MIKHAYLOV, I.F.

Studies on properties of antigen-antibody complexes by means of a fluorescent antibody method. Zhur.mikrobiol.epid.i immun. 32 no.3:28-35 Mr '61. (MIRA 14:6)

1. Iz kafedry mikrobiologii Voyenno-meditsinskoy ordena Lenina akademii imeni Kirova.
(ANTIGENS AND ANTIBODIES)

MIKHAYLOV, I.F.; DASHKEVICH, I.O.

Detection of a fixated complement by means of fluorescent antibodies
Zhur. mikrobiol. epid. i immun. 32 no.7:87-91 Je '61. (MIRA 15:5)

1. Iz Voyenno-meditsinskoy ordena Lenina akademii imeni S.M.Kirova.
(COMPLEMENT FIXATION) (ANTIGENS AND ANTIBODIES)

MIKHAYLOV, I. F.; LAVRENT'YEV, N. I.

Stainability of para-agglutinating strains of Escherichia coli with fluorescent sera of different specificity. Zhur. mikrobiol., epid. i immun. 32 no.8:74-78 Ag '61. (MIRA 15:7)

1. Iz kafedry mikrobiologii Voyenno-meditsinskoy ordena Lenina akademii imeni Kirova.

(ESCHERICHIA COLI) (SERUM)

MIKHAYLOV, I.F.; STANISLAVSKIY, Ye.S.

Staining isolated bacterial structures with fluorescent antibodies. Zhur. mikrobiol., epid. i immun. 40 no.6: 74-79 Je '63. (MIRA 17:6)

1. Iz Moskovskogo instituta vaktsin i syvorotok imeni Mechnikova.

MIKHAYLOV, I.F.

Criteria of specific fluorescence of bacteria stained with fluorescent antibodies. Zh. mikrobiol. 40 no.7894-97 Jl'63
(MIRA 17:1)

1. Iz Moskovskogo instituta vaktsin i syvorotok imeni Mechnikova.

MIKHAYLOV, I.F.; PERS, I.F.

Isolation of antibodies from antigen-antibody complex with ultrasonics. Zhur. mikrobiol., epid. i immun. 41 no.1:112-119 Ja '64. (MIRA 18:2)

1. Moskovskiy institut vaktsin i syvorotok imeni Mechnikova.

MIKHAYLOV, I.F.; KOVALEVA, V.V.

Properties of the specific luminescence of S- and R-forms of bacteria stained with fluorescent antibodies. Zhur. mikrobiol., epid. i immun. 41 no.3:33-39 Mr '64. (MIRA 17:11)

1. Gosudarstvennyy kontrol'nyy institut meditsinskikh biologicheskikh preparatov imeni Tarasevicha.

MIKHAYLOV, I.F.

Study of the first phase of serological reactions using the method of fluorescent antibodies. Zhur.mikrobiol., epid. i immun. 42 no.3:14-17 Mr '65. (MIRA 18:6)

1. Gosudarstvennyy kontrol'nyy [illegible] biologicheskikh preparatov imeni Tarasevicha.

MIRABAYLOV, I.P.

[illegible]

1. Gosudarstvennyy [illegible]

MIKHAYLOV, I. G.: Master Tech Sci (diss) -- "Investigation of methods of preparing excavation sections in the working of thick, sloping seams. The example of the Shurab deposit". Moscow, 1957. 16 pp (Min Higher Educ USSR, All-Union Correspondence Polytech Inst), 200 copies (KL, No 4, 1958, 127)

MIKHAYLOV, I.G., gornyy inzh.

Maintaining the main drive in working thick flat seams. Ugol' 33 no.12:10-12 D '58. (MIRA 11:12)
(Coal mines and mining) (Subsidences (Earth movements))

MIKHAYLOV, I. G.

USSR/Mathematics - Pedagogy Sep/Oct 52

"Third Mathematical Olympiad of Students of City of Stalingrad," I. G. Mikhaylov and V. S. Potapov

"Usp Matemat Nauk" Vol 7, No 5(51), pp 242-6

Discuss yearly all-city mathematical olympiad in Stalingrad for the school year 1951-52, which was organized by the Chair of Mathematics of the Pedagogic Inst. Give the various problems posed for the various classes of students. Example of a problem for highest class (10th): Solve and investigate the equation $(a-1)\cos x + (a+1)\sin x = 2a$.

242T81

POTAPOV, V.S.; MIKHAYLOV, I.G.

Fourth mathematical olympiad in Stalingrad. Usp.mat.nauk 8 no.6:163-168 N-D '53. (MLRA 6:12)
(Stalingrad--Mathematics) (Mathematics--Stalingrad)

SOV/137-58-10-20481

Translation from Referativnyy zhurnal, Metallurgiya, 1958, Nr 10 p 20 (USSR)

AUTHOR: Mikhaylov, I.G.

TITLE Forty Years of Soviet Metallurgy (Sorok let sovetskoy metallurgii)

PERIODICAL Izv. vyssh. uchebn. zavedeniy. Chernaya metallurgiya 1958, Nr 1, pp 3-16

ABSTRACT: A review of the development of Soviet ferrous metallurgy in the past 40 years. Note is taken of the increase in gross industrial production by 33 times over 1913, including an increase of 74 times in production of productive facilities. By 1960 it is planned to increase the smelting of pig iron to 53, of steel to 68.3, and of rolled metal to 52.7 million t. The major directions to be taken to meet this objective are indicated.

M P

1. Steel industry--USSR 2. Iron industry--USSR 3. Metallurgical plants--USSR

Card 1/1

18(3) SOV/14[illegible]-1[illegible]19

AUTHOR: Mikhaylov, I.G., Engineer

TITLE: Some Problems in the Development of Ferrous Metallurgy During the Prospective Seven-Year Plan (Nekotoryye voprosy razvitiya chernoy metallurgii v predstoyashchem semiletii)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy - Chernaya metallurgiya, 1959, Nr 1, pp 3-9 (USSR)

ABSTRACT: Information is given on the prospective development of ferrous metallurgy in the Soviet Union during the period from 1959 to 1965. By 1965 the metallurgical output shall reach the following figures: 65 to 70 million tons of cast iron; 86 to 91 million tons of steel; 65 to 70 million tons of rolled metal; 150 to 160 million tons of commercial iron ore. The Seven-Year Plan includes the construction of industrial units with an output of 24 to 30 million tons of cast iron; 28 to 36 million tons of steel and 23 to 29 million tons of rolled metal. There are three main metallurgical centers in the Soviet Untion: 1) the Southern region with the Donbas and the Dnepr area which can be supplied from the enormous iron ore reserves of the Kursk Magnetic Anomaly and Krivoy

Card 1/3

Some Problems in the Development of Ferrous Metallurgy During the Prospective Seven-Year Plan

Rog for centuries; 2) the Ural region where the extension of existing metallurgical plants and the construction of new ore mining enterprises are being planned including the Kachkanar, the Nizhniy-Tagil, and the Sokolov-Sarbay Mining-Concentration Combines 3) the Siberian and Kazakhstan regions. Here the construction of new industrial units include the Karaganda Metallurgical Plant, the Yermakov Ferroalloy Plant, the West Siberian Metallurgical Plant at Stalinsk and two other plants at Krasnoyarsk and Barnaul, which regions are particularly favorable due to their extended reserves of coal, power resources and iron ore, favorable transportation and agricultural conditions as well as their density of population. The organization of a scientific research institute

Some Problems in the Development of Ferrous Metallurgy During the Prospective Seven-Year Plan

of ferrous metallurgy is recommended.

ASSOCIATION: Sibirskiy metallurgicheskiy institut (Siberian Metallurgical Institute)

MIKHAYLOV, I G

18.000,18.2000

77151
SOV/148-59-9-21/22

AUTHORS: Sachko (Docent, Candidate of Technical Sciences), Mikhaylov, I. G., Shriro, N. A. (Engineers)

TITLE: Concerning the Problem of Selecting Optimal Economical Beneficiation Rates of Iron Ores in Gornaya Shoriya

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, 1959, Nr 9, pp 179-187 (USSR)

ABSTRACT: In view of the rapid development of ferrous metallurgy anticipated by the current Seven-Year Plan (1959 to 1965) an ore shortage in the Kuznetsk Basin is expected. The blowing-in of new blast furnaces at Kuznetsk Metallurgical Combine (Kuznetskiy metallurgicheskiy kombinat) and West-Siberian Plant (Zapadno-Sibirskiy zavod) will increase this shortage. In this connection the question of the most economical utilization of iron ore arises. As opposed to other areas in the USSR, the coke-to-ore expenditure ratio is rather peculiar in Kuznetsk Basin; i.e., 68% of total expenditures go for mining and preparation. Kuznetsk Metallurgical Combine receives most of its

Card 1/3

ore from the mines of Gornaya Shoriya (6,027,300 tons iron ore, containing 2,710,400 tons iron, in 1957) and Mundybash Sinter-Beneficiation Plant (Mundybashskaya aglomeratsionnoobogatitel'naya fabrika). In 1957 the losses of iron in all mines amounted to 156,700 tons (5.9%), while they were 4 4 000 ton at Mundybash Plant alone. Yu. A. Markhasin (engineer) of Mundybash Plant showed that a 10% decrease (from 60 to 50%) of iron content in the concentrate lowers the iron content in the tailings by 4% (from 15 to 11%). The authors, in cooperation with G. A. Grazhdan (engineer), investigated the possibilities of lowering or raising the concentration obtaining the following results: (1) Current concentration at Gornaya Shoriya and Mundybash Plant (57.2% Fe) ensures the most economical production of cast iron at Kuznetsk Metallurgical Combine. Any increase in concentration would lead to greater loss of iron, boosting the cost of cast iron, although higher furnace productivity would increase blast furnace output of the shop by about 4%.

Card 2/3

Concerning the Problem of Selecting Optimal [illegible]
Economical Beneficiation Rates of Iron Ores SOV/[illegible]
in Gornaya Shoriya

(2) Lowering of concentration does not increase the cost of cast iron production and leads to considerable loss of iron, estimated to reach about [illegible] million rubles per year. Furthermore, by the utilization of additional slag in the production of low-cost cement, another [illegible] million rubles per year can be saved. However, the productivity of the blast furnace shop would decrease by a minimum of [illegible]%, as a result of decreased efficiency. The authors emphasize the need for improved beneficiation techniques and technology in order to cut iron losses. It is assumed that the above changes in the technical and economic performance figures apply to the Abagurskaya Sinter Plant (Abagurskaya aglofabrika) although transportation facilities and preparation techniques should be considered individually. There are 3 tables; and 2 Soviet references.

