethylchlorophosphazohydride (I) gives the corresponding N-halide derivatives. It also reacts easily with phosphorus pentachloride, phosphorus oxychloride, trimethylchlorosilane, and sulfuryl chloride with the formation of N-substituted phosphazo compounds. The infrared spectra of the phosphazo compounds obtained lead to qualitative conclusions regarding the nature of conjugation of the P=N bond with substitutions on the nitrogen atom. Efforts to synthesize N-iodophosphazo compound did not succeed. Experimental procedures are presented for the synthesis of 7 of the mentioned derivatives. The yields, physical properties and infrared spectra are described.

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USSR

UDC 546.185

KOLODYAZHNYI, O. I., SAMARAY, L. I., and GAYDANAKA, S. N., Institute of Organic Chemistry, Academy of Sciences Ukrainian SSR

"Anionotropic Conversion of bis(Trichloromethyl)chlorophosphazocarbonyl Chloride"

Leningrad, Zhurnal Obshchey Khimii, Vol 41, No 8, Aug 71, p 1872

Abstract: bis(Trichloromethyl)chlorophosphazohydride reacts with oxalyl chloride to give bis(trichloromethyl)chlorophosphazooxalyl chloride. The latter decomposes on heating to 120° to give carbon monoxide and a mixture of isomers -- bis(trichloromethyl)dichloroisocyanatophosphorus and bis(trichloromethyl)chlorophosphazocarbonyl chloride, UV spectra indicate mobile equilibrium of the isomers in the mixture, which is characteristic of tautomeric systems.

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USSR

UDC 546.185

KOZLOV, E. S., ~~GAYDAMAKA, S. N.~~, BOROVNIKOV, Yu. Ya., TSYBA, V. T., and  
KIRSANOV, A. V., Institute of Organic Chemistry, Ukrainian Academy of  
Sciences

"The Infrared Spectra and Nuclear Magnetic Resonance Spectra of  $P^{31}$ , and  
the Dipole Moments of Bistrychloromethylchlorophosphazohydride and  
-chlorophosphazoalkanes"

Leningrad, Zhurnal Obshchey Khimii, Vol XL, No 12, Dec 70, pp 2549-2552

Abstract: Recent studies of the synthesis of bistrychloromethylchloro-  
phosphazo compounds  $(CCl_3)_2ClP = NR$  ( $R = H, Alk$ ) (I) have allowed us to  
observe the effect of bulky electrophilic substituents at the phosphorus  
atom -- and of electron donor substituents at the nitrogen atom -- on the  
character of the  $P = N$  bond; but information on the trichlorophosphazo-  
alkanes  $(Cl_3P = N Alk)_2$  has not offered the same possibility.

To achieve this, the authors made experimental studies of trichloro-  
methylchlorophosphazo- $\beta$ -chloroethane.

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KOZLOV, E. S., et al., Zhurnal Obshchey Khimii, Vol XL, No 12, Dec 70, pp 2549-2552

It was found that with increase in the PNC angle, there is a shift in the resonance of the phosphorus atom, and an increase in the dipole moment, and in the bond order of the P = N bond.

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USSR

UDC 577.1:615.7/9

GAYDAMAKIN, N. A., KUL'KIN, S. G., DAVYDOV, B. I., and SHASHKOV, V. S.

"Effect of Pharmacological Agents on Reactivity of Organism to Combined Exposure to gamma-Irradiation and Transverse Overloads"

V sb. Probl. kosmich. biol. (Problems in Space Biology -- Collection of Works), Vol 14, Moscow, "Nauka" (Science), 1971, pp 336-350 (Russian) (from RZh-Biologicheskaya Khimiya, No 20, Oct 71, Abstract No 20F1714 from conclusions)

Translation: Male mice of the C57BL strain were subjected to gamma-ray irradiation with Co-60 in a dose of 350 or 700 roentgens (dose rate 18 roentgens/min), and a day later to overloads in the amount of 10 units for 30 min (centrifuge). The effect of these factors was studied in an experimental group of animals against a background of the combined injection, 15-30 min prior to irradiation, of 75 mg/kg each of cystamine and S, $\beta$ -aminoethylisothiuronium (AET). It was established that the effect of the overloads one day prior to irradiation decreases radiation damage to the hematopoietic organs, while in the event of such exposure a day after irradiation there was observed an insignificant intensification of radiation depletion of the spleen and bone marrow and an increase of destructive lesions in the peripheral nervous system. Cystamine  
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GAYDAMAKIN, N. A., et al., Probl. kosmich. biol. (Problems in Space Biology -- Collection of Works), Vol 14, Moscow, "Nauka" (Science), 1971, pp 336-350 (Russian) (from RZh-Biologicheskaya Khimiya, No 20, Oct 71, Abstract No 20F1714 from conclusions)

in conjunction with AET has an antiradiation protective effect both in case of irradiation without overloads and in case of their combined action. In the latter case nonuniform damage to various divisions of the peripheral nervous system is noted.

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USSR

UDC 577.1:615.7/9

DAVYDOV, B. I., and GAYDAMAKIN, N. A.

"Effect of Radioprotectors From the Mercaptoalkyl Amine Group (S, $\beta$ -Aminoethylisothiuronium) on the Resistance of Animals to Transverse Overloads"

V sb. Probl. kosmich. biol. (Problems in Space Biology -- Collection of Works), Vol 14, Moscow, "Nauka" (Science), 1971, pp 7-25 (Russian) (from RZh-Biologicheskaya Khimiya, No 20, 25 Oct 71, Abstract No 20F1715 from summary)

Translation: A study using mice and rats was made of the effect of cystamine (I) and S, $\beta$ -aminoethylisothiouronium bromide hydrobromide (AET; doses 50-150 mg/kg intraperitoneally) on the resistance (survival rate) of animals to overloads (centrifugation, 44.4 units; 30 min to 24 hours after injection of I or AET). An equation was obtained describing the relationship between the dose causing animals' death given 10-minute centrifugation and the action of I and AET. Four hours after injection of radioprotectors resistance to overloads becomes normal. Reduction with time in the depressant action of I and AET is due to "elimination" of the pharmacological (toxic) effect. The authors assume that one of the possible mechanisms whereby the organism's resistance to overloads is lowered under the influence of I is the decrease in the glycogen reserves of the liver.

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Immunology

USSR

UDC 576.858.25.097.2.077.3

GAYDAMOVICH, S. Ya., OBUKHOVA, V. R., MEL'NIKOVA, Ye. E., VOLOKHOVA, N. A., KIRYUSHCHENKO, T. V., KLISENKO, G. A., KRASNOBAYEVA, Z. N., LAVROVA, N. A., SHARIPOVA, Sh. A., and SHANOYAN, N. K., Institute of Virology imeni D. I. Ivanovskiy, Academy of Medical Sciences USSR, Moscow

"Use of Ultrasound to Increase Arbovirus Antigen Activity in Serological Tests in Vitro"

Moscow, Voprosy Virusologii, No 3, May/Jun 1973, pp 356-360

Abstract: An ultrasonic technique to increase antigen activity was tested on five groups of arbovirus antigens. Antigens prepared from suckling mouse brain by the sucrose-acetone and freon methods, or in chick fibroblasts without preliminary processing, were subjected to 30-40 sec of 20,000-25,000 Hz ultrasonic treatment. Titers determined before and after treatment by hemagglutination inhibition (HAI), complement fixation (CF), and agar gel diffuse precipitation (AGDP) were compared. For group A and B arboviruses CF and HAI titers increase 4-8 times after treatment, while AGDP titers remained unchanged. In the Kemerovo-Bunyamvera-California group, the CF titers increased by 2-4 times, and no change was observed in HAI titers. CF titers increased 2-8 times for all but Neapolitan arbovirus of the Phlebotomus group.

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GAYDAMOVICH, S. Ya., et al., Voprosy Virusologii, No 3, May/Jun 1973, pp 356-360

The only HAI response in this group was by Bujaru arbovirus, and only after treatment the AGDP titers increased in a few cases. Ultrasonic treatment had an especially favorable effect on CF and AGDP titers in the Uukuniemi group, while changes in HAI titers were less pronounced. Thus ultrasonic treatment normally facilitates antigen activity in CF and HAI reactions and has a variable effect on the AGDP reaction. Treated antigens did not lose specificity. It is concluded that ultrasonic treatment can be used not only to increase titers but also to reveal titers of relatively inactive antigens.

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USSR

UDC 576.858.25.097.34

KIRYUSHCHENKO, T. V., and GAYDAMOVICH, S. Ya., Institute of Virology imeni D. I. Ivanovskiy, Academy of Medical Sciences USSR, Moscow

"Direct and Indirect Hemagglutination Tests With Sumakh-Uukuniyemi Virus"

Moscow, Voprosy Virusologii, No 1, 1973, pp 117-122

Abstract: An absence of information on the hemagglutinating properties of Sumakh-Uukuniyemi virus and on possibilities for sensitizing erythrocytes to it for direct and indirect hemagglutination test purposes promoted the research described. The best hemagglutinin accumulation was obtained when specific antigen was prepared by alkali extraction in the presence of freon or sucrose-acetone with subsequent Tween-80 and ether processing. Titers were 8-16 times higher with sucrose-acetone than with freon processing. In both cases 37°C and pH 5.6-6.0 are optimum for hemagglutination and hemagglutination-inhibition tests. Dilution of antigen with phosphate buffer improved results. The virus's agglutinating ability was tested on erythrocytes of six species of mammals and birds. Results varied depending on species, probably due to differences in erythrocyte densities which affected available surface area and receptor quantity. Treatment of erythrocytes with trypsin and calcium ions improved indirect hemagglutination 2-8 times by increasing erythrocyte sensitivity. Dextrose-veronal-gelatine buffer worked best for erythrocyte dilution. Such

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KIRYUSHCHENKO, T. V. and GAYDAMOVICH, S. Ya., Voprosy Virusologii, No 1, 1973, pp 117-122

extensive processing is apparently necessary because hemagglutinins of this virus group are blocked by inhibitors. Due to the difficulties of sensitizing erythrocytes. The hemagglutination-inhibition test is recommended when hemagglutinating antigen is available.

