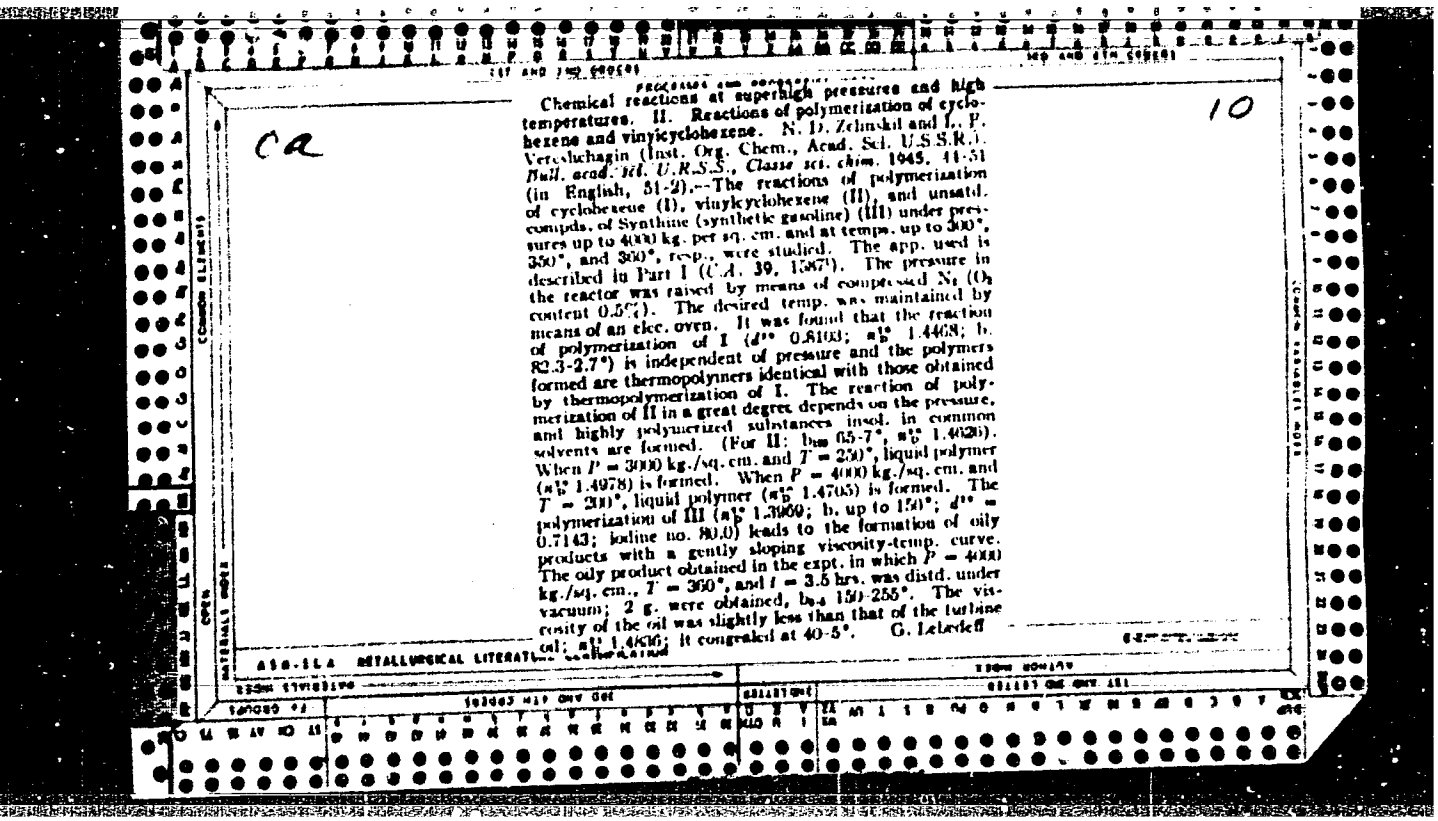
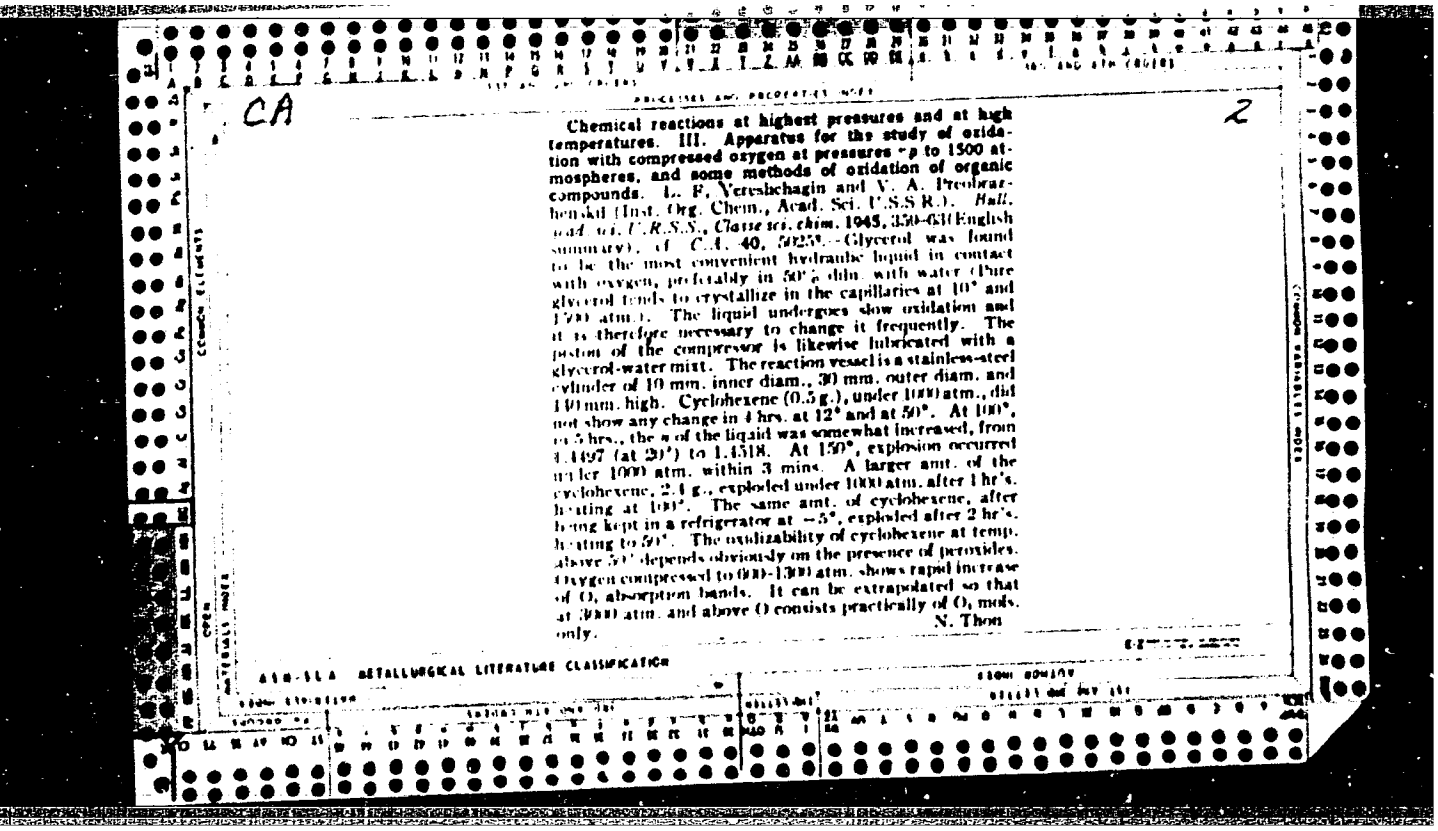


CA

10

Chemical reactions at superhigh pressures and high temperatures. II. Reactions of polymerization of cyclohexene and vinylcyclohexene. N. D. Zelinskii and L. P. Vereshchagin (Inst. Org. Chem., Acad. Sci. U.S.S.R.). *Bull. acad. Sci. U.R.S.S., Classe sci. chim.* 1945, 41-51 (in English, 51-2).--The reactions of polymerization of cyclohexene (I), vinylcyclohexene (II), and unsatd. compds. of Synthine (synthetic gasoline) (III) under pressures up to 4000 kg. per sq. cm. and at temps. up to 300°, 350°, and 360°, resp., were studied. The app. used is described in Part I (*C.A.* 39, 1567f). The pressure in the reactor was raised by means of compressed N_2 (O_2 content 0.5%). The desired temp. was maintained by means of an elec. oven. It was found that the reaction of polymerization of I (d^{20} 0.8103; n_D^{20} 1.4468; b. 82.3-2.7°) is independent of pressure and the polymers formed are thermopolymers identical with those obtained by thermopolymerization of I. The reaction of polymerization of II in a great degree depends on the pressure, and highly polymerized substances insol. in common solvents are formed. (For II: b$_{760}$ 65-7°, n_D^{20} 1.4620). When P = 3000 kg./sq. cm. and T = 250°, liquid polymer (n_D^{20} 1.4978) is formed. When P = 4000 kg./sq. cm. and T = 200°, liquid polymer (n_D^{20} 1.4705) is formed. The polymerization of III (n_D^{20} 1.3909; b. up to 150°; d^{20} = 0.7143; iodine no. 80.0) leads to the formation of oily products with a gently sloping viscosity-temp. curve. The oily product obtained in the expt. in which P = 4000 kg./sq. cm., T = 360°, and t = 3.5 hrs. was distd. under vacuum; 2 g. were obtained, b$_{0.4}$ 150-255°. The viscosity of the oil was slightly less than that of the turbine oil; n_D^{20} 1.4656; it congealed at 40-5°. G. Lebedeff



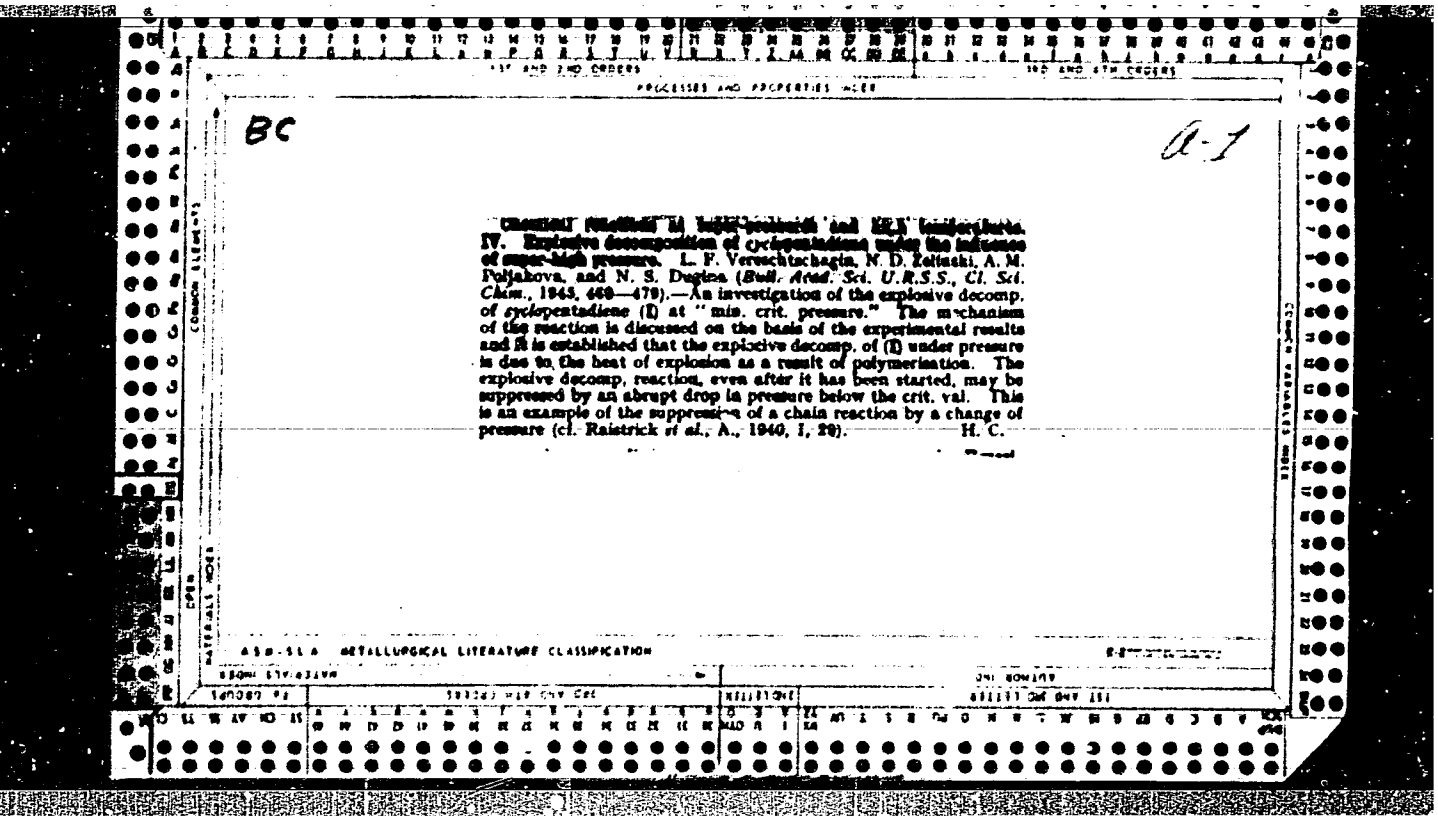
CA

2

Chemical reactions at highest pressures and at high temperatures. III. Apparatus for the study of oxidation with compressed oxygen at pressures up to 1500 atmospheres, and some methods of oxidation of organic compounds. L. F. Yereshchagin and V. A. Predvoditelenkil (Inst. Org. Chem., Acad. Sci. U.S.S.R.). *Bull. acad. sci. U.R.S.S., Classe sci. chim.* 1945, 350-63 (English summary). cf. *C.A.* **40**, 5025⁹.—Glycerol was found to be the most convenient hydraulic liquid in contact with oxygen, preferably in 50% dilu. with water (Pure glycerol tends to crystallize in the capillaries at 10° and 1700 atm.). The liquid undergoes slow oxidation and it is therefore necessary to change it frequently. The piston of the compressor is likewise lubricated with a glycerol-water mixt. The reaction vessel is a stainless-steel cylinder of 10 mm. inner diam., 30 mm. outer diam. and 140 mm. high. Cyclohexene (0.5 g.), under 1000 atm., did not show any change in 4 hrs. at 12° and at 50°. At 100°, in 5 hrs., the n_D of the liquid was somewhat increased, from 1.4497 (at 20°) to 1.4518. At 150°, explosion occurred under 1000 atm. within 3 mins. A larger amt. of the cyclohexene, 2.4 g., exploded under 1000 atm. after 1 hr's. heating at 100°. The same amt. of cyclohexene, after being kept in a refrigerator at −5°, exploded after 2 hr's. heating to 50°. The oxidizability of cyclohexene at temp. above 50° depends obviously on the presence of peroxides. Oxygen compressed to 900-1300 atm. shows rapid increase of O_3 absorption bands. It can be extrapolated so that at 3000 atm. and above O_3 consists practically of O_3 mols. only.