ASSOCIATION: Siberian Metallurgical Institute (Sibirskiy metallurgicheskiy institut)

SUBMITTED: June 1, 1959

Card 3/3

Fedor Dmitriyevich MIKHAYLOV, Ivan Gavrilovich RYBITSKIY, Nikolay Antonovich VOROB'YEV, F.I., redaktor; CHUNAYEVA, Z.V., tekhnicheskiy redaktor

[Fruit and berry orchards and nurseries] Plodovo-iagodnyi sad i pitomnik. Izd. 3-e. Moskva, Gos. izd-vo sel'khoz.lit-ry, 1957. (MLRA 10:10)

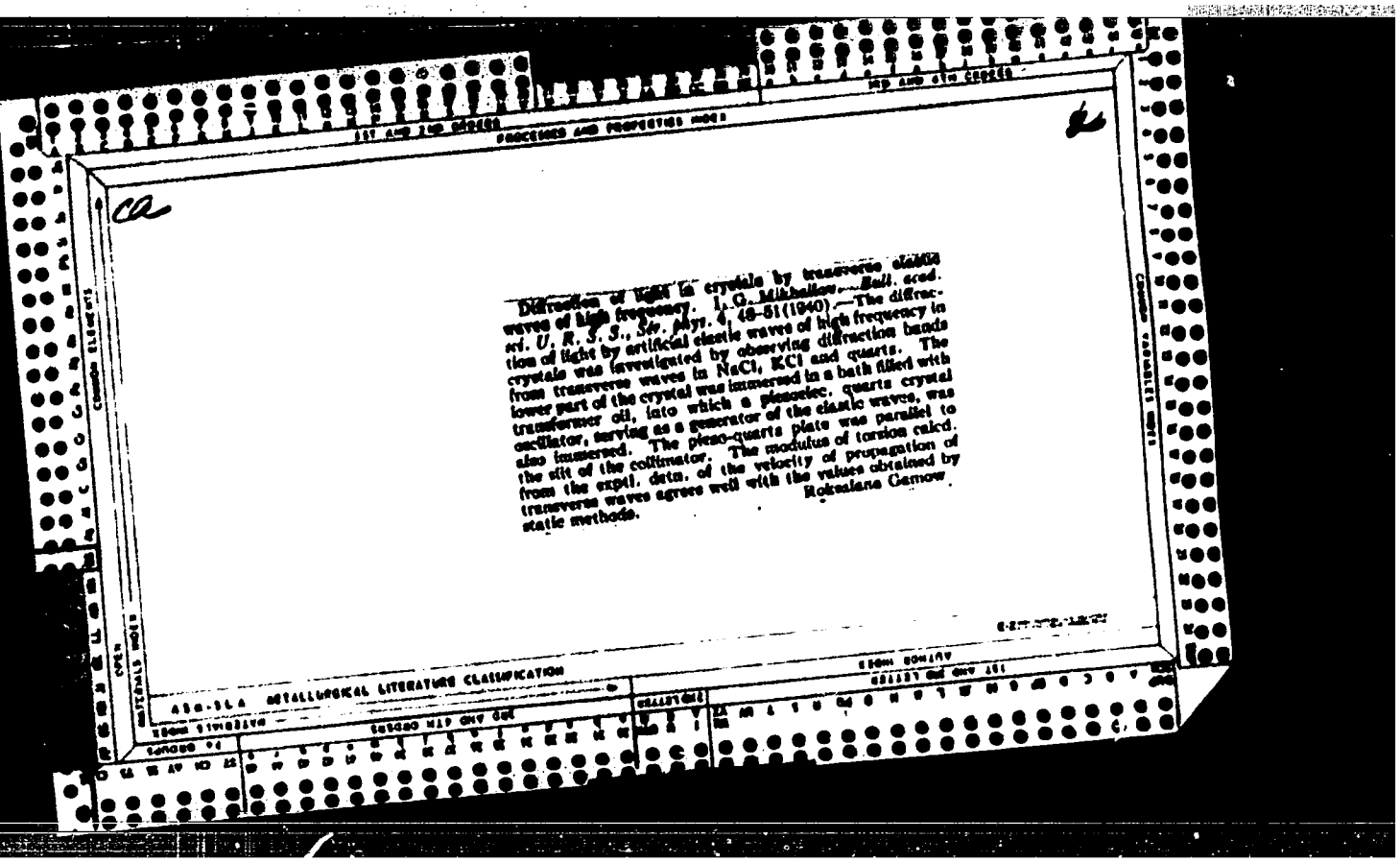
(Fruit culture) (Nurseries (Horticulture))

BOGORAD, Lazar' Moiseyevich; GAVRILOV, Viktor Gavrilovich, kand.sel'skokhoz. nauk; GORYACHEVA, Yevgeniya Petrovna, kand.sel'skokhoz.nauk; LIKHONOS, Fedor Dmitriyevich, doktor sel'skokhoz.nauk; MIKHAYLOV, Ivan Gavrilovich; PETROV, N.P., red.; MOLODTSOVA, N.G., tekhn.red.

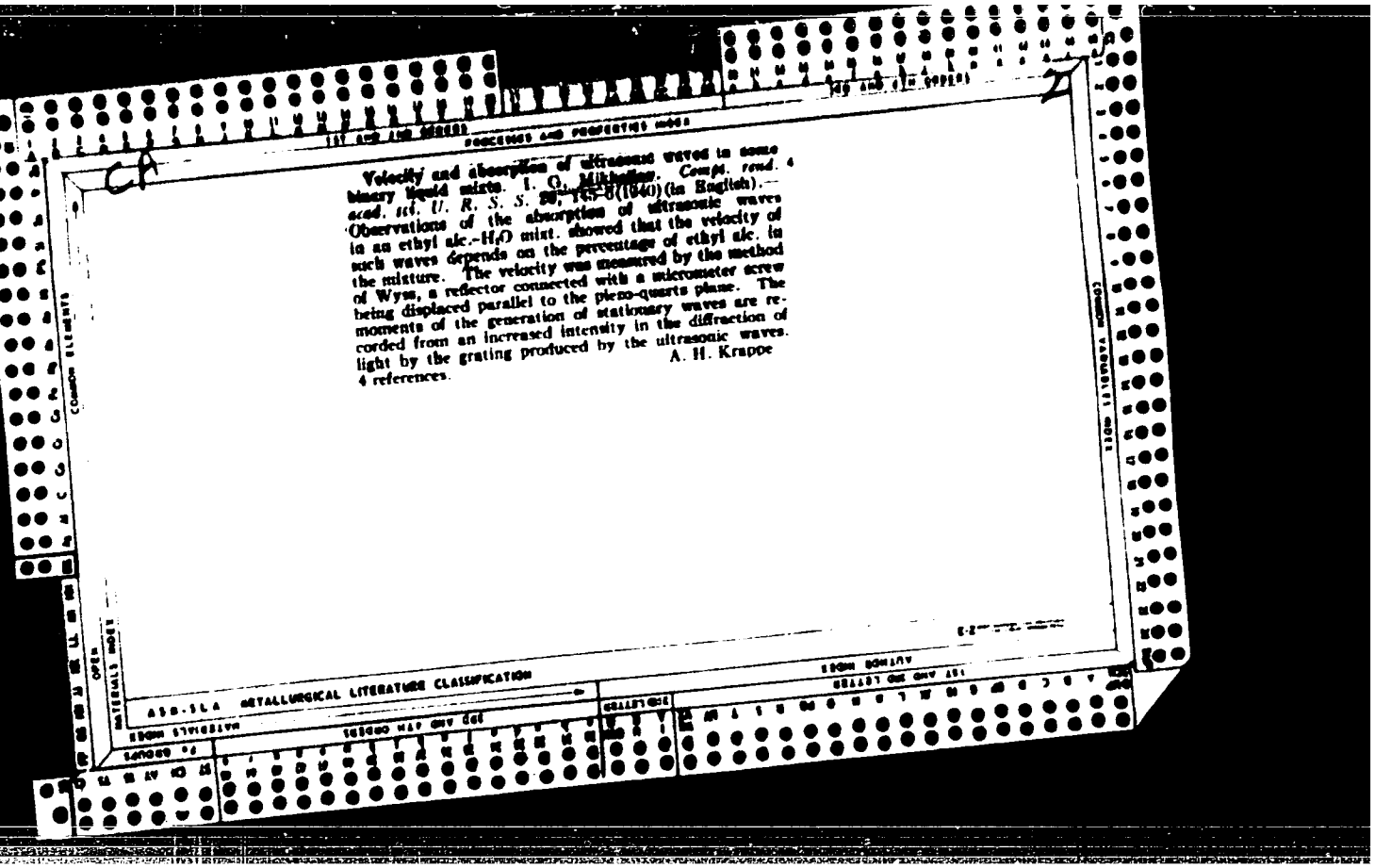
[Manual for orchard foremen on collective and state farms of the non-Chernozem zone] Spravochnik brigadira-sadovoda; kolkhozov i sovkhozov nechernozemnoi polosy. Izd.2. Moskva, Gos.izd-vo sel'khoz.lit-ry, 1959. 398 p. (MIRA 14:1)
(Fruit culture)

MIKHAYLOV, Ivan Gavrilovich, agronom; DANILEVSKAYA, O.N., red.; LEVONEVSKAYA, L.G., tekhn. red.

[Strawberries] Zemlianika. Leningrad, Lenizdat, 1961. 94 p. (MIRA 15:7)
(Leningrad Province—Strawberries)

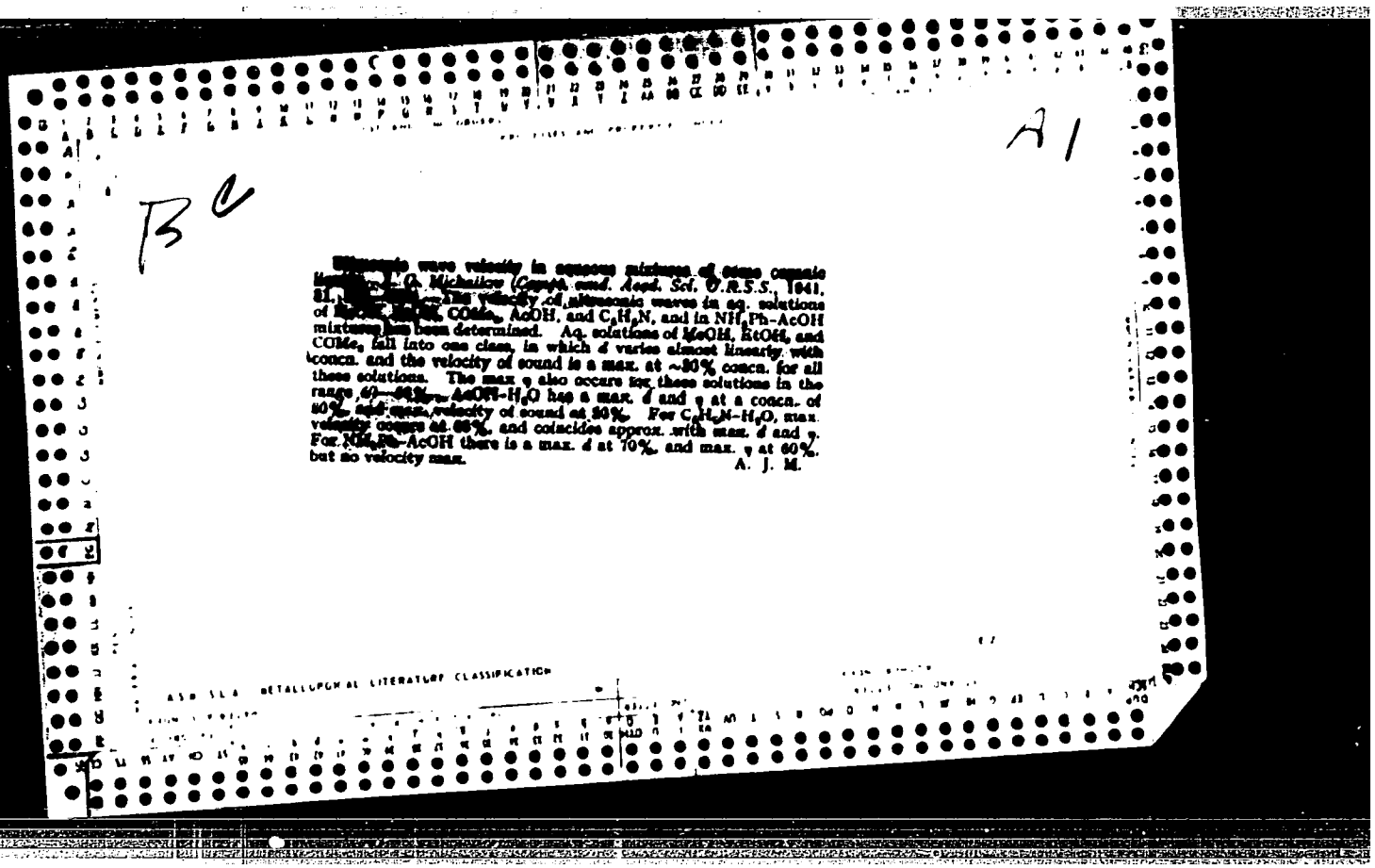


Diffraction of light in crystals by transverse elastic waves of high frequency. L. G. Mikhailov. *Bull. acad. sci. U. R. S. S., Sér. phys.* 4, 46–51 (1940).—The diffraction of light by artificial elastic waves of high frequency in crystals was investigated by observing diffraction bands from transverse waves in NaCl, KCl and quartz. The lower part of the crystal was immersed in a bath filled with transformer oil, into which a piezoelec. quartz crystal oscillator, serving as a generator of the elastic waves, was also immersed. The piezo-quartz plate was parallel to the slit of the collimator. The modulus of torsion calcd. from the exptl. data, of the velocity of propagation of transverse waves agrees well with the values obtained by static methods. Rokesalane Gamow.



