

LAZAREV, Petr Petrovich, akademik [deceased]. Prinsipali uchastiye:  
BERNSHTAYN, L.B.; FEJIN, B.I.; SHMIDT, V.V.. KITAYGORODSKIY,  
A.I., prof., otv.red.; POLENOVA, T.P., tekhn.red.

[Energy, its sources on the earth and its origin] Energiya,  
ee istochniki na zemle i ee proiskhozhdenie. Moskva, Izd-vo  
Akad.nauk SSSR, 1959. 274 p. (MIRA 13:2)  
(Force and energy)

24(3,5,7)

PHASE I BOOK EXPLOITATION

SOV/2401

Kitaygorodskiy, Aleksandr Isaakovich

Vvedeniye v fiziku (Introduction to Physics) Moscow, Fizmatgiz, 1959.  
704 p. 50,000 copies printed.

Ed.: V.A. Grigороva; Tech. Ed.: S.S. Gavrilov.

**PURPOSE:** The book is intended as a text for students of higher technical schools.

**COVERAGE:** The author states that theoretical and experimental physics should be taught separately in higher technical schools and that the student should take a course in general physics before he engages in laboratory work. This text, therefore, emphasizes the theoretical principles of physics and does not require a knowledge of mathematical integration but only a comprehension of definite integrals. The book differs from other Soviet physics texts in that the structure and properties of matter are treated separately, and radiophysical and optical problems are dealt with from one point of view. Historical data are kept to a minimum. The examples and draw-

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KITAYGORODSKIY, A.I.; MNYUKH, Yu.V.

Structure of solid solutions of n-paraffins. *Vysokom.soad. 1*  
no.1:128-131 Ja '59. (MIRA 12:9)

1. Institut elementoorganicheskikh soedineniy AN SSSR.  
(Solutions, Solid) (Paraffins)

KITAYGORODSKIY, A.I.; TSVANKIN, D.Ya.

Structure of cellulose. Part 1. Vysokom.sped. 1 no.2:269-278  
F '59. (MIRA 12:10)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.  
(Cellulose)

И.И. ГАВРОДСКИЙ, . . . ; Д.Я. ГАНКИН, Д.Я.

Structure of cellulose. Part 2. Vysokomol. 1 no.2:279-286  
p. 150. (MIRA 12:10)

1. Институт элементоорганической химии АН СССР.  
(Cellulose)

24(7)

CCV/26-59-3-5/47

AUTHOR: Kitaygorodskiy, A.I., Professor (Moscow)

TITLE: A New Trend in the Study of Organic Molecules

PERIODICAL: Priroda, 1959, Nr 3, pp 21-28 (USSR)

ABSTRACT: The author explains first the concept of dynamic stereochemistry, showing it in connection with the new term of conformation of molecules and conformational analysis - the new method of studying chemical reactions. This opened a field of chemistry which may be called dynamic stereochemistry. He then outlines the cases in which the static configuration becomes insufficient to explain the chemical behavior and properties of the molecule, and when dynamic conformation replaces the molecule. He quotes an example explaining the sense of the terms and draws the conclusion - when spatial arrangement changes of the molecule atoms take place because of heat movement, the molecule energy will

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SOV/26-59-3-5/47

A New Trend in the Study of Organic Molecules

oscillate around one minimum point. Of such a molecule it may be said that it possesses a single conformation. If, on the contrary, the heat movement causes the molecule energy to oscillate near 2 or more minimums, such a molecule will possess several conformations. Before examining specific cases of conformational transformations, the author acquaints the reader with the basic laws of the geometry and mechanics of molecules, and the structure of ordinary molecules in which chemistry was faced with conformational problems. For this purpose the article shows 3 pictures representing molecule models of mono-derivatives of ethane, of cyclohexane in 2 forms, and of derivatives of cyclohexane. The author then deals with the conformation of polymer molecules and aromatic molecules, stating in regard to the latter that it is entirely wrong to presume that conformational changes arise

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SOY/26-59-3-5/47

A New Trend in the Study of Organic Molecules

solely for account of turns around the single connections. In the molecules of aromatic hydrocarbon, many instances can be found where molecules exist in 2 or more spatial forms, not separable in a chemical way and linking with each other without disrupting connections. In conclusion the author deals with the conformation of a molecule and the state of aggregation. The study of the conformations of organic molecules represents a new and promising trend. The conformational analysis likewise permits to comprehend and foresee the physical properties of organic substances. There are 4 photographs and 7 diagrams.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR (Institute of Elemento-Organic Compounds of the Academy of Sciences USSR)

Card 3/3



KITAYGORODSKIY, A.

"Bricks" of matter. IUn.tekh. 3 no.2:47-48 P '59.  
(MIRA 12:1)  
(Crystallography)

SOV/70-4-2-11/56

**AUTHORS:** Kitaygorodskiy, A.I. and Kozhin, V.M.

**TITLE:** The Structure of Mixed Crystals in the System Anthracene-Phenanthrene (Stroyeniye smeshannykh kristallov sistemy antratsen-fenantron)

**PERIODICAL:** Kristallografiya, 1959, Vol 4, Nr 2, pp 209-213 (USSR)

**ABSTRACT:** Conditions for forming solid solutions have been formulated in accordance with the work of A.I. Kitaygorodskiy (Ref 1) and state that for the formation of a continuous solid solution isomorphism of the molecules is a necessary, but not a sufficient, condition. Two cases were examined; mixed symmetrical and asymmetrical molecules and mixed crystals, the molecules of which are symmetrical. This covers the phenanthrene-anthracene system where both molecules are symmetrical but have different symmetries. Theory would predict the impossibility of a continuous range of solid solutions even in the case of great similarity in the forms of the molecules and their packing in the crystals. Bradley and Marsh (Ref 3) showed by thermal analysis a continuous range of mixed crystals. Kofler (Ref 4) showed two phases microscopically with a

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SOV/70-4-2-11/36

The Structure of Mixed Crystals in the System Anthracene-  
Phenanthrene

peritectic at  $148^{\circ}$  (31% anthracene). The present experiments showed the anthracene structure up to 20% phenanthrene and the phenanthrene structure up to 10% anthracene but no uniform structure in between. Liquidus and solidus temperatures were measured for various mixtures of the purified components. Except for the range 20-80% anthracene single crystals were grown - usually platy in form. The composition in the mixed crystals was found by U/V absorption spectroscopy. Anthracene crystals have the space group  $C_{2h}^2 - P2_1/c$  according to the work of Mathieson et al (Ref 5) with  $Z = 2$ . The parameters were found (using an RKU-86 camera) to be:  $a = 8.5206$ ;  $b = 6.0010$ ;  $c = 11.1377 \pm 0.0001$  kX;  $\beta = 124^{\circ} 33' \pm 1.0$ . The cell of phenanthrene, transformed to correspond with that of anthracene, has  $a = 8.4310$ ;  $b = 6.1406$ ;  $c = 11.7584 \pm 0.0001$  kX and  $\beta = 127^{\circ} 22' \pm 1'$ . The anthracene molecule has a centre

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The Structure of Mixed Crystals in the System Anthracene-  
Phenanthrene <sup>SOY/70-4-2-11/36</sup>

of symmetry but the phenanthrene molecule has not. Examination of the  $h0l$  reflexions in the mixed crystals with up to 10% anthracene showed the phenanthrene structure and correspondingly for up to 20% phenanthrene. The solid solutions were well ordered. For mixed single crystals with 20% phenanthrene the dimensions were  $a = 8.5080$ ;  $b = 6.0149$ ;  $c = 11.1229 \pm 0.0005$  kX;  $\beta = 124^{\circ}00' \pm 10'$ . This change in parameters of 0.01 kX indicates that the phenanthrene molecules are well inserted into the space left by the neighbouring anthracene molecules. To show this, interatomic distances were calculated from the known structure of anthracene. The minimum intermolecular distances in the layers between H...H atoms is 3.05 kX and between H...C is 2.80 kX. The latter is less than the usually assumed distance of 2.97 kX. Between layers the H...H distances are 2.50 kX. As the phenanthrene structure has not been determined the analysis at the other end of the composition range cannot be made.

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SOV/70-4-2-11/36  
The Structure of Mixed Crystals in the System Anthracene-  
Phenanthrene

There are 3 figures, 1 table and 6 references. 2 of  
which are Soviet, 2 international, 1 German and 1 English.

ASSOCIATION: Institut elementoorganicheskikh sovedineniy  
(Institute of Elemento-organic Compounds)

SUBMITTED: September 12, 1957

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SOV/70-4-4-30/34

**AUTHORS:** Kitaygorodskiy, A.I. and Tavankin, D.Ya.

**TITLE:** One-dimensional Diffraction in X-ray Diffraction Patterns from Polymers

**PERIODICAL:** Krintallografiya, 1959, Vol 4, Nr 4, pp 625-627 (USSR)

**ABSTRACT:** Theoretical. One-dimensional diffraction showing an intensity distribution spread out continuously along layers in reciprocal space is sometimes encountered for systems of chains which are parallel but otherwise disordered. It is, however, shown here that one-dimensional scattering can occur when there are only slight departures from strict three-dimensional order due to defects in the packing of chains. The effects of disturbances of the proper inter-chain distances in the equatorial plane and the displacements of the chains parallel to their axes is examined. It is assumed (A) that the packing defects consist of the chance departures of the chain axes from the positions they would have in the ideal lattice or (B) that the defectiveness of the packing increases in a radial direction. The result for (A) is analogous to that

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SOV/70-4-4-30/34  
One-dimensional Diffraction in X-ray Diffraction Patterns from  
Polymers

obtained for isotropic thermal vibrations but there is a supplementary term causing the intensity to be distributed in layer lines. For the zero layer, the intensity falls off at large and at small angles and for higher layers it decreases with distance from the meridian. For (B) the diffraction field will get narrower but the lines will become wider than in the first case. If the disturbance to the long-range order increases, then on the zero layer the scattering will become of the gaseous type with an increase at low angles. Thus, if such a disturbance occurs then a continuous intensity distribution along the layer lines arises, because of the one-dimensional diffraction of the separate chains. There are 4 references, of which 2 are Soviet, 1 German and 1 English.

