

SEMERAU-SIEMIANOWSKI, Zbigniew; BORKOWSKI, Maciej; KALETA, Zbigniew

Effect of noradrenalin on the carbohydrate metabolism in myocardium
and on the coronary circulation. Polski tygod. lek. 17 no.3:81-85 15
Ja '62.

1. Z Zakladu Chirurgii Doswiadczalnej PAN; kierownik: doc. dr med.
J. Nielubowicz).

(NOREPINEPHRINE pharmacol) (MYOCARDIUM metab)
(CARBOHYDRATES metab)

SEMERCHAN, A. A.

L-2707
HYDRAULIC SUPER-PRESSURE COMPRESSOR²⁵ A. A.
Semerchan. Vestnik Akad. Nauk S.S.S.R. 28: 33-40(1956)
OC. (In Russian)

A description and scheme are given for a hydraulic compressor of 1200 l. of water capacity under 2,000 atm. and using 100 kw. The compressor was applied in the studies of physics and hydrodynamics of supercritical fluid streams (p = 2000 atm. the velocity is of 600 m/sec order). (R.V.J.)

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~~SEMERCAN, A.A.~~
~~SEMERCAN, A.A.~~

~~SEMERCAN, A.A.~~

PA - 1844

CARD 1 / 2

GALAKTIONOV, V.A.,

SUBJECT
AUTHOR

USSR / PHYSICS
VERESCAGIN, L.F., SEMERCAN, A.A., FIRSOV, A.I.,

TITLE

FILLER, F.M.
Some Investigations on the Hydrodynamics of a Jet of Liquid
ejected from a Nozzle under the Pressure of up to 1500 atm.
Zurn. techn. fis, 26, fasc. 11, 2570-2577 (1956)

PERIODICAL

Issued: 12 / 1956

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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

Semerchan, A.A.

PA - 2154

AUTHOR
TITLE

VERESHCHAGIN, L.F., ~~SEMERCHAN, A.A.~~, FILLER, F.M.
Some Investigations concerning the Water-Jet Propelled from a Nozzle
under a Pressure of up to 2000 atm. overpressure. (Nekotorye issledo-
vaniya strui vody, vytekayushchey iz sopla pod davleniyem do 2000 atmosfer)
Izvestiia Akad.Nauk SSSR, Otdel.Tekhn., 1957, Nr 1, pp 57-60 (U.S.S.R.)
Received 3/1957

PERIODICAL

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 pro-
filed aperture of 0.2 - 1.24 mm diameter, is obtained. In order to ob-
tain 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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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 occurring on the occasion