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UNCLASSIFIED
TITLE--KINETICS AND MECHANISM OF THE OXIDATION OF ZINC SULFIDE -U-

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AUTHOR-(02)-DIMITROV, R., VANYUKOV, A.V.

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CIRC ACCESSION NO--AP0126951   UNCLASSIFIED   PROCESSING DATE--27NOV70
ABSTRACT/EXTRACT--(U) GP-0-   ABSTRACT.   STRONGLY EXOTHERMIC REACTION WAS
SHOWN AT HIGHER TEMPS. OF OXIDN. BY AMORPHOUS (IS GREATER THAN
773DEGREES), CUBIC (IS GREATER THAN 898-1013DEGREES), AND HEXAGONAL (IS
GREATER THAN 923DEGREES) FORMS CORRESPONDING TO APPARENT ACTIVATION
ENERGIES Q OF 153, 190-6, AND 205-33 KCAL-MOLE. CUBIC ZNS SHOWED A
KINETIC CHARACTER AT 1203DEGREES IN OXIDN. EFFICIENCY RELATIVE TO
GASEOUS O CONTENT, HOWEVER THE CURVES OVER THE COMPLETE TEMP. RANGES
ILLUSTRATED MULTIPLE REACTIONS.   FREE ENERGY CALCNS. ENABLED PREDICTION
OF OXIDN. TO ZNSO SUB4 AT LOWER, AND TO ZNO AT HIGHER TEMPS.   THAT ZNSO
SUB4 FORMATION AT HIGHER TEMPS. WAS POSSIBLE WAS ATTRIBUTED TO REACTIONS
WITH GASEOUS SO SUB2. PRACTICAL ANALYSES CONFIRMED THE LIMITATION OF
ZNSO SUB4 TO GREATER THAN 1PERCENT BYINTERACTION WITH ZNS.   PRELIMINARY
SURFACE REPLACEMENT BY DENSE ZNO COULD BE OBSD. IN POLARIZED LIGHT, OR
STEPWISE ATTACK AT ACTIVE CENTERS BY THE ELECTRON MICROSCOPE.   THAT
FORMED ON HEXAGONAL ZNS, Q EQUALS 3.811, HAD THE LATTICE CONST. A EQUALS
3.249 ANGSTROM COMMON TO ZINCITE, WHEREAS ON CUBIC ZNS A EQUALS 5.412 IT
WAS LESS DENSE, MORE FRIABLE, AND THUS MORE FAVORABLE TO OXIDN.
INTERNALLY VIA CRYSTAL DEFECTS; IN THE LATTER CASE, THE OXIDE FILM
ASSUMED A FLOCCULATED APPEARENCE THOUGH NOT ASSOCD. WITH CRYSTAL
DECREPITATION.

UNCLASSIFIED

USSR

UDC 620.179.16

DIMITROV, T. V. and SAZHIN, V. V., VNIINK

"The 'SNEZHINKA' Ultrasonic Detector Unit"

Abstract: The authors have developed the SNEZHINKA (snow flake) unit which has the following detectors: divided-integrated (d.i.) detectors for testing parts of cylindrical shape; a d.i. widecut detector; a d.i. detector with improved parameters, a direct contact-immersion detector; and slanting, miniature and wear-resistant detectors. The detectors are mounted on an eight-pointed star-shape table and can be used under shop or laboratory conditions at ambient temperatures between -10 and +40 C.

In 1970 the SNEZHINKA unit underwent shop tests at metallurgical plants and the interdepartmental commission recommend it for series production. The Elektrotochpribor Plant started using the first industrial batch of SNEZHINKA units in 1971. A photograph of the unit is given along with three tables of technical specifications. 1 figure, 3 tables, 9 bibliographical references.
1/1

USSR

DIMITROV, V.

"The Laboratory of Aviation Medicine -- Health Service"

Baku, Bakinskiy Rabochiy, 27 Mar 70, p 3

Translation: There are no minor things in the routine work of pilots.
For an aircraft to function properly pilots must solve the most di-
verse problems, including serving passengers and seeing to prompt re-
pair of complex engineering, increasing the effectiveness of use of
aircraft, fulfilling assignments for oilmen and geologists, and help-
ing farmers obtain a good harvest...

     But there is another task that is not forgotten for a minute.
That is the concern for the health of airmen.

     "The flight personnel is under constant medical supervision,"
explains the administrator of the pilot's medical service, the out-
standing health worker, Z. Sultanov. "We even have LAM for the pro-
tection of the health of airmen..."

1/8

USSR

DIMITROV, V., Baku, Bakinskiy Rabochiy, 27 Mar 70, p 3

LAM is the laboratory of aviation medicine. It appeared 14 years ago as the basis of the aviation medicine consultation office that operated at the polyclinic. This office was operated by two doctors and one nurse. Today, there are 17 experienced medical workers in LAM. They have well-equipped offices.   For example, in the functional diagnostic laboratory there is special equipment that allows them not only to hear how the heart works, but also to see it on a television screen.

The LAM specialists are not as busy with treatment as they are with preserving the health of the flying and engineering personnel. In this they see a guarantee of safe flights. Incidently, there is not a single case on record of impaired flight related to the health condition of aircraft crews.

Not a single case... We cannot help but imagine how the medics have to organize their work to obtain such a result. For it could happen that a pilot, having experienced a malaise or merely 2/8

USSR

DIMITROV, V., Baku, Bakinskiy Rabochiy, 27 Mar 70, p 3

slight fatigue, would not attribute any importance to this and plan to go on a flight. And in the air, a misfortune will happen...

As if reading my mind, the laboratory chief, Sh. Atamalibekhova, honored physician of the republic and outstanding health worker, explains:

"We have developed, if we can express it this way, a triangle of health: LAM doctors, doctors of the aviation subdepartments, and flight physicians. The fligh personnel cannot escape the field of vision of this triangle..."

We find that the LAM specialists make the rounds of all the aviation enterprises once a year, and issue medical certificates to flight and engineering personnel on the spot. After each examination recommendations are given, and the subdepartment physicians see to it that they are meticulously followed. They also supervise the vacation schedules for the crews. And before each flight, the pilots, engineers, navigators, and radio operators are required to visit
3/8

USSR

DIMITROV, V., Baku, Bakinskiy Rabochiy, 27 Mar 70, p 3

flight physician. He is implacable: he will not allow anyone who did not rest well to fly, let alone anyone who does not feel well.

LAM is the main link in medical care for pilots. In order to investigate working conditions for people in airborne professions, their behavior under complex flight conditions, the medics go up with them and observe the condition of flight crew members in the most diverse working conditions. They investigate their living conditions, and organize vacations for flight engineering personnel working in the field of airborne crop spraying. The physicians go out to the air strips, explain the rules for handling chemicals, and teach personnel how to administer first aid for poisoning that could occur if such rules are broken.

LAM doctors organize scientific and practical conferences at which medical workers from other Aviation administrations participate, and they travel to conferences instituted by their colleagues. They constantly exchange experience and accumulate valuable data which help improve medical care for aviation specialists.

4/8

- 59 -

USSR

DIMITROV, V., Baku, Bakinskiy Rabochiy, 27 Mar 70, p 3

The triangle of health functions smoothly and well. Each flier is under routine medical supervision. Accidental events are, so to speak, excluded.

When needed the flight personnel are given passes to sanatoriums issued from the special fund of the USSR Ministry of Civil Aviation. And once he reaches the age of 40 years, each member of the flight crew undergoes a mandatory complete check-up at a hospital.

"These measures are very effective," explains the head of the Laboratory of Aviation Medicine.

They extend the time a man can work in flight service. But if it should happen that a flier is "grounded" for reasons of health, he still remains under our observation, is given all the necessary therapeutic and prophylactic care, is eligible for sanatorium and resort therapy, and as a rule returns to his flying profession after a certain time.

5/8

USSR

DIMITROV, V., Baku, Bakinskiy Rabochiy, 27 Mar 70, p 3

There is another interesting detail. The road to aviation also begins in the LAM. Here medical certificates are issued for future students of flying and aircraft engineering schools, and aviation institutes.

A truly enormous work is done by the laboratory physicians, Dr. R. Stepanov, phthisiologist, has dedicted 42 years to protection of human health. For 20 of these years he has served aviators. And if you are unlikely to find a victim of tuberculosis at the enterprises of the Azerbaydzhan administration, this is to be credited to Ruben Mikhaylovich.

"To treat successfully," he says, "you have to discover the sickness in time."

Early detection of disease, effective treatment, as prescribed by Ruben Mikhaylovich, and constant supervision of such treatment yield remarkable results.

6/8

USSR

DIMITROV, V., Baku, Bakinskiy Rabochiy, 27 Mar 70, p 3

This doctor has traveled a long professional road. He has scientific works to his credit. According to the latest accreditation, he is recognized as a physician in the highest category.

The fliers of the Azerbaydzhan Administration are also well aquainted with Ye. Kudryashova who is an oculist. For 25 years she has worked here. Her paper about her work was heard by oculists of the LAMs of all the Civil Aviation administrations in the nation, who recently gathered in Odessa at a scientific and practical conference.

The otolarngologist, Z. Aliyeva, also enjoys deserved authority here. For over 25 years the following have worked with aviators: M. Rybina and B. Asribekova, registered nurses and T. Karetnikova, Laboratory technician who was awarded the honorary title outstanding public health worker. Nurse G. Nuraliyeva is respected here for her thoughtfulness and sensitivity.

LAM specialists stand watchful guard over health. The triangle

7/8

USSR

DIMITROV, V., Baku Bakinskiy Rabochiy, 27 Mar 70, p 3

they have created is always in battle readiness. The doctors have
set up a reliable screen against poor health and in performing their
noble mission they are prolonging the flight biography of the con-
querors of the air ("The Fifth Ocean.").

8/8

- 61 -

USSR

IVAKHNENKO, A. G., DIMITROV, V. D., GULYAN, N. V., IVAKHNENKO, L. N.

"Problems of Modeling of Complex Objects on the Basis of Heuristic Self-Organization"

Kiev, Kibernetika i Vychistel'naya Tekhnika, No 13, 1972, pp 18-38.

Abstract: A number of trends in cybernetics concern the problem of modeling of complex objects. The authors show that in spite of the differences in initial assumptions, all of these trends can be reduced to the creation of very complex objects, the quality of which is determined by the extent to which they can "learn" rapidly: i.e., the extent to which they can "construct an internal model of an external situation." Models studied include the Gabor predicting filter, the Kalman filter, the perceptron, and neuron networks.

1/1

USSR

DIMITROV, V. D.

UDC   8.74

"Polyserial Stochastic Languages and Stochastic Grammars With a Finite Number of States"

Kiev, Tekhn. kibernetika--sbornik (Technical Cybernetics--collection of works), 1971, pp 214-225 (from RZh-Matematika, No 1, Jan 73, abstract No 1V799 by V. Mikheyev)

Translation: The paper describes a multiserial stochastic language and stochastic grammar with a finite number of states in the form of a finite stochastic automaton with a certain operational criterion. A finite stochastic automaton is understood to be a system $QA = (X, S, M, p_0, q)$, where $X = \{x_1, \ldots, x_n\}$ is the set of input symbols of the alphabet; $S = \{s_1, \ldots, s_n\}$ is the set of internal states; M is the mapping of X onto the set of $n \times n$ stochastic matrices (the set of transition probability matrices); $p = [p_{01}, \ldots, p_{0n}]$ is a stochastic n-dimensional line vector (initial distribution of states); $q = [q_1, \ldots, q_n]$ is an n-dimensional column vector of the utility (preference, degree of desirability) of states. An example is given of a stochastic grammar with a finite number of states.

1/1

USSR

DIMITROV, V. D.