Card ~~43~~

*Instr Elements - Organic Compounds*  
*AS USSR*

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76012  
SOV/10-4-5-34/36

**AUTHORS:** Belov, N. V., Vaynshteyn, B. K., Kitaygorodskiy, A. I.,  
Poray-Koshits, M. A., Semiletov, S. A., Shertal, N. H.

**TITLE:** International Fedorov Session on Crystallography Held in  
Leningrad

**PERIODICAL:** Kristallografiya, 1959, Vol 4, Nr 5, pp 796-800 (USSR)

**ABSTRACT:** The International Union of Crystallography (IUC) and the  
Academy of Sciences of the USSR convened an International  
Session (interim) on Crystallography commemorating the 40th  
anniversary of the death of the great Russian crystallo-  
grapher Ye. S. Fedorov. The session, attended by 600  
scientists from the USSR, U.K., France, U.S., Japan,  
Germany, Czechoslovakia, Netherlands, Canada, Australia,  
and other countries, was held in Leningrad from May 21  
to 27, 1959. The major reports were presented to the  
plenary sessions and some 100 reports to 2 panels. The  
subject of the 1st panel was crystal-chemical analysis  
and that of the 2nd panel electron was diffraction studies.

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International Fedorov Session on  
Crystallography Held in Leningrad

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The reports to the plenary sessions were presented by the following Soviet scientists: N. V. Belov (VP of IUC), V. I. Simonov, V. A. Frank-Kamenetskiy, G. B. Bokiy, M. A. Poray-Koshits, L. O. Atovmyan, G. N. Tishchenko, A. B. Ablov, T. I. Malinovskiy, Ye. A. Shugam, V. M. Levina, Yu. S. Terminasov, Sh. Kh. Yar-Mukhamedov, Ya. S. Umanskiy, V.I. Iveronova, L. S. Palatnik, V.A. Finkel', Ye. I Gladyshevskiy, Z. G. Pinsker, G. S. Zhdanov, A. S. Sonin, I. S. Zheludev, I. G. Ismailzade, I. S. Rez, A. V. Stepanov, I. B. Borovskiy, A. S. Povarennykh, Z. V. Zvonkova, A. I. Kitaygorodskiy, O. V. Stavrovskiy, N. N. Sandakova, N. M. Bashkirov, B. K. Vaynshteyn, I. M. Rumanova, V. L. Indenbom, I. I. Shafranovskiy, N. P. Trifonov, B. M. Shchedrin, D. M. Kheyker, M. M. Umanskiy, A. V. Shubnikov, V. F. Parvov, and V. V. Semenov. The reports of the U.S. crystallographers were presented by R. Pepinsky, D. Harker, W. H. Zachariasen, R. Randle, J. Donohue, G. Donnay, J. H. D. Donnay, and W. Parrish. Six reports were presented by British crystallographers, 2 by German, 2 by Czech, 2 by Dutch and 1 each by

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International Fedorov Session on  
Crystallography Held in Leningrad

1959  
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French, Canadian, and Japanese crystallographers. The session admitted five new member nations into IUC, confirmed its newly appointed officers, including the editor of "Acta Crystallographica," A. J. C. Wilson, appointed G. B. Bokiy as head of the subcommittee for abstracting the Soviet publications in crystallography, planned Japan to be the site of the next interim, and Italy or Israel of the next congress, and solved some other business matters.

SUBMITTED: July 1, 1959

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24(4)

SOV/25-59-11-14/38

AUTHORS: Kitaygorodskiy, A.I., Professor, Doctor of Physico-Mathematical Sciences, Fedin, E.I., Scientific Worker

TITLE: New Spectroscopy

PERIODICAL: Nauka i zhizn' 1959, Nr 11, p 35 - 40 (USSR)

ABSTRACT: The article deals with radiospectroscopy - a new field of science by which the finest properties of matter can be analyzed. The author describes spectral analysis, the energetic structure of molecules and why atomic spectra are mainly studied in ultra-violet and visible rays. He explains the difficulties arising when studying the spectra of complex molecules, stating that the atom itself has a rich optic spectrum which consists of several dozens of lines. On the spectrogram of the molecule, these spectra are superimposed one on the other, thus complicating the deciphering. Moreover, the spectral analysis in visible and ultra-violet rays is too rough an instrument for investi-

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SOV/25-59-11-14/38

New Spectroscopy

gating the closely arranged energetic levels of complex molecules. The author illustrates by an example the possibilities offered by infra-red spectroscopy which are also limited. For studying complex molecules containing not only fluorine, but also many elements which are widely used by modern chemistry, it is necessary to find new more closely-arranged energy levels. The author writes about two resonances: 1) the electronic paramagnetic resonance (EPR) and 2) the nuclear magnetic resonance (NMR). The electronic paramagnetic resonance was discovered by the Soviet physicist Ye.K. Zavoyskiy in 1944, the nuclear magnetic resonance by two American physicists in 1946. The combined application of infrared spectroscopy and nuclear magnetic resonance make it possible to fully determine the structure of a molecule. The discovery of Ye.K. Zavoyskiy made it possible to at once notice even small concentrations of molecular particles, the so-called free radicals, which is very important for

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New Spectroscopy

many chemical reactions. The method EPR was successfully employed in the laboratory of the Corresponding Member of the AS USSR V.V. Vovodskiy of the Institut khimicheskoy fiziki (Institute of Chemical Physics) for studying reactions caused by radioactive radiation. In 1950, the YaMR was followed by the appearance of the nuclear quadrupole resonance (YaKR). The main difficulty in the study of the quadrupole resonance is the separation of very weak signals from noises. At the Laboratory of Professor A.I. Kitaygorodskiy, the work is in progress to increase the sensitivity of quadrupole spectrometers. Much experimental material has already been collected which makes it possible to compare the characteristics of chemical combination of the nucleus of chloride in hundreds of different compounds. Equal work is being done with the nuclei of bromine, iodine, nitrogen, sulfur and antimony. It must be mentioned that these interesting data have been obtained without screening with

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New Spectroscopy

a magnetic field, the stabilization of which creates so many difficulties in the YaMR (nuclear magnetic resonance). The second important property of the YaMR consists in the fact that its lines are narrow and legible only if the substance is in a solid state. The YaMR shows a reverse situation: its lines can be observed clearly and easily in fluids, but they expand and become dim in a solid state. A nuclear magnetic radio-spectrometer of super-high efficiency as shown in a picture is used for the investigation of chemical shifts of the proton resonance and permits in many cases to determine exactly the structure of the compound within 10 - 15 minutes. The laboratory of roentgenostructural analysis of the Institute of Elemental Organic Compounds of the AS USSR under the heading of Professor A.I. Kitaygorodskiy has created

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SOV/25-59-11-14/38

New Spectroscopy

a new scientific direction - the organic crystallo-chemistry. There are 1 photograph, 9 drawings and 1 drawing on the centerfold.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR (Institute for Elemental-Organic Compounds of the AS USSR) ✓

Card 5/5

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71100  
007/52-59-12-4/43

**AUTHORS:**

Kitaygorodskiy, A. I., Mnyukh, Yu. V.

**TITLE:**

Crystalline Structure of the Paraffins of Triclinic Modification

**PERIODICAL:**

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1959, Nr 12, pp 2008-2024 (USSR)

**ABSTRACT:**

The authors analyzed superimpositions of molecular layers, which lead to formation of close-packed paraffin structures with triclinic symmetry. Taking the paraffin  $C_{18}H_{38}$  as an example, authors compared theoretical parameters of the possible variants of the layers M and T (layer R was excluded as obviously not conforming to the structure of the paraffin; for the characteristics of the R, M, and T layers see: Kitaygorodskiy, A. I., Kristallografiya, 2, 456, 646 (1957)) with the experimental data on the unit-cell dimensions (borrowed from: Miller, A., Longdale, K., Acta Cryst., 1, 129 (1948)). The data in the table

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Crystalline Structure of the Paraffins  
of Triclinic Modification

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197/02-59-12-4/43

below show that the triclinic lattice of  $C_{18}H_{38}$  is built up from the layers  $T[\pm \frac{1}{2}, 0]$ .

Layer	a (Å)	b (Å)	c (Å)	$\alpha$	$\beta$	$\gamma$	$\alpha_0$	$\beta_0$	$\gamma_0$
M(00)	4.2	4.4	—	—	—	—	—	—	—
M( $\pm 1, 0$ )	4.9	4.4	—	—	—	111	90	90	90
M( $0 \pm 1$ )	4.2	5.1	—	—	—	107	90, 120	90	90
T( $\pm \frac{1}{2}, 0$ )	4.3	4.5	—	—	—	107	90	90, 120	90
T( $\frac{1}{2}, 1$ )	4.3	5.2	—	—	—	100	73	73	120
T( $\frac{1}{2}, \bar{1}$ )	4.3	5.2	—	—	—	100	73	120	120
Paraffin Cell <sub>00</sub>	4.23	4.82	23.07	91°6'	92°4'	107°18'	73	73	120

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Crystalline Structure of the Paraffins  
of Triclinic Modification

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507/62-59-12-4/43

Comparison of the unit-cell volumes ( $V = d_{001} \cdot ab \sin \gamma$ ), which amounted to the comparison of the values of  $d_{001}$  for both variants (found to be 23.8 Å for  $T[1/2, 0]$  and 22.9 Å for  $T[1/2, 0]$ , while the experimental value was 23.04 Å) allowed to choose the layer  $T[1/2, 0]$  as the only layer variant, which makes up the close-packed structure of  $C_{18}H_{38}$ . Comparison of densities of the layer packing for other layers ( $T[1/2, 0]$ ,  $M[0, 0]$ ,  $M[0, 1]$ ) with the value for  $T[1/2, 0]$  confirms the above findings. Figure 1b shows the superimposition for the layer  $T[1/2, 0]$ , along with the layer  $T[1/2, 0]$ . There are 3 figures; 1 table; and 4 references, 3 Soviet, 1 Danish.

