USSR                                          UDC 576.858.75.095.383

ARKHANGEL'SKIY, YE. V., CHEPULIS, G.-K. S., DERKACH, YU. S., KOSYAKOV, P. N.,
and ZHDANOV, V. M., Institute of Virology imeni D. I. Ivanovskiy, Academy of
Medical Sciences USSR, Moscow

"New Evidence that Influenza Virus Can Be Freed of Host Cell Antigens"

Abstract: AO/PR8 influenza virus always contains host cell antigens.  Species-
specific chicken antigen is located on the surface of the virus, while
Forssman's heterogenous antigen and group specific A antigen are incorporated
into deeper structures.  By exposing influenza virus -- prepurified through
cellulose ion-exchange column chromatography -- to the enzymatic activity of
trypsin, the antigens can be removed from the virus, as evidenced by immuno-
chemical and fractional analysis and by radioisotope methods.  Influenza virus
treated with trypsin preserves its biological properties.  However, it no
longer exhibits its activity toward tissue antisera and reacts only with virus-
specific antisera.

1/1

Immunology

URYVAYEV, L. V., CHEPULIS, G.-K., DERKACH, Yu. S., ZHDANOV, V. M., and
YERSHOV, F. I., Institute of Virology imeni D. I. Ivanovskiy, Academy of
Medical Sciences USSR

"Protein Components and Antigens of Venezuelan Equine Encephalomyelitis
Virus"

Abstract:  The protein composition of highly purified Venezuelan equine
encephalomyelitis virus was studied by electrophoresis in polyacrylamide
gel and by double diffusion in agar.  Both methods revealed the presence
in the virus particles of three virus-specific proteins with antigenic
properties.

1/1

USSR                                          UDC 576.311.1

URYBAYEV, L. V., DERKACH, YU. S., ZHDANOV, V. M., and YERSHOV, F. I.,
Institute of Virology imeni D. I. Ivanovskiy, Academy of Medical Sciences USSR

"Structural Proteins of Venezuelan Equine Encephalomyelitis Virus"

Abstract:  Polyacrylamide gel electrophoresis revealed that highly purified
VEE virus contains three main proteins.  The ribonucleoprotein fraction
isolated by centrifuging virus destroyed by tween and ether in a performed
cesium chloride density gradient (1.43 g/cm$^3$) contained a protein with a
molecular weight of 59,000 to 61,000.  The more mobile hemagglutinin protein
had a molecular weight of 34,000 to 38,000.  The fraction which  may represent
basal membrane protein had a molecular weight of 15,000 to 18,000.

1/1

USSR

UDC 578.083

ZHDANOV, V. M., Academician, Academy of Medical Sciences USSR, SITO, A. F., and DERKACH, Yu. S., Institute of Virology imeni D. I. Ivanovskiy, Academy of Sciences USSR, Moscow

"Identification of the Information RNA of Newcastle Disease Virus"

Moscow, Doklady Akademii Nauk SSSR, Vol 193, No 1, Jul/Aug 70, pp 211-214

Abstract: The specificity of virus-induced RNA was studied, using chicken fibroblasts which were incubated to determine the content of 18 S-RNA. A portion of this preparation was infected with Newcastle disease virus and subsequently treated to remove the virus and isolate the RNA in its pure form (18 S-RNA). The portions of 18 S-RNA obtained from noninfected and infected cultures were incubated in a protein-rich medium; 18 S-RNA from infected cultures induced protein synthesis more intensely than that from noninfected cultures. Subjecting both specimens to various scientific tests showed that the RNA isolated from the infected portion had a specific effect on the formation of its products, leading to the conclusion that it is the information RNA in the synthesis of ribonucleoproteins (S-antigen).

1/1

USSR                                              UDC 616.5-092:613.1(98)

SHAPOSHNIKOV, O. K. and DERKACHEV, Ye. F., Chair of Skin and Veneral Diseases, Military Medical Academy imeni S. M. Kirov

"Effect of Climate on the Development of Some Dermatoses in the Far North"

Moscow, Vestnik Dermatologii i Venerologii, No 9, 1971, pp 11-13

Abstract:  Analysis of the case histories of persons hospitalized over a period of 10 years in the Far North (Kila Peninsula) for various forms of pyodermatitis (702) and microbial eczema (1000) clearly implicated weather conditions in the origin of these skin diseases.  The incidence of pyodermatitis is characterized by 2 peaks, winter (December to February) and summer (July and August).  The winter peak is attributed to the lack of sunlight and prolonged low temperatures combined with high humidity and strong winds, resulting in overchilling and lowered resistance.  The summer peak is apparently due to the high humidity and little wind, which create favorable conditions for the development of pathogenic flora.  Microbial eczema occurs most often in May and October, transitional months marked by extreme weather instability.  More than half the cases of pyodermatitis and eczema develop during the first year of the individuals' stay in the Far North.  The number drops sharply and steadily thereafter as they become acclimatized.
1/1

1/2    039                 UNCLASSIFIED              PROCESSING DATE--09OCT70
TITLE--STATISTICAL ANALYSIS OF THE DECARBURIZATION DYNAMICS OF A MOLTEN
METAL -U-

AUTHOR-(05)-KAGANOV, V.YU., SURGUCHEV, G.D., DERKACHEV, YE.N., MOSALOV,
G.I., TITOV, V.I.

COUNTRY OF INFO--USSR

SOURCE--IZV. VYSSH. UCHEB. ZAVED., CHERN MET. 1970, 13(1), 167-71

DATE PUBLISHED--------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--DECARBURIZATION, LIQUID METAL, STATISTIC ANALYSIS, OXYGEN,
CARBON, FLUID DYNAMICS

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1981/0594         STEP NO--UR/0148/70/013/001/0167/0171

CIRC ACCESSION NO--AT0050601
                         UNCLASSIFIED

CIRC ACCESSION NO--AT0050601

ABSTRACT/EXTRACT--(U) GP-0-  ABSTRACT.  REMOVAL OF C FROM A LIQ. METAL IS A COMPLEX PROCESS, NOT ALWAYS SUSCEPTIBLE TO RECOGNIZED FORMS OF ANAL. RESULTS ARE GIVEN OF STATISTICAL ANAL. OF RANDOM FUNCTIONS DETG. THE DYNAMICS OF DECARBURIZATION OF FUSED METAL BY THE INTRODUCTION OF O. THE CONNECTION BETWEEN AMT. OF O ADDN. AND RATE OF DECARBURIZATION (U(T)-V(T)) IS DETD., THOUGH THIS IS DIFFICULT IN VIEW OF THE MULTIPLE PROBABILITY SURFACES OF THE RANDOM FUNCTIONS, AND HENCE, ONLY THE SIMPLEST APPROXNS. CAN BE EXAMD.  CURVES ARE GIVEN TO COMPARE THE MATH. EXPECTATION AND MEAN SQUARE DEVIATIONS OF EXPTL. MELTS WITH RESULTS ACTUALLY OBTAINED.  THE C CONTENT EXERCISES ONLY A SMALL EFFECT ON THE MATH. EXPECTATION OF V(T).  DECARBURIZATION IS A NONSTATIONARY EFFECT FOR STEEL MELTS, OWING TO A COMBINATION OF INTERNAL COMPN. FACTORS.

UNCLASSIFIED

TITLE--WASHING OF SUSPENSION POLYMERS IN A ROTOR PULSATION APPARATUS -U-

UNCLASSIFIED          PROCESSING DATE--23OCT70

AUTHOR-(05)-MAYOROV, B.A., GARBUZOVA, G.L., SVICHAR, L.I., DERKO, P.P., NOVICHKOV, A.N.

COUNTRY OF INFO--USSR

SOURCE--PLAST. MASSY 1970, (3), 59-60

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS, MECH., IND., CIVIL AND MARINE ENGR

TOPIC TAGS--POLYVINYL ACETAL RESIN, CELLULOSE RESIN, CHEMICAL SUSPENSION, MANUFACTURING METHOD

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1997/0579

STEP NO--UR/0191/70/000/003/0059/0060

CIRC ACCESSION NO--AP0119497
UNCLASSIFIED

CIRC ACCESSION NO--AP0119497
ABSTRACT/EXTRACT--(U) GP-0-  ABSTRACT.  THE WASHING PROCESS OF POLY(VINYL
  BUTYRAL) AND ET CELLULOSE IN A ROTOR PULSATION APP. WAS STUDIED ANAL. TO
  DET. THE OPTIMUM NO. OF WASHING CYLCES UNDER MANUFG. CONDITIONS.  THE
  WASHING WAS EFFICIENT, REQUIRED LESSER AMTS. OF WASHING AGENTS, AND
  COULD BE USED AS A CONTINUOUS PROCESS.

UNCLASSIFIED

USSR

UDC 541.138.3:547

ARTEMOVA, V. M., DERKUL'SKAYA, V. S., and GOVORUKHA, V. G., Donetsk Institute of Soviet Trade

"Study of the Activity of Titanium, Zirconium, Niobium, and Tantalum During Electroreduction of Certain Organic Acids"

Abstract: A study was made of the activity of the transition metals in groups 4 and 5 to reduction of organic acids of various structures. The reduction of maleic, benzoic, oxalic, and phthalic acids in sulphuric acid or alcohol-sulphuric acid solutions was studied by the polarization curve method and also coulometrically. The data indicate that maleic acid causes a potential shift in the positive direction, reaching 200 mv in titanium, niobium, and tantalum. The coulometric measurements showed that electroreduction of maleic acid occurs with good yield on tantalum and with somewhat less yield on niobium and zirco-nium. Electroreduction of oxalic acid does not occur on any of these cathodes at a concentration on the order of 0.1 mol/l. However, when the acid concen-tration is increased by five times, some reduction does occur on zirconium. Benzoic and phthalic acids, practically speaking, are not reduced under the

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USSR

ARTEMOVA, V. M., et al, Elektrokhimiya, Vol 6, No 8, Aug 70, pp 1128-1130

conditions used on any of the metals. The selectivity of the process probably results not only from the greater or lesser change in hydrogen potential, but also from the differing nature of the hydrating agent on the metals, which have different capacities for hydrogen adsorption.

2/2

Single Crystals

USSR

UDC 548.55

PERFILOVA, V. E., BODYACHEVSKIY, S. V., AVVAKUMOVA, L. A., and DERMAN, A. S.

"Study of the Temperature Fields of Melts for Growing Single Crystals"

Moscow, Neorganicheskiye Materialy, Vol 6, No 1, Jan 70, pp 100-103

Abstract: An investigation was made of the temperature fields of aggressive solutions of $V_2O_3$-$Fe_2O_3$ in BaO-$B_2O_3$ and PbO-$PbS_2$-$B_2O_3$ melts to determine the optimal temperature conditions for growing single crystals. The temperature fields were measured in the 1000-1250°C range. During one experiment the temperatures were measured in several horizontal planes of the melt and the temperature field was constructed from this. It was established that there are zones of thermal conductivity and free convection zones in the melt.

It is pointed out that the planar isotherms in the upper part of the melt arise from the fact that the heat transfer is realized as a result of thermal conductivity. The absence of convection in the liquid is characterized by the fact that the Rayleigh criterion does not exceed 1710, i.e., $Ra + Pr \cdot Gr < 1710$. The value of Ra was calculated for a boron-barium melt. In order to spread the region of existence of convection to the entire volume of the melt, it is necessary to increase the mean temperature level. In order to maintain crystallization

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USSR

PERFILOVA, V. E., et al, Neorganicheskiye Materialy, Vol 6, No 1, Jan 70, pp 100-103

conditions when doing this, the concentration of crystal-forming oxides must be increased.

It is also pointed out that the calculated values of the Rayleigh numbers confirm that the measured temperature fields correctly reflect the heat-exchange processes taking place in the melt. When growing single crystals from the investigated systems on a seed charge, the crystal grows in the upper part of the melt. As the temperature is decreased, the zone of thermal conductivity increases. Crystal growth becomes difficult since the melt surrounding the crystal is impoverished by the garnet phase. At the same time, the zone of thermal conductivity prevents penetration of the convective fluxes rich in crystal forming oxides into the crystal. Consequently, the mass transfer in this region can be realized only by diffusion.