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Pathology

USSR

UDC 616.988.25-092.9-091

GUSOVSKIY, Ya, M., KLISENKO, G. A., and GAYDAMOVICH, S. Ya, Institute of Infectious Diseases, Ministry of Health Ukrainian SSR, Kiev, and the Institute of Virology imeni D. I. Ivanovskiy, Academy of Medical Sciences USSR, Moscow

"Morphological Changes in Experimental Infections With the Sumakh Virus (Uukuniyemi Influenza)"

Moscow, Voprosy Virusologii, No 2, 1973, pp 167-171

Abstract: This communication consists of the first pathomorphologic description of mice infected with the Sumakh virus. Infections were induced in 1-2 and 6-7 day-old mice by intracerebral injection of a brain suspension containing a 100 LD<sub>50</sub> dose of the virus, strain 540, isolated in Azerbaydzhan in 1968. Prior to injection, the suspension was filtered through a 220 nm pore size Millipore filter to exclude bacterial infection. Control animals received a similarly treated suspension of a normal brain. Histologic sections were obtained daily, commencing with the 3rd post-infection day (prior to the appearance of clinical symptoms), fixed in 10% formalin, and stained with hematoxylin-eosin and thionine by the method of Nissl. Histologic evaluation showed that prior to the development of clinical signs, encephalitis had already developed by the 3rd day with primary inflammation of the dorsal regions of the subcortical ganglia (optic thalamus), gray matter of the horn of Ammon, and the ventral sections of the

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USSR

GUSOVSKIY, Ya. M., Voprosy Virusologii, No 2, 1973, pp 167-171

brain stem. The cells showed partial destruction or complete karyolysis. Infiltration of the affected parenchyma consisted primarily of segmented leukocytes, with some lymphocytes and an occasional histiocyte. Later, an inflammatory vascular reaction occurred which was fairly limited. With the passage of time new regions became involved, but the histotopographic distribution of the lesions remained the same. On the 4th day there was evidence of phagocytosis, accelerated lymphocyte infiltration, and more discrete glial hyperplasia. On the 6-7th day, the infiltrate consisted predominantly of lymphocytes, along with a small number of monocytes, histiocytes, and glial elements. Leptomeningitis developed in each of the infected animals with localization of the inflammatory infiltrates in the sulci. Leptomeningitis in the control mice was apparently due to injection of the brain suspension and the attendant trauma, and parenchymal cells at some distance from the inflammatory foci were seen to undergo dystrophic changes, from tigrolysis to frank lysis, while glial reaction was limited to irregular hyperplasia in the white and gray matter. In the experimental animals the inflammatory changes in the 1-2 and the 6-7 day old mice (at the time of injection) were comparable, with the older animals only showing a tendency for earlier localization of the lesions. In addition, the experimental animals showed productive focal inflammation and

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GUSOVSKIY, Ya. M., Voprosy Virusologii, No 2, 1973, pp 167-171

dystrophic changes in the skeletal muscles, while no such changes were observed in the control mice. Lesions of the internal organs were noncontributory in that they did not differ from those commonly encountered in other infections or intoxications. In terms of the morphologic picture, Sumakh virus encephalitis may be characterized as a selective, acute, primary polioencephalitis.

3/3

USSR

UDC 576.858.25.01(473.9)

SKOFERTSA, P. G., GAYDAMOVICH, S. Ya., OBERKOVA, V. R., KORCHENAR', N. D.,  
YAROVY, P. I., KLISENKO, G. A., and MEL'NIKOVA, Ye. E., Scientific Research  
Institute of Hygiene and Epidemiology, Kishinev, Moldavian SSR, and Institute  
of Virology imeni D. I. Ivanovskiy, Academy of Medical Sciences USSR, Moscow

"Isolation of Kharagysh Virus From the Kemerovo Group in the Moldavian SSR"

Moscow, Voprosy Virusologii, No 6, 1972, pp 709-711

Abstract: A virus isolated in 1971 from an *Ixodes ricinus* pool collected from sheep in the Moldavian SSR, named Kharagysh by the authors, was lethal to 2-4 day mice and not so to 3-4 week mice. The virus passed through a 100 nanometer pore filter but was retained at 50 nanometers. Sodium deoxycholate and ether had little effect on virus titers. Inasmuch as it was impossible to obtain a hemagglutinating antigen to the virus by usual methods, identification studies were carried out by the complement-fixation reaction. Tests with immune ascitic fluid reactive to several arboviruses were positive only for the Kemerovo group. Moreover, within that group the most pronounced cross-reaction was with the Tribach subgroup. Thus it is demonstrated that Kharagysh virus belongs to the Kemerovo-Tribach group. Apparently *I. ricinus* plays an important carrier role in the infection cycle.

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USSR

UDC 576.851.71.077.3

SHARITOVA, Sh. A., and GAYDAMOVICH, S. Ya., Uzbek Institute of Epidemiology and Microbiology, Tashkent, and Institute of Virology imeni D. I. Ivanovskiy, Academy of Medical Sciences USSR, Moscow

"Serological Tests With Viruses of the Phlebotomus Fever Group"

Moscow, Voprosy Virusologii, No 6, 1972, pp 691-695

Abstract: Methods for obtaining antigens from newborn mouse brain to Phlebotomus fever viruses (Sicilian, Neapolitan -- Sabin strain, Bujara -- IsAn 47693 strain, and Chagres -- JW-10 strain) were developed for use in serological tests. The acetone-sucrose method produced antigens suitable for all tests: Hemagglutination reaction (HR), complement-fixation reaction (CFR), and agar gel diffuse precipitation (AGDP). Antigens produced by the freon and borate-salt methods were best suited for the CFR. Additional antigen treatments were attempted to increase titers: While treatment by protamine sulfate and by Tween-80 and ether did not produce significant changes, ultrasonic treatment (20,000 cps, 2 min) increased titers of acetone-sucrose antigens by 2-64 times and freon antigens by 2-8 times in the HR, by 4 times for acetone-sucrose antigens only in the AGDP, and by 2-4 times for both antigen types in the CFR. Thus acetone-sucrose antigens are best suited for 1/2

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USSR

SHARIPOVA, Sh. A. and GAYDAMOVICH, S. Ya., *Voprosy Virusologii*, No 6, 1972, pp 691-695

serological tests. Optimum hemagglutination activity was established at 22°C, pH 6.0 for Sicilian, 37°C, pH 6.0 for Neapolitan and Chagres, and 37°C, pH 6.4 for Bujaru virus. Highest titers were obtained with erythrocytes from geese, chicks, and hamsters, lowest titers prevailed with human and monkey erythrocytes, while those of rabbits and guinea pigs caused spontaneous agglutination.

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USSR

UDC 911.3:61:576.858(47+57)

GAYDAMOVICH, S. Ya.

"Problems of and Prospects for Study of Arbovirus Infections in the USSR"

V sb. Materialy XV Vses. s'ezda epidemiologov, mikrobiologov i infektionistov, Tezisy Dokl. Ch. 1 (Proceedings of the 15th All Union Congress of Epidemiologists, Microbiologists, and Infectious Disease Specialists, Theses Reports, Part 1 -- collection of Works), Moscow, 1970, pp 341-342 (from RZh-Meditsinskaya Geografiya, No 2, Feb 1971, Abstract No 2.36.57)

Translation: The most pressing problems in the study of arbovirus infections in the USSR are the pronounced appearance of arbovirus over the territory of the USSR, the study of their connection to human disease, the creation of cultures and identification of strains, the development of measures for specific prophylaxis, and the sanitation of natural foci.

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USSR

UDC 576.858.25.095.38:576.895.771

GAYDANOVICH, S. YA., TSILINSKIY, Y. YA., L'VOVA, A. I., and KHUTORETSKAYA, N. V., Institute of Virology imeni D. I. Ivanovskiy Academy of Medical Sciences USSR, Moscow

"Reproduction Characteristics of Clones of Venezuelan Equine Encephalomyelitis Virus in *Aedes aegypti* Mosquitos"

Moscow, Meditsinskaya Parazitologiya i Parazitarnyye Bolezni, Vol 40, No 3, May/Jun 71, pp 267-271

Abstract: Genetically stable clones of arboviruses are useful for experimental work designed to study reproduction. A comparison study of reproduction in *Aedes aegypti* mosquitos of various virus clones was made. The clones differed in their pathogenic character with respect to white mice and in a few other genetic characteristics. A "wild" strain of Venezuelan equine encephalomyelitis was used and from it were isolated clones 3/5 and 17, as well as clones 53 and 56. The two latter clones are avirulent for white mice at lower temperatures. Clones 3/5 and 5 had a high virulence and represented induced mutants which predominate in the population of "wild" virus, whereas clone 17 was a "spontaneous" mutant, which belongs to the natural population and which has reduced pathogenic character for mice. The natural virulent mutants multiplied intensively  
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USSR

GAYDAMOVICH, S. YA., et al., Meditsinskaya Parazitologiya i Parazitarnyye Bolezni, Vol 40, No 3, May/Jun 71, pp 267-271

in *Aedes aegypti* mosquitos, accumulated in the salivary glands of white mice, and were transmitted by bite. The virulent species caused intense viremia. It was concluded that these biological properties of the virulent species may ensure their permanent circulation in nature and their predominance in the natural population of Venezuelan equine encephalomyelitis virus. The avirulent species, on the other hand, do not penetrate into the salivary gland, are not transmitted by bite and as they reproduce in the mice, their concentration in the blood is insufficient for vector infection. Also, the circulation of "spontaneous" mutants with low pathogenicity is inhibited by low viremia.

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USSR

UDC 576.858.25.095.5

GAYDAMOVICH, S. Ya., TSILINSKIY, Ya. Ya., L'VOVA, A. I., and KHUTORETSKAYA, N. V., Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

"Genetic Properties of Venezuelan Equine Encephalomyelitis Virus Manifested During Replication in Carriers"

Moscow, Voprosy Virusologii, No 4, Jul/Aug 71, pp 412-415

Abstract: Certain characteristics of several clones of Venezuelan equine encephalomyelitis virus were studied during replication in *Aedes aegypti* mosquitoes, which are not the natural carriers of these viruses. No clones were pathogenic to the mosquitoes. Clones 3/5 and 5 were readily transmitted to the mosquitoes, multiplied rapidly, entered the salivary glands of the mosquitoes, and were transmitted from mosquito to mouse by bite. Upon intracerebral or intraperitoneal administration into healthy mice, extracts of these mosquitoes induced encephalomyelitis in the mice. Clones 7, 14, and 17, though ingested with food, multiplied in the mosquitoes at a much slower rate, did not enter salivary glands, and thus were not transmitted by bite; extracts of these mosquitoes were not pathogenic to mice either after intracerebral or

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GAYDAMOVICH, S. Ya., et al, Voprosy Virusologii, No 4, Jul/Aug 71, pp 412-415

after intraperitoneal administration. It is concluded that the ability of Venezuelan equine encephalomyelitis virus to proliferate in *Aedes aegypti* mosquitoes and to enter their salivary glands represents genetic properties of some clones, directly associated with their virulence.