Dr. Arn.

Diffraction of light from high-frequency transverse waves in cubic crystals. I. G. Michailov (Compt. rend. Acad. Sci. U. S. S. R., 1940, 26, 760-763). The propagation of ultrasonic waves through crystals is accompanied by the formation of longitudinal and transverse waves. Like the longitudinal waves, the transverse waves can also act as a diffraction grating. This effect with transverse waves has been investigated for NaCl and KCl crystals. The torsion moduli of NaCl and KCl calc. from the diffraction agree with the vals. obtained by Joffe (1908) by the static method. Under different conditions of excitation it is possible to observe the diffraction of light from the first and second transverse waves individually. The directions of the vibrations of the two waves are at right angles to each other. In order to obtain diffraction with both waves simultaneously the crystal must be oriented in such a way that the directions of vibration of the waves make an angle of 45° with the direction of the light. The diffraction phenomena could be observed with comparatively low ultrasonic-wave energies.



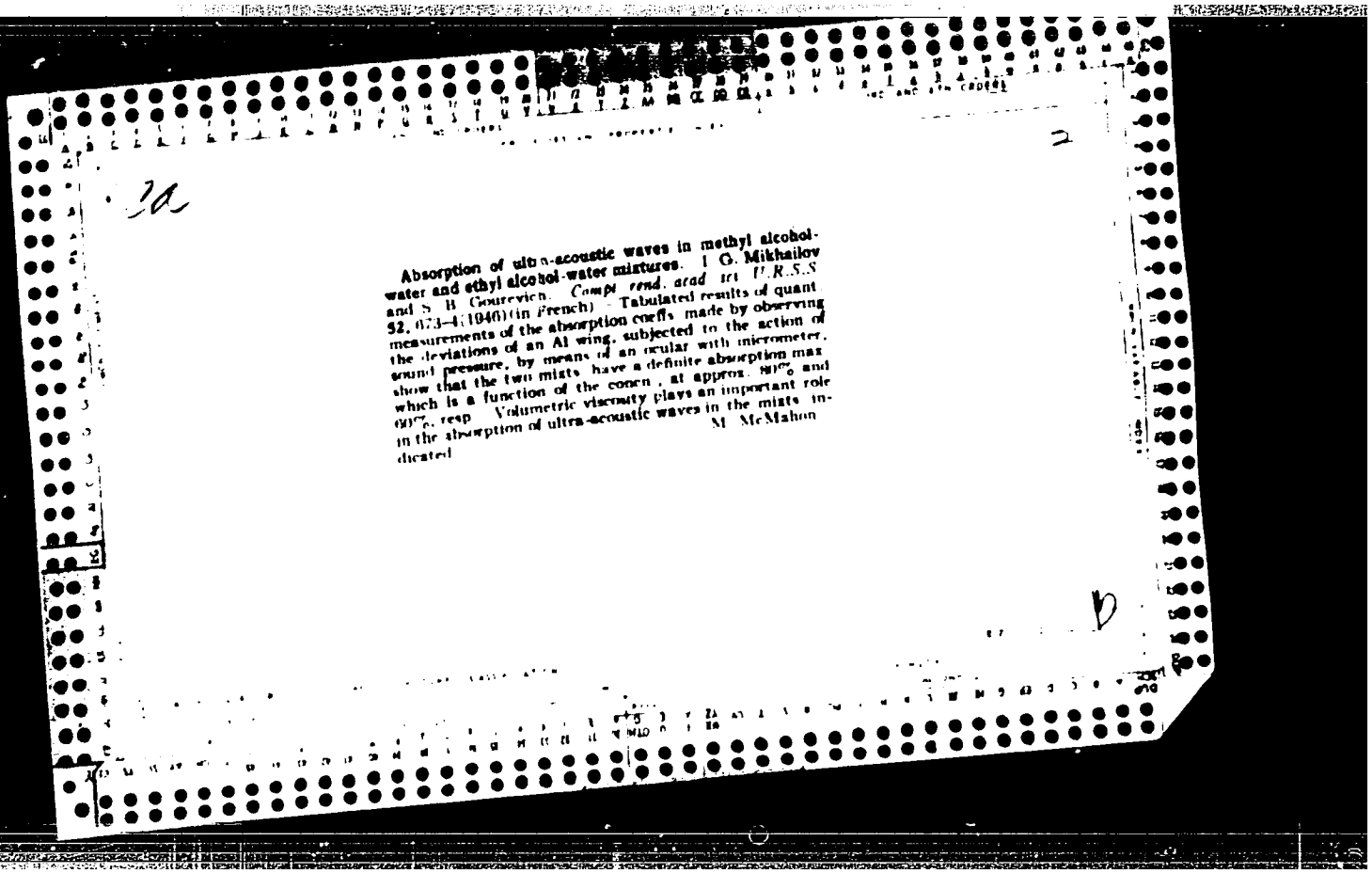
B C

A 1

Ultrasonic wave velocity in aqueous mixtures of some organic liquids. O. Michailow (*Compt. rend. Acad. Sci. U.R.S.S.*, 1941, 31, [illegible]). The velocity of ultrasonic waves in aq. solutions of [illegible], COMe$_2$, AcOH, and C$_5$H$_5$N, and in NH$_2$Ph–AcOH mixtures has been determined. Aq. solutions of MeOH, EtOH, and COMe$_2$, fall into one class, in which d varies almost linearly with concn. and the velocity of sound is a max. at ~80% concn. for all these solutions. The max. η also occurs for these solutions in the range 60—[illegible]%. AcOH–H$_2$O has a max. d and η at a concn. of 80%, and max. velocity of sound at 80%. For C$_5$H$_5$N–H$_2$O, max. velocity occurs at 68%, and coincides approx. with max. d and η. For NH$_2$Ph–AcOH there is a max. d at 70%, and max. η at 60%, but no velocity max.

A. J. M.

Ultrasonic wave velocity in formic acid-water mixtures. I. G. Michailov (*Compt. rend. Acad. Sci. U.R.S.S.*, 1941, 31, 550–553). At concns. of 1 mol. HCO_2H to 1 mol. H_2O, and 1 mol. HCO_2H to 2 mols. H_2O there are definite changes in ultrasonic velocity, the effect being greater for the first mixture than for the second. Similar changes in d, η, and other properties have also been observed at these concns. The velocity-concn. curve shows a max. at a concn. of ~20% HCO_2H. A. J. M.



Absorption of ultra-acoustic waves in methyl alcohol-water and ethyl alcohol-water mixtures. I G. Mikhailov and S B Gourevich. *Compt. rend. acad. sci. U.R.S.S.* 52, 673–4 (1946) (in French). Tabulated results of quant. measurements of the absorption coeffs made by observing the deviations of an Al wing, subjected to the action of sound pressure, by means of an ocular with micrometer, show that the two mixts. have a definite absorption max. which is a function of the concn., at approx. 80% and 60% resp. Volumetric viscosity plays an important role in the absorption of ultra-acoustic waves in the mixts. indicated. M McMahon

MIKHAYLOV, I. G.

USSR/Ultrasonic Testing Mar 1947
Structural analysis

"Ultrasonics as a Method for Studying Substance Structure," I. G. Mikhaylov, 31 pp

"Vestnik Leningradskogo Universiteta" No 3

Introduction mentions S. Ya. Sokolov as having worked on television. The distribution of supersound in gas, liquid, and solids has opened up a completely new field which can be called "micro - acoustics." Speed of absorption and dispersion of sound vibrations in gas, or mixtures, and the speed of supersonic waves in liquids and mixtures. Mathematical formulae.

16T92

MIKHAYLOV, I. G.

USSR/Physics — Oct 1947

Waves, Ultrasonic

Flow, Viscous

"Absorption of Supersonic Waves in Highly Viscous Liquids," I. G. Mikhaylov, S. B. Gurevich, Phys Inst, Leningrad State U, 3½ pp

"Dok Akad Nauk SSSR, Nova Ser" Vol LVIII, No 2

Has been noticed that actual absorption of supersonic waves in liquid much more than that as calculated according to classic theory of Stokes and Kirchoff. This difference has been explained as caused by the fact that during the observation of the acoustic phenomenon not possible to disregard

[redacted] 49T89

USSR/Physics (Contd) — Oct 1947

the phenomenon of viscosity. Authors generally discuss the absorption in viscous liquids, and submit formula for more accurate calculations. Submitted by Academician A. N. Terenin, 27 Mar 1947.

[redacted] 49T89

2

CA

Velocity of sound in some organic liquids and the molar constant of Rao. I. G. Mikhailov and A. M. Nizhin (Leningrad State Univ.). *Doklady Akad. Nauk S.S.S.R.* 58, 1669-92(1947); cf. Rao, *C.A.* 35, 3566.—Velocity of sound in PrOH (all at 20°) is 1221 m./sec.; in BuOH 1256, iso-BuOH 1306, Me_2COH 1177, n-$C_5H_{11}OH$ 1318, Me_2PrCOH 1218, $Me_2(iso-Pr)COH$ 1281, $MeEt_2COH$ 1269, iso-BuMe-CHOH 1281, $Et(iso-Pr)CHOH$ 1271, n-$C_6H_{13}OH$ 1361, PhCH-CH_2OH 1630, PhCH:CHCH(OH)Me 1487, PhCH:CHCH(OH)Et 1531, $PhNH_2$ 1659, PhNHEt 1509, $PhNEt_2$ 1470, diisobutylene 1158, triisobutylene 1306, tetraisobutylene 1281, pentaisobutylene 1334. For ROH the av. CH_2 increment of the Rama Rao const. is 190; in isobutylene polymers it is 173-185. G. M. Kosolapoff

USSR/Physics May 48
Sound, High Frequency
Sound - Absorption

"Absorption of Supersonic Waves in Liquids," I. G. Mikhaylov, S. B. Gurevich, 34 pp

"Uspekhi Fiz Nauk" Vol XXXV, No 1

Discusses Stokes-Kirchhof theory; L. I. Mandel'shtam and M. A. Leontovich's absorption theory; general relaxation theory; theory of dispersion of light; absorption in very viscous liquids; theory of absorption and relaxation processes in liquids.

11/49T102

USSR/Physics
Absorption
Waves, Ultrasonic

21 Mar 1948

"Speed and Absorption of Supersonic Waves in Certain Solid, Vitreous Bodies," I. G. Mikhaylov, Phys Inst, Leningrad State U, 3 pp

"Dok Akad Nauk SSSR, Nova Ser" Vol LIX, No 9

Author measured the absorption in polymer of methylmethacrylate which had been overpolymerized by the addition of plasticizers with the density of the specimen ρ = 1,202 g/cc. Found that in methylmethacrylate the coefficient of absorption, as in colophony with high viscosities, is proportional to the square rest of the frequency. Submitted by Academician A. N. Terenin. 27 Jan 1948. 51T97

MIKHAYLOV, I. G.

"Propagation of Supersonic Waves in Liquids" (Rasprostraneniye Ul'trazvukovykh Voln v Zhidkostyakh), I. G. Mikhaylov, edited by Academicians S. I. Vavilov, A. F. Ioffe, P. I. Lukirskiy, and V. A. Fok, and Corresponding Member of the Academy of Sciences USSR Ya. I. Frenkel', Gostekhizdat, Moscow/Leningrad, 1949, 152 pages, 5 rubles 60 kopeks.

The propagation and absorption of supersonic waves are investigated for pure liquids, mixtures, solutions, and less completely for amorphous solid substances. The investigations reported are chiefly those of Soviet scientists in the last 20 years.

SO: Uspekhi Khimii, Vol 18, #6, 1949; Vol 19, #1, 1950 (W-10083)

KHAYLOV, I. G.

PA32/49T95

SSR/Physics — Mar 49
Absorption
Waves, Ultrasonic

"Absorption and Velocity of Supersonic Waves in Certain Very Viscous Fluids and Hard Amorphous Bodies," I. G. Mikhaylov, S. B. Gurevich, Leningrad State U, 9 pp

"Zhur Eksper i Teoret Fiz" Vol XIX, No 3

Presents results of measuring absorption of ultrasonic waves in molten and solid colophony from 40 to 145° C, and also their absorption

[redacted] 32/49T95

USSR/Physics (Contd) — Mar 49

and speed in polymethylmethacrylate. Establishes that in frequency range investigated and for large viscosities, in agreement with relaxation theory, absorption coefficient in colophony decreases as viscosity increases. Reduction is roughly proportional to square root of frequency, which is not in accord with simplest form of relaxation theory. Frequency-absorption relationship discovered in polymethylmethacrylate is not accompanied by dispersion. Suggests that further development of relaxation theory may explain results. Submitted 16 Jul 48.

