

69-20-1-9/20

Investigation of the Nature of the Adhesion Bond in the Cementing of two High-Molecular Compounds

The reaction of the substrata plays an important role. It is highest in a neutral medium (Fig. 3) and is lowered when acid or alkali solutions are applied. This phenomenon is explained by a reduction of the surface density of electrification.

There are 3 figures, 4 tables, and 6 references, 5 of which are Soviet, 1 English.

ASSOCIATION: Institut fizicheskoy khimii AN SSSR Moskva (Institute of Physical Chemistry of the AS USSR, Moscow)

SUBMITTED: December 18, 1956

AVAILABLE: Library of Congress

Card 3/3

KROTOVA, N. A.;

The influence of an electrical field on the dispersion of a liquid."

report presented at the Fourth All-Union Conference on Colloidal Chemistry,  
Tbilisi, Georgian SSR, 12-16 May 1958 (Koll zhur, 20,5, p.677-9, '58, Taubman, A.B)

Исследования А. А. и И. П. МОРЗОВА, И. П.

"Adhesional Connection and the Methods of its Investigation."

report presented at the Section on Colloid Chemistry, VIII Mandelejev Conference of  
General and Applied Chemistry, Moscow, 16-23 March 1959.  
(Koll. Zhur. v. 21, No. 4, pp. 509-511)

5(4)

AUTHORS:

Krotova, N. A., Morozova, L. P.

SOV/20-127-1-38/65

TITLE:

Investigation of Diffusion Processes in the Adhesion of Polymers by Means of the Luminescence Method (Issledovaniye diffuzionnykh protsessov v adgezii polimerov lyuminesstentnym metodom)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 1, pp 141-144 (USSR)

ABSTRACT:

In a previous paper (Ref 1) the authors pointed out that the adhesion bond between polymers may take place by two different processes: (1) by the formation of an electric double layer at the boundaries of both polymers, and (2) by diffusion processes, in which case the boundary between the polymers is blurred to an extent as to be aptly designated as contact zone. There occurs not only a diffusion of chain segments and macromolecule chains, but also a passage of whole structural complexes into the other molecule. New experiments showed that also in this case an electric double layer is generated first. This was determined by means of a measuring device (Fig 1). A metal plate was soldered onto the grid of a radio tube. When approaching an electrically charged polymer to this plate,

Card 1/3

Investigation of Diffusion Processes in the  
Adhesion of Polymers by Means of the Luminescence Method

SOV/20-127-1-38/65

the changed grid potential caused a neon lamp inserted in the circuit to extinguish. If both polymer surfaces are glued to each other, the electric double layer may be maintained in some systems for an arbitrarily long time, whereas it vanishes gradually in other systems owing to diffusion. The blurring of the contact zone was microscopically investigated at different temperatures in the system gutta-percha - paraffin (Table 1). Moreover, the diffusion process was investigated by marking the one polymer with a luminophore (tropaeolin). The microscopic preparations were photographed in the ultraviolet light. The following was investigated: (1) gelatin - polyvinyl alcohol, (2) perchloro vinyl - gutta-percha, (3) gutta-percha - paraffin, (4) natural rubber - natural rubber (smoked sheets). The photographs taken reveal that in some systems the boundary is maintained (System 1 - Fig 2), whereas in other systems diffusion occurs in the contact zone (System 3 - Fig 3, System 4 - Fig 4). The authors thank T. A. Krotova and

Card 2/3

Investigation of Diffusion Processes in the  
Adhesion of Polymers by Means of the Luminescence Method

SOV/20-127-1-38/65

M. Ya. Vol'pert for assistance and B. V. Deryagin ,  
Corresponding Member of AS USSR for valuable advice. There are  
4 figures, 1 table, and 7 references, 6 of which are Soviet.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR  
(Institute of Physical Chemistry of the Academy of Sciences, USSR)

PRESENTED: December 12, 1958, by P. A. Rebinder, Academician

SUBMITTED: December 9, 1958

Card 3/3

15(8)

SOV/20-127-2-19/70

AUTHORS:

Krotova, N. A., Morozova, L. P., Sokolina, G. A.

TITLE:

The Mechanical Properties of the Adhesion of Polymers

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 2, pp 302-305  
(USSR)

ABSTRACT:

In the introduction it is stated that the methods used hitherto for investigating polymer adhesion are deficient. A new "adhesiometer" is described which enables the determination of the separating work of two bodies by means of an adjustable velocity, and permits recording of voltage-oscillations during separation. A scheme of this instrument is given in figure 1. An electric resistance tensiometer is used for the determination of voltage fluctuations. After a general discussion of the "adhesiometer" the experimental results are given. First, the oscillograms shown in figure 3 of the systems gutta percha - steel, and ether of cellulose plus benzyl alcohol - steel are discussed. Subsequently, experiments are described which were made in order to investigate the separation of two telescoped cylinders connected by a layer of polymers 200 - 300  $\mu$  thick. In these experiments the separation was recorded by means of a

Card 1/2

The Mechanical Properties of the Adhesion of Polymers SOV/20-127-2-19/70

cinematic camera. The change in voltage and in the distance between the two cylinders is shown in two diagrams (Fig 4). From results obtained in this manner the authors assume that a separating stress may be determined simultaneously with the separating work. Yu. M. Kirillova, N. Ye. Golyanskaya and B. A. Fadeyev assisted in the investigation. The authors thank B. V. Deryagin for his advice. There are 4 figures, 1 table, and 7 references, 6 of which are Soviet.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR  
(Institute of Physical Chemistry of the Academy of Sciences,  
USSR)

PRESENTED: March 28, 1959, by P. A. Rebindar, Academician

SUBMITTED: March 25, 1959

Card 2/2



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SOV/20-129-1-41/64

~~5.3830~~ 5.3830, 15.1100

AUTHORS: Krotova, N. A., Morozova, L. P., Deryagin, B. V., Corresponding Member, AS USSR

TITLE: An Investigation of the Adhesion of a Polymer to Modified Glass Surfaces in Connection With the Reversal of Its Charge Sign in Tearing off

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 1, pp 149-152 (USSR)

ABSTRACT: In reference 1 the authors observed that polymers severed from glass surfaces in the course of changes in the reaction surface reverse the sign of their charge. The present paper investigates the relationship between the mechanical and electrical values of adhesion to bases the chemical character of which had been modified. The base employed consisted of glass the surface of which was first cleaned by means of a glow discharge and then treated with organosilicic compounds of the series  $(CH_3)_{4-n}SiCl_n$  ( $n = 1, 2, 3, 4$ ). The following polymers were applied to the surface: nitrocellulose, benzyl- and alkyl cellulose, polyvinyl alcohol, gutta-percha, perchlorovinyl- and carboxyl-containing

Card 1/3

66494

SOV/20-129-1-41/64

An Investigation of the Adhesion of a Polymer to Modified Glass Surfaces in Connection With the Reversal of Its Charge Sign in Tearing off

rubber, copolymerisates of synthetic styrene rubber with methacrylic acid. Adhesion was determined by measuring the tearing off energy at a tearing off rate of 1 cm/sec. The sign of the charge of the torn off film was tested with a tube electrometer. The experimental results shown in table 1 and figures 1-3 led the authors to the following conclusions: The reversal of charge signs depends on the chemical composition of the surface. Minimum adhesion is found near the point of reversal of the charge sign. Thus there is a direct relation between the mechanical and electrical adhesion values. The stated influence of a chemical modification of the surface indicates the importance of the chemical factor in the formation of the electric double layer. Since, according to the electrical theory of adhesion, the charges of the surfaces torn asunder must be considered as residual charges of the electric double layer, the reversal of the charge sign of these separated surfaces must be caused by an equivalent reversal in the charge signs of the double layer. The untreated glass surface, an electron donor, is transformed into an electron acceptor by modification when the ratio between

Card 2/3

66494

SOV/20-129-1-41/64

An Investigation of the Adhesion of a Polymer to Modified Glass Surfaces in  
Connection With the Reversal of Its Charge Sign in Tearing off

methyl and hydroxyl groups on the surface reaches a certain value. The authors thank A. Ya. Korolev in whose laboratory the modification of the glass surfaces was carried out. There are 3 figures, 2 tables, and 4 Soviet references.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry of the Academy of Sciences, USSR)

SUBMITTED: July 2, 1959

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Card 3/3

PHASE I BOOK EXPLOITATION SOV/5364

Krotova, Nataliya Aleksandrovna

O skleivani i prilipani (On Cementing and Adhesion) Moscow, Izd-vo AN SSSR, 1960. 167 p. (Series: Akademiya nauk SSSR. Nauchno-populyarnaya seriya) 10,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut fizicheskoy khimii.

Resp. Ed.: V.I. Likhtman; Ed. of Publishing House: A.P. Purmal'; Tech. Ed.: T.V. Polyakova.

PURPOSE: This book is intended primarily for students in schools of higher and secondary education.

COVERAGE: Part I contains a brief historical review of the development of technological processes of cementing, varnishing, adhesion, etc., in various applications. Part II of the book attempts to clarify the mechanism of these processes, and is based on existing literature and on investigations carried out at the laboratory of the Institut fizicheskoy khimii (Institute of Physical

Card-1/5-

On Cementing and Adhesion

SOV/5364

Chemistry) under the direction of B.V. Deryagin, Corresponding Member, AS USSR. In the Foreword the author speaks of the electrical theory of adhesion evolved by her and B.V. Deryagin and based on the concept of the double electrical layer formed in a close contact of two surfaces and of the forces of electrostatic attraction between them. According to the author this attraction would be the main cause of adhesion phenomena, while the forces of molecular interaction, heretofore considered the cause of these phenomena, would in reality play only a secondary role. The author thanks the following persons for their advice: B.V. Deryagin, V.I. Likhtman, V.V. Karasev, A.Ya. Korolev, F.F. Vol'kenshteyn, V.A. Zhukova, N.N. Serb-Serbina, M.P. Serebryanaya, A.L. Zaydes, and S.S. Voyutskiy. Part I is accompanied by 49 references, all Soviet (including 2 translations); Part II by 18, all Soviet.