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USSR

UDC 576.858.25

GAYDAMOVICH, S. YA., NIKIFOROV, L. P., GROMASHEVSKIY, V. L., OBUKHOVA, V. R., KRUSENKO, G. A., CHERVONSKIY, V. I., and MEL'NIKOVA, YE. E., Institute of Virology ineni D. I. Ivan ovskiy, USSR Academy of Medical Sciences, Moscow

"New Arbovirus Sunakh from the Uukuniemi Group"

Moscow, Voprosy Virusologii, No 1, Jan/Feb 71, pp 21-25

Abstract: Isolation of the arbovirus Sunakh in the USSR is described for the first time. The virus was obtained from the hearts and lungs of black-birds (*Turdus merula*) collected in Azerbaydzhan. The virus was similar to but not identical with Uukuniemi, as shown in the agar gel diffusion test, but not by the complement fixation test. The isolated virus was pathogenic for suckling white mice. An incubation period of 11 days was found upon intracerebral, which in subsequent passages was reduced to 96 hours. Mice 1-3 days of age were most susceptible. An antigen for hemagglutination reactions was prepared from suckling mouse brains by the ucrose-acetone method. The titer of this antigen did not exceed 1:64. Subsequent workup with Tween-80 and ether raised the titer to 1:256-1:512. When the antigen was prepared by the freon method, the material was enriched with Tween-80 and ether and 1/2

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USSR

GAYDAMOVICH, S. YA., et al., Voprosy Virusologii, No 1, Jan/Feb 71, pp 21-25

could serve for agglutination of erythrocytes in dilutions of 1:32-1:64. Optimum hemagglutination was achieved at pH 5.8 and at a temperature of 37° C. According to preliminary data on agar diffusion, the Sumakh virus is not identical with the Uukuniemi virus. A detailed study of the antigenic structure of Sumakh virus is under way.

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USSR

UDC 616.988.25-092.9-085.37:576.858.095.383]07:616.157-078

GAYDAMOVICH, S. Ya., and AGRBA, V. Z., Institute of Virology imeni D. I. Ivanovskiy, Academy of Medical Sciences USSR, Moscow

"The Effect of Interferon on Viremia During Arbovirus Infection"

Moscow, Voprosy Virusologii, No 5, Sep/Oct 70, pp 569-573

Abstract: A study was made of viremia in mice experimentally infected with Venezuelan equine encephalomyelitis virus. The higher susceptibility of suckling mice to this infection as compared to adult mice is reflected in higher viremia. The highest levels of viremia coincided with the maximum content of interferon in the blood. In absolute values, interferon production in suckling mice was lower than in adult mice, even though virus titers in the blood of suckling mice were much higher than in adults. Interferon was evidently unable to stop the development of viremia in suckling mice, but did affect viral reproduction in sensitive cells of adult mice. The deaths of adult animals from the infection may be attributable to a loss of the ability to produce interferon during that period of the infection when no antibodies have yet appeared.

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1/2 023

UNCLASSIFIED

PROCESSING DATE--30OCT70

TITLE--PRECIPITATING ANTIGEN IN THE BLOOD OF MICE INFECTED WITH ARBOVIRUSES -U-

AUTHOR-(04)-GAYDAMOVICH, S.YA., KRECHETOVA, N.A., LVOVA, A.I., MELNIKOVA, YE.E.

COUNTRY OF INFO--USSR

G

SOURCE--VCPROSY VIRUSOLOGII, 1970, NR 3, PP 337-341

DATE PUBLISHED-----70

SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES

TOPIC TAGS--ARBOVIRUS, ANTIGEN, MOUSE, BLOOD SERUM, VENEZUELAN EQUINE ENCEPHALITIS VIRUS

CCNTRCL MARKING--NO RESTRICTIONS

DGCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAE--2000/1835

STEP NO--UR/0402/70/000/003/0337/0341

CIRC ACCESSION NO--AP0125446

UNCLASSIFIED

2/2 023

UNCLASSIFIED

PROCESSING DATE--30OCT70

CIRC ACCESSIGN NO--AP0125446

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE POSSIBILITY OF USING THE AGAR GEL DIFFUSION TEST FOR DETECTION OF VIRUS (ANTIGEN) IN THE BLOOD ON EXPERIMENTAL ARBOVIRUS INFECTION WAS STUDIED. TWELVE ARBOVIRUSES WERE TESTED. THE ANTIGEN WAS THE NATIVE BLOOD SERUM FROM INFECTED SUCKLING MICE COLLECTED AT THE HEIGHT OF THE DISEASE, WHILE IMMUNE ASCITES TO THE CORRESPONDING VIRUSES WERE USED AS THE SOURCE OF ANTIBODY. POSITIVE RESULTS WERE OBTAINED WITH SEMLIKI, PIKSUNA, VENEZUELAN EQUINE ENCEPHALOMYELITIS AND UUKUNIEMI VIRUSES. DETECTION OF ANTIGEN IN THE BLOOD SERUM DEPENDS UPON THE LEVEL OF VIREMIA AND CAN BE REGULARLY ACHIEVED AT A VIRUS TITER IN THE BLOOD OF LG 8 LD SUB50-0.02 ML.

FACILITY: INSTITUT VIRUSOLOGII IMENI D. I. IVANOVSKOGO AMN SSSR, MOSKVAAA.

UNCLASSIFIED

1/2 018

UNCLASSIFIED

PROCESSING DATE--30OCT70

TITLE--DOMAIN STRUCTURE OF UNIAXIAL ANTIFERROMAGNETS. THE PROBLEM OF NUCLEATION -U-

AUTHOR--(03)-MITSEK, A.I., GAIDANSKIY, P.F., PUSHKAR, V.N.

COUNTRY OF INFO--USSR

SOURCE--PHYSICA STATUS SOLIDI, 1970, VOL 38, NR 1, PP 69-79

DATE PUBLISHED-----70

SUBJECT AREAS--PHYSICS

TOPIC TAGS--MAGNETIC DOMAIN STRUCTURE, MAGNETIC TRANSFORMATION, MAGNETIC ANISOTROPY, NUCLEATION, ANTIFERROMAGNETIC MATERIAL

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1989/1058

STEP NO--GE/0030/70/038/001/0069/0079

CIRC ACCESSION NO--AP0107567

UNCLASSIFIED

2/2 018

UNCLASSIFIED

PROCESSING DATE--30OCT70

CIRC ACCESSION NO--AP0107567

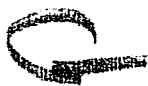
ABSTRACT/EXTRACT--(U) GP-0-

ABSTRACT. THE DEPENDENCE OF THE ENERGY OF GAMMA SUB180 AND THE HALF WIDTH DELTA SUB180 OF 180 DEGREES L DOMAIN WALLS IN ANTIFERROMAGNETS ON THE MAGNETIC FIELD H IS CALCULATED FOR LOW FIELDS. AT H YIELDS H SUB0 (H SUB0 IS THE CRITICAL FIELD OF THE SPIN FLOP TRANSITION) THE WALLS EXPAND AND THEIR ENERGY GAMMA SUB180 DECREASES. IN THE SPIN FLOP REGION 90 DEGREES DOMAIN STRUCTURE APPEARS. GAMMA SUB90 AND DELTA SUB90 ARE DETERMINED BY THE VALUE OF FOURTH ORDER ANISOTROPY CONSTANT K SUB2. THE CALCULATION OF THE METASTABLE STATE (K SUB2 SMALLER THAN 0) REGION SHOWS THAT ITS BOUNDARIES MAY BE APPROXIMATED BY THE ASTROID AT THE MAGNITUDE OF K SUB2 IS LESS THAN K SUB1 ONLY. THE WALL DISPLACEMENT IN THE SPIN FLOP REGION (K SUB2 IS SMALLER THAN 0) AND THE DOMAIN STRUCTURE AT K SUB2 IS GREATER THAN 0 ARE DISCUSSED. THE PROBLEM OF THE NEW MAGNETIC PHASE NUCLEATION IS CONSIDERED.

FACILITY: URAL STATE UNIVERSITY, SVERDLOVSK.

UNCLASSIFIED

AND0016971



ZIR 9012

AUTHOR-- GAYDAR, I., CORRESPONDENT

TITLE-- "IT WILL BE A WISE ONE. . ."

NEWSPAPER-- PRAVDA, JANUARY 28, 1970, P 4, COLS 6-7

Handwritten scribbles and numbers, possibly '17'.

ABSTRACT-- THE MISSION OF A JOINT YUGOSLAV AND SOVIET PROJECT, DIRECTED BY THE SCIENTIFIC-TECHNICAL COUNCIL COMPOSED OF FOUR REPRESENTATIVES OF EACH COUNTRY, IS TO DEVELOP A NEW ELECTRONIC COMPUTER WHICH IS NEEDED FOR CARRYING OUT MOST COMPLEX RESEARCH. THE YUGOSLAV SIDE IS REPRESENTED BY THE BELGRADE INSTITUTE IMENI MIKHAIL PUPIN /VELEMIR KOSTICH, DIRECTOR/ AND THE SOVIETS ARE REPRESENTED BY THE INSTITUTE OF AUTOMATION AND TELEMECHANICS OF THE ACADEMY OF SCIENCES, U.S.S.R. THE THEORETICAL ASPECTS OF THE PROJECT ARE HANDLED BY THE SOVIET INSTITUTE, THE ENGINEERING BY THE YUGOSLAVS.

KOSTICH EXPECTS THE PROJECT TO BE COMPLETED SOMETIME THIS YEAR.

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USSR

UDC: 621.372.829

VESELOV, G. I. and GAYDAR, V. I.

"Designing a Circular Waveguide with an Inner Cruciform Conductor"

Moscow, Radiotekhnika, Vol. 25, No. 11, 1970, pp 102-104

Abstract: The inner conductor of this waveguide, which is asserted to be practically useful because of its favorable range and directional characteristics, extends the length of the guide and has a cross section in the shape of a plus sign. Under the assumption that all conductors are ideally conductive and that the thickness of the inner conductor cross arms is infinitely small, the authors of this brief communication find the critical H and E conditions of the system through the method of partial regions. Curves are plotted for the critical frequency reduction factor and for the relative error in that factor as functions of the ratio  $a/b$ , where  $a$  is half the length of the cross arm and  $b$  is the inner radius of the waveguide.

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USSR

UDC 629.78.002.3

BELITSKIY, M. Ye., BATURIN, G. T., GAYDARENKO, A. L., GERMANCHUK, F. K.,  
SKRIPKA, V. F.

"Study of the Chemical Stability of Certain Nonmetallic Components of Friction Materials at High Temperatures"

Sb. nauch. tr. Kiyev. in-t inzh. grazhd. aviatsii (Collection of Scientific Works of the Kiev Institute of Civil Aviation Engineers), 1971, No. 2, pp 64-67 (from RZh-41. Raketostroyeniye, No 11, Nov 72, Abstract No 11.41.189)

Translation: Studies of the chemical stability of widely used, promising nonmetallic components and solid lubricants of friction metalloceramic materials are described. Recommendations are made as to their application as high-temperature solid lubricants for friction materials of heavy-load braking devices: boron nitride, 2-calcium fluoride and synthetic mica. 6 ill., 1 table, 7 ref. Resume.