2/2

104739a     Temperature fields of melts for growing single crystals. Perfilova, V. E.; Bodyachevskii, S. V.; Avvakumova, L. A.; Derman, A. S. (Vses. Nauch.-issled. Inst. Elektroterm. Oborudovaniya, USSR). Izv. Akad. Nauk SSSR, Neorg. Mater. 1970, 6(1), 100-3 (Russ). To det. the optimum temp. conditions for the growth of single crystals, temp. fields of aggressive $V_2O_3$-$Fe_2O_3$ soln. in BaO-$B_2O_3$ and PbO-$PbF_2$-$B_2O_3$ melts were studied. The temp. fields were examd. at 1000–1250°. The presence of a thermal cond. zone and a free convection zone was established in the melts.     S. A. Mersol

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REEL/FRAME
19801282

USSR

UDC 621.382.3

DERMENZHI, P.G., YEVSEYEV, YU. A.

"Concerning The Turn-On Transient Of A Triode Structure"

V sb. Poluprovodn. pribory i ikh primeneniye (Semiconductor Devices And Their Application--Collection Of Works), Issue 24, Moscow, "Sov.radio," 1970, pp 59-69 (from RZh--Elektronika i yeye primeneniye, No 4, April 1971, Abstract No 4B240)

Translation: The paper considers the turn-on transient of a triode structure without an allowance for instantaneous determination of the distribution of the excess carriers with respect to the thickness of the base region. In the case of high injection levels in the base, analytical expressions are obtained for nonstationary distributions of the emitter and collector current densities with respect to the structure area and the concentration of excess carriers at the boundary of the emitter junction. 3 ill. 5 ref. Author's abstract.

1/1

USSR
UDC 614.484:615.285.7]:614.72

TUNIK, A. I., ANANOVSKIY, L. N., PRAVE, V. Ye., TIKHOTSKAYA, A. N.,
DERNITSYNA, Ye. A., and MINKINA, T. A., Moscow Municipal Disinfection
Station

"Hygienic Evaluation of the Air in Places Treated With Chlorophos"

Abstract:  Analysis of 250 air samples in a special experimental chamber
and of air samples from well-ventilated places in cafes, hostels, hospitals,
and restaurants showed that 3 hours after treatment with a 5% water solu-
tion of the organophosphorus insecticide chlorophos, the air contained no
more than 0.5 mg/m$^3$ of the compound (maximum permissible concentration).
With very poor ventilation it took as long as 24 hours before the concen-
tration of the insecticide dropped to the permissible level.  The external
temperature was an important factor.  When the outdoor and indoor tempera-
tures differed considerably and the windows were open, all traces of
chlorophos disappeared within one hour of treatment.

1/1

USSR

UDC: 621.374.4(088.8)

BARANOV, V. V., DERNOVSKAYA, N. V.

"A Frequency Divider"

USSR Author's Certificate No 265949, filed 29 Mar 67, published 2 Jul 70 (from RZh-Radiotekhnika, No 1, Jan 71, Abstract No 1G259 P)

Translation: This Author's Certificate introduces a frequency divider which contains two division channels based on flip-flops. These flip-flops are connected to an analyzer which is equipped with coincidence circuits. To eliminate any isolated failures of the divider, the coincidence circuits are connected to an OR logic cell which is connected through an integrating circuit, threshold module and delay module to an actuating module which synchronizes the divider in the case of a failure, or switches the outputs of the divider channels.

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DEROYAN, G.

# MEDICINE

DEROYAN, O., head of the Chair of Communal Hygiene, and KOS'YAN, Sh., docent of the Chair of Labor Hygiene of the Medical Institute (Yerevan)

"Equipment Should be Under Our Master"

Moscow, Meditsinskaya Gazeta, 14 Feb 71, p 6

Excerpts: More and more often scientists must resort to modern biochemical, physiological, histochemical, and other methods of research to accomplish the various tasks of hygienic science. In particular, problems connected with normalizing the harmful effects of external environmental factors... But further extensive development of experimental work cannot be guaranteed if a hygienic institution is poorly equipped with modern equipment.

Many devices and instruments are imperfect (they are not durable, they are cumbersome, there are no automatic devices, etc.) and their parts are in short supply....

There is no equipment for studying comprehensively the physiological functions of an organism. But one cannot do without it during research on the physiology of labor, school and domestic hygiene, etc. Few electronic devices are produced, and for this reason the new methods of studying the human organism (for example,

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USSR

DEROYAN, O., KOS'YAN, Sh., Meditsinskaya Gazeta, 14 Feb 71, p 6

radiobiotelemetry) are still unavailable to hygienists. Not enough attention is being given to producing devices to automatically record indication levels of the external environment in humoral factors (chemical substances, dust, vibration, and bacterial contamination). The lack of needed equipment makes the task of gathering air samples very time-consuming.

Well, what about the production base? Institutions, primarily in Moscow -- the experimental technical production of the Scientific Research Institute of Labor Hygiene and Occupational Diseases of the USSR Academy of Medical Sciences -- are engaged in producing equipment for hygienic research. Both enterprises primarily serve their own institutes and their capability to fulfill orders from other institutions is limited. Some devices and parts are produced in Leningrad, Kiev, Sverdlovsk, and Kiev, making the search for and receipt of needed equipment and instruments for peripheral scientific institutions extremely complicated....

Installation of experimental equipment in place also encounters considerable difficulties. Just try to obtain parts and components if several enterprises produce them and you have to order one part from Moscow, another from Kiev, and a third from Leningrad!
2/3

1/2    013                    UNCLASSIFIED          PROCESSING DATE--30OCT70
TITLE--HIGHLY LOCAL X RAY MICROANALYZER -U-

AUTHOR-(05)-VASICHEV, V.N., VERESHCHAGIN, YE.N., DERSHVARTS, G.V.,
KAPLICHNYY, V.N., KISEL, G.D.
COUNTRY OF INFO--USSR

SOURCE--PRIB. TEKH. EKSP. 1970, 1, 217-20

DATE PUBLISHED------70

SUBJECT AREAS--PHYSICS

TOPIC TAGS--ELECTRON MICROSCOPE, X RAY SPECTROMETER, MICROOCHEMICAL
ANALYSIS

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1988/1476        STEP NO--UR/0120/70/001/000/0217/0220

CIRC ACCESSION NO--AP0106232
                      UNCLASSIFIED

CIRC ACCESSICN NO--AP0106232
ABSTRACT/EXTRACT--(U) GP-0-  ABSTRACT.  AN ELECTRON MICROSCOPE X RAY
MICROANALYZER IS DESCRIBED WHICH MAKES IT POSSIBLE TO CONDUCT AN X RAY
SPECTRUM ANAL. OF AREAS WITH A DIAM. SIMILAR TO OR LESS THAN 500
ANGSTROM.  RESULTS OF TESTING OF THE LIGHTING SCHEME OF THE DEVICE AND
ITS NCNDISPERSICN SYSTEM OF REGISTRATION OF CHARACTERISTIC SPECTRA ARE
PUBLISHED.  LINES OF THE CHARACTERISTIC SPECTRUM CAN BE REGISTERED IF
THE WT. OF THE PART OF THE MATERIAL UNDER STUDY EQUALS 1.7 TIMES 10
PRIME NEGATIVE17 G.

UNCLASSIFIED

PIKUNOV, M. V., DANILINA, T. B., MEL'NIKOVA, L. V., DESIPRI, A. I.

"Investigation of the Structure and Certain Properties of Alloys Based on the Molybdenum-Rhenium System"

Translation:  The metallographic structure of the alloy Mo-50% Re-50% Fe, produced in an arc furnace with a nonconsumable electrode, is studied in detail.  A method of preparation of sections and etching conditions are developed for this purpose.  It is demonstrated that this alloy, depending on the conditions of heat treatment, may be either a one-or a two-phase alloy with the corresponding changes in properties.  Physical heterogeneity of ingots is detected, related to the conditions of solidification and manifested as sharp differences in dendritic structure.  This heterogeneity causes differences in hardness in various sectors of the ingot.  The possibility of deformation of the alloy by hot pressing and impact upsetting is studied.  3 figs; 4 tables; 5 biblio refs.

1/1

USSR

DEM'YANENKO, V. S. and DERUNOV, YE. K., Institute of Theoretical and Applied
Physics, Siberian Department, Academy of Sciences, USSR

"Supersonic Streamline Flow About a Right Dihedron"

Abstract: The paper presents results of experimental research, in a hyper-
sonic wind tunnel, on the flow in a right dihedron formed by straight plates
with sharp edges. The experiments were conducted for the following values:
Mach number = 2.03, Reynolds number = 4.9 x $10^6$, and Mach number = 4.01,
Reynolds number = 9.6 x $10^6$ in the range of angles of attack and slippage of
the model from -12° to +12°, and consisted of measurement of the pressure
distribution at the edges of the dihedron, and in visulization of the flow
by means of an oilsoot mixture. The experiments showed that the flow pattern
near the vortex of the dihedron is very complex and is characterized by strong
churning; at some distance from the front edges the flow is almost conical,
in any case for moderate angles of attack and slippage. It was found that for
calculating the value of the average pressure in the region of interaction of
a right dihedron within the range of the combined angle of attack (alpha)
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USSR

DEM'YANENKO, V. S., and DERUNOV, YE. K., Izvestiya Sibirskogo Otdeleniya
Akademii Nauk SSSR, Seriya Tekhnicheskikh Nauk, No 8, Jun 71, pp 22-25

and angle of slippage (beta), where alpha + beta = 16 to $+21^{\circ}$, when alpha +
beta $>$ 0 the desired pressure is equal to the pressure behind the oblique
shock wave which deflects the stream by the angle alpha + beta, and when alpha
+ beta $<$ 0, the desired pressure is equal to the pressure behind the fan
of rarefication waves which deflect the stream by an angle of alpha + beta.
Three figures, 1 reference in the form of a footnote.

2/2

1/2    017                    UNCLASSIFIED           PROCESSING DATE--27NOV70
TITLE--KINETICS OF THE SETTLING OF METALLIC INCLUSIONS IN SLAGS -U-

AUTHOR-(04)-PANFILOV, M.I., BARYSHNIKOV, V.G., DERYABIN, A.A., POPEL, S.I.

COUNTRY OF INFO--USSR

SOURCE--IZVEST. AKAD. NAUK SSSR, METALLY, MAR.-APR. 1970, (2), 106-115

DATE PUBLISHED-------70


SUBJECT AREAS--MATERIALS, PHYSICS

TOPIC TAGS--REACTION KINETICS, DESULFURIZATION, STEEL, METAL INCLUSION



CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--3003/1446        STEP NO--UR/0370/70/000/002/0106/0115

CIRC ACCESSION NO--AP0130379
                          UNCLASSIFIED

CIRC ACCESSION NO--AP0130379

ABSTRACT/EXTRACT--(U) GP-0-  ABSTRACT.  THE KINETICS OF THE SETTLING OF
METAL PARTICLES AND THE RISING OF GAS BUBBLES IN SLAGS DURING VARIOUS
METALLURGICAL PROCESSES ARE DISCUSSED THEORETICALLY.  ALLOWANCE IS MADE
FOR THE COMBINED MOTION OF THE METAL PARTICLES AND THE GAS BUBBLES.  IN
THE DESULPHURIZATION OF STEEL, AS THE SIZE OF THE BUBBLES INCREASES THE
RATE OF SETTLING OF THE METAL FALLS TO ZERO AND MAY EVEN CHANGE
DIRECTION.  THIS EFFECT WAS CONFIRMED EXPERIMENTALLY.  THE FLOTATION OF
METAL DROPS BY GAS BUBBLES GREATLY INCREASES THE PERIOD WHICH THEY SPEND
IN THE SLAG AND TENDS TO INCREASE THE OVERALL LOSS OF METAL.

UNCLASSIFIED

1/2     024                     UNCLASSIFIED               PROCESSING DATE--30OCT70
TITLE--DETERMINATION OF THE INTERFACIAL TENSION OF LIQUID METALS WITH
SLAACCORDING TO THE WEIGHT OF A DROP -U-
AUTHOR-(03)-DERYABIN, A.A., SAIDULIN, R.A., POPEL, S.I.