TABLE OF CONTENTS:

Foreword	
Introduction	3
Card-2/5	5

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S/069/60/022/01/014/025  
D034/D003

AUTHORS: Serebryanaya, M.F., Krotova, N.A.

TITLE: The Deformation and Atomization of Colloid Systems in the Vicinity of a Charged Surface

PERIODICAL: Kolloidnyy zhurnal, 1960, Vol XXII, Nr 1, pp 82-89 (USSR)

ABSTRACT: The present paper, which was delivered as a report at the IV Vsesoyuznaya konferentsiya po kolloidnoy khimii (IV All-Union Conference of Colloidal Chemistry) in Tbilisi (1958), gives the results of a study of the behavior of some oleophilic colloidal system near the surface of a dielectric charged by friction. Objects of the investigation were carbon-black suspensions in vaseline oil and suspensions of printing inks and coloring dyes in machine oil. The investigation revealed two basic processes in carbon-black suspensions subjected to the effect of the charged dielectric surface:

Card 1/4

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D034/D003

The Deformation and Atomization of Colloid Systems in the Vicinity  
of a Charged Surface

1) abrupt separating of large drops, which during their movement assume a spherical form; diameter of the drops 3-6 mm; 2) abrupt separating of small drops, quickly following one another (at a medium rate of 100 drops per second); the size of the drops varies from 0.1 mm to  $10^{-3}$  mm. Very often the formation of small drops (atomization) can be observed immediately after the fall of a large drop. Both processes can alternate. Adding of a stabilizer (oleic acid) to the suspension does not affect its behavior in the electric field. The deformation of small volumes of carbon-black suspension in vaseline oil (and also of printing inks) under the effect of a uniformly charged dielectric surface is explained by migration of the charged particles of the disperse phase to the

Card 2/4

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The Deformation and Atomization of Colloid Systems in the Vicinity  
of a Charged Surface

surface, the particles entraining in their motion the dispersion medium. In the absence of the disperse phase the solvent (under the conditions of the experiment) does not react to the approach of the charged surface. When a sufficient number of charged particles has accumulated at the droplet surface, it atomizes, owing to repulsion of particles of the same sign and fall in the surface tension. With the aid of high-speed photography the authors measured the magnitudes of deformation as function of the distance from the charged surface, as well as the sizes and shapes of the atomizing particles and the rate of atomization. The observed phenomena may be utilized for contactless printing and electrostatic aerography. The authors mention the scientist N.N. Serb-Serbina, who with the Veyler-

Card 3/4



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S/069/60/022/01/014/025  
D034/D003

The Deformation and Atomization of Colloid Systems in the Vicinity  
of a Charged Surface

-Rebinder device investigated the characteristics of aged dyes. They express their gratitude to the Associate Member of the AS USSR B.V. Dervagin for useful advice, and also to N.Ye. Golynskaya and B.A. Fadeyev for their participation in the experimental part of the work. There are 5 photographs, a set of photographs, 3 graphs and 9 references, 4 of which are Soviet, 4 English and 1 German. ✓

ASSOCIATION: Institut fizicheskoy khimii AN SSSR, Moskva (Institute of Physical Chemistry of the AS USSR, Moscow)

SUBMITTED: November 24, 1958

Card 4/4

151120  
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31896  
S/643/61/000/000/001/007  
E040/E485

AUTHORS: Krotova, N.A., Morozova, L.P.  
TITLE: Investigation of adhesion of polymers by means of luminescent technique  
SOURCE: Konferentsiya po poverkhnostnym silam. Moscow, 1960. Issledovaniya v oblasti poverkhnostnykh sil; sbornik dokladov na konferentsii, Moscow, Izd-vo AN SSSR, 1961. At head of title: Akademiya nauk SSSR. Institut fizicheskoy khimii. 48-54 + 1 plate

TEXT: In the present paper the authors give a detailed analysis of previous studies on the bond formed by adhesion between surfaces of various polymers and their critical evaluation is followed by an account of the investigations, carried out at the Institute of Physical Chemistry AS USSR. The study was made by means of luminescence techniques because this method offers a number of advantages in comparison with the more usual X-ray techniques. Preliminary tests involved the introduction of a luminophor (tropolin) into the solvent of one of the polymers in the concentration of 1:20000. A film of the polymer with luminophor was then formed on the surface of another polymer deposited on  
Card 1/4

Investigation of adhesion ...

31896  
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EO40/E485

the sub-base of hydrophobic glass. After the removal of the solvent, the double layer of polymers was cut into a number of small specimens for microscopic examination in UV light. The tests showed that gelatine-gutta-percha polymers separation boundary is clearly discernible and little diffusion occurs of one polymer into the other. Data obtained in bond strength tests showed that electric charges of opposite signs are present at the separation boundary in the above system and that gelatine behaves as an electron donor with respect to polyvinyl alcohol. Vinyl perchloride behaves similarly with respect to gutta-percha. Investigation of this production of electric charges on the surface of polymer pairs during their separation showed that an electrical double layer develops in all cases (including self-diffusion) in the initial period of boundary separation. In some polymer systems this double-layer is preserved indefinitely and, in others it disappears in consequence of diffusion. Further studies were made on an extended range of polymers including natural and synthetic rubbers, paraffin and other materials. Full details are also given of tests conducted with self-luminescent polymers. In some cases, the separation boundaries of polymer pairs were heat-

Card 2/4

Investigation of adhesion ...

31896  
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EO40/E485

cured before testing. The diffusion of the luminophor was found to depend on the chemical nature of the polymers. The contact boundary between identical polymers is very diffuse and indicates self-adhesion. Self-adhesion occurs also in heat-cured boundaries in the paraffin-gutta-percha system. Gelatine-vinyl perchloride and other systems with polar groups have a sharp separation boundary. In systems in which paraffin is one of the components, the separation boundary is very sharp ( $0.06\ \mu$ ) in comparison with the diffusion range in other systems:  $0.119$  to  $0.165$  mm for the heat-cured gutta-percha-paraffin boundary. Natural rubber-gutta-percha and similar systems have a wide separation boundary characteristic of non-polar polymer pairs with similar chemical structure and of other systems involving low molecular weight paraffins. Systems with components with a clear difference in their chemical structure (polar and non-polar), but with characteristic polar groups present in one of the components, gave a very narrow separation zone (micron and below). The vinyl perchloride - **CKБ** (SKB) system gave a sharp separation boundary irrespective of the method of its preparation and the type of thermal curing. It is suggested that the luminescence technique  
Card 3/4

X

Investigation of adhesion ...

31896  
S/643/61/000/000/001/007  
EO40/E485

is suitable for investigations of local stresses in microvolumes, e.g. in the process of film formation, shrinkage and tearing. In all these cases, bright luminescence is discernible. The results of the investigation led the author to the conclusion that the diffusion and electrostatic theories of adhesion are compatible. X  
Acknowledgments are expressed to A.L.Zaydes, T.A.Krotova and G.R.Vol'pert for assistance. B.V.Deryagin, S.K.Zherebkov, A.M.Medvedeva, L.A.Berlin, S.S.Voyutskiy and V.L.Vakula are mentioned in the article for their contributions in this field. There are 4 figures, 1 table and 9 references: 5 Soviet-bloc, 1 Russian translation from non-Soviet-bloc publication and 3 non-Soviet-bloc. The two references to English language publications read as follows: Ref.2: D.Josfowitz, H.Mark, Ind. Rub. World, 1949, v.33, 106; Ref.4: McLaren, Mod. Plast., v.31, no.11, 1954, 114, 116, 181.

ASSOCIATION: Institut fizicheskoy khimii AN SSSR  
(Institute of Physical Chemistry AS USSR)

Card 4/4

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31899  
S/643/61/000/000/004/007  
EQ40/E485

AUTHORS: Krotova, N.A., Morozova, L.P.  
TITLE: Application of infrared spectroscopic techniques in the study of adhesive-base interactions (polymer-glass)  
SOURCE: Konferentsiya po poverkhnostnym silam. Moscow, 1960. Issledovaniya v oblasti poverkhnostnykh sil; sbornik dokladov na konferentsii, Moscow, Izd-vo AN SSSR, 1961. At head of title: Akademiya nauk SSSR. Institut fizicheskoy khimii. 83-88

TEXT: Infrared spectroscopy was used for examining the interaction with glass surfaces of two types of polymers: with inter- and intramolecular hydrogen bonds, the investigation being based on an experimentally determined linear relationship between the infrared absorption maxima and the distance between the proton donors and acceptor atoms (Ref.3: K.Nakamoto, M.Margoshes, R.E.Rundell, J. Am. Chem. Soc., 1955, 77, 6430). The glass surfaces were specially prepared in order to improve the adhesive effect (pores varying from 40 to 1000 Å). Preliminary investigations showed that the hydroxyl groups on the glass surface behave as adsorption centres for organic molecules  
Card 1/3

Application of infrared ...

31899  
S/643/61/000/000/004/007  
EO40/E485

(metacrylic acid monomer). A comparative study was made of the spectra of glass control specimens, previously dehydrogenated by heating in vacuum, with those obtained for identical glass specimens with a layer of adsorbed monomers which were subsequently polymerized by heating. The polymers studied were: para-carboethoxyphenylmetacrylamide and ortho-carboethoxyphenylmetacrylamide. Adsorption of the monomers from the gaseous phase gave spectra indicating hydrogen bonding between the hydroxyl groups of the glass and the COOH groups of metacrylic acid. A deeper chemical change occurs after prolonged contact of glass surface with liquid monomer and leads to the disappearance of the hydroxyl groups. Adhesive interaction of the para monomer with hydroxyl groups gives a greater displacement of the OH absorption band toward longer wavelengths than that observed in an analogous interaction of the ortho compound. This points to a difference in the distance between the O ... O atoms in the hydrogen bond formed in these compounds. Differences in the width of absorption bands of the ortho and meta polymers indicate a greater increase in the O ... O distance in the ortho polymers with intramolecular hydrogen bonds. There are 6 figures and  
Card 2/3

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Application of infrared ...