[redacted] 32/49T95

C.A

Absorption of supersonic waves in gelatin solutions. I. G. Mikhailov and L. I. Tarutina. *Doklady Akad. Nauk S.S.S.R.* 74, 41–4 (1950).—Absorption coeffs. α were detd. by the method of diffraction of light by supersonic waves. At room temp., at a frequency ν = 10.30 Mc., concn. of gelatin c = 0, 1.5, 3.0, 5.0, 7.0%, α = 0.030 ± 0.002, 0.048 ± 0.005, 0.082 ± 0.008, 0.093 ± 0.012, 0.090 ± 0.010 cm.$^{-1}$, and 10^{17} α/ν^2 = 28 ± 2, 45 ± 3, 76 ± 3, 86 ± 11, 84 ± 9, i.e., increasing with c up to about 3%, then remaining practically const. At ν = 8.2 Mc., c = 3.0 and 5.0, α = 0.052 ± 0.006 and 0.060 ± 0.007, 10^{17} α/ν^2 = 77 ± 8 and 88 ± 10. Linear dependence of α on the viscosity η evidently holds only at the lowest c, where there is no structure formation. At c = 1.5%, η calcd. by Stokes' formula from the velocity of sound is ~ 800 cm.$^{-1}$; the expt. value, 0.048. Thus at sufficiently high c, the static η, as measured by ordinary viscometry, does not enter into the propagation of supersonic waves. The abnormally high static η of lyophilic colloids is entirely due to the binding of a major part of the solvent by the micelles. The slow relaxation effects detd. by this binding can play a role only at very low frequencies. At supersonic frequencies, the significant short relaxation times may be linked, not with the slow displacement of micelle-solvent complexes, but with such processes as changes of shape of mols. or rotation of at. groups. The initial growth of α with increasing c may be due to such processes. The leveling off of α at higher c is evidently due to formation of a rigid structure by spatial cross-linking. Absorption of supersonic waves at this stage may be detd. by deformation or orientation of relatively short parts of the spatial net work. The fact that at c = 3 and 5% the quadratic dependence of α on ν^2 is preserved indicates that in this range ωτ is less than 1, i.e. the relaxation time τ is short. This and the very high content of H_2O in the gel account for the independence of α of c, and for the small difference in α between the gel and the pure solvent.

N. Thon

cA

Simple method of measurement of the absorption of supersonic waves in strongly absorbing solid bodies. I. G. Mikhal'tsev and V. A. Solov'ev. *Doklady Akad. Nauk S.S.S.R.* 78, 245–8(1951).—A prism of the solid examd. is immersed in H_2O; a supersonic beam is refracted through the prism, and the intensity of the refracted beam is measured with the aid of a suitable collector such as a radiometer or a piezoelec. quartz. The thickness x of the absorbing layer of solid is varied by displacement of the prism. The intensity of the transmitted beam is $I = I_0 e^{-\alpha x}$, where α = absorption coeff. of the solid, and the absorption coeff. of H_2O can be disregarded in comparison with α. The effect of reflection is eliminated automatically. Plots of log I as a function of x are linear. The expt. error is about 10% with $\alpha \sim 0.1$ and about 5% with $\alpha \sim 1$. Detns. of α were made, in frequencies ν = 1.95, 2.19, 4.87, 6.48, and 6.75 megaherts, on: rosin, α = 0.11, 0.17, 0.31, 0.45; polymethylmethacrylate, 0.33, 0.43, 0.68, 0.80, 0.91; polystyrene, 0.11, 0.14, 0.22, 0.33, 0.35; bitumen (softening temp. ~ 95°) 1.8, 2.4, 3.1, —, 3.9. Plots of log α as a function of log ν are linear for rosin and bitumen, but are distinctly curved convexly to the axis of ν for the 2 polymers. Thus

USSR/Physics - Ultrasonics in Fluids 11 Dec 51

"Velocity of Ultrasonic Waves in Certain Binary Mixtures of Organic Fluids," I. G. Mikhaylov, A. A. Chistorazum

"Dok Ak Nauk SSSR" Vol LXXXI, No 5, pp 770-782

Measure the velocity of sound (m/sec), compressibility (cm^2/dyne), and density (g/cm^3) as a function of one of the components (0-100%). Mixtures used were: $(CH_3)_2CO-CS_2$; CH_3OH-CS_2; $CH_3OH-C_6H_6$; $(CH_3)_2CO-CHCl_3$; $C_2H_5COCH_3-H_2O$. Measurements were

210T96

USSR/Physics - Ultrasonics in Fluids 11 Dec 51 (Contd)

carried out on the ultrasonic interferometer at a frequency of 2,869 cycles/sec. Cf. I. G. Mikhaylov "Propagation of Ultrasonic Waves in Fluids," 1949. Submitted by Acad A. N. Terenin 15 Oct 51.

MIKHAYLOV, I. G.

210T96

I. G. MIKHAYLOV (1949), "Rasprostraneniye Ul'trazvnkovykh Voln v Zhidkostyakh"

USSR/Chemistry - Ultrasound

Aug 52

"Review of B. B. Kudryavtsev's Book 'Application of Ultrasonic Methods in Practical Physicochemical Research,'" (V. F. Nozdrëv, reviewer)

Zhur Fiz Khim, Vol 26, No 8, pp 1218-1220

B. B. Kudryavtsev's "Primeneniye Ul'traakusticheskikh Metodov v Praktike Fiz-Khim Issledovaniy (Application of Ultrasonic Methods in Practical Physicochemical Research), Gostekhizdat, 1952, is the first Russian-language work which completely reflects achievements in the field of ultrasonics as applied to the investigation of physical and physicochemical processes. It describes work done in the USSR and abroad. The book

263T13

of I. G. Mikhaylov (1949), "Rasprostraneniye Ul'trazvnkovykh Voln v Zhidkostyakh" (Propagation of Ultrasonic Waves in Liquids), dealt only with the investigation of liquids and was therefore incomplete and one-sided. On the other hand, Kudryavtsev's book encompasses all the basic research, both theoretical and exptl, on the propagation of ultrasonic waves in gaseous, liquid, dispersed, and solid systems. It also includes a section on the application of ultrasonics in colloid chemistry.

263T13

MIKHAYLOV, I. G.

4

USSR.

534.23

5216. Propagation of ultrasonic waves in polymer solutions. I. G. MIKHAILOV AND I. A. SHAGALOVA. *Dokl. Akad. Nauk SSSR*, 89, No. 5, 829-32 (1952) In Russian. English translation, *U.S. National Sci. Found. NSF-tr-117.*

The absorption of ultrasound in solutions of polystyrene in benzene and of copanol in transformer oil, expressed as α/ν^2, where α is the coeff. of absorption and ν is the sonic frequency, increases very much less with concentration than would be predicted by calculation from Stokes' formula. The results for copanol cannot be interpreted in terms of friction of the solvent with immobile polymer molecules: the additional absorption due to the presence of solute, thus calculated, is several times that measured. A formula derived by Gotlib and Vol'kenshtein (preceding abstract), allowing for motion of the clusters of chain molecules within the solvent, gives satisfactory agreement with experiment when applied to solutions of polystyrene in benzene.

R. C. MURRAY

MIKHAYLOV, L.O., SYRNIKOV, Yu.P.

Sound velocity and structure of liquids. Vest. LGU 8 no.2:21-22 F '53. (MIRA 12:7)
(Ultrasonic waves--Speed) (Liquids)

MIKHAYLOV, I. G.

863. Mikhailov, I. G., and Solov'ev, V. A., Absorption of ultrasonic waves in liquids and the molecular mechanism of volume viscosity (in Russian), *Usp. fiz. Nauk* 50, 1, 3-50, May 1953.

Volume viscosity and the associated molecular processes are of great significance in leading to an understanding of the molecular mechanism of the liquid state, but few investigations have been made on this type of viscosity. Direct measurements can be made by determining the absorption of ultrasonic waves in liquids, and in this paper the work of a number of well-known investigators which has a bearing on the molecular mechanisms in liquids in this connection is critically examined. The high values of ultrasonic absorption obtained (super-Stokes absorption) lead to the conclusion that the molecular mechanism of volume viscosity is not completely clear, but if more suitable models could be made of the various relaxation processes, based on the theory of Mandel'shtam and Leontovich, for instance, and further work could be carried out to determine the variation of the ultrasonic absorption in liquids with temperature, then the experimental results of ultrasonic absorption could be used to study the molecular mechanisms of the liquid state. BB

Marie Goyer, England

Propagation of ultrasonic waves in polymer solutions. I. G. Mikhailov and L. A. Shagalova. *Doklady Akad. Nauk S.S.S.R.* 89, 829–32 (1953) (English translation issued as *U.S. Atomic Energy Comm. HSF-tr-117*, 1–4 (1953)).—The absorption and velocity of ultrasonic waves were detd. for a 13.4% aq. polyvinyl alc. soln., a 5.4% polyisobutylene soln. in benzene, polystyrene solns. in benzene, and Oppanol solns. in transformer oil. The absorption was measured both by a pulse method using a modified Sokolov defectoscope with carrier frequencies of 1.25, 2.50, and 3.75 Mc./sec., and by a prism method previously developed by M. and Solovyev (*C.A.* 45, 7839f) utilizing brass shells in the shape of prisms. The wave velocity was detd. with an ultrasonic interferometer. Values for the ratio of the absorption coeff. to the square of the frequency used, α/ν^2, were detd. From viscosities measured in an Ostwald viscometer, α/ν^2 was calcd. from Stoke's formula as 4400×10^{-17} and $12{,}000 \times 10^{-17}$ for the polyvinyl alc. and polyisobutylene solns., resp. The observed α was too small to be detected, and thus $\alpha/\nu^2 < 200 \times 10^{-17}$. The structural formation in the polystyrene solns. was considered to be weak, since no dependence of the viscosity on the velocity gradient was found except at the highest concn. studied, 14.2%. The absorption coeff. increased only slightly with concn.; this indicated that the mechanism of sound propagation was the same in solns. having weak structural formation and in completely structured solns., such as gelatin (M. and Tarutina, *C.A.* 45, 416d). As for the polystyrene solns., the Oppanol in transformer oil solns. showed a much smaller dependence of α on concn. than predicted from Stoke's formula. The data obtained indicated that the use of a completely stationary network model was inapplicable to ultrasonic propagation in polymeric solns. Values calcd. from the Gotlib-Vol'kenshtein equation (cf. preceding abstr.) agreed with the exptl. data for the polystyrene solns. — Philip Goodman

AYLOV, I. G.

259T95

USSR/Physics - Ultrasonic Absorption 21 Apr 53

"Absorption of Ultrasonic Waves in Certain Viscous Fluids," I. G. Mikhaylov

DAN SSSR, Vol 89, No 6, pp 991-993

Preliminary results of measurement of absorption of ultrasonic waves in refined cottonseed, tung, and castor oil, in which volumetric viscosity plays a small role. Acknowledges participation of V. S. Vasil'yeva and T. A. Kompaneyskaya in the work. Cites related works of V. N. Tsvetkov and V. Ye. Eskin (DAN SSSR, Vol 67, No 2, 1949), who

259T95

investigated orientational relaxation in castor oil by method of acoustic birefringence. Presented by Acad A. N. Terenin 2 Feb 53.

AILOV, I. G.