COUNTRY OF INFO--USSR

SOURCE--ZAVOD. LAB. 1970, 36(3), 292-3

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--SLAG, SURFACE TENSION, LIQUID METAL

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1996/1885          STEP NO--UR/0032/70/036/003/0292/0293

CIRC ACCESSION NO--AP0118847
                              UNCLASSIFIED

CIRC ACCESSION NO--AP0118847

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE WEIGHT OF A DROP METHOD WAS
USED TO DETD. THE INTERFACIAL TENSION OF FE IN CONTACT WITH A SLAG OF
THE COMPN.: CAO 40, SIO SUB2 40, AND AL SUB2 O SUB3 20PERCENT. ADDN.
OF 7.05PERCENT OF FEO AND 3.22PERCENT OF FE SUB2 O SUB3 TO THE ORIGINAL
SLAG LOWERED THE SURFACE TENSION FROM 1200 TO 750 MJ PER M PRIME2. THE
SURFACE TENSION OF FE WAS NOT AFFECTED BY KEEPING IT FOR 2 HR AT
1570-1600DEGREES UNDER THE SLAG. THE INTERFACIAL TENSION OF FERROCHROME
CONTG. 10 AND 15PERCENT CR IN CONTACT WITH A SLAG OF AL SUB2 O
SUB3,CAO,MGO WAS ALSO DETD. BY THIS METHOD. THE RESULTS COINCIDED WITH
THE ONES OBTAINED BY X RAY PHOTOGRAPHY.          FACILITY: URAL NII
CHERN. MET., SVERDLOVSK, USSR.

UNCLASSIFIED

USSR                                              UDC 632.951

DERYABIN, V. I., and AZIMBEGOV, N., Samarkand Experimental Station of the
Union Scientific Research Cotton Institute

"Effectiveness of Some Acaricides Against the Cobweb Tick on Cotton"

Moscow, Khimiya v Selskom Khozyaystve, Vol 9, No 3, 1971, pp 41-42

Abstract: Several preparations were tested: a 30% emulsion concentrate of
methylmercaptophos (etalon) alone and in a mixture with a 30% emulsion con-
centrate of synerphos (a synergist for methylmercaptophos), a 40% emulsion
concentrate of kilval, and a 90% wetted powder of milbeks. In addition to
the effectiveness of these preparations, the duration of their protective
effect was studied. The experiments showed that a 1:1 mixture of methyl-
mercaptophos and synerphos protected cotton plants against the cobweb tick
for 40 days or more, whereas methylmercaptophos alone had a protective
effect of only 20 days. Kilval repressed development of the cobweb tick for
20 days. When the doses were increased to 1.5 kg/hectare, the protective
effect was prolonged to 25-30 days; and with doses of 2.5 kg/hectare, the
protective effect lasted 40 days. No scalding of leaves or other negative
effects were observed with cotton plants sprayed with kilval. The prepara-
tion could be mixed with water in any desired ratio, it could be stored over
1/2

USSR

DERYABIN, V. I. and AZIMBEGOV, N., Khimiya v Selskom Khozyaystve, Vol 9,
No 3, 1971, pp 41-42

a wide atmospheric temperature range from 15 to 38°C. Milbeks protected
cotton against the cobweb tick for 20 days when it was used in an amount
of 1 kg/hectare, for 25 days when it was used in an amount of 1.5 kg/hectare,
for 35 days when it was used in an amount of 2.0 kg/hectare. Milbeks is pre-
ferred over methylmercaptophos because it is less toxic and does not scald
the leaves of the plant. Moreover, milbeks attacks the eggs and larvae of
the cobweb tick. Milbeks can be applied only with ground machinery. It is
therefore recommended to apply it in limited areas (gardens, orchards, etc)
where use of methylmercaptophos is prohibited.

2/2

USSR                              UDC:  621.317.77
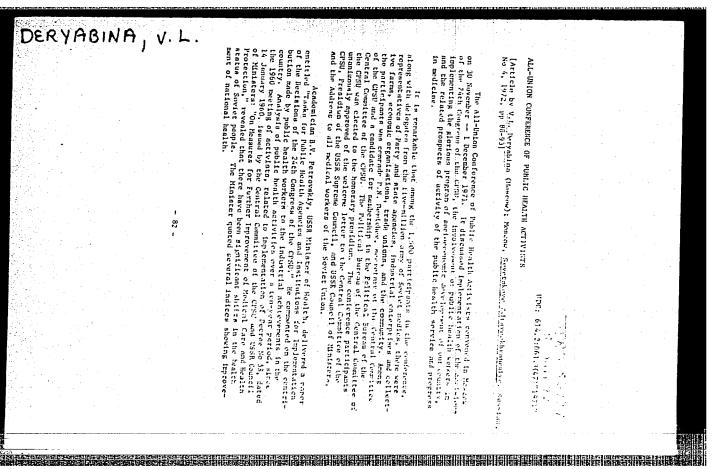
DERYABIN, Yu. F., MOROZOV, V. I., SOLODAR', G. G.
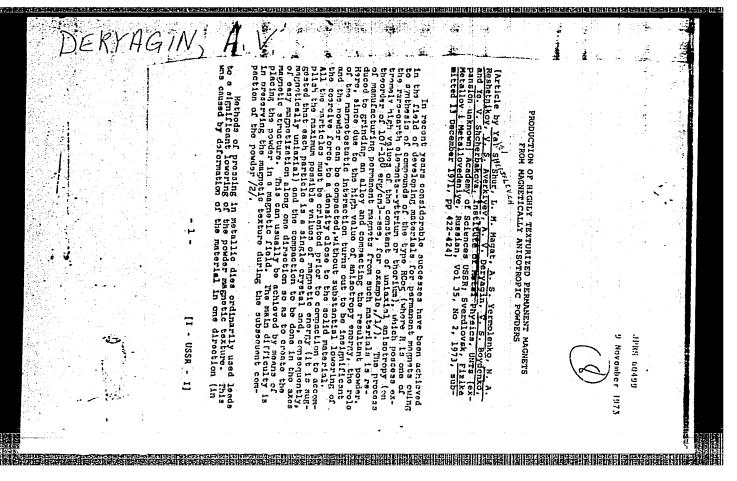
"A Digital Phase Meter"

Dokl. Vses. nauchno-tekhn. konferentsii po radiotekhn. izmereniyam. T. 2 (Report of the All-Union Scientific and Technical Conference on Radio Engineering Measurements. Vol. 2), Novosibirsk, 1970, pp 87-89 (from RZh-Radiotekhnika, No 12, Dec 70, Abstract No 12A336)

Translation:  The authors describe a phase meter which converts the difference in phases of two SHF signals to numbers in four-digit parallel binary code.  The proposed instrument is distinguished from conventional digital phase meters by its high speed.  The phase meter consists of two parts:  the SHF section in which the measured phase is converted to a series of five voltages, and an analog-digital converter where these voltages are converted to four-digit binary code.  Tests of a model of the phase meter showed that its error in a frequency band of 10% is no more than $\pm 10°$ when input powers are changed by $\pm 3$ DB, and speed is at least 0.5 $\mu$sec.
E. L.

1/1

DERYABINA, V. L.

ALL-UNION CONFERENCE OF PUBLIC HEALTH ACTIVITIES

UDC: 614.2:061.3(47)"1971"

The All-Union Conference of Public Health Activities convened in Moscow
on 30 November -- 1 December 1971. It discussed implementation of the decisions
of the 24th Congress of the CPSU, the involvement of public health workers in
implementing the glorious program of communist development of our country,
and the related prospects of activity of the public health service and progress
in medicine.

It is remarkable that among the 1,500 participants in the conference,
along with delegates from the five-million army of Soviet medics, there were
representatives of Party and state agencies, industrial enterprises and collective
farms, economic organizations, trade unions, and the community. Among
the participants was comrade P.N. Demichev, secretary of the Central Committee
of the CPSU and a candidate for membership in the Political Bureau of the
Central Committee of the CPSU. The Political Bureau of the Central Committee of
the CPSU was elected to the honorary presidium. The conference participants
unanimously approved of the welcome letter to the Central Committee of the
CPSU, Presidium of the USSR Supreme Council, and USSR Council of Ministers,
and the Address to all medical workers of the Soviet Union.

Academician B.V. Petrovskiy, USSR Minister of Health, delivered a report
entitled "Tasks for Public Health Agencies and Institutions for Implementation
of the Decisions of the 24th Congress of the CPSU." He commented on the contri-
bution made by public health workers to the industrial achievements in the
country. Analysis of public health activities over a ten-year period, since
the 1960 meeting of activists, related to implementation of Decree No 58, dated
14 January 1960, issued by the Central Committee of the CPSU and USSR Council
of Ministers: "On Measures for Further Improvement of Medical Care and Health
Protection," revealed that there have been significant shifts in the health
status of Soviet people. The Minister quoted several indices showing improve-
ment of national health.

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DERYAGIN, A.V.

JPRS 00499

9 November 1975

PRODUCTION OF HIGHLY TEXTURIZED PERMANENT MAGNETS
FROM MAGNETICALLY ANISOTROPIC POWDERS

[Article by Ya. S. Shur, L. M. Magat, A. S. Yermolenko, N. A.
Reshetnikov, V. S. Averkiyev, A. V. Deryagin, V. S. Boydenko
and Ya. V. Shcherbakova, Institute of Metal Physics, UrNTs [ex-
pansion unknown] Academy of Sciences USSR, Sverdlovsk, Fizika
Metallov i Metallovedeniye; Russian, Vol 35, No 2, 1973, sub-
mitted 13 December 1971, pp 422-424]

In recent years considerable successes have been achieved
in the field of developing materials for permanent magnets using
to synthesis of compounds of the type RCo$_5$ (where R is one of
the rare-earth elements--yttrium or thorium), which possess ex-
tremely high values of the constant of uniaxial anisotropy (on
the order of 10$^7$-10$^8$ erg/cm$^3$--see, for example /1/). The process
of manufacturing permanent magnets from such materials is re-
duced to grinding an alloy and compacting the resultant powder.
Here, since due to the high value of anisotropy energy the role
of the nanmostatic interaction turns out to be insignificant
and the powder can be compacted, without substantial lowering of
the coercive force, to a density close to the solid material.
All the particles must be oriented prior to compaction to accom-
plish the maximum possible values of magnetic energy (it is sug-
gested that each particle is a single crystal and, consequently,
magnetically uniaxial) and the compaction to be done in the axes
of easy magnetization along one direction so as to create the
magnetic structure. This can usually be achieved by means of
placing the powder in a magnetic field. The main difficulty is
in preserving the magnetic texture during the subsequent com-
paction of the powder /2/.

Methods of pressing in metallic dies ordinarily used leads
to a significant lowering of the powder magnetic texture. This
was caused by deformation of the material in one direction (in

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[I - USSR - I]

USSR                                    UDC 546.212

DERYAGIN, B. V., and CHURAYEV, N. V., Institute of Physical Chemistry,
Academy of Sciences USSR ,Moscow

"The Problem of 'Anomalous Water'"

Abstract:  Results of analytical examinations of the composition of
anomalous condensates show that their properties can be explained by the
presence of impurities, without resorting to the hypothesis of "polymeric
water."

1/1

USSR

DERYAGIN, B. V., Corresponding Member of the USSR Academy of Sciences, and
PROKHOROV, A. V.

"Effect of the Mobility of Small Drops on Their Vapor Pressure Equilibrium
and on the Work of Their Formation"

Abstract: Earlier papers on this subject have shown, on the basis
of general statistical methods, that the mobility of the drop seed
reduces the work of the drop formation. Since the calculations in-
volved are complex and still incomplete, the authors of the present
paper propose a more direct physical approach to the problem of the
effect of the mobility of small drops on the work of their forma-
tion. They begin their analysis by considering the effect of the
drop mobility on its equilibrium with vapor. Three possible as-
pects of mobility are examined. The authors promise to consider
the Brownian motion of the seed in denser vapors, requiring a
change in the method of computing the number of seed collisions
with the vapor molecules, in their next paper.
1/1

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USSR                                        UDC 533.6.011.8

YALAMOV, Yu. I., OBUKHOV, B. A., and DERYAGIN, B. V., Corresponding Member
of the USSR Academy of Sciences, Institute of Physical Chemistry, Moscow

"Diffusiphoresis of Large Nonvolatile Aerosol Particles"

Abstract: An aerosol particle in a nonuniformly concentrated gas mixture
experiences a diffusiphoretic force. In an earlier article (Yalamov, Yu. I.,
et al, ZhTF, No 5, 1972) expressions were obtained for the force and for the
velocity of the particle by neglecting the inertial terms of the Navier-
Stokes equations. In the present paper, the effects of the inertial forces
are taken into account to find the diffusiphoretic forces. The analysis
begins with the consideration, in a spherical system of coordinates, of a
spherical particle of given radius which is large compared to the average
length of the molecular free path. The system of equations for the relative
concentration, the velocity, and the pressure of the binary gas mixture is
presented. The expression found for the force acting on the particle shows
it to be the sum of viscous and diffusiphoretic forces, vanishing for a
uniformly moving particle. An expression is obtained for the velocity of
the particle which coincides with that obtained earlier with the inertial
forces not taken into account.
1/1

Water and Water Treatment

DERYAGIN, B. V., YEVKO, E. I., KISIN, V. I., LUK'YANOVICH, V. M.,
RABINOVICH, YA. I., CHURAYEV, N. V., and BARONOVA, R. V., Institute of Physical
Chemistry, Academy of Sciences USSR; and Institute of Crystallography imeni
A. V. Shubnikov, Academy of Science USSR

"Electron Diffraction Study of Modified Water"

Abstract:  Modified water (m.w.) was prepared by three processes on a quartz
film in order to study the "anomalous component" (a.c.), e.g. that part of the
m.w. which is nonvolatile at room temperature.  The bulk of the sample is
amorphous. The polytypic character of the different crystalline modifications of
the a.c., seen earlier in electron micrographs and ascribed to impurities of
$Na^+$ and $K^+$, was evident in the electron diffraction patterns; in the latter
case, however, it could not be correlated with $Na^+$ or $K^+$.  It was thus assumed
that the crystalline part was composed of different contaminants. The diffrac-
tion pattern, autoradiographs of tritiated samples, and electron micrographs
are included.