N. Thon

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



BC

A-1

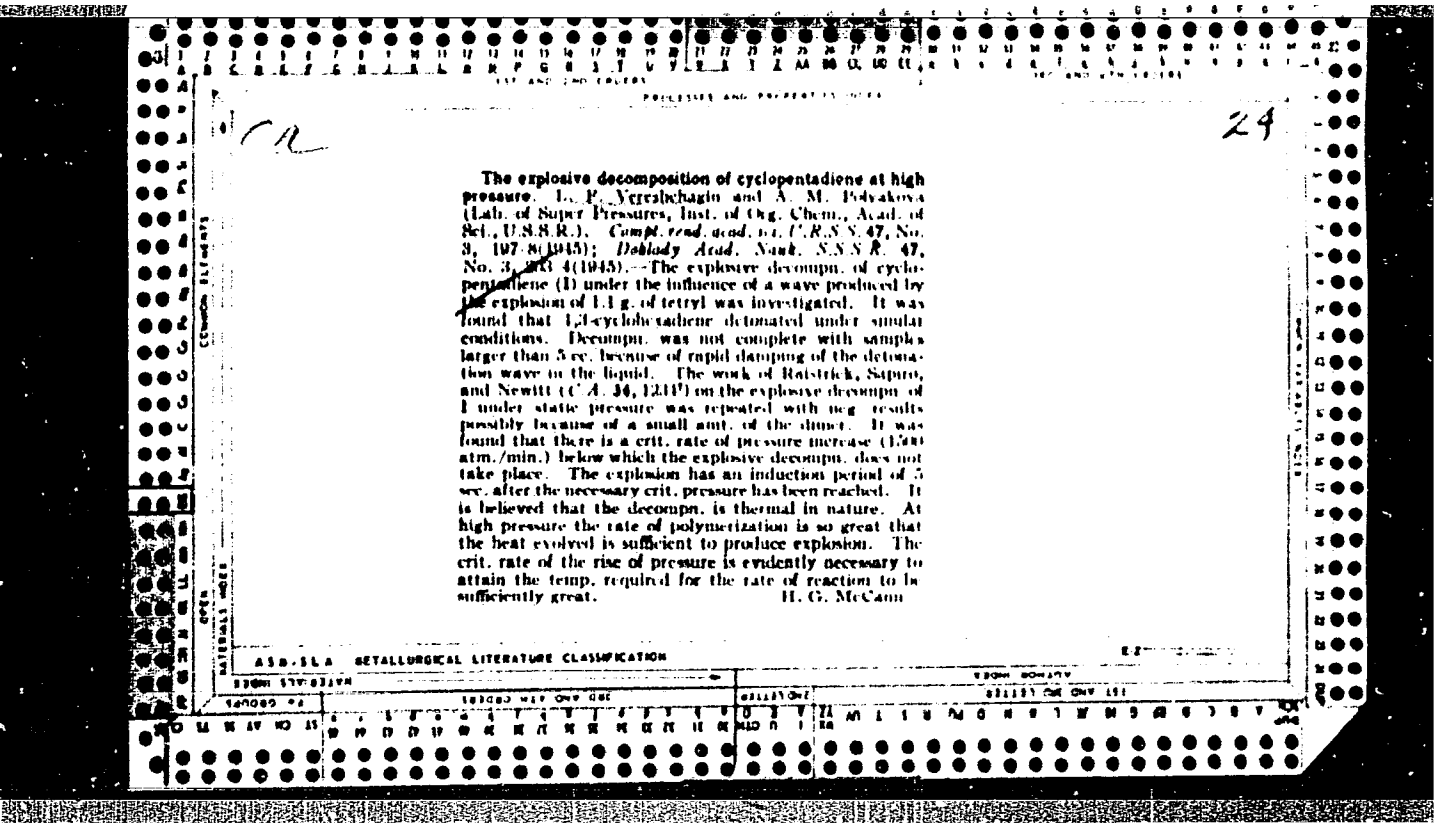
IV. Explosive decomposition of cyclopentadiene under the influence of super-high pressure. L. F. Verechtchagin, N. D. Zelinski, A. M. Poljakova, and N. S. Dugina (*Bull. Acad. Sci. U.R.S.S., Cl. Sci. Chim.*, 1945, 469—479).—An investigation of the explosive decomp. of *cyclopentadiene* (I) at " min. crit. pressure." The mechanism of the reaction is discussed on the basis of the experimental results and it is established that the explosive decomp. of (I) under pressure is due to the heat of explosion as a result of polymerisation. The explosive decomp. reaction, even after it has been started, may be suppressed by an abrupt drop in pressure below the crit. val. This is an example of the suppression of a chain reaction by a change of pressure (cf. Raistrick *et al.*, A., 1940, I, 29). H. C.

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

VERESHCHAGIN, L. F.

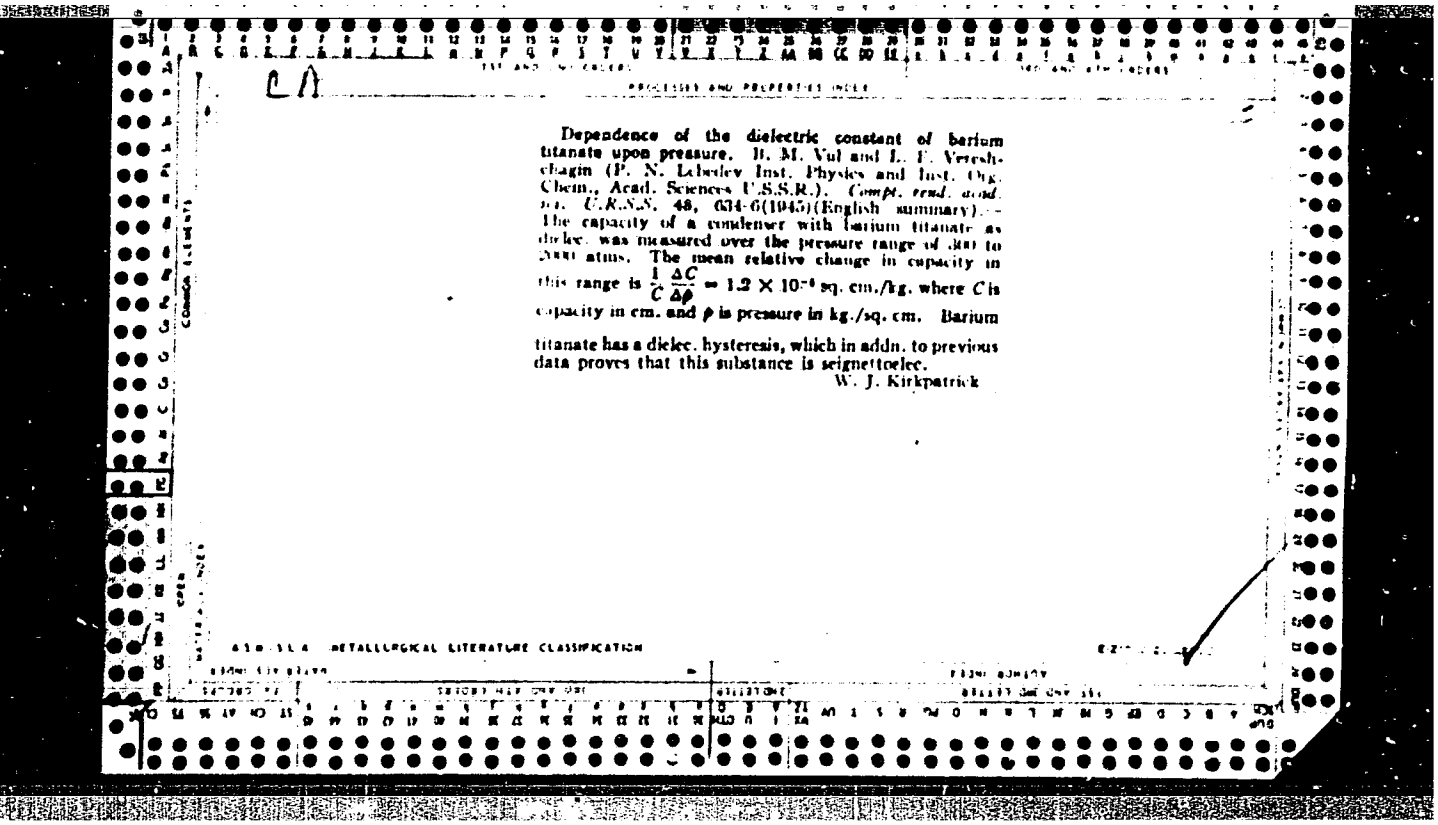
"Study of Chemical Reactions at Super-High Pressures and High Temperatures," Iz. Ak. Nauk SSSR, Otdel. Khim. Nauk, Nos. 4 and 5, 1945.

Inst. of Org. Chem., AS USSR



29

The explosive decomposition of cyclopentadiene at high pressure. L. F. Verashchagin and A. M. Bidyakova (Lab. of Super Pressures, Inst. of Org. Chem., Acad. of Sci., U.S.S.R.). *Compt. rend. acad. sci. U.R.S.S.* 47, No. 3, 197-8(1945); *Doklady Acad. Nauk. S.S.S.R.* 47, No. 3, 203-4(1945).—The explosive decompn. of cyclopentadiene (I) under the influence of a wave produced by the explosion of 1.1 g. of tetryl was investigated. It was found that 1,3-cyclohexadiene detonated under similar conditions. Decompn. was not complete with samples larger than 5 cc. because of rapid damping of the detonation wave in the liquid. The work of Ralstick, Sapiro, and Newitt (*C.A.* 36, 1211[9]) on the explosive decompn. of I under static pressure was repeated with neg. results possibly because of a small amt. of the dimer. It was found that there is a crit. rate of pressure increase (1,200 atm./min.) below which the explosive decompn. does not take place. The explosion has an induction period of 5 sec. after the necessary crit. pressure has been reached. It is believed that the decompn. is thermal in nature. At high pressure the rate of polymerization is so great that the heat evolved is sufficient to produce explosion. The crit. rate of the rise of pressure is evidently necessary to attain the temp. required for the rate of reaction to be sufficiently great. H. G. McCann



Dependence of the dielectric constant of barium titanate upon pressure. B. M. Vul and L. F. Vereshchagin (P. N. Lebedev Inst. Physics and Inst. Org. Chem., Acad. Sciences U.S.S.R.). *Compt. rend. acad. sci. U.R.S.S.* 48, 634-6(1945)(English summary).—The capacity of a condenser with barium titanate as dielec. was measured over the pressure range of .001 to 2000 atms. The mean relative change in capacity in this range is $\frac{1}{C}\frac{\Delta C}{\Delta p} = 1.2 \times 10^{-4}$ sq. cm./kg. where C is capacity in cm. and p is pressure in kg./sq. cm. Barium titanate has a dielec. hysteresis, which in addn. to previous data proves that this substance is seignettoelec.

W. J. Kirkpatrick

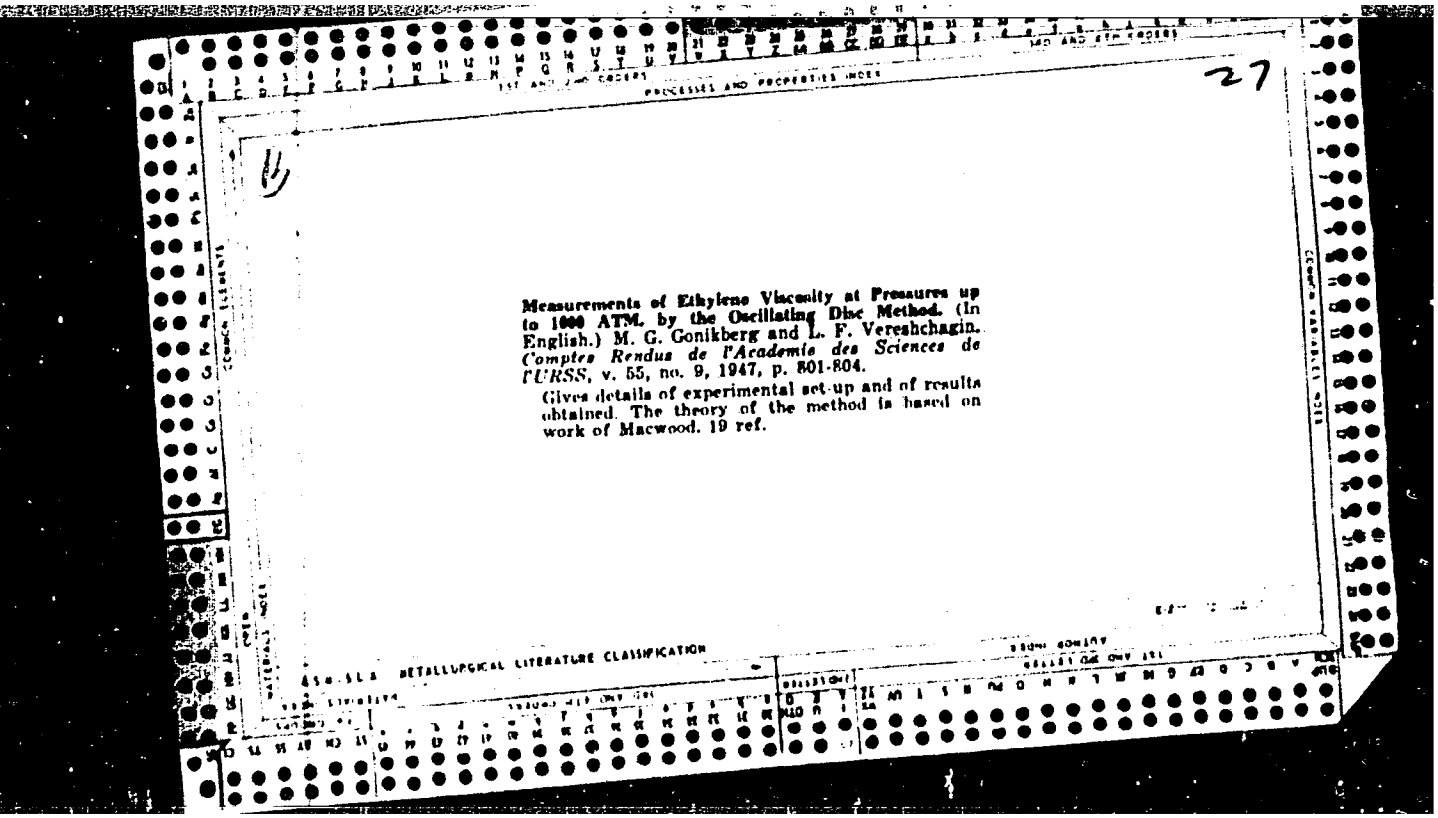
VEREshCHAGIN, L. F.

"Hydraulic Compressor of Ultra-High Pressures," Zhur. Tekh. Fiz., 16, No. 6, 1946. Inst. Organic Chemistry, AS SSSR, Lab. High Pressure

VERESHCHAGIN, L. F.

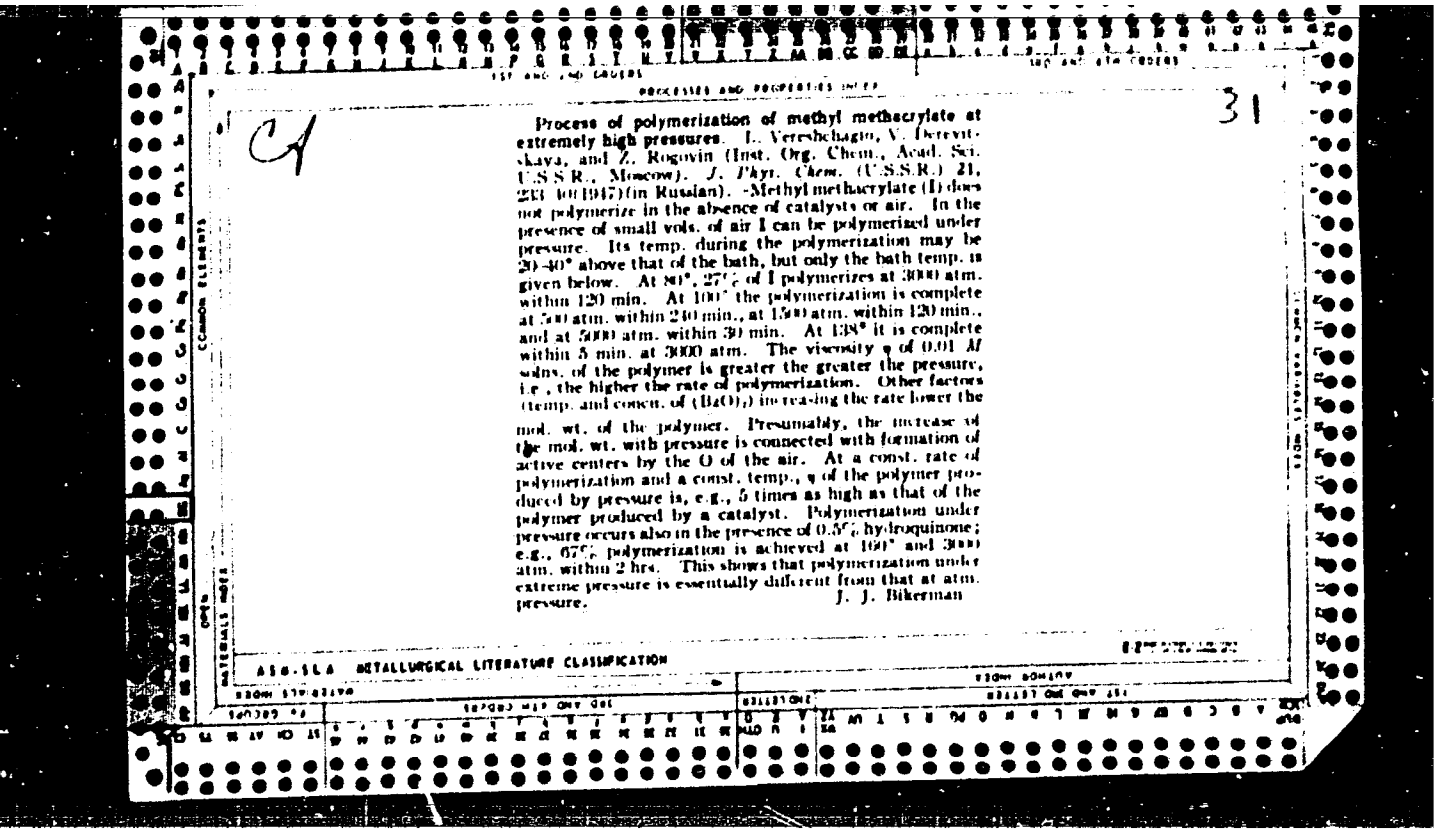
"Influence of a Raised Impression on Stereochemistry of Platin Complexer (Polymerisalicon of Peyronet Salt)," Dok. AN, 54, No. 8, 1946.