31899  
S/643/61/000/000/004/007  
EO40/E485

7 references: 4 Soviet-bloc, 1 Russian translation from non-Soviet-bloc publication and 2 non-Soviet-bloc. The two references to English language publications read as follows:

Ref.2: A.A.Ketelaar. Chem. Constitution. Amsterdam, 1957, p.404;  
Ref.3: K.Nakamoto, M.Margoshes, R.E.Rundell. J. Am. Chem. Soc., 1955, 77, 6430.

ASSOCIATION: Institut fizicheskoy khimii AN SSSR  
(Institute of Physical Chemistry AS USSR)

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Card 3/3



DERYAGIN, B.V., *otv.red.*; ZAKHAVAYEVA, M.N., *red.*; KROTOVA, N.A., *red.*;  
KUSAKOV, M.M., *red.*; NERPIN, S.V., *red.*; PROKHOROV, P.S., *red.*;  
TALAYEV, M.V., *red.*; FUKS, G.I., *red.*; BANKVITSER, A.L.,  
*red.isd-va*; RYLINA, Yu.V., *tekh.red.*

[Investigations in the field of surface forces; collection of reports made at the Conference on Surface Forces, April 1960]  
Issledovaniia v oblasti poverkhnostnykh sil; sbornik dokladov na konferentsii po poverkhnostnym silam, aprel' 1960 g. Moskva, 1961. 231 p. (MIRA 14:4)

1. Akndemiya nauk SSSR. Institut fizicheskoy khimii. 2. Chlen-korrespondent AN SSSR (for Deryagin).  
(Surface chemistry)

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15.1100

25687  
S/181/61/003/007/009/023  
B102/B214

**AUTHORS:** Krotova, N. A., Morosova, L. P., and Sokolina, G. A.

**TITLE:** Investigation of adhesive binding of solid bodies

**PERIODICAL:** Fizika tverdogo tela, v. 3, no. 7, 1961, 1999-2009

**TEXT:** In an earlier paper, the authors investigated the electrical nature of adhesion phenomena which are based on the formation of an electric double layer. The mechanism of formation of this double layer is different for different systems. The authors now investigate the character of adhesive binding for semiconductors, dielectrics, and metals, and determine the adhesion characteristics of these solids by means of mechanical and optical methods. The measurements were made by a universal adhesiometer of the type A3C-1 (AZB-1), constructed in the authors' laboratory. As usual, adhesion is characterized by the rupture energy. The new instrument permits the determination of the rupture energy, the specific rupture stress, as well as the mechanical properties of the joined materials. The instrument is schematically shown in Fig. 1. On the stand (1) there is an element (2) moving up and down and connected with the lower clamp which is

Card 1/5

25687

8/181/61/003/007/009/023

Investigation of adhesive binding of ... B102/B214

joined to the sample. The rupture with the given rate of 0.5 mm/sec is brought about by a magnetic mechanism. The fluctuations in tension are recorded by electric resistance tensionometers (5). The spectroscopic investigations of the samples were carried out with a spectrograph of the type HCK-14 (ISK-14) for which a special vacuum chamber was constructed. Luminescence was also investigated. The adhesive binding of the following systems was studied; semiconductor - metal, polymer - semiconductor, polymer - glass, and polymer - polymer. The investigations showed, inter alia, that the adhesion between indium and germanium substantially increases if the surface of the latter has previously been subjected to a glow discharge. The increase of adhesion may be explained as being due to the appearance of a large number of adhesion-active recombination centers, which is indicated by the decrease of the carrier lifetime experimentally observed. These results are in agreement with those of V. P. Smilga and B. V. Deryagin (DAN SSSR, 122, v. 6, 1049, 1958) who have shown that the field at the junction of the semiconductor and the metal increases rapidly with an increase in the number of ionized centers at the surface of the semiconductor (before contact). The adhesive power is given by  $F = E^2/8\pi$ . The surface recombination which depends essentially on adhesion, is

Card 2/5

25687

S/181/61/003/007/009/023

B102/B214

Investigation of adhesive binding of ...

directly proportional to the number of surface states which, in their turn, are related to the number of ionized centers on the free surface of the semiconductor. In the cases investigated, the establishment of an adhesive binding between polymer and glass is due to the appearance of a hydrogen bond between the hydroxyls of the glass and the functional groups of the polymer. On breaking the contact the glass surface is found to be protonized while the polymer surface emits electrons. From this, it may be concluded that the total statistical effect that accompanies the destruction of the hydrogen bonds acting in the interfacial plane gives rise predominantly to positive charges on the glass, caused by protons of the broken bonds. The establishment of an adhesive binding between two polymers is introduced by electrostatic processes. Thereupon, diffusion processes take place on the interface, as was shown by luminescence studies. The interface is blurred, and on separating the two polymers no further electrical phenomena appear. T. A. Sokolova and L. A. Ovayannikova are mentioned. There are 5 figures, 4 tables, and 15 references: 12 Soviet-bloc and 3 non-Soviet-bloc. X

ASSOCIATION: Institut fizicheskoy khimii AN SSSR Moskva (Institute of Physical Chemistry, AS USSR, Moscow)  
Card 3/5

VOLINA, L.M.; KROTOVA, N.A.

Motion picture method of investigating the impregnation of chips.  
Dum.prom. 37 no.3:11-14 Mr '62. (MIRA 15:3)

1. Moskovskiy filial Vsesoyuznogo nauchno-issledovatel'skogo  
instituta bumazhnoy promyshlennosti (for Volina). 2. Institut  
fizicheskoy khimii AN SSSR (for Krotova).  
(Woodpulp)

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S/020/62/147/006/031/034  
B144/B186

047750

AUTHORS: Sokolina, G. A., Krotova, N. A., Khrustalev, Yu. A.

TITLE: Study of the properties of a polymer-semiconductor interface

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 6, 1962, 1409-1412

TEXT: The adsorption process occurring at polymer-semiconductor interfaces was investigated by measuring the surface conductivity in the "field effect". The sample used was n-type germanium with a resistivity of 40 ohm-cm and a diffusion length of 2.5 mm etched in a H<sub>2</sub>O<sub>2</sub>-alkali mixture

and coated with films of linear vinyl-type polymers or methylmethacrylate-methacrylic acid copolymers. The field applied had a strength of 10<sup>6</sup> v/cm. First, the surface conductivity was measured in a sample of uncoated Ge: here the  $\Delta\sigma$ -versus-time curve showed a sharp rise when the field was applied, followed quickly by the minimum and returning then to the initial value. On Ge, two surface states were observed: the "fast" states at the Ge oxide - Ge interface and the "slow" states at the external face of the oxide or in the oxide. These slow surface states characterizing the adsorption and adhesion processes were studied by applying a constant

Card 1/2

Study of the properties of a ...

S/020/62/147/006/031/034  
B144/B186

voltage. Control studies of the semiconductor-air interface revealed the positive charge of the surface. The effect of the polymer films on the surface conductivity depended on the nature and concentration of the functional groups. An increase in the concentration of the COOH groups, which are electron-donors, changed the amount and the sign of the bending of the bands and also the quantity and the sign of the charge resulting from the adhesion bond between semiconductor and polymer. The experimental data were compared with those calculated from known theories. The importance of these investigations for the coating of semiconductors is stressed. There are 4 figures.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)

PRESENTED: July 19, 1962, by P. A. Rebinder, Academician

SUBMITTED: July 16, 1962

Card 2/2

POLYAKOV, A.M.; KROTOVA, N.A.

"Mechanoelectron" emission intensity during the break-off and deformation of polymer films. Dokl. AN SSSR 151 no.1:130-133  
J1 '63. (MIRA 16:9)

1. Institut fizicheskoy khimii AN SSSR. Predstavleno akademikom A.N.Frumkinym.

(Polymers) (Electrons--Emission)



KRUTIWA, Natal'ya Aleksandrovna

"Electrical phenomena in adhesion."

report to be presented at the 4th Intl Cong on Surface Active Substances,  
Brussels, Belgium, 7-12 Sep 64.

ACCESSION NR: AP4023500

S/0069/64/026/002/0207/0214

AUTHORS: Krotava, N.A.; Morozova, L.P.; Polyakov, A.M.; Sokolina, G.A.; Stefanovich, N.N.

TITLE: Investigation of various types of adhesion bonds

SOURCE: Kolloidnyy zhurnal, v. 26. no. 2, 1964, 207-214

TOPIC TAGS: adhesion mechanism, adhesion bond, interface erosion, chemisorption, donor acceptor interaction, functional group, electron emission, semiconductor surface conductivity, surface modification, high speed semiconductor, germanium

ABSTRACT: In order to determine the mechanism of adhesion, several phenomena at the polymer-solid substrate interface were investigated. Adhesive bonds resulting from diffusion processes in which the interface is eroded, from the formation of a new phase on the substrate by the polymerization of organometallic compounds, and from chemisorption on the interface leading to the formation of a double electric layer are discussed. By IR spectroscopy it has been established that adhesion of polymers is largely due to chemical

Card 1/7

ACCESSION NR: AP4023500

donor-acceptor interactions. The adhesion can therefore be controlled by rational selection of the function groups of the adhesive and substrate on the basis of their donor-acceptor properties. A number of functional polymer groups were arranged in series according to their ability to impart a positive charge to the surface on tearing the film from the substrate (i.e., decrease in their donor properties). A method was worked out for determining the effect of the functional groups of the polymer by measuring the intensity of electron emission formed by the breakdown of the adhesion bond between the polymer and the glass substrate (figs. 1 and 2). There are changes in the characteristics of a semiconductor upon formation of adhesion bonds between it and the polymer; the part played by the functional groups of the polymer responsible for the degree of charge of the surface was investigated. The surface conductivity in the field effect of germanium crystals modified with alkyl-chlorosilanes (fig. 3) was determined in an apparatus shown in fig. 4. Modification significantly changes (reduces) the high speed properties of the semiconductor surface. Orig. art. has: 7 figures