"Multiple-row Stochastic Languages and Stochastic Grammars with Finite
Numbers of States"

Translation: Definitions of a multiple-row stochastic language and sto-
chastic grammar with finite number of states in the form of a finite
stochastic automaton with defined functioning criterion are given. A
finite stochastic automaton refers to the system $QA = (X, S, M, p_0, q)$,

where $X = \{x_1, \ldots, x_n\}$ is the set of input characters in the alphabet;

$S = \{s_1, \ldots, s_n\}$ is the set of internal states; M is a mapping of X in a

set of $n \times n$ stochastic matrices (set of transition probability matrices);

$p = [p_{01}, \ldots, p_{0n}]$ is a stochastic, n-dimensional vector-row (initial

distribution of states); $q = [q_1, \ldots, q_n]$ is an n-dimensional vector

column, of the usefulness (preference, degree of desirability) of states.
An example of a stochastic grammar with a finite number of states is pre-
sented.
1/1

DIMITROV, V.D.

mathematics

PART II

POLYSERIAL ALGORITHMS OF THE THEORY OF STATISTICAL SOLUTIONS AS APPLIED TO
CLASS RECOGNITION PROBLEMS

The theory of statistical solutions is the straitened operation for
pattern or class recognition implementing the idea of information accumulation.
In classical form, this theory is polynomial in the sense that it is based on
a single calculation of the risk function with respect to fixed variables; the
matrix of a priori probabilities, the experimental matrix and the loss matrix.
These three matrices can be called "complete," since they combine all the
arguments directly, and for dependent arguments, all their covariations, which
requires quite broad initial data for strict observation of stationarity of
the process.

In accordance with the basic idea of the "method of group consideration
of arguments (see the Ukrainian journal Avtomatika, 1968-1970), it is
proposed that the polyserial "complete" algorithm be replaced by a system of
several series of "partial" descriptions for all possible pairs of arguments.
For training each of the "partial" algorithms it is sufficient to have a com-
paratively short series of experimental data available, and the so-called
analog of the complete description can be obtained from a system of partial
descriptions by exclusion   of   intermediate variables.

The complete description (algorithm) has the known form:

$$P(d_j) = \sum_i P(R_i) h_i(R_i, G_i)(x_1, \ldots, x_n) P(x_1, \ldots, x_n / R_i),$$ (1)

where $P(d_j)$ is the decision-making risk; $P(R_i)$ is the a priori probability of
the class; c_j is the solution in favor of the j-th class;

$x_1, \ldots, x_n$ are discrete arguments $(x_i = 1, 2, \ldots, q$ where q is the
number of digitization levels);

- 15 -

USSR   UDC 51.155.001.57.681.3.06

DIMITROV, V. D.

"Heuristic Generator for a Model of a Human Operator Controlling a Technological Process Based on MGUA Algorithm with Eroded Zade Sets"

Tekhn. Kibernetika. Vyp. 2 [Engineering Cybernetics, No. 2 -- Collection of Works], Kiev, 1970, pp 23-42 (Translated from Referativnyy Zhurnal Kibernetika, No. 4, April, 1971, Abstract No. 4 V712 by S. Berkovich).

Translation: It is suggested that a network graph (automaton) with eroded transition functions based on the Zade theory be used as a model of the course of a production process. It is assumed that the model of operative thought of the human operator controlling the process corresponds to this network graph. Testing of sugar production operators confirms this assumption. Heuristic generation is expressed as a process of search for the optimal decision using a certain set of courses. Based on the information read from instruments, the operator constructs an internal model of the process being controlled in the form of an eroded automaton, in which the method of group consideration of arguments (MGUA) is realized.

1/1

USSR   UDC 62-50

IVAKHNENKO, O. G., SPYNU, YE. I., DIMITROV, V. D., PATEREU, S. G.,
and PATRATIY, I. Z. (Kiev, Sofia, Kishinev)

"Recognizing the Lethal Duration and Content of Pesticides in Planst
According to a Probability Algorithm for a Method of Data Handling by
Groups"

Abstract: The article describes the development of a probability al-
gorithm for a method of data handling by groups which uses the numerator
of the Bayes formula or its modification as a support function. The
probability algorithm is used to solve the following problem:

        1) Approximately determining the time constant in the exponent
in the expresion for a pesticide's toxicity on the basis of data con-
cerning the physicochemical properties of the preparation, the conditions
of its use, and plant peculiarities;

1/2

USSR

IVAKHNENKO, O. G., et al., Avtomatyka, No 5, Sep-Oct 70, pp 42-52

2) Determining the current concentration of a pesticide at a given time from calculated data on the initial concentration of the substance in plants and the destruction rate constant.

2/2

- 41 -

USSR   UDC: 629.7.036:536.46

GOLOVICHEV, V. I., DIMITROV, V. I.

"Composition and Thermodynamic Properties of Combustion Products of Hydrogen in Air"

Aerofiz. Issledovaniya [Aerophysical Research -- Collection of Works], Novosibirsk, 1972, pp 83-85 (Translated from Referativnyy Zhurnal Aviatsionnyye i Raketnyye Dvigateli, No 5, 1973, Abstract No 5.34.90, from the Resume).

Translation: The problem of determining the values of equillibrium composi- tions and properties of the products of combustion of hydrogen in air is solved numerically. The following quantities were defined: the values of $T_{comb.\ prod.}$, enthalpy, entropy, frozen and equillibrium heat capacities C_p and C_v, frozen and equillibrium values of adiabatic index, molecular weight of combustion products. The solution is produced by a linearized version of the Newton-Rafson method. Results are presented in the parameter ranges $P = 0.5$-10 atm, $\alpha = 0.5$-10, $T_0 = 300$-$1200°$ K. 1 figure.

1/1

AA0038781‾   D   Dimitrov, V. I.
                               UR 0482

Soviet Inventions Illustrated, Section I Chemical, Derwent,
    237322 NON-RESIDUAL OXIDISING GASIFICATION   3/70
            METHOD FOR OIL RESIDUES by incomplete
burning in air or oxygen, differs in being carried
out in two stages first at 500-700°C and then at
1200-1400°C with the formation of gaseous
products. The preliminary oxidation chamber is
fed with part of the air, 0.1 of the stoichio-
metric quanrity, and with all the fuel to be
gasified. The whole mass of fuel is evenly heated
in the chamber. This causes considerable
destruction of the complex compounds, introducing
atoms of oxygen into the molecular structure of the
fuel. The process in this chamber is not brought
to a thermodynamic balance, so the condensation
reactions do not have time to finish, and the
product, containing a rich selection of active
radicals, enters the reaction chamber. where,
being mixed with the remaining air, it reacts up
to the point of terminal gaseous products con-

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                19731977

AA0038781

siderably more rapidly.   By eliminating
intermediate oxidation, the process takes place
more energetically, less jerkily, is easily
regulated, and produces less soot. 29.3.67.
as 1146013/23-26, MASLENNIKOV, V.M. et al.
Theoretical and Practical Mechanics Inst.
Siberian Sect. Acad. Sciences U.S.S.R. (7.7.69)
Bul. 8/12.2.69. Class 24e, Int. Cl. C 10j.

AUTHORS: Maslennikov, V. M.; Vyskubenko, Yu. A.; Dimitrov, V. I.;
Zharkova, G. M.; Morozov, A. P. and Chusov, D. V.

Institut Teoreticheskoy i Prikladnoy Mekhaniki Sibirskogo
Otdeleniya AN SSSR

19731978

USSR   UDC: 662.58

GOLOVICHEV, V. I.,DIMITROV, V. I., SOLOUKHIN, R. I., Novosibirsk

"Numerical Analysis of Kinetic Models of Hydrogen Combustion"

Novosibirsk, Fizika Goreniya i Vzryva, Vol 9, No 1, Jan/Feb 73, pp 95-101

Abstract: The paper presents a numerical integration of the system of
kinetic equations which describe the reaction of ignition and combustion of
hydrogen, for various initial states and kinetic models of the system (in-
troduction of additives, change in the initial level of concentration of
active centers, addition of water vapor). These calculations are done to
determine the sensitivity of the kinetic model to the effect of changes
in small initial concentrations of active centers, and to define the part
played by nonisothermality of the combustion process. A comparison is made
with experimental data on ignition delays.

1/1

USSR

UDC 517.937

DIMITROV, Y. P., People's Republic of Bulgaria

"On the Stability of Solutions of Differential-Recurrence Equations. II. Stability in Linear Approximation"

Minsk, Differentsial'nyye Uravneniya, Vol 8, No 8, Aug 72, pp 1372-1376

Abstract: The article considers the stability of linear systems subject to constantly operating disturbances, specifically the equation

$$\frac{dx_{n+1}(t)}{dt} = Ax_{n+1}(t) + Bx_n(t) + u(t),$$

where $u(t)$ is the constantly operating disturbance, as well as the equation

1/3

USSR

$$\frac{dx_{n+1}(t)}{dt} = Ax_{n+1}(t) + Bx_n(t).$$

Theorems regarding stability in t, n, and the straight line t = kn are proved. The author also considers stability in a linear approximation with respect to the equation

$$\frac{dx_{n+1}(t)}{dt} = Ax_{n+1}(t) + Bx_n(t) + f(x_n(t), x_{n+1}(t), t, n),$$

where $f(u, v, t, n)$ is a continuous vector function in the region

2/3

- 3 -

USSR

DIMITROV, Y. P., Differentsial'nyye Uravneniya, Vol 8, No 8, Aug 72, pp 1372-1376

$$D\{\|u\| \leqslant H, \|v\| \leqslant H, 0 \leqslant t < \infty, n \geqslant 1\}.$$

The   following condition is fulfilled in the region D:

$$\|f(x_n(t), x_{n+1}(t), t, n)\| \leqslant M\|x_n(t)\| + N\|x_{n+1}(t)\|,$$

where M and N are nonnegative numbers.

3/3

FRACTIONATION OF VALINE ISOACCEPTOR tRNAs FROM BAKER'S YEAST '

S. K. VASILENKO, F. F. DIMITROVA, L. V. OBUKHOVA, V. F. PODGORNYY

Institute of Organic Chemistry, Siberian Branch of the Academy of Sciences,
USSR, Novosibirsk

A new method for the chromatography of isoacceptor tRNAs Val from baker's yeast
is described. The chromatography is carried out on TEAE-cellulose columns at 38—40° in
solution of 7 M urea and 0.1 M CH₃COOH, in NaCl linear gradient from 0.35 to 0.5 M.
Mg^{+2} ions and EDTA in concentrations 0.005—0.01 M have a marked influence on the
fractionation. tRNA Val was fractionated into a few isoacceptor fractions. Structural dif-
ference of these fractions was confirmed by the analysis of guanylo-ribonuclease digests
of ¹⁴C-valyl-tRNA on TEAE-cellulose columns in linear gradient of HCOOH and NaCl
in 7 M urea. The final purification of tRNA Val was performed by the chemical method of
periodate oxidation.

Molecular Physics

ANTIPENKO, K. M., DMITRYUK, A. V., ZUBKOVA, V. S., KARAPETYAN; G. O., and MAK, A. A., Institute of Precision Mechanics and Optics

"Cooperative Processes in Activated Glasses"

Abstract: Cooperative phenomena were found and studied in glasses activated with Yb--Tb, Yb--Eu. It is shown that there are at least two mechanisms for anti-Stokes excitation of the Tb^{3+} and Eu^{3+} ions: fast (cooperative sensitized luminescence) and slow (combinational excitation). Some quantitative parameters of the cooperative processes were determined. A study was made of the functional dependence of the efficiency of the cooperative processes on excitation power and energy, glass structure and composition, temperature, and activator concentration ratio. It is shown that disorder of the structure of the glasses does not prevent the occurrence in them of cumulative processes such as cooperative sensitization and combinational excitation, the efficiency of the cumulative processes in the glasses being commensurable with the efficiency of two-photon absorption with the participation of the virtual level.

1/1

KOZLOV, A. P., BAZHANOV, YE. B., DIMOV, V. I., TERPUGOV, V. G., and SHISHOV,
V. A., Laboratory of High Energies, Institute of Oncology a imeni N. N. Petrov,
Ministry of Health USSR, Leningrad

"Distribution of Depth Doses During Irradiation With Bremsstrahlung from a
B5M-25 Betatron"

Abstract: In experiments in which a water phantom was used, the distribution
of ionization along the beam axis upon irradiation with bremsstrahlung from
the new medical betatron B5M-25 in the energy range E_{max} = 12-27 Mev at DIB
values of 80, 100, and 200 cm was studied. It was shown that as the distance
from which irradiation of the surface was carried out increased, the ioniza-
tion maximum at E_{max} = 20-27 Mev was displaced towards greater depths of the
tissue-equivalent medium by 2.0 and 0.9 cm for every meter of this distance
in irradiation with filtered and unfiltered radiation, respectively. With
increasing values of E_{max}, the position of the ionization maximum was displaced
at the rate of 0.12 $\pm$ 0.05 cm/Mev for both filtered and unfiltered radiation
1/2

USSR

KOZLOV, A. P., et al., Meditsinskaya Radiologiya, Vol 17, No 7,

irrespective of the value of DIB. Steel plates were used to filter the radiation. Some characteristics of the isodose curves were determined. There was almost complete coincidence of the position of the 50% isodose with the geometric boundaries of the beam at the depth of the ionization maximum, while any dependence of this position on the dimensions of the radiation field was absent. The results obtained can be used in calculations to determine the optimum procedures in therapy.