SR/Physics - Ultrasonics

rd : 1/1

thors : Mikhailov, I. G. and Savina, L. I.

tle : Ultrasonic wave absorption in binary liquid mixtures with one relaxation component

riodical : Dokl. AN SSSR, 96, Ed. 6, 1147 - 1150, June 1954

stract : Ultrasonic wave absorption was measured in castor oil - benzene and castor oil - cotton seed oil mixtures (binary mixtures) for the purpose of determining the relaxation mechanism of the castor oil which is considered as a relaxation component. The results obtained from measuring the absorption, speed of sound, viscosity and density of one of the binary liquid mixtures as well as the concentration and Stokes values are given in table. Absorption was measured by the liquid prism method at 5 frequencies in a mc range of 4.45 to 8.50 mc. Six references. Table, graphs.

stitution : The A. A. Zhdanov State University, Leningrad

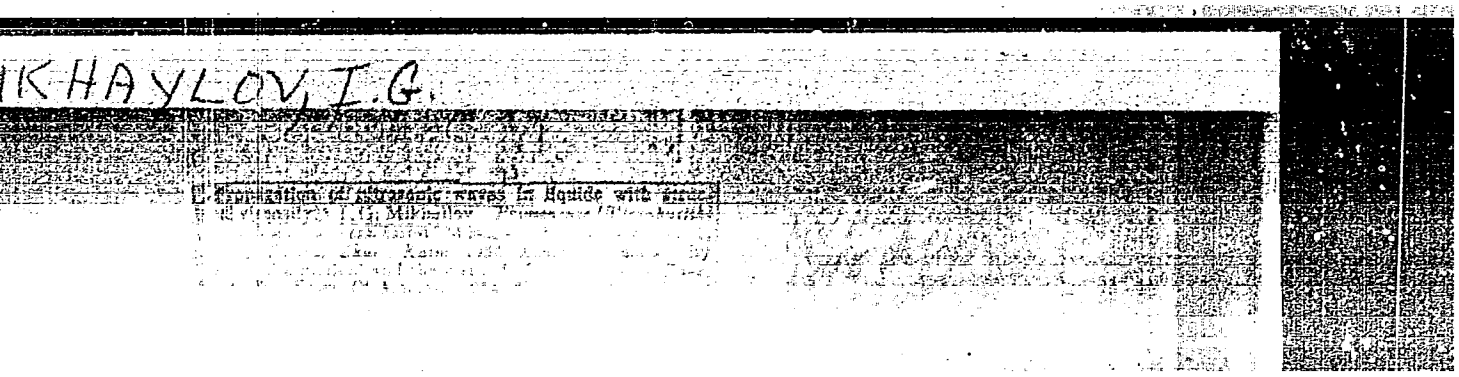
esented by : Academician A. N. Terenin, March 19, 1954

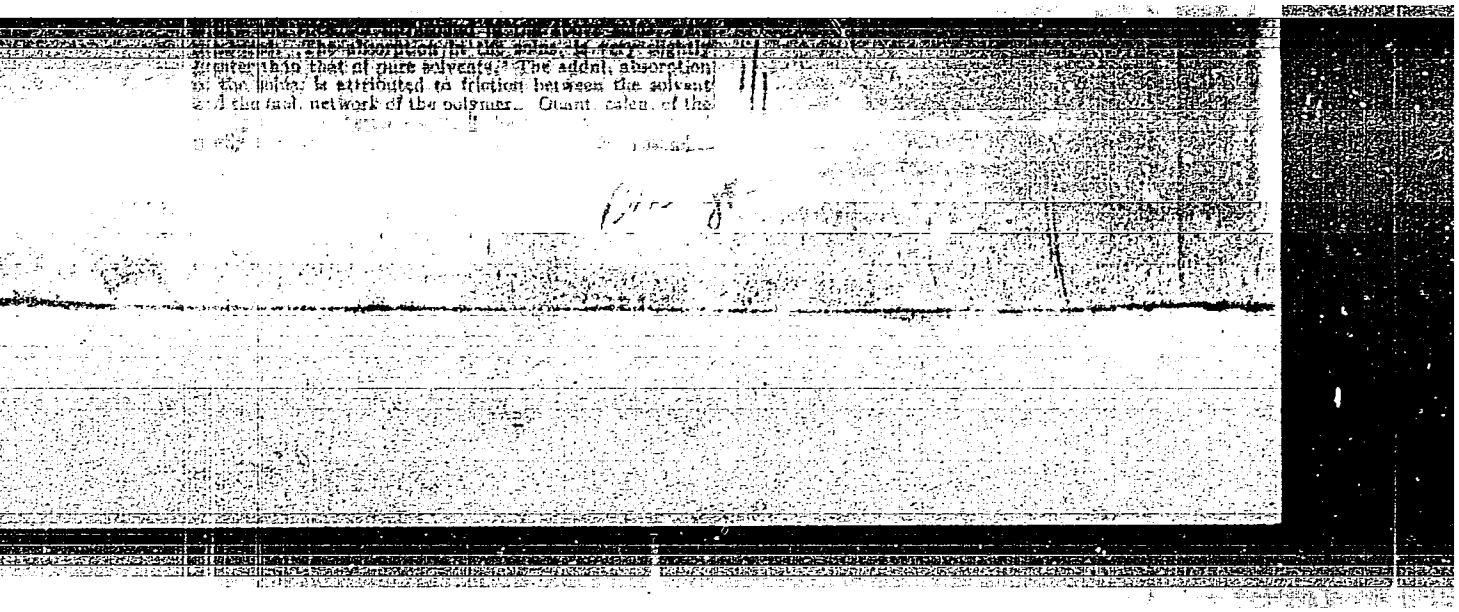
HAYLOV, I. G.

"Relaxation Mechanism Governing the Absorption of Ultrasonic Waves in Castor Oil", a report presented at a conference of professors and teachers of the institutes of the Ministry of Education RSFSR and published in the "Application of Ultrasonics to the Investigation of Substances," Moscow, 1955.

HAYLOV, I. G.

"Velocity of Sound and Compressibility of Concentrated Solutions of Strong Electrolytes", a paper presented at the second conference on the Liquid State of Matter, Kiev, 30 May to June 1955, Usp. Fiz. Nauk, April 1955





[M]IKHAYLOV, I.G.

2 Matl

M.A. YOUTZ
3 copies

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[illegible]. APPLICATION OF A COMPOSITE PIEZOELECTRIC VIBRATOR FOR INVESTIGATING MECHANICAL PROPERTIES OF POLYMERS. I.G.Mikhailov and V.A.Solov'ev. Akust. Zh., Vol. [illegible], No. [illegible], [illegible] (195[illegible]). In Russian.

The composite vibrator method in the usual form is not suitable for investigating materials with high loss and low velocity of sound such as polymers. The authors have shown it to be feasible to work with specimens of smaller cross-section than that of the piezo-crystal; some results are given. Elastic anisotropy in stretched samples of vinyl plastic has been detected by this method. C.R.S.Manders

RAW 4
PM 0
FM 0 2-MAY

HAYLOV, I. G.

"The Differential Method of measuring Ultrasonic Absorption in Liquids".

"Ultrasonic Absorption in Viscous Liquids".
Abstracted for inclusion in the Second International Congress on Acoustics, Cambridge, Mass., 17-24, 1956

Leningrad State University

USSR/Fitting Out of Laboratories - Instruments. H-
Their Theory, Construction, and Use.

Abs Jour : Ref Zhur - Khimiya. No [illegible], 1957, 868.

Author : Mikhaylov, I.G., Feofanov, G.N.

Inst : [illegible]

Title : A Differential Method for Measuring the Absorption of Ultrasonic Waves in Liquids.

Orig Pub : Akust. zh., 1956, 2, No 2, 194-198

Abstract : A differential method has been developed for measuring small differences in the absorption coefficients ($\Delta\alpha$) of ultrasonic waves in liquids. Two similar piezoelectri crystals are used to radiate ultrasonic high-frequency impulses of equal intensity and duration in a liquid. These impulses are propagated in two cells, the reference cell and the test cell, and after reflection from the opposing cell walls are received by the same piezoelectric crystals, amplified in the [illegible] and fed to the

Card 1/2

USSR/Fitting Out of Laboratories - Instruments. H-
Their Theory, Construction, and Use.

Abs Jour : Ref Zhur - Khimiya, No 3, 1957, 8681

intensities of the ultrasonic impulses is measured with an indicating instrument connected to the output of the receiver circuit. A reduction in the noise level produced by heat currents is achieved by the careful thermostating of the cells. The accuracy of the measurements of $\Delta\alpha$ with the apparatus described is 3-5%. The described method has been applied to the determination of the dependence of $\Delta\alpha$ on the temperature and on the concentration of samples of quartz sand.

Card 2/2

Mikhaylov I. G.

Category: USSR / Physical Chemistry - Solutions. Theory of acids and base. B-11

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 30093

Author : Mikhaylov I. G., Shutilov V. A.
Inst : Leningrad University. Academy of Sciences USSR.
Title : Sound Velocity and Compressibility of Aqueous Solutions of Inorganic Acids

Orig Pub: Vestn. Leningr. un-ta, 1956, No 16, 16-28. Dokl. AN SSSR, 1956, 110, No 1, 116-118

Abstract: Interferometric determinations were made of the velocity of ultrasound (frequency 6 megahertz) in aqueous solution of H_2SO_4 (4.2 - 91.3%), HCl (4.9 - 27.0%) at 15-100°, and of HNO_3 (14.5 - 61.0%) at 20-90°. Densities of solutions, in the same temperature ranges, were measured pycnometrically (with an accuracy of 0.0001 g/cm). Sound velocities in the solutions under study have a temperature (I) and a concentration (II) maximum. I -- disappears at concentration of the acid of about 30% and higher, II -- levels off with rise in temperature. In solutions of H_2SO_4 a minimum of sound velocity is

Card : 1/2 -1-

MIKHAYLOV, I. G.

USSR/Acoustics - Ultrasonics, J-4

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 35565

Author: Solov'yev, V. A., Mikhaylov, I. G.

Institution: Leningrad University, Leningrad, USSR

Title: On the Theory of the Composite Piezoelectric Vibrator

Original Periodical: Izv. AN SSSR, ser. fiz., 1956, 20, No 2, 261-267

Abstract: Description of a method of investigating the mechanical properties of high polymers over a wide frequency range (10^4 - 10^5 cycles) with the aid of a composite piezoelectric vibrator. A bar made of the investigated material is glued to the piezoelectric bar in which oscillations of the required type are excited. The resonant frequency and the Q of the composite vibrator are then measured. The contribution of the piezocrystal to the parameters of the composite vibrator can be readily eliminated. The theory of the composite-vibrator is analyzed and equations are derived for calculating the complex modulus of elasticity of the

Card 1/2

USSR/Acoustics - Ultrasonics, J-4

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 35565

Abstract: investigated substance for the following 3 types of load of the piezocrystal: load on one side; the lengths of the piezocrystal and of the specimen are chosen aribtrarily. Load symmetrical -- 2 equal specimens of arbitrary lengths. Load on one side, but the length of the specimen is so chosen that its resonant frequency is approximately the same as the frequency of the crystal. A comparison is made of the 3 variants, principally from the point of view of their use for the investigation of mechanical properties (modulus of elasticity and absorption coefficient) of high polymers.

Card 2/2

ategory : USSR / Physical Chemistry - Colloid chemistry. Disperse systems. B-14

bs Jour: Referat Zhur-Khimiya, No 9, 1957, 30256

uthor : Mikhaylov I. G., Marenina K. N.
nst : Leningrad University
itle : Absorption of Ultrasonic Waves in Suspensions

rig Pub: Vestn. Leningr. un-ta, 1956, No 22, 56-74

bstract: In a unit provided with an impulse generator a study was made of the absorption of ultrasonic waves having a frequency ν of 4 - 17.82 Mhertz, in 1 - 3% aqueous suspensions (S) of quartz sand of mean particle size d = 2.5 - 10 μ, emery (d = 5 μ) and in 0.25% S of lycopodium with spherical particles having a radius r = 15.3 μ, and in chemically prepared S of $PbCrO_4$, $PbSO_4$, $BaSO_4$, $Fe_2(SiO_3)_3$, and MnO_2. Results of the experiments are, qualitatively, in accord with deductions of the theory of S. M. Rytov et al., (Zh. eksperim. i teor. fiziki, 1938, 8, No 5, 614), but no quantitative agreement could be obtained, apparently because polydispersity of S was not

ard : 1/2 -14-

USSR/Physical Chemistry - Solutions. Theory of Acids and Bases, B-11

Abst Journal: Referat Zhur - Khimiya, No 1, 1957, 482

Abstract: solution studied good agreement was observed with the equation $\beta = \beta_0 - Ac - Bc^{3/2}$, where β is the compressibility; β_0, that of the pure solvent; c, the concentration of the electrolyte; and A and B are constants which have different values for the different salts. The concentration dependence of the sound velocity (v) is related to the molecular weight (M) of the solute salt. In solutions of salts with small M, v increases with the concentration, while in those with large M, it decreases the concentration.