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- 105 -



1/2 031

UNCLASSIFIED

PROCESSING DATE--30OCT70

TITLE--EPITAXIAL GALLIUM ARSENIDE PN JUNCTIONS GROWN IN A CLOSED IODIDE SYSTEM WITH VARYING IODINE CONCENTRATIONS -U-  
AUTHOR--(04)--VILISOVA, M.D., LAVRENTYEVA, L.G., GAYDAREVA, S.P., IVLEVA, O.M.

COUNTRY OF INFO--USSR

SOURCE--IZV. VYSSH. UCHEB. ZAVED., FIZ. 1970, 13(2), 31-5

DATE PUBLISHED-----70

6

SUBJECT AREAS--PHYSICS

TOPIC TAGS--CRYSTAL GROWING, EPITAXIAL PN JUNCTION, GALLIUM ARSENIDE SEMICONDUTOR, IODIDE, IMPURITY LEVEL, CRYSTAL DEFECT, CRYSTAL DISLOCATION, X RAY ABSORPTION, ABSORPTION EDGE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAE--1988/0195

STEP NO--UR/0139/70/013/002/0031/0035

CIRC ACCESSION NO--AT0105271

UNCLASSIFIED

2/2 031

UNCLASSIFIED

PROCESSING DATE--30OCT70

CIRC ACCESSION NO--AT0105271

ABSTRACT/EXTRACT--(U) GP-0-

ABSTRACT. EPITAXIAL GAAS LAYERS WERE GROWN BY I TRANSPORT IN A SEALED AMPUL. THE FOLLOWING PROPERTIES WERE STUDIED AS A FUNCTION OF THE I CONC.: TRANSPORT RATE, AV. EPITAXIAL GROWTH RATE, PACKING DEFECT D., DISLOCATION D., INTEGRAL X RAY INTENSITY AT THE GA K ADSORPTION EDGE, CONCNS. AND MOBILITIES OF CHARGE CARRIERS, EPITAXIAL IMPURITY DISTRIBUTION, AND RELATIVE POSITION OF THE P-N JUNCTION WITHIN THE LAYER. ELEC. P-N JUNCTIONS ARE DISPLACED AS FAR AS 40 MU INTO THE EPITAXIAL LAYERS WHEN A ZN DOPED SOURCE IS EMPLOYED IN CONJUNCTION WITH A TE DOPED SUBSTRATE. THIS IS DISCUSSED IN TERMS OF CURRENT AUTODOPING THEORIES. THE CRYST. PERFECTION IS AN INVERSE FUNCTION OF THE GROWTH RATE. FACILITY: SIB. FIZ. TEKH. INST. IM. KUZNETSOVA, TOMSK, USSR.

UNCLASSIFIED

USSR

UDC 550.557:622.241

SANTO, K. L., GAYDASH, A. D., Volga-Ural Affiliate of the All-Union Scientific Research Institute of Geophysical Prospecting Methods

"A Device for Induction Well Logging"

Moscow, Otkrytiya, Izobreteniya, Promyshlennyye Obratzy, Tovarnyye Znaki, No 19, 1970, Author's Certificate No 272449, p 63

Abstract: This author's certificate introduces a device for induction well logging which contains a multiple-coil probe with master and reception circuits, an AC oscillator connected to the master circuit of the probe, and a measurement channel in the form of the probe reception circuit, an amplification and rectifying device, a cable communications line and a well logging registration unit all connected in series. As a distinguishing feature of the patent, the protection of the measurements from interference is improved and provision is made for recording a quantity inverse to the signal amplitude. The device is equipped in the measurement circuit with elements of a pulse-frequency telemetry system. The demodulator is made in the form of meters which measure the pulse repetition frequency and period.

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1/2 006 UNCLASSIFIED PROCESSING DATE--18SEP70  
TITLE--DETERMINATION OF THE VAPOR PRESSURE OF RHO, METHOSYPHENOL,  
BUTOXYANISOLE, AND 2,5-DIBUTOXYANISOLE -U-  
AUTHOR-(02)-GAKH, I.G., GAYDAY, N.S.  
COUNTRY OF INFO--USSR  
SOURCE--ZH. PRIKL. KHIM. (LENINGRAD) 1970, 43(1), 212  
DATE PUBLISHED-----70  
SUBJECT AREAS--CHEMISTRY  
TOPIC TAGS--VAPOR PRESSURE, METHOXY COMPOUND, ANISOLE, PHENOL  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAME--1987/0334 STEP NO--UR/0080/70/043/001/0212/0212  
CIRC ACCESSION NO--AP0103989  
UNCLASSIFIED

2/2 006

UNCLASSIFIED

PROCESSING DATE--18SEP70

CIRC ACCESSION NO--AP0103989

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE VAPOR PRESSURE (RHO, TORR) WAS  
DETD. BY A STATIC METHOD (E. KREL', 1960). THE RHO CAN BE EXPRESSED AS  
A FUNCTION OF TEMP. T BY THE FOLLOWING:  $\ln RHO = \Delta H - RT + \alpha$   
PLUS ALPHA. THE VALUES OF  $\Delta H$  AND  $\alpha$  ARE 6997.34, 19.94;  
6547.50, 18.22, AND 7741.88, 20.125 FOR RHO, METHOXYPHENOL,  
BUTOXYANISOLE, AND 2,5-DIBUTOXYANISOLE, RESP.

UNCLASSIFIED

USSR

UDC 669.35.71.1.24.6.782.71.620.193.27(088.8)

VOL, A. Ye., GAYDAY, P. I., GORYNIN, I. V., KAPYRIN, G. I., KUZNETSOV, Ya. Ya.,  
PROKOF'YEV, S. N., ~~SUNIKOV~~, N. S., CHIZHIKOV, G. I., SHUMSKIY, K. A.

"Copper-Based Alloy"

USSR Author's Certificate, No. 276417, Filed 27/10/67, Published 16/10/70. (Translated from Referativnyy Zhurnal Metallurgiya, No. 5, 1971, Abstract No. 5 I713P).

Translation: An alloy with increased corrosion-fatigue strength in sea water is suggested. The composition of the alloy (%) is: Al 7-9, Mn 8-12, Fe 2-4, Ni 1.5 - 4, Sn 0.1-0.5, Si 0.1-0.5, remainder - Cu. The technological properties of the alloy can be improved by introducing up to 0.3 % Mg and up to 0.2 % Be. These additions decrease the tendency of the alloy toward film formation. The alloy has (in kg/mm<sup>2</sup>)  $\sigma_b > 65$ ,  $\sigma_{0.2} > 30$ , HB 180-210,  $\sigma_{-1} \geq 17$  at  $10 \cdot 10^6$  cycles and is a promising shipbuilding material.

1/1

USSR

UDC 547.26'118.07

ABDULLAYEV, G. K., GAYDAY, V. I., MAMEDOV, H. M.

"A Method of Making Hydroxybenzyl Ester of Phosphorous Acid"

Moscow, *Otkrytiya, Izobreteniya, Primyshlennyye Obraztsy, Tovarnyye Znaki*, No 15, Apr 73, Author's Certificate No 374322, Div C, filed 4 May 70, published 20 Mar 73, p 52

Translation: This Author's Certificate introduces: 1. A method of making hydroxybenzyl ethers of phosphorous acid distinguished by the fact that phenols are interacted with paraform and phosphorus trichloride at a temperature from -10 to +80°C in an organic solvent with subsequent isolation of the goal product by conventional methods. 2. A modification of this method distinguished by the fact that the process is carried out in a medium of methyl and ethyl alcohols, acetone, dioxane, or diethyl ether.

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- 30 -

GAYDAYENKO, U.P.

SPS 59008  
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XI-2. THE CHARACTERISTIC FEATURES OF GROWTH OF AUTOEPITAXIAL SILICON LAYERS IN A DEVICE WITH A HORIZONTALY ARRANGED REACTOR

Article by Yu. I. Boytsov, V. P. Gaydayenko, V. N. Kazanov, I. S. Kondrat'eva, N. A. Belyy, Leningrad; Novosibirsk; Ill. Sbornik po Protsessam Rosta i Sinteza Poluprovodnikov Khimicheskoye Primeneniye, 11-17 June 1972, p. 1859

A study was made of the effect of the growth conditions on the electrical parameters (the thickness and specific resistance) of autoepitaxial layers of silicon. In order to measure the thickness and specific resistance, the infrared method and the method of spreading resistance were used. It was demonstrated that the autoepitaxial layers grown in the device with a horizontally arranged reaction chamber have specific characteristics of distribution of the thickness and specific resistance. Recommendations are made with respect to the application of the technological procedures and measurements for growing epitaxial layers which are uniform with respect to thickness and specific resistance.



1/2 015 UNCLASSIFIED PROCESSING DATE--18SEP70  
TITLE--RESEARCH IN A DESIGN PLANNING INSTITUTE -U-

AUTHOR--(05)--KARATAYEV, G., VNIYZEMAMASH, M., GAYDAYENKO, YU., NAUMOV, A.,  
BLOKH, G.

COUNTRY OF INFO--USSR

SOURCE--STROITEL, NAYA GAZETA, MAY 6, 1970, P 2, COLS 5-7

DATE PUBLISHED--06MAY70

SUBJECT AREAS--MECH., IND., CIVIL AND MARINE ENGR, BEHAVIORAL AND SOCIAL  
SCIENCES

TOPIC TAGS--RESEARCH AND DEVELOPMENT, EARTH HANDLING EQUIPMENT, DESIGN  
FACILITY PLANNING, INDUSTRIAL INSTITUTE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAME--1986/0183

STEP NO--UR/9024/70/000/000/0002/0002

CIRC ACCESSION NO--AN0102254

UNCLASSIFIED

2/2 015

UNCLASSIFIED

PROCESSING DATE--18SEP70

CIRC ACCESSION NO--AN0102254

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE THREE ARTICLES BY THE  
AFOREMENTIONED AUTHORS DISCUSS CERTAIN DRAWBACKS OF THE SOVIET RESEARCH  
AND DEVELOPMENT SYSTEM. ACCORDING TO KARATAYEV, THE VNIIZEMMASH  
COMPRISES RESEARCH DEPARTMENTS NAUCHNO ISSLEDOVATEL, SKIYE OTDELY, A  
LEADING DESIGN BUREAU GOLOVNOYE KONSTRUKTORSKOYE BYURO, AND A PILOT  
PLANT, OPYTHYY ZAVOD-. ITS PRINCIPAL PROBLEM IS LACK OF TESTING AND  
FIELD TESTING FACILITIES FOR THE EARTH MOVING MACHINERY IT DEVELOPS.  
GEMMERLING COMPLAINS ABOUT THE "DOUBLE LIFE" STANDARD FORCED UPON HIS  
INSTITUTE BY THE MINISTRY OF BUILDING MATERIALS, U.S.S.R. THE  
RESEARCH, NAUCHNAY, AND THE DEVELOPMENT, PROYEKTNAY, -SECTIONS OF THE  
INSTITUTE ARE SUBORDINATE TO DIFFERENT MAIN ADMINISTRATIONS OF THE  
MINISTRY AND HAVE DIFFERENT BUDGETS. IN GEMMERLING, S OPINION, BUDGET  
MONEYS SHOULD BE ALLOCATED TO THE ADMINISTRATION OF THE INSTITUTE TO  
FUND THE DEVELOPMENT OF PILOT PROJECTS ON THE BASIS OF COMPLETED  
RESEARCH PROGRAMS.