Kurnakov Inst. Gen. and Inorg. Chem., AS



Measurements of Ethylene Viscosity at Pressures up to 1000 ATM. by the Oscillating Disc Method. (In English.) M. G. Gonikberg and L. F. Vereshchagin. *Comptes Rendus de l'Academie des Sciences de l'URSS*, v. 55, no. 9, 1947, p. 801-804.

Gives details of experimental set-up and of results obtained. The theory of the method is based on work of Macwood. 19 ref.



CA

31

Process of polymerization of methyl methacrylate at extremely high pressures. L. Vereshchagin, V. Derevitskaya, and Z. Rogovin (Inst. Org. Chem., Acad. Sci. U.S.S.R., Moscow). *J. Phys. Chem.* (U.S.S.R.) 21, 233–40 (1947) (in Russian). α-Methyl methacrylate (I) does not polymerize in the absence of catalysts or air. In the presence of small vols. of air I can be polymerized under pressure. Its temp. during the polymerization may be 20–40° above that of the bath, but only the bath temp. is given below. At 80°, 27% of I polymerizes at 3000 atm. within 120 min. At 100° the polymerization is complete at 500 atm. within 240 min., at 1500 atm. within 120 min., and at 5000 atm. within 30 min. At 138° it is complete within 5 min. at 3000 atm. The viscosity η of 0.01 *M* solns. of the polymer is greater the greater the pressure, i.e., the higher the rate of polymerization. Other factors (temp. and concn. of $(BzO)_2$) increasing the rate lower the mol. wt. of the polymer. Presumably, the increase of the mol. wt. with pressure is connected with formation of active centers by the O of the air. At a const. rate of polymerization and a const. temp., η of the polymer produced by pressure is, e.g., 5 times as high as that of the polymer produced by a catalyst. Polymerization under pressure occurs also in the presence of 0.5% hydroquinone; e.g., 67% polymerization is achieved at 100° and 3000 atm. within 2 hrs. This shows that polymerization under extreme pressure is essentially different from that at atm. pressure.

J. J. Bikerman

ASS-SLA METALLURGICAL LITERATURE CLASSIFICATION

VERESHCHAGIN, L. F. PA 52T91

USSR/Physics Oct 1947
Dielectrics - Pressure Effects
Dielectrics - Gaseous

"The Measurement of Dielectrical Stable Ethylene Under Pressures up to 2149 Atmospheres," L. F. Vereshchagin, N. S. Dugina, Lab Super Pressure, Inst Org Chem, Acad Sci USSR, 4 pp

"Dok Akad Nauk SSSR" Vol LVIII, No 1

Study of the dielectric properties of ethylene as a function of pressure and temperature, shown in tabular and graphical forms. Submitted by Academician G. S. Landsberg.

52T91

CA

Dependence of the rate of chemical reaction on pressure. M. G. Gonikberg and L. F. Vereshchagin (Acad. Sci. U.S.S.R., Moscow). *Zhur. Fiz. Khim.* 23, 1447-8 (1949); cf. *C.A.* 43, 6054h.—The mol. vol. V cc. of dimeric cyclopentadiene at 40° is 135.9 (literature data), 131.1 (new measurement), and 128.0 (extrapolated) at 1, 500, and 1000 atm. From the expts. by Ralstrick, *et al.* (*C.A.* 34, 1231⁹) the vol. V_1 of the activated complex in the reaction of dimerization of cyclopentadiene is 135, 131.5, and 127.5 cc. at these pressures. Again $V = V_1$.
I. J. Bikerman

VERESHCHAGIN, L. F.

USSR/Chemistry - Hydrolysis
Chemistry - Piperazine, Diketo, Hydrolysis of

Feb 49

"Influence of Pressure on the Hydrolysis of 2,5-Diketopiperazine and the Development of Polypeptide Bonds," A. M. Polyakova, L. F. Vereshchagin, Lab Ultrahigh Pressures, Inst Org Chem, Acad Sci USSR, 2 pp

"Dok Ak Nauk SSSR" VolLXIV, no 5

Determined that pressure sharply increases the speed of hydrolysis of diketopiperazine. Submitted by Acad N. D. ZELINSKIY, 18 Dec 48.

PA 29/49T3

VERESHCHAGIN, L. F.

PA 197T17

USSR/Chemistry - Catalysts Nov/Dec 51

"Effect of Super-High Pressures of the Catalytic Properties of Aluminum Oxide," L. F. Vereshchagin, L. Kh. Freydlin, A. M. Rubinshteyn, I. U. Numanov, Inst Org Chem, Acad Sci USSR

"Iz Ak Nauk SSSR, Otdel Khim Nauk" No 6, pp 809-818

Investigation of catalytic activity in the dehydration of ethyl alc and of the structure of samples of aluminum oxide before pressing and after pressing at 20,000 atm showed that the pressed

197T17

USSR/Chemistry - Catalysts (Contd) Nov/Dec 51

catalysts are more effective and durable. Established that pressing at 20,000 atm does not result in phase transformations of Al_2O_3; the only change is reduction of macroporosity.

USSR/Chemistry, Physics - High Pressures Jan 52

"High Pressures," L. F. Vereshchagin, Dr Phys-Math Sci

"Nauka i Zhizn'" Vol XIX, No 1, pp 14-16

In the laboratory, 400,000 at are reached in work on solids, 100,000 at in work on liquids, and 20,000 at in work on gases. Superhigh pressures change the chem reactivity of substances. In chemistry, the 25,000-50,000 at range (combined with high temps) is particularly important, in physics the 100,000 at range. At 25,000 at, many brittle materials (beryllium, steel, superhard alloys based on wolfram carbide) become plastic. At 10,000 at, marble can be stretched to 4 times its length and has a tensile strength 20 times of that at 1 at. High pressures can be measured up to 30,000 at electrically with a manganin resistance gauge. X-ray investigations of AgI, RbI, etc., in the range up to 5,000 under use of photographic films were carried out in a chamber equipped with a Be window. At higher pressures (Ce up to 15,000 at), a Be chamber was used. Recently, for still higher pressures (AgBr up to 23,000 at), diamond chambers were constructed. Compressibility of elements varies with the position in the periodic system. Compressibility can now be measured up to 100,000 at. In this range alkali metals and alkaline earths are the most compressible (vol of Cs drops to 3/8 of that at 1 at), while C (diamond) is the least compressible, showing a vol reduction of only 1.8% in relation to that at 1 at. Results cited herein represent only a small part of data obtained by USSR scientists in work at high pressures.

203T13

VERESHCHAGIN, L. F.

Jun 52

VERESHCHAGIN, L. F.

USSR/Physics - High Pressure

"Hydraulic Compressors of Super-High Pressure," L. F. Vereshchagin, Stalin Prize Winner

Nauka i Zhizn', Vol 19, No 6, pp 43-44

Soviet scientists overcame difficulties in construction of super-high pressure equipment. They possess hydraulic compressors of super-high power with motorized drive and magnetic starter. These compressors provide any desired output in a broad pressure range.

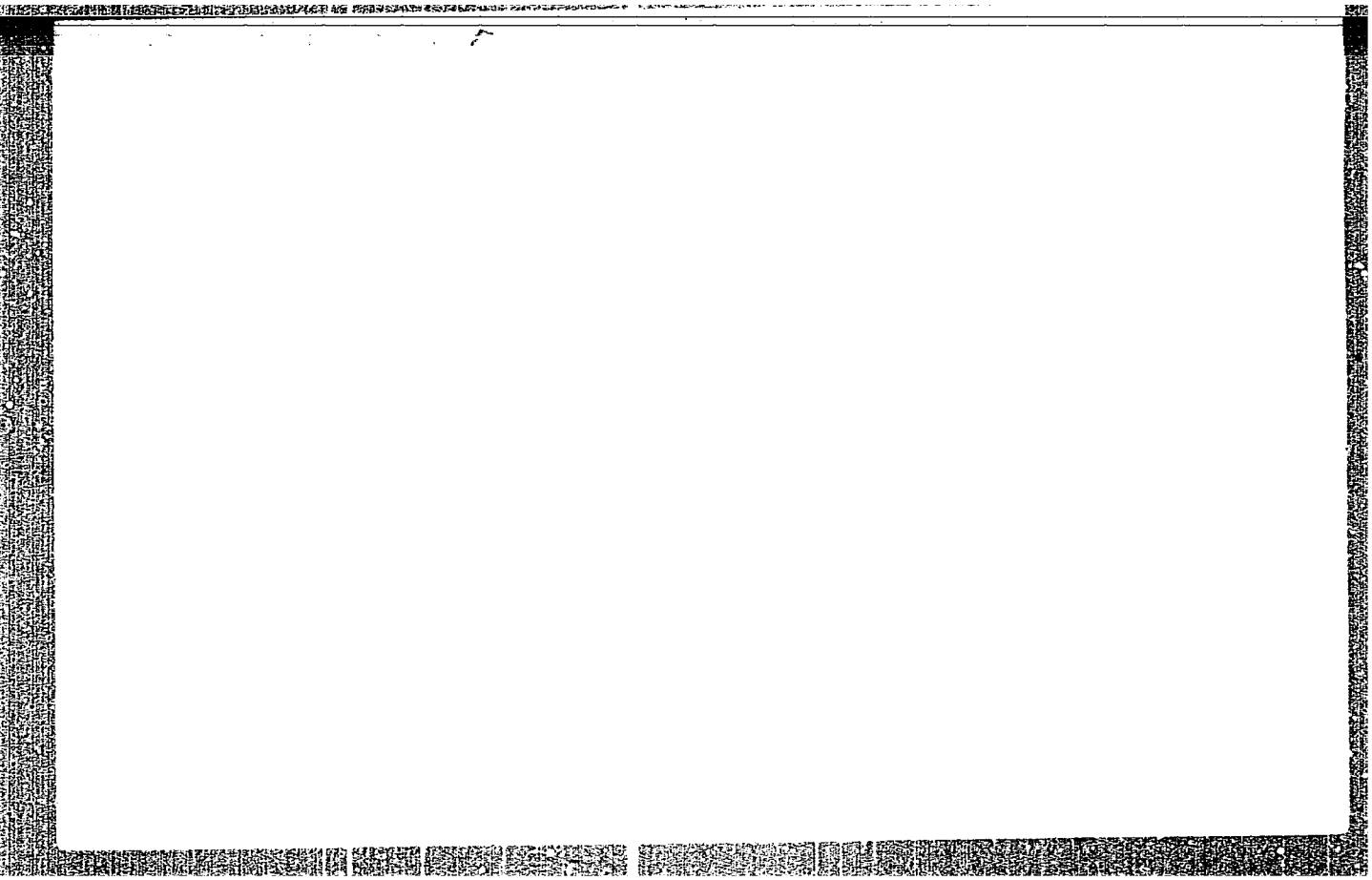
267T89

VERESHCHAGIN, L. F.

Chemical Abst.
Vol. 48 No. 4
Feb. 25, 1954
Organic Chemistry

Effect of pressure on the condensation of acetone. L. F. Vereshchagin and M. L. Matveeva (Inst. Org. Chem., Acad. Sci., Moscow). Zhur. Fiz. Khim. 26, 650-6 (1952). The reversible condensation of 2 Me_2CO into $Me_2C(OH)CH_2COMe$ (I), the equil. of which at room temp. and under normal pressure lies near 6–10% I, does not proceed at a measurable rate under these conditions, without addn. of a condensing agent. It does proceed under pressures of 1000–3000 atm., apparently owing to the action of the wall of the steel reactor. In a flow system, and in the presence of $Ba(OH)_2$, the yield of condensation products increases with the feed rate decreasing from 200 to 25 ml./hr., and reaches its max. limit at about 24 ml./hr. At that feed rate, in the presence of $Ba(OH)_2$, increase of the pressure from 1 to 3000 atm. shifts the equil. in favor of I and increases the yield of condensation products by a factor of 4.5. Moreover, $Me_2C(OH)CH_2COCH_2C(OH)Me_2$ (II) appears in the product (17% of the total product; the rest, 83%, is I). Increase of the temp. from 20 to 60° results in a shift of the equil. in favor of Me_2CO, and in a decrease of the relative amt. of II in the product. The total yield of product decreases by 30%, and the product consists of 93% I and 7% II.

M. Thon



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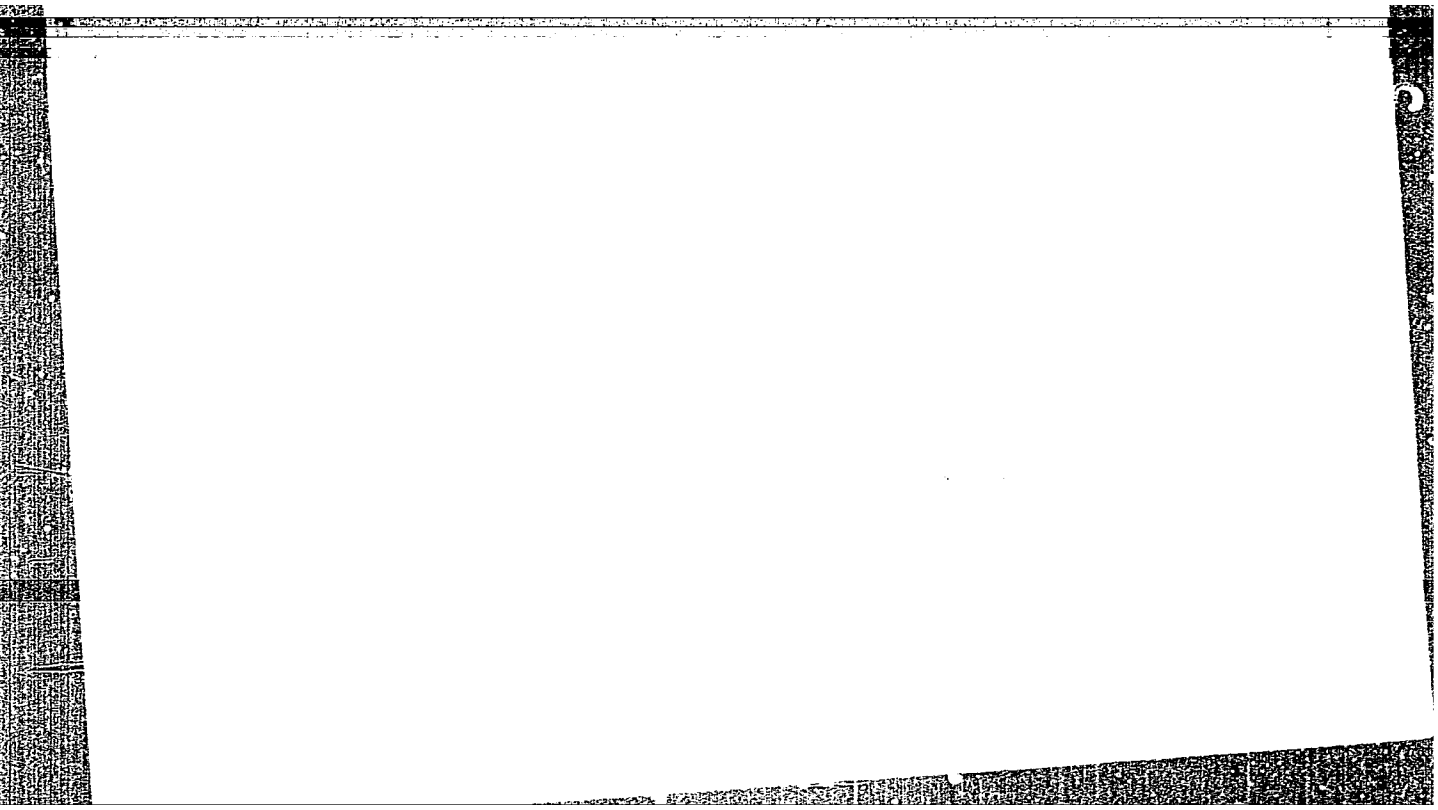

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VERESHCHAGIN L F

USSR/Chemistry

Card 1/1 : Pub. 40 - 21/22

Authors : Preysler, L. Kh.; Vereshchagin, L. F.; Neymark, I. E.; Numanov, I. U.;

Title :

Periodical : Izv. AN SSSR

Abstract : ... the changes in porosity, adsorb... were investigated. The

Institution : ...

Submitted : December 13, 1952

VEHESHCHAGIN, L.F.