2/2

Acc. Nr: Abstracting Service: Ref. Code:
AP0046635   CHEMICAL ABST. 4/70   UR 0131

81820d   Increased stability of mold plates.   Dimova, D. Kh.; Piguzov, Yu. V. (Mosk. Inst. Stali Splavov, Moscow, USSR). *Ogneupory* 1970, 35(1), 16–19 (Russ). The efficiency of the utilization of presses in the production of refractory products depends to a large extent on the life of press mold plates. The zone of the max. wear occurs at a definite distance (in this particular case 0.8 mm) from the upper surface of the plate. The effect of quenching temp. on the wear-resistance of plates and ratio of martensite/austenite in the steel structure were studied. After heat treatment of plates by carburizing at 1080° followed by quenching with a repeated heating at 820° and tempering at 150°, the max. amt. of martensite and a large amt. of carbides were obtained in the surface layer of the plate. The austenite content is slight. On the contrary, the plates carburized at 1080° and quenched from this temp. have, in the surface layer, mostly austenite (~60%) in the mass of which large needles of martensite are observable. The potential wear resistance of plates with the martensitic structure of steel is higher than that with austenitic. To explain the premature failure of plates with martensite structure the profile of wear of plates was analyzed. The profile of plates with martensite structure is characterized by

AP0046635

less wear of the upper part of a plate in comparison with the part of the plate corresponding to the pressing zone. The premature failure of plates of martensite structure is caused by the cracking of the products during pressing. The plates, the upper part of which were tempered, are softer which makes it possible to prevent the breaking of products during their expulsion from the mold.   J. Jindra

19781948

Explosives and Explosions

USSR   UDC 532.525.1

MEL'NIKOV, M. A., GAVRILIN, A. I., DIMOVA, N. I., and KALASHNIKOV,
A. L., Tomsk Polytechnical Institute Imeni S. M. Kirov

"Mechanism of the Explosion Initiation of Silver and Thallium Azides
by Electrical Discharge"

Abstract: Experimental data are reported on the explosion initiation
of silver and thallium azides by means of an electrical discharge.
The samples studied were subjected to charge impulses with a front of
$T_{fr}=5 \cdot 10^{-6}$ sec and amplitude 4.5 kv. Critical energy of the initia-
tion of AgN_3 and TlN_3 by an electrical discharge was measured by os-
cillography of the current, charge and the beginning of glow; it was
found to be $0.2 \cdot 10^{-3}$ and $0.5 \cdot 10^{-3}$ J respectively. The results support
the contention about thermal nature of the initiation of azides by
electrical discharge. It was shown experimentally that a spark with
an energy below that of the critical one does not cause the explosion
of above azides. The spark energy appears to be the determinant ini-
tiation parameter.

1/1

USSR
.   UDC 662.215.1

DIMZA, G. V. (Moscow)

"Detonation of Filled Explosives in Small-Diameter Charges"

Novosibirsk, Fizika Goreniya i Vzryva, Vol 8, No 2, Jun 72, pp 306-310

Abstract: The article describes results of an experimental study of regular-
ities in the variation of critical detonation diameters and velocities as a
function of charge density and porosity and explosive grain size and quality
in systems containing an explosive (single-crystal and commercial powdered
hexogen, in some cases trotyl) and an inert filler (paraffin). It was found
that the single-crystal hexogen grain with filler is characterized by a
constant critical detonation velocity ($D_{cr} \simeq 5300$ m/sec). The latter remains
constant regardless of the grain size (from 0.1 to 0.85 mm in the investi-
gated cases) or the filler content. In addition, there is direct proportion-
ality between grain size and reaction time. This can be regarded as con-
firmation of the layer-by-layer grain combustion scheme.

D_{cr} is constant for commercial powder charges at low filler contents
(porosity over 20 percent), then increases with a further increase in the

1/2

USSR

DIMZA, G. V., Fizika Goreniya i Vzryva, Vol 8, No 2, Jun 72, pp 306-310

filler content (from 5300 to 7300 m/sec for hexogen, from 4500 to 6300 m/sec for trotyl), apparently as a result of the reaction in inhomogeneities (voids, micropores, dislocations) present in the hexogen grain and trotyl.

The results are in poor agreement with the conclusions of A. N. DREMIN et al. suggesting grain fragmentation as the reason for the discrepancy between reaction time in the detonation wave and explosive grain size.

2/2

Explosives and Explosions

USSR   UDC 541.427.6

APIN, A. YA., and DIMZA, G. V., Institute of Chemical Physics,
Academy of Sciences USSR, Moscow, Academy of Sciences USSR

"Characteristics of the Rise in the Detonation Rate of Mixed Explo-
sives With Increasing Charge Diameters"

Moscow, Doklady Akademii Nauk SSSR, Vol 192, No 4, 1970, pp 850-852

Abstract: The relation between the detonation rate D and the charge
diameter d was determined for mixtures of polydisperse hexogen pow-
der with a mean particle size of ~ 0.1 mm and paraffin wax added in
amounts of 10 - 28% with reference to the mixture in the form of a
gasoline solution. On evaporation of the gasoline, the mixtures
were pressed into tablets. The concentration and dispersity of
hexogen was the same in every mixture, while the porosity decreased
and the density increased with an increasing paraffin wax content.
With an increasing paraffin content, D increased. The D(d) curves
for mixtures with 10, 20, and 24% paraffin showed a lower D plateau
from which D increased abruptly to a higher plateau at a certain
value of d that decreased with increasing degrees of filling with
paraffin. At 28% of paraffin, the lower plateau was missing; D rose
1/3

USSR

directly to the 2nd plateau. The presence of two plateaus and the abrupt increase in D, which amounted to 350 - 500 m/sec, can be explained by assuming that the initial surface reaction (lower plateau) was supplemented by a homogeneous reaction of the thermal explosion type that took place within the volume of hexogen grains. The surface of hexogen in mixtures was varied by using hexogen with a grain size from 0.001 to 0.35 mm, while the degree of filling with paraffin was kept constant at 20%. With an increasing grain size, entrance into the 1st horizontal section (lower plateau) of the $D(d)$ curve took place more slowly and the value of d at which the abrupt transfer to the 2nd plateau occurred became greater. For the mixture with hexogen particles of the grain size 0.001 mm, the lower plateau was absent and the limiting value of D (upper plateau) was reached directly, evidently because the highly disperse explosive burned rapidly. For the mixture with a hexogen grain size of 0.35 mm, transfer to a higher plateau was not yet observed at d $=$ 40 mm, the maximum value of d in the experiments described, while the mixtures

2/3

USSR

APIN, A. YA., et al, Moscow, <u>Doklady Akademii Nauk SSSR</u>, Vol 192, No 4, 1970, pp 850 - 852

with intermediate grain sizes (0.1 and 0.2 mm) showed a lower plateau and a transfer from it to a higher D level. Similar relations were observed for mixtures of two explosives. In experiments with 70/30 hexogen-trotyl mixtures having the same density, but a hexogen grain size of 0.1 and 0.85 mm, respectively, while the trotyl grain size was the same (0.1 mm) in both cases, the D(d) curve for the mixture with the larger hexogen grain size showed an abrupt increase to a higher value of D, whereas this increase was absent on the D(d) curve for the other mixture. The values of D were higher for the mixture with the smaller hexogen grain size.

3/3

USSR

LYUBLINER, I. P., YERMOLENKO, I. N., KOFMAN, A. YE., and DIN', K. K.,
Institute of General and Inorganic Chemistry, Academy of Sciences BSSR

"Investigation of the Phosphorylation Process of Carbon Fibers"

Abstract: The phosphorylation process of carbon fiber materials obtained by
pyrolysis of oxidized cellulose with PCl_3 vapors has been investigated by
means of physico-chemical methods. It has been shown that the amount of
chemically bound phosphorus increases with increasing temperature of phos-
phorylation up to the maximum of 10 weight-%. At the same time it depends
on the pyrolysis temperature of the carbon fiber used in phosphorylation. By
means of chemical analyses and potentiometric titration it has been established
that the phosphorylated fibers obtained are monobasic ion exchange resins
with exchange capacity of up to 3 mg-eq/g. The IR spectra and chemical
studies showed that along with the phosphorylation process there occurs
an addition of chlorine to the carbon fiber. The roentgenograms show that
during the phosphorylation process no structural changes in the fibers take

1/2

USSR

LYUBLINER, I. P., et al., Vestsi Akademii Navuk BSSR, Seriya Khimicheskikh Navuk, No 3, 1973, pp 80-85

place, except for some degree of disorganization. The thermal stability of phosphorylated carbon fibers is higher by about 100° than that of the starting carbon. The phosphorylated ion exchange resins are stable in strongly acetic media during repeated sorption-desorption cycles.

- END -

2/2

CSO: 1841-W

TITLE--AMPHOTERIC ION EXCHANGE RESINS -U-

AUTHOR-(02)-DINABURG, V.A., VANSHEYDT, A.A.

COUNTRY OF INFO--USSR

SOURCE--U.S.S.R. 152,737
REFERENCE--OTKRYTIYA, IZOBRET., PROM. OBRAZTSY, TOVARNYE ZNAKI 1970,
DATE PUBLISHED--26JAN70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--ION EXCHANGE RESIN, CHEMICAL PATENT, PYRIDINE, VINYL COMPOUND,
BENZENE DERIVATIVE, SULFATE, TRIAZINE, POLYMER CROSSLINKING, RADICAL
POLYMERIZATION

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--3007/0834   STEP NO--UR/0482/70/000/000/0000/0000

CIRC ACCESSION NO--AA0136268
                         UNCLASSIFIED

UNCLASSIFIED   PROCESSING DATE--04DEC70

CIRC ACCESSION NO--AA0136268
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. AN AMPHOTERIC ION EXCHANGE RESIN
IS PREPD. BY COPOLYMG. 2,METHYL,5,VINYLPYRIDINE WITH K P,VINYL, BENZENE
SULFATE WITH A CROSSLINKING AGENT, HEXAHYDRO,1,3,5,TRIACRYLOYL,
2,TRIZAINE, IN THE PRESENCE OF INITIATORS OF FREE RADICAL POLYMN.

UNCLASSIFIED

1/2   008   UNCLASSIFIED   PROCESSING DATE--02OCT70
TITLE--CUPOLA FUEL FROM LEAN COALS FROM THE KUZNETSK BASIN -U-

AUTHOR-(05)-RYABICHENKO, A.O., DINEL, V.M., MOSIN, S.V., LEVDIN, V.P.,
MANUKHOV, A.V.
COUNTRY OF INFO--USSR

SOURCE--LITEINOE PROIZVOD. 1970, (1) 38-9

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--COAL, SULFUR, COKE, CAST IRON

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1986/0111   STEP NO--UR/0128/70/000/001/0038/0039

CIRC ACCESSION NO--AP0102201
                        UNCLASSIFIED

CIRC ACCESSION NO--AP0102201
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. COKE MADE BY SLOW HEATING OF THE
TITLE COAL TO 1000DEGREES WAS EVALUATED IN A CUPOLA FURNACE. IT
PRODUCED AN INCREASE IN GAS PERMEABILITY OF THE CHARGE, AND INCREASE IN
GAS PERMEABILITY OF THE CHARGE, AN INCREASE IN THE GAS TEMP., A DECREASE
IN THE CO-CO SUB2, AN IMPROVED HEAT EXCHANGE, A HIGHER METAL TEMP., AND
A LOWER S CONTENT IN THE PRODUCT.