Card 2/2

MIKHAYLOV, I. G.

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534.22 : 532.13

3082. VELOCITY OF SOUND IN, AND COMPRESSIBILITY OF, AQUEOUS SOLUTIONS OF INORGANIC ACIDS. I.G.Mikhailov and V.A.Shutilov, Dokl. Akad. Nauk SSSR, Vol. 110, No. 1, 116-18 (1956). In Russian.

The velocity of sound in the aqueous solutions of hydrochloric, nitric and sulphuric acids has a concentration maximum which becomes more pronounced at lower temperatures, and a temperature maximum which disappears at concentrations of 15-30%, being replaced by a linear dependence. There is a concentration minimum for the compressibility of all the acids at all temperatures, the position of the minimum being lower the lower the temperature. The light which these measurements throw on the effect of the various ions present on the structure of water is discussed. R.C.Murray

Leningrad State U. im. Zhdanov

MIKHAYLOV, I. G.

"Application of a Piezoelectric Quartz Wedge to Measurement of Absorption in Liquids,"

report presented at the Seminar on Physics, Application of Ultrasound. 4-12 Oct '57.

Leningrad Electro-Tech. Inst., Leningrad.

AUTH: Mikhaylov, I.G. and Solovev, V.A. 46-1-8/20

TITLE: Investigation into the mechanical properties of polyethylene and of paraffin by a composite vibrator method. (Issledovaniye mekhanicheskikh svoystv polietilena i parafina metodom sostavnogo vibratora.)

PERIODICAL: "Akusticheskiy Zhurnal" (Journal of Acoustics), 1957, Vol. III, No. 1, pp. 65 - 73, (U.S.S.R.)

ABSTRACT: Measurement of the dynamic Young modulus

$$E = E' + iE''$$

(where E' represents elasticity and the imaginary part E'' represents the energy loss) in polymers by the composite vibrator method has been described in their earlier works by the authors 1), 2). The sample of material under test, in the form of a rod, is attached to the surface of an axially vibrating rod of piezo-electric material. The self-resonant frequency and mechanical losses in the sample are then determined from the change in the resonant frequency of the equivalent resistance of the vibrator. If resonant frequencies both of the piezo-electric rod and of the sample are nearly equal, a sample rod of a smaller diameter than that of quartz may be used 1), which permits wider application of the method, namely, for testing materials with low sound speed and high losses. In the present article, the method is applied to the investigation of mechanical properties of polyethylene and paraffin (used for condensers filling, mean molecular, cryosopic in benzole weight 490) in a wide temperature range,

Card 1/3

Investigation into the mechanical properties of polyethylene and of paraffin by a composite vibrator method. (Cont.)

-165 to + 90 °C, in which the sound velocity drops to the order of 250 m/sec. Measurements were made at 40.0, 60.5, 75.0 and 100.3 kc/s, in a thermostatically-controlled (to within 0.1 ÷ 0.3 °C) ambience. The self-resonant frequencies of samples were within 10⁻⁴ of the frequency of the quartz. Results are presented as graphs of E', E" and of the logarithmic decrement as functions of the temperature.

A peculiarity of the curves of temperature dependence of the sound velocity, both of polythene and paraffin is a very rapid fall of the velocity with temperature. Curves for E" (energy losses) show a distinct broad maxima. Although their positioning is not accurately determined and the temperature interval rather narrow it can be reasonably firmly established that these maxima, when frequency is increased, tend to shift towards the high temperature region, which implies that they are of relaxation origin. Comparison with dielectric measurements shows that the form of relaxation spectra in both cases differs, though the positioning regions coincide very well. No dispersion can be observed, which cannot be explained from the point of view of relaxation theory. The results for polyethylene are largely in accordance with results obtained by others. From theoretical considerations, a third maximum should be expected for E" in the investigated temperature

Investigation into the mechanical properties of polyethylene and of paraffin by a composite vibrator method. (Cont.)

range, but it is probably masked by the too small value of the investigated moduli.
5 graphs are included. There are 10 references, of which 7 are Russian.

SOCIATION: Leningrad State University (Leningradskiy Gosudarstvennyy Universitet.)

BMITTED: May 10, 1956.

AILABLE:

ard 3/3

AUTHOR: Mikhaylov, I.G. 46-2-11/23

TITLE: Absorption of ultrasonic waves in viscous liquids. (Pogloshcheniye ultrazvukovykh voln v vyazkikh zhidkostyakh)

PERIODICAL: "Akusticheskiy Zhurnal" (Journal of Acoustics), 1957, Vol.3, No.2, pp. 177-182 (U.S.S.R.)

ABSTRACT: The absorption of ultrasonic waves in viscous liquids has been investigated very little. Bazhulin (4) has established a second power relation between absorption and frequency in glycerine, in the 5 - 20 Mc/s range. No agreement can be found in literature as to the absolute value of absorption. Bazhulin (1) has found that at t^0 = 21 C the experimentally obtained values differ by 30% with the Stokes figure: Litovich (5) has found them differing by the factor of 2. Absorption in castor oil and other vegetable oils has been measured by Bazhulin and I. Mikhaylov (4), (6). In the present article, the author presents the results of his measurement of absorption of ultrasonic waves, using the impulse method, for three different experimental conditions: 0.26 - 2.5 Mc/s, 4.0 - 18 Mc/s and 15 - 30 Mc/s. The sound velocity was measured with an ultrasonic interferometer, the viscosity - with an Ostwald viscosimeter and density with a picrometer. Absorption in castor oil, tung-oil, peanut oil,

Card 1/2

AUTHOR: Mikhaylov, I.G. and Shutilov, V.A. 46-2-20/23

TITLE: The diffraction of light by ultrasonic waves of large amplitude. (Diffraktsiya sveta na ultrazvukovykh volnakh bol'shoy amplitudy) (Letters to the Editor)

PERIODICAL: "Akusticheskiy Zhurnal" (Journal of Acoustics), 1957, Vol.3, No.2, pp. 203-204 (U.S.S.R.)

ABSTRACT: A series of photographs of light spectra in liquids, subjected to various sound intensities and at different distances between the quartz and the light beam intersecting the ultrasonic field, were taken in an endeavour to establish the law, governing the asymmetry of the diffraction spectrum when large amplitude ultrasonic waves are present in the liquid. The description of the measuring arrangement is given. It is thought that the observed asymmetry is the result of distortion of the ultrasonic waveform, due to the presence of shock-waves. The existence of the latter in liquids has been experimentally established by Zarembo et al. (4) and subsequently confirmed by Fox and Wallace (5), (6). Following calculations of Biguard (7), the authors have satisfied for the conditions of the shock-waves initiation. They also mention that within the range of the sound intensities used, the ultra-sound velocity remained constant (within the experimental error of approx.

AUTHORS: Mikhaylov, I.G. and Fedorova, N.M.

TITLE: Absorption of Large Amplitude Ultrasonic Waves in Structurated Solutions (Pogloshcheniye ul'trazvukovykh voln bol'shoy amplitudy v strukturirovannykh rastvorakh)

PERIODICAL: Akusticheskiy Zhurnal, 1957, Vol.III, Nr 3, pp.239-242 (USSR)

ABSTRACT: The propagation of ultrasonic waves of large amplitude in liquids is of major interest. It was shown in (Refs.1 and 2) that the coefficient of absorption of ultrasonic waves depends on the intensity of ultrasound. So far this effect has only been observed in some pure liquids. The present authors have studied the absorption of ultrasonic waves of large amplitude in solutions having structural viscosity. It might be expected that in this case at large intensities a break up in the structure of the solution would occur. This would necessarily have an effect on the coefficient of absorption as a function of intensity of ultrasound. Thus, a study of the absorption of ultrasonic waves of finite amplitude may lead to information on the interactions between molecules of structurated solutions. For these reasons the absorption of ultrasonic waves of finite amplitude was measured in solutions of a number of polymers (polyizobutylene

46-3-5/15

Absorption of Large Amplitude Ultrasonic Waves in Structurated Solutions.

There are 4 figures and 5 references, 3 Russian and 2 English.

ASSOCIATION: Leningrad State University (Leningradskiy gosudarstvennyy universitet)

SUBMITTED: July 25, 1956.

AVAILABLE: Library of Congress.

Card 3/3

45-6-17/17

AUTHORS: Mikhaylov, I.G., and Shutilov, V.A.

TITLE: An Apparatus for Measuring the Absolute Intensity of Ultrasound (Pribor dlya izmereniya absolyutnoy intensivnosti ul'trazvuka)

PERIODICAL: Akusticheskiy Zhurnal, 1956, Vol.III, Nr 4, pp. (USSR)

ABSTRACT: The apparatus consists (cf. Fig.) of a Dewar vessel, 1, which is filled with a working substance, 2. The vessel is covered with a ground glass cap, 3, having a [illegible] (cf. 4 in Fig.), 4. Sound waves enter the vessel through this window and are absorbed by the working substance. [illegible] to prevent reflections from the bottom of the vessel, the latter is made in the form of a cone at the end [illegible] filled with glass wool. The beam entering the vessel is reflected by the truncated conical reflector, 7. [illegible] is attached to the rod, 8, which serves as a [illegible]. If the sound waves enter the dewar they are absorbed [illegible] by the working substance which expands through the

Card 1/2

46-4-17/17

Library of Congress.

1. Ultrasound intensity-Measurement

MIKHAYLOV I.G.

AUTHORS: Mikhaylov, I. G., Savina, L. I., Fedorov, G. N. 56-4-5/20

TITLE: Speed of Sound and Compressibility of Strong Electrolyte Concentrated Solutions (Skorost' zvuka i szhimayemost' kontsentrirovannykh rastvorov sil'nykh elektrolitov).

PERIODICAL: Vestnik Leningradskogo Universiteta Seriya Fiziki i Khimii, 1957, Vol. 22, Nr 4, pp. 25-42 (USSR).

ABSTRACT: The ultrasonic velocity in aqueous salt solutions has been measured by an ultra sonic interferometer. An ultra sonic velocity of 1482.2 m/sec. at 20°C in pure water has been found, as against 1557.0 m/sec. at 73.5°C. The water represents an exceptional case as compared with the measurements in salt solutions, for at all the other liquids examined the ultrasonic velocity goes steadily down at a rising temperature. The specific physical properties of the water are attributed to the specific properties of its structure. The ions introduced into the water by the solution of the salts destroy the normal structure of the dipole molecule of the water by the strong effect of the elector static fields the more the higher the salt concentration, thus also the position of the maximum of the ultrasonic velocity ought to change. The examinations show, that with all solutions the maximum moves more or less to

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Speed of Sound and Compressibility of Strong Electrolyte Sol... /2
Concentrated Solutions

range of lower temperatures. The concentration dependence of the ultrasonic velocity depends on the molecular weight of the salt, as well as on the rate of influence of the cations and anions upon the structure of the solution.
This study has been carried out in the ultrasonic laboratory of the branch for molecular physics of the faculty of physics at the Leningrad State University.
There are 7 figures, 14 tables, and 7 references, 4 of which are Slavic.

SUBMITTED: March 29, 1957.