Card: 2/7

ACCESSION NR: AP4023500

ASSOCIATION: Institut fizicheskoy khimii AN SSSR, Moscow (Institute of Physical Chemistry, AN SSSR)

SUBMITTED: 03Aug62

DATE ACQ: 15Apr64

ENCL: 04

SUB CODE: OC, EC

NO REF SOV: 009

OTHER: J1001

ATD PRESS: 3044

Card 3/7

ACCESSION NR: AP4023500

ENCLOSURE: 01

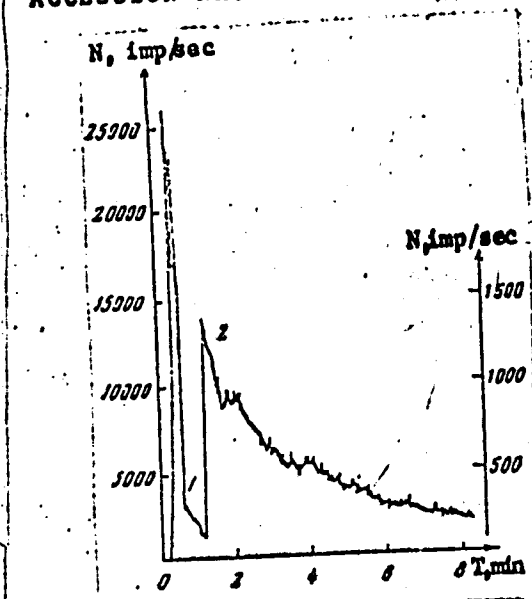


Fig. 1. Diagram of a recording of after-emission of electrons with gutta-percha film torn away from glass

Card

4/7

ACCESSION NR: AP4023500

ENCLOSURE: 02

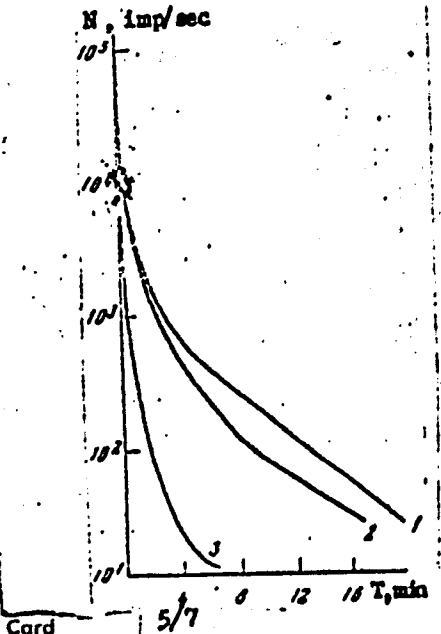


Fig. 2. Curves of the relationship of the intensity of after-emission to time for different polymers after removing from glass

1 - Nitrile rubber, 2 - gutta-percha, 3 - carboxylate rubber

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ENCLOSURE: 03

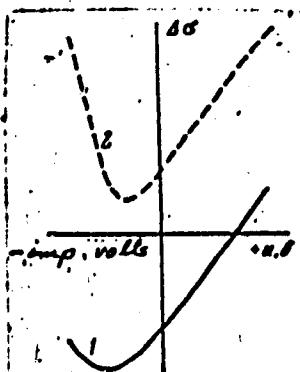


Fig. 3. Surface conductivity in the field effect for sample of germanium, modified with alkylchlorosilane. The dark (1) and light (2) curves were obtained by the method of static photoconductivity. Picture taken from oscillograph screen

6/7

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ACCESSION NR: AP4023500

ENCLOSURE: 04

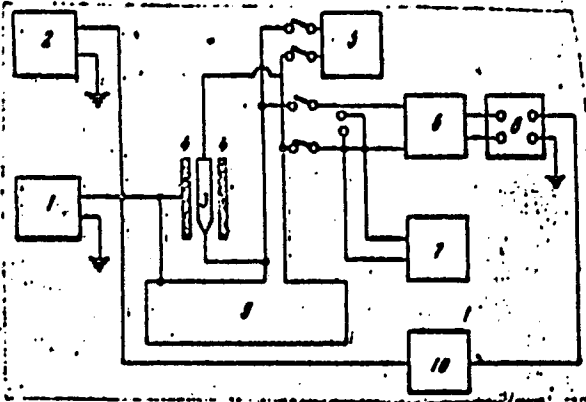


Fig. 4. Block diagram of apparatus for measuring surface conductivity in the field effect by the fixed conductivity method

1 - Generator, 2 - voltmeter, 3 - sample, 4 - electrodes, 5 - potentiometer, 6 - amplifier, 7 - condenser, 8 - oscillator, 9 - radiodiagram, 10 - phase scanner.

Card 7/7



40  
32

AUTHOR: Krotova, N. A.

Investigation of the state of germanium surface during the formation of an adhesive bond with a polymer

Referentsiya po poverkhnostnye sllany (1962) Issledovaniya v oblasti  
In investigations of the state of germanium surface during the formation of an adhesive bond  
doklady konferentsii. Moscow, izd-vo nauka, 1962, 49-51

Investigation of the state of germanium surface during the formation of an adhesive bond with a polymer film, in: Proceedings of the 1962 Conference on Surface Phenomena, Moscow, 1962, pp. 49-51.

ABSTRACT: The application of piezoelectric measurements to the study of the semiconductor-polymer interface enables us to obtain very important data on the changes in the surface potential of the semiconductor during the formation of an adhesive bond. The piezoelectric effect is used experimentally to characterize the surface potential of the semiconductor. The change in the surface potential and surface charge during the formation of an adhesive bond with a polymer was investigated by electro-  
Correlation of length, and the change in state of germanium semiconductor surface during the formation of an adhesive bond with a polymer was investigated by electro-

AD 500 04 10

chemical methods. These experiments proved the possibility of measuring the rate of surface recombination and changes in surface conductivity of a semiconductor covered by a film of polymethylsiloxane, polyacrylonitrile, polyhydroxy-

acetone, and polyethylene glycol. It was found that a polymer film applied to germanium can change not only the magnitude,

but also the sign of the surface conductivity change. The results of the experiments

are presented in the paper. The experiments were performed in the Laboratory of

NO REF SOV: 021

ENCL: 00  
OTHER: 013

SUB NOF 50 10

L 24442-65 EPF(ε)/EPR/EPA(ε)-2/EMP(j)/EMT(ε)/T/EWA(ε)/EAP(1)/EAP(τ)  
FR-4/PB-4/Pt-10 RH/WW/MLK  
ACCESSION NR: AT5000411 9/0000/64/000/000/0112/0321

Pc-4/  
63  
60  
B+1

AUTHOR: Polyakov, A. M.; Krotova, N. A.

TITLE: Investigation of the electrical properties of a freshly formed surface with respect to the emission of fast electrons

SOURCE: Konferentsiya po poverkhnostnym silam, 2d, 1967. Issledovaniya v oblasti mekhaniki (Investigations in the field of mechanics). Moscow, Izdatel'stvo Nauka, 1967.

DDIC TAGS: polymer film, plastic deformation, secondary emission, polymer surface, polymer interface, polymer electrical properties, electron emission, polymer

ABSTRACT: The emission of mechanoelectrons during the separation and deformation of polymer films was investigated using the complex AK-1 adhesiometer. The magnitudes were determined simultaneously with a determination of the intensity. Special attention was given to the study of the multiplet structure of the mechanoelectron emission. It was established that the emission current observed

L 24441-65

ACCESSION NR: AT5000411

During the separation process can be recorded by a microammeter switched into the circuit. The magnitude of the emission current was approximately  $20 \mu A/cm^2$  for the system *B*-guttapercha-glass. It was disclosed that the emission of secondary electrons is observed not only from the gap between the plates being separated, but also from the freshly formed surface of the adhesive bond. The emission of secondary electrons from the gap during the separation of the adhesive bond was examined as a variety of autoelectric phenomena. It was found that the emission of secondary electrons is developing in the gap between the plates being separated. The secondary emission from the freshly formed surface and selected emission from the law  $N = aT^b$ , where  $T$  is the temperature, are considered. In some cases, emission from the freshly formed surface is observed after the separation. It was also established that the emission of secondary electrons from the freshly formed surface is dependent on the temperature of the surface, the rate of separation, and the area of the surface.



1965-65 SWI(m)/EPF(c)/EMP(S)/T Pc-4/Pr-4 RM/DJ

ACCESSION NR: AP4046902

S/0191/64/000/019/0056/0058

21  
268

AUTHOR: Kroteva, H. A.; Toporov, Yu. P.; Parfanovich, B. N.

ABSTRACT: The construction of the APO testing machine commonly used for testing  
of polymer films and laminates at different speeds was  
described. APO machine is ribbed and has a  
...

AP40.8902

under dynamic conditions, which is of great interest. The

region of the spectrum is of interest in the

application of the theory to the

analysis of the data.

The results of the analysis are

presented in the following figures.

The first figure shows the

power spectrum of the signal.

The second figure shows the

cross-spectrum of the signal.

The third figure shows the

coherence function of the signal.