1/1                                    - END -

CSO:  1841-W

USSR

DERYAGIN, B. V., Corresponding Member of the Academy of Sciences USSR, and
CHURAYEV, N. V., Institute of Physical Chemistry, Academy of Sciences USSR,
Moscow

"Disjoining Pressure Isotherm of Water Films on the Surface of Quartz"

Abstract: The state of liquid films can be described with the aid of dis-
joining pressure isotherms $h(\Pi)$, connecting the film thickness h with the
pressure $\Pi$ which is in effect in the film and is excessive compared to the
bulk phase of the same liquid. The $h(\Pi)$ isotherm for water films on the
surface of quartz is S-shaped for the case of incomplete wetting. It is im-
portant to determine if it is possible, by using the idea of various disjoin-
ing pressure components, to give a quantitative description of the course of
the isotherm, including the $\Pi < 0$ region. The electrostatic, molecular,
and structural components are considered. It is found that the stability of
thin water films (at $h < 110$ Å) is actually determined by one component only

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USSR

DERYAGIN, B. V., and CHURAYEV, N. V., Doklady Akademii Nauk SSSR, Vol 207, No 3, 1972, pp 572-575

-- the structural component of the disjoining pressure $\Pi$ . The sign of the component of disjoining pressure $\Pi$ changes with a decrease in $\alpha$ -film thickness.

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Hydraulic and Pneumatic

USSR                                    UDC: 532+533/533.6

BAZARON, U. B., DERYAGIN, B. V., BUDAYEV, O. R.

"Mechanical Properties of Liquids"

Poverkhnost. Sily v Tonkikh Plenkakh i Dispers. Sistemakh [Surface Forces in Thin Films and Dispersed Systems], Moscow, Nauka Press, 1972, pp 279-301 (Translated from Referativnyy Zhurnal Mekhanika, No 12, 1972, Abstract No 12B1029, by O. K. Rozanov)

Translation:  Results are presented from an experimental study of the mechanical properties of liquids, including determination of the angle of mechanical losses. The dynamic measurement method was used, in which the liquid being studied is applied onto piezoquartz and covered with another quartz plate, thus forming a thin film.  In contrast to earlier works, the authors determined the complex shear modulus by additional determination of the imaginary portion of the complex frequency shift, based on the change of the resonant curve of the piezo-quartz.  The working frequency of the oscillations was about 74 kH.  The following liquids were studied: water, hexyl alcohol, triethylene glycol, oleic acid, vaseline and caster oils and polymethyl siloxane.  Measurements were performed at room temperature.  The dependences of piezoquartz frequency shift on inverse film thickness produced are presented graphically.

1/2

USSR

Bazaron, U. B., Deryagin, B. V., Budayev, O. R., Poverkhnost. Sily v Tonkikh Plenkakh i Dispers. Sistemakh, Moscow, Nauka Press, 1972, pp 279-301.

It is determined that in the case of triethylene glycol, polymethyl siloxane and vaseline and caster oils, the mechanical loss angle tangent is not dependent on film thickness within the limits of measurements error. This is explained by the absence of a boundary film with singular properties in these liquids, or the low thickness of this film if it is present. In the case of water and hexyl alcohol, it was found that there is a dependence of mechanical loss angle tangent on film thickness: as the thickness decreases, the tangent decreases. The results of measurements of mechanical parameters are presented in a table. An estimate is given of the effective viscosity manifested in oscillations of the piezoquartz for five liquids (all except water and hexyl alcohol), under the assumption of addition of elastic and viscous stresses (Kelvin body) or when elastic and viscous deformations are added (Maxwell body). The viscosity for the Maxwell body is about 15% higher than values for the Kelvin body. One exception is polymethyl siloxane, where significant divergences are explained by low values of mechanical loss angle tangent.

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USSR                                                              UDC 533.15

YALAMOV, Yu. I., ALADZHYAN, V. M., GALOYAN, V. S., and DERYAGIN, B. V.,
Corresponding Member of the Academy of Sciences USSR, Institute of Physical
Chemistry, Academy of Sciences USSR, Moscow

"Diffusiophoresis of Volatile Aerosol Particles in a Slipping Mode"

Abstract:  In earlier articles the authors developed a diffusiophoresis
theory for moderately large, nonvolatile aerosol particles whose radius
satisfies the condition:

$$0{,}01 \leqslant \lambda/R \leqslant 0{,}03,$$

where $\lambda$ is the mean free path length of gaseous molecules in binary gaseous
mixtures.  A diffusiophoresis theory was also considered for very large
volatile particles.  The present article deals with the derivation of a
formula for the diffusiophoresis velocity of moderately large volatile
particles, with allowance for all factors which are proportional to the
Knudsen number, equal to $\lambda/R$.  The authors consider a spherical drop
consisting of a substance which can be evaporated (or condensed), forming

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USSR

YALAMOV, Yu. I., et al., Doklady Akademii Nauk SSSR, Vol 206, No 2, 1972, pp 316-318

one of the components (for example, the first) of a binary gaseous mixture. Allowance is made for gas slippage along the particle surface.

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"Improving the Theory of Homogeneous Condensation and Comparing it
With Experiment"

Abstract: This article is based on an earlier paper by the first
of the authors named above, in the same journal (vol 193, No 5,
1970, p 1096; B. V. Derjaguin, J. Coll. Interf. Sci., 38, No 2,
1972).  In this earlier paper, a formula was derived for the prob-
able number of drops forming per unit time from moderately super-
saturated steam containing N molecules.  This formula contained a
factor U, representing the work done in the formation of the cri-
tical "seed" in the supersaturated steam, and the purpose of the
present article is to introduce a correction into the computation
of U and thus improve the theory of homogeneous condensation.
Since U is a function of the surface tension $\sigma$ of the drops, the
correction consists in expanding $\sigma$ in a power series in terms of
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1/R, where 1/R is the curvature of the seed. The formula for the probable number of drops is put into a form convenient for numerical calculations for comparison with experimental results obtained by other authors.

2/2

USSR
CHEMISTRY
Aerosols

USSR

UDC 541.182.2/3

DERYAGIN, B. V., PAVLIKHINA, M. A., and SMIRNOV, L. P., Institute of Physical Chemistry, Academy of Sciences USSR, Moscow

"Flow Method for Determining the Capture Coefficient for the Adherence of Aerosol Particles to a Sphere in a Flow"

Abstract: Aerosol jets were directed at spheres and the streamlines were determined for both symmetrical and unsymmetrical stationary turbulent flow around the object. Particles were observed to settle on the back side of the sphere at the beginning of this stationary turbulence. A critical trajectory, e.g., the longest possible path for which the particle could still be captured, was measured. A capture coefficient was determined from the difference in the direction of the jet at the two positions producing the critical trajectories. The capture coefficient can be calculated from the equation

$$\xi = \frac{M}{\pi \, a^2 v n m t}$$

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USSR

DERYAGIN, B. V., et al., Kolloidnyy Zhurnal, Vol 34, Vyp 5, Oct/Nov 72, pp 762-765

where M is the total mass of the particles on the sphere, a is the radius of the sphere, $\pi$ is the constant, v,n, and m are the velocity, mass, and concentration in the gas of the particles, respectively, and t is the time. Values determined from the aerosol method agreed well with gravimetric data.

USSR                                                        UDC 546.26

FEDOSEYEV, D. V., DERYAGIN, B. V., VARNIN, V. P., and USPENSKAYA, K. S.,
Institute of Physical Chemistry, Acad. Sc. USSR, Moscow

"Diamond Synthesis.  II.  Diamond Synthesis From Methane in the Diffusion
Zone"

Abstract:  The transition from the kinetic zone to the diffusion zone is
affected by temperature, by the thickness of the powder layer, its dispersion
and dilution by the reaction product of methane decomposition -- i.e.,
hydrogen.  Hydrogen slows down the growth of diamond, but even more so it
slows down the formation of soot, so that the original process is prolonged.
A similar effect is achieved by limiting the consumption of methane.  The
rate of growth of diamond powder of various degrees of dispersion was de-
termined.  Experimental data obtained agree with the calculated values
obtained from the equation of diffusion kinetics.


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USSR

DERYAGIN, B. V., FEDOSEYEV, D. V., and USPENSKAYA, K. S., Institute of
Physical Chemistry, Acad. Sc. USSR, Moscow

"Diamond Synthesis.  I.  Kinetic and Diffusion Zones of Diamond Synthesis
From Gaseous Methane"

Abstract:  Diamond which under normal conditions is a metastable form of
carbon may be grown from carbon-containing gases under reduced pressures.
In this paper the kinetics of diamond synthesis from methane is reported.
An equation was derived for diamond growth in the kinetic zone of the
process.  Comparable expressions have been obtained for the diffusion,
transition and kinetic zone.  Experimental data showed no difference
between the specific growth rates on synthetic and natural diamonds under
comparable conditions.  The rate of growth decreases with time due to the
blocking action exerted on the surface of the diamond by the non-diamond
carbon.  The agreement between the experimental data and the theoretically
calculated ones was very good.

1/1

Miscellaneous

USSR

DERYAGIN, B. V., BAKUL', V. M., and FEDOSEYEV, D. V.

"Synthesis of Diamonds at Low Pressures"

Kiev, Visnik Akademiyi Nauk Ukrayins'koy RSR, Vol 35, No 5, May 71, pp 80-88

Abstract:  On the basis of results obtained at the Institute of Superhard
Materials, State Plan of the UkSSR, production of synthetic diamonds was
organized in 1961 at an experimental plant of this institute.  This initiated
the development of a USSR synthetic diamond industry.  At present the static
method of high-pressure synthesis (50-70 kilobar at 1200-1500$^{\circ}$) is being ap-
plied in preference to the dynamic method involving shock-wave compression to
750-1000 kilobar, which takes less time, but leads to smaller crystals.  Since
1956, work on the low-pressure synthesis of diamonds has been conducted at
the Division of Surface Phenomena, Institute of Physical Chemistry, Academy
of Sciences USSR.  The low-pressure synthesis is based on the decomposition of
a carbon-containing gas such as methane and epitaxial crystallization of C in
the diamond form on face (III) of diamond seed crystals.  The theory of epi-
taxial synthesis is outlined in articles by Fedoseyev, V. P. Varnin, and
Deryagin (DAN SSSR, Vol 196, No 6, 1970) and Bakul' (Sinteticheskiye Almazy
Vol 2, No 8, 1970).  In work carried out jointly by the Institute of Physical
Chemistry and the Institute of Superhard Materials, it was established that
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DERYAGIN, B. V., et al, Visnik Akademiyi Nauk Ukrayins'koy RSR, Vol 35, No 5, May 71, pp 80-88

epitaxial crystallization of C on diamond seed crystals with the formation of diamond single crystal grains takes place at 1000-1100° and a $CH_4$ pressure of 0.20 mm. Epitaxial diamond films that can be applied in radioelectronics were also obtained. Spitaxial crystallization of C in the form of diamond was furthermore found to take place from molten metals in which C was dissolved. In the experiments conducted, it was necessary to remove black non-diamond carbon from the diamond surface by treatment with $HClO_4$ or with $H_2$ at 200 atm and 1000°, because this carbon interfered with the growth of diamond crystals, but methods for purification by gas treatment under mild conditions and a procedure in which parasitic C does not form have been developed. It was found that it is possible to grow epitaxial diamond crystals in the form of threads (Deryagin et al, Kristallografiya, Vol 14, No 3, 1969). This discovery was of importance because of the high rate of growth of such crystals (approx. 10 microns per hr. on the average, reaching 100-400 microns/hr) and because of the exceptional mechanical strength of thread-like crystals or whiskers (pre sence of 50% by weight sapphire whiskers increases the strength of Nb by a

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USSR

factor of four). The VLS method has been developed for growing diamond
whiskers under drops of molten metals. Diamond whisker crystals formed
minute spheroids that often developed facets, giving rise to isometric cry-
stals. The low-pressure synthesis, in addition to being of value as such,
forms a useful supplement to the high-pressure synthesis, because it makes it
possible to increase the size of diamond micropowders obtained by the high-
pressure method and thus produce a powder with a larger particle size that
can be used for industrial grinding. An installation for the application of
the low-pressure, epitaxial synthesis on an industrial basis has been com-
pleted; production of the first batch of diamonds by this method on a semi-
industrial scale is expected in 1971. The weight of the diamonds used for
seeding can be increased by 20% per day by the method in question. In the
epitaxial synthesis fractionation of C isotopes takes place, so that the
crystals which are grown become enriched in $^{13}C$. The authors thank V. O. Ryabov,
B. V. Spitsyn, Yu. I. Nikitin, A. V. Bochko, V. P. Varnin, V. L. Primachuk,
and A. V. Lavrent'yev for their collaboration in the work described.