UNCLASSIFIED

USSR

SARNAVSKIY, N. M., AVRUTIS, M. G., DINER, I. G., Kiev

"Manufacture of Combined Parts of Hard Alloy Cutting Punches
by the Electric Spark Method Using Chemical Nickel Plating"

Abstract: At the Kiev Relay and Automation and Equipment Plant,
a special hard alloy equipment section has been set up. Cutting
dyes and matrices are being manufactured by chemical nickel
plating, which has completely replaced the old method combining
direct and inverse copying. Two steel copies are made by the
chemical nickel plating method together. One of these is used
to cut a layered electrode of AVM (tungsten plus copper plus
nickel alloy for working by the inverse dye copying method. The
second model is coated with a layer of chemical nickel. The
nickel covers the surface of the part in an even layer. This
second model is used as a guide in cutting the matrix. By
selecting the thickness of the nickel layer applied and the
cutting modes, any even clearance or interference can be produced
1/1 between the matrix and dye.

- 46 -

USSR

DINER, I. Ya.

"Regionalization of a Set of Vectors of States of Nature and the Task of Selection of a Decision"

Translation: Regionalization refers to the task of subdivision of a set of state vectors of nature into parts, in each of which action is optimally defined. The solution of the problem is studied for a finite set of actions with various levels of information concerning the state of nature.

1/1

1/2   014   UNCLASSIFIED   PROCESSING DATE--30OCT70
TITLE--DETERMINING THE TECHNOLOGICAL PROPERTIES OF SKD-1 RUBBER -U-

AUTHOR-(03)-KROL, V.A., DINER, YE.Z., GRECHANOVSKIY, V.A.

COUNTRY OF INFO--USSR

SOURCE--KAUCH. REZINA 1970, 29(3), 1-3

DATE PUBLISHED--------70

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

TOPIC TAGS--VISCOELASTICITY, SYNTHETIC RUBBER, FLUID VISCOSITY, RUBBER
    WORKING MACHINERY/(U)SKD1 SYNTHETIC RUBBER

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1997/0463   STEP NO--UR/0138/70/029/003/0001/0003

CIRC ACCESSION NO--AP0119399
                        UNCLASSIFIED

CIRC ACCESSION NO--AP0119399
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. STATISTICAL METHODS INDICATE A
LINEAR RELATION BETWEEN MOONEY VISCOSITY (M SUB2 SUB0) DETD. AT
20DEGREES OF SYNTHETIC SKD-1 RUBBER AND ITS WORKABILITY (W): W EQUALS
225,M SUB2 SUB0 MINUS 2.46. THE RELATION IS RECOMMENDED FOR ROUTINE
PROCESS CONTROL USE. M SUB2 SUB0 IS RELATED LINEARLY TO MOONEY
VISCOSITY DETD. AT 100DEGREES BY THE STD. SOVIET METHOD. THE
VISCOELASTIC PROPERTIES OF SKD-1 (AND W) IMPROVE WITH THE INCREASE OF
ITS POLYDISPERSITY.   . FACILITY: VSES. NAUCH.-ISSLED. INST. SIN.
KAUCH. IM. LEBEDEVA, LENINGRAD, USSR.

UNCLASSIFIED

TITLE--RHEOLOGICAL BEHAVIOR OF POLYDISPERSED CIS,POLYBUTADIENES -U-

AUTHOR-(03)-GRECHANOVSKIY, V.A., DINER, YE.Z., KROL, V.A.

COUNTRY OF INFO--USSR

SOURCE--VYSOKOMOL. SOEDIN., SER. A 1970, 12(3), 561-7

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS, CHEMISTRY

TOPIC TAGS--POLYMER RHEOLOGY, POLYBUTADIENE, SYNTHETIC RUBBER, CATALYTIC
  POLYMERIZATION, SHEAR STRESS, VISCOMETER, FLUID VISCOSITY

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1995/1198   STEP NO--UR/0459/70/012/003/0561/0567

CIRC ACCESSION NO--AP0116663
                        UNCLASSIFIED

CIRC ACCESSION NO--AP0116663
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE RHEOL. PROPERTIES OF
CIS,POLYBUTADIENE (SKD RUBBER) (I) (OBTAINED BY POLYMN. IN THE PRESENCE
OF TI SALTS) WERE STUDIED AT LOW AND HIGH SHEAR STRESSES (SIGMA) AND
SHEAR RATES (GAMMA) BY MEANS OF A MODIFIED MOONEY VISCOMETER AT
20-100DEGREES. RAPID SEDIMENTATION ANAL. IN AN ULTRACENTRIFUGE SPINCO
GAVE 3 SETS OF I SAMPLES HAVING DIFFERENT WT. AV. MOL. WT. AND (OR)
POLYDISPERSITY INDEX. INCREASED POLYDISPERSITY AT A CONST. VISCOSITY
AV. MOL. WT. BROUGHT ABOUT LOWER VISCOSITY. AT A GAMMA SIMILAR TO 1 SEC
PRIME NEGATIVE1, THE VISCOSITY OF I WAS DEPENDENT OF POLYDISPERSITY,
WHEREAS AT GAMMA IS LARGER THAN OR EQUAL TO 10 SEC PRIME NEGATIVE1, THE
VISCOSITY WAS A SINGLE VALUED FUNCTION OF POLYDISPERSITY. THREE
EQUATIONS, WHICH RELATED THE VISCOSITY OF I TO THE MOL. WT. UNDER
VARIOUS FLOW CONDITIONS, WERE DERIVED. THE EXPONENT IN THE EQUATION WAS
INVERSELY PROPORTIONAL TO SIGMA AND (OR) GAMMA.   FACILITY: VSES.
NAUCH. ISSLED. INST. SIN. KAUCH. IM. LEBEDEVA, LENINGRAD, USSR.

UNCLASSIFIED

1/2   038   UNCLASSIFIED   PROCESSING DATE--04DEC70
TITLE--EFFECT OF THE PROPHYLACTIC ADMINISTRATION OF CYSTAMINE ON THE
BIOELECTRIC ACTIVITY OF SOME BRAIN SECTIONS -U-
AUTHOR-(02)-DINER, L.D., MOZZHUKHIN, A.S.

COUNTRY OF INFO--USSR

SOURCE--RADIOBIOLOGIYA 1970, 10(2), 289-93

DATE PUBLISHED-------70

SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES

TOPIC TAGS--PROPHYLAXIS, BRAIN, BIOELECTRIC PHENOMENON,
ELECTROENCEPHALOGRAPHY, CAT, CYSTAMINE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY FICHE NO-----FD70/605004/C01 STEP NO--UR/0205/70/010/002/0289/0293

CIRC ACCESSION NO--AP0139611
                         UNCLASSIFIED

CIRC ACCESSION NO--AP0139611
ABSTRACT/EXTRACT--(U) GP-0-   ABSTRACT.   CYSTAMINE (100 MG-KG) WAS INJECTED
I.M. IN CATS AND THE ANIMALS WERE IRRADIATED WITH 600 R,
ELECTROENCEPHALOGRAPHIC EXAMN. SHOWED A SUBSTANTIAL NORMALIZATION OF THE
BRAIN BIOELEC. ACTIVITY WHEN COMPARED WITH IRRADIATED UNTREATED ANIMALS.
     FACILITY: VOENNO-MED. AKAD. IM. KIROVA, LENINGRAD, USSR.

UNCLASSIFIED

3

USSR   UDC 616.981.553

GLADKOVSKIY, A. P., LESNIKOV, A. L., MAKAROVA, T. A., PANOVA, Z. M., DINER, Z. S.,
-- KRUPINA, A. P., and VITIVKER, V. S., Leningrad Hospital imeni S. P. Botkin, and
Chair of Infectious Diseases, First Leningrad Medical Institute imeni I. P.
Pavlov, and Institute of Epidemiology and Microbiology imeni Pasteur

"Clinical Symptoms and Etiology of Botulism"

Moscow, Klinicheskaya Meditsina, Vol 48, No 9, Sep 70, pp 79-83

Abstract: From 1959 to 1967 the authors treated 14 cases of botulism, most of
which were caused by eating marinated or salted mushrooms or home-canned fish.
The incubation period ranged from 2 hours to 3 days. The disease was incorrectly
diagnosed in all but one case, owing to unfamiliarity with the symptoms on the
part of the first doctors to see the patients (botulism has for sometime been
virtually eradicated in the USSR). The initial symptoms are characteristic and
readily detectable. They include a combination of indications of gastrointestinal
disorders (vomiting, nausea, constipation, abdominal pains), with symptoms of im-
paired vision (anisocoria, mydriasis, diplopia, blepharoptosis, nystagmus, etc.),
impaired swallowing, speech, and respiration. Prompt injection of antibotulinus
serum usually prevents further development of the symptoms and, combined with anti-
biotics and hormones plus cardiovascular agents, strychnine, physostigmine, and
pilocarpine, brings about recovery within about a month.
1/1

Acc. Nr: *AP0044020*   Ref. Code: UR 0240

PRIMARY SOURCE: Gigiyena i Sanitariya, 1970, Nr 2, pp 7-10.

URGENT PROBLEMS OF SOIL HYGIENE

G. I. Sidorenko, L. A. Kozhinova, A. A. Dinerman

The paper carries information concerned with sanitary protection of soil. Its historical development in the USSR is expounded and in conclusion main trends of scientific research in this field are outlined.

REEL/FRAME
19770457

USSR

UDC 629.7.036.3:533.6

VALUYEV, N. I., DINEYEV, Yu. N., SIMONOV, V. I.

"Some Results of an Experimental Study of the Operation of a Small-Scale Axial Turbine With a Bladeless Nozzle Device"

Sb. nauch. tr. Kiyev. in-t inzh. grazhd. aviatsii (Collection of Scientific Works of Kiev Institute of Civil Aviation Engineers), 1971, No. 2, pp 120--122 (from RZh - 34. Aviatsionnyye i raketnyye dvigateli, No 9, Sep 72, Abstract No 9.34.59)

Translation: Comparative results are presented on tests of two small-scale axial turbines with bladeless nozzle devices and having the same mode and geometrical parameters but differing in the shape of the flow-through portion of the spiral chambers. 3 ill., 3 ref. Resume.

1/1

- 191 -

USSR

DINITS, Ye. A.

"An Algorithm of Bit-by-Bit Reduction of Discrepancies, and Transport Problems"

Translation: Let L be a linear programming problem given in canonical form: $c(x) \to \max$, $Ax = b$, $x \geqslant 0$. It may be assumed that all $b_j \geqslant 0$. At the same time, the author examines a class of problems which differ from L only in the second members of the limitations: i. e., problems with limi-tations of the form $Ax = b - \nu$. It will be understood henceforth that all plans considered are optimum for the new problem. The components of the vector ν are called discrepancies of plan x relative to problem L; the $\nu = \sum_i |\nu_i|$ is called the total discrepancy. It is readily seen that a plan with $\nu = 0$ is optimum for the initial problem. Solution of problem L with the use of a method for reducing discrepancies can be imagined as movement

1/4

- 84 -

USSR

DINITS, Ye. A., Issled. po diskretnoy mat., "Nauka", 1973, pp 46-57

from plan to plan where reduction of the total discrepancy can be effected strictly monotonically. Let us call an iteration the transition from plan x to plan x' with $\nu - \nu' = \delta > 0$ accomplished by means of some subalgorithm. At present the only known estimates for the number of iterations needed for attaining a plan [with] $\nu = 0$ are exponentially dependent on m and n.

For a certain class of problems (the most important of which is a transport problem) there are no estimates of another kind. Let the problem L be absolutely integral, and all the b_i be whole numbers (then all reference plans are whole-number plans). Under these conditions it may be assumed that iteration of the method of reducing discrepancies for L with respect to a whole-number plan gives a whole-number plan again; i. e., the total discrepancy decreases on each iteration by a whole number not less than unity. Hence it follows that starting with a whole-number plan x^0 with total discrepancy ν^0, ν^0 iterations are sufficient for solving problem L. In the general case, ν^0 can be bounded from above only as $\sum_i b_i$, which corresponds to a zero initial plan. When solving problems by the method of reducing discrepancies it is natural to aim at the largest possible reduc-

2/4

USSR

DINITS, YE. A., Issled. po diskretnoy mat., "Nauka," 1973, pp 46-57

tion δ of the total discrepancy ν on each iteration. However, bounding δ_{max} from below for a given plan only through the values of discrepancies in the general case fails, since δ_{max} depends on the variables of the plan as well.