ASSOCIATION:

Institute of Elemento-Organic Compounds of the Academy of Sciences, USSR (Institut elementoorganicheskikh sovedineniy Akademii nauk SSSR)  
March 25, 1958

SUBMITTED:

Card 3/4

5(4)

AUTHOR:

Kitaygorodskiy, A. I.

S07/20-124-4-37/67

TITLE:

The Gas-crystalline State of Matter in Polymers (Gazokristallicheskoye sostoyaniye veshchestva v polimerakh)

PERIODICAL:

Doklady Akademii nauk SSSR, 1952, Vol 124, Nr 4, pp 861-864 (USSR)

ABSTRACT:

One of the most common phase states of matter composed of molecules is that in which the "centers" of the molecules form a regular three-dimensional lattice and where the azimuths of the molecules are distributed in disorder (either with spherical or with axial symmetry). This gas-crystalline state can be ascertained by measurement of the dielectric constant and the transformation heats. By radiostructural analysis the existence of this state can be directly proved. The character of the motion of molecules in the gas-crystalline state has as yet not been explained, and this state is characterized by the following structural features: A long-range order with respect to the position of the molecule centers, and the lack of a short-range order with respect to orientation. The gas-crystalline state occurs in all cases in which the rotations of the molecules do not noticeably

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The Gas-crystalline State of Matter in Polymers. 307/20-124-4-37/67

modify the density of polarization. The second part of the present paper gives a short account of the packet-structure of the polymers, and the third part deals with the characteristic features of the gas-crystalline state. In each of the two variants of the regions of the packet, which are in the gas-crystalline state, there must be a hexagonal lattice in the corresponding cross section, which corresponds to a tight packing of the cylinders. The circular cross section of the cylinder must be equal to the central surface  $S$  of the chain molecule. The theoretical pictures of X-ray diffraction in the gas-crystalline state are easily calculated. This state is characterized by the existence of 1-3 equatorial sharp ("crystalline") reflections and a sharp decline of the intensity of dispersion. Such a type of X-ray picture can be due neither to liquid nor to crystalline orders. The gas-crystalline state may manifest itself in many respects; thus, it narrows the lines of nuclear-magnetic resonance. The fourth and last part of this paper deals with the gas-crystalline state in polyacronitril. The author thanks D. Ya. Tevankin for his help in carrying out calculations. There are 2 tables and 10 references, 6 of which are Soviet.

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The Gas-crystalline State of Matter in Polymers SOV/20-124-4-37/67

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR  
(Institute for Elemental-organic Compounds of the Academy of  
Sciences, USSR)

PRESENTED: October 3, 1958, by V. A. Kargin, Academician

SUBMITTED: July 18, 1958

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5(4)

AUTHOR:

Kitaygorodskiy, A. I.

SOV/20-124-6-24/55

TITLE:

On the Theory of the Stress of Organic Molecules (K teorii napryazheniya organicheskikh molekul)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 6, pp 1267 - 1270 (USSR)

ABSTRACT:

The present paper discusses the possibility of investigating and calculating the stresses and conformations (i.e. the valence angles) of cyclic organic molecules. For this purpose the use of the electric model of molecules is very problematic. On the other hand, it would be probably very promising in this case to consider the molecule as a mechanical system. The author here investigates the possibilities of this mechanical model and also discusses several of its applications. This investigation is based on the assertion that the chemical bond determines the distances between the valence-like bound atoms and also the "natural" angles between these angles. The conformation of the molecule is supposed to be brought about by interaction and by repulsion of the not valence-like bound atoms. The energy of the molecule is assumed to be the sum of 3 components:

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## On the Theory of the Stress of Organic Molecules

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$U = U_{\text{valence bond}} + U_{\text{angle}} + U_{\text{repulsion}}$ . The sum  $U_{\text{angle}} + U_{\text{repulsion}}$  is here denoted as  $U_{\text{stress}}$ . The conformation of a real molecule satisfies the minimum condition  $\partial U_{\text{stress}} / \partial \epsilon_i = 0$  for stress, where  $\epsilon_i$  denotes the parameters of molecule conformation. An expression is written down for the energy of stress. The author here finds a method for the solution of two problems: The direct problem concerns determination of conformation from the known values of rigidity. The reversed problem concerns determination of the rigidity coefficients (and also, if there should be any doubt, of the "normal" angles) from the exact structural data. There is at present, little possibility of solving the direct problem, because no data are available concerning the potential of the interaction of non valence-like bound atoms as well as concerning the electric potential of the angle. It is all the more of importance to investigate the rigidity coefficients by analyzing molecular structure. Several conclusions concerning the amount of stress energy result from thermochemistry. The data on potential interaction can be determined only in one way, namely by the analysis of the confirmation of molecules

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On the Theory of the Stress of Organic Molecules

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with sufficiently accurately known geometric properties. The author then gives a short report on some possible simplifications. In the case of many cyclic molecules a variation of conformation does not vary the energy of steric repulsion. The energy of stress is then reduced to the elasticity energy of the angles, and calculation leads immediately to the angles which correspond to the minimum of energy. For the purpose of checking the theory, the author calculated acenaphthene. Considerable interest is caused by the angles in the case of an aliphatic carbon atom which is bound with 2 H-atoms and 2 C-atoms. In aliphatic compounds the angles  $\angle CCC$  are  $112^\circ$ . It would be of interest to determine the conditions for the minimum of the energy of all accurately determined structures. It would further be useful to check the simple conclusions of the theory. There are 1 figure and 3 references, 1 of which is Soviet.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR  
Institute for Elemental—organic Compounds of the Academy  
of Sciences, USSR)

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S/081/61/000/021/091/094  
B107/B147AUTHOR: Kitaygorodskiy, A. I.

TITLE: Tasks of structural analysis of high-polymeric and high-molecular substances

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 21, 1961, 499 abstract 21R2 (Sb. "Fiz.-khim. i strukturn. osnovy biol. yavleniy", M., AN SSSR, 1960, 12-17)

TEXT: Besides the investigation of the conformation of molecules and their sizes (for selecting the most regular among many possible conformations), the main task of the structural analysis of molecules of high-molecular compounds is the investigation of the structure of condensed molecule conglomerates. To study the molecular structure, a molecule model is required besides a model of the molecule packing. Various possible packings of molecules in a bundle of long molecules are considered; different alternating packings of molecules may perhaps occur along the chain. [Abstracter's note: The last sentence of the original reads: packings of the chains along the chain, which seems to be wrong.]

Card 1/2

Tasks of structural analysis of high-...

S/081/61/000/021/091/094  
B107/B147

[Abstracter's note: Complete translation.]

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Card 2/2

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AUTHORS:

Klavayevodskiy, A. I., Stambkov, Yu. P.,  
T. L., Vol'pin, M. Ye., Kurbanov, B. H.

TITLE:

Crystal Structure of Tropylium Perchlorate

PERIODICAL:

Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1960, Nr 1, pp 39-44 (USSR)

ABSTRACT:

X-ray diffraction study of the structure of tropylium perchlorate and iodide monocrystals was made, using the method of three-dimensional electron density. The following cell constants are given:

	(C <sub>7</sub> H <sub>7</sub> )(ClO <sub>4</sub> )	(C <sub>7</sub> H <sub>7</sub> )I
a (Å)	9.39 ± 0.04	9.01 ± 0.02
b (Å)	8.54 ± 0.04	8.22 ± 0.02
c (Å)	6.52	6.78
d <sub>measured</sub> (g/cm <sup>3</sup> )	~1.4	~1.8
d <sub>calculated</sub> (g/cm <sup>3</sup> )	1.45	1.82
M	190.6	219.05
n	3	3

Card 1/5

Crystal Structure of Tropyllium  
Perchlorate and Iodide

78061

SOV/62-66-1-1711

The radius of tropyllium ring, length of C - C bond and other data are given in Figs. 1, 2, 3, 4, 5. There are 5 figures; and 5 references, 1 U.K., 1 Danish, 3 Soviet. The U.K. reference is: M. A. B. Dewar, R. Pettit, J. Chem. Soc., 1011 (1956).

ASSOCIATION: Institute of Element-Organic Compounds Academy of Sciences USSR (Institut elementoorganicheskikh sovedinoniy Akademii nauk SSSR)

SUBMITTED: April 30, 1958

Card 2/5

Crystal Structure of Tropylium  
Perchlorate anion

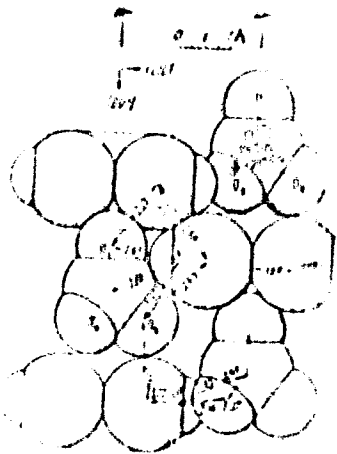


Fig. 1. Contacts anion-  
cation in tropylium  
perchlorate structure.

Card 4/5

000722920004-5

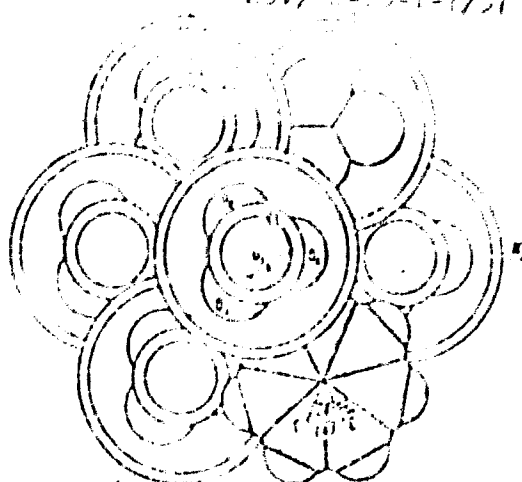


Fig. 2. Projection of xy  
structure of tropylium  
perchlorate.