Nikolai Dmitrievich Zelinskii; obituary. Koll. zhur. 15 no.6: 401-403 '53. (MLRA 6:12)

(Zelinskii, Nikolai Dmitrievich, 1861-1953)

260T7

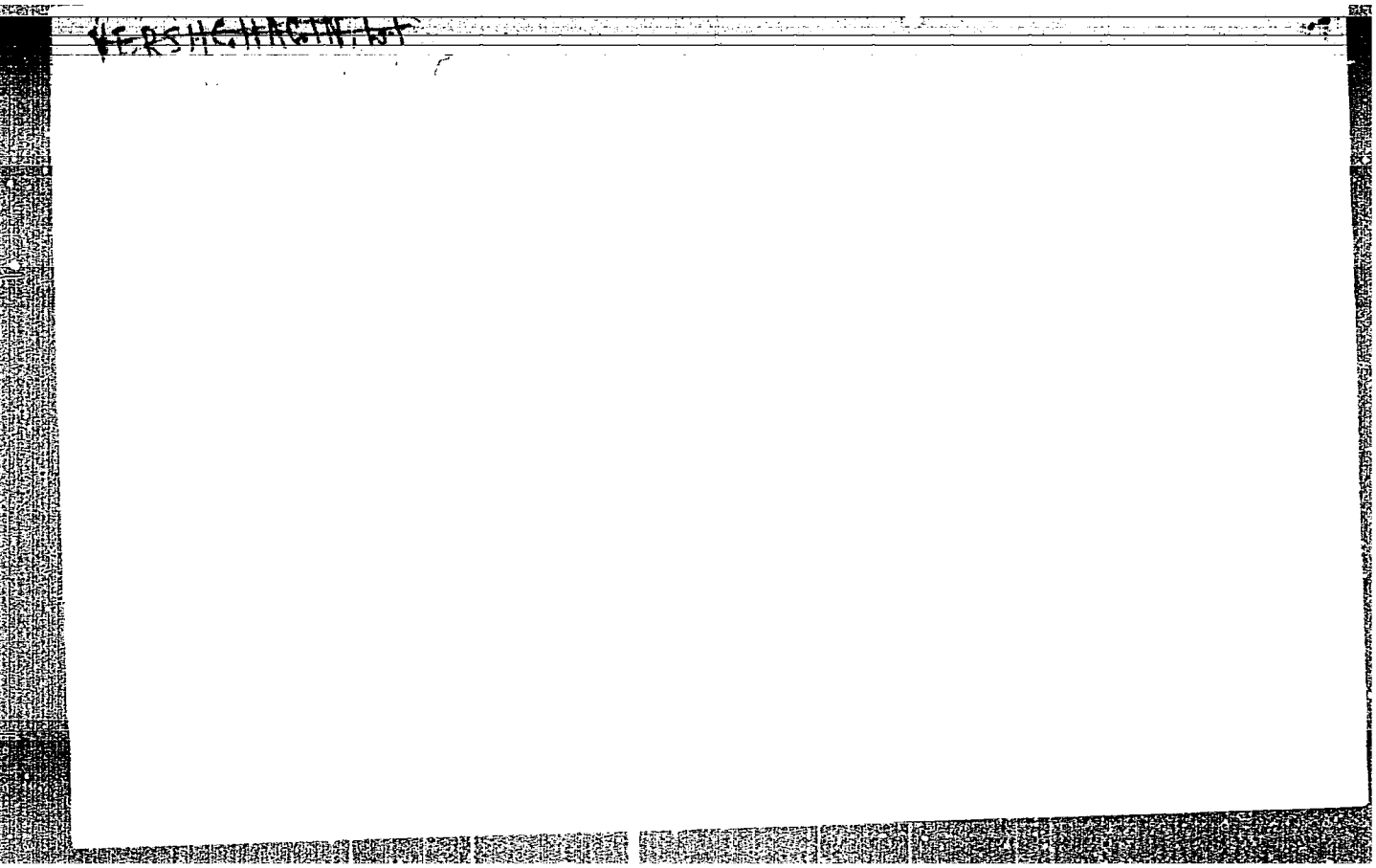
USSR/Chemistry - Catalysts 21 Feb 53

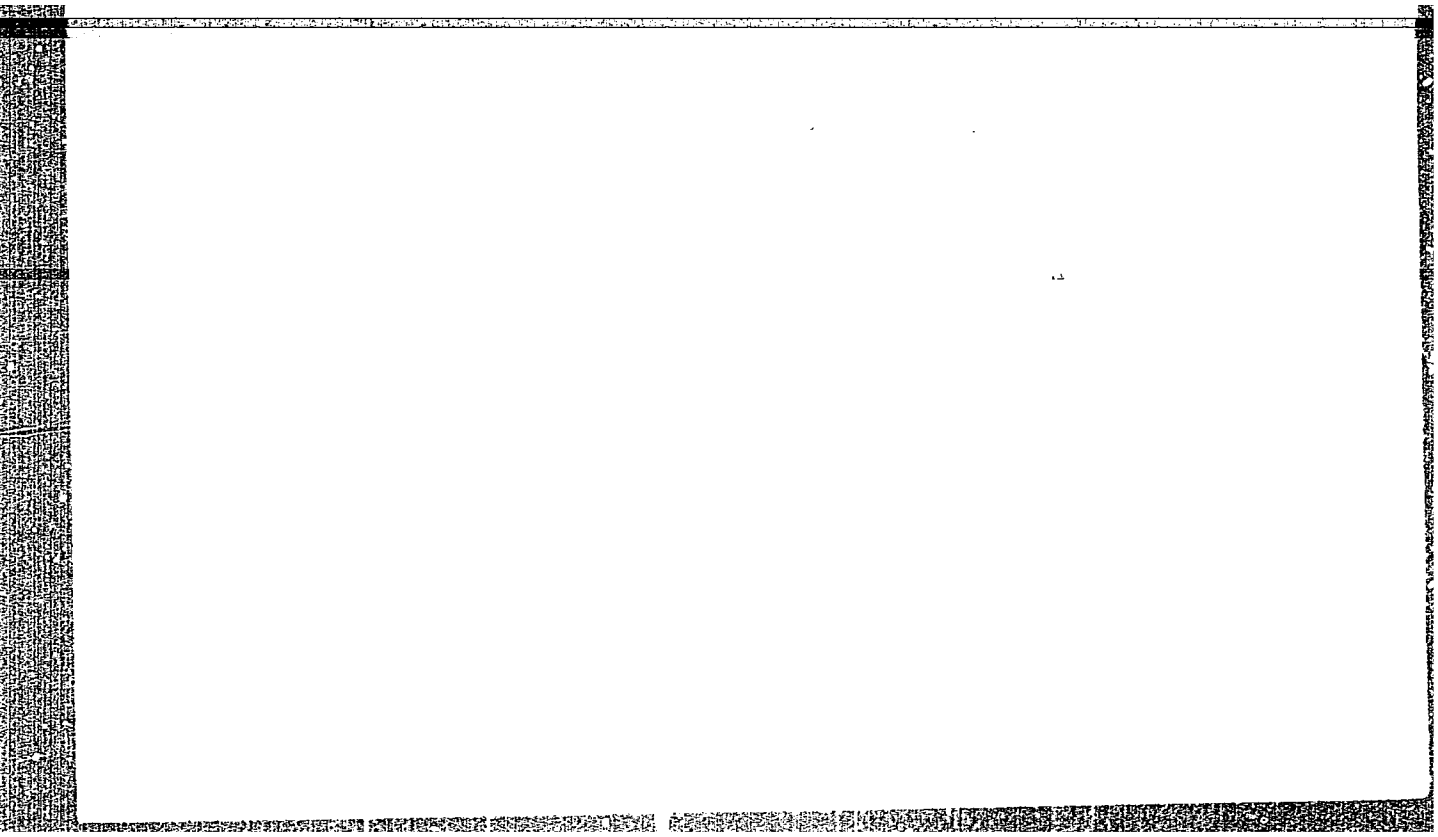
"The Effect of Pressing on the Properties of Solid Catalysts," L. Kh. Freydlin, L. F. Vereshchagin, and I. U. Numanov, Inst of Org Chem Acad of Sci USSR

DAN SSSR, Vol 88, No 6, pp 1011-1014

Studied the effect of pressing on the properties of over ten catalysts of varying compn. The results indicate that pressing can improve the essential properties of pptd catalysts to a great extent, raise their mechanical stability and activity, and increase their useful life. Presented by Acad B.A. Kazanskiy 13 Dec 52.

260T7





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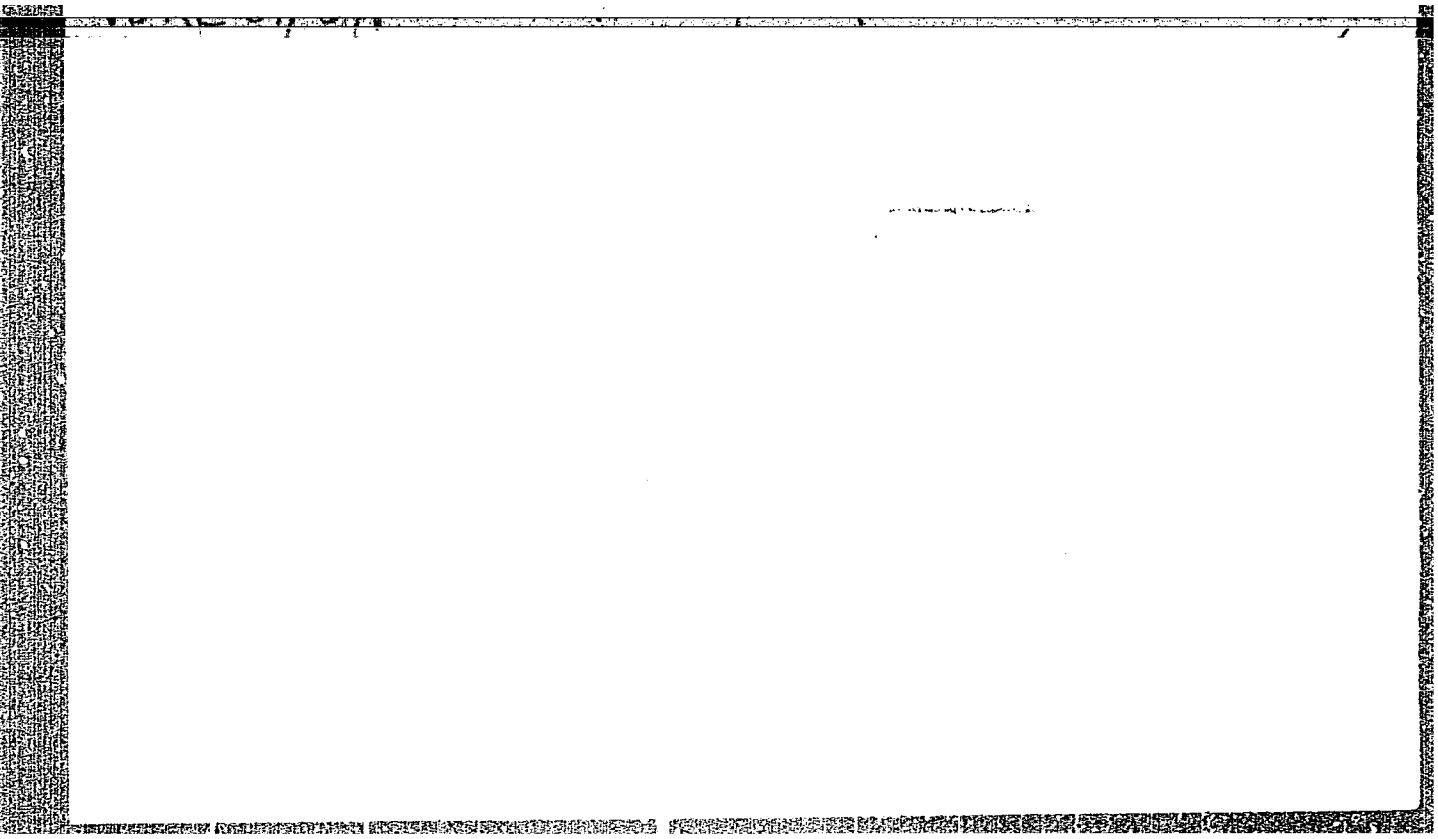
11

(5)

Effect of pressure on the reaction of polycondensation of glycine methyl ester. A. M. Polyakova, L. I. Cherabkagin, A. A. Sikharova, and E. S. Tamborvtseva (Inst. Org. Chem., Acad. Sci. U.S.S.R., Moscow). *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1954, 142-8; cf. *C.A.* **43**, 8403i.—$H_2NCH_2CO_2Me$ was subjected to polycondensation by heating 6 hrs. under pressure in a vessel provided with sliding pistons; the material remained under pressure a total of 42 hrs. in each expt. The expts. made at 4500 atm. at 50°, 75°, and 130° showed that the pressure definitely increases the rate of polycondensation and its extent; the polymer obtained at 50° had av. mol. wt. 4368, that at 75° 3855, that at 130° 3284, but the yields were, resp., 10.6, 13, and 18.9%. At atm. pressure the products are polypeptides, insol. in H_2O. The products formed under pressure contain 0.7-0.05% MeO groups; detn. of amino N indicates that diketopiperazine rings are not formed and the products are probably linear.

G. M. Kosolapoff



APPROVED FOR RELEASE: 09/01/2001 CIA-RDP86-00513R001859430001-0"

Card

Authors :

Title :

Periodical :

Abstract :

Presented by:

VERESHCHAGIN, L.F.; LIKHTER, A.I.

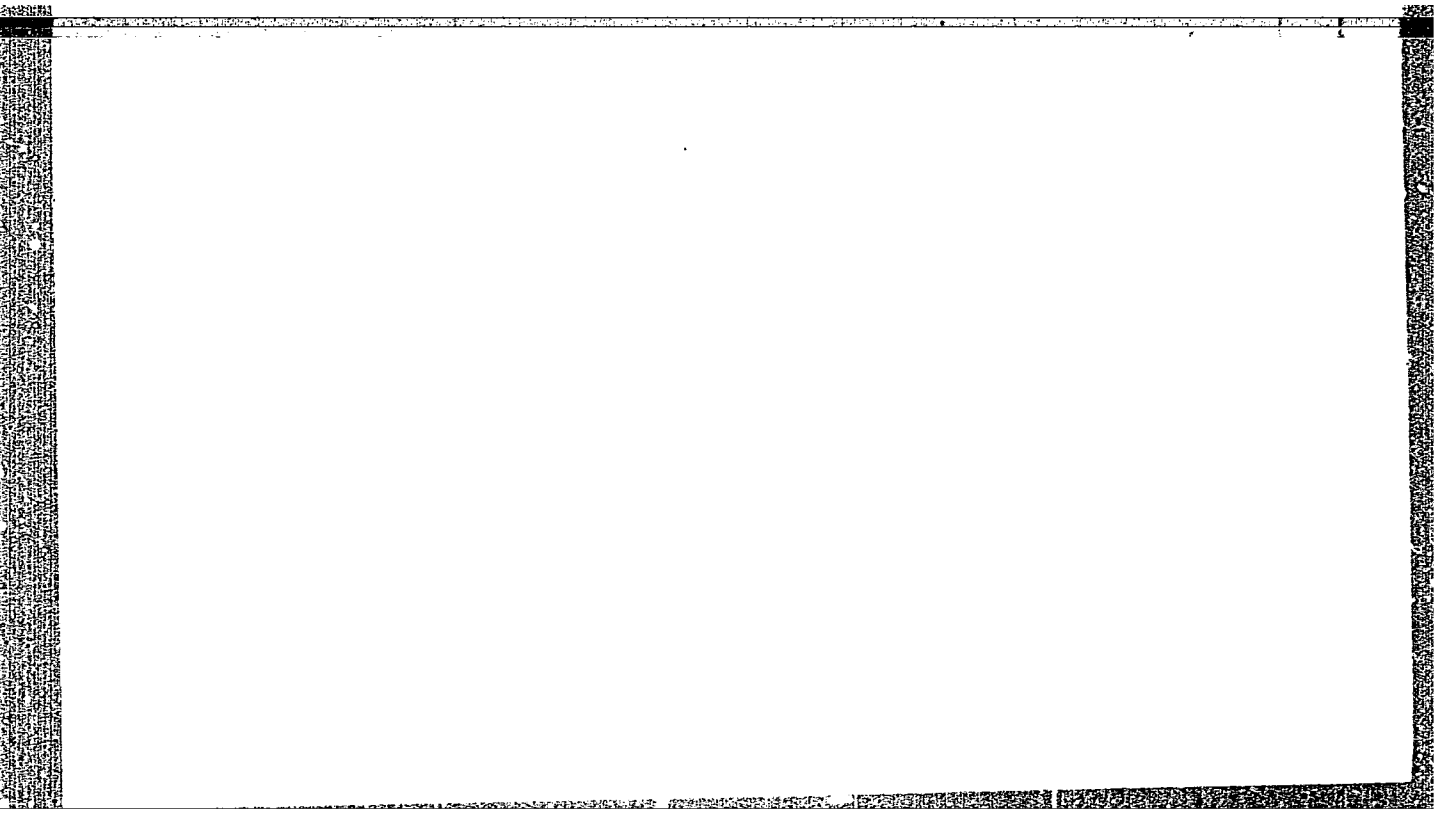
Pressure dependence of the Hall effect in bismuth. Dokl.AN SSSR 103 no.5:791-794 Ag '55. (MLRA 9:1)

1.Laboratoriya fiziki sverkhvysokikh davleniy Akademii nauk SSSR. Predstavlena akademikom G.S.Landsbergom.
(Hall effect) (Bismuth--Electric properties)

VERESHCHAGIN, L.F., doktor fiziko-matematicheskikh nauk; ZHAVORONKOV, N.M., redaktor; VOLODINA, M.I., redaktor; POLYAKOVA, T.V., tekhnicheskiy redaktor

[High pressure in the technology of the future] Vysokie davleniia v tekhnike budushchego Moskva, Izd-vo Akademii nauk SSSR, 1956. 35 p. (MIRA 9:3)

1. Chlen-korrespondent AN SSSR (for Zhavoronkov)
(Pressure (Physics))



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Category : USSR/Atomic and Molecular Physics - Physics of high pressure D-6

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 916

Author : Vereshchagin, L.F., Lakhter, A.I., Ivanov, V.I.
Title : Production of Superhigh Pressures in a Setup Employing a Conical Piston

Orig Pub : Zh. tekhn. fiziki, 1956, 26, No 4, 874-877

Abstract : To eliminate packing gaskets, which are the weak point in super-high pressure setups, a compression chamber was developed with a conical piston. The conical piston is pressed into a carefully ground socket and normal pressure is produced on the periphery of the cone. The cone angle is chosen to make this pressure always greater than the pressure produced by the piston in the liquid, thereby insuring hermeticity. The construction is described and the design calculations (employing the theory of elasticity) are given for the first version of such a setup. A pressure up to 14,000 kg/cm^2 was obtained, the pressures being measured with a manganin manometer.