In this paper a method of selecting the δ for solving problem L which eliminates the influence of aplan variables is proposed. In this connection, in the first place $\delta \gg \frac{1}{2}\delta_{max}$, and in the second place $\delta \gg \frac{1}{2}max \, \nu_i$. The latter inequality entails an estimate of the number of iterations of the form $O(n \log_2 \max_i b_i)$.

The work consists of three parts. The first realizes the proposed method for the general, absolutely integral problem of linear programming L. In the second part a more convenient algorithm is proposed for the transport problem. In addition, a procedure is presented for carrying out iteration of the method of reducing discrepancies for a transport problem having an estimate of the number of actions of second-order relative to the dimensionality of the problem. The third part is devoted to application of the ideas of the given work to the problem of maximum flow and

3/4

USSR

DINITS, YE. A., Issled. po diskretnoy mat., "Nauka," 1973, pp 46-57

also to an estimate for this problem of the labor involved in an algorithm consisting of the maximum possible increase in flow capacity on each iteration.

4/4

USSR

DINITS, Ye. A.

"Algorithm for Digit-by-Digit Reduction of Discrepancies and Transport Problems"

Issled. po diskretnoy mat. [Studies in Discrete Mathematics -- Collection of Works], Moscow, Nauka Press, 1973, pp 46-57 (Translated from Referativnyy Zhurnal - Kibernetika, No 8, 1973, Abstract No 8 V464)

Translation: Suppose L is a problem of linear programming, fixed in canoni- cal form: $c(x) \to max$, $Ax-b$, $x \geq 0$. It can be considered that all $b_i \geq 0$. At the same time, let us study the class of problems differing from L only in the right portions of the limitations, i.e., with limitations of the form $Ax=b-v$. In the following it will be assumed that all plans studied are optimal for the new problem. The components of vector   are called dis- crepancies of plan x concerning problem L; $v = \sum_i v_i$ is called the summary

discrepancy. It is easy to see that the plan with $v=0$ is optimal for the initial problem. The solution of problem L by the method of reduction of

1/4

USSR

DINITS, Ye. A., Issled. po diskretnoy mat., Moscow, Nauka Press, 1973, pp 46-57

discrepancies can be looked upon as motion from plan to plan, such that the summary discrepancy strictly monotonically decreases. The iterations refer to transitions from plan x to plan x with $\nu-\nu =\delta>0$, performed by means of a certain subalgorithm. For the number of iterations necessary to produce plan $\nu=0$ as yet only estimates exponentially dependent on m and n are known.

For a certain class of problems (the most important of which is the transport problem), estimates of another type exist. Suppose problem L is an absolutely integer problem and all b_i are integers (then all reference plans are integer plans). Under these conditions, it can be considered that an iteration of the method of reduction of discrepancies for L according to the integer plan yields once more an integer plan, i.e., the summary discrepancy decreases in each iteration by a whole number not less than 1. We see from this that with an integer initial plan x^0 with summary discrepancy ν^0, iterations are sufficient to sovle problem L. In the general case, ν^0 can be given an upper estimate only as $\sum_i b_i$, corresponding to the zero initial plan.

2/4

USSR

DINITS, Ye. A., Issled. po diskretnoy mat., Moscow, Nauka, Press, 1973, pp 46-57

When the problem is solved by the method of reduction of discrepancy, it is natural to strive for the greatest possible descrease δ in summary discrepancy ν in each iteration. However, production of a lower estimate of δ_{max} for a given plan on the basis of knowledge of the discrepancy alone is generally impossible, since δ_{max} also depends on the values of the variables of the plan.

In this work for the solution of L, a method of selection in δ is suggested, eliminating the influence of plan variables. Here, in the first place, $\delta \geq \frac{1}{2}$ max, while secondly $\delta \geq \frac{1}{2}$ max ν_i. This inequality results in an estimate of the number of iterations of form $O(n \log_2 \max_i b_i)$.

The work consists of three parts. The first describes a realization of the method suggested for a general absolutely integer problem in linear programming L. The second part suggests a more convenience algorithm for the

3/4

USSR

DINIT, Ye. A., Issled. po diskretnoy mat., Moscow, Nauka, Press, 1973, pp 46-57

transport problem. Furthermore, a method is presented for performing iterations in the method of reduction of discrepancy for the transport problem, providing an estimate of the number of second order actions relative to the dimensionality of the problem. The third part is dedicated to application of the ideas of this work to the problem of the maximum flow, and also an estimate for this problem of the length of the algorithm, consisting in the maximum possible increase in the capacity of the flow in each iteration.

4/4

UDC 615.616.24-003.656.6

USSR

DINKELIS, S. S., KRIKUNOV, G. N., KIRILYUS, Z. YE., KONDRASHOVA, M. YA., MYAKISHEV, I. A., POLYANSKAYA, L. A.

"Significance of the Petrographic Composition and Degree of Oxidation of Coal Dust When Evaluating It In Anthracosis Danger"

Nauch. tr. Irkutsk. med. in-t (Scientific Works of the Irkutsk Medical Institute), 1972, vyp 110, pp 39-40 (from RZh--Farmakolo-giya. Khimioterapevticheskiye Sredstva. Toksikologiya, No 3, Mar 73, Abstract No 3.54.889)

Translation: Three specimens of coal dust of defined petrographic composition and state of oxidation comprising 98-99 percent organic material and not containing SiO_2 were obtained experimentally. After intratracheal administration of these coal dust samples to rats, by the results of the histomorphologic and biochemical studies it was established that the rats developed pulmonary fibrosis. Among the trace components of the coal dust, the more expressed fibrogenic reaction was obtained for fusinite. The biological effects caused by the unoxidized coal dust (by comparison with oxidized) appeared more quickly and were most expressed during the first ten days after poisoning.

1/1

TITLE--EFFECT OF ADDITIVES OF TRACE FERTILIZERS ON THE TEMPERATURE OF
MODIFICATION TRANSITIONS AND ON THE CRYSTAL LATTICE PARAMETERS OF

AUTHOR-(05)-GANZ, S.N., VARIVODA, I.KH., KUZNETSOV, I.YE., DINKEVICH,
I.D., LARINA, L.M.

COUNTRY OF INFO--USSR

SOURCE--ZH. PRIKL. KHIM. (LENINGRAD) 1970, 43(4), 732-5

DATE PUBLISHED-------70

SUBJECT AREAS--AGRICULTURE, CHEMISTRY

TOPIC TAGS--AMMONIUM NITRATE, CRYSTAL LATTICE, TRACE ELEMENT, NITROGEN
FERTILIZER

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--3001/1627   STEP NO--UR/0080/70/043/004/0732/0735

CIRC ACCESSION NO--AP0127118
                    UNCLASSIFIED

CIRC ACCESSION NO--AP0127118

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE EFFECT OF CU(NO SUB3)SUB2, MG(NO SUB3)SUB2, ZN(NO SUB3)SUB2, MNSO SUB4, AND NA SUB2 B SUB4 O SUB7 ADMIXTS. (0.3-2PERCENT) ON THE MONOCLINIC ROTHORHOMBIC TRANSITION TEMP. OF NH SUB4 NO SUB3 WAS INVESTIGATED. THE GREATEST EFFECT WAS OBSD. FOR 0.5PERCENT ZN(NO SUB3)SUB2, STABILIZING THE ORTHORHOMBIC MODIFICATION AT A TEMP. HIGHER BY SIMILAR TO 5.1DEGREES. THE CRYSTAL LATTICE PARAMETERS WERE DETD. FOR 15 MIXTS. AND FOR PURE NH SUB4 NO SUB3.   FACILITY: DNEPROPETROVSK. KHIM. TEKHNOL. INST., DNEPROPETROVSK, USSR.

UNCLASSIFIED

TITLE--REACTION OF BUTADIENE NITRILE RUBBERS WITH PHENOLFORMALDEHYDE
   RESINS IN THE PRESENCE OF HEXAMETHYLENETETRAMINE -U-
AUTHOR-(04)-DINZBURG, B.N., CHECHIK, L.E., KOMISSAROV, S.A., BARAMBOYM,
   N.K.
COUNTRY OF INFO--USSR

SOURCE--KAUCH. REZINA 1970, 29(2), 10-12

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--BUTADIENE, NITRILE RUBBER, PHENOL FORMALDEHYDE RESIN,
   HEXAMETHYLENETETRAMINE, IR SPECTRUM, COPOLYMER, VULCANIZATE, PLASTIC
   FABRICATION, MOLECULAR STRUCTURE, SPECTROMETER/(U)SKN40 NITRILE RUBBER,
   (U)NOVOLAK PHENOLIC RESIN, (U)UR10 SPECTROMOTER, (U)UKC14 SPECTROMETER

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1997/0461   STEP NO--UR/0138/70/029/002/0010/0012

CIRC ACCESSION NO--AP0119397
                        UNCLASSIFIED

CIRC ACCESSION NO--AP0119397
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE REACTION OF SKN-40 RUBBER (I)
WITH A PHENOL CH SUB2 O NOVOLAK RESIN 18 (II), HEXAMETHYLENETETRAMINE
(III), AND S WAS STUDIED BY IR SPECTROSCOPY. MODEL I-II-III MIXTS. WERE
MILLED AT 30-40DEGREES AND MOLDED AT 155DEGREES FOR 20 HR, AND THE
PRODUCTS WERE EXAMD. IN UR-10 AND UKC-14 SPECTROMETERS OVER A WIDE RANGE
OF FREQUENCIES. I AND II REACTED DURING MILLING TO GIVE 8-II COPOLYMERS
(THE AMT. OF COPOLYMERS FORMED DEPENDS ON THE I-II RATIO AND PROCESSING
CONDITIONS). MOLDING AND HEAT TREATMENT OF I COMPNS. WAS ACCOMPANIED BY
HARDENING OF II WITH III, A REACTION BETWEEN I, II, AND III, AS WELL AS
A REACTION BETWEEN S, I, AND II. THE REACTION LED TO THE FORMATION OF
SUPRAMOL. STRUCTURES WHICH IMPROVED THE PHYSICOMECH. PROPERTIES OF THE
VULCANIZATES.   FACILITY: VSES. NAUCH.-ISSLED. INST. PLENOCHNYKH.
MATER. ISKUSSTV. KOZHI, MOSCOW, USSR.

UNCLASSIFIED

Marine and Shipbuilding

USSR   UDC 532.529.5/.6

DIOGENOV, A. V.

"Planar Problem of Aperiodic Motion of a Supercavitating Wing in an Ideal, Limitless Fluid"

Asimptotich.Metody v Teorii Sistem. Mezhvuz. Nauch-Temat. Sb. [Asymptotic Methods in Systems Theory. Inter-University Scientific-Thematic Collection], No 2, 1972, pp 109-116, (Translated from Referativnyy Zhurnal, Mekhanika, No 11, 1972, Abstract No 11 B494 by V. I. Blyumin).

Translation: The method for solution of problems of unstable aperiodic motion of lifting surfaces using the small time parameter suggested by A. N. Panchenkov (Samoletostr. i Tekhn. Vozd. Flota. Resp. Mezhved. Nauchno-Tekhn. Sb., 1970, No 21, pp 18-26, RZhMekh, 1971, 1 B370) is applied to the case of a supercavitating wing moving in a limitless fluid. It is assumed that a cavity originates at the forward edge of the wing, and the cavitation number is assumed equal to zero. Theoretical formulas are produced, from which the lift coefficients of the supercavitating wing can be determined. Results of calculation of the characteristics of a supercavitating wing produced on the BESM-4 computer are presented and compared with the corresponding characteristics of a wing moving through a potential flow. The results
1/2

USSR

UDC 532.529.5/.6

DIOGENOV, A. V., Asimptotich.Metody v Teorii Sistem. Mezhvuz. Nauch-Temat. Sb., No 2, 1972, pp 109-116.

of calculation are not compared with experimental data.   5 Biblio. Refs.

2/2

- 96 -

1/2   013   UNCLASSIFIED   PROCESSING DATE--27NOV70
TITLE--NA, RB-BR, CL AND RB, CS-BR, CL SYSTEMS -U-

AUTHOR-(02)-DIOGENOV, G.G., BYKOVA, T.YE.