Crystal Structure of Tropylium  
Perchlorate and Iodide

70001  
308/62-60-1-7/37

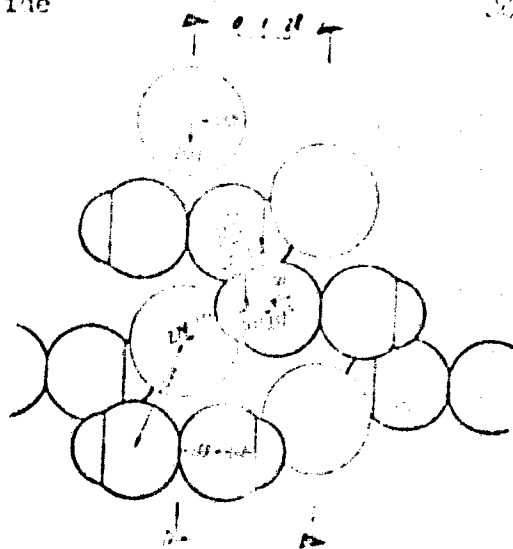


Fig. 3. Ion packing in structure of tropylium iodide.

C. 4/5

Crystal Structure of Tropylium  
Perchlorate and Iodide

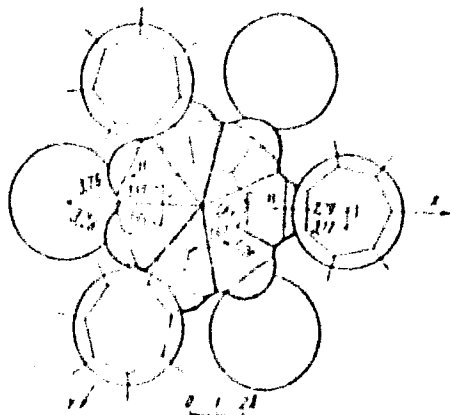


Fig. 4. Contacts cation-anion  
in structure of tropylium iodide.

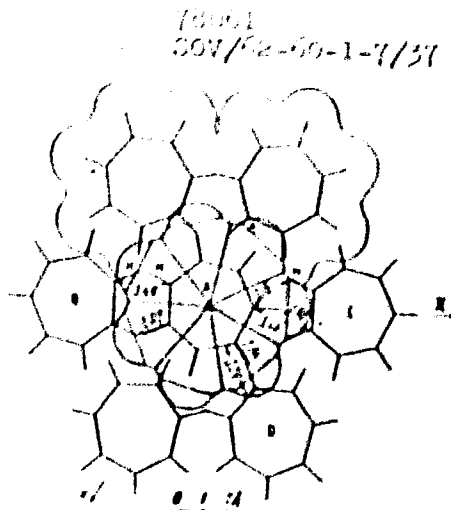


Fig. 5. Contacts cation-cation  
in structure of tropylium iodide.

Card 5/5

KITAYGORODSKIY, A.I.

Conditions of solubility of organic compounds in the solid state.  
Zhur. strukt. khim. 1 no.3:324-332 8-0 '60. (MIRA 14:1)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.  
(Solubility) (Solutions, Solid)



24.7100

2809.  
304/70-5-1-3/30

AUTHOR: Kitaygorodskiy, A. I.

TITLE: The Problems of the Study of Crystal Chemistry and Crystal Physics of Organic Matter

PERIODICAL: Kristallografiya, 1960, Vol 5, Nr 1, pp 19-23 (USSR)

ABSTRACT: Although the nearest atoms of adjacent molecules are spaced only twice as far apart as atoms within a molecule, intermolecular bond energy (0.1 kcal/mol) is only 1-2 thousandths of interatomic bond energy (50-100 kcal/mol) within a molecule. This and some structural characteristics of organic crystals determine their physical properties, such as low mp high viscosity, etc., and to a certain extent can be applied to the structure of high polymers, the study of which is incomparably more complex. Thus, knowledge on the structure of organic crystals will probably furnish a basis upon which a theory can be developed on the properties of high polymers as functions of their

Card 1/3

The Problems of the Study of Crystal  
Chemistry and Crystal Physics of  
Organic Matter

1967.  
S00770-5-1-3/30

structure. The molecular structure, because of which two drastically different bonds exist in organic crystals, facilitates the prediction of their space groups, and of the symmetry in molecular distribution in the crystals. Since bond energy is a function of bond length, precision of the packing theory requires considerable data on intermolecular spacing, which will furnish a basis for predicting physical properties of organic crystals and, indirectly, of high polymers. The study of phase transitions, structure of organic solid solutions, molecular structure of high polymers themselves (especially of chain molecules, bond angles, and bond lengths), and short-range order in organic liquids and gases will likely contribute to the same effect. On the other hand, studies for obtaining only empirical data on organic compounds and their structure and molecular geometry are considered as of no consequence unless solution of some theoretical

Card 2/3

The Problems of the Study of Crystalline  
Chemistry and Crystal Physics of  
Organic Matter

18.9.  
SOV/70-5-1-3/30

problem is at stake. Interatomic spacing and the electron density increase in it can be determined by crystal structural methods with less accuracy than the data furnished by the methods of quadruple or magnetic resonance; the exact distribution of electrons can not be determined at all because of low resolving power (0.5 Å) of the structural methods. Hence, the use of crystal structure methods for study of the nature of chemical bond is not recommended except in special cases. The conclusion lists physical properties of organic matter, their dependence on the atomic arrangement in the molecules, stereochemistry, and the nature of chemical bond as indicated by nuclear resonance data, as the priority subjects of scheduled studies.

Card 3/3

KITAYGORODSKIY, A.I.; LIAN DUN-CHAY [Liang Tung-ch'ai]

Structure of solid solutions and phase diagram of the system p-dibromobenzene - p-diiodobenzene. Kristallografiia 5 no.2:238-246  
Mr-Ap '60. (MIRA 13:9)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.  
(Benzene) (Solutions, Solid)

KITAYGORODSKIY, A.I.; MYASHIKOVA, R.M.

Distribution of impurity molecules in solid solutions of organic compounds. Kristallografiia 5 no.2:247-252 Mr-Ap '60. (MIRA 13:9)

1. Institut elementoorganicheskikh soedineniy AN SSSR.  
(Solutions, Solid) (Organic compounds)

S/070/60/005/004/010/012

AUTHORS: Kitaygorodskiy, A.I. <sup>E132/E360</sup> and Myasnikova, R.M.

TITLE: On the Theory of Solid Solutions of Organic Substances 1

PERIODICAL: Kristallografiya, 1960, Vol. 5, No. 4,  
pp. 638 - 642

TEXT: Earlier contributions to the theory of solid solutions of organic substances (9 references to work by this group) are now followed by a thermodynamic examination of the problem. Concepts of the radius of action of the impurity (minor constituent) molecules and "interlock solubility" are introduced. In the latter case impurity molecules enter the lattice of a solvent only in the boundaries between blocks and not continuously. A quantitative relationship is found between the solubility and the geometrical distortions of the lattice. ✓B  
A preliminary assessment is made of which factors are important thermodynamically. For an experimental verification it is necessary to determine: the strain energy on change of the crystal unit cell size from the energy curve of the interaction of non-valency bonded atoms; the change in the oscillation energy of the molecules by finding by X-ray methods the characteristic  
Card 1/2

S/070/60/005/004/010/012  
E132/E360

On the Theory of Solid Solutions of Organic Substances

temperature, the difference of the free energies of the components by measuring their heats of sublimation. Tests of numerical values give agreement with the simple thermodynamic picture. A numerical calculation is given of the distortion energy of anthracene molecules in the acridine lattice. Cases are observed experimentally where the cell size of the solvent does not greatly alter with the presence of solute molecules and here interblock solubility may occur. ✓ B

There are 10 references: 9 Soviet and 1 French.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR  
(Institute of Element-organic Compounds of the  
AS USSR)

SUBMITTED: February 2, 1960

Card 2/2

5.4500(B)

65605

~~24(2)~~  
AUTHORS: Kitaygorodskiy, A. I., Fedin, E. I.

8/020/60/130/05/014/061  
B013/B014

TITLE: Variation in the Intensity of Nuclear Quadrupole Resonance in a Molecular Crystal Irradiated by Fast Electrons

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 130, Nr 5, pp 1005-1007 (USSR)

ABSTRACT: The author of the paper under review made use of nuclear quadrupole resonance for indicating radiation damages of polycrystalline samples of n-dichlorobenzene which were exposed to different doses of 750-kev electron radiation. Resonance was determined by means of a frequency-modulated quadrupole radio-spectrometer with synchronous detection and signal recording by means of a recording millivoltmeter. The quadrupole resonance line was recorded several times for each sample (of Fig 2). These lines have a "saturation region" when the increase in the irradiation dose no longer influences the intensity of the quadrupole resonance signal. This region corresponds to an unexpectedly low diminution of the signal intensity compared to the signal intensity of the nonirradiated sample ( $A/A_0 = 0.75$ ). A considerable decrease of the signal ( $A/A_0 = 0.3$ ) was achieved

Card ~~1/5~~



Variation in the Intensity of Nuclear Quadrupole  
Resonance in a Molecular Crystal Irradiated by  
Fast Electrons

68605  
9/020/60/130/05/014/061  
B013/B014

for a sample which had been cooled insufficiently during irradiation. Thus, fusion centers developed. In this case, the quadrupole resonance frequency remained unchanged. This fact and earlier obtained results are easily explained by the assumption that the chemical transformation occurring under the action of  $\gamma$ - and  $\beta$ -radiation can proceed inversely only at the crystal sites where the packing density is lower than in a perfect lattice. At sites of normal packing the position of molecule fragments obtained by the disruption of the chemical bond remains strictly fixed, and the bond is immediately re-established. After the molecules in the thin surface layer of the blocks, at the crack boundaries, etc have been destroyed, a further increase of the radiation dose has no effect on the intensity of the quadrupole resonance signal. When the sample is heated,  $A/A_0$  decreases because the number of insufficiently packed and completely free molecules increases the fusion centers.