Card : 1/1

VERESHCHAGIN, L.F.

USSR/Optics K

Abs Jour: Referat Zhur-Fizika, 1957, No 4, 10412

Author : Kalashnikov Ya.A., Vereshchagin, L.F.
Inst : Not Given
Title : Measurement of Temperature at High Pressure from the Radiation and Certain Optical Phenomena in Gases Under These Conditions.

Orig Pub: Zh. tekhn. fiziki, 1956, 26, No 8, 1802-1814

Abstract: An investigation was made of the radiation in a high pressure bomb by means of thermocouple and by photoelectric pyrometer. The authors have observed experimentally and explained the attenuation of the radiation at high pressures and large temperature gradients. It is concluded that any optical investigations at high pressures and high temperatures (spectral, temperature, visual, etc.) should be carried out in such a way that the entire path of the rays from the high temperature zone to the place where they leave that region of high pressure pass

Card : 1/2

USSR / Optics K

Abs Jour: Referat Zhur-Fizika, 1957, No 4, 10412

through an isotropic solid body, where the irregularities of density are completely eliminated. They describe the construction of an optical pyrometer for the measurement of temperatures up to 350°. Bibliography, 41 titles.

Card : 2/2

VERESCHAGIN, L. F. [illegible]

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1844
AUTHOR VERESCAGIN.L.F., SEMERCAN,A.A., FIRSOV,A.I., GALAKTIONOV,V.A., FILLER,F.M.
TITLE Some Investigations on the Hydrodynamics of a Jet of Liquid ejected from a Nozzle under the Pressure of up to 1500 atm.
PERIODICAL Žurn.techn.fis, 26, fasc.11, 2570-2577 (1956)
Issued: 12 / 1956

By the work carried out in the laboratory for the physics of extremely high pressure of the USSR Academy of Science concerning the construction of compressors for extremely high pressures it was possible to develop a continuously operating machine which is able to eject water through a nozzle of from 0,2 to 0,8 mm diameter at pressures (prevailing before the nozzle) of up to 1500 atm. As such a pressure drop before and behind the nozzle requires great efficiency of the hydraulic compressor, it was necessary to build a machine that performed at least 1000 revolutions per minute and that was able at pressures of up to 2000 atm to produce one ton of water per hour.
The authors carried out their tests at pressures below 1500 atm in order to diminish the part played by the boundary layer introducing the jet of liquid. They used nozzles of at least 0,45 mm diameter; shape and surface of the nozzle exercise considerable influence on the disintegration of the jet of liquid. The most favorable shape of the nozzle is shown in form of a drawing. On this occasion it was not possible to use any of the existing methods for the direct measuring of the jet velocity, and it was necessary to use the BERNOULLI

Žurn.tech.fis,26, fasc.11, 2570-2577 (1956) CARD 2 / 2 PA - 1844

equation for this purpose. A diagram illustrates the dependence of jet velocity on the pressure prevailing in the receiver before the nozzle. The authors computed this dependence by using BRIDGMAN'S data for the compressibility of water. Up to pressures of from 3000 to 4000 atm the compressibility of water does not play an important part and the approximated formula $v = 14\ p$ may be used (p in kg/cm^2, v in m/sec). At such velocities REYNOLD'S numbers become very high (order of magnitude 10^5). They are mentioned in a table for a nozzle of 0,6 mm. The temperature of the jet increases with an increase of pressure and therefore also with an increase of velocity. Heating by friction and adiabatic cooling act in opposition to each other. Also a negative JOULE-THOMSON effect becomes noticeable. According to the opinion of the authors the experimentally attainable velocity of a jet of water ejected from a nozzle is limited only by the JOULE-THOMSON effect, for the temperature of the jet increases to such an extent at a certain pressure that the water evaporates. The authors found such an evaporation to take place on the occasion of an experiment carried out at 5000 atm, which fact may also be confirmed by rough calculation. The jet of water was investigated by means of a cinematographic camera producing 5000 pictures per sec, so that the general properties of the jet could be examined.

INSTITUTION:

USSR/Atomic and Molecular Physics - Statistical Physics, Thermodynamics, D-3

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 34347

Author: Vereshchagin, L. F., Voronov, F. F.

Institution: Laboratory of Ultrahigh Pressures, Academy of Sciences USSR, Moscow

Title: Change in Melting Temperature of Solid Ammonia at High Pressures

Original Periodical: Zh. fiz. khimii, 1956, 30, No 2, 329-333

Abstract: To determine the melting temperature t_m of ammonia as a function of the applied pressure, a setup was built which makes it possible to carry out the research at pressures up to 3,000 atmos. It is established that t_m increases monotonically in the range of one to 3,000 atmos.

1 of 1

USSR/Electricity - Dielectrics G-2

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 6960

Author : Vereshchagin, L.F., Kuznetsov, L.F., Alayeva, T.I.
Title : Dielectric Properties of Castor Oil at High Pressure

Orig Pub : Zh. eksperim. i teor. fiziki, 1956, 30, No 4, 661-666

Abstract : A study was made of the dependence of the dielectric constant (ε) and the tangent of the dielectric loss angle ($\tan\delta$) of castor oil on the pressure (p). The author has described in detail an experimental setup, which makes possible measurement of ε and $\tan\delta$ of liquid dielectrics all the way to p = 9,000 atmos. It is shown that ε of castor oil, at normal pressure, is 4.35, and increases with increasing p until it reaches a maximum (ε = 5.25) at 3600 atmos. Further increase in pressure reduces ε (ε = 4 at 9,000 atmos). The increase in pressure at $1 \leq p \leq 3600$ atmos is attributed to the increase in the density of the castor oil with increasing pressure. The reduction of ε upon further increase in p is due to the increase in the relaxation time. The curve of $\tan\delta$ of castor oil vs. p also exhibits a maximum.

Card : 1/1

VERESHCHAGIN, L. F.

USSR/Physical Chemistry. Crystals. B-5

Abs Jour: Ref Zhur-Khimiya, No 5, 1957, 14455

Author : L. F. Vereshchagin, I. F. Brandt
Inst : -
Title : X-ray investigations of matter at pressures up to 30,000 atmospheres

Orig Pub: Dokl. AN SSSR, 1956, 108, No 3, 423-424

Abstract: An X-ray investigation was made of Bi samples at amospheric pressure at a pressure of 30,000 atmos. (a pressure higher than that at which one observes a gradual decrease of ~8.6% of the Bi volume). For the purpose of X-ray photography at 30,000 atmos. a special camera was constructed in which the sample was placed inside the Be-cone. The latter was reinforced by a steel cone enclosed in a steel casing. The pressure on the sample was transmitted with the aid of pistons made from a BK-8 alloy; the entire camera was placed under a hydraulic press. From photos of Bi powder samples, taken in

Card 1/2

USSR/Physical Chemistry. Crystals. B-5

Abs Jour: Ref Zhur-Khimiya, No 5, 1957, 14455

Abstract: the indicated conditions, it was established that the volume change is a function of the crystalline structure changes and not of intra-atomic electron migrations.

Card 2/2

VERESHCHAGIN, L.F. and YUSEPOVICH, Mme., Laboratory of Physics of High Pressure, AS USSR

"Investigations on the velocity of Sound in Liquids at Pressures up to 2000 Atm," a paper submitted at the Colloquium on the Optical and Acoustical Properties of Compressed Fluids and Intermolecular Forces, Bellevue, France, 1-6 Jul 57.

B-3,087,136, 6 Sep 57.

AUTHOR: VERESHCHAGIN, L.F., SEMERCHAN, A.A., FILLER, F.M. PA - 2154

TITLE: Some Investigations concerning the Water-Jet Propelled from a Nozzle under a Pressure of up to 2000 atm. overpressure. (Nekotorye issledovaniya strui vody, vytekayushchey iz sopla pod davleniyem do 2000 atmosfer)

PERIODICAL: Izvestiia Akad.Nauk SSSR, Otdel.Tekhn., 1957, Nr 1, pp 57-60 (U.S.S.R.)

Received 3/1957 Reviewed 4/1957

ABSTRACT: In the laboratory for the physics of super-high-pressures of the Academy of Science of the U.S.S.R. a permanently operating machine is established, by means of which a continuous water jet which is previously compressed up to 2000 - 2500 atm. overpressure, and then emerges from a round profiled aperture of 0.2 - 1.24 mm diameter, is obtained. In order to obtain a continuous waterjet at a pressure of 2000 - 2500 atm. overpressure, which corresponds to a jet-velocity of 600 - 650 m/sec^{-1} it was necessary to construct a fast-running machine (1000 wave-revolutions/min.) with an electromotor of 240 kW. Two models of such a machine were constructed. One of them had an output of 1200 l p.h. with a consumption of 20 - 85 kW at different pressures, the other had an output of 1800 l p.h. at 110 - 120 kW and approximately 2000 atm. overpressure. Different jet-diameters facilitated the modification of the pressures before the jet. The jet has behind the conical part with a certain narrowing angle a cylindrical part of a certain length. The inner surface must be carefully polished. According to Bernoulli, the velocity for a perfect incompressible and for a compressible liquid in dependence on the pressure was calculated and

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PA - 2154

Some Investigations concerning the Water-Jet Propelled from a Nozzle under a Pressure of up to 2000 atm. overpressure.

shown in a diagram. The general character of the passage of a jet through the atmosphere was determined. It turned out that, with an increase of jet-velocity beyond sound-velocity in air, the water-jet becomes more compact, the conical aperture-angle, however, decreases. The thermal effects occuring on the occasion of throttling become compensated in a certain degree. On the occasion of throtteling a compressed liquid a heat-effect viz. the Joule-Tomson-effect is produced. Experiments show that the liquid ejected from the jet actually becomes heated. It is the author's opinion that the only reason for the existence of a limit for the experimentally obtainable velocity of a water-jet ejected under pressure from a jet is due to the Joule-Tomson-effect, for, at a certain pressure, temperature rises to such an extent that the water evaporates. (13 illustrations)

ASSOCIATION Not given
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SUBMITTED 18. 9. 1956
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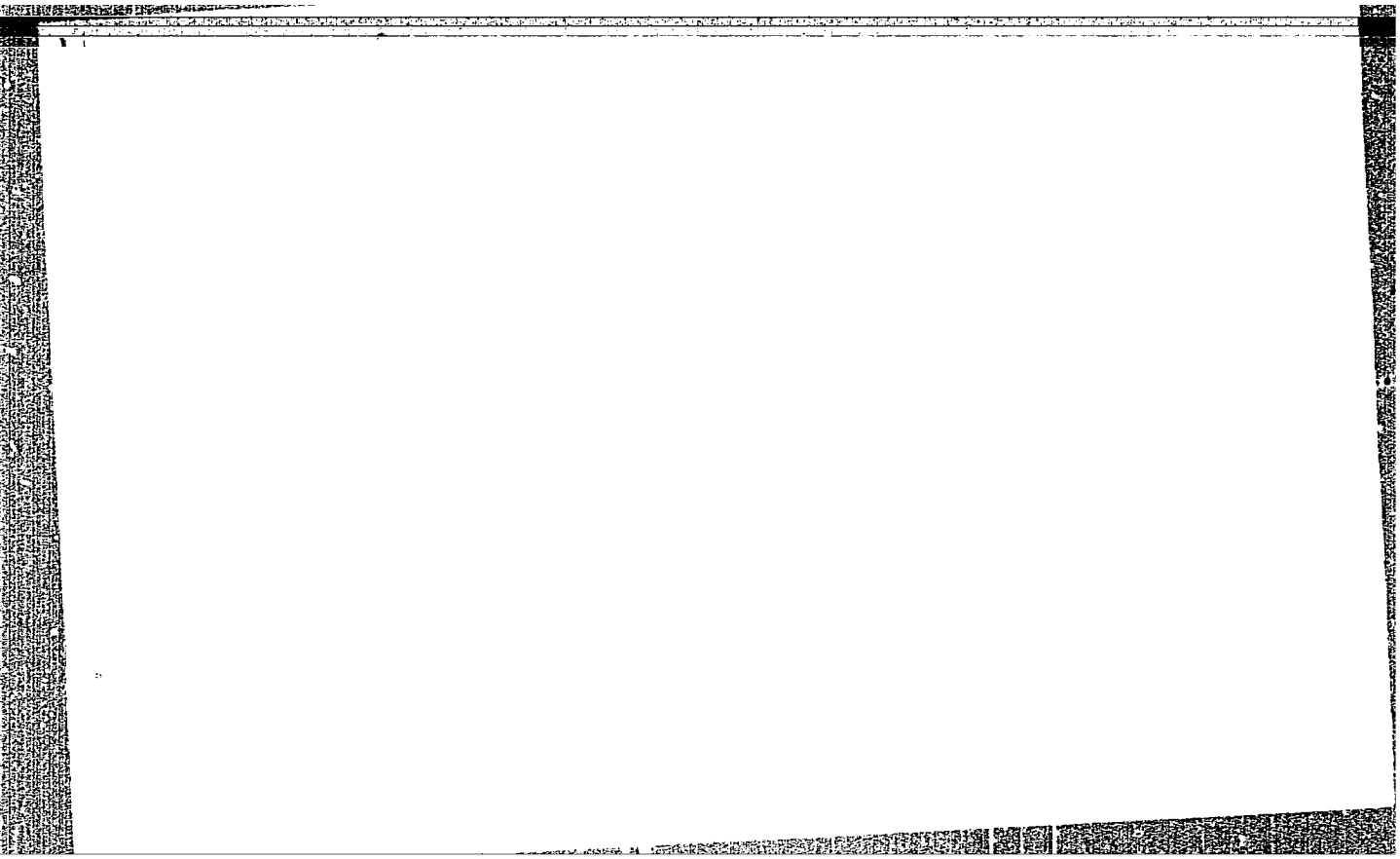
Card 2/2



APPROVED FOR RELEASE: 09/01/2001 CIA-RDP86-00513R001859430001-0"

VERESHCHAGIN, L. F.

AUTHORS: Beresnev, B.I., Vereshchagin, L.F., Ryabinin, Yu. N. (Moscow). 24-5-5/25

TITLE: Certain features of the rheological behaviour of metals pressed through a die by means of a liquid under high pressure (without a plunger). (Ob osobennostyakh reologicheskogo novedeniya metallov, pressuyemykh zhidkost'yu).

PERIODICAL: "Izvestiya Akademii Nauk, Otdeleniye Tekhnicheskikh Nauk" (Bulletin of the Ac.Sc., Technical Sciences Section), 1957, No.5, pp.48-55 (U.S.S.R.)