COUNTRY OF INFO--USSR

SOURCE--ZH. NEORG. KHIM. 1970, 15(6), 1680-3

DATE PUBLISHED-------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--PHASE DIAGRAM, SOLID SOLUTION, X RAY DIFFRACTION PATTERN,
  BROMIDE, CESIUM CHLORIDE, RUBIDIUM CHLORIDE, SODIUM CHLORIDE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--3006/1386   STEP NO--UR/0078/70/015/006/1680/1683

CIRC ACCESSION NO--AP0135060
                        UNCLASSIFIED

CIRC ACCESSION NO--AP0135060

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. SQUARE PHASE DIAGRAMS OF RBCL RBBR CSCL CSBR AND NACL NABR RBBR RBCL ARE CONSTRUCTED.   THE SYSTEMS ARE OF THE REVERSIBLE MUTUAL TYPE AND FORM 2 FIELDS OF SOLID SOLNS. THE DATA FOR THE BINARY RBCL RBBR SYSTEM IS TABULATED AND ITS X RAY DIFFRACTION PATTERN IS GIVEN.

UNCLASSIFIED

USSR   UDC 669.295.053.28

DIOMIDOVSKIY, D. A., LEVIDOV, V. A., REVUTSKIY, Ye. Ya., TSIVIRKO, G. P.

"Device for Recording the Rate of Level Changes of a Liquid Electrically Conducting Medium"

Translation: The design of a discrete differentiator with inductive output for determination of the rate of level changes of a liquid electrically conducting medium by measurement of the first finite difference in the level of the medium is described. The total error of the device is calculated and the quantization level which minimizes it is determined, for example in measuring the consumption of a mixture of fused salts of Ti with $MgCl_2$. 1 fig; 6 biblio refs.

1/1

1/2   008   UNCLASSIFIED   PROCESSING DATE--20NOV70
TITLE--ATTACHMENT TO A POTENTIOMETER FOR SIMULTANEOUS TITRATION WITH
SEVERAL INDICATOR ELECTRODES -U-
AUTHOR-(03)-DIGNISYEV, V.D., CHEBOTAREV, V.K., IVANOVA, Z.I.

CCUNTRY OF INFO--USSR

SOURCE--ZAVOD. LAB. 1970, 36(3), 280-1

DATE PUBLISHED-------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--ELECTRODE POTENTIAL, POTENTIOMETRIC TITRATION, CHEMICAL
LABORATORY APPARATUS

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--3004/1960   STEP NO--UR/0032/70/036/003/0280/0281

CIRC ACCESSION NO--AP0132221
                            UNCLASSIFIED

CIRC ACCESSICN NO--AP0132221
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE DEVICE DESCRIBED IN DETAIL IS
ESSENTIALLY A MULTIPOLE DOUBLE THROW SWITCH WHICH ALLOWS THE DETN. OF
THE POTENTIAL OF ALL THE INDICATOR ELECTRODES AT EACH POINT OF THE
TITRN.; TO DET. THE SUITABILITY OF ANY ONE ELECTRODE IN THE COURSE OF
ONE TITRN. AND TO DET. THE JUMP IN POTENTIAL AND THE CORRESPONDING
EQUIVALENCE POINT.   FACILITY: ROSTOV. GOS. UNIV., ROSTOV, USSR.

UNCLASSIFIED

1/2   038   UNCLASSIFIED   PROCESSING DATE--27NOV70
TITLE--TOXICITY OF TETRAMETHYLTHIURAM DISULFIDE -U-

AUTHOR-(03)-GLADENKO, I.N., FORTUSHNYY, V.A., DIRENKO, P.M.

COUNTRY OF INFO--USSR

SOURCE--VISN. SIL'S'KOGOSPOD. NAUKI 1970, 13(1), 106-9

DATE PUBLISHED-------70

SUBJECT AREAS--BIOLOGICAL AND MEDICAL SCIENCES

TOPIC TAGS--ORGANIC SULFUR COMPOUND, FUNGICIDE, TOXICITY, CENTRAL NERVOUS
   SYSTEM, EYE, RESPIRATORY SYSTEM, DIGESTIVE SYSTEM

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--3007/1975   STEP NO--UR/0534/70/013/001/0106/0109

CIRC ACCESSION NO--AP0137154
                    UNCLASSIFIED

CIRC ACCESSION NO--AP0137154
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. TETRAMETHYLTHIURAM DISULFIDE (I),
A FUNGICIDE, DISTRUBS THE FUNCTION OF THE CENTRAL NERVOUS SYSTEM IN
HUMANS AND ANIMALS. THE MUCOUS MEMBRANE OF THE EYES, THE RESPIRATORY
TRACT AND THE GASTROINTESTINAL TRACT ARE IRRITATED. TOXICITY TO RABBITS
WAS FOUND WITH I.V. INJECTION OF 50-100 MG I-KG LIVE WT. FEEDING TO
CATTLE WITH CORN FOR 2 MONTHS AT 380 MG-KG FODDER HAD NO ADVERSE
EFFECTS. FACILITY: UKR. NAUK.-DOSLID. INST. EKSP. VET., USSR.

UNCLASSIFIED

USSR   UDC 621.375.82

KURBATOV, L. N., BRITOV, A. D., DIROCHKA, A. I., KOZINA, G. S., MOCHALKIN, N. N.,
AVER'YANOV, I. S., STARIK, P. M.

"Stimulated Radiation of Solid Solutions of Tin and Lead Chalcogenides in the
10-Micron Band"

V sb. Kvant. elektronika (Quantum Electronics--collection of works), No 3, Mos-
cow, Soviet Radio, 1972, pp 97-99 (from RZh-Fizika, No 12, Dec 72, Abstract No
12D982)

Translation: A study was made of recombination radiation in the presence of
electron excitation, and induced emission was obtained in $Pb_{1-x}Sn_xSe$ crystals

grown by the Bridgman method with x = 0.04, 0.05, and 0.07 and in $Pb_{1-x}Sn_xTe$

crystals grown from the gas phase with x = 0.17 and 0.18. The radiation wave-
length at 90° K is within the 8-11-micron band. The pulse power is 1-10 mil-
liwatts. A study was made of the temperature functions. The maximum operating
temperature does not exceed 140° K. The bibliography has 5 entries.

1/1

USSR

DISHLER, V. YA., FILIPEKA, V. F., and NAGLE, E. F., Institute of Biology, Latvian Academy of Sciences

"Effect of Ionizing Radiation on Barley Fertility and Frequency of Chromosome Aberrations in Meiosis"

Abstract: Air-dried seeds of the Maya spring barley variety were irradiated with fast neutrons (0.05 to 0.8 krad) or gamma rays (0.5 to 8.0 kr) to determine which form of irradiation produces the largest number of chromosome translocations. Increasing the dose of fast neutrons produced a linear increase in the number of M_1 plants with semisterile central heads and sterile flowers, whereas sterility was not affected significantly by increasing the dose of gamma rays. Plants with completely sterile heads were found when the seeds were irradiated with fast neutrons at 0.2 krad or more nore gamma rays at 2 kr or more. The frequency of cytogenetic injuries in meiotic cells after irradiation was 9.1 to 19.5% in prophase-metaphase I and 0.2 to 2.9% in anaphase I. The frequency of injury was independent of the kind and dose of radiation used. Fast neutrons at 0.1 to 0.4 krad and gamma rays at 8.0 kr induced the largest number of major chromosome translocations.

1/1

- 79 -

USSR

UDC 575.24+576.312.3

KAVATS, G. E., and DISHLER, V. YA., Institute of Biology, Latvian Academy of Sciences

"Effect of Fractional Doses of Fast Neutrons on the Cytogenetic Effect in the Meristem of Crepis capillaris Roots"

Riga, Izvestiya Akademii Nauk Latviyskoy SSR, No 7, 1973, pp 37-41

Abstract: Crepis capillaris seedlings were irradiated at 10+15, 10+35 and 10+55 rad with 1, 2, 3, 4, and 5 hour intervals between the fractions of fast neutrons. The number of chromosome abberations began to decrease beginning with the 2-hour interval between the fractions. The effect of fractionation varied with the total dose used. It was manifested after total doses of 25 and 45 rad but absent after a total dose of 65 rad. The number of two-hit abberations was slight (about 10% of the one-hit aberrations and chromatid breaks) and independent of fractionation. The presence of such inhibitors of protein and nucleic acid synthesis as chloramphenicol, 5- fluorouracil, 2,4--dinitrophenol, and aurantin did not block the effect of fractionation, suggesting that the latter was due to neutralization by endogenous protective systems of the mutagenic and toxic substances produced in the seedlings by the fast neutrons.
1/1

- 80 -

USSR

UDC 615.917

DISHOVSKA   Z. A.

"Some Clinical-Experimental Data on Changes in the Organs of the Oral Cavity Under the Effect of the Gamma-Hexachlorocyclohexane (Lindane)"

V sb. Gigiyena primeneniya, toksikol. pestitsidov i klinika otravl. (Hygiene of the Application and Toxicology of Pesticides and the Clinical Aspects of Poisoning — collection of works), vyp. 9, Kiev, 1971, pp 330-335 (from RZh-Farmakologiya. Khimiterapevticheskiye sredstva. Toksikologiya, No 2, Feb 72, Abstract No 2.54.791)

Translation: On examining 63 industrial workers (31 men and 32 women; ages 25-69 years) having industrial contact (from 2 to 25 years) with pesticides of various groups, clearly expressed parodontal changes were discovered in 60, and dental caries were found in three. Out of 14 workers in contact primarily with organochlorine compounds, in 11 I-III stage parodontosis was detected, and in 3 gingivitis and dental caries were found. In rats after poisoning with lindane in a dose of $1/100$ DL_{50} per day (1.7 mg/kg) for 9 months, severe parodontal changes were observed, there were deep pathological gingival pouches with chronic suppurative infectious processes, with transfer of the infection to the bone and the development of maxillary osteomyelitis; individual teeth had come
1/2

USSR

DISHOVSKAYA, Z. A., <u>Gigiyena primeneniya, toksikol. pestitsidov i klinika otravl.</u>, vyp. 9, Kiev, 1971, pp 330-335

loose and fallen out, and dental caries and pigmentation in the dental fissures were noted.

2/2

USSR

UDC 612.014.3

DISHOVSKIY, Kh. D., KAGAN, Yu. S., KOVTUN, S. D., KOKSHAREVA, N. V.,
TODIONOV, G. O., and SASINOVICH, L. M., Division of Experimental Toxicology,
All-Union Institute of the Hygiene and Toxicology of Pesticides, Polymers,
and Plastics

"The Physiological Mechanism of the Action of Dipyroxime"

Abstract: Therapeutic administration of dipyroxime to rats poisoned with
the insecticides DDVP (0,0-dimethyl-2,2-dichlorovinyl phosphate) and
chlorophos resulted in a partial reactivation of cholinesterase in the
brain, spinal cord, and striated muscles, as shown by histochemical data.
Cytophotometric studies showed that the reactivation of cholinesterase
under the effect of dipyroxime in the brain of animals poisoned with
DDVO was most pronounced in the caudate nucleus - putamen complex. Elec-
tromyographic investigation indicated a beneficial effect of dipyroxime
on the transmission of impulses in nerve-muscle synapses. The results of
the study of the physiological action of dipyroxime substantiated the
conclusion arrived at in earlier work that this drug is effective in the
treatment of poisonings with DDVP and chlorophos (cf. Kagan et al,
Farmakol. i Toksikol., 3, 359, 1971).
1/1

USSR   UDC: 621.396.673-423.2

DISKOVSKIY, V. M., KHODATAYEV, Yu. V.

"Equivalent Interelectrode Space in High-Frequency Breakdown of a Loop Antenna"

Translation: Breakdown conditions close to the free end of a bent dipole vehicle antenna are considered. A quantitative relation is established between homogeneous and nonhomogeneous puncture fields by introducing an equivalent interelectrode space, which simplifies calculation of electric strength in the pulse emission mode. One illustration, bibliography of seven titles. Resumé.

1/1

USSR

UDC: 621.396.674.3

DISKOVSKIY, V. M., KHODATAYEV, Yu. V.