L 01286-66 EWT(1)/EWT(m)/EPF(c)/EWP(j)/T/EWP(t)/EWP(b)/EWA(h) IJP(c)/RPL  
JD/AM/GS/AT RM

ACCESSION NR: AT5020453 <sup>44.55</sup> UR/0000/64/000/000/0087/0104 <sup>44.55</sup>

AUTHOR: <sup>44.55</sup> Krotova, N. A.; <sup>44.55</sup> Sokolina, G. A.; <sup>44.55</sup> Khrustalev, Yu. A.; <sup>44.55</sup> Agranenk, N. P. <sup>89</sup>  
<sup>44.55</sup> Lomova, N. F.; <sup>44.55</sup> Khomutov, A. M. <sup>B+1</sup>

TITLE: Change in the surface state of germanium during the formation of an adhesion bond with a polymer <sup>27</sup>

SOURCE: <sup>44.55</sup> Mezhvuzovskaya nauchno-tekhnicheskaya konferentsiya po fizike poluprovodnikov (poverkhnostnyye i kontaktnyye yavleniya). Tomsk, 1962. Poverkhnostnyye i kontaktnyye yavleniya v poluprovodnikakh (Surface and contact phenomena in semiconductors). Tomsk, Izd-vo Tomskogo univ., 1964, 87-104

TOPIC TAGS: <sup>44.55</sup> polymer, <sup>44.55</sup> semiconductor research, <sup>44.55, 21</sup> protective coating, surface property, crystal surface, lacquer/ LVS-31 lacquer, MBK-1 lacquer

ABSTRACT: The authors study the effect which the functional groups in a polymer have on the surface state of germanium in connection with the use of organic polymer materials for protecting semiconductor devices from atmospheric action. The field effect method was used for experimentally ~~studying~~ the surface conductivity with the application of a constant field. The slow changes in conductivity with time were

Card 1/6



L 01286-66

ACCESSION NR: AT5020453

6

recorded. The material studied was *n*-germanium with a resistivity of 40  $\Omega \cdot \text{cm}$  and a diffusion length of 2.5 mm. The specimen was a plate with dimensions of 20 x 5 x 5 mm cut from a single crystal of germanium parallel to plane (111). Ohmic contacts were fused to the ends of the specimen. The sample was etched in a peroxide-alkali mixture. The surface conductivity is shown as a function of time in fig. 1 of the Enclosure. Typical curves for conductivity in the field effect for high resistance *n*-germanium are given in fig. 2 of the Enclosure. These curves may be given as  $\Delta\sigma = f(U)$  or as  $\Delta\sigma = \phi(Q)$ , if  $Q$  is the induced charge of a condenser determined from the capacity. Here  $\Delta\sigma$  indicates the change in surface conductivity, and  $U$  gives the potential. Polymers of the vinyl series were studied with regard to the effect of the nature of functional groups and their concentration in the chain of a copolymer on the shape of  $\Delta\sigma = \phi(Q)$  curves plotted from measurements in vacuum. The results are shown in fig. 3 of the Enclosure. Curves are also given for copolymers of methyl-methacrylate with methacrylic acid, for a gelatin-germanium interface (where the gelatin has functional radicals  $\text{NH}_2$ ,  $\text{OH}$  and  $\text{COOH}$ ) and for polyhydroxyethylene--a polymer which has no functional polar radicals and which has oxygen bound by single bonds in the chains. A comparison of the curves indicates that functional radicals change the position of  $\Delta\sigma_{\text{min}}$  noticeably, while polymers without strongly polar groups have little effect on this parameter. Compositions of polymers were studied

Card 2/6

L 01286-66

ACCESSION NR: AT5020453

along with individual polymers. It was found that two industrial lacquers, MBK-1 and LVS-31, offer more protection against moisture than do the individual polymers. However, the lacquer films are much thicker than the individual polymer films. It is shown that LVS-31 has a few advantages over MBK-1 as a protective film for semiconductor devices. Orig. art. has: 13 figures, 6 tables.

ASSOCIATION: none

SUBMITTED: 06Oct64

ENCL: 03

SUB CODE: SS, HT

NO REF SOV: 006

OTHER: 005

Card 3/6

L 01286-66

ACCESSION NR: AT5020453

ENCLOSURE: 01

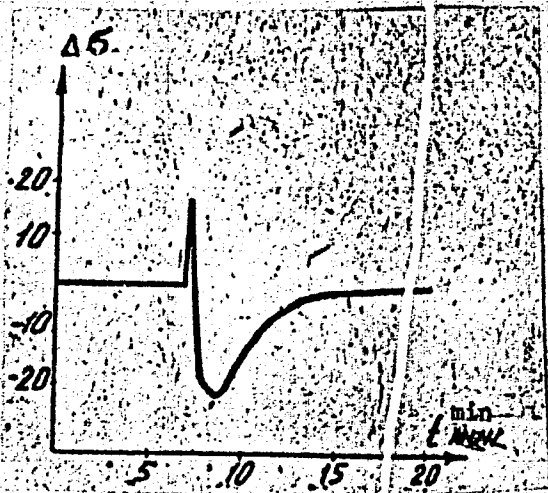


Fig. 1. Change in surface conductivity with time

Card 4/6

L 01286-66

ACCESSION NR: AT5020453

ENCLOSURE: 02

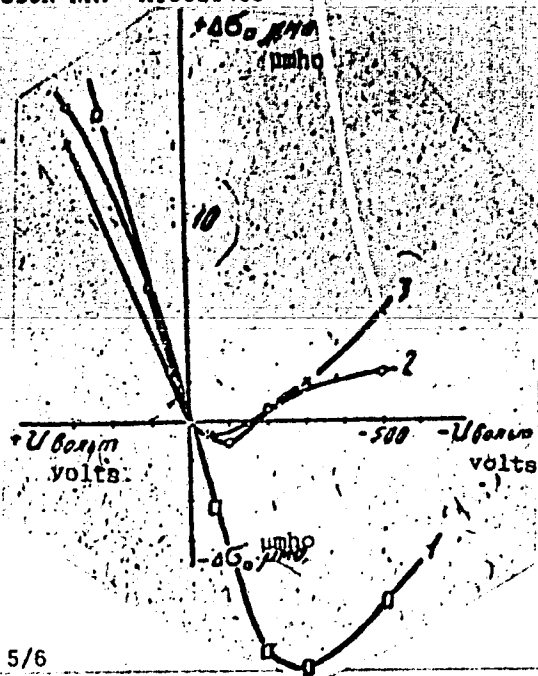


Fig. 2.  $\Delta R_H$  in field effect for high-resistance n-germanium

Card 5/6

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ACCESSION NR: AT5020453

ENCLOSURE: 03

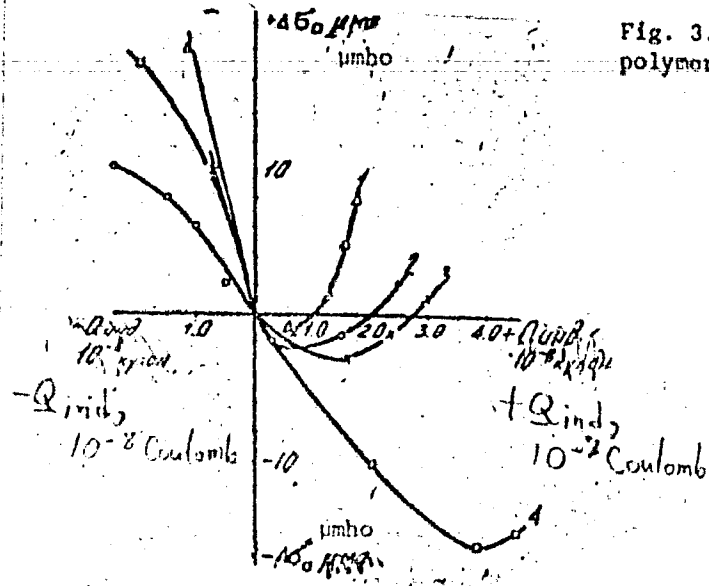


Fig. 3.  $\Delta\sigma$  as a function of  $Q$  for polymers of the vinyl series

Card 6/6



7712-65

ACCESSION NR: AT5600412

to study the nature of a chemically modified surface and the nature of the interaction between it and the functional groups of monomers of polymerizable vinyl monomers, which does not change the surface of the treated substrate, is called to yield any desired adhesive strength. This is because the character of the interaction between the monomer or polymer and the substrate is different after modification; these changes are very rapid, however, significant after only a few seconds. Treatment of glass with alkylthiophosphonates, for example, decreases the concentration of OH groups and increases that of methyl groups; cross-linking of Si-Si bonds is often produced. Treatment with methacrylic acid results in hydrogen bond formation between the carboxyl groups of the acid and the OH groups.

page 2/2 LL

...the adhesive strength of polymers

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**ABSTRACT:** This article develops and reviews procedures and apparatus for research on the strength of surfaces. The nature of different types of surfaces and a comparison of the strength of the joints formed by different types of surfaces are discussed.



ADDITION NR: AT3000-113

series the authors describe the latest adhesionmeter with automatic calibration and control  
function, the APO-1. The class of a few meters with the same

1. N. I. AT5000413

... for producing the copolymer samples ...  
and B. N. Parfianovich, A. I. Bessonov and I. A. Sulya\*kov for designing the ap-  
... ..

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... .. 30May64

ENCL: 00

SUB CODE: MT

KRETT, V., H.A.; TOBOKOV, Yu.F.; PARFANOVICH, E.M.

Tests for adhesion, friction and mechanical testing of polymeric films. Plant. massy no. 10096-58 '84. (M.R. 17-10)

K-2

USSR/Forestry - Forest Biology and Typology.

Abs Jour : Ref Zhur - Biol., No 5, 1958, 20114

Author : Krotova, N.G.

Inst  
Title

: The Effect of a Change in Atmospheric Conditions on the Growth and Development of Pine in the Wood Lot of the Moscow Agricultural Academy im. K.A. Timiryazev.