ABSTRACT: Pressing of metals in the cold state can be effected either by means of a plunger pressing against the work or by means of fluid under high pressure. The first method is at present very widely used but owing to the very high friction forces between the material and the die walls it cannot be applied to metals with high yield points. This obstacle can to a certain extent be eliminated by using the second method, namely, pressing by means of the hydrostatic pressure of a liquid. The here described experiments were carried out by the Laboratory of Super-high Pressure Physics of the Ac.Sc. (Laboratoriya Fiziki Sverkhvysokikh Davleniy AN SSSR) and represent one of the first attempts to obtain

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Certain features of the rheological behaviour of metals pressed through a die by means of a liquid under high pressure(without a plunger). (Cont.) 24-5-5/25

information on pressing metals by means of liquids under high pressure and to elucidate the influence of such a method of shaping on the mechanical characteristics of the metal and the features of the flow of the metal through the die. This paper deals with the part of the study relating to the rheological behaviour of the materials pressed by means of a liquid. For materialising the process apparatus was built which permits pressing by means of pressures up to 12 000 atm. The upper limit of the pressure is given by the pressure which can be produced by the compressor built in the Laboratory. A photo of the apparatus is shown in Fig.2, p.49, whilst Fig.3 shows the attachment for pressing the material through the die and Fig.4 shows the die geometry. The die was produced from ШХ-15 Steel heat treated to a hardness of 62 Rockwell C. Fig.5 gives curves of the specific pressing pressure, p kg/cm^2 against a deformation for aluminium and for copper using dies with differing entering angles. Fig.6 shows the dependence of the specific pressing pressure on the entering

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Certain features of the rheological behaviour of metals pressed through a die by means of a liquid under high pressure (without a plunger). (Cont.) 24-5-5/25

angle for aluminium and copper, whilst Fig.7 shows the dependence of the pressing pressure on P on the magnitude of the entering angle of the die. Graphs, Figs. 8—10 give theoretically calculated values, which are compared with experimental results. Compared to the process of pressing metals through dies by means of a plunger, pressing of dies by applying hydraulic pressure has the following advantages: the total pressing pressure is considerably reduced since there are no losses caused by friction in the cylindrical part of the die; the resulting reduction in the total required pressing force also leads to a reduction of the friction coefficient between the metal and the die; the reduction in the friction coefficient between the metal and the die leads to a considerable reduction of the optimum entering angle as compared to the optimum entering angle in the case of pressing by means of a plunger. There are 10 figures and 9 references, all of which are Slavic.

Card 3/3

SUBMITTED: March 1, 1957.

ASSOCIATION: Laboratory of Super-high Pressure Physics of the Ac.Sc. (Laboratoriya Fiziki Sverkhvysokikh Davleniy AN SSSR)

AVAILABLE:

Vereshchagin, L.F.

AUTHORS: Vereshchagin, L.F. and Ivanov, V.Ye. 120-4-21/35

TITLE: Gas Compressor for Super-high Pressure Research (Gazovyy kompressor dlya issledovaniy pri sverkhvysokikh davleniyakh)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1957, No.4, pp. 73 - 77 (USSR).

ABSTRACT: A piston gas compressor for pressures 5 000 - 6 000 atm. with a compression ratio of the order of 100 and an output of 120 cm^3/h is described. The power supply was 5 - 7 kW. The constructional details and the results of experimental operation are given.

The authors decided to design a compressor working with a high compression ratio, despite the fact that high gas temperatures (1 000 °C) are encountered. The compressor, the mechanical construction of which is shown in Figs. 1 and 2, is a water-cooled, reciprocating piston type operated at 240 strokes/min. by a crank mechanism. The intake valve is a slide valve in the form of a sleeve on the piston which cuts off the intake at the commencement of the piston movement. The delivery valve is a small conical cap with elastic walls and very small lift from its seating. The sealing between moving parts received special attention as even small losses could not be

Card1/2

tolerated. All gaps are filled with liquid oil carried in small quantities by the gas in the intake passage. Filling the gaps of the sealing by liquid oil meets two requirements: establishment of liquid friction conditions of the working parts and obtaining a pressure gradient in the gap along the piston due to the higher surface tension and viscosity of the lubricant compared with the compressed gas.
Experiments were conducted into the piston clearance and the effects of different lubricants for different gases (nitrogen, hydrogen, ammonia and isobutane). Fig. 3 shows the growth of pressure against time with different lubricants; Fig. 4 - the growth of pressure against piston speeds; Figs. 5 and 6 - the compression with different input pressures.
There are 5 figures and 8 references, 5 of which are Slavic.

ASSOCIATION: Laboratory of Super-high Pressure Physics Ac.Sc. USSR (Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR)

SUBMITTED: February 1, 1957.

AVAILABLE: Library of Congress

VERESHCHAGIN, L.F.[Vereshchahin, L.F.]

High-pressure techniques of the future. Dos. such. fiz. no.5:263-286 '57. (MIRA 16:6)

(High-pressure research)

VERESHCHAGIN, L.F.

120-5-20/35

AUTHORS: Vereshchagin, L.F., Se[illegible] A.A., [illegible] V.A.

TITLE: The Indicator Diagram of [illegible] High Pressure Hydraulic Pump (Indikatornaya diagramma [illegible] kompressora sverkhvysokogo davleniya)

PERIODICAL: Pribory i Tekhnika Eksperimenta, [illegible] pp. [illegible] (USSR).

ABSTRACT: Diagrams from 2 [illegible]. The [illegible] is a
[illegible] 000 atm. and
laboratory machine with a [illegible] Gosplan SSSR pump,
flow of 15 litres/hour. It differs [illegible] pressure valves. The K-38
type ГK-7/6 000 in having duplicate [illegible] 3 500 atm. at a
is for the compression of water [illegible] model,
rate of about 4 tons/hour. A [illegible] (Ref.2). The machines
the K-17, is at the [illegible]. The
were made in 1943, but have [illegible] 0.05 [illegible] in dia. and
pressure transducer is a [illegible] 100 Ω, fixed to the
8 mm long, with an initial resistance of [illegible] the tube
wall of the obturator tube. On [illegible] a tempera-
outside the pressure [illegible] disposition of
ture compensator. Fig. [illegible]. Fig. 2 shows the
pickoff, cylinder and pressure [illegible]. The transducer and compen-
circuit of the measuring [illegible] is amplified
sator are arms of a bridge. Th[illegible]

Card1/4

The Indicator Diagram of a Super[illegible] Pump for Hydraulic Pulp.

and fed via a phase-sensitive [illegible] electromagnet oscillograph type M-[illegible]. [illegible] are fed from an oscillator at 10 k/[illegible] forms part of an instrument 3TC-23-9 developed by VNII MOP for telemetry. When used with the K-38, an increase [illegible] internal dia. of 7 mm increases the "dead" volume of the cylinder by 20%. For the smaller pump an insert is necessary to reduce the supplementary volume to about 0.005 cm³. A special test established that the use of such a narrow bore in the pickoff (0.2 mm) did not reflect on the indicator diagram. On calibration, the pickoffs were linear up to 3 500 atm. Figs. 4 and 5 show the means adopted to sample the piston position in the K-38 and K-6, respectively. Piston position in K-6 was measured to within 0.1 mm; top-dead-centre was [illegible] registered in K-38. Fig. 6 shows part of an oscillogram taken on K-6 when compressing a 1:1 mixture of transformer oil and kerosene into a vessel of capacity 32 cm³. Fig. [illegible] refers to K-38 compressing water into a reservoir with a [illegible] leak out of a jet. In this case marked oscillations are to be observed; their origin has not been established with certainty. Fig. 9 shows the K-6

Card2/4 results re-plotted in the form of a conventional indicator

120 5-20/25

'The Indicator Diagram of a Sup[illegible]

diagram. Also superposed are the [illegible] for [illegible] thermal and polytropic operation [illegible] obtained by collaboration with V.V. P[illegible] and V.V. Z[illegible]. The measurement of the fundamental data is described in Ref. 3. The following comments may be made on Fig.3. 1) [illegible] necessary to open the pressure valve is [illegible] 500 to 600 atm. greater than the pressure on the other side of the valve. This is explained by the variations in density and viscosity affecting the tightness of fit of the pressure valve. The effect is greatest at around 2 000 atm. maximum pressure. 2) At the highest pressure, near top-dead-centre [illegible] ascending portions of the diagram [illegible]. This is known when the fluid is very viscous. The valve [illegible] but does so while the piston [illegible] of its travel, thus wasting some of its [illegible]. 3) The [illegible] at bottom-dead-centre. [illegible]. This is due to incomplete filling of the [illegible] pressures as 90 atm. 4) The [illegible] curves do not agree very well. This is explained by the fact that the pump took 0.12 sec. to [illegible] while the piezometer from which the [illegible] derived took

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The Indicator Diagram of a Super-High Pressure Hydraulic Pump.

18 sec. The calculation [illegible] of deformation of the cylinder and valve [illegible]. The M-50 results plotted as indicator diagrams [illegible] steeper because of the lower [illegible]. At 3 000 atm. diagram starts soon after [illegible] 1 200 atm. diagram is delayed [illegible]. During this time, the piston is [illegible]. Figs. 11 and 12 show the different behavior [illegible]. It is partly explained by the fact that [illegible] 10 atm. while the oil pump draws at 30 [illegible]. The relative accuracy of the individual diagrams [illegible] considered to be higher than in other methods. As for the [illegible] accuracy is concerned, the pressure [illegible] 10% at 3 000 atm. and the volume [illegible] 5%. There are 12 figures and 3 Slavic references.

ASSOCIATION: Super-high Pressure Physics Laboratory AN SSSR. (Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR)

SUBMITTED: March 8, 1957.

AVAILABLE: Library of Congress

Card 4/4

Vereshchagin, L F

126-1-29/40

AUTHORS: Vereshchagin, L. F. and Zubova, Yo. V.

TITLE: Dependence of the shear force of elements on the periodic number at high pressures. (Zavisimost' sily sdviga elementov ot poryadkovogo nomera pri bol'shikh davleniyakh).

PERIODICAL: Fizika Metallov i Metallovedeniye, 1957, Vol.5, No.1, pp. 171-173 (USSR)

ABSTRACT: Bridgman, P. W. (Refs.1 and 2) determined the shear force for a number of elements at pressures of 25 000 and 50 000 atm. The authors of this paper have continued these investigations and for this purpose apparatus was built which is similar to that used by Bridgman. For some of the elements which were investigated by Bridgman data were obtained which are in agreement with the numerical values of Bridgman. However, the question arose whether a relation exists between the shear force at elevated pressures and the periodic number similar to that which was established by one of the authors and A. I. Likhter (Ref.3) for the dependence of the compressibility of elements at elevated temperatures on the periodic number of the element Z. It can be seen from Fig.1 that the shear force on elements shows a periodic dependence on Z and its absolute value increases with increasing pressures. It is of interest to point out

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Dependence of the shear force of elements on the periodic number at high pressures.

that the shear force apparently depends only on the number of the external electrons and not on their total number in the atom and also not on the type of the crystal lattice. It is also important to point out that the shear is inversely proportional to the compressibility of the element (Fig.1). Thus, it can be concluded that the viscous flow of a solid under pressure is influenced solely by the external electrons of the atom. This problem is at present being investigated at appreciably higher pressures by means of the apparatus which has been built.
There are 1 figure and 3 references, one of which is Slavic.

(Note: This is a complete translation except for the figure captions).

SUBMITTED: January 4, 1957.
ASSOCIATION: Laboratory of Superhigh Pressure Physics Ac.Sc. USSR. (Laboratoriya Fiziki Sverkhvysokikh Davleniy AN SSSR).

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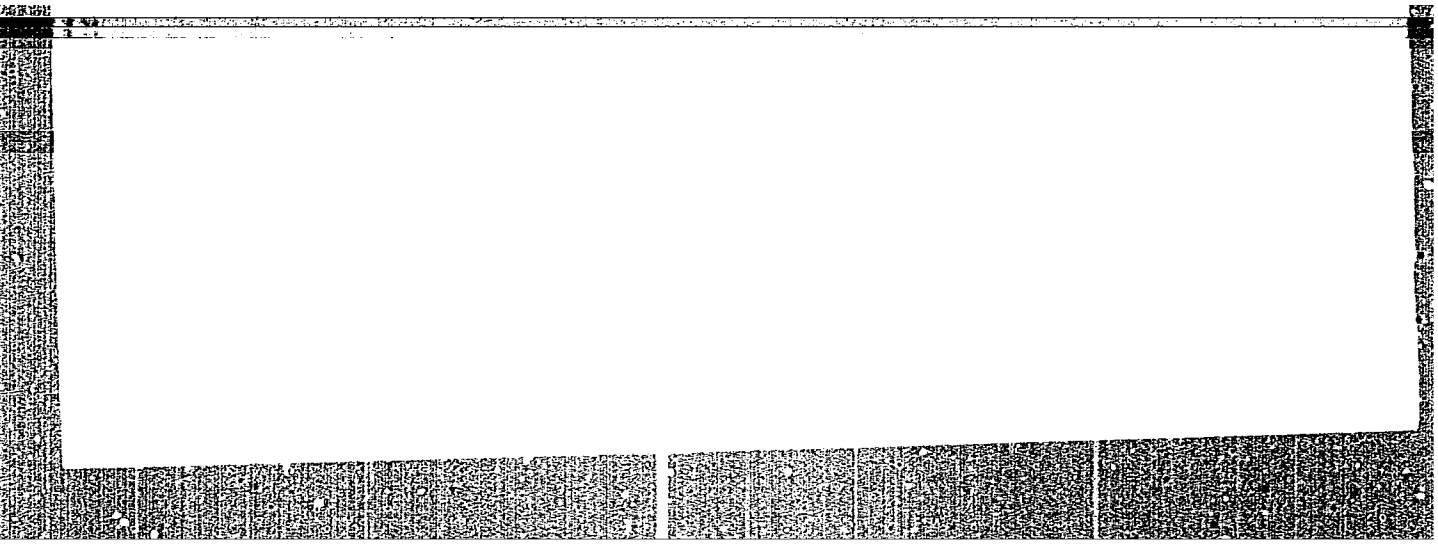
Card 2/2



APPROVED FOR RELEASE: 09/01/2001 CIA-RDP86-00513R001859430001-0"

VERESHCHAGIN, L. F.

25-12-13/39

AUTHOR: Vereshchagin, L.F., Doctor of Physico-Mathematical Sciences, Director

TITLE: Superhigh Pressures (Sverkhvysokiye davleniya)

PERIODICAL: Nauka i Zhizn', 1957, # 12, pp 11-16, (USSR)

ABSTRACT: The properties of matter may be changed arbitrarily by applying high pressure. The grade of compressibility of different elements varies with their molecular structure. Theoretical and experimental research conducted by Soviet and foreign scientists showed that the difference of compressibility of different elements decreases with increasing pressure. At a pressure of 1,400,000 atm the difference of compressibility is very small and periodicity in dependence of the specific atomic number disappears completely. Experiments to study the mechanical properties of hard substances under pressure, and especially under shearing conditions, were conducted by the Laboratory of Physics for Superhigh Pressures (Laboratoriya fiziki sverkhvysokikh davlenii). In addition, the same laboratory conducted experiments with the manufacture of aluminum wire under high pressure - in order to obtain wire of improved pliability and strength. Scientists were convinced that the resistance to rupture increases when the object is placed in a liquid which is under high pressure, for instance

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25,000 to 30,000 atm. Even such brittle material as cast iron becomes resistant to rupture under a pressure of approximately 30,000 atm, whereby the resistance to shearing stress amounts to 336 kg per sq mm of the cross section. One brand of steel showed at 28,000 atm a resistance of 340 kg per sq mm. If the pressure could be raised to 100,000 atm it must be assumed that the breaking strength would be increased to 826 kg per sq mm. The role of micro cracks pertaining to the pliability of rock salt under pressure was studied by A.F. Ioffe. The author reviewed also the experiments conducted for the production of artificial diamonds, and mentioned the fact that synthetic diamonds are being produced in the USA.

There are 1 diagram, 5 photographs, and 5 figures.

ASSOCIATION: Laboratory of Physics for Superhigh Pressures at the USSR Academy of Sciences (Laboratoriya fiziki sverkhvysokikh davleniy Akademii nauk SSSR)

AVAILABLE: Library of Congress

VERESHCHAGIN, L. F.

57-27-7-24/40

AUTHORS: Vereshchagin, L. F., Semerchan, A. A., Maslennikov, L. V., Sekoyan, S. S.

TITLE: Concerning the Problem of the Friction of a Water Jet on the Nozzle Wall at Supersonic Velocities (K voprosu o trenii strui vody o stenki sopla pri sverkhzvukovoy skorosti).