Card ~~27~~

MMYUKH, Ya.V.; BELAVTSEVA, Ye.M.; KITAYGORODSKIY, A.I.

Morphology of molecular packings in linear polyesters. Dokl.AN  
SSSR 133 no.5:1132-1135 Ag '60. (MIRA 13:8)

1. Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR.  
Predstavleno akad. I.V.Obreimovym.  
(Meters) (Crystals)

PHASE I BOOK EXPLOITATION SOV/5502

Kitaygorodskiy, Aleksandr Isaakovich, and Yuriy Vladimirovich Mnyukh

Kak postroyeny polimery; po novym dannym (The Structure of Polymers; According to New Data) Moscow, Izd-vo "Znaniye", 1961. 31 p. (Series: Vsesoyuznoye obshchestvo po rasprostraneniyu politicheskikh i nauchnykh znaniy. Seriya IX, 1961: Fizika i khimiya, no. 5) 25,500 copies printed.

Sponsoring Agency: Vsesoyuznoye obshchestvo po rasprostraneniyu politicheskikh i nauchnykh znaniy.

Ed.: I. B. Faynboym; Tech. Ed.: L. Ye. Atroshchenko.

PURPOSE : This book is intended for the general reader interested in the structure and properties of polymeric materials.

COVERAGE: The booklet bases predictions of thermal and mechanical properties of polymers on their atomic packings and micromorphological peculiarities of structure. The configurations of many  
Card 1/3

## The Structure of Polymers (Cont.)

SOV/5502

organic molecules, including polymers, are analyzed on the basis of geometric factors such as valence bond length, "ideal" bond angles, interatomic radii, and physical factors such as steric hindrance and van der Waals forces. The analytical techniques of x-ray and radiospectroscopic methods, including electron paramagnetic resonance (EPR), nuclear magnetic resonance (NMR), and nuclear quadrupole resonance (NQR) are cited. Future trends of research envision micromorphological investigations combining electron diffraction and electron microscope techniques, with the resolving power of the microscope brought to 3 - 4 Å and the area of microdiffraction reduced to 100 - 200 Å in order to study as desired any small section of the electron microscope image. No personalities are mentioned. There are 8 references, all Soviet.

## TABLE OF CONTENTS:

The Microworld and Macromolecules	3
The Configurations of Organic Molecules Card 2/3.	4

SHISHAKOV, Nikolay Alekseyevich; ~~KITAYGORODSKIY~~, A.I., doktor fiz.-matem.  
nauk, otv. red.; BABAD-ZAKHRYAPIN, A.A., red. izd-va; BRUZGULS, V.V.,  
tekhn. red.

[Principles of structure analysis] Osnovnye poniatia strukturnogo  
analiza. Moskva, Izd-vo Akad. nauk SSSR, 1961. 363 p.  
(MIRA 14:8)

(Crystallography)

KITAYGORODSKIY, A.I.; VAISHTEYN, B.K.; RUMANOVA, I.M.; ZVONKOVA, E.V.

Theory and practice of direct methods in the structure analysis  
of crystals. Zhur.strukt.khim. 2 no.5:622-639 S-O '61. (MIRA 14:11)

1. Institut elementoorganicheskikh soyedineniy AN SSSR,  
Institut Kristallografii AN SSSR i Fiziko-khimicheskiy institut  
imeni L.Ye. Karpova.

(Crystallography)

KITAYGORODSKIY, A.I.; TSVANKIN, D.Ya.; PETROV, Yu.M.

Large periods in enanthic fibers. *Vysokom.soed.* 3 no.9:1428  
S<sup>1</sup>(1). (MIRA 1419)

(Polyamides)

FEDIN, E.I.; KITAYGORODSKIY, A.I.

Investigation of solid solutions of certain organic compounds by  
the nuclear quadrupole resonance method. Kristallografiia 6 no.  
3:406-412 My-Je '61. (MIRA 14:8)

1. Institut elementoorganicheskikh soedineniy AN SSSR.  
(Nuclear magnetic resonance and relaxation)  
(Solid solutions) (Organic compounds)



KITAYGORODSKIY, A.I., doktor khimicheskikh nauk

Roentgenography of polymers. Zhur.VKHO 6 no.4:370-373 '61.  
(Polymers) (X rays--Diffraction) (MIRA 14:7)

KITAYGORODSKIY, A.I.; MIPSKAYA, K.V.

Calculating the energy of molecular crystal lattices. Part 1.  
Kristallografiia 6 no.4:507-514 JI-Ag '61. (MIRA 14:8)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.  
(Crystal lattices)

KITAYGORODSKII, A.I., prof.

"Strange" states of Matter. Priroda 50 no. 3:9-14, Mr '61,  
(MIRA 14:2)

1. Institut elementoorganicheskikh soedineniy, Moskva.  
(States of matter)

KITAYGORODSKIY, A.I., prof.; FEDIN, E.I.

Molecular radio signals. Priroda 50 no.11:44-52 N '61.  
(MIRA 14:10)

1. Institut elementroorganicheskikh soedineniy AN SSSR (Mskva).  
(Microwave spectroscopy) (Molecular spectra)

KITAYGORODSKIY, A.I.; STRUCHKOV, Yu.T.; AVOYAN, G.L.; DAVYDOVA, M.A.

Steric interactions in some halo derivatives of naphthalene. Dokl.  
AN SSSR 136 no. 3:607-609 Ja '61. (MIRA 14:2)

1. Institut elementoorganicheskikh soedineniy AN SSSR.  
Predstavleno akademikom A.N. Mesnyanovym.  
(Naphthalene) (Steric hindrance)

LITVINSKIY, N.I.

Interaction between carbon and hydrogen atoms which are not united  
by a valence bond. Dokl. Akad. Nauk SSSR no. 1:11-11, Pt. 1961.  
(MED 14:2)

1. Institut khimicheskikh i teoreticheskikh khimii  
SSSR. Predstavleno akademikom N.I. Litvinskiy.  
(Carbon) (Hydrogen) (Chemical bonds)

KITAYCORODSKIY, A.I.

Debye approximation for organic crystals. Kristallografiia 7  
no.2:195-198 Mr-Apr '62. (MIRA 15:4)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.  
(Organic compounds) (Crystals--Thermal properties)

S/070/63/008/002/004/017  
E021/E120

AUTHORS: Aleksandrov K.S., Belikova G.S., Ryzhenkov A.P.,  
Teslenko V.R., and Kitaygorodskiy A.I.

TITLE: Elastic constants of molecular crystals.  
Elastic constants of naphthalene

PERIODICAL: Kristallografiya, v.8, no.2, 1963, 221-224

TEXT: A study of the elastic constants is the main method of investigating the laws of interaction of molecules, a knowledge of which is necessary for constructing a theory of the properties of organic crystals. Coarse crystals of naphthalene grown from the melt and annealed for three days were studied. The orientation of the crystals was found by X-ray measurements. Measurements of the rate of propagation of elastic waves in the crystal were carried out using ultrasonic apparatus at frequencies of 1.7 and 5.0 megacycles. The waves were propagated in six different directions:

[001] , [110] , [010] , [101] , [100] and [011].

The rates of propagation in three directions at right angles were measured in each case. From the results the moduli of elasticity  
Card 1/2



Elastic constants of molecular ...

S/070/63/008/002/004/017  
E021/E120

were measured, e.g. the volume compressibility is equal to  $20 \times 10^{-6} \text{ cm}^2/\text{kg}$ . It was shown that the results obtained experimentally agreed with theoretical values calculated by the method of A.I. Kitaygorodskiy (Dokl. AN SSSR, v.137, 1, 1961, 116) and A.I. Kitaygorodskiy and K.V. Mirskaya (Kristallografiya, v.6, 3, 1961, 406).  
There is 1 table.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR  
(Institute of Elemental Organic Compounds, AS USSR)

SUBMITTED: August 25, 1962

Card 2/2

L 12799-63  
ACCESSION NR: AP3000771

BDS

9/0070/63/008/003/0393/0397

AUTHOR: Kitaygorodskiy, A. I.; Myasnikova, R. M.; Sanarskaya, V. D.

50  
49

TITLE: Mutual solubility of tolan and mercury diphenate in the solid state

SOURCE: Kristallografiya, v. 6, no. 3, 1963, 393-397

TOPIC TAGS: molecular volume, solid solution, organic solids, tolan, mercury diphenate

ABSTRACT: This study is a continuation of work on measuring mutual solubilities of organic substances, carried on for several years at the Institute of Hetero-organic Compounds. The two constituents in the present study have molecules geometrically similar. It was found that the maximum content of tolan in crystals with mercury-diphenate structure is 8.2%, and the maximum content of the diphenate in tolan structure is 14.0%. The authors have constructed diagrams showing composition of the system and have plotted curves relating molecular volume to concentration of admixture in the crystals. Phases with the structure of mercury diphenate show a smooth decline in the curve of molecular volume, but the corresponding curve for tolan passes through a maximum. The authors conclude, particularly from this fact, that it is necessary to have a complete thermodynamic theory in order to explain peculiarities of solubility in such systems. Orig. art. has: 4 figures  
Card 1/1 ASS: Institute of Elementoorganic Compounds

S/020/63/148/005/016/029  
B144/B186

**AUTHORS:** Kitaygorodskiy, A. I., Mnyukh, Yu. V., Asadov, Yu. G.

**TITLE:** Polymorphous single crystal - single crystal transition in p-dichloro benzene

**PERIODICAL:** Akademiya nauk SSSR. Doklady, v. 148, no. 5, 1963, 1065-1068

**TEXT:** By a microscopical study of the behavior of p-dichloro benzene crystals in glycerin it was established that  $\alpha \rightarrow \beta$  transition takes place above  $30.8^{\circ}\text{C}$  (the temperature of phase equilibrium), and that the temperature of  $\alpha \rightarrow \beta$  transition increases with increasing purity of the substance and perfection of the crystals. Perfect crystals mostly melted in the  $\alpha$ -phase at  $52.7^{\circ}\text{C}$ . Two types of  $\alpha \rightarrow \beta$  transition were observed: single-centered and multi-centered. From microphotographs it was evident that the polymorphous single crystal - single crystal transition is due to the growth of a bounded single crystal from a solid monocrystalline medium which is not in the equilibrium phase. The direction of growth can be varied by changing the temperature. The mutual orientation of the  $\alpha$  and  $\beta$  lattices was investigated by an attempt to find an answer to the following

Card 1/3

Polymorphous single...