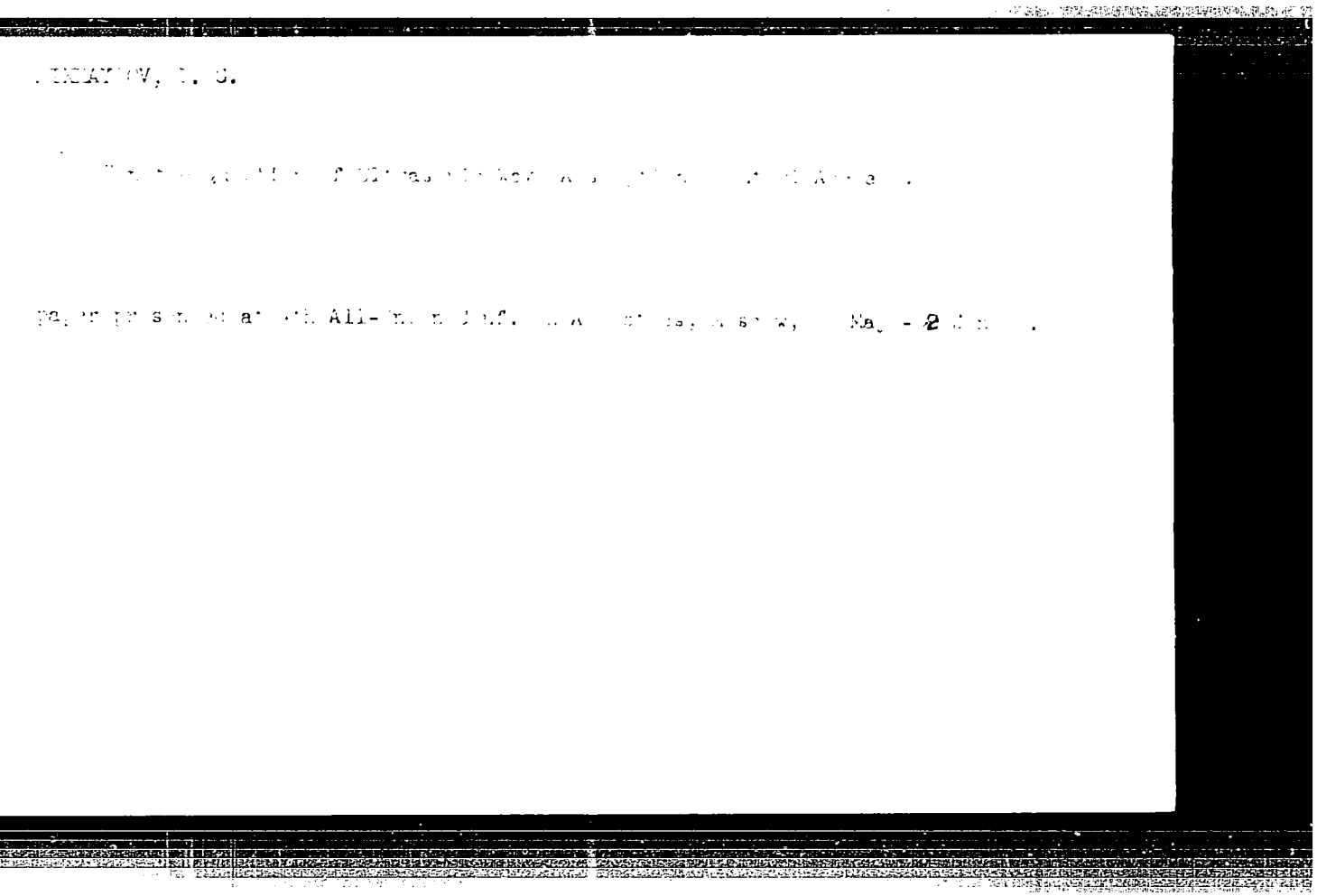
AVAILABLE: Library of Congress.

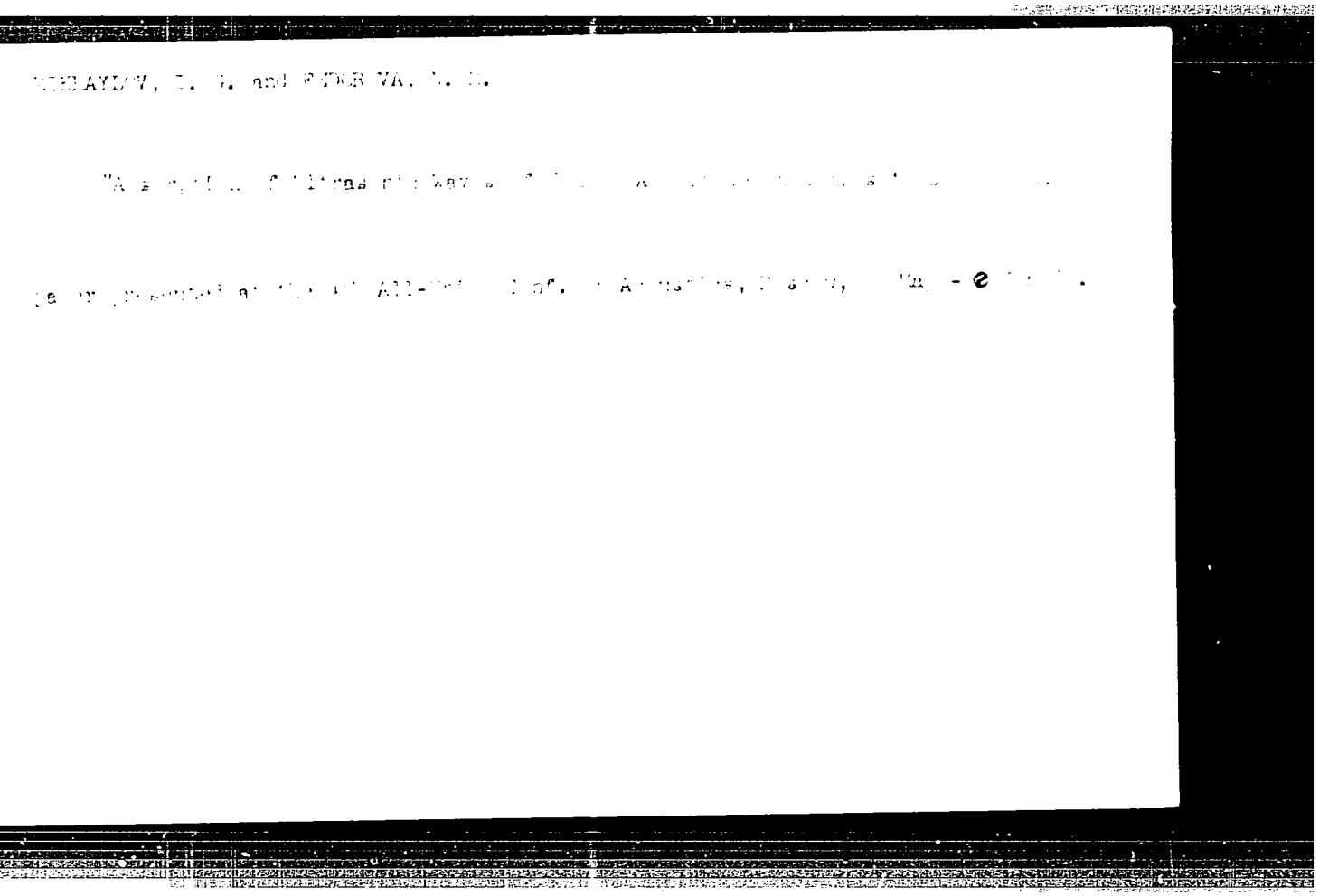
Card 2/2

MIKHAYLOV, I. G., KOSHKIN, N. I., LUTOVININ, V. S., NOZDREV, V. F. and STAROSTINA, O. A.

"Absroption of Sound in Acetates."

report presented at the 6th Sci. Conference on the Application of Ultrasound in the investigation of Matter, 3-7 Feb 1958, organized by Min. of Education Rsfsr and Moscow Oblast Pedagogic Inst. im N. K. Krupskaya.





MIKHAYLOV, I. G. and SHUTILOV, V..A.

"Optical Investigations of Ultrasonic Waves of Finite Amplitude in Liquids"

Report submitted at the XXXXXX [illegible] Acoustical Society, [illegible] - 2 [illegible]

MIKHAYLOV, I. G. and MARENINA, K. N.

"Sound Absorption in Suspensions."

Report presented at the [illegible] Acoustics, May - June [illegible].

2A(1) FIAM I BOOK EXPLOITATION SOV/1627

Vsesoyuznaya akusticheskaya konferentsiya. 4th, Moscow, 1958

Chetvertyy dokladov (Abstracts of Reports at the Fourth All-Union Acoustical Conference) Pt. 2. Moscow, Akad. nauk SSSR, 1958. 44 p. Number of copies printed not given.

Sponsoring Agency: Akademiya nauk SSSR.

Resp. Ed.: L.M. Brekhovskikh, Corresponding Member, USSR Academy of Sciences.

PURPOSE: These abstracts are intended for scientists and engineers interested in acoustics.

COVERAGE: This is a mimeographed collection of brief abstracts of papers presented at the Fourth All-Union Acoustical Conference. The subjects covered are propagation of sound in nonhomogeneous media, nonlinear acoustics, ultrasonics, acoustic measurements, electroacoustics and architectural and structural acoustics.

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МИКЕЛАДЗЕ, Т. Г.: Doc Phys-Math Sci (Abs) --- "Investigation of the diffusion of ultrasonic waves in liquids". Leningrad, 1955. 2[illegible] pp (Leningrad Order of Lenin State U im A. A. Zhdanov), 150 copies (KL, No [illegible], 1956, 103)

MIKHAYLOV, I.G., kand. fiz.-mat. nauk; MYASNIKOV, L.L., prof., nauchnyy red.; VLADIMIRSKIY, D.M., red. izd-va; GURDZHIYEVA, A.M., tekhn. red.

[Ultrasonic waves and their application] Ul'trazvuk i ego primenenie. Leningrad, Ob-vo po rasprostraneniiu polit. i nauchn. znanii RSFSR, Leningr. otd-nie, 1958. 46 p. (MIRA 11:9)
(Ultrasonic waves)

Mikhaylov, I. G.

24(1) PHASE I BOOK EXPLOITATION SOV/3150

Vserossiyskaya konferentsiya professorov i prepodavateley pedagogicheskikh institutov

Primeneniye ul'traakustiki k issledovaniyu veshchestva; trudy konferentsii, Vyp. 7 (Application of Ultrasonics for Analysis of Substances; Transactions of the All-Russian Conference of Professors and Teachers of Pedagogical Institutes, Nr 7) Moscow, Izd. MOPI, 1958. 283 p. 1,500 copies printed.

Tech. Ed.: S. P. Zhitov; Eds.: V. F. Bozdrev, Professor, and B. B. Kudryavtsev.

PURPOSE: This book is intended for physicists, technicians, aeronautical engineers and other persons concerned with ultrasonics.

COVERAGE: The book contains twenty eight articles which treat ultrasonic phenomena in five general categories: 1) historical data on the development of ultrasonics in the Soviet Union over the past forty years; 2) the speed of sound in suspensions of varying concentration and number and type of components and the relationship between sound velocity and the compressibility of electrolytes; 3) ultrasonic investigations of physical and chemical properties of materials and the determination of physical and chemical constants, e. g. density of aqueous solutions, adiabatic compressibility, molarity of solutions (with given temperatures), viscosity, surface tension, saturation pressure and also ultrasonic investigation of the carbon content and petrographic state of coal; 4) industrial applications of ultrasonics, e. g. emulsification of reagents, cleansing of textile fibers and enhancing the susceptibility of some synthetic fibers to dyeing, etc.; and 5) apparatus which produce ultrasonic waves. No personalities are mentioned. References accompany each article.

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[illegible]

24(1) PHASE I BOOK EXPLOITATION SOV/1211

Nozdrev, Vasiliy Fedorovich

Primeneniye ul'trakustiki k issledovaniyu veshchestva (Application of Ultrasonics in Molecular Physics) Moscow, Fizmatgiz, 1958. 456 p. 5,000 copies printed.

Eds.: Sushkov, B.N., and Ye. K. [illegible] Tech. Ed.: Murashova, N.Ya.

PURPOSE. This book is intended for post-graduate research students and students of advanced courses in the field of molecular physics and acoustics. It may also serve as an aid to engineers and technicians in different branches of industry.