Orig Pub : Dokl. Mosk. s.-kh. akad. im. K.A. Timiryazeva, 1957, vyp, 29, 300-306

Abstract : The condition of the planted forest at the experimental wood lot of the Moscow Agricultural Academy is described. The highest productivity in the wood lot plantings was obtained in 1920-1925. In the 40-45 years of growth, the annual addition to the tree stand totalled 6.6 cubic meters per hectare. From 1935 on fall off and disorder began in the plantings. In 1954 the average yearly increase was 3.7 cubic meters per hectare. Observations were made in

Card 1/2

- 30

*KROTOVA, N.G.*  
KROTOVA, N., nauchnyy sotrudnik

Nauka i pered. op. v sel'khoz. Nauka i pered. op. v sel'khoz.  
8 no.1:37-38 Ja '58. (MIRA 11:2)

1. Sel'skokhozyaystvennaya akademiya K.A. Timiryazeva.  
(Forests and forestry) (Smoke)

KROTOVA, N. G. Cand Agr Sci -- (diss) "Effect of smoke-filled air upon pine trees in the experimental <sup>woodlot</sup> ~~forest-stands~~ of the Agricultural Academy imeni Timiryazev and measures <sup>for</sup> ~~towards~~ the creation of <sup>natural forest</sup> ~~stable forest~~ plantations." Mos, 1959. 12 pp (Mos Order of Lenin Agr Acad im K. A. Timiryazev), 110 copies (KL, 44-59, 128)

MUCHNIK, D.A.; IVANOV, Ye.B.; KUSHNIROV, V.F.; VASIL'CHENKO, S.O.; KROTOVA, N.I.

Effect of the coarseness of crushing of the various coal charge  
components of the quality of coke. Koks i khim. no.1:5-7 '63.  
(MIRA 16:2)

1. Krivorozhskiy metallurgicheskiy zavod.  
(Coke)

20166

S/114/61/000/004/001/006  
E194/E435

26.2120

AUTHORS: Zelenin, V.M., Candidate of Technical Sciences and  
Krotova, N.V., Engineer

TITLE: The Application of Electronic Computers to  
Calculation of the Natural Frequencies of Turbine Discs

PERIODICAL: Energomashinostroyeniye, 1961, No.4, pp.5-7

TEXT: Calculation of the natural frequencies of turbine discs  
is a laborious process in turbine design. The object of the  
present work was to examine and compare existing methods of  
calculating the vibration of turbine discs and to assess the  
possibilities of obtaining solutions with analogue or digital  
computers, to select the method of calculation most convenient for  
mechanization and to determine the computer time required. Two  
methods of calculation were selected, namely a method of successive  
approximations and a method of A.V.Levin. Both are based on the  
energy balance equation

$$\Phi_{\text{potent}}^{\text{max}} = \Phi_{\text{kinet}}^{\text{max}} = p^2 \Phi_{\text{kinet}}^{\text{max}}$$

Card 1/10



20166

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The Application of ...

whence the square of the natural frequency of the bladed disc

$$p^2 = \frac{\Phi_{\text{max}}^{\text{potent}}}{\Phi_{\text{max}}^{\text{kinet}}}$$

The maximum values of potential and kinetic energy of the vibrating system  $\Phi$  are functions of the shape of bending of the mean plane of the disc which may be represented in the form

$$W(r, \varphi) = X(r) \cos m\varphi$$

where  $X(r)$  is a function of the radius;  $r, \varphi$  are polar coordinates and  $m$  is the number of node diameters. Thus determination of the natural frequencies of the disc consists in determining the function  $X(r)$ . For this purpose it suffices to replace the shape of bending of the disc during oscillation by the shape of static bending due to a uniform load over the radius. Use of an analogue computer is first considered and equations are  
Card 2/10

20166

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E194/E435

The Application of ...

written down for static bending of the disc and of a blade. The disc chosen for consideration is illustrated in Fig.1 for which the equation of static bending is a linear non-uniform fourth order differential equation with variable coefficients.

$$x^{IV} + \frac{A_3(r)}{A_4(r)} x''' + \frac{A_2(r)}{A_4(r)} x'' + \frac{A_1(r)}{A_4(r)} x' + \frac{A_0(r)}{A_4(r)} x = -\frac{\text{const}}{A_4(r)} \quad (3)$$

One special feature of this problem is the presence of a differential equation with boundary conditions. Of the four boundary conditions two are given at one end of the interval of integration and two at the other. The boundary conditions may be satisfied by obtaining numerous solutions for various combinations of initial values of the two variables. It is shown that the problem consists in determining three functions with known initial conditions and two constants from the boundary conditions at the

Card 3/10

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E194/E435

The Application of ...

far end of the range of integration. In order to make the search for a solution of the boundary conditions fully automatic, a special unit was developed, to complement the analogue computer, which consisted of blocks of variable coefficients and groups of relays. A necessary and sufficient condition for automatic search for a solution with this unit is that the function shall be monotonous; this condition is fulfilled in the case considered. A second feature of the problem is that two equations are solved simultaneously: that of static bending of the disc and that of bending of the blade. The solution is required to determine the maximum values of kinetic and potential energy of bending of the oscillating bladed disc, from the ratio of which the natural frequencies of oscillation may be determined. Since the maximum values of potential and kinetic energies are functions of maximum bendings of the disc and blade an important condition of modelling is a selection of scales such that the time required to solve the two equations should be the same. Then if solution of the two equations is commenced simultaneously, their solutions are obtained together at the end of the interval of integration. An analogue computer type MH-8 (MN-8) was used to obtain solutions for nine  
Card 4/10

20166

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E194/E435

The Application of ...

variants of conical disc shape. The initial variant was a particular profile of turbine disc and the other eight were obtained by changing one or another of its geometrical characteristics such as thickness, or angle of conicity. For the initial disc the analogue computer gave a frequency of 375 c/s and the value obtained on a "Ural" digital computer was 361 c/s. The agreement is very good. The divergence is attributed to the lower accuracy of the analogue computer, to different methods of fixing the blades in the bundles and to the fact that vibration of the hub was allowed for in the digital but not the analogue computer. The total solution time including search for unknown initial conditions was about 50 seconds. A considerably greater time was required in preparing the problem for solution on the machine, in calculating the machine coefficients and so on. It is also very inconvenient that the coefficients in Eq.(3) depend on the disc geometry so that they need to be recalculated on changing over from one variant to another. Thus, a fairly complicated mathematical problem was solved sufficiently accurately but considerable preparatory work was required. To obtain a solution on a digital computer the

Card 5/10

20166

The Application of ...

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E194/E435

method of A.V. Levin was used (Ref.1), according to which the static bending of the disc is given by

$$X(r) = ar^s \quad (6)$$

where  $s$  is an unknown variable parameter. The true value of  $s$  is determined from the condition of minimum of the function  $p^2(s)$  which is of the form

$$p^2(s) = \frac{q}{\gamma} \cdot \frac{2A_1 A_2}{A_1 B_2 + A_2 B_1 + \sqrt{(A_1 B_2 - A_2 B_1)^2 + 4A_1 B_2 B_3^2}} \quad (7)$$

where  $A_1, A_2, B_1, B_2, B_3$  are functions of the parameter  $s$  and the blade and disc geometry. This procedure was used to programme the calculation of vibration of bladed discs with a body consisting of various sections of cylindrical or conical profiles. The programme contains two zones (III and IV). The zone III contained the initial data (159 elements), constants and a programme of calculation of magnitudes which do not depend on the

Card 6/10

20166

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E194/E435

The Application of ...

parameter such as moment of inertia, and the programme of blade calculation. Zone IV includes the main programme of calculation

$$f_{st}(s) = \frac{p(s)}{2\pi}$$

Variation of  $s$  over a wide range was considered so as to analyse the function  $f_{st}(s)$  in order to obtain information about the limits of variation of  $s$  in practical calculations. Calculations were made on three discs: one of constant thickness, another with a body of conical profile and a third with a body of two sections, the inner conical and the outer of constant thickness (Fig.2). The results plotted for different values of  $m$ , the number of node diameters, show that the curves of  $f_{st}(s)$  have not more than two minima or inflection points. It was found that the shape of the disc body has a considerable influence on the shape of these curves and for a conical disc the influence of the hub is not so great as for a disc of constant thickness. In order to study the formation of these inflection points on the curve, for one of the discs values were plotted proportional to the potential  
Card 7/10

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The Application of ...

energies of the hub, the disc body and the rim and it was found that the shapes of the potential energy curves of the hub and body have the most influence. The point is illustrated in Fig.3 which shows the formation of minima on the curves of  $s$  for a flat-conical disc where curve (1) corresponds to oscillation of the body and curve (2) to the hub. The formation of two inflection points, by super-position of the curves, is clearly seen. Certain procedures are recommended for simplifying the calculations. It is concluded that if a universal programme is available for the digital computer "Ural", it is best to calculate the natural frequencies on the digital computer. The use of an analogue computer is both less accurate and requires more preparatory work for calculation of each fresh variant. Using A.V.Levin's method of calculation requires 4 to 5 working days of manual labour while the "Ural" computer can do the work in 30 to 60 minutes. With manual calculation the minimum on the curve is determined from 3 to 4 points and on the computer from 20 to 25 points. There are 3 figures and 2 Soviet references.

X

Card 8/10

ZHDANOV, S., kand.tekhn.nauk; MAKAROV, V., inzh.; KROTOVA, O., inzh.

Device capable of seeing the invisible. Pozh.delo 9 no.7:22-23  
Jl '63. (MIRA 16:10)



KROTOVA, O.A., kandidat sel'skokhozyaystvennykh nauk.

Sakhalin in growing its own potatoes. Nauka i pered.op. v sel'khoz.  
no.12:11-13 D '56. (MLRA 10:1)  
(Sakhalin Province--Potatoes)

*КРОТОВА*

USSR/Cultivated Plants - Potatoes, Vegetables, Melons. M.

Abs Jour : Ref Zhur - Biol., No 10, 1958, 44104

Author : Krotova, O.A.

Inst : Moscow Agricultural Academy.

Title : Treatment of Seeds with Ultra-High-Sound.

Orig Pub : Sad i ogorod, 1957, No 9, 28-29.

Abstract : Acceleration of germination and increased yields were obtained at the Vegetable Experimental Station of the Moscow Agricultural Academy by treating the seeds vegetable cultures with ultra-high-sound. The seeds of the Sax variety radish, Besson onion, carrot and eggplant were tested. Intra-molecular changes in the protein particles take place and oxidizing processes are intensified under the effect of the ultra-sound energy.