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USSR                                                    UDC 543.123.11+532.74

SPITSTN, V. I., GLAZUNOV, M. P., MULYAR, V. M., DERYAGIN, B. V., CHURAYEV,
N. V., and ZORIN, Z. M., Institute of Physical Chemistry Academy of Sciences
USSR, Moscow

"Study of the Anomalous Water by the Method of Neutron Activation Analysis"

Abstract: Samples of anomalous water were studied for their content of admix-
tures which could possibly be leached out of the glass; particularly Si and Na,
after irradiation with thermal neutrons. As a preliminary experiment quartz
glass itself was examined. The Na impurities were found to be low, and irre-
gularly distributed throughout the capillary. The anomalous water samples were
compared to double distilled water. It was established that the admixture
concentration was much higher in the anomalous samples than in the double
distilled material. The content of Si and Na was inversely proportional to the
volume of the sample studied. This could be due to the evaporative procedures
used, the impurities being introduced from the surface layer of the capillaires,
from the   evaporation equipment, etc. Temperature doesn't seem to have any
particular effect on the content of imputities. The quantity of the anomalous
components in the samples of anomalous water varied in the range of $5 \cdot 10^{-3}$ to
$5 \cdot 10^{-8}$ g.
1/1

USSR                                                    UDC 546.26

FEDOSEYEV, D. V., GALIMOV, E. M., VARNIN, V. P., PROKHOROV, V. S., and
DERYAGIN, B. V., Corresponding Member Academy of Sciences USSR, Institute
of Physical Chemistry, Academy of Sciences USSR, Moscow, Moscow Gas and
Oil Institute

"Fractionation of Carbon Isotopes During the Physical-Chemical Synthesis of
Diamond From Gas"

Abstract:  In the synthesis of diamond from gas by deposition, a highly
dispersed diamond powder was used as the primer.  Methane pressure was
0.2 - 0.5 torr at 1000 - 1050°.  The isotopic composition of the deposited
carbon was studied by mass spectrometry.  From the results obtained it was
concluded that assumptions on the thermodynamic isotopic effect can be
eliminated since the value of the distribution coefficient in the methane-
diamond system at 1050°C is negligible.  Probably the fractionation of the
isotopes of carbon during the synthesis of diamond is determined by a kinetic
effect together with a formation process and the growth of a new phase.

1/1

USSR                                    UDC 541.182.2;541.183.022;541.183.26

DERYAGIN, B. V., and KURGIN, YU. S., Institute of Physical Chemistry, USSR
Academy of Sciences, Moscow

"A Theory of Passivation of Condensation Growth in Mist Droplets by Use of
Cetyl Alcohol Vapors"

Abstract: Considerable funds are being invested in study of control of phase
transitions in warm clouds and fogs, and this is associated with various
technical difficulties. Control of drop growth through formation of monolayers
on them of surface-active substances is one promising avenue of approach.
      The authors study theoretically several factors involved in droplet
growth, and derive curves expressing them: 1) specific resistance to
evaporation as related to surface pressure for a monolayer of cetyl alcohol
at $25^\circ$; 2) surface pressure of the alcohol monolayer as related to surface
necessary per molecule at $20^\circ$; and 3) approximate relation between condensa-
tion coefficient of water covered by the molecule and degree of filling of
the monolayer -- both for pure water and for cetyl alcohol. Appropriate
equations are given which should assist further research in this field.

1/1

USSR                                                    UDC 541.182.2/.3

DERYAGIN, B. V., YALAMOV, YU. I., and GALOYAN, V. S., Institute of Physical
Chemistry, Academy of Sciences USSR, Moscow

"Theory of the Thermophoresis of Moderately Large Volatile Aerosol Particles"

Moscow, Kolloidnyy Zhurnal, Vol 33, No 4, Jul-Aug 71, pp 509-514

Abstract: The article considers a spherical, moderately large volatile
aerosol particle placed in a binary gas mixture. The problem is to determine
the total force acting on the particle and then, on the basis thereof, the
thermophoresis rate, using the hydrodynamic method. The total force acting
on the particle is calculated by integrating the total stress tensor along
the surface of the particle allowance is made of the jump of the absolute
concentration of the volatile component at the boundary of the Knudsen layer
at the particle surface. The following expression is obtained for the thermo-
phoresis rate:

$$u_T = - \frac{2\delta\left[K_{sl} + \frac{m_1}{m_2}\left(1 + 6\frac{c_m\lambda}{R}\right)\right]\varkappa_e D_{12}}{n_0\Phi\left(1 + 2c_m\frac{\lambda}{R}\right)\left(1 + \frac{2K_c\lambda}{R}\right)}(\nabla T)_{\infty} -$$

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USSR

DERYAGIN, B. V., et al., Kolloidnyy Zhurnal, Vol 33, No 4, Jul-Aug 71, pp 509-514

$$-\frac{2KT_{Tsl}v}{T_0\Phi}\left[\varkappa_e + \left(\varkappa_i + \frac{2Lm_iD_{12}\delta}{1+\frac{2K_e\lambda}{R}}\right)\right](\nabla T)_\infty$$

$$\Phi = \left[2\varkappa_e + \left(\varkappa_i + \frac{2Lm_iD_{12}\delta}{1+2K_e\frac{\lambda}{R}}\right)\left(1+\frac{2c_i\lambda}{R}\right)\right]$$

The thermophoresis rate is found to differ significantly from the rate obtained previously by two of the authors (DERYAGIN and YALAMOV) for moderately large nonvolatile aerosol particles. In the absence of volatility the above expression changes to the DERYAGIN-YALAMOV formula for nonvolatile particles.

2/2

- 2 -

DERYAGIN, B. V., and FEDOSEYEV, D. V., Institute of Physical
Chemistry, Academy of Sciences USSR, Moscow

"Epitaxial Diamond Synthesis in the Metastable Region"

Abstract:  The article describes a new direction in the field of
diamond synthesis based on the influence of the surface forces of
the diamond seed crystal on the process of carbon segregation on
its surface.  Epitaxial synthesis proceeds from carbon-containing
gases or from carbon solutions in molten metals.  A survey is
given of foreign publications and patents (W. G. EVERSOLE, D. A.
BRINKMAN et al.), as well as the work of Soviet scientists (YU. A.
LITVIN and V. P. BUTUZOV), devoted to the epitaxial synthesis of
diamond in the region of its metastable stability from $10^{-3}$ mm Hg
to 1000 atm.  A description is given of the synthesis of diamond
whiskers at low pressures by the authors in conjunction with V. M.
LUK'YANOVICH, B. V. SPITSYN, V. A. RYABOV, A. V. LAVRENT'YEV and
L. L. BUYLOV.  Experiments were staged on a radiation heating ap-

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USSR

DERYAGIN, B. V., and FEDOSEYEV, D. V., Uspekhi Khimii, Vol 39, No 9, Sep 70, pp 1661-1671

paratus based on a DKSR-6000 superhigh-pressure xenon lamp.  The single seed crystal was secured by rhenium needle holders and placed in the focal spot of the apparatus.  The single-crystal character of the diamond whiskers was established by an electron microdiffraction study.  Special experiments were performed on the growth of diamond single-crystal whiskers under molten drops of metals by the VLS method.  The results indicate that the VLS method is a possible (but not the only) method for diamond crystal growth.  The authors also observed the transformation of a diamond whisker into an isometric diamond crystal with an average diameter of 0.1 mm and poorly pronounced faces.  An X-ray microdiffraction study of this crystal by V. G. LYUTSAU showed it to be a single crystal.  The article includes a photograph of an isometric crystal 20 microns in diameter, taken with a scanning electron microscope in the laboratory of V. G. SPIVAK at Moscow State University.

V. P. VARNIN took part in some of the calculations.

2/2

USSR                                          UDC: 66.047

DERYAGIN, B. V., MERZHANOV, K. M.

"On the Problem of Designing a Diffusion Chamber with Time-Variable Tempera-ture Conditions at the Wall and Supersaturation with Respect to Volume"

Minsk, Inzhenerno-fizicheskiy zhurnal, Vol 19, No 6, Dec 70, pp 983-990

Abstract:  The authors investigate a simple heat transfer scheme which can be used to determine time-periodic temperature conditions at the wall of a diffusion chamber.  An equation is derived and solved which describes the change in wall temperature with time.  Analysis of the solution shows the possibility of thr**  -  of conditions at the wall:  $\omega \gg h/HC\rho$, $\omega \ll h/HC\rho$

...c $\omega = 2\pi/T$,  T is the period of wall temperature variation, H is wall thickness, $\rho$ is the density of the wall material, C is the specific heat of the wall material, and h is the heat-exchange coefficient.  These sets of conditions present various experimental possibilities.  A detailed analysis of all three sets of conditions is given, the optimum values of $h_0$ and $\gamma_0$ being determined for each of them, where $\gamma$ is the product of duration and repetition frequency for the temperature cycle.  Expressions are also examined

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USSR

DERYAGIN, B. V., MERZHANOV, K. M., Inzhenerno-fizicheskiy zhurnal, Vol 19,
No 6, Dec 70, pp 983-990

which relate these quantities to the frequency $\omega$. Data are given on the
process of temperature wave propagation within the chamber. It is shown
that $\omega$ is determined from conditions of temperature uniformity within the
chamber. The resultant formulas can be used to determine all thermophysical
data necessary for designing devices with a predetermined degree of tempera-
ture homogeneity and uniformity of supersaturation in the chamber. Two
examples are given.

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USSR

VIKTORINA, M. M., DERYAGIN, B. V., Corresponding Member of the USSR Academy of Sciences, YERSHOVA, I. G., ZNAMENSKIY, B. V., and CHURAYEV, N. V.

"Paramagnetism of Modified Water (Water II)"

Abstract:  This article contains a description of a microcapillary procedure for measuring the magnetic susceptibility of volumes of liquid on the order of $10^{-6}$ to $10^{-7}$ cm$^3$ which is a modification of the well-known Gouy method. The procedure was checked by measuring the magnetic susceptibility of a column of benzene; ordinary water (bidistillate) was used as the standard liquid.  Analogous measurements were then made for modified water.  On the basis of the preliminary experiments only a qualitative conclusion of paramagnetism of the anomalous component could be drawn.  It was visually apparent that upon inclusion of the magnetic field, the columns of sufficiently concentrated modified water and the columns of ordinary water shifted to different sides in the capillaries.  Results of one of the last series of experiments, in which some quantitative estimates could be made, are presented in a table.  For columns of modified water with a low content of

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USSR

VIKTORINA, M. M., et al, Doklady Akademii Nauk SSSR, Vol 197, No 1, March-April 1971, pp 114-116

anomalous component, the magnetic susceptibility was greater than $-0.38 \cdot 10^{-6}$. The mechanism of the effect of the anomalous component is discussed in detail, and a formula is derived for using the presented data to make a rough estimate of the magnetic susceptibility of pure anomalous component (water II). Using this formula, a value of $7 \cdot 10^{-6}$ was obtained.