UNCLASSIFIED

I/2 033 UNCLASSIFIED PROCESSING DATE--27NOV70  
TITLE--EXPERIMENTAL STUDY OF THE EFFECT OF A TRANSVERSE MAGNETIC FIELD ON  
THE VOLT AMPERE CHARACTERISTICS OF THE THERMIONIC CONVERTER IN A KNUDSEN  
AUTHOR--(05)-BABANIN, V.I., BARABASH, M.B., GAYDO, G.K., DUNAYEV, YU.A.,  
KRAVINSKIY, YU.G.  
COUNTRY OF INFO--USSR  
SOURCE--ZH. TEKH. FIZ. 1970, 40(3), 561-6.  
DATE PUBLISHED-----70

6

SUBJECT AREAS--ENERGY CONVERSION (NON-PROPULSIVE), PHYSICS  
TOPIC TAGS--VOLT AMPERE CHARACTERISTIC, CATHODE, ANODE, BARIUM, CESIUM,  
MAGNETIC FIELD EFFECT, THERMIONIC ENERGY CONVERSION

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAE--2000/2259 STEP NO--UR/0057/70/040/003/0561/0566

CIRC ACCESSION NO--AP0125837  
UNCLASSIFIED

2/2 033

UNCLASSIFIED

PROCESSING DATE--27NOV70

CIRC ACCESSION NO--AP0125837

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. OVER A WIDE RANGE OF CATHODE TEMPS. AND OF BA AND BA PLUS CS PRESSURES, THE INCREASE IN THE FIELD STRENGTH RESULTS IN A DECREASE IN THE SATN. CURRENT FOR THE CONVERTER. THIS IS IN GOOD QUAL. AGREEMENT WITH THE THEORETICAL CONCLUSIONS. IN A TRANSVERSE MAGNETIC FIELD THE CURRENT DOES NOT ACHIEVE SATN. WITH AN INCREASE IN THE POS. POTENTIAL ON THE ANODE BUT CONTINUES TO INCREASE, THE EFFECT BEING MORE PRONOUNCED FOR LOW CURRENT VALUES. THE INCREASE IN THE CURRENT MAY BE DUE TO A NO. OF REASONS, ONE OF WHICH IS THE WIDENING OF THE PREANODE ZONE.

UNCLASSIFIED

1/2 031

UNCLASSIFIED

PROCESSING DATE--30OCT70

TITLE--EXPERIMENTAL STUDY OF THE WIDTH OF THE NEAR ANODE LAYER IN A  
KNUDSEN SYSTEM FOR A THERMIONIC ENERGY CONVERTER -U-

AUTHOR--(05)-BABANIN, V.I., BARABASH, M.B., GAIDO, G.K., DUNAYEV, YU.A.,  
KRAVINSKIY, YU.G.

COUNTRY OF INFO--USSR

SOURCE--ZH. TEKH. FIZ. 1970, 40(4), 833-8

DATE PUBLISHED-----70

SUBJECT AREAS--PHYSICS

TOPIC TAGS--ELECTRODE PROPERTY, THERMIONIC ENERGY CONVERSION, VOLT AMPERE  
CHARACTERISTIC, BARIUM, CESIUM, TRANSVERSE MAGNETIC FIELD

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAME--2000/1196

STEP NO--UR/0057/70/040/004/0833/0838

CIRC ACCESSION NO--AP0124850

UNCLASSIFIED

2/2 031

UNCLASSIFIED

PROCESSING DATE--30OCT70

CIRC ACCESSION NO--AP0124850

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE WIDTH OF THE NEAR ANODE LAYER IN A THERMIONIC ENERGY CONVERTER FILLED WITH BA,CS IN A TRANSVERSE MAGNETIC FIELD WAS INVESTIGATED EXPTL. VOLT AMPERE (V,A) CHARACTERISTICS ARE SHOWN FOR CATHODE, BA, AND CS TEMPS. OF 1893, 936, AND 373DEGREEK, RESP. A SMALL CURRENT INCREASE IN THE SATN. REGION IS EXPLAINED BY WIDENING OF THE NEAR ANODE LAYER. THE VALUES OF THIS WIDTH CALCD. BY V. I. KUZNETSOV, ET AL. (1970) WERE CONFIRMED EXPTL. BY ANAL. OF THE V,A CHARACTERISTICS. THE COMPENSATION DEGREE MAY BE DETD. IF THE WIDENING OF THE NEAR ANODE LAYER IS TAKEN INTO ACCOUNT.

UNCLASSIFIED

Metrology, Surveying, Mapping, Graphics

USSR

UDC 778.37

GAYDON, V. N.

"The Method for Velocity Measurement and the Equipment for Putting Into Operation a System for Photographing "Luminescent" Models During Ballistic Research"

Moscow, Zhurnal Zauchnoy i Prikladnoy Fotografii i Kinematografii, Vol 15, No 4, 1970, pp 246-249

Abstract: A description is given of method for measuring the flight velocity of a model in the range of 2300-500 m/sec, based upon the "self-luminescence" of the models. In order to avoid ambiguities in measurement of the velocity, a collimation system was used. This brought about stable operation of the equipment for putting the photography system into operation. Airflow maps of the model are presented for  $U_{\infty} = 3970$  m/sec and  $P_{\infty} = 133.3$  millibars and  $U_{\infty} = 4920$  m/sec and  $P_{\infty} = 133.3$  millibars.

1/1

ELECTRICAL ENGINEERING

Circuit Elements

UDC 621.318.43

USSR

BESEDIN, A. I., GAYDOV, N. T., ROZHDESTVENSKIY, V. F., YAKOVLEV, G. M.

"A Choke"

Moscow, Otkrytiya, Izobreteniya, Promyshlennyye Obrazttsy, Tovarnyye Znaki, No 22, 1970, Soviet Patent No 275188, Class No 21, filed 11 Nov 68, p 45

Abstract: This Author's Certificate introduces a choke which contains a ribbon core, fitted with a winding and located in a hermetically sealed container made from a nonmagnetic heat-conducting material and filled with grease. As a distinguishing feature of the patent, heat removal from the choke is improved by placing the choke winding inside a core made in the form of two tubes helically formed from tape of a magnetically soft material such as iron-nickel alloy. This core is mounted together with insulating sleeves inside the container which is used as the heat-removing radiator and the housing for the choke.

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USSR

UDC 669.15'26-194:546.261

BRAUN, M. P., GAYDUCHENKO, G. K., and VINOKUR, B. B., Institute of Casting Problems, Academy of Sciences Ukr SSR

"Formation of Carbides in a 3% Chromium Steel With Additional Alloying"

Kiev, Metallofizika, No 40, 1972, pp 85-90

Abstract: The composition of the carbide phase in a 3% chromium steel containing 0.3% carbon was studied by x-ray diffraction and chemical methods. It was established that chromium and manganese, entering into the cementite composition, destabilize it and lead to the formation of chromium carbide by the aging mechanism. In the Cr-Ni steel the chromium carbide forms at a lower tempering temperature by an "at point" mechanism. Additional alloying with molybdenum increases the temperature of  $Me_7Cr_3$  formation. Here, for both steels, the carbide is precipitated by the aging mechanism. 1 figure, 3 table, 11 bibliographic references.

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1/2 029 UNCLASSIFIED PROCESSING DATE--18SEP70  
TITLE--THERMALLY ACTIVATED SLIP IN LITHIUM FLUORIDE CRYSTALS -U-

AUTHOR-(03)-GAYDUCHENYA, V.F., BLISTANOV, A.A., SHASKOLSKAYA, M.P.

COUNTRY OF INFO--USSR

SOURCE--FIZ. TVERD. TELA 1970, 12(1), 36-41

DATE PUBLISHED-----70

SUBJECT AREAS--MATERIALS, PHYSICS

TOPIC TAGS--THERMAL EFFECT, RELAXATION PROCESS, SINGLE CRYSTAL, ACTIVATION  
ENERGY, CRYSTAL LATTICE STRUCTURE, LITHIUM FLUORIDE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAE--1980/0239

STEP NO--UR/0181/70/G12/001/0036/0041

CIRC ACCESSION NO--AP004851R

UNCLASSIFIED

2/2 029

UNCLASSIFIED

PROCESSING DATE--18SEP70

CIRC ACCESSION NO--AP0048518

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. BY MEASURING THE YIELD POINT ( $\tau$ ) AND THE RATE OF STRESS RELAXATION ( $\dot{\tau}$ ) ON COMPRESSION OF SINGLE CRYSTAL SPECIMENS AT 77-450DEGREESK, THE MECHANISM OF SLIP WAS INVESTIGATED IN PURE SINGLE CRYSTAL LIF AND LIF CONTG. 0.1 AT. PERCENT MG IN THE QUENCHED AND TEMPERED STATES. THE TEMP. DEPENDENCE OF THE THERMAL COMPONENT OF THE YIELD POINT  $\tau$  AGREES WELL WITH THE THEORY OF STRENGTHENING OF CRYSTALS BY ATOMS OF THE IMPURITY AS A RESULT OF THE APPEARANCE OF TETRAGONAL DISTORTIONS OF THE LATTICE (THE FLEISCHER THEORY). THE ENERGY OF ACTIVATION OF THE MOTION OF DISLOCATIONS  $H$  AND THE ACTIVATION EXCHANGE  $V$  AGREE SUFFICIENTLY WELL WITH THE THEORY AT 77-200DEGREESK. A BETTER CORRESPONDENCE OF  $H$  AND  $V$  OF THE ABOVE THEORY WAS OBSD. FOR LIF CRYSTALS WITH A LOW IMPURITY CONCN. AND FOR LIF CONTG. MG IN THE ANNEALED STATE. THE OBSD. DEVIATIONS FROM THE THEORY OF THE DEPENDENCES  $H(\tau)$  AND  $V(\tau)$ , ESP. PRONOUNCED STARTING AT 180-210DEGREESK, ARE RELATED TO THE BLOCKING OF DISLOCATIONS IN THE PROCESS OF RELAXATION OF STRESSES BY IMPURITY ATOMS WHICH BECOME MOBILE AS THE TESTING TEMP. INCREASES.