S/020/63/148/005/016/029  
B144/B186

3 questions: (1) Is there a fixed connection between the orientations of the  $\alpha$  and  $\beta$  lattices? (2) If so, what is their mutual orientation? (3) If not, is there a discrete selection of possible mutual orientations, or are they purely accidental? Based on a series of Laue patterns taken from one and the same crystal over the entire transition period, it was established in a very carefully planned experiment that such a great number of lattice orientations develops in the new phase, and that their random growth becomes probable. The Laue patterns taken from a crystal subjected to 10 transitions revealed that all the  $\beta$ -phases had lattices of different orientation. Monocentered as well as multicentered transition could be observed in the same crystal, and perfect crystals were obtained from non-ordered crystals. Two inconsistent conclusions are drawn from these observations, which must still be cleared up. (1) Since the mutual orientation was never repeated in the numerous  $\alpha \rightarrow \beta$  transitions observed, non-ordered transition should be assumed; (2) The orientation of the  $\alpha$ -crystals in a series of  $\alpha \rightarrow \beta \rightarrow \alpha \rightarrow \beta$  transitions was often the same, which makes an ordered transition probable. It is suggested that question 1 may be answered in the affirmative and that a fixed relationship may be assumed. A certain analogy to the polymorphous monocrystal - polycrystal transition is evident. The difference between the two types of transition is probably due to

Card 2/3

Polymorphous single...

S/020/63/148/005/016/029  
B144/B186

conditions determining the number of growing centers. There are 4 figures and 1 table.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR (Institute of Elemental Organic Compounds of the Academy of Sciences USSR)

PRESENTED: October 22, 1962, by A. V. Shubnikov, Academician

SUBMITTED: October 18, 1962

Card 3/3

L 18962-63 EWP(j)/ENT(m)/BDS/ES(v) AFFTC/ASD Pc-4/Pe-4 RM/MAY

ACCESSION NR: AP3006597

S/0020/63/151/006/1356/1357

AUTHORS: Belavtseva, Ye. M.; Gumargaliyeva, K. Z.;  
Kitaygorodskiy, I. A. 67  
66

TITLE: Electron microscopic analysis of the structure of phospho-tungstic acid-treated caprone and lavsan fibers. 15

SOURCE: AN SSSR. Doklady\*, v. 151, no. 6, 1963, 1356-1357.

TOPIC TAGS: microscopic analysis, plastics, phospho-tungstic acid, caprone fiber, lavsan fiber, polyethylene terephthalate, 6-hendecanone, KOH, gold-platinum dust.

ABSTRACT: Since an X-ray study of the shape, size, and contact regions of different sides of high-polymeric materials did not produce a desirable result, the same problem was attacked with an electron microscope. Fibre was initially mechanically dispersed in distilled water, then spread over a grate, covered with a supporting film and air

Card 1/2

L 18962-63

ACCESSION NR: AP3006597

dried. After that, a drop of 2% solution of phospho- tungstic acid in water was put over the material. Acid was neutralized to pH 7-7.2 with 1 N KOH. After 3 to 5 minutes, excess acid was removed with filter paper and dried. Another portion of dispersed fiber was treated in vacuum with gold- platinum dust. Electron microscopic photographs show that both fibers consist of fibrils, but the structure of these fibrils was not revealed. On the other hand, photographs of samples treated with phospho-tungstic acid show the structure of the fiber through a few layers, which makes it possible to establish the difference in shape and orientation of the fibrils in both materials. Orig. art. has: 3 figures.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR (Institute of organometallic compounds, Academy of sciences, SSSR).

SUBMITTED: 11Feb63

DATE ACQ: 27Sep63

ENCL: 00

SUB CODE: CH

NO REF SOV: 000

OTHER: 003

Card 2/2

BELAVTSEVA, Ye.M.; GUMARGALIYEVA, K.Z.; KITAYGORODSKIY, A.I.

Electron microscope study of grafted polymers. Dokl. AN SSSR  
153 no.3:631-633 N '63. (MIRA 17:1)

1. Institut elementoorganicheskikh soedineniy AN SSSR.  
Predstavleno akademikom I.V. Obreinaovym.



BEHAVENWA, Ye. M.; GUMAGALIYEVA, K. Z.; KITAYGORODSKII, A. I.; VILKOV, A. V.

"Staining method used for graft polymer investigation by electron microscopy."

report submitted to 3rd European Regional Conf, Electron Microscopy, Prague, 26 Aug-3 Sep 64.

ACCESSION NR: APL021985

S/0070/64/009/002/0171/0173

AUTHOR: Kitaygorcdskiy, A. I.

TITLE: Tensor of the derivative of the temperature characteristic for deformation of a molecular crystal

SOURCE: Kristallografiya, v. 9, no. 2, 1964, 171-173

TOPIC TAGS: temperature characteristic, crystal deformation, molecular crystal, tensor, naphthalene, low symmetry molecular crystal, solid state equation, Grüneisen constant

ABSTRACT: The author has proposed, as a description of oscillatory changes during deformation, the use of the tensor of the entropy derivative for the deformation. He has shown that by means of approximations discussed in a previous paper (Kristallografiya, 7, 195, 1962) it is possible, by using this tensor, to compute the tensor of the temperature characteristic of the crystal for deformation. He illustrates this by computations for naphthalene. The computations show that for low-symmetry molecular crystals it is advisable to reformulate somewhat the

Card 1/2

ACCESSION NR: AP4024985

equation for solid state as used for the atomic lattice. This involves a substitution of the indicated tensor for the Grüneisen constant and is of special interest because the behavior of the temperature characteristic of a molecular crystal is sharply anisotropic. Orig. art. has: 7 formulas.

ASSOCIATION: Institut elementoorganicheskikh sovedinaniy AN SSSR (Institute of Hetero-organic Compounds, AN SSSR)

SUBMITTED: 12Jun63

DATE ACQ: 16Apr64

ENCL: 00

SUB CODE: PH, CH

NO REF SOV: 004

OTHER: 001

Card 2/2

AVOYAN, R.I.; KITAYBOLOVSKIY, A.I.; GIL'DENBERG, Ye.I.

Steric hindrances and conformation of molecules. Report 9:  
Structure of a 5,6-dichloro-11,12-diphenylanthracene crystal  
and molecule. Zhur. strukt. khim. 5 no.3:420-439 1976.  
(MIRA 1817)

1. Institut elementoorganicheskikh soedineniy AN SSSR.

ZYULKOVSKA, B.; MYASHNIKOVA, R.M.; KITAYGORODSKIY, A.I.

Crystal structure of diphenyl mercury. Zhur. strukt. khim. 5  
no.5:737-742 S-O '64 (MIRA 18:1)

1. Institut elementoorganicheskikh soedineniy AN SSSR.

ACCESSION NR: APL024986

S/0070/64/009/002/0174/0181

AUTHORS: Kitaygorodskiy, A. I.; Mirskaya, K. V.

TITLE: Computing the lattice energies of molecular crystals in the cross section of the surface of lattice energy

SOURCE: Kristallografiya, v. 9, no. 2, 1964, 174-181

TOPIC TAGS: crystal lattice energy, molecular crystal, lattice energy surface, valence bond, interaction potential, molecular axis, crystal axis

ABSTRACT: The lattice energy of a crystal is represented as a function of the lattice parameters and of the angles between molecular axes and crystal axes:

$$U = U(a, b, c, \alpha, \beta, \gamma, \theta, \psi, \varphi).$$

By means of interaction potentials of nonvalence-bound atoms  $\Phi(r)$ , the authors have computed the one-dimensional profile of the energy surface, i.e., the curve of the lattice energy as a function of one of the indicated nine parameters, the other eight remaining unchanged. It is shown that when experimental data are

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ACCESSION NR: AP4024986

sufficient, individual profiles of the energy surface of a molecular crystal may be investigated rather precisely. If the proposed scheme of computing lattice energy is valid, then the method may be used to set up optimal potential curves. Rather exhaustive data may be obtained after determining the temperature dependence of the expansion and elasticity factors. A future paper will be devoted to this matter. "The authors express their thanks to G. I. Aref'yeva for her part in preparing the problem and to A. B. Tovbis for setting up the program and making the calculations on the computer." Orig. art. has: 4 figures, 2 tables, and 8 formulas.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR (Institute of Organoelemental Compounds AN SSSR)

SUBMITTED: 02Jul63

DATE ACQ: 16Apr64

ENCL: 00

SUB CODE: SS

NO REF SOV: 006

OTHER: 002

Card 2/2

ACCESSION NR: AP4041160

8/0020/64/156/004/0924/0925

AUTHOR: Slonimskiy, G. L.; Korshak, V. V.; Vinogradova, S. V.; Kitaygorodskiy, A. I.; Askadskiy, A. A.; Salazkin, S. N.; Belavtseva, Ye. M.

TITLE: Physico-chemical means of regulating supermolecular structure and mechanical properties of amorphous polyarylate F-1.