USSR

UDC 539.4.015.1

DERYAGIN, B. V., Corresponding Member, Academy of Sciences, USSR, PAPLAUSKAS,
A. B., RYABOV, V. A., and SEMENOV, N. I., Institute of Physical Chemistry,
Academy of Sciences, USSR, Moscow

"Strengthening of Glass by the Hydrothermal Method"

Abstract:  It is shown that when glass is subjected to hydrothermal treatment
under dynamic conditions, not only is the surface of the glass dissolved, but
it is also greatly strengthened.  Under certain conditions, strengthening by
a factor of 5-6 can be obtained with retention of the optical properties of
the glass, and glass with a light-diffusing surface can be obtained with
strengthening by a factor of 4-5.  If the optical properties of the glass
need not be considered, tenfold strengthening may be obtained.  This is
valid only with respect to defects of the glass, abstracting from other
factors.  3 figures, 5 bibliographic entries.

1/1

UDC: 541.182.2/3:539.12.172

USSR

YALAMOV, Yu. I., and DERYAGIN, B. V., Institute of Physical Chemistry, Acad. Sc., USSR, Moscow

"Theory of Thermophoresis of Moderately Large and Large Aerosol Particles With Allowance for the Thermal Gas Slip and Temperature Jump of the Surface of Particle"

Abstract: In the development of the theory use is made of Deryagin's method based on the calculation of the isothermal heat flow through an "aerosol partition" connecting two gas filled vessels, allowing for the Onsager relationship. The formulas obtained for the thermophoresis rate of moderately large and large aerosol particles depend essentially on the magnitude of the temperature jump at the gas particle interface, being independent of the gas slip velocity caused by the local concentration gradient.

1/1

- 2 -

USSR                                        UDC:  541.12.013.5

DERYAGIN, B. V., Corresponding Member Academy of Sciences USSR, ZORIN, Z. M.,
RABINOVICH, YA. I., TALAYEV, M. V., (DECEASED) and CHURAYEV, N. V., Institute
of Physical Chemistry, Moscow, Academy of Sciences USSR

"Thermal Stability of Modified Water"

Abstract:  The authors confirmed the results obtained in preliminary experi-
ments that at temperatures $\geq 700^\circ$ modified water (M.W.), which consists of
two components -- anomalous component (A.C.) and normal water -- decomposes
converting to normal water.  Initially changes in expansion of water columns
were studied in temperatures of 250 and $400^\circ$ and both cases gave similar
curves, separated in accordance with the temperature difference.  Next dis-
tillation of the M. W. across a heat barrier was carried out and it was
shown that up to $500^\circ$ no noticeable changes occur.  At $700^\circ$ the condensate
looked like normal water, indicating that thermal decomposition of M.W.
occurs at $t \not> 700^\circ$.  On the basis of their experimental data the authors
calculated the bond energy of A.C. molecules to be about 50 kcal/mole.

1/1

Acc. Nr:               Abstracting Service:        Ref. Code:
AT0048312_    CHEMICAL ABST. 5/70          4P 0020

93956r  Auto-epitaxial synthesis of diamond crystals.  Derya-
gin, B. V.; Lyuttsau, V. G.; Fedoseev, D. V.; Ryabov, V. A.
(Inst. Fiz. Khim., Moscow, USSR).  Dokl. Akad. Nauk SSSR
1970, 190 (1), 86-7 [Tech Phys] (Russ).  By using the method
described by Deryagin, et al. (1968), a ~80μ diam. and 120μ
long diamond crystal was grown on the (111) lattice of a support
crystal.                                            HMJR

                                                        13 VK

                    REEL/FRAME
                    19800014                              13

TITLE--ON THE CHARGE DENSITY ON THE SURFACE OF DISPERSED PHASE OF GOLD
  HYDROSOL AT FAST COAGULATION THRESHOLDS -U-

AUTHOR-(05)-BARAN, A.A., GLAZHAN, YU.M., DERYAGIN, B.V., KUDRYAVTSEVA,
  N.M., STRAZHESKO, D.N.

COUNTRY OF INFO--USSR

DATE PUBLISHED--------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--GOLD COMPOUND, COAGULATION, MICROSCOPY, CALCIUM COMPOUND,
  YITRIUM COMPOUND, RUBIDIUM COMPOUND, HYDROXIDE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
                        UNCLASSIFIED

CIRC ACCESSION NO--AP0108968
ABSTRACT/EXTRACT--(U) GP-0-  ABSTRACT.  THE AMOUNTS OF SORBED RB POSITIVE,
CA PRIME2 POSITIVE AND Y PRIME3 POSITIVE COUNTERIONS AT THE FAST
COAGULATION THRESHOLDS OF RED GOLD HYDROSOL HAVE BEEN MEASURED BY A
RADIOMETRIC METHOD.  THE COAGULATION THRESHOLDS HAVE BEEN DETERMINED
FROM KINETIC CURVES OBTAINED BY FLOW ULTRAMICROSCOPY.   ON THE BASIS OF
THE DATA ON THE COUNTERIONS SORPTION IT HAS BEEN POSSIBLE TO ESTIMATE
THE CHARGE DENSITY ON DISPERSED GOLD FROM THE SURFACE AREA VALUE.  IT IS
SUGGESTED THAT IN GOLD HYDROSOL THE OH NEGATIVE IONS ARE POTENTIAL
DETERMINING.

UNCLASSIFIED

83434e  Dependence of water vapor pressure on the concentration of the anomalous component in modified water. Deryagin, B. V.; Zheleznyi, B. V.; Rabinovich, Ya. I.; Simonova, V. Kh.; Talaev, M. V.; Churaev, N. V. (Inst. Fiz. Khim., Moscow, USSR). Dokl. Akad. Nauk SSSR 1970, 190(2), 372-5 [Phys Chem] (Russ). The so-called modified water, defined as a 2-component system, one of which is ordinary water and the other referred to as "anomalous component" of which the nature is unknown for the present, was studied. The anomalous component is less volatile, its diffusion coeff. is smaller, its d. is greater, and its $n$ and mol. wt. are appreciably greater than of ordinary water. The mol. wt. of the anomalous component was detd. exptl. as $200 \pm 50$ and by a method of computation as $180 \pm 50$. For the present, these values given for mol. wt. are merely tentative upper limit values. The changes observed in modified water upon removal of one of the components are completely reversible. The state of complete modification of water, i.e. a state in which the water is satd. with the anomalous component, is equally reversible; however, the time required for attaining equil. may be several days or even weeks.                M. Hoseh

LD  //

REEL/FRAME

19741300

1/2     013                    UNCLASSIFIED          PROCESSING DATE--30OCT70
TITLE--THERMAL STABILITY OF MODIFIED WATER -U-

AUTHOR-(05)-DERYAGIN, B.V., ZORIN, Z.M., RABINOVICH, YA.I., TALAYEV, M.V.,
   CHURAYEV, N.V.
CCUNTRY OF INFO--USSR

SOURCE--DOKL. AKAD. NAUK SSSR 1970, 191(4), 859-61

DATE PUBLISHED-------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--WATER, THERMAL STABILITY, DISTILLATION, BOND ENERGY

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--2000/0697       STEP NO--UR/0020/70/191/004/0859/0861

CIRC ACCESSION NO--AT0124369
                         UNCLASSIFIED

CIRC ACCESSICN NO—AT0124369
ABSTRACT/EXTRACT—(U) GP-0-  ABSTRACT.  THE THERMAL STABILITY OF MODIFIED
WATER WAS STUDIED BY USING THE METHOD OF DISTN. THROUGH A THERMAL
BARRIER (D., 1967).  THE RESULTS SHOW THAT THE ANOMALOUS COMPONENT OF
THE MODIFIED WATER DECOMPS. TO FORM ORDINARY WATER.  THE BOND ENERGY FOR
THE MOLS. OF THE ANOMALOUS COMPONENT WAS EVALUATED BY MEANS OF THE
BATLER—PCLYANI EQUATION (1962) AND FCUND TO BE 50 KCAL—MOLE.  THE HIGH
THERMAL STABILITY OF THE ANOMALOUS COMPONENT MOLS. EXPLAINS THE
STABILITY OF THE MODIFIED WATER, THE PROPERTIES OF WHICH DO NOT CHANGE
EVEN DURING PROLONGED STORAGE.          FACILITY:  INST. FIZ. KHIM.,
MOSCOW, USSR.

UNCLASSIFIED

1/2    019                    UNCLASSIFIED              PROCESSING DATE--13NOV70
TITLE--INTERACTION OF GLASS WITH WATER UNDER DYNAMIC HYDROTHERMAL
  CONDITIONS -U-
AUTHOR-(04)-DERYAGIN, B.V., PAPLAUSKAS, A., RYABOV, V.A., SEMENOV, N.I.

COUNTRY OF INFO--USSR

SOURCE--DOKL. AKAD. NAUK SSSR 1970, 191(6), 1316-18

DATE PUBLISHED-------70


SUBJECT AREAS--MATERIALS, CHEMISTRY

TOPIC TAGS--GLASS SURFACE PROPERTY, LIQUID GLASS, WATER, FLOW RATE




CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--3006/1128        STEP NO--UR/0020/70/191/006/1316/1318

CIRC ACCESSION NO--AT0134814
                          UNCLASSIFIED

CIRC ACCESSION NO--AT0134814
ABSTRACT/EXTRACT--(U) GP-0-  ABSTRACT.  RATE OF GLASS REMOVAL (DELTA)
CHARACTERIZING THE INTERACTION OF GLASS WITH WATER UNDER DYNAMIC
HYDROTHERMAL CONDITIONS IS STUDIED.  AN INITIAL INCREASE IN DELTA WITH
TEMP. (T) IS PRACTICALLY THE SAME FOR ALL THE WATER FLOW RATES USED
(3.3, 6.4, 9.1, AND 17.8 M-SEC), BUT IT SHARPLY INCREASES FROM SOME
CRIT. TEMP. REACHING MAX. VALUES (DELTA SUBMAX) AT T SUBMAX; FOR HIGHER
FLOW RATES DELTA SUBMAX IS HIGHER AND SHIFTS TOWARDS THE HIGHER TEMPS.
WITH FURTHER INCREASE IN TEMP. DELTA DECREASES.  FOR FLOW RATES LARGER
THAN 2 M-SEC THE GLASS SURFACE HAS A MAT OR SMOOTH FINISH DEPENDING ON
THE TEMP. OF THE WATER FLOW; FOR FLWO RATES SMALLER THAN 1 M-SEC, THE
GLASS SURFACE IS COVERED WITH THE PRODUCTS OF THE WATER GLASS COMPONENT
INTERACTION RESULTING IN FORMATION OF THE LIGHT DISPERSION SURFACE.
     FACILITY:  INST. FIZ. KHIM., MOSCOW, USSR.

USSR                                                                          UDC 532.68

DERYAGIN, B. V. (Corresponding Member, Academy of Sciences USSR); FEDYAKIN, N. N., and NOVIKOVA, A. V., (Institute of Physical Chemistry, Academy of Sciences USSR, Moscow, and the Serpukhov Higher Command Engineering School imeni Lenin Komsomol, Serpukhov, Moscow Oblast')

"On Mirror Reflection of Molecular Vapor and Supermolecular Flow in Fine Capillaries"

Abstract: The authors briefly review the limitations of the cosine rule of distributed reflection of molecules from cleaved alkali halide crystals and discuss the relations and conditions necessary for mirror reflection and the limiting angle of total mirror reflection.

An experiment is described in which water vapor escapes from a capillary having a radius of less than one micron. When the capillary is larger than the free path of a molecule, the rate of vapor flow follows the Knudsen equation. When the capillary is smaller, the flow is greater than that predicted by the Knudsen equation. Under certain conditions of vapor density, molecules collide with the

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USSR

wall at less than the critical angles and can bounce back and forth between the walls without colliding with other vapor molecules. The mirror angle for water vapor is found to be 5 to 7 degrees. The capillary experiments are intended to separate the mirror-reflected from the diffuse-reflected molecules. A theoretical relation is derived for the flow density of the vapor, and a proof, more direct than the one given in a previous paper, is presented. Basis for the proof is the fact that the pressure of a neutral gas affects the path length of the vapor molecules, and those that are reflected from the wall at less than the critical angle collide with molecules of the neutral gas before again striking the wall.