"Electric Strength of Dipole Antennas in a Rarefied Atmosphere"

Radiotekhnika. Resp. mezhved. temat. nauch.-tekhn. sb. (Radio
Engineering. Republic Thematic Interdepartmental Scientific
and Technical Collection), 1971, vyp. 17, pp 57-61 (from RZh-
-Radiotekhnika, No 3, Mar 72, Abstract No 3B37)

Translation: High-frequency breakdown in a rarefied atmosphere
close to the free end of a dipole radiator is considered. The
equation of continuity is solved by an approximate method, the
error in determining the puncture fields being no more than
2% as compared with the method of finite differences. The re-
sults of the solution are presented. Two illustrations, bib-
liography of five titles. Resumé.

1/1

DISLER, Ye. N.

Biochemistry

UNCLASSIFIED

Institute of Biochemistry and Physiology of Microorganisms, Pushchino

SECTION VI

So Selected Facilities
PCS-69 SEPT 71

Description:

(U) During this quarterly reporting period, five new articles were located from the Institute of Biochemistry and Physiology of Microorganisms at Pushchino. On the basis of these articles, it was possible to identify 13 new personalities with the Institute. The personalities, the subjects of the articles, and the dates are given below:

Name	Subject	Date
Butler, M. Yu.	a-oxoglutaric acid	
Boronin, A. M.	antibiotic production	1969 (65)
Divler, Ye. N.	candida lipolytica	1970 (65)
Kolibaba,	a-oxoglutaric acid	1971 (65)
Kirzhinich, R. Ya.	a-oxoglutaric acid	1969 (65)
Liyasirich, G. Y.	a-oxoglutaric acid	1969 (65)
Maldia, S. Z.	a-oxoglutaric acid	1970 (65)
Peltsmann, I. Zh.	antibiotic production	1970 (65)
Rozenfel'd, S. M.	a-oxoglutaric acid	1970 (65)
Slava, V. A.	candida lipolytica	1970 (65)
Takhmariya, S. N.	a-oxoglutaric acid	1971 (65)
Kalchman	a-oxoglutaric acid	1971 (65)
Zarloya, D. R.	a-oxoglutaric acid	1971 (65)

Two of the five new articles were authored by personalities already identified with the Institute of Biochemistry and Physiology of Microorganisms. One of these articles dealt with penicillium brevi corpactum (68) and the other with methane oxidizing bacteria (69). Reference 65 was jointly issued from the above institute and the Institute of Microbiology Acad A. Kirkhenshteyn Riga, possibly indicating some joint work between the two facilities.

UNCLASSIFIED

10

DISTANOV, B. G.

gas chromatography

USE OF GAS CHROMATOGRAPHY IN PETROCHEMISTRY

(Conference in Moscow)

    Increase of the effectiveness of scientific investiga-
tions and growth of the productivity and rate of chemical pro-
cesses used in industry are stipulated to a considerable degree
by the successful development of new physicochemical methods of
conducting scientific experiments and controlling production.
One such method is gas chromatography. Many quantitative deter-
minations previously considered practically impossible are per-
formed by means of gas chromatography in the course of minutes,
and in some cases even of seconds. The method has high resolu-
tion and sensitivity, is readily automated, and makes it possible
to effectively control technological processes.

    The scientific councils for petrochemistry and Chromato-
graphy, the Institute of Petrochemical Synthesis imeni A. V.
Topchiyev of the AS USSR and the Scientific and Technological
Council of the Ministry of Petroleum-Refining and Petrochemical
Industry USSR conducted on 5-8 February the first All-Union Con-
ference on the Use of Gas Chromatography in Petrochemistry. Par-
ticipating in it were over 200 persons representing over 90
scientific research organizations, enterprises, special design
offices and VUZ. Thirty-four reports were heard.

    In his introductory speech the Chairman of the Scientific
Council for Chromatography of the AS USSR K. V. Chmutov noted
the ever-increasing importance of gas chromatography in the ana-
lysis of complex mixtures in petroleum refining and petrochemis-
try. In studying the thermodynamics of absorption and adsorp-
tion and the processes of chemisorption and catalysis, and in
determining the diffusive characteristics of gases and liquids
and other physicochemical characteristics.

- 179 -

The contemporary state of the production and application of Soviet stationary liquid phases, solid carriers and absorbents for gas chromatography were examined in the reports of K. I. Sakodynskiy, B. G. Distanov et al and M. I. Dement'yeva et al, and the use of computers to process the results of gas-chromatographic investigations -- in the report of V. A. Barnov.

The held conference demonstrated the expansion of the applications of gas chromatography in petrochemistry and designated the paths of the further development of those methods.

- 181 -

DISTLER, G.I.

UDC: 539.2

INVESTIGATION OF THE STRUCTURE AND PROPERTIES OF SOLIDS BY DECORATION METHODS

Decoration methods, by which should be understood defin-ite methods of revealing and visualizing active elements which determine various properties of the surface and volume of solids are finding ever-wider application at the present time. Those methods consist in this, that on the surface (and in the volume) of various objects crystallization, for example, is accomplished by thermal evaporation, cathode sputtering and precipitation from solutions. Various materials -- metals, semiconductors, and dielectrics -- are used as decorating substances. Gold, silver, silver chloride and anthraquinone are used especially often. The decorating substances are selectively crystallized on the active elements of the surfaces of solids. Investiga-tions have been conducted of natural and synthetic single cry-stals, amorphous material, biological specimens, and also of objects subjected to various external effects, for example, ir-radiation or deformation.

In contrast with previously existing concepts, according to which the microgeometry of the surface of crystals was con-sidered the only active element influencing crystallization, it has now been established by numerous works that the nuclea-tion and growth of crystals are determined by the electrical in-fluence of the surface of solids, where crystallization takes plac nuclei are formed selectively on electrically active point de-fects of the surfaces of crystals, in other words, the image photograph of the point defects of the investigated surface. This permits "seeing" in crystals the distribution of the cen-ters of coloration, the centers of luminescence and catalysis,

DISTLER, G.I.

JPRS 59268 6-13

I-6. EPITAXY AS THE MATRIX REPLICATION PROCESS PROGRAMMED IN THE ELECTRIC
CRYSTAL-SUBSTRATE STRUCTURE AND THE BOUNDARY LAYERS

[Article by G. I. Distler, Moscow; Novosibirsk, Ill Simpozium po Protsessam
Rosta i Sinteza Poluprovodnikovykh Kristallov i Plenok, Russian, 12-17 June,
1972, p 8]

In real crystals between differently charged pinholes and their pileups
where the intensity of the electric field has a maximum, linear polarization
microstructures arise: the net of which together with the pinholes forms a sublat-
tice -- reticular structure. In the elements of this electrically active grid,
nuclei and bridges between them occur, and then lateral growth takes place which
leads to the formation of monocrystalline films. As a rule, the pinholes form
groupings -- complex active centers--the shape and orientation of which determine
the morphology and the orientation of the growing microcrystals. The growth and
coalescence of the nuclei and also quite large microcrystals takes place with
the highest rate in the local sections of the surface of substrates having the
largest negative charge and potential where predominantly thin physically adsorbed
layers of water are formed which play the role of the "lubricant". The crystals-
substrates can be coated with amorphous, polycrystalline and monocrystalline
boundary layers, including metallic boundary layers in which under the effect
of the electrically active elements of the substrate surface, linear polarization
microstructures arise which reflect the initial potential relief. This permits
use of the boundary layers during epitaxy an electrical copies of the crystals-
substrates. As follows from the set of experiments, epitaxy is a matrix repli-
cation process programmed in the electrical structure of the crystal-substrate
surface and the boundary layers. Depending on the specific conditions of the
crystallization, certain program elements appear, that is, certain elements of
the electrical relief of the surface, including electrically active elements of
its geometric relief.

DISTLER, G.I.

SP's 5/3/63
6-73

I-7. PHOTOEPITAXY ON THE SURFACE OF SINGLE GERMANIUM AND SILICON CRYSTALS

[Article by G. I. Distler, L. A. Shenyavskaya, Moscow; Novosibirsk, III Simpozium po Protsessam I Si-Era Poluprovodnikovykh Kristallov I Plenok, Russian, 12-17 June, 1972, p 9]

A study was made of the effect of light in the region of characteristic absorption of single germanium and silicon crystals on the crystallization process taking place on their surfaces. The p and n-type crystals were cut out along the (100) and (111) planes and they were treated by polishing etching. The crystals were stained with anthraquinone in the dark, with illumination and also in the dark after preliminary illumination. On the (100) surface of the unilluminated specimens, biaxial textures of anthraquinone crystals occur, and on the (111) surface, triaxial textures, that is, the surface is negatively charged as a result of etching. The illumination of the surface specimens with a mercury lamp leads to crystallization of the anthraquinone in the form of a uniaxial texture, that is, the surface is recharged and becomes positively charged [1]. Changing the sign of the surface charge during illumination is connected with the occurrence of nonequilibrium carriers illumination is connected with the occurrence of nonequilibrium carriers acting with the active centers existing on the semiconductor-oxide interface since oxide films on the surface of Ge and Si do not absorb radiation in the spectral interval used. When stainless previously illuminated specimens in the dark, uniaxial textures of the anthraquinone crystals are formed as before, and this memory effect is retained about fifteen minutes. Epitaxy actually takes place on the outside of the amorphous oxide films, that is, by the long-acting mechanism [2]. In the oxide film, under the effect of electrically active surface centers of the crystals, information linear polarization microstructures occur (by which, probably, migration of charges and energy takes place), giving film to epitaxy. The recharging of the centers at the semiconductor-oxide interface takes place in microseconds, and it can not be connected with the long-term memory of the specimens. The polarization microstructures slowly change under the external effects, and this explains the crystal memory during photo-epitaxy.

BIBLIOGRAPHY

1. S. A. Kobzareva, G. I. Distler, V. P. Konstantinova, Kristallografiya (Crystallography), No 15, 510, 1970.

2. G. I. Distler, DAN SSSR (Reports of the USSR Academy of Sciences), Vol 199, 802, 1971.

- 8 -

USSR

DISTLER, G. I.; SHENYAVSKAYA, L. A. (Institute of Crystallography, USSR Academy
of Sciences, Moscow)

"Semiconductor Crystal Memory under Photoepitaxy"

ABSTRACT: In an optical microscope, by a method of coating by anthraquinone,
the authors studied the electrical contour of the surface of single crystals
of germanium and silicon and its variation occurring as a result of the illu-
mination of the crystals in the area of their fundamental absorption. The
samples were cut along the (100) and (111) planes and were etched and polished.
The crystals were coated in darkness, during illumination, and also after pre-
liminary illumination. On the (100) plane of the unilluminated samples a bi-
axial texture of the anthraquinone crystals appeared; and on the (111), a tri-
axial texture -- i.e., the surface is negatively charged as a result of the
etching. A uniaxial texture was formed on the illuminated portions, indicating
an overcharge of those portions which become positively charged. A change of
sign of the charge of the surface is related to the occurrence, during illumi-
nation, of nonequilibrium carriers interacting with active centers existing on

1/2

USSR

DISTLER, G. I. and SHENYAVSKAYA, L. A., Fizika Tverdogo Tela; May 1972,
pp 1400-5

the boundary of a semiconductor oxide with so-called fast states. The memory
effect of the surfaces of germanium and silicon during photoepitaxy, when uni-
axial textures are formed in darkness, lasts for a period on the order of 15
minutes. The memory effect found in the semiconductors is explained by the
fact that epitaxy actually occurs on the outside of the oxide films in which,
under the effect of the centers -- fast states, local linear polarization
structures occur. These structures (slow states) after overcharge of the sur-
face centers -- fast states -- change slowly, which fact also explains the long
memory of crystals of germanium and silicon during photoepitaxy.

2/2

1/2   026   UNCLASSIFIED   PROCESSING DATE--16OCT70
TITLE--ELECTRICAL RELIEF OF THE SURFACE OF CRYSTAL SUBSTRATES AS A
   DETERMINING FACTOR IN NUCLEATION AND GROWTH PROCESSES -U-
AUTHOR-(03)-VLASOV, V.P., GERASIMOV, YU.M., DISTELER, G.I.