SOURCE: AN SSSR. Doklady\*, v. 156, no. 4, 1964, 924-925, and insert facing p. 924

TOPIC TAGS: polyarylate, supermolecular structure, amorphous polymer, mechanical property, control, regulation, phenolphthalein isophthalic acid polymer, polymerization, reaction medium, brittleness, elongation, strength, impact strength, rigid macromolecular structure

ABSTRACT: The supermolecular structure and consequently the mechanical properties, especially the brittleness, of amorphous polyarylate F-1 (phenolphthalein-isophthalic acid based polymer) were improved by selecting a new polymerization reaction medium. Electron microscopic comparison of F-1 polymerized as previously in ditolylmethane in which it is insoluble and polymerized in  $\alpha$ -chloronaphthalene in which it is soluble showed the structure no longer comprised a multitude of fine weakly bonded spherical particles, but was fibrillar with no fractures. In the

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Lara 2/2



L 30093-65 EWT(m)/EPT(c)/EWP(j) Pp-4/Pr-4 RM

ACCESSION NR: AP5005316

8/0181/65/007/002/0643/0645

AUTHOR: Kitaygorodskiy, A. I.; Koresnikov, B. D.; Kul'kin, A. G.

TITLE: Calculation of the Debye temperature of adamantane from the intermolecular-interaction potential

SOURCE: Fizika tverdogo tela, v. 7, no. 2, 1965, 643-645

TOPIC TAGS: organic crystal, adamantane, Debye temperature, intermolecular interaction, interaction potential, Gruneisen constant

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19  
B

ABSTRACT: This is a continuation of earlier work by one of the authors (Kitaygorodskiy, Kristallografiya v. 7, 1968, 1962) where it was assumed that the Debye approximation can be applied to an organic molecular crystal. In the present article the authors calculate from calorimetric and spectral data the dependence of the Debye temperature of several crystals on the temperature, and illustrate ways of checking the degrees of suitability of the Debye approximation. For the latter test, the authors have undertaken to calculate the Debye temperature of a cubic face-centered crystal of adamantane ( $C_{10}H_{16}$ ), using the potential of intermolecular interaction as a base. It is assumed that the intermolecular forces are additive,

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L 34493-65

ACCESSION NR: AP5005316

so that the interaction between molecules is equal to the sum of interactions of all the atoms of one molecule with all the atoms of the other. Only the interaction between nearest neighbors was taken into account. The cubic symmetry of the lattice has made it possible to reduce the number of calculated dynamic coefficients from 46 to 10, and the mean square oscillation frequency was calculated using the Born formula. In addition, the Gruneisen constant was calculated as a function of the unit-cell volume. The results are in fair agreement with the results obtained in the earlier paper for naphthalene. The authors state in the conclusion that aluminum was chosen for the calculations, in spite of the lack of experimental data for comparison, because of the high symmetry of its lattice, which simplifies the calculations. It is concluded that the suitability of the procedure is reasonably demonstrated. Similar calculations will be made in the future for other organic crystals. Orig. art. has: 1 figure and 6 formulas.

ASSOCIATION: Institut elementoorganicheskikh sovedineniy, Moscow (Institute of Organoelemental Compounds)

SUBMITTED: 19Aug64

ENCL: 00

SUB CODE: 68, 0C

REF SOV: 003

OTHER: 002

ATT PRESS 3213

Card 2/2

KITAYGORODSKIY, A. I.; MIRSKAYA, K.V.

Quadrupole interactions in molecular crystals. Kristallografiya  
10 no.2:162-166 Mr-Apr '65. (MIRA 18:7)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.

... , V. Kiteygorodskiy, A. ... Ankin, Y. ...

... of the kinetics of the polymorph ... alpha-beta and beta-alpha  
... transitions in single-crystal p-dichlorobenzene

... physical parameters of ...  
... in an ideal experiment ...  
... of the difficulties of ...

L 28731-65

ACCESSION NR: AP5004363

authors produced repeated  $\alpha \rightleftharpoons \beta$  transformations of single-crystal p-dichlorobenzene, measuring each time the rate of transformation of the linear phase-separation

... equilibrium temperatures ...

KITAYGORODSKIY, A.I., prof.

Organic crystals. Priroda 54 no.3;6-15 Mr '65.

(MIRA 18:4)

1. Institut elementoorganicheskikh soyedineniy AN SSSR, Moskva.

POGLAZOV, B.F.; VAZINA, A.A.; BELAVTSEVA, Ye.M.; KITAYGORODSKIY, A.I.

Roentgenographic and electron microscopic study of tail coatings of the phage T-2. Dokl. AN SSSR 163 no.2:488-490 J1 '65. (MIRA 18:7)

1. Institut radiatsionnoy i fiziko-khimicheskoy biologii AN SSSR; Institut biologicheskoy fiziki AN SSSR i Institut elementoorganicheskikh soyedineniy AN SSSR. Submitted September 30, 1964.

L 16103-66 EWP(j)/EIT(m) RM/WM  
ACC NR: AP6003250 (A)

SOURCE CODE: UR/0020/65/165/006/1323/1324

AUTHOR: Slonimskiy, G. L.; Korshak, V. V. (Corresponding member AN SSSR);  
Vinogradova, S. V.; Kitaygorodskiy, A. I.; Askadskiy, A. A.; Salazkin, S. N.;  
Belavtseva, Ye. M.

51  
53

ORG: Institute of Hetero-organic Compounds, Academy of Sciences, SSSR (Institut  
elementoorganicheskikh soedineniy Akademii nauk SSSR)

4413) B

TITLE: Difference in supramolecular structures of amorphous polyarylates obtained  
by interfacial polycondensation and high-temperature polycondensation in homo-  
geneous media

SOURCE: AN SSSR. Doklady, v. 165, no. 6, 1965, 1323-1324, and insert facing  
p. 1324

TOPIC TAGS: polyaryl plastic, interfacial polycondensation, polycondensation,  
polymer, impact strength, tensile strength

ABSTRACT: Electron-microscopic and mechanical studies were carried out on special-  
ly synthesized types of P-7 polyarylates (products of polycondensation of tereph-  
thaloyl chloride with phenolphthalein anilide). The results fully confirmed the  
hypothesis that in interfacial polycondensation, when the polymer is formed at the  
interface of two liquid phases in which it is insoluble, the supramolecular  
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UDC: 541.64



L 16103-66

ACC NR: AP6003250

structure should be globular, whereas in homogeneous polycondensation in a solvent medium, the structure of the polymer is predominantly fibrillar. The mechanical properties were consistent with these observations: polyarylate F-7<sup>15</sup> prepared by polycondensation in a homogeneous medium, had a greater impact and tensile strength and higher softening point than polyarylate F-7-M, synthesized by interfacial polycondensation. This fact is particularly notable, since it shows that an amorphous polymer of the same chemical structure can have different softening points depending upon the supramolecular structure. Orig. art. has: 1 table.

SUB CODE: \, 07/ SUBM DATE: 14Jul65 / ORIG REF: 004

MNYUKH, Yu.V.; PETROPAVLOV, N.N.; KITAYGOBOLSKIY, A.I.

Laminar growth of crystals in polymorphic transformation. Dokl.  
AN SSSR 166 no.1:80-83 Ja '66. (MGRA 1961)

1. Institut elementoorganicheskikh soedineniy AN SSSR. Submitted  
April 27, 1965.

AKOPYAN, Z.A.; KITAYGORODSKIY, A.I.; STRUCHKOV, Yu.F.

Steric hindrances and conformation of molecules. Report No.12:  
Crystalline and molecular structure of 1,8-dinitronaphthalene.  
Zhur.strukt.khim. 6 no.5:729-744 8-0 '65.

(MIRA 18:12)

1. Institut elementoorganicheskikh soyedineniy AN SSSR. Sub-  
mitted July 15, 1965.

L 14497-66 EWT(1)/EWT(m)/ETC(F)/EWG(m)/T/ETC(m)-6 IJP(c) JW/GG/WE

ACC NR: AP6003762

SOURCE CODE: UR/0181/66/008/001/0062/0068

AUTHOR: Kitaygorodskiy, A.I.; Korshkov, B.D.

ORG: Institute of Organometal Compounds, AN SSSR, Moscow (Institut elementoorganicheskikh soedineniy AN SSSR)

TITLE: The study of the characteristic temperature of molecular crystals. Scalar derivatives of the characteristic temperature

SOURCE: Fizika tverdogo tela, v. 8, no. 1, 1966, 62-66

TOPIC TAGS: molecular crystal, thermodynamic analysis, naphthalene, benzene

ABSTRACT: A method has been proposed for the analysis of thermodynamic data concerning molecular crystals. The investigation was performed on naphthalene and benzene-type molecules representing sufficiently rigid molecules, the crystalline forces of which are many times weaker than the corresponding intramolecular forces. From experimental data, the authors evaluated the characteristic temperature derivatives with respect to the P, V, and T parameters and plotted derivative curves as a function of temperature. An analysis of the results shows that the magnitudes and general behavior of the derivative curves are not in agreement with the predictions of the isotropic quasi-harmonic model.

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ACC NR: AP6003762

This may be caused by 1) the fact that the characteristic temperature is not a function of the volume but a function of the crystal cell parameters; 2) anharmonism; and 3) incorrect assumptions concerning the independence of the intramolecular frequencies on the volume. Preliminary discussion seems to indicate that by taking into account anharmonic effects partial agreement can be achieved. The presence of extrema still remains unexplained. A more thorough discussion of the existing results is being postponed until data concerning the tensor derivatives of the characteristic temperature become available. Orig. art. has: 13 formulas and 3 figures. [08]

SUB CODE: 20 / SUBM DATE: 26Jun65 / ORIG REF: 002 / OTH REF: 004  
ATD PRESS: 4197

Card 2/2

L 14571-66 EWT(m)/EWF(j)/T WM/RM

ACC NR: AP6004390

SOURCE CODE: UR/0020/66/166/003/0593/0594

AUTHOR: Andrianov, K. A. (Academician); Slonimskiy, G. L.; Kitsygorodskiy, A. I.;  
Zhdanov, A. A.; Belavtseva, Ye. M.; Levin, V. Yu.