Card 1/1

KROTOVA, O.A., kand.sel'skokhozyaystvennykh nauk

Cold can help too. *IUn. nat. no.3:38* Mr '61.  
(Seeds) (Fertilizers and manuers)

(MIRA 14:3)

KROTOVA, O., kand.sel'skokhozyaystvennykh rabot

Do it for your collective farm. IUn.nat. no.3:36-37 Mr '62.  
(MIRA 15:4)

(Fertilizers and manures) (Vegetable gardening)

ALEKSEYEVA, M.V., doktor sel'khoz. nauk, prof, retsenzent; ~~KROTOVA, O.A.~~, kand. sel'khoz. nauk, retsenzent; SHEV'YEV, Ye.I., agrom, retsenzent; LEZHANSKINA, Z.S., kand. sel'khoz. nauk, red.; VISHNYAKOVA, Ye., red.; GAYEVSKIY, A., red.; POKHLEBKINA, M., tekhn. red.

[Cooperation of science and production; experience in joint work of the vegetable growers on the M.Gorkii State Farm and the scientists of the Research Institute of Vegetable Gardening] So-druzhestvo nauki i proizvodstva; opyt sovmetnoi raboty ovo-shchevodov sovkhosa im. M.Gor'kogo i uchenykh Nauchno-issledovatel'skogo instituta ovoshchnogo khoziaistva. Moskva, Mosk. ra-bochii, 1963. 133 p. (MIRA 16:6)  
(Vegetable gardening)

KROTOVA, Ol'ga Alekseyevna, kand. sel'khoz. nauk; LEONOVA, T.S.,  
~~red.; RAKITIN, I.T., tekhn. red.~~

[Seed pellets] Semena-drazhe. Moskva, Izd-vo "Znanie,"  
1964. 30 p. (Novoe v zhizni, nauke, tekhnike. V Seria:  
Sel'skoe khoziaistvo, no.3) (MIRA 17:3)

KROTOVA, P.G.

Integration of equations for the motion of an asymmetrical gyroscope.  
Izv. Sib. otd. AN SSSR no.7:75-86 '58. (MIRA 11:9)  
(Gyroscope)

KHOTOVA, P.A.G., Cand Phys-Math Sci -- (diss) "Integration of equations  
of motion of an asymmetric heavy gyroscope." Mos, 1959. 4 pp (Mos  
State U in M.V. Lomonosov). 100 copies (ML, 33-59, 114)

8



KROTOVA, R.; SOLDATOVA, V.

We support the start made in Rostov. Fin.SSSR 21 no.4:72  
Ap '60. (MIRA 13:4)

1. Predsedatel' mestkoma Zhdanovskogo rayfinotdela Moskvy  
(for Krotova). 2. Predsedatel' mestkoma Kalininskogo rayfinotdela  
Moskvy (for Soldatova).  
(Education, Cooperative) (Finance--Study and teaching)

KROTOVA, R.G. (Vladimir)

Scientific and atheistic evening with the use of physical  
experiments. Fiz.v shkole 22 no.6:65-68 N-D '62.

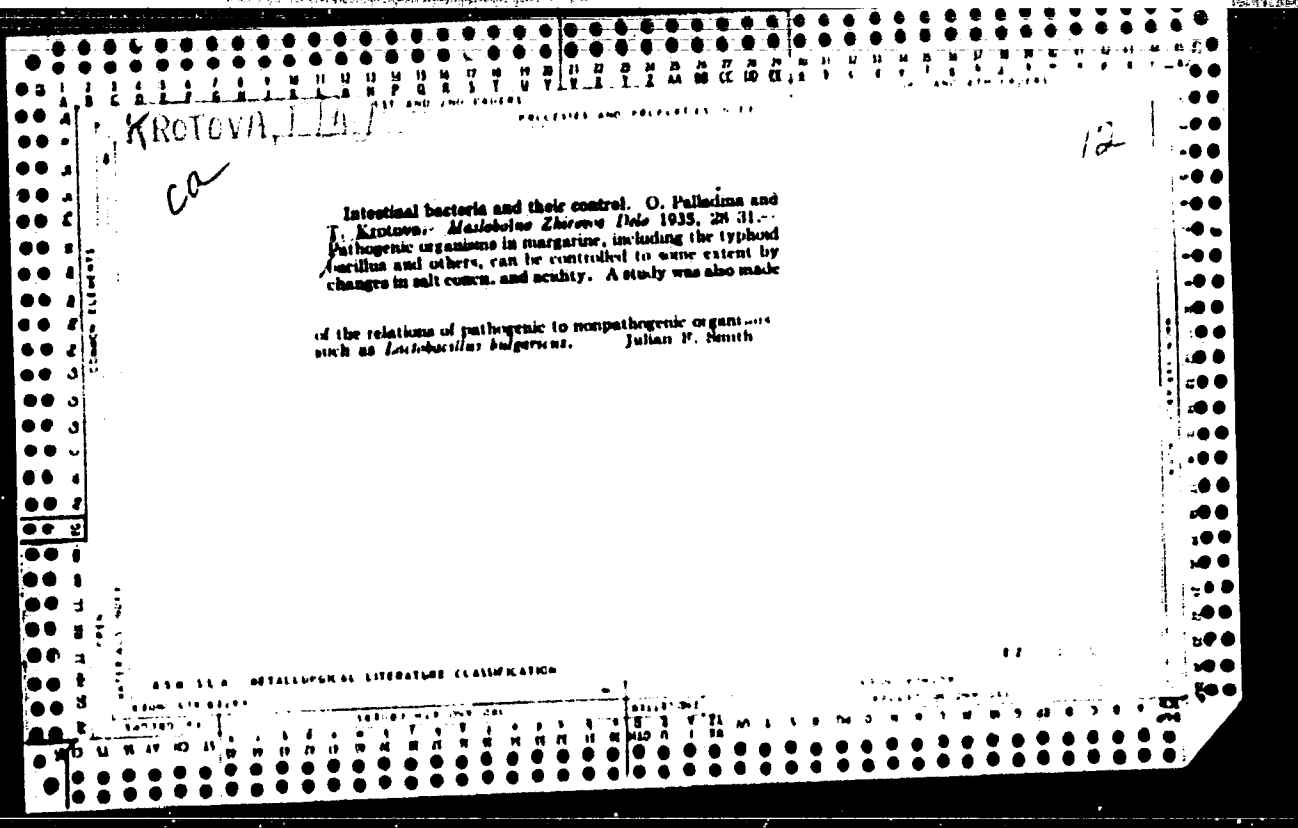
(MIRA 16:2)

(Atheism--Study and teaching)

(Physics--Experiments)

VISHNEVSKIY, N.A.; ABDULLAYEVA, V.M.; IVANOVA, Ye.A.; KOTOVA, Ye.S.;  
KROTOVA, S.I.; STIKSOVA, V.N.

Critical evaluation of the significance of "initial signs" of  
radiation cataract. Med. rad. 5 no.11:77-81 N '60. (MIRA 13:12)  
(RADIATION SICKNESS) (CATARACT)



KROTOVA T. A.

Jul/Aug 48

USSR/ Medicine - Microbiology  
Medicine - Acidophilous Flora, Action

"Normal Acidophilous Flora of the Intestines, Which Ferment Starch," O. K. Palladina, T. A. Krotova, V. A. Mazyukevich, A. A. Anoskina, Leningrad Inst. of Blood Transfusion, 10 pp

"Mikrobiologiya" Vol XVII, No 4

Refers to many unsatisfactory studies of subject. Discloses own studies on possibility of promoting acid formation by intestinal microflora, in which weak fermentative activity was observed. In process of transformation of various cultures, determined that a transformation of lactic acid bacteria series frequently produced a positive accumulation of acidity in starch culture media. However, these intestinal lactobacillus S or R-acidophilus, or Bacteria Bulgarium from milk, produced identical results. Gives four tables of experimental results. Submitted 30 June 47.

PA 44/49T71

KROTOVA, T. A.

"Directed Variation in the Characteristics of  
Dysenteric Bacteria," Zhur Mikrobiol, Epidemiol  
i Immunobiol, 1951, No. 2

Mikrobiologiya, Vol XX, No. 5, 1951  
-7-24,635.

KROTOVA, T.A.

Rational methods for the sterilization of and the removal of dust  
from the air during blood giving. Akt.vop.perel.krovi no.4:78-84  
'55. (MIRA 13:1)

1. Bakteriologicheskaya laboratoriya i todel konservatsii krovi Lenin-  
gradskogo instituta perelivaniya krovi.  
(AIR--PURIFICATION) (BLOOD--COLLECTION AND PRESERVATION)

KROTOVA, T.A.; DIMBO, M.A.

On the possibility of using colimycin in blood preservation.  
Antibiotiki 4 no.4:117-121 J1-Ag '59. (MIRA 12:11)

1. Bakteriologicheskaya laboratoriya (zav. T.A.Krotova) i  
laboratoriya suchikh preparatov (zav. - prof.L.G.Bogomolova)  
Leningradskogo nauchno-issledovatel'skogo instituta perelivaniya  
krovi.

(BLOOD PRESERVATION)  
(ANTIBIOTICS)



ALEKSHYEVA, A.V., nauchnyy sotrudnik; ANTONOVA, Ye.V., starshiy nauchnyy  
sotrudnik; KROTOVA, T.A., doktor biolog.nauk

Study of the influence of ionizing radiation on some immunobiological  
and physicochemical properties of preserved blood. Akt.vop.perel.krovi  
no.7:137-145 '59. (MIRA 13:1)

1. Otdel zagotovki krovi, bakteriologicheskaya i serologicheskaya  
laboratorii Leningradskogo instituta perelivaniya krovi.  
(X RAYS--PHYSIOLOGICAL EFFECT) (BLOOD)

~~KROTOVA, T.A.~~, starshiy nauchnyy sotrudnik; MALINA, V.M. nauchnyy sotrudnik

Possibility of the sterilizing effect of ultrasound on plasma and blood plasma substitutes. Akt.vop.perel.krovi no.7:220-222 '59.