COUNTRY OF INFO--USSR

SOURCE--KRISTALLOGRAFIYA 1970, 15(2), 346-52

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS, PHYSICS

TOPIC TAGS--CORUNDUM, SINGLE CRYSTAL, SILVER, GOLD, BROMIDE, NUCLEATION,
   METAL FILM, CRYSTALLIZATION

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1995/0926
                              STEP NO--UR/0070/70/015/002/0346/0352
CIRC ACCESSION NO--AP0116436
                          UNCLASSIFIED

CIRC ACCESSION NO--AP0116436

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. CRYSTAL FILMS OF AG, AU, PBTE, CDS, SNSE, AGCL, AGI, AGBR, AND NACL ON THE (010) PLANE OF TRIGLYCINE SULFATE AND AG AND AU FILMS ON THE (11BAR26) PLANE OF CORUNDUM SINGLE CRYSTALS AND ON KBR WERE STUDIED. THE SUBSTRATES WERE AT 20DEGREES, AND THE AV. THICKNESS OF THE FILMS WAS 80-120 ANGSTROM. ON NEG. DOMAINS OF TRIGLYCINE SULFATE, WELL ORIENTED SINGLE CRYSTAL FILMS OF AGCL FORMED, WHEREAS ON THE POS. DOMAINS ONLY PARTIALLY ORIENTED FILMS FORMED. AT A SPECIFIC THICKNESS, AGCL, AGI, AND AGBR FILMS WERE SINGLE CRYSTAL ON BOTH SURFACES. NACL FILMS ON POS. DOMAINS WERE UNIFORMLY SINGLE CRYSTAL, WHEREAS ON NEG. DOMAINS THEY WERE POLYCRYST. THIS EFFECT IS LESS PRONOUNCED IN THE CRYSTN. OF SEMICONDUCTORS. CRYSTN. OF AG AND AU ON KBR AND CORUNDUM CONFIRMED THE EFFECT OF THE ELEC. RELIEF OF THE SURFACE ON FILM CRYSTN.   FACILITY: INST. KRISTALLOGR., MOSCOW, USSR.

UNCLASSIFIED

1/2   052   UNCLASSIFIED   PROCESSING DATE--27NOV70
TITLE--ORIENTED CRYSTALLIZATION ON PHOTOELECTRIT SELENIUM LAYERS
   DUPLICATING THE ELECTRIC STRUCTURE OF CRYSTAL SURFACES -U-
AUTHOR-(02)-DISTLER, G.I., OBRONOV, V.G.

COUNTRY OF INFO--USSR

SOURCE--DOKL. AKAD. NAUK SSSR 1970, 191(3), 584-7

DATE PUBLISHED-------70

SUBJECT AREAS--PHYSICS, MATERIALS

TOPIC TAGS--CRYSTAL STRUCTURE, SURFACE PROPERTY, SELENIUM,
   CRYSTALLIZATION, ANTHRAQUINONE, SODIUM CHLORIDE, SUBLIMATION, RADIATION
   EFFECT, REACTION MECHANISM, POLYVINYL CHLORIDE, THIN FILM MEMORY

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--3003/0842   STEP NO--UR/0020/70/191/003/0584/0587

CIRC ACCESSION NO--AT0129921
                         UNCLASSIFIED

CIRC ACCESSION NO--AT0129921
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. SE FILMS ON A NACL SUBSTRATE AND
WITH THE SUBSTRATE REMOVED WERE IRRADIATED AT 400-500 M MU FROM A 1970 W
INCANDESCENT ALMP USING A BLUE FILTER. FILMS OF ANTHRAQUINONE WERE
SUBLIMED AT 130DEGREES ON SE PLUS NACL AT ROOM TRMP. AND ON SE FILMS
WHICH HAD BEEN REMOVED FROM THE NACL SUBSTRATE WITH A POLY(VINYL
CHLORIDE) RIBBON ON WHICH THE SE FILM REMAINED FOR THE STUDY OF THE
CONTACT SURFACE. IN THE SUBLIMATION OF ANTRHRQUNIONE DIRECTLY ON NACL,
NEEDLELIKE CRYSTALS, 10-40 MU LONG, FORMED A BIAXIAL TEXTURE, D. EQUALS
5 TIMES 10 PRIME5-10 PRIEM7-CM. PRIME2. IN THE SUBLIMATION OF
ANTHRAQUINONE ON NACL COATED WITH AMORPHOUS SE, 200 ANGSTRON THICK,
ORTHORHOMBIC CRYSTALS, 3-8 MU, FORMED A BIAXIAL TEXTURE, D. EQUALS 3
TIMES 10 PRIME5-5 TIMES 10 PRIME6-CM. PRIME2. THESE ORIENTED CRYSTALS
FORMED BOTH IN THE LIGHT AND IN THE DARK. BUT, FOR SUBLIMATION OF
ANTHRAQUINONE IN LIGHT, ON THE CONTACT SIDE OF SE THE NATURE OF CRYSTN.
CHANGED. NO ORIENTATION OCCURRED FOR SUBLIMATION IN THE DARK, I.E. THE
FILMS DID NOT "REMEMBER" ORIENTATION INFROMATION. TO ENDOW THE FILMS
WITH "MEMORY", IT IS NECESSARY TO IRRADIATE THE FILMS WITH SCATTERED
LIGHT BEFORE REMOVAL FROM THE SUBSTRATE. THE RESULTS SUGGEST A
PHOTOELECTRET MECHANISM OF THE RETENTION AND TRANSMISSION OF INFORMAITON
BY THE AMORPHOUS BOUNDARY OF SE LAYERS.   FACILITY: INST.
KRISTALLOGR., MOSCOW, USSR.

TITLE--EPITAXIAL GROWTH OF SILVER ON ELECTRICALLY HETEROGENEOUS SURFACES
 OF SODIUM CHLORIDE CRYSTALS -U-
AUTHOR-(04)-DISTLER, G.I., LEBEDEVA, V.N., MOSKVIN, V.V., KORTUKOVA, YE.I.

COUNTRY OF INFO--USSR

SOURCE--FIZ. TVERD. TELA 1970, 12(4), 1149-54

DATE PUBLISHED-------70

SUBJECT AREAS--PHYSICS, MATERIALS

TOPIC TAGS--EPITAXIAL GROWTH, SILVER, SODIUM CHLORIDE, METAL CRYSTAL,
 CRYSTAL SURFACE, CRYSTAL ORIENTATION

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--3001/0377   STEP NO--UR/0181/70/012/004/1149/1154

CIRC ACCESSION NO--AP0126132
                         UNCLASSIFIED

CIRC ACCESSION NO--AP0126132

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. BY ELECTRON MICROSCOPY, THE EPITAXIAL GROWTH WAS STUDIED OF AG ON ELEC. HETEROGENEOUS SURFACES OF NACL CRYSTALS CONTG. 0.15 WT. PERCENT PBCL SUB2. AT CRYSTAL TEMPS. OF 100 AND 150DEGREES THE CRYSTAL SURFACES ARE DECORATED BY INCLUSIONS OF THE PBCL SUB2 PHASE SURROUNDED BY DOUBLE ELEC. LAYERS. ON THE SURFACE OF THESE DOUBLE ELEC. LAYERS, CHARGED NEG., ORIENTATION COALESCENCE OF AG CRYSTALS TAKES PLACE INITIALLY, WHICH DETS. THE PARALLEL ORIENTATION (100) SUBAG MAGNITUDE OF (100) SUBNACL, WHILE ON THE REST OF THE SURFACE MIXED ORIENTATION (100)(111) SUBAG MAGNITUDE OF (100) SUBNACL IS OBSD. AT 20DEGREES ON THE SECTIONS OF IMPURITY ENRICHED NACL CRYSTALS, COALESCENCE OF AG PARTICLES WAS OBSD., WHICH CAUSED THE APPEARANCE OF MIXED ORIENTATION, WHILE AG CRYSTALS ON THE REMAINDER OF THE SURFACE WERE DISTRIBUTED HETEROGENEOUSLY. UNDER IDENTICAL CONDITIONS OF CRYSTN. (CRYSTAL TEMP., RATE OF CONDENSATION, DEGREE OF VACUUM), THE DETG. ROLE IN THE EPITAXIAL GROWTH IS PLAYED BY THE ELEC. RELIEF OF THE SURFACE OF THE CRYSTALS, AND THE ORIENTATIONAL COALESCENCE OF THE PREVIOUSLY FORMED PARTICLES TAKES PLACE PRIMARILY ON NEG. CHARGED SECTIONS OF THE CRYSTAL SURFACE.   FACILITY: INST. KRISTALLOGR., MOSCOW, USSR.

1/3   019   UNCLASSIFIED   PROCESSING DATE--23OCT70
TITLE--ELECTRICAL STRUCTURE OF THE SURFACE OF CRYSTALLINE SUBSTRATES AND
  ITS INFLUENCE OF NUCLEATION AND GROWTH PROCESS -U-
AUTHOR--DISTLER, G.I.

COUNTRY OF INFO--USSR

SOURCE--KRISTALL UND TECHNIK, 1970, VOL 5, NR 1, PP 73-84

DATE PUBLISHED-------70

SUBJECT AREAS--CHEMISTRY, PHYSICS

TOPIC TAGS--NUCLEATION, CYRSTALLIZATION, SILVER COMPOUND, CHLORIDE,
  GLYCINE, EPITAXIAL GROWTH, ELECTRIC PROPERTY

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1998/0408   STEP NO--GE/0109/70/005/001/0073/0084

CIRC ACCESSION NO--AP0121084
                         UNCLASSIFIED

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE ELECTRICAL STRUCTURE OF
CRYSTALLINE SUBSTRATES HAS BEEN STUDIED BY A NEW TECHNIQUE BASED ON
SELECTIVE CRYSTALLIZATION OF DECORATING MATERIAL AND SELECTIVE
DEPOSITION OF CHARGED COLLOIDAL PARTICLES. SILVER CHLORIDE WAS FOUND TO
BE A VERY EFFECTIVE INDICATOR OF THE ELECTRICAL RELIEF OF CRYSTAL
SURFACES. AT EARLY STAGES OF THERMAL CONDENSTATION, IT CRYSTALLIZES
ORIENTEDLY ON NEGATIVELY CHARGED REGIONS OF THE SURFACE AND RANDOMLY ON
THOSE CHARGED POSITIVELY. THE METHOD HAS BEEN APPLIED TO THE STUDY OF
TRIGLYCINE SULPHATE. LIF, AND NACL CRYSTALS. IT HAS BEEN FOUND THAT
THE SURFACE OF REAL CRYSTALS CONSISTS AS A RULE OF POSITIVE AND NEGATIVE
REGIONS, REPRESENTING ASSEMBLIES OF CHARGED POINT DEFECTS. NEAR THE
CLEAVAGE STEPS CERTAIN "DEAD ZONES" ARISE, IN WHICH A LOCAL COMPENSATION
OF CHARGES TAKES PLACE. NUCLEATION OCCURS MAINLY AT CHARGED POINT
DEFECTS AND ORIENTED COALESCENCE OF ISLANDS PROCEEDS WITH DIFFERENT
VELOCITY ON SURFACE LOCAL REGIONS OF DIFFERENT SIGNS. THE SELECTIVITY
OF CRYSTALLIZATION DEPENDS ON THE RELATION OF THE SIGN AND MAGNITUDE OF
POTENTIAL BETWEEN DIFFERENT SMOOTH AREAS OF THE SURFACES OF CRYSTALLINE
SUBSTRATES, ON THE ONE HAND, AND BETWEEN STEPS AND SMOOTH AREAS, ON THE
OTHER. THE CHARGED POINT DEFECTS AND THEIR ASSEMBLIES WHICH ARE PRESENT
ON THE SURFACE OF CRYSTALLINE SUBSTRATES INDUCE POLARIZATION STRUCTURES
OF THE ELECTRET TYPE IN AMORPHOUS INTERFACIAL LAYERS. THESE STRUCTURES
ARE "FROZEN" IN INTERFACIAL LAYERS IN SO STABLE A MANNER THAT THE LAYERS
TURN OUT TO BE ELECTRICAL COPIES OF CRYSTAL SURFACES, THUS REFLECTING
THE DISTRIBUTION OF POTENTIAL OF THE SURFACE.

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