ORG: Institute of Heteroorganic Compounds, Academy of Sciences SSSR (Institut elemento-  
organicheskikh soyedineniy Akademii nauk SSSR)

TITLE: Morphological forms of high-elastic polymers 7.44.56

SOURCE: AN SSSR. Doklady v. 166, no. 3, 1966, 593-594

TOPIC TAGS: morphological form, high elastic polymer, silicone, polysiloxane

ABSTRACT: Recent studies of morphological forms in high-elastic polymers have dis-  
proved the older theory of high elasticity which is based on the idea of random en-  
tangled macromolecules. V. A. Kargin and associates (DAN, 144, 1089, 1962) have  
observed fibrillar structures in these polymers. In this study the morphological  
forms of high-elastic polymers have been studied with polyaluminodimethylsiloxanes  
(I) synthesized by polycondensation of aluminum butoxide with  $\alpha, \omega$ -dihydroxypoly-  
dimethylsiloxane. The morphological forms of I were investigated by electron micro-  
scopy. I was shown to have a globular structure with globular formations varying in  
size from 50—100 to over 1000Å. The small globules were, possibly, macromolecules.  
The large globular formations consisted of small globules which were either aggregated  
as a result of molecular interaction, or linked by chemical bonds formed in polycon-

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UDC: 541.68

L 14571-66

ACC NR: AP6004390

densation, or both. This globular structure, formed in two steps, is apparently one of the common morphological forms in amorphous polymers both in the high-elastic and the glassy (G. L. Slonimskiy V. V. Korshak, et al. DAN,156, 924, 1964) states. The presence of globular and above-mentioned fibrillar morphological forms in high-elastic polymers raises the following problems: 1) fundamental review of the older theory of high elasticity; 2) studies of the effect of the morphological forms of amorphous polymers and their high-elastic and mechanical properties; 3) determination of the effect of the synthesis conditions and conditions for the formations of a solid or elastic body on the type of morphological forms produced. Orig. art. has: 1 figura.

[80]

SUB CODE: 11/ SUBM DATE: 20Jul65/ ORIG REF: 007/ ATD PRESS: 4/90

Card 2/2

L 8843-66 EWT(1)/EWT(m)/ETC/EMG(m)/EWP(j) JW/RM

ACC NR: AP5022734

SOURCE CODE: UR/0181/65/007/009/2843/2844

AUTHOR: <sup>44,55</sup> Kitaygorodskiy, A. I.; <sup>44,55</sup> Koreshkov, B. D.; <sup>44,55</sup> Pikus, Ye. L.

45  
B

ORG: <sup>44,55</sup> Institute of Hetero-Organic Compounds, Moscow (Institut elementoorganicheskikh soyedineniy)

TITLE: Characteristic temperature of molecular crystals

SOURCE: Fizika tverdogo tela, v. 7, no. 9, 1965, 2843-2844

TOPIC TAGS: molecular crystal, organic crystal, <sup>21, 44, 55</sup> thermodynamics

ABSTRACT: The characteristic temperature  $\theta$ , defined as the mean geometric frequency of the normal mode, is calculated for a number of organic crystals. The results are given graphically. It is found that organic molecular crystals have low characteristic temperatures lying in the narrow range of 80-150°K. In most cases, the characteristic temperatures fall smoothly with temperature. The derivatives of  $\theta$  with respect to  $T$  lie within an even narrower range than the values of  $\theta$ . Consequently their Gruneisen constants  $\gamma$  are extremely close. Orig. art. has: 1 figure.

SUB CODE: 20/      SUBM DATE: 15Feb65/      ORIG REF: 009/      OTH REF: 011

BVK  
Card 1/1



GOROKHOVSKIY, S.I.; KITAYGORODSKIY, A.P.; PANIN, V.I., red.; BOBYL'NYA,  
L.V., red. ~~isd-vost~~; ~~EL'YUSHIN, A.A., tekhn, red.~~

[Experience in the operation of the Taganrog municipal power  
system] Opyt raboty taganrogskoi gorodskoi elektroseti. Moskva,  
Isd-vo M-va kommun. khoz. RSFSR, 1958. 26 p. (MIRA 11:12)  
(Taganrog--Electric power distribution)

TSAPALIN, A.M., podpolkovnik med. slushby; KITAYGORODSKIY, B.A., mayor med. slushby

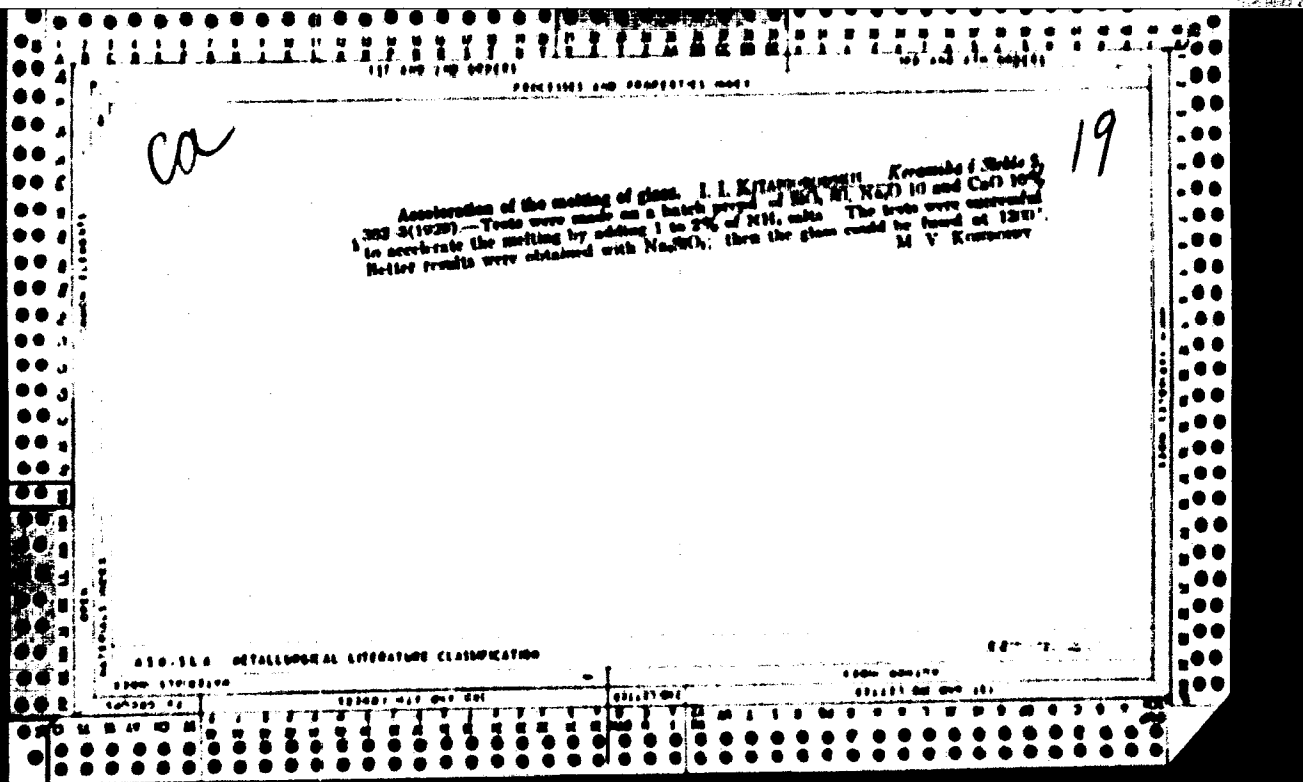
Fluorography of the accessory sinuses of the nose in the selection  
of specialists for the Navy. Voenn. med. zhurn. no.2:50-53 F '59.

(PARANASAL SINUSES, radiography (MIRA 12:7)

fluorography of accessory sinuses in selection of naval  
specialists (Rus))

(ARMED FORCED PERSONNEL

naval specialist selection by fluorography of accessory  
sinuses of nose (Rus))



17

Pumice stone and obsidian as raw material in the glass industry. I. I. KITANUKUCHI AND N. Y. RIZOV. *Trans. State Inst. for Testing Building Materials and Glass Moscow*, No. 20, 3 21(1970). Very rich deposits of readily mined volcanic pumice and obsidian have been recently uncovered in many localities of Armenia. These varieties of pumice and 2 of obsidian showed contained  $\text{SiO}_2$  65.87-74.24,  $\text{FeO}$  0-0.70,  $\text{Al}_2\text{O}_3$  13.20-18.12,  $\text{P}_2\text{O}_5$  0.05-4.10,  $\text{MnO}$  or  $\text{FeO}$  0-0.75,  $\text{CaO}$  0.92-3.00,  $\text{MgO}$  trace 1.32,  $\text{K}_2\text{O}$  2.65-8.70,  $\text{Na}_2\text{O}$  1.84-4.00,  $\text{NH}_3$  0-0.00,  $\text{CO}_2$  loss 0.17-5.10%. In the lab., the authors made very fine, green bottle glass from the following mixts of pumice, using a hot-plate stove and traps up to 1400-1450°: (1) pumice (10-12 cm pieces) 40%, sand 27.5%, chalk 23.9%, dolomite 19.5%; (2) granular pumice (0.7-0.8 cm), 48.6%, sand 10.37%, chalk 22.0-24.7%, soda 19.5%. The best results were obtained with so-called dry-fountain, granular pumice and obsidian to 42.5% soda each, 24.8% chalk and 16% soda. The heating lasted 6 hrs at 1400°. The volcanic material should constitute 71.75% of the wt of the mixt. Dry-fountain material, especially that from the "Aniyakaya" region, is highly recommended for immediate utilization. The presence of 8% alkali in this igneous material effects an economy in the use of soda and sulfates. Other advantages are the exclusion of super-normal temps., the simplification of the process in making glass bottles and preservative vessels, and the superiority of all such glass as regards leakage, resistance to temp., resistance to percussion and resistance to internal pressure. Analytical tables and temp curves give all details.

J. FINKBACH

ASD 55A METALLURGICAL LITERATURE CLASSIFICATION