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1957, Vol. 27, Nr 7, pp. 1589-1590 (USSR)

ABSTRACT: Reference is made to the earlier papers by the authors in Zhurnal Tekhnicheskoy Fiziki, 1956, Vol. 26, Nr 11; Zhurnal Tekhnicheskoy Fiziki, 1957, Vol. 27, Nr 1 and Nr 2, in which was stated that in the case of a 6 liter (volume) the fluctuations of pressure in front of the nozzle at a total pressure of 2000 atmospheres do not exceed 10 %. But at a high velocity of jet, about 500-600 m/sec, an estimation of the friction produced on the metal wall is very difficult. For this purpose the attempt was made to determine by experiment the dependence of the water-jet friction at the nozzle wall on the diameter and on the quantity of pressure in front of the nozzle. The experiments showed that the

Card 1/2

Concerning the Problem of the Friction of a Water Jet on the Nozzle Wall at Supersonic Velocities 57-27-7-24/40

water temperature is highly dependent as well on the diameter of the nozzle as on the pressure. Based on the tests it may be said that from a diameter of 1,25 mm and more and a pressure below 700 atmospheres the frictions on the nozzle wall may be disregarded in the outflow of water from the nozzle. There are 2 figures and 3 references, all of which are Slavic.

ASSOCIATION: Physics Laboratory of Ultrahigh Pressures AS USSR, Moscow (Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR, Moskva)

SUBMITTED: January 26, 1957

AVAILABLE: Library of Congress

1. Nozzles-Performance 2. Water-Friction-Supersonic velocity 3. Water jet-Nozzle friction-Supersonic velocity 4. Friction-Water-Supersonic velocity

Card 2/2

VERESHCHAGIN, L.F.

AUTHORS: Ryabinin, Yu. N., Livshits, L. D., Vereshchagin, L. F.

57-10-18/33

TITLE: Plasticity of Brass at Superhigh Pressures (Plastichnost' latuni pri sverkhvysokikh davleniyakh)

PERIODICAL: Zhurnal Tekhn. Fiz., 1957, Vol. 27, Nr 10, pp. 2321-2325 (USSR)

ABSTRACT: The mechanical properties of brass were investigated at pressures up to 30 000 kg/cm^2. The appearance of the break as well as the micro section surface showed that the plasticity of brass increases essentially under pressure. The plastic deformation degree of the torn patterns can be expressed quantitatively by the value of the true deformation: $A=\ln(S_o/S_p).S_o$ is the cross section before the experiment and S_p the cross section at the rupture locations. It was evident that the occurring saturation of the plasticity curve which is characteristic of brass is not the result of defects of the material. The experiments also confirm that the plasticity curve changes into a saturation. This takes place at 4000 kg/cm^2. The actual deformations occurring in the case of breaking of the patterns were somewhat smaller than the theoretical ones. It was shown that the plasticity increases essentially up to a pressure of 3000 kg/cm^2 and approaches then, as already mentioned at 4000 kg/cm^2 saturation. Thus a new kind of the de-

Card 1/2

Plasticity of Brass at Superhigh Pressures. 57-1o-18/33

pendence of the plasticity on pressure was detected, as the author determined. There are 3 figures and 5 Slavic references.

ASSOCIATION: Laboratory for the Physics of Superhigh Pressures AN USSR, Moscow (Laboratoriya fiziki sverkhvysokikh davleniy Akademii Nauk SSSR, Moskva)

SUBMITTED: March 2, 1957

AVAILABLE: Library of Congress

Card 2/2

Vereshchagin, L. F.

AUTHORS: Vereshchagin, L. F., Semerchan, A. A., Piller, E. M., 57-11-26/33
Galaktionov, V. A.,

TITLE: The Role of the Receiver at the Flow of a Water Flux at Supersonic Velocity (Znacheniye resivera pri istechenii vodyanoy strui sverkhzvukovoy skorosti)

PERIODICAL: Zhurnal Tekhn. Fiz., 1957, Vol. 27, Nr 11, pp. 2640-2646,(USSR)

ABSTRACT: Here a theoretical computation of the dependence of the pressure-pulsation-smoothing degree in the receiver on the capacity of at pressure production in this receiver by means of a hydraulic ultra-high-pressure compressor was carried out. The influence of the receiver-capacity (contents) on the pressure-pulsation-smoothing degree in the receiver is investigated by experiment. The results of the computation were compared with those of the experiment with regard to the pressure-pulsation-smoothing degree of the water in the receiver and it was ascertained that the theoretical computation in spite of a number of simplifying assumptions shows a satisfying conformity with the data of the experiments. On account of the results of the experiments the water jet, which flows out of a 5-6 liter receiver at supersonic velocity, may be looked upon as well smoothed with regard to the impulse-pressures and consequently also with regard to the impulse-velocities. There are 5 figures, 2 tables and 3 Slavic references.

Card 1/2

Lab for Physics of Ultra High Pressures AN SSSR

VERESHCHAGIN, L.F.

USSR/Electricity - Conductors G-4

Abs Jour : Ref Zhur - Fizika, No 1, 1958, 1391

Author : Likhter, A.I., Vereshchagin, L.F.

Inst : Laboratory for Physics of Superhigh Pressures, Academy of Sciences, USSR.

Title : Hall Effect in Bismuth at a Pressure of 30,000 kg/cm^2.

Orig Pub : Zh. eksperim. i teor. fiziki, 1957, 32, No 3, 618

Abstract : Measurements of the Hall effect in 99.99% pure bismuth were measured in a special matrix, which can withstand a pressure (p) up to 30,000 kg/cm^2. It turns out that, as p increases, the Hall effect diminishes gradually, and in the modification III it becomes three orders of magnitude smaller than at normal pressure. The dependence of the resistance on the magnetic field in modification III also falls beyond the limits of the sensitivity of the measuring apparatus. The authors propose that, unlike Bi I, Bi III is a genuine metal.

Card 1/2

VERESHCHAGIN, L.F.

56-3-10/59

AUTHORS Likhter, A.I., Ryabinin, Yu.N., Vereshchagin, L.F.

TITLE Phase Diagram of Cerium.
(Fazovaya diagramma tseriya.-Russian)

PERIODICAL Zhurnal Eksperim.i Teoret.Fiz., 1957, Vol 33, Nr 3, pp 610-613 (U.S.S.R.)

ABSTRACT The p - T diagram of a 99.8 % chemically pure cerium preparation was measured in the temperature range +100°C to -71°C and the following points were found:

T°C	p(kg/cm²)
	11100
+94,5	8100
+20	7600
+17	7150
+4	3550
-71	1
-150 (exterpolated)	

The phase equilibrium line in the - p - T diagram is a straight line with the inclination 43 kg/cm² .grad.
There are 1 table, 3 figures and 1 Slavic reference.

ASSOCIATION Laboratory for Maximum Pressures, AN USSR.
(Laboratoriya fiziki sverkhvysokikh davleniy Akademii nauk SSSR.)

SUBMITTED March 26, 1957

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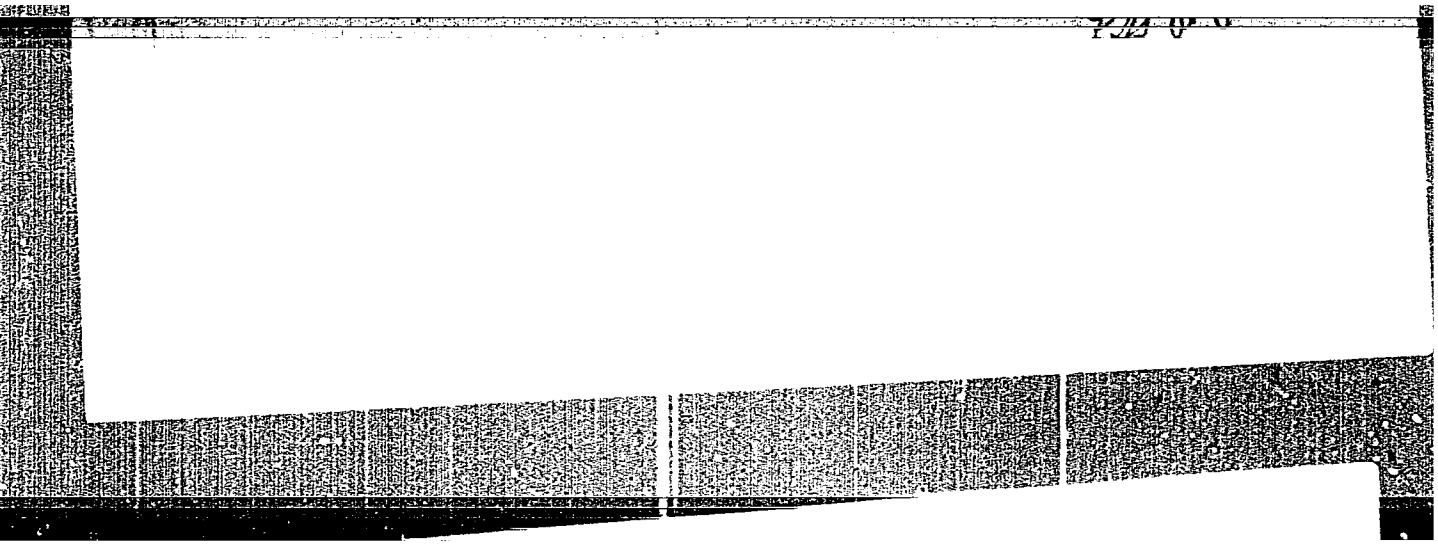

APPROVED FOR RELEASE: 09/01/2001 CIA-RDP86-00513R001859430001-0"

The Investigation of the Crystal Structure of the Halides of Rubidium at High Pressure. PA - 3045

room temperature are given in a table. Accordingly, RbJ and RbCl have the structure of CsCl in the case of the conditions given. The lattice constant amounts 3.82 and 4,29 Å for RbCl and RbJ respectively. The polymorphous transition to RbCl and also to RbJ is thus connected with the transition from the type of structure of the NaCl to the structure type of CsCl. The abrupt modification of the volume in the case of polymorphous transition was determined by comparison of the x-ray densities of the modifications existing at high and at low pressure. Thus, the halides of the rubidium at high pressure have the crystal structure of the CsCl. in the case of compounds with large cations the density is stronger than the structure of the NaCl.
(2 tables)

ASSOCIATION Laboratory for the Plastics of Superpressures of the Academy of Science of the USSR
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Card 2/2

VERESHCHAGIN, L. F. and YUZEFOVICH, N. A.

"Propagation of Ultrasound in in Liquids at Pressures up to 2,000 Atmospheres."

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.

SOV/120-58-2-20/37

AUTHORS: Ryabinin, Yu. N., Vereshchagin, L. F., Balashov, D. B. and Livshits, L. D.

TITLE: Equipment for Mechanical Studies of Metals at Pressures up to 30 000 kg/cm^2 (Apparatura dlya mekhanicheskikh issledovaniy metallov pri davleniyakh do 30 000 kg/cm^2)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1958, Nr 2, pp 79-85 (USSR)

ABSTRACT: A description is given of an apparatus which produces a hydrostatic pressure of up to 30 000 kg/cm^2 in a liquid enclosed in a chamber 13 mm in diameter and 40-70 mm long. The principle of the device is illustrated in Fig.1. The high pressures are produced within a chamber drilled in a conical metallic body. In order to be able to withstand pressures greater than 20 000 kg/cm^2 this conical member is supported by a close fitting female cone. Experiments have shown that the best angle of this cone is 5°. The same value was used by Bridgman (Refs.1 and 5). The multiplicator is also of the type described by Bridgman in Refs.5 and 6. The multiplicator is shown diagrammatically in Fig.3. The apparatus was designed for experiments on various specimens placed within the pressurised region. The force applied to the specimens is measured by a "compressimeter" described by Bridgman in

Card 1/2

Equipment for Mechanical Studies of Metals at Pressures

30 000 kg/cm^2.

Ref.2. The pressure was measured by a manganin manometer. The apparatus has been used to investigate the behaviour of steel at high pressures. Fig.8 shows photographs of steel specimens stretched to breaking point under various pressures. There are 8 diagrams, no tables and 10 references, of which 3 are English, and the rest Soviet.

ASSOCIATION: Laboratoriya Fiziki sverkhvysokikh davleniy AN SSSR (Laboratory of Ultra-high Pressure Physics of the Academy of Sciences USSR)

SUBMITTED: July 25, 1957.

Card 2/2

1. Metals--Mechanical properties 2. Metals--Pressure
3. High pressure equipment--Applications

SOV-120-58-3-20/33

AUTHORS: Voronov, F. F., Vereshchagin, L. F., Murav'yev, V. I.

TITLE: A Pulse Method of Measuring the Speed of Propagation of Ultrasonic Waves (Impul'snaya ustanovka dlya izmereniya skorosti rasprostraneniya ul'trazvukovykh voln)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1958, Nr 3, pp 81-85 (USSR)

ABSTRACT: The method is based on measuring the time by which the echo signal is delayed with respect to the incoming signal. The method is illustrated by Fig.1. The triggering block 1 produces pairs of pulses at a repetition frequency of 1 kc/s. One of the pulses is used to trigger the pulse generator 2 and the other triggers the slave sweep of the oscilloscope 4 . The second pulse in each pair produced by the generator 2 is delayed with respect to the first one by adjustable and known length of time. Simultaneously with the triggering pulse the generator 2 produces a short packet of waves having a frequency of 10 Mc/s at a rate of 1000 packets per second. This r.f. pulse is

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A Pulse Method of Measuring the Speed of Propagation of Ultrasonic Waves

applied to the piezoelectric crystal 5 . This leads to the production of elastic vibrations 7 in the specimen under investigation 6 . The elastic waves are reflected at the far end of the specimen (or a reflector) and return to the quartz crystal. The reflected signal (echo) is amplified by the receiver 3 , is detected and then applied to the oscillograph 4 . The triggering block is designed so that when the triggering pulses are suitably delayed one can observe on the CRO screen both the transmitted and the reflected pulses. If the reflected and transmitted pulses are made to coincide on the CRO screen (by adjusting the delay time in each pair of pulses) one obtains a measure of the time taken by the elastic wave in traversing the specimen under investigation. The time scale must of course be calibrated in a preliminary experiment. The apparatus differs from those used previously in that it employs a very accurate delaying circuit based on a quartz stabilised generator (2). If the leading edge of the signal is considerably distorted on passing through the medium the "dark spot" method described by Bergman in Ref.6 is used. Using the above method, the velocity of propagation of ultrasonic

A Pulse Method of Measuring the Speed of Propagation of Ultrasonic Waves

waves may be measured to an accuracy of 5%. Results are given for copper and iron. There are 4 figures, 1 table and 6 references, of which 3 are English and 3 Soviet.

ASSOCIATION: Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR (Laboratory of Physics of Ultra-High Pressures of the Academy of Sciences, USSR)

SUBMITTED: September 15, 1957.

1. Ultrasonic radiation--Propagation 2. Ultrasonic radiation--Measurement 3. Pulse generators--Applications 4. Pulse generators--Performance

Card 3/3

SOV-120-58-3-22/33

AUTHORS: Vereshchagin, L. F., Kabalkina, S. S. and Yevdokimova, V. V.

TITLE: A Camera for X-Ray Studies of the Structure of Monocrystals under High Pressure (Kamera dlya rentgenostrukturnykh issledovaniy monokristallov pod vysokim davleniyem)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1958, Nr 3, pp 90-92 (USSR)

ABSTRACT: An X-ray camera has been built for studies of monocrystals under a pressure of up to 7000 kg/cm^2. The pressure is transmitted by a steel piston and the liquid employed is benzene. The piston is fixed in the working position by means of a special nut. The pressure is measured by means of a manganin manometer. The camera works on the rotation principle. An example is given of an X-ray photograph of sodium chloride under a pressure of 4000 kg/cm^2 (Fig.4). A sectional drawing through the high

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A Camera for X-Ray Studies of the Structure of Monocrystals under High Pressure

pressure chamber is shown in Fig.2. V. G. Gorshkov is thanked for his advice. There are 4 figures and 11 references, of which 4 are Soviet, 1 German and the rest are English.

ASSOCIATION: Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR (Laboratory of Physics of Ultra-High Pressures of the Academy of Sciences of the USSR)

SUBMITTED: August 7, 1957.

1. X-ray diffraction cameras--Design 2. Single crystals--X-ray analysis

Card 2/2

SOV/120-58-4-25/30

AUTHORS: Vereshchagin, L. F., Gladkovskiy, V. A., Oleynik, N. I.

TITLE: An Instrument for Measuring the Hardness of Metals at Ultra-High Pressures (Pribor dlya izmereniya tverdosti metallov pri sverkhvysokikh davleniyakh)

PERIODICAL: Pribory i tekhnika eksperimenta, 1958, Nr 4, p 103 (USSR)

ABSTRACT: At the present time machines are available which may be used to investigate plastic deformation of specimens under the action of hydraulic compression. The instrument described in this paper differs from those described so far in that the mechanical properties of a metal under pressure may be determined without damage to the sample. The hardness of metals under pressure is determined from the impression on its surface made by a standard indentor in the form of a sphere, cone, etc. The instrument may be used in static tests on metals under hydrostatic pressures of up to

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An Instrument for Measuring the Hardness of Metals at Ultra-High Pressures

10 000 kg/cm^2. A cross section drawing through the instrument is shown in Fig 1 and it was developed and is being used at the Urals Branch of the Academy of Sciences of the USSR There is 1 figure, no tables or references.