The rate of water vapor evaporation from a 56-micron capillary was measured at various pressures. The water-filled capillary, sealed at one end, was placed in a glass test chamber connected to a vacuum pump and containing silica gel. Following the experiment the moisture content of the gel was used to determine the vapor pressure. The diameter of the capillary was less than the free path length even at atmospheric pressure. Under these conditions the Knudsen

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USSR

relation ought to be valid.  Between 200 and 760 mm Hg pressure the Knudsen
relation does hold, following a linear curve; below 200 mm Hg the evaporation
rate is markedly higher, but again it falls along a straight line.  The curves
represent the evaporation rate as a function of the reciprocal of the depth of
the liquid meniscus in the capillary.

It is concluded that with respect to sufficiently small-bore capillaries there
is a narrow air pressure interval at which Knudsen flow becomes supermolecular,
and the flow rate is independent of air pressure.

Orig. art. has 3 figs. and 10 refs.

3/3

USSR                                      UDC 532.74

DERYAGAN, B. V., Corresponding Member Academy of Sciences USSR, AORIN, Z. M.,
LAPUTINA, I. P., RABINOVICH, YA. I., and CHURAYEV, N. V., Institute of
Physical Chemistry, Academy of Sciences USSR, and Institute of the Geology
of Ore Occurences, Petrography, Mineralogy and Geochemistry, Academy of
Sciences USSR, Moscow

"A Study of the Composition of Modified Water by Means of an Electron Probe"

Abstract:  Samples of modified $H_2O$ that were obtained by condensation of $H_2O$
vapor in quartz, capillaries, on quartz powder, or on plane quartz surfaces were
subjected to analysis by means of an electron probe.  The content of non-
volatile extraneous substances was determined that were isolated by evapora-
tion of the modified $H_2O$ on a Cr surface.  The modified $H_2O$ contained one or
several of the elements Na, C, K, Cl, S the compounds of which can form true
solutions.  In cases in which these elements were absent, the modified $H_2O$
contained a sol or gel of silicic acid.  The results indicated that the
anomalous properties of modified water can be explained without taking recourse
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USSR

to the hypothesis of formation of polymeric $H_2O$ on quartz surfaces, which was advanced before the presence of impurities in the water in question had been established. To arrive at a definite solution of the problem of a quantitative explanation of the properties of modified $H_2O$, the molecular composition of modified water will have to be investigated. It has been established that $H_2O$ introduced in the liquid state into capillaries did not show a raised content of Si or Na. The raised content of these elements in modified $H_2O$ can be explained by a higher solution capacity of freshly con- densed $H_2O$. The authors thank I. I. Belyayeva, V. V. Berezkin, B. V. Zheleznyy, N. N. Zakhavayeva, A. I. Izmaylova, V. V. Karasev, D. S. Lychnikov, M. A. Prusakov, V. Kh. Simonova, V. D. Sobolev, and Ye. N. Khromova for preparing samples and assisting in the experiments.

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DERYAGIN, B.V.

Biology
Phys. Chemist

A CONDENSATION METHOD FOR RECOVERING HIGHLY DISPERSE FRACTIONS OF BIOLOGICAL
AEROSOLS AND DETERMINATION OF THEIR CONCENTRATION

UDC 614.716-07

Since all aerosols obey the same physical laws, the same methods of
recovering the particles of biological aerosols and determining their con-
centration can be used as those employed in studying aerosols in general.
Among the biological aerosols we include bacterial and viral aerosols,
pollen, plant seeds, and aerosols obtained from vaccines, sera, and various
drugs. The particles in biological aerosols vary greatly in size. Some
bacterial and viral particles have a radius as small as $10^{-6}$ cm.

Particles with a radius of $< 10^{-4}$ are the most dangerous from the
standpoint of aerogenic infection because the effect of gravity and inertia
weakens with increasing degree of dispersion of the particle. This enables
them to penetrate more deeply into the respiratory tract. By the same token,
the use of intrapulmonary and transpulmonary methods of treatment and pro-
phylaxis with drugs in aerosol form (Eydel'shteyn, 1967) should be par-
ticularly effective if the particles have a radius of less than $10^{-4}$ cm.

The choice of method of recovering biological particles for purposes
of microbiological analysis depends on their size and volatility, desired
experimental accuracy, and some other specific conditions dictated by the
problem under study. Hence our (Deryagin and Storozhilova, 1964; Storo-
zhilova, 1964) jet method of studying aerosols, which guarantees the
complete (100%) precipitation of the particles, might well be used, with
some modification, to recover biological aerosols for purposes of further
bacterial or virological analysis (Storozhilova, 1965). The method can
also be used to determine the concentration of such aerosols at the same
time. This cannot be done with any other method (Storozhilova, 1961).

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DERYAGIN, B.V.

CHEM

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80

PPD: SOVIET SCIENCE

Association in the twelve departments of the Institute have a wide range of tasks. They are studying the physics and mechanics of subterranean rock and are looking for effective methods of breaking that rock and for means of controlling air-and-gas dynamics. They are creating progressive methods and technical means for processing useful materials. Every department has a complex of complicated and important problems. There is research on subterranean rock under stress and its displacement and on the interaction of these factors with the reinforcement of mines being worked. Theories are being formed on the control of rock pressure, and equipment is being designed for studying rock masses under stress.

In the department of Mining Mechanics, headed by Pavel Deryagin, methods of lifting... In charge of the Ukrainian Academy of Sciences, new types of coal... have been success... processes their strength and durability... Wide called are technicalized and have a numerical...

A session is now being made for more effective methods of breaking rock when mines are sunk to great depths. Together with the All-Union State Institute for Planning Establishments of the Coal Mining Industry, a technical plan has been developed for a thermo-mechanical combine to sink mine shafts through particularly hard rock. Much of the theoretical research was done by the Department of Excavation and Loading Processes.

The Department of Mining Air-and-Gas Thermodynamics, led by Fyodor Abramov, Corresponding Member of the Ukrainian Academy of Sciences, has developed instruments which can be read from a central above-ground panel at a mine. At present, instruments controlling a mine's atmosphere can only be read where they have been installed. The new ventilation system is planned for the Donbass. Further investigations will determine the optimal ventilation regime.

The Institute has connections with enterprises and is helping them in their technical progress and in solving tasks promoted by economic reform. Last year recommendations by the Institute resulted in savings of 4.2 million rubles.

"Science knows much about water, but there is still much more to be learned," in said Boris V. Deryagin.

1. "Pravda" USSR

Moscow: PRAVDA 16 Jun 63 p 2

Recently the Institute of Physical Chemistry of the Academy of Sciences USSR developed "polywater" water which possesses unusual properties. Details on this science were made by the project director, Corresponding Member of the Academy of...

"Science knows much about water, but there is still much more to be learned," in said Boris V. Deryagin.

"Scientific libraries of the world have impressive monographs, reviews, and dissertations on the subject of this omnipresent substance. In fact, water is always present. About 74% of the bodies of living beings and 90% of the plants consist of water. In other words water is life. Scientists established its basic properties a long time ago. For example, it is known that it has a very high thermal capacity and that its highest density is observed at 4° C. Under ordinary conditions, water freezes at 0° C.

UkSSR, USSR

15 Jun 71

BAYKALOV, A.    , Cand Tech Sci, Laboratory head, Institute of Superhard Synthetic
Materials, in Kiev, is author of article on international exhibit of diamonds,
diamond tools, and diamond-processing equipment, to open in Kiev 16 Jun;
mentioned in article is
DERYAGIN, B. V., Corr mem, AS USSR, who devised way to synthesize diamonds from
gas at subatmospheric pressure, at Institute of Physical Chemistry, AS USSR.

Pravda Ukrainy, 15 Jun 71, p 2, col 1-6                              (2)

USSR

18 Mar 71

An item states that the following Soviet scientists succeeded
in obtaining diamond crystals from ordinary methane gas at
temperatures considrably lower than the atmospheric:
DERYAGIN, B. V., Corresponding Mbr, AS USSR,
FEDOSEYEV, D. V., Doctor of Chemical Sciences,
LUK'YANOVICH, V. M., Doctor of Chemical Sciences,
RYABOV, V. A., Candidate of Chemical Sciences,
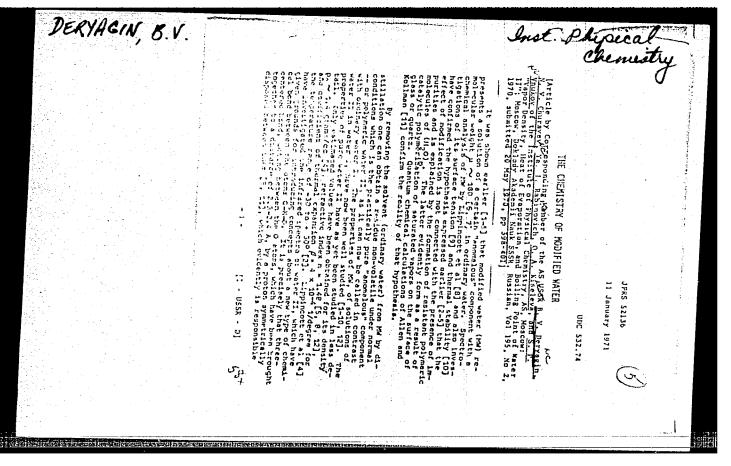SPITSYN, B. V., Candidate of Chemical Sciences,
LAVRENT'YEV, A. V., Engineer,
     all from the Institute of Physical Chemistry of the USSR Academy
     of Sciences.

Vechernyaya Moskva, 18 Mar 71, p 1, col 7                      (6)

*DERYAGIN, B.V.*

*Inst. Physical Chemistry*

# THE CHEMISTRY OF MODIFIED WATER

[Article by Corresponding Member of the AS USSR B. V. Deryagin, N. V. Churayev, Ia. I. Rabinovich, O. A. Kiseleva, and S. V. Nhusov: "Vapor Density, Heat of Evaporation and Boiling Point of Water II"; Moscow, Doklady Akademii Nauk SSSR, Russian, Vol 195, No 2, 1970, submitted 20 May 1970, pp 398-401]

It was shown earlier [1-5] that modified water (MW) represents a solution of a certain "anomalous" component with a molecular weight $\mu \sim 180$ [5, 7], in ordinary water. Chemical analysis of MW by Lippincott et al [8] and investigations of its surface tension [9] and thermal stability [10] have confirmed the hypothesis expressed earlier [2-5] that the effect of modification is not connected with the presence of impurities and is explained by the formation of resistant polymeric molecules of (H₂O)ₙ. The latter evidently form as a result of catalytic polymerization of saturated vapors on the surface of glass or quartz. Quantum chemical calculations of Allen and Kollman [11] confirm the reality of that hypothesis.

By removing the solvent (ordinary water) from MW by distillation one can obtain a residue (practically pure non-volatile under normal conditions which is the practically pure "anomalous" component -- or polymeric water). As it can now be called in contrast with ordinary water. The properties of MW, of solutions of properties of pure water in have now been well studied [1-10, 12]. The tail, only estimated values have as yet been studied in less detail. Thus we have obtained for its density ρ ~ 1.4 g/cc [5]; refractive index n ~ 1.48 [5, 8, 12]; and coefficient of thermal expansion β ~ 4 × 10⁻⁴ 1/degree; the temperature range of -35 to +300 [2]. Lippincott et al [4] have investigated the infrared spectra of water, which gives grounds for introducing concepts about a new type of chemical bond between the atoms O-H-O. It is precisely that three-together with a distance between the O atoms, which have been brought... between the atoms [H], which evidently is responsible...

- 1 -

:: - USSR - 2]

DERYAGIN, Boris Vladimirovich

(b. 27 July (9 Aug) 1902, Moscow), Soviet scientist in the field of physical
chemistry and molecular physics, corresponding member of AS USSR (1946).
Graduated MGU [Moskovskiy Gosudarstvennyy Universitet; Moscow State U] (1922).
From 1935 director of the film lab (now the division of surface phenomena) of
the Inst of Physical Chemistry, AS USSR. Developed the study of surface forces
and their effect on the properties of dispersed systems (colloids, foam, soils,
ground, aerosols). Originated: the theory of stability of colloids, direct
measurements of molecular attraction of solids; investigations of the special
properties of boundary layers of liquids (boundary phases) and the interactions
between gases with aerosol particles and solid surfaces; the molecular theory of
friction; and the theory of adhesion of solids. With N.A. Krotova he investigated
electroadhesion phenomena.