(MIRA 13:1)

1. Leningradskiy institut perelivaniya krovi.  
(ULTRASONIC WAVES--PHYSIOLOGICAL EFFECT)  
(BLOOD PLASMA--STERILIZATION)

AKKERMAN, V.V., doktor med.nauk; IVANOVA, N.M.; KLIMOVA, K.N.;  
KROTOVA, T.A., prof.; MYASISHCHEVA, N.V.

Changes in natural immunity and the content of vitamin B<sub>12</sub>  
in leukemia in relation to treatment. Probl.gemat.i perel.krovi  
no.7:3-11 '62. (MIRA 15:9)

1. Iz Leningradskogo nauchno-issledovatel'skogo instituta pereli-  
vaniya krovi (nauchnyy rukovoditel' - chlen-korrespondent AMN  
SSSR prof. A.N. Filatov, dir. - dotsent A.D. Belyakov).  
(LEUKEMIA) (IMMUNITY) (CYANOCOBALAMINE)

RESHETNIKOV, N.S., dots.; LEVANOVA, R.V., inzh.; RASHKOVSKAYA, A.N., inzh.;  
ANTONOVA, G.P., tekhnik; ANIKIYENKO, O.M., tekhnik; KORESHKOVA, V.I.  
tekhnik; KROTOVA, T.N., tekhnik; BIRYUKOVA, V.N., tekhnik; PAVLYUKOVA,  
S.N., tekhnik; PARAKHINA, N.L., tekhn. red.

[Album of working drawings of parts and units of the TDT-60 tractor]  
Al'bom rabochikh chertezhei detalei i uzlov traktora TDT-60. Moskva,  
Goslesbumizdat. Pt.2. [Xcept the motor] Krome dvigatelia. 1959. 388 p.  
(MIRA 14:12)

1. Khimki. tsentral'nyy nauchno-issledovatel'skiy institut mekhaniza-  
tsii i energetiki lesnoy promyshlennosti. 2. Laboratoriya tipovoy  
tekhnologii remonta lesozagotovitel'nogo oborudovaniya i organizatsii  
remontnykh predpriyatiy TSentral'nogo nauchno-issledovatel'skogo in-  
stituta mekhanizatsii i energetiki lesnoy promyshlennosti (for all  
except Levanova, Parakhina).  
(Tractors—Design and construction)

RESHETNIKOV, N.S., dotsent; LEVANOVA, R.V., inzh.; RASHKOVSKAYA, A.N., inzh.; KHAZOV, I.I., inzh.; ANTONOVA, G.P., tekhnik; ANIKIYENKO, O.M., tekhnik; KORESHKOVA, V.I., tekhnik; KROTOVA, T.N., tekhnik; BIRYUKOVA, V.N., tekhnik; GOROKHOV, M.G., red.izd-va; PARAKHINA, N.L., tekhn.red.

[Album of working drawings of parts and units of MAZ-200 and MAZ-501 trucks] Al'bom rabochikh chertezhei detalei i uslov avtomobilei MAZ-200 i MAZ-501. Moskva, Goslesbumizdat. Pts.2-3. 1960. 319 p. (MIRA 14:7)

1. Moscow. Tsentral'nyy nauchno-issledovatel'skiy institut mekhanizatsii i energetiki lesnoy promyshlennosti. 2. Nachal'nik laboratorii tipovoy tekhnologii remonta mashin i organizatsii remontnykh predpriyatiy Tsentral'nogo nauchno-issledovatel'skogo instituta mekhanizatsii i energetiki lesnoy promyshlennosti (for Reshetnikov). (Motortrucks—Equipment and supplies)

USSR/Medicine - Chemotherapeutic Agents Oct 49

"A Sour Milk Product 'Nurung,'" L. Ye. Khundanov,  
V. A. Krotova

"Priroda" No 10, pp 59-61

Natives in the eastern part of Asiatic USSR drink a beverage produced from sour milk. The formation of this product is made possible by the symbiotic interrelationship of Bact. casei (82%), Bact. lactic acidl (7%) and the lactic fungus Torula currunga (11%). Chem and phys studies have revealed that because of the basic compn of this drink it

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is a good medical remedy in case of loss of wt, loss of appetite, thinness of blood, various chronic afflictions of the respiratory passages and some intestinal disorders.

KROTOVA, V. A.

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И В Л И Д  
KROTOVA, V.A.; NOSKOVA, L.I.

Method of treating agar with a hydrochloric acid solution. Izv. Irk.  
gos. protivouchum. inst. 12:289-294 '54. (MIRA 10:12)  
(AGAR) (HYDROCHLORIC ACID)

~~KHOTOVA, V.A.~~

Amino acid composition of variants of the plague bacillus grown under  
different conditions. Tez. 1 dokl.konf. Irk.gos.nauch.-issl.protivo-  
chum.inst. no.2:31 '57. (MIRA 11:3)  
(AMINO ACIDS) (PASTEURILLA PESTIS)



TROFIMENKO, N.Z.; VASIL'YNA, Z.I.; KROTOVA, V.A.

Change in the amino acid composition of the nutrient medium  
in deep culturing of the plague microbe. Report No.1. Izv. Irk.  
gos.nauch.-issl.prirodokhim.inst. 18:117-123 '58.

(MIRA 13:7)

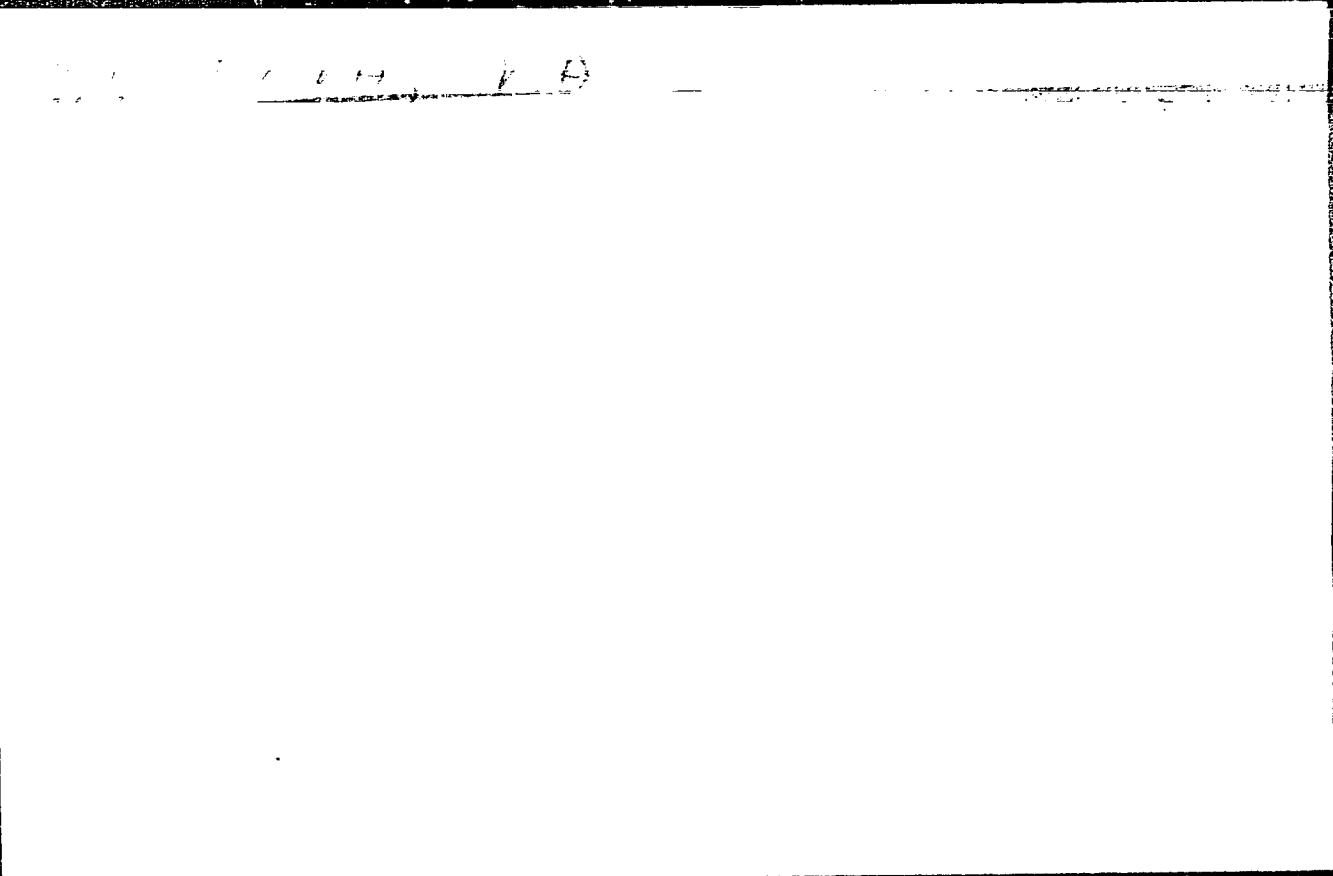
(AMINO ACID METABOLISM)

(PASTEURILLA PESTIS)

DOMARADSKIY, I.V.; KHUNDANOV, L. Ye.; KALMYKOVA, A.P.; SHKURKO, Ye.D.;  
KROTOVA, V.A.; TOKAREVA, A.A.

Study of the characteristics of serums obtained by the immunization of rabbits with plague bacillus fractions. *Biul. eksp biol i med.* 54. no.12:75-79 D'62. (MIRA 16:6)

1. Iz Irkutskogo nauchno-issledovatel'skogo protivuchumnogo instituta Sibiri i Dal'nego Vostoka (dir. - prof. I.V. Domaradskiy). Predstavlena deystvitel'nym chlenom AMN SSSR N.N. Zhukovym-Verezhnikovym.  
(PASTEURILLA) (SERUM)



KROTOVA, V.A.

The role of the gypsum-anhydrite Kungurian stratum in forming the chemical composition of underground water and preserving petroleum deposits of the Second Baku. Geol.sbor. no.3:240-244 '55. (MLHA 8:6)

(Second Baku--Petroleum geology)  
(Second Baku--Water, Underground)