USSR

UDC 546.661

GAYDUK, M. I., GILYAROV, O. N., ZHABOTINSKIY, M. YE., ZOLIN, V. F.,  
KROTOVA, L.V. (DECEASED) KULIKOVSKIY, B. N., LEBEDEV, V. G., and  
ELLERT, G. V., Institute of General and Inorganic Chemistry imeni N.  
S. Kurnakov, Academy of Sciences USSR

"Luminescence Centers in Solutions of Rare Earth Elements in Phospho-  
rus and Selenium Oxychlorides at 77° K"

Moscow, Izvestiya Akademii Nauk SSSR, Neorganicheskiye Materialy,  
Vol 6, No 7, Jul 70, pp 1276-1280

Abstract: The article considers the dependence of the relative con-  
centrations of luminescence centers on the composition and conditions  
for the preparation of europium solutions in phosphorus and selenium  
oxychlorides with tin tetrachloride. The luminescence spectra of the  
isolated centers are analyzed on the basis of crystal field theory.

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USSR

UDC 621.385.6

VILKOVA, L. P., GAYDUK, V. I., NEFEDOV, YE. I.

"Interaction of A Nonaxisymmetric Tubular Spiral Flux with Undelayed Waves in a Cylindrical Wave Guide"

Kiev, Izvestiya vysshikh uchebnykh zavedeniy--Radioelektronika, Vol XIV, No 9, 1971, pp 1009-1021

Abstract: A systematic analysis of the effects connected with the effect of the space charge in various superhigh-frequency devices using the interaction of curvilinear electron fluxes with fast electromagnetic waves. The dispersion equation is found in the linear approximations for a tubular spiral electron flux formed by a longitudinal magnetic field in a cylindrical wave guide where the flux axis cannot coincide with the waveguide axis. As an illustration of the developed theory, a more detailed analysis is performed for the case of a nonaxisymmetric flux (for interaction with waves of the  $H_{ok}$  type) and the case of an axisymmetric flux (for interaction with longitudinal E or H waves). The space charge field is considered in the quasistatic approximation.

The discussed linear theory is based on strict expressions for the

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USSR

VILKOVA, L. P., et al., Izvestiya vysshikh uchebnykh zavedeniy-Radioelektronika, Vol XIV, No 9, 1971, pp 1009-1021

charge and current densities in curvilinear fluxes [Gayduk, Radiotekhnika i elektronika, Vol 11, No 2, 219, 1966] and on the excitation equations [Gayduk, Izv. vuzov SSSR -- Radioelektronika, Vol 14, No 1, 17, 1971]. The theoretical characteristics permit expressions to be obtained for the coupling resistance in closed form -- in the form of quadratures or ordinary functions. Thus, it is not necessary to expand the fields excited in the flux in infinite Fourier series as is usually done when considering interaction with one E or H wave. The derived dispersion equation for the propagation constant  $k$  reduces to algebraic equations for interaction of the displaced flux with the  $H_{0k}$  wave and the axisymmetric flux with arbitrary E or H waves. In the general case it is transcendental but also can be approximately reduced to algebraic. Consideration of the quasistatic Coulomb fields indicates the presence of varied effects caused by the space charge in the spiral tubular flux. The effects connected with these waves are different on variation of the position of the centers of the electron orbits and on variation of the azimuthal number  $n$ . Thus, when  $n \neq 0$ , the relativism can be reduced to an increase in effectiveness of the interaction in certain cases. For a displaced flux with a small radius of the electron orbits, the effect of the Coulomb forces is quite different.

2/2

- 179 -

USSR

UDC 591.111.2

KORENEVA, L. G., and GAYDUK, V. I., Institute of Radio Technology and Electronics, Academy of Sciences USSR, Moscow

"The Theoretical Possibility That Ultrahigh-Frequency Oscillations Produce a Resonant Effect in Hemoglobin"

Moscow, Doklady Akademii Nauk SSSR, Vol 193, No 2, 1970, pp 465-468

Abstract: It has been noted that irradiation at one wavelength produces an effect upon a biological specimen which is completely different from that produced by irradiation at a slightly different wavelength, although the reasons for this phenomenon are not clear. When the wavelength is close to the natural frequency of the irradiated dipole group, a resonant effect may take place, provided that this is the only group in the molecule's active center responsible for the inherent structure and function of the substance and provided this group has a large dipole moment and an adequate freedom of transition. In the present study, the resonant effect that may be produced in hemoglobin was studied. The only relatively free and functionally crucial polar molecule in the vicinity of the heme is histidine E7. This amino acid can approach the iron of the heme or the propionic groups and thus either break or form weak bonds of the Fe-O...N type. Irradiation disrupts the natural equilibrium of this reaction by causing a drastic  
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USSR

ZORENEVA, L. G., et al, Doklady Akademii Nauk SSSR, Vol 193, No 2, 1970, pp 465-468

shift in one direction or another. The exact mechanism of this resonant effect is described by means of mathematical equations and models.

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USSR

UDC 669.245'26'27:539.4.014.13

GAYDUK, V. V., LAVRENKO, A. S., SUKHANOV, Yu. V., Zaporozh'yc Machine Building Institute

"Dilatometric Method of Evaluating Temperature Stresses in Nichrome-Tungsten Compositions"

Kiev, Problemy Prochnosti, No 9, Sep 72, pp 108-111

Abstract: A method is outlined for determining the internal heat stresses in compositions with a matrix of EI435 alloy and tungsten wire. The procedure is based on analysis of dilatometric curves of expansion. It is shown that the matrix is subjected to tensile stresses at low temperatures and compressive stresses at high temperatures. It is found how mechanical stresses influence the properties of the matrix as a whole. It is shown that the magnitude and sign of the internal stresses in the matrix must be taken into consideration when making parts from composition sheet material by bending or stamping.

1/1

- 40 -

USSR

UDC 69-419.4:669.24'26'28'27

BANAS, F. P., GAYDUK, V. V., NATAPOV, B. S., ALEKSANDROV, B. V.,  
and YEFIMENKO, L. N., Zaporozh'ye Machine Building Institute

"Nichrome-Molybdenum, Tungsten Composites"

Moscow, Metallovedeniye i Termicheskaya Obrabotka Metallov, No 8,  
1971, pp 6-11

Abstract: The article describes a process for obtaining composite sheet material based on nickel-chromium alloys reinforced with refractory metals and their alloys in the form of unidirectional wires and different types of gauze. Packs of alternating sheets of the matrix and reinforcing fibers with superimposed wire contour frame undergo isothermal hot pressing in a vacuum chamber. During pressing the wire contour frame seals the pack, which permits subsequent rolling of the pressed material in air at 1100-1150° C. Scale-resistant sheet alloys KhN78T (EI435) (20% Cr, 78% Ni, 1% Fe, 1% the balance) and VZh98 (29% Cr, 14%

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USSR

BANAS, F. P., et al., Metallovedeniye i Termicheskaya Obrabotka Metallov, No 8, 1971, pp 6-11

(W, 56% Ni, 1% the balance) are used as the matrix material, 0.2-0.5-mm-diameter molybdenum and tungsten wire gauze as the reinforcement. The described method permits the fabrication of compact materials.

A white unetched zone is formed at the "fiber-matrix" interface. This zone apparently is a solid solution of chromium based on the intermetallides  $WNi_4$  and  $MoNi_n$ . The hardness of the zone is greater than that of the fiber and matrix. The distribution of tungsten, molybdenum, nickel, and chromium along the width of the transition zone shows that the total interdiffusion depth can be characterized by the width of the white unetched zone. The rate of interdiffusion between fibers and matrix is stabilized in 250 hours for tungsten fibers and 500 hours for molybdenum

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USSR

BANAS, F. P., et al., Metallovedeniye i Termicheskaya Obrabotka Metallov, No 8, 1971, pp 6-11

fibers. The width of the transition zone is approximately ten times greater for molybdenum fibers than for tungsten fibers. The solubility of molybdenum in both matrices is considerably higher than that of tungsten. The degree of dissolution of tungsten fibers is considerably lower in the VZh98 matrix containing tungsten than in the tungsten-free KhN78T matrix. The solubility of molybdenum fibers is approximately the same in both matrices. The regularities of the interdiffusion between fibers and matrix in nickel-chromium materials reinforced with molybdenum and tungsten fibers make it possible to select the fiber diameter and the thickness of the outer protective layer of the matrix in relation to the required temperature and service life.

3/3

1/2 007 UNCLASSIFIED PROCESSING DATE--04DEC70  
TITLE--STABILIZATION OF THE VISCOSE FIBER PARAMETERS DURING FORMING -U-  
AUTHOR--(04)-REZNIK, K.YA., GAYDUKOV, K.A., GRITSKOV, I.V., BUTYAGIN, P.A.  
COUNTRY OF INFO--USSR  
SOURCE--KHIM. VOLOKNA 1970, (2), 49-52  
DATE PUBLISHED-----70  
SUBJECT AREAS--MATERIALS  
TOPIC TAGS--RAYON, TEXTILE INDUSTRY  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAME--3005/0102 STEP. NO--UR/0183/70/000/002/0049/0052  
CIRC ACCESSION NO--AP0132395  
UNCLASSIFIED

2/2 007

UNCLASSIFIED

PROCESSING DATE--04DEC70

CIRC ACCESSION NO--AP0132395

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. IN SPINNING RAYON FIBERS DIFFERENCES ARE OBSO. IN FIBER QUALITY FROM 1 SPINNERET HEAD TO ANOTHER. THESE DIFFERENCES ARE CAUSED BY DIFFERENCES IN THE RESIDENCE TIMES OF VISCOSE IN THE CONDUITS OF THE SPINNING MACHINE. A RECIRCULATION METHOD IS PROPOSED AND SUPPORTED BY MATH. DEDUCTIONS FOR EQUALIZING THE RESIDENCE TIMES. FACILITY: KIEV FILIAL, VNIIV, KIEV, USSR.

UNCLASSIFIED

GAY DUKOV, M.G.

EFFECT OF VARIOUS COMBINATIONS OF AGING AND DEFORMATION ON THE STRUCTURE AND MECHANICAL PROPERTIES OF E437B ALLOY

N. N. Dajnov, A. I. Ustarev, A. N. Ushenikov, R. R. Romanova, H. A. Karabakhyanov, and M. G. Gaydukov, Institute of the Physics of Metals, Central Scientific Center of the USSR Academy of Sciences, submitted to press 18 June 1971; final version, 19 February 1972. pages 1251-1258

UDC 620.17:519.25

*Effect of various combinations of aging and deformation on the structure and mechanical properties of E437B alloy*  
to order of the USSR Academy of Sciences  
M. G. Gaydukov & R. R. Romanova  
1972, # 6, 1972

The effect of deformation performed after low-temperature aging before high-temperature aging on the structure and mechanical properties of alloy E437B was studied. Experimental data confirming the possibility of decreasing or preventing recovery in this alloy by means of moderate deformation between low-temperature and high-temperature aging were obtained. It was established that the use of treatment according to the following scheme: hardening--low-temperature aging--deformation (straining)--high-temperature aging leads to an essential increase of the mechanical properties in comparison with aging without deformation.