Directed the first successful synthesis (under low pressures) of filiform diamond
crystals -- diamond "antennas" -- and developed methods of building diamond
crystals and powders from gas under low pressures. Prize imeni M.V. Lomonosov,
AS USSR (1958). Awarded the Order of Labor Red Banner and medals.

[Continued on card 2:  see DERYAGIN, Boris Vladimirovich]

Moscow, BSE, 1972, Vol 8, p 131

DERYAGIN, Boris Vladimirovich

      [Continued from card 1:  see DERYAGIN, Boris Vladimirovich]

Works:  "Adhesion," Moscow-Leningrad, 1949 (jointly with N.A. Krotova); "The Physico-Chemistry of Building Up Fine Layers on a Moving Sublayer" (jointly with S.M. Levi); "What Exactly Is Friction?"  Second Edition, Moscow, 1963.

Bibliog:  "B.V. Deryagin," Moscow, 1962 ("Materials for a Bibliography of USSR Scientists."  Chemical Sciences Series, No 31.

Moscow, BSE, 1972, Vol 8, p 131

USSR                                   Rpt 5 Jan 71

DERYAGIN, Boris Vladimirovich, Head, Otdel, Institute of
    Physical Chemistry, AS, USSR; Corresponding Mbr, AS,
    USSR, is the subject of an article concerning two dis-
    coveries in which he participated concerning filamentary
    crystals of diamonds and formation of  ultra-dense water.

Moskovskaya Pravda, 5 Jan 71, p 4, col 3

(1)

USSR

5 Nov 70

The Academy of Sciences USSR, in accordance with Article 23 of the Bylaws, announces the names of candidates to become Full Members (Academicians) and Corresponding Members of the Academy of Sciences USSR, submitted in response to a notice in the newspaper Izvestiya dated 11 and 12 September 1970 by scientific institutions, VUZ, enterprises, social organizations, and scientific workers and groups:

Full Member (Academician)
Department of Mechanics and Control Processes

ISANIN, Nikolay Nikitich, Doctor of Technical Sciences.

Department of General and Technical Chemistry

VDOVENKO, Viktor Mikhaylovich, Corres Mem Acad Sci USSR,
GOL'DANSKIY, Vitaliy Iosifovich, Corres Mem Acad Sci USSR,
GORBACHEV, Sergey Vasil'yevich, Doctor of Chemical Sciences, Professor,
DERYAGIN, Boris Vladimirovich, Corres Mem Acad Sci USSR,
YEROFEYEV, Boris Vasil'yevich, Academician Acad Sci Belorussian SSR,

Izvestiya, 5 Nov 70, pp 3, 4

5 of 122

(6)

USSR

"pt 27 May 70

TSAREGORODTSEV, V. Ye., Dep Chmn, Com for Inventions and Dis-
coveries, Council of Min, USSR, is interviewed regarding
discovery of "ultra-dense water" by
DERYAGIN, B. V., Corresponding Mbr, AS, USSR, and
FEDYAKIN, N. N., Cand, Physical-Mathematical Sciences.

Sovetskaya Kirgiziya, 27 May 70, p 4, col 4

(3)

KISSR, USSR                          23 June 69

KARAKEYEV, K.   , President, AS, KiSSR; Corresponding Mbr, AS, USSR,
    opened an all-union symposium on mechanoemission and mechano-
    chemistry of solids.
DERYAGIN, B. V., Corresponding Mbr, AS, USSR; one of the greatest physi-
    cal chemists of the country, spoke to the symposium.

Sovetskaya Kirgiziya, 24 June 69, p 3, col 1

(2)

USSR

Rpt 25 Dec 68

The article "Again On Water and the Magnet" refers to an article on this subject published in Izvestiya (No 129, 1965) by
KLASSEN V. Professor, Institute of Mineral Fuels, and
MINENKO, V.,

and Klassen discusses this subject further in the present interview on the change of the properties of water under the action of magnetic and electrical fields. Direct experiments were conducted at the Institute of Mineral Fuels by
BERGER, G. S., and
ZHILENKO, G. V.

Cooperative theorectical efforts in this connection have been made
REBINDER, P. A., Academician, AS USSR, and
DERYAGIN, B. V., Corr-Mbr, AS USSR.

Izvestiya, 25 Dec 68, p 4, cols 6-7

(6)

DERYAGIN, B. V

The Academy of Sciences of the USSR announced the names of
the following candidates for active member:

Department of Mechanics and Control Processes:

URAZBAYEV, Magomet Tashevich, academician of the Acad Sci
of the Uzbek SSR,
CHERNYY, Gorimir Gorimirovich, corresponding member of the
Acad Sci USSR,
YANGEL', Mikhail Kuz'mich, academician of the Acad Sci of the
Ukrainian SSR.

Department of General and Applied Chemistry:

BAGAL, Lev Il'ich, Doctor of Chemical Sciences, professor,
GOL'DFARB, Yakov Lazarevich, Doctor of Chemical Sciences,
professor,
GORBACHEV, Sergey Vasil'yevich, Doctor of Chemical Sciences,
professor,
DERYAGIN, Boris Vladimirovich, corresponding member of the
Acad Sci USSR,

Izvestiya, 14 Jun 66, p 3, col 1

USSR

UDC: 669.295.5:539.43

YELAGINA, L. A., DERYAGIN, G. A., SHTOVBA, Yu. K.

"Influence of Structure on Fatigue of VT8 and VT9 alloys"

Tekhnol. Legkikh Splavov. Nauch.-Tekhn. Byul. VILSa [Light Alloy Technology. Scientific and Technical Bulletin of All-Union Institute of Light Alloys], 1973, No 2, pp 56-63 (Translated from Referativnyy Zhurnal Metallurgiya, No 8, 1973, Abstract No 81484, by the authors).

Translation: The fatigue limits $\sigma_{-1}$ are determined at 20 and 500° with various types of loading for bars of the alloys VT8 and VT9 with various types of structure, including the "Moire" macrostructure, not studied earlier.

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USSR

UDC: 620.178.32

DERYAGIN, G. A., Moscow

"Evaluation of Fatigue Properties of D16T and AVT1 Aluminum Alloys on the Basis of Limiting Stresses"

Kiev, Problemy Prochnosti, No 11, Nov 1972, pp 74-81.

Abstract: Diagrams of the maximum Smith and Hey-Sonderberg stresses produced for D16T and AVT1 aluminum alloys with various structures are presented. The ambiguous influence of alloy structure on fatigue properties in extension-compression and bending on specimens with various stress concentrations is demonstrated. In order to reduce the cumbersomeness of production of maximum stress diagrams, a number of empirical dependences between strength properties of these aluminum alloys under static and cyclical loadings are tested and evaluated. It is concluded that all three types of diagrams of maximum stresses used supplement each other.

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IVANOVA, V. S., KUDRYASHOV, V. G., DERYAGIN, G. A., SHTOVBA, YU. K.,
Institute of Metallurgy, Academy of Sciences USSR, Moscow

"Comparison of the Breakdown Viscosity $K_{1c}$ of Aluminum (AK4-1T1, V95T1,
D16T) and Titanium (VT8, VT9) Alloys Under Static and Cyclic Loads"

Abstract: Aluminum and titanium alloys were studied to determine the
breakdown viscosity of structural materials both under static ($K_{1c}^{S}$) and
under cyclic ($K_{1c}^{C}$) loading and also to show the optimal conditions for
fatigue tests when $K_{1c}^{S} = K_{1c}^{C}$. It is noted that the problem of brittle
fracture of materials is now receiving much attention and that a new
breakdown characteristic $K_{1c}$, the breakdown viscosity of the material under
plane deformation conditions, which characterizes the residual strength of
material in the presence of cracks, has been introduced into calculations
in connection with large-scale metal structures. It is difficult to deter-
mine the breakdown viscosity $K_{1c}$ of materials of medium strength, such as

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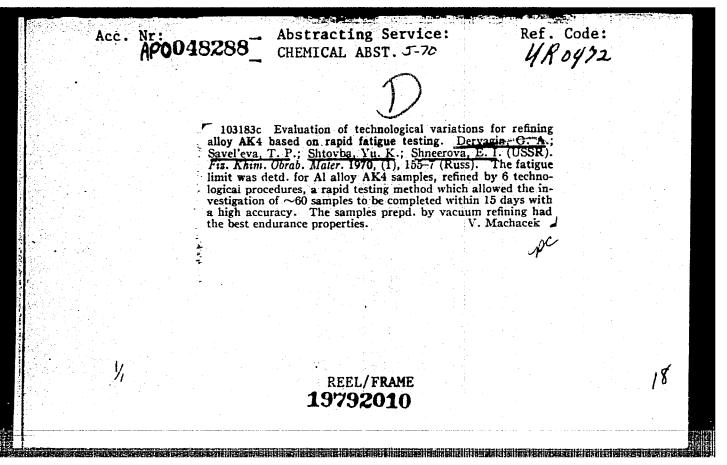IVANOVA, V. S., et al, Problemy prochnosti, No. 5, May 72, pp 29-35

structural aluminum alloys, according to linear breakdown mechanics; this requires tests of samples of extremely large dimensions and hence it is important to study the possibility of determining $K_{1c}$ on the basis of

fatigue tests of samples by a method proposed previously by Ivanova and Kudryashov. This avoids many difficulties associated with tests under static loading, such as the application of sharp cuts, the growth of fatigue cracks, and assuring conditions for plane deformation. Pressed profiles of cross section 60 × 80 and 65 × 200 mm$^2$ and bars of diameter 18 mm of AK4-1T1 alloy, pressed plates of cross section 35 × 250 mm$^2$ of V95T1 alloy and rods of diameter 18 and 60 mm of V95T1 alloy, pressed plates of cross section 42 × 250 mm$^2$, a panel of thickness 38 mm and rods of cross section 50 × 60 mm$^2$ and of diameter 18 mm of D16T alloy, pressed rods of diameter 18 mm of D1T, AVT1 and AMg6 alloys, pressed profiles of titanium alloys VT8 and VT9 and rods of diameter 35 mm of VT9 alloy in the annealed state were investigated. It was found that materials can be evaluated from the aspect of breakdown viscosity on the basis of fatigue tests and that the form of the load, the cycle and the load spectrum do not play a considerable role. The only condition for the best convergence of estimates of $K_{1c}^{s}$ and $K_{1c}^{c}$ is that the stress correspond to the critical fatigue stress. Analysis of test data on fatigue under bending and stretching of cylindrical samples of the aluminum and titanium alloys showed that the breakdown viscosity $K_{1c}^{s}$ under static loading as

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determined by the Irwin method and the breakdown viscosity $K_{Ic}^{c}$ under cyclic loading as determined by the Ivanova and Kudryashov method are close to one another at the critical fatigue stress. It was also shown that it is possible to determine $K_{Ic}^{c}$ at high temperatures on the basis of fatigue tests of samples using the relationships of linear mechanics considering the length of the fatigue crack.

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103183c  Evaluation of technological variations for refining alloy AK4 based on rapid fatigue testing.  Deryagin, G. A.; Savel'eva, T. P.; Shtovba, Yu. K.; Shneerova, E. I. (USSR). *Fiz. Khim. Obrab. Mater.* 1970, (1), 155–7 (Russ).  The fatigue limit was detd. for Al alloy AK4 samples, refined by 6 technological procedures, a rapid testing method which allowed the investigation of ~60 samples to be completed within 15 days with a high accuracy.  The samples prepd. by vacuum refining had the best endurance properties.                V. Machacek

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**19792010**

1/2    025                    UNCLASSIFIED            PROCESSING DATE--13NOV70
TITLE--ACCELERATED METHODS FOR DETERMINING THE ENDURANCE LIMIT OF ALUMINUM
ALLOYS -U-
AUTHOR-(03)-DERYAGIN, G.A., SHTOVBA, YU.K., SHNEYEROVA, E.I

COUNTRY OF INFO--USSR

SOURCE--PROBLEMY PROCHNOSTI, VOL. 2, APR. 1970, P. 11-17

DATE PUBLISHED----APR70


SUBJECT AREAS--MATERIALS, METHODS AND EQUIPMENT

TOPIC TAGS--TEST METHOD, ALUMINUM ALLOY, FATIGUE TEST/(U)D16T ALUMINUM
ALLOY, (U)AV ALUMINUM ALLOY, (U)D1 ALUMINUM ALLOY, (U)AK4 1 ALUMINUM
ALLOY



CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--2000/0110          STEP NO--UR/3663/70/002/000/0011/0017

CIRC ACCESSION NO--AP0123882
                        UNCLASSIFIED