COVERAGE: This book deals with the physical principles of the optical and impulse methods of measuring the velocity and coefficient of absorption of ultrasonic waves in liquids and gases. Special attention is given to apparatus and methods of measuring the velocity and coefficient of absorption of ultrasonic waves in liquids and their vapors at high temperatures and pressures, including the critical region. Tables of acoustic properties, constants, and parameters of many substances are included. Research data from Soviet institutions, foreign institutions and individual scientists which have a dir-

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ect bearing on the subject matter of this book are given, including the results of the Second International Congress on acoustics held in the USA in June 1956. The author states that this book is not a complete survey, but that it presents the results of many years of work by personnel of the Laboratoriya molekulyarnoy akustiki MOPI (Laboratory for Molecular Acoustics of the Moscow State Pedagogical Institute imeni N.K. Krupskaya) and part of the work by the Faculty of Molecular Physics of Moscow State University, headed by A.I. Prokhorov, Corresponding Member, Academy of Sciences, USSR. The author states that there are three works in the Russian language which contain complete data on developments in ultrasonics up to 1956. They are: "Rasprostraneniye ul'trazvukovykh voln v zhidkostyakh." (Propagation of Ultrasonic Waves in Liquids), by I. Mikhaylov; "Primeneniye ul'trazvuka k issledovaniyu v praktike fiziko-khimicheskikh issledovaniy" (The Application of Ultrasonic Methods in Practical Physicochemical Investigations), by L. Kasyanov; and "Ul'trazvuk" (Ultrasonics), by L. Bergmann; the latter is a translation from the German. The author thanks his teacher, Professor A.S. Predvoditelev for discussions on the most difficult problems of molecular acoustics, Professor S.Ya. Sokolov, Corresponding Member of the Academy of Sciences, USSR, Professor S.N. Rzhevkin, N.K. Semenchenko

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and B.B. Kudryavtsev for carefully reviewing the manuscript; and Candidates of Sciences N.I. Koshkin, L.F. Lapeshin, V.F. Yakovlev, N.A Dmitriyeva, post-graduate student V.M. Kovaleva, and L.G Belinskaya for assistance in preparing the manuscript for publication. There are 280 references, of which 178 are Soviet, 1 Dutch, 76 English, 13 French, 21 German and 1 Scandinavian.

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3-10-59

AUTHORS: Mikhaylov, I. G., Fedorova, N. M. SOV/[illegible]

TITLE: Propagation of Ultrasonic Waves in Polymer Solutions (Rasprostraneniye ul'trazvuka v rastvorakh polimerov)

PERIODICAL: Vestnik Leningradskogo universiteta. Seriya fiziki i khimii, 1958, Nr 3, pp [illegible] (USSR)

ABSTRACT: The authors investigated the propagation of ultrasonic waves of small and of great amplitude in concentrated polymer solutions; simultaneously they measured the structural viscosity of these solutions. The solutions of poly-isobutylene in gasoline; of perbutane in toluene, acetone, and bromobenzene; of polystyrene in toluene and bromobenzene were examined. It turned out that the absorption in these solutions differs only little from the absorption in the pure solvents. Substances of a bulk viscosity as low as possible were employed as solvents. Data on poly-isobutylene solutions are given in table 1. It can be seen that relaxation occurs if the concentration is increased. The same phenomenon can be observed in a solution of perbutane in toluene as well (Table 2). This corresponds to the calculation by Gotlib and Vol'kenshteyn. When the intensity is increased

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it does not vary linearly as the distance any more. This fact leads to the conclusion that the absorption coefficient itself is dependent on the intensity. In the case of intensities higher than the so-called threshold intensity the magnitude of the received pulse depends on the duration of irradiation. Hence, it can be derived that at intensities higher than the threshold intensity a change in the capability to absorb takes place apparently connected with a change of the structure of the solution. The time-dependent change of the received pulses has been observed to go on in perfectly the same way on the occasion of small and high amplitudes (Fig 9). The change of the absorbtion power of the medium depends on the viscous loss because of the destruction of the structure of the solution. Furthermore it was found out that after having stopped the ultrasonic irradiation the initial acoustic properties of the solution are completely established. This shows that at intensities above the threshold intensity tixotropic phenomena occur. They are connected with the rupture of the Van der Waals nodes in the polymer lattice. The amount of the threshold intensity depends only on the nature of the dissolved polymer and of the solvent, but neither on the concentration nor on the molecular weight of the polymer.

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All results indicate the possibility of applying ultrasonic methods for the investigation of the structure of polymer solutions and for the determination of the energy of the node bindings. There are 3 figures, 2 tables, and 10 references, 6 of which are Soviet.

SUBMITTED: March 5, 1958

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AUTHORS: Mikhaylov, I.G. and Shutilov, V.A. 46-4-2-10/20

TITLE: Diffraction of Light on Ultrasonic Waves of Large Amplitude (Difraktsiya sveta na ul'trazvukovykh volnakh bol'shoy amplitudy)

PERIODICAL: Akusticheskiy Zhurnal, 1958, Vol IV, Nr 2, pp. 174-183 (USSR)

ABSTRACT: The present authors reported earlier (Ref 1) that on transmission of a light beam through a liquid layer, in which ultrasonic vibrations of large amplitude were excited, a diffractional image with asymmetrical distribution of the diffractional maxima was observed. It was also reported that with increase of distance between the sound source and the light beam, this asymmetry increases. Fig 1 repeats in qualitative form the results obtained in Ref 1 by giving the distribution of intensity in diffractional maxima for three distances between the sound source and light beam (7, 25, 65 cm respectively) and for various values of the sound intensity. The curves in Fig 1 are envelopes of microphotograms of maxima with the highest intensities, as shown in Fig 1, 1. All curves have, in general, two maxima which are resolved only at sufficiently high acoustic sound intensities. Fig 2 shows photographs of diffractional images corresponding to curves of Fig 1.

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Diffraction of Light on Ultrasonic Waves of Large Amplitude 46-4-2-10/20

These photographs and curves illustrate diffraction of light on ultrasound of 573 kc/s frequency (0.26 cm wavelength) and up to 15 W/cm^2 intensity at a depth of 2 cm in distilled water. The present paper deals with the interpretation of the diffractional image asymmetry. The authors suggest that the cause of this asymmetry lies in the distortion of the sinusoidal form of sound wave at large acoustic intensities. The sinusoidal wave is assumed to be distorted into saw-tooth form at high ultrasound intensities. Calculations assuming saw-toothed wave are in good qualitative agreement with the experimental data on the distribution of light in diffractional images obtained earlier by the authors. These calculations took into account only the phase modulation of light, excluding the amplitude modulation. This does not mean, however, that the latter is absent and in general modulation should be regarded as mixed, i.e. amplitude and phase modulation present together. The authors thank S.M. Rytov for his advice. There are 6 figures

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Diffraction of Light on Ultrasonic Waves of Large Amplitude

and 10 references, 3 of which are Soviet, 2 German, 1 Swiss, 1 American, 1 English, 1 French and 1 translation of Western work into Russian.

ASSOCIATION: Leningradskiy Gosudarstvennyy Universitet (Leningrad State University)

SUBMITTED: May 4, 1957

Card 3/3 1. Sound—Distortion 2. Light—Refraction 3. Ultrasonic waves —Applications

AUTHOR: Mikhaylov, I.G. 46-4-2-15/20

TITLE: On the Problem of Absorption of Ultrasonic Waves in Ethyl Acetate (K voprosu o pogloshchenii ul'trazvukovykh voln v etilatsetate,

PERIODICAL: Akusticheskiy Zhurnal, 1958, Vol IV, Nr 2, pp 199-200 (USSR)

ABSTRACT: Recently V.F. Nozdrev et al. published a number of papers on absorption of ultrasonic waves in acetates and formates (Refs 1-3). These papers confirmed the known fact of the existence of relaxation in such liquids. They also found that, e.g. in ethyl acetate, two maxima are observed on the curve $\alpha\lambda = f(\nu)$, where α is the coefficient of absorption, λ is the acoustic wavelength and ν is the ultrasound frequency. These maxima were found in the frequency region 3-30 Mc/s and the corresponding relaxation times were calculated to be 0.98×10^{-8} and 2.65×10^{-8} sec at 20°C. The present author disputes the relaxational nature of both these maxima. He points out that the relaxational theory shows that to resolve two relaxational maxima in measurements whose precision is of the order of 5-10%, these relaxation times must differ by a factor of not less than 10. Thus, if in ethyl acetate there are two maxima in the region 3-30 Mc/s, they are not relaxational maxima. This was pointed out by the present author

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On the Problem of Absorption of Ultrasonic Waves in Ethyl Acetate

and his co-workers at various conferences in 1956-7. Since after discussions at these conferences the problem of the nature of these maxima was still an open question the author carried out some further measurements of ultrasound absorption in ethyl acetate. These were made using a pulse method in the temperature region -40°C to +20°C. A piezo-quartz wedge was used as the ultrasonic source. The method used was carefully checked on a number of known liquids such as m-xylol, benzene and others, and good agreement was obtained between the results reported earlier by other authors and those obtained using the wedge method. The author found that in the region 5-20 Mc/s the experimental points for ethyl acetate at all temperatures lie on a curve of the form $\alpha/\nu^2 = A/[1 + (\nu/\nu_r)^2] + B$, where ν_r is the relaxation frequency. This curve is given in a figure on p. 199 and the experimental points obtained by the present author are shown as circles, while those of V.F. Nozdrev and A.M. Sultanov (Ref 1) are shown as crosses. All these results were obtained at 20°C. The values of constants in the equation for the curve shown in the figure are $A = 70 \times 10^{-17}$ and $B = 32 \times 10^{-17}$. The relaxation time is

On the Problem of Absorption of Ultrasonic Waves in Ethyl Acetate

calculated to be 1.25×10^{-8} sec. The author's curve agrees well with that of Karpovich, given by Beyer and Jacob (Ref 4) and with the majority of experimental data given in Ref 4. The figure on p. 199 shows that there is a considerable difference between the results of Nozdrev and Sultanov and those of the present author particularly at frequencies below 20 Mc/s. The present author regards Nozdrev and Sultanov's results, as well as those of Beyer and Smith (Ref 5), to be in error. In the present author's opinion only one relaxational region exists in ethyl acetate. It is suggested, however, that at frequencies greater than 100 Mc/s there should exist a second relaxational region in ethyl acetate. There are one figure and five references, three of which are Soviet and two American.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: December 16, 1957

Card 3/3 1. Waves—Absorption 2. Ethyl acetate—Applications

AUTHORS: Mikhaylov, I.G., Sobolyev, V. A., Syrnikov, Yu. P.

TITLE: The Main Problems of Certain Theories for Acoustics (Osnovnyye problemy nekotorykh teoriy akustiki)

PERIODICAL: Akusticheskiy Zhurnal, 1958, Vol. 4, Nr. 1, pp. 11-[illegible] (USSR)

ABSTRACT: This is a review of the present state of [illegible]. Both Western and Russian work is considered. In view of relative simplicity of ultrasonic methods the velocity of sound has been measured in a very large number of liquids. The velocity has been correlated with various macroscopic and microscopic properties of liquids and various empirical rules have been suggested. Among the empirical rules is the one due to Rao. The authors point out that in their opinion Rao's rule does not summarise any special molecular mechanism. This is shown above all by the approximate nature of this result and its limited range of applicability. The correct way of developing theoretical rules for acoustics would be to calculate the compressibility and hence the velocity of sound, rather than to try and find a theoretical foundation for Rao's law. However, as is well known, this is very difficult and has not as yet been done. Some attempts have been made to calculate the velocity of sound directly from

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molecular sound relations (Refs.1 and 2) but in these attempts the velocity was obtained not through a solution of the kinetic equations but by using very simplified models. The calculations give the right order of magnitude for the velocity of sound but they are quite useless in providing information on the actual structure of the particular liquid. Relaxation theory points to a connection between volume viscosity and irreversible processes leading to equilibrium. Some work on this has been done by Mandel'shtam and others (Refs.15 and 17). In the authors' opinion, Frenkel's theory gives the most correct physical picture of the structure of liquids. Unfortunately, at the present time the mathematical apparatus of this theory is not sufficiently developed. The authors consider that a development of Frenkel' theory in general, and the application to the calculation of irreversible relaxation processes, would be of major value in the present problem. A more detailed discussion of the present review is the problem as to whether relaxation processes or

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the only reason for the ... of volume viscosity. The authors consider ... it is. ... experimental ... pointed out that in many experiments on ... sound in liquids the intensity of the ultrasound ... not taken into account. ... established (Refs.9-24) that the coefficient of absorption does depend on the intensity even for relatively low amplitudes. Another experimental ... absorption of ultrasonic waves ... wider frequency range. ... references, of which 26 are Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: September 14, 1957.

1. Acoustics 2. Sound--Velocity 3. Liquids--Acoustic properties