In reference [1] the conclusion made earlier [2] that preliminary low-temperature aging before high-temperature aging must be effective in increasing the mechanical properties of alloys of the manganese type was experimentally confirmed. In these alloys the initial nuclei of the precipitation phase have an equiaxial form and are capable of a noticeable growth at low-temperature aging. Also, prolonged aging at low temperatures increases the stability of the nuclei (or the Guinier-Preston zone) and their larger quantity is preserved in subsequent high-temperature aging. Such double aging provides a large dispersivity of the precipitations and high strength properties in comparison with the dispersivity and strength of the alloy aged at an increased temperature. However, the minimum on isothermic curves of hardness in high-temperature aging testifies that a

con-siderable part of the G<sub>1</sub> P<sub>1</sub> zones [5] or the metastable nuclei [1] during recovery are dissolved or change their composition even in a case of prolonged preliminary low-temperature aging [4, 5]. According to data in reference [6], in E1437B alloy in recovery 14% of the precipitation phase is dissolved.

We may assume that if we prevent recovery in the transition from low-temperature aging to high-temperature aging, then we will obtain alloys with more dispersed precipitations and greater strength. According to references [7-9], the effect of plastic deformation on the G<sub>1</sub> P<sub>1</sub> zones and the metastable coherent or partially coherent precipitations is manifested in the fact that part of the nuclei may be dissolved, and part stabilized. For example, the G<sub>1</sub> P<sub>1</sub> zones may shift to metastable precipitation, moderate deformations, the effect of the solution of the nuclei may be insignificant in comparison with the effect of stabilization. Having increased the stability of the nuclei, we may prevent or decrease recovery if the alloys are strained after low-temperature aging before high-temperature aging. Aside from this, recovery may be decreased because of the appearance of new nuclei due to the ones dissolved during deformation.

In this work we set ourselves the problem of studying the effect of deformation between low-temperature and high-temperature aging on the structure and mechanical properties of alloy E1437B.

The structure of the alloy was investigated by the fine-foil electron-microscopic method. Measurements of hardness according to Vickers points, elongation and compression. Heat treatment of the alloy consisted of annealing at 1040°C for eight hours and cooling in the air. In the interval of aging of 690-850° the specimens were cooled at a rate of 100° per minute. The aging was accomplished at 700 and 850°. After different variations of heat treatment the specimens were strained by rolling, basically by 20%.

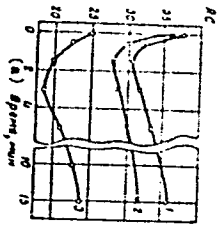


Figure 1. Hardness of alloy E1437B in isothermic aging at 850°: (1) after preliminary aging at 700° for ten hours and straining by 20%; (2) after preliminary straining by 20% and aging at 700° for ten hours; (a) after aging at 700° for ten hours, (a) time, min.



1/2 014 UNCLASSIFIED PROCESSING DATE--30OCT70  
TITLE--TOPOLOGY OF THE FERMI SURFACE OF METALS, REFERENCE TABLES -U-  
AUTHOR--GAYDUKOV, YU.P.  
COUNTRY OF INFO--USSR  
SOURCE--USP. FIZ. NAUK 1970, 100(3), 449-66  
DATE PUBLISHED-----70  
  
SUBJECT AREAS--MATERIALS, PHYSICS  
TOPIC TAGS--METAL CRYSTAL STRUCTURE, CHEMICAL BONDING, FERMI SURFACE  
  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAME--1998/0488 STEP NO--UR/0053/70/100/003/0449/0466  
CIRC ACCESSION NO--AP0121162  
UNCLASSIFIED

2/2 014

UNCLASSIFIED

PROCESSING DATE--30OCT70

CIRC ACCESSION NO--AP0121162

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE FERMI SURFACE TOPOLOGY IS GIVEN FOR METALS AND INTERMETALLIC COMPOUNDS., BASED MAINLY ON GALVANOMAGNETIC EFFECTS. THE TABLE GIVES THE CRYSTAL STRUCTURE, FEATURES OF THE FERMI SURFACE, AND REFS. INDICATING THE METHODS USED IN STUDYING THE FERMI SURFACE. FACILITY: MOSK. GOS. UNIV. IM. LOMONOSOVA, MOSCOW, USSR.

UNCLASSIFIED

*COPY* *4-70* *US 0000*

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Abstracting Service:  
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Ref. Code:

**US 0000**

83872w Determination of the specular reflection coefficient of conduction electrons in zinc whiskers at  $T = 4.2^\circ\text{K}$ . Gaidukov Yu. P.; Kadlecova, I. (Moscow State Univ., Moscow, USSR). *J. Low Temp. Phys.* 1970, 2(1), 131-6 (Eng). The influence was studied of the transverse dimensions of Zn single crystals in the form of whiskers and thin platelets on their sp. resistance ( $\rho$ ) at  $T = 4.2^\circ\text{K}$ . The thickness of the specimens measured was 10-0.2  $\mu$ . With decreasing thickness of the specimens,  $\rho$  increased considerably. Under the assumption that for a pure diffuse reflection of electrons on the specimen boundary the product ( $\rho_\infty \cdot d_\infty$ ) in a bulk specimen is equal to  $1.8 \times 10^{-11}$  ohm-cm<sup>2</sup> for a crystallographic orientation corresponding to whiskers, and  $2.2 \times 10^{-11}$  ohm-cm<sup>2</sup> for a crystallographic orientation corresponding to platelets, a specular reflection coeff. of approx. 0.6 was calcd. for both whiskers and platelets. RCMY

REEL/FRAME  
**19771106**

18

Industrial

USSR

UDC:662.215.2

AMELINA, L. S., GAYEK, Yu. V., SVIRIDENKO, A. N., Dnepropetrovsk

"Energy Evaluation of the Process of Welding of a Bimetal Using Explosive Energy"

Novosibirsk, Fizika Goreniva i Vzryva, Vol. 6, No. 3, Sep 70, pp. 358-363

Abstract: Experimental data are presented to indicate the energy capacity of explosive welding of copper with stainless steel. The experiments were performed using tubular specimens. It is established that the boundary between the steel and copper may be wavy or almost straight, the geometry of the waves depending on the thickness of the copper cladding layer and the radial velocity with which the inner tube expands under the influence of the explosive charge to meet the outer tube. It is noted that the welded boundary is heterogeneous in its structure.

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1/2 030 UNCLASSIFIED PROCESSING DATE--04DEC70  
TITLE--CONDENSED DISCHARGE THROUGH CAPILLARIES -U-  
AUTHOR--GAYEL, I.A. G  
COUNTRY OF INFO--USSR  
SOURCE--ZH. PRIKL. SPEKTROSK. 1970, 12(5), 804-10.  
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CIRC ACCESSION NO--AP0136311

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE RESULTS ARE REPORTED OF AN ATTEMPT TO DET. THE DEGREE OF EXTINCTION OF THE RADIATION FROM THE CAPILLARY WHEN THE CURRENT PASSES THROUGH ZERO, THE CHANGES IN THE SPECTRAL COMPN. OF THE RADIATION, THE RELATION BETWEEN THE D. AND VELOCITY OF THE DIRECTED ELECTRON STREAM, AND THE RADIATION INTENSITY OF THE CONTINUOUS SPECTRUM; TO OBTAIN ADDNL. INFORMATION ON THE PERTURBATION OF THE ENERGY STATES OF THE IONS AND ATOMS UP TO THE FORMATION OF A CONTINUOUS SERIES OF VALUES; TO ESTABLISH THE CHARACTER AND FLOW RATE OF THE PLASMA; TO FIND A METHOD OF MEASURING THE PLASMA TEMP.; AND TO DET. THE ENERGY BALANCE AND EFFICIENCY COEFF. OF THE TRANSFORMATION OF ELEC. INTO RADIATIVE ENERGY. THE DISCHARGE IS A POWERFUL AND CONVENIENT SOURCE OF CONTINUOUS SPECTRUM FOR THE STUDY OF THE ABSORPTION SPECTRA OF POORLY TRANSMITTING SUBSTANCES.

UNCLASSIFIED

USSR

UDC 621.762.002.5(088.8)

UDACHIN, I. V., MAKAROV, V. S., TIMOSHIN, D. Ya., GAYEV, O. B., and GRIN, L. T.

"Device for Processing Powdered Materials With Liquids"

USSR Author's Certificate No. 268610, Filed 1/07/68, Published 3/08/70  
(Translated from Referativnyy Zhurnal-Metallurgiya, No. 2, 1971, Abstract  
No. 2 G472 P).

Translation: The device includes a container, the base of which is equipped with a drainage aperture and a perforated barrier. In order to eliminate oxidation of the powder near the bottom of the container as it is dried, an automatic valve is mounted coaxially with the drainage aperture for drainage of the liquid.

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USSR

UDC 576.858.13:636.27.083.35

PISKAREVA, N. A. and GAYEVA, L. L., Leningrad Scientific Research Institute  
of Children's Diseases

"The Effect of Cofactor on Sensitivity of the Neutralization Reaction with  
Vaccine Virus in Tissue Cultures"

Moscow, Laboratornoye Delo, No 12, 1971, pp 733-736

Abstract: Sera from children vaccinated for the first time against smallpox were used. The neutralization reaction was conducted with 67 serum samples in a culture of chick fibroblasts with and without cofactor. At the same time, the hemmagglutination inhibition reaction with 55 specimens (I), and the neutralization reaction with human chlorio-allantoic membrane (CAM) with 23 specimens (II) were run in parallel. The obtained results show that use cofactor (as 10% native rabbit serum) increased the neutralization reaction sensitivity two weeks after vaccination. Virus-neutralizing antibodies were recorded in sera diluted to 1:80 and higher. At the same time, titration of sera under similar conditions but without cofactor showed that antibodies were either absent or present in small amounts (1:10). The mean geometric titers of virus-neutralizing antibodies two weeks after vaccination was 1:56 with cofactor and only 1:10 without it. A similar relationship was established with sera taken six weeks after vaccination. Two other  
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PISKAREVA, N. A., et al., Laboratornoye Delo, No 12, 1971, pp 733-736

reactions, I and II, showed approximately the same results with the use of cofactor. Statistically reliable data with respect to antibodies for the suggested method and for methods I and II could not be obtained.

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Acc. Nr

AP0049989

Abstracting Service:  
CHEMICAL ABST.