ASSOCIATION: Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR (Laboratory of Ultra-High Pressure Physics of the Academy of Sciences, USSR)

SUBMITTED: October 16, 1957.

SOV/120-58-6-28/32

AUTHORS: Vereshchagin, L. F. and Ivanov, V. Ye.

TITLE: A Valve for Ultra-High Pressures (Ventil' sverkhvysokogo davleniya)

PERIODICAL: Pribory i tekhnika eksperimenta, 1958, Nr 6, pp 114-115 (USSR)

ABSTRACT: The valve is shown diagrammatically in Fig.1. It consists of: 1) the body, 2) a needle or a spindle which covers an aperture in the body of the valve, 3) a special tightening device for the needle, 4) a lock and 5) a screw; these last two items can impart a progressive motion to the needle. The return motion of the needle is caused by the action of the liquid or gas pressure on the needle and by a spring. The screw 5 is turned by means of a small flywheel which is inserted on it, or by means of a worm drive. The problem of tightening or gasketing the needle presented some difficulties. It was finally solved by adopting a number of cylindrical coaxial shells (as shown in Fig.1). The valve was tested in a laboratory with liquids at pressures up to 8000 atm and with gases (nitrogen) at pressures up to 3000 atm,

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A Valve for Ultra-High Pressures

and it was found that its performance was satisfactory. The paper contains 2 figures and 3 Soviet references.

ASSOCIATION: Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR (Physics Laboratory for Ultra High Pressures of the Soviet Academy of Sciences)

SUBMITTED: December 25, 1957.

Card 2/2

VERESCHAGIN, L. F.

CZECHOSLOVAKIA/Solid State Physics - Structural Crystallography. E

Abs Jour : Ref Zhur - Fizika, No 8, 1959, 17835

Author : Werestschagin, L.F., Brand, I.W.
Inst : -
Title : X-Ray Structure of Investigation of Substances with Pressures up to 30,000 Atmos.

Orig Pub : Exptl. Techn. Phys., 1958, 6, No 6, 283-285

Abstract : Translation from Dokl. AN SSSR, 1956, 108, No 3, 423 -- 424 (see Referat Zhur Fizika, 1957, No 8, 19769).

Card 1/1

SOV/126-6-6-20/25

AUTHORS: Gladkovskiy, V.A., Vereshchagin, L.F.

TITLE: Investigation of the Strength of Thick-walled Tubes (Issledovaniye prochnosti tolstostennykh trub)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958, Vol 6, Nr 6, pp 1100 - 1104 (USSR)

ABSTRACT: In a number of cases, it is of great importance to evaluate the maximum internal pressure which will bring about tube failure. It can be assumed that the pressure at which tube failure will occur depends basically on the thickness of the tube and the strength characteristics of the tube material (Ref 3). However, this assumption requires experimental confirmation. For this purpose, Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR (The Laboratory of Physics of Very High Pressures of the Ac.Sc.USSR) carried out in 1952-1955 strength studies of tubes subject to very high internal pressures up to 14 000 atm. Similar strength studies of carbon-steel tubes (0.28% C) with pressures up to 7 100 atm were carried out not very long ago by Crossland and Bones (Ref 4) at Bristol University. A sketch of the special test rig permitting investigation

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Investigation of the Strength of Thick-walled Tubes

of thick-walled tubes at internal pressures up to 14 000 atm is given in Figure 1. Preliminary filling was effected with a hydraulic compressor which increased the pressure to 3 000 - 4 000 atm. Further increases in the pressure were obtained by displacing a piston (6) inside a cylinder (5) by feeding fluid into the lower cavity of the cylinder (7). For obtaining in the high-pressure cylinders a pressure of 15 000 kg/cm^2, it was necessary to produce in the low-pressure cylinder a pressure slightly exceeding 300 kg/cm^2. Tubes were tested which were made of four differing grades of steel: 30KhGSA, 40Kh, U10 and EYaIT, the mechanical properties of which are

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Investigation of the Strength of Thick-walled Tubes

entered in a table on p 1102. The failure curves (D/d versus pressure) for tubes of the four steels are graphed in Figures 2 - 5. The obtained experimental curves are not in agreement with any of the semi-empirical formulae (Ref 4) proposed for calculating the pressure at which thick-walled tubes fail.
Lomakin (Ref 5) published in 1955 theoretical work on the calculation of tubes, taking into consideration high elastic-plastic deformations. In a separate paper, the authors of this paper propose to evaluate the obtained results and to compare them with calculated data, based on various strength theories.

There are 5 figures, 1 table and 5 references, 3 of which are Soviet and 2 English.

SOV/126-6-6-20/25

Investigation of the Strength of Thick-walled Tubes

ASSOCIATION: Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR
(Laboratory of Physics of Very High Pressures of the Ac.Sc.USSR)

SUBMITTED: April 11, 1957

Card 4/4

SOV/136-58-8-14/27

AUTHORS: Beresnev, B.I., Vereshchagin, L.F. and Ryabinin, Yu.N.

TITLE: Installation for Drawing and Rolling Metals in Freely Rotating Rolls in a Liquid under High Hydrostatic Pressure (Ustanovka dlya volocheniya i prokatki v svobodno vrashchayushchikhsya valkakh metallov v zhidkosti pod vysokim gidrostaticheskim davleniyem).

PERIODICAL: Tsvetnyye Metally, 1958, Nr.8, pp.61-63 (USSR)

ABSTRACT: Bridgeman(Ref.1) on the basis of investigations of the effect of pressure on metal properties proposed and carried out preliminary experiments on the rolling and drawing of metals under hydrostatic pressure. Bridgeman (Ref.1) and also the authors, working in the Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR (Laboratory of Super-High Pressure Physics of the AS USSR) (Ref.4), extended the technique and noted the improvement of metal properties. Special installations (Fig.1) have been used to compare the two methods of deformation and served as the basis for an installation produced by the authors for drawing or rolling (idler rolls) metals in hydrostatic pressures up to 10,000 kg/cm^2 (Fig.2). The liquid is supplied by a laboratory

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Installation for Drawing and Rolling Metals in Freely Rotating Rolls in a Liquid under High Hydrostatic Pressure.

compressor rated at 3.8 litres/hour at 10,000 kg/cm^2. The conversion from drawing to rolling is simply effected. The more important parts are made of heat-treated alloy steels. The installation has been used for experiments on the pressure drawing and rolling to various degrees of deformation, but the authors do not give their results. There are 2 figures and 6 Soviet references.

1. Metals--Processing 2. Rolling mills--Design 3. Pressure--Metallurgical effects 4. Water--Applications

BERESNEV, V.I.; VERESHCHAGIN, L.F.; RYABININ, Yu.N.

Mechanical properties of aluminum subjected to preliminary plastic deformations at high hydrostatic pressures [with summary in English]. Inzh.-fiz. zhur. no. 9:119-122 S '58. (MIRA 11:10)

1. Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR, g. Moskva i Institut fiziki metallov AN SSSR, g. Sverdlovsk.
(Aluminum--Testing)

SOV/24-58-10-28/34

AUTHORS: Beresnev, B. I., Vereshchagin, L. F., Ryabinin, Yu. N. (Moscow)

TITLE: Role of the Medium in the Extrusion of Metals by Means of a Liquid under High Pressure (Rol' sredy pri vydavlivanii metallov zhidkost'yu vysokogo davleniya)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, 1958, Nr 10, pp 144-146 (USSR)

ABSTRACT: Bridgman carried out experiments on extruding copper and steel with a liquid under pressures of up to 12 000 atm. He stated that he did not succeed in finding an optimum regime for this process and, as a result of that, at very high pressures the metal came out of the die in individual bits instead of continuously. Similar work carried out in the Very High Pressure Physics Laboratory of the Academy of Sciences, USSR, has shown that the correct selection of the medium which transmits the pressure determines to a considerable extent not only the magnitude of the pressure necessary for effecting flow of the metal but also the quality of the metal after deformation. Information gained during these experiments is reported in this paper. The authors studied

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Role of the Medium in the Extrusion of Metals by Means of a Liquid under High Pressure

the influence of various media, which act both as a medium for transmitting the pressure and as a lubricant on the pressure necessary for producing equal deformations. For this purpose aluminium was extruded through a die with a cone angle $\alpha = 40^{\circ}$. The reduction was maintained constant at 0.773. The method was the same as that described in earlier work (Ref.2). The following results were obtained:

Liquid transmitting pressure	Pressure at which the flow of metal begins P, kg/cm^2	Surface quality
Hypoid lubricant	3750	Bad
Transformer oil	5500	Satis-factory
Transformer oil + kerosene (0.5+0.5)	6500	"
Transformer oil + kerosene + oleic acid (0.49+0.49+0.02)	6450	"
Kerosene	6900	"
Gasoline	6900	"
Methylated spirits	6075	"
Ethyl alcohol	6450	

Role of the Medium in the Extrusion of Metals by Means of a Liquid under High Pressure

Table (continued)

Liquid transmitting pressure	Pressure at which the flow of metal begins P, kg/cm²	Surface quality
Water	5500	Good
Water + a layer of hypoid lubricant applied to the surface of the specimen	5000	Excellent

On the basis of the obtained results, the following conclusions are arrived at:

1) The pressure necessary to produce a flow of the metal as well as the surface quality of the deformed metal are greatly dependent on the fluid used.

2) It was found that plating of the specimen with a thin layer

Role of the Medium in the Extrusion of Metals by Means of a Liquid under High Pressure

of a tin-lead solder reduces considerably the pressure necessary for extrusion.
3) Optimum conditions of extrusion were determined, by means of which a high surface quality can be obtained, namely, by applying a thin layer of hypoid lubricant on a specimen which is extruded by means of water.
4) It was found that if the wrong liquid is applied this can lead not only to damage of the surface of the extruded metal but also to its complete destruction. There are 1 table, 1 figure and 6 Soviet references.

ASSOCIATION: Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR, Institut fiziki metallov, AN SSSR (Laboratory of Physics of Very High Pressures, Academy of Sciences USSR, Institute of Metal Physics, Academy of Sciences USSR).

SUBMITTED: May 27, 1958.

BERESNEV, B.I.; VERESHCHAGIN, L.F.; RYABININ, Yu.N.

Extrusion of pipes and parts of complex profile by liquid under high pressure. Inzh.-fiz.zhur. no.11:105-109 N '58. (MIRA 12:1)

1. Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR, g. Moskva, i Institut fiziki metallov AN SSSR, g. Sverdlovsk.
(Extrusion (Metals))

VERESHCHAGIN, L F

57-2-30/38

AUTHORS: Vereshchagin, L. F., Semerchan, A. A., Filler, F. M.

TITLE: On the Velocity Break in a Water Jet (K [illegible] skorosti v vodyanoy struye)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 28, Nr 2, pp. 433-435 (USSR)

ABSTRACT: Reference is made to the tests already described (references 1 and 2) on the investigation of the water-jets with supersonic speed. The jet is produced by a water-compressor with an expansion chamber. The water jet flowing out of a 1 mm nozzle was photographed with a cinematographic equipment. The velocity of the photograph was 8000 pictures per second. The obtained photographs give the possibility to determine when the conditions for the outflow of the jet seem to be guaranteed, the shape of the jet does not change with time and all pictures are stereotype. The here-observed nature of the outflow in many respects recalls the cases described in reference 1. It is shown that a disk of liquid forms at the intersection of the "fast" and the "slow" jet. Two cases of discon-

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57-2-32/32

On the Velocity Break in a Water Jet

tinuity were theoretically investigated: 1.) the velocity in the nozzle is a step-function of the time and 2.) the velocity in the nozzle makes an instantaneous jump with a subsequent linear fall with respect to time. In both cases a discontinuity of the free jet occurs. At the intersection of the "fast" and the "slow" jet a disk of liquid forms which rotates with a velocity that is equal to the arithmetic mean of the velocity of the liquid-particles immediately before and after the intersection. In the first case the disk is flat and moves with a velocity $= \frac{u_1 + u_2}{2}$. In the second case the disk loses its flat shape and the point of intersection moves slowly. These tests made by the author essentially confirm the conclusions of theory. It is pointed out that this report made here for the time being has only a qualitative nature. There are 2 figures, and 5 references, 4 of which are Slavic.

ASSOCIATION: Ultra-High Pressure Physics Laboratory, AS USSR (Laboratoriya fiz. [illegible] Akademii Nauk SSSR)

SUBMITTED: May 3, 1957
AVAILABLE: Library of Congress
Card 2/2

1. Jets-Velocity-Water 2. Water-Velocity-Test methods
3. Water-Velocity-Test results

USCOMM-DC-54759

SOV/ 57-28-7-3/35

AUTHORS: Ryabinin, Yu. N., Livshits, L. D., Vereshchagin, L. F.

TITLE: On the Change of the Electric Conductivity of Silicon at Superhigh Pressure (K voprosu ob izmenenii elektroprovodnosti kremniya pod sverkhvysokim davleniyem)

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1958, Vol. 28, Nr 7, pp. 1382 - 1386 (USSR)

ABSTRACT: First it is shown that the results obtained by P.W.Bridgman (Refs 2 and 8) are not constant and, to a certain extent, uncertain. A measurement of the electric conductivity of silicon of the p-type in dependence on the pressure is repeated. A silicon monocrystal, produced according to the method of Chokhral'skiy at the State Institute of Rare Metals was used as sample. It had the form of a parallel epiped with 9,8 x 5,8 x 4,0 mm. A Wheatstone bridge of the type MKL-49 was used for the measurement of the electric resistance. A multiplier (analogous to that of Bridgman) which was developed in the laboratory of the authors was used for the measurement of the sample resistance under high hydrostatic pressure. The measurements were

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started with the determination of the amount of the temperature factor of the electric resistance α at atmospheric pressure. They show that the sample resistance does not change in the case of an alteration of the current polarity and is independent of the amount of amperage in the region of 0,2 ÷ 10 mA . The specific sample resistance at 20° amounted to 18,4 ohm cm. The measurement of the sample resistance was carried out gradually up and down under pressure. It was found that the electric resistance of silicon is reduced with increasing pressure. It was shown that pure silicon of the p-type has the same effect sign as germanium of the p type and selenium (Ref 2,5 resp.). No such great hysteresis of the silicon resistance by the pressure was observed as in the case of Bridgman. It is pointed out that the electric resistance in the case of silicon of the p-type is to a great extent influenced by the chemical purity, the composition of the admixture, the thermal and mechanical pretreatment. S. A. Ratenberg put the silicon crystal at the authors' disposal. N.I.Chetverikov helped to produce the contacts. There are 2 figures and 10 references, 3 of which are Soviet.

On the Change of the Electric Conductivity of Silicon at Superhigh Pressure

507/57-28-7-3/35

ASSOCIATION. Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR Moskva (Laboratory of the Physics of Superhigh Pressures, AS USSR, Moscow)

SUBMITTED: October 2o, 1957

1. Silicon--Conductivity

Card 3/3

SOV/57-28-9-30/33

AUTHORS: Semerchan, A. A., Vereshchagin, L. F., Filler, F. M., Kuzin, N. N.

TITLE: Momentum Distribution in a Continuous Fluid Jet at Supersonic Velocity (Raspredeleniye kolichestva dvizheniya v neprerjvnoy zhidkostnoy struye sverkhzvukovoy skorosti)

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1958, Vol 28, Nr 9, pp. 2062-2071

ABSTRACT: This paper covers the investigation of a continuous horizontal fluid jet at sub- and supersonic velocity (from 300 to 540 m/sec). The principal procedure adopted in the experiments is described. In order to obtain a jet with the required parameters, the Nr 1 hydraulic plant of the association mentioned below (Ref 7) was used. The distribution of momentum in a continuous water jet ejected at supersonic velocities from a nozzle was obtained. According to the curves describing the momentum distribution the boundaries of a free water jet moving with supersonic velocity in the atmosphere were determined. The contour of the jet is in accordance with that observed in photographs. It was found that an increased viscosity of the fluid results in a reduction of the conical angle of the jet. A com-

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Momentum Distribution in a Continuous Fluid Jet at Supersonic Velocity

bination of the method of determining the momentum (which was used here), together with a satisfactory method of determining the density of the moving medium throughout the jet makes it possible to find the velocity field and the distribution of kinetic energy in supersonic fluid jets. There are 11 figures, 2 tables, and 7 references, 5 of which are Soviet.

ASSOCIATION: Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR, Moskva (Laboratory of Physics of Superhigh Pressures, AS USSR, Moscow)

BERESNEV, B.I.; VERESHCHAGIN, L.F.; RYABININ, Yu.N.

Equipment for metal drawing and rolling in freely rotating rolls with liquids under high hydrostatic pressure. TSvet. met. 31 no.8:61-63 Ag '58. (MIRA 11:9)
(Drawing (Metalwork)) (Deformation (Mechanics))