R. T. GAYEVA  
4-70

Ref. Code  
UR0131

82427t Dehydration, rehydration, and sensitivity of Troshkovskii clays to drying. Popov, A. D.; Shchetnikova, I. I.; Chukrazva, E. I.; Kelareva, E. I.; Gagva, R. T. (Vost. Inst. Ogneupor. Sverdlovsk. SSSR). Ogneupor 1970, 35(1), 23-0 (Russ). The temp. interval and the dehydration kinetics of the Troshkovskii clays, their sensitivity to drying, and the possibility to intensify the drying without forming cracks were studied. To study dehydration processes at high temps. all samples of clays were 1st dried to const. wt. at 60°. According to dehydration curves some samples (A) loose a small amt. of H<sub>2</sub>O at low temps. (100-200°). It is in abs. accord with DTA: on DTA curves up to 200°C slight initial endothermal effects are evident. Other samples (B) of the Troshkovskii clays lose nearly all adsorbed H<sub>2</sub>O at 100-200°. The amt. of H<sub>2</sub>O adsorbed is of 2 kinds; it is caused by the presence of Mg<sup>++</sup> and Ca<sup>++</sup> in the exchange com-

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plex. The dehydration of clays is considerably dependent on duration of heating. Samples (A) dehydrate almost fully at 100° during 20-30 min while samples (B) during 90-100 min. The dehydration is accelerated by increasing temp. to 150-200°. For all samples the escape of adsorbed water is complete at ~300°. Samples after thermal treatment again take up water. This rehydration of samples was detd. from the wt. changes of samples annealed at 100, 200, 300, and 500° and then exposed at room temp. to relative air moisture of 25 and 75%. The rehydration increases with increasing content of the montmorillonite in the clay. All samples after thermal treatment at 100° adsorb much more water than untreated samples. The thermal treatment >300° brings about a lower rehydration. The removal of adsorbed water from montmorillonite is the main cause of propensity of some Troshkovskii clays to cracking. Preliminary treatment of the Troshkovskii clays contg. montmorillonite at 300-400° achieves partial dehydration; also, it decreases rehydration and sensitivity to drying. J. Jindra

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19801928

USSR

UDC 621.762.5:669.29:669.018.4:620.18

KISLYY, P. S., SHVAB, S. A., GAYEVSKAYA, L. A., NESCHETNYI, V. A., and BUTUZOV, S. S., Institute of Problems of Material Science, Academy of Sciences Ukrainian SSR

"Structure and Properties of Titanium Diboride With 20% Titanium Carbide"

Kiev, Poroshkovaya Metallurgiya, No 9, Sep 73, pp 35-38

Abstract: Samples of titanium diboride powder with 20% titanium carbide (particle size of initial powder = 1 micron) with a porosity of almost 32% were sintered in a graphite resistance furnace in hydrogen at 2000-2300°C for 0 to 180 minutes. After a specified soaking time at a given temperature the samples were cooled, and grain size, bend strength, porosity and electric resistance were determined. It was found that grain size increases with sintering time (the higher the temperature the larger the grain size). Bend strength increases with sintering time up to a point (around 40 minutes) and then starts declining. The highest bend strength value is achieved for a sintering temperature of 2300°C but after the 40-minute mark it diminishes more quickly than a sample sintered at 2200°C. Porosity curves were the opposite of the bend strength curves with porosity dropping during the first 40 minutes and then increasing. Electrical resistance curves followed the same pattern

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KISLYY, P. S., et al., Poroshkovaya Metallurgiya, No 9, Sep 73, pp 35-38

as the porosity curves although samples sintered at 2300°C reach a low value after 40 minutes of sintering and this value remains constant for the subsequent sintering time. The conclusion was reached that titanium diboride samples with 20% titanium carbide possess the best qualities after sintering at 2200-2250°C for 40 minutes. 6 figures, 1 table, 3 bibliographic references.

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USSR

UDC 621.357.7:669.225'73

KUDRA, O. K., IZBEKOVA, O. V., GAYEVSKAYA, L. V.

"Study of Electrolytic Separation of Silver-Cadmium Alloy"

Vestn. Kiev. Politekhn. In-ta. ser. Khim. Mashinostr. i Tekhnol [Herald of Kiev Polytechnical Institute, Chemical Machine Building and Technology Series], No 8, 1971, pp 52-54 (Translated from Referativnyy Zhurnal, Khimiya, No 3, 1972, Abstract No 3 L327 by Z. A. Solov'yeva).

Translation: Cathode polarization and the composition of Ag-Cd alloys from a trilonate electrolyte are studied. It is demonstrated that the precipitation of the alloy begins after attainment of  $D_{(lim)}$  with respect to Ag. As  $D$  is increased, the content of Cd in the alloy increases. Following attainment of the second  $D_{(lim)}$  (for Cd), the composition of the alloy is stabilized and becomes independent of  $D$ . Mixing increases both  $D_{(lim)}$ , increases the content of Ag in the alloy and increases the permissible value of  $D$ . The yield per current of alloy increases with increasing  $D$ , particularly without agitation. As the content of Ag in the alloy increases, the hardness of the sediment passes through a maximum at 30-35% Ag. The intermediate resistance of the alloy is  $\sim 0.03$  ohm with various Ag contents, which is near that of pure electrolytic silver. To produce an alloy containing 30-40% Ag, an elec-  
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USSR

UDC 621.357.7:669.225'73

KUDRA, O. K., IZBEKOVA, O. V., GAYEVSKAYA, L. V., Vestn. Kiev. Politekhn.  
Inta. ser. Khim. Mashinostr. i Tekhnol, No 8, 1971, pp 52-54.

trolyte is recommended containing (mol/l)  $\text{AgNO}_3$  0.035,  $\text{CdSO}_4$  0.165, trilon  
B 0.3, pH 8-9 (adjusted by KOH), D 1-1.25 a/dm<sup>2</sup> without agitation or  
7-8 a/dm<sup>2</sup> with intensive agitation.

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USSR

UDC 612.123-06:612.013-064

GAYEVSKAYA, M. S. and BELITSKAYA, R. A., Institute of Biomedical Problems,  
Moscow

"Content of Nonesterified Fatty Acids in Blood Plasma During Hypobiosis"

Moscow, Voprosy Meditsinskoy Khimii, No 3, 1971, pp 263-266

Abstract: Hypobiosis was induced in rats by combining artificial hibernation (administration of a lytic cocktail consisting of chlorpromazine, pipolphen, promedol, and d-tubocurarine) with external chilling. Hypobiosis was prolonged by transferring the animals to a chamber at 16°C where they remained for 24 to 29 hours. The level of nonesterified fatty acids rose the first day but steadily declined thereafter due to their gradual utilization for energy needs. Twenty-four hours after the artificial hibernation was terminated by warming the animals to 28°C, the content of nonesterified fatty acids returned to normal. Thus, nonesterified fatty acids seem to be a source of energy for nonhibernating animals like rats during hypobiosis and for some time thereafter.

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USSR

UDC 612.013-0647.015.3

GAYEVSKAYA, M. S., NOSOVA, YE. A., BELITSKAYA, R. A., and KURKINA, L. M.,

"Metabolism in Rat Tissues During Prolonged Artificial Hypobiosis"

Moscow, Byulleten' Eksperimental'noy Biologii i Meditsiny, No 4, 1971, pp 53-55

Translation: Prolongation of artificial hypobiosis in rats from 24 to 29 hours by combining premedication with external chilling did not result in significant shifts in carbohydrate-phosphorus metabolism in the brain, but intensified conformational changes in brain proteins. The glycogen content of the liver and muscles during 24 to 29 hours of hypobiosis was very low, but hyperglycemia persisted. After 29 hours of hypobiosis, some of the animals exhibited a sharp decrease in the content of nonesterified fatty acids in the blood.

Mortality among nonhibernating homoiothermic animals in a state of artificial hypobiosis (maintenance of lowered vital activity against a background of hypothermia) is known to increase when this state is sustained for more than one day. There are indications that death of animals is related to the development of noncoordination of the metabolic processes in the tissues (14, 22).

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USSR

GAYEVSKAYA, M. S., et al., Byulleten' Eksperimental'noy Biologii i Meditsiny No 4, 1971, pp 53-55

Metabolic changes in the tissues of rats kept in a state of hypobiosis for up to one day were investigated by us in earlier studies (3, 5, 9, 11). The purpose of this work was to study metabolic shifts in the brain, liver, muscles, and blood of rats when the state of hypobiosis is lengthened from 24 to 29 hours.

Procedure

Experiments were performed on male rats weighing 150 to 250 g. Artificial hypobiosis was induced by Timofeyev's method (8, 12). After injection of a lytic mixture and tubocurarine, the rats were placed in a ventilated chamber at  $-10^{\circ}\text{C}$  where their body temperature dropped to 18 to  $20^{\circ}\text{C}$ . The animals were then transferred to a chamber where the temperature was 16 to  $18^{\circ}\text{C}$  and their body temperature was maintained at 18 to  $22^{\circ}\text{C}$  for 24 to 29 hours.

After the animals were decapitated, the electrophoretic motility of soluble proteins (7) in brain tissues and their ultraviolet absorption spectra (13) were determined. Blood sugar was determined by the Hagedorn-Jensen method; ketone bodies (2) and nonesterified fatty acids (19) were also determined. Other studies were conducted in tissues after they were frozen in situ in liquid nitrogen. Total amide groups of proteins (6), total content of ATP and ADP (from readily hydrolyzable phosphorus), content of creatine

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GAYEVSKAYA, M. S., et al., Byulleten' Eksperimental'noy Biologii i Meditsiny No 4, 1971, pp 53-55

phosphate (1), inorganic phosphorus (21), glucose (10), glycogen (18), and lactic acid (15) were determined in brain tissue. Glycogen was determined in the liver and muscles (4) and the content of glucose (10) and of lipids (16) was determined in the liver.

Results

Prolongation of the period of hypobiosis from 24 to 29 hours did not produce any significant shifts in carbohydrate-phosphorus metabolism in the brain.

Such shifts as occurred indicated that conformational changes in brain proteins intensified as hypobiosis continued. However, the insignificance of the shifts noted both in carbohydrate-phosphorus metabolism and in brain proteins suggest that they could hardly have been a major factor in the death of animals with the given duration of hypobiosis.

Extension of hypobiosis from 24 to 29 hours did not produce significant shifts in the amount of glucose or glycogen in the liver. There was a slight but significant decrease in the amount of lipids. The glycogen content of the muscles after 29 hours of hypobiosis remained as low as after 24 hours.

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GAYEVSKAYA, M. S., et al., Byulleten' Eksperimental'noy Biologii i Meditsiny  
No 4, 1971, pp 53-55

Hyperglycemia persisted after the period of hypobiosis was lengthened. It could have been caused either by glyconeogenesis or by the very low utilization of glucose by the tissues, which changed after chilling to the preferential utilization of fat, as is the case in supercooling and hibernation (17, 20). Other investigators (22) detected hypoglycemia when they tried to prolong hypobiosis in rats, but we did not. After 29 hours of hypobiosis, the blood content of ketone bodies remained high, a phenomenon consistent with the idea of preferential utilization of fat during hypothermia.

The content of nonesterified fatty acids in blood plasma after 29 hours was little different from that found at the end of 24 hours of hypobiosis in 7 rats but was sharply lower in 3. These particular rats were in the most serious condition: respiration was infrequent, barely perceptible, and muscle tone was very weak.

Thus, of the indices of metabolism studied, only the insufficiency of nonesterified fatty acids in the blood could be directly related to the death of the rats following the prolongation of hypobiosis for more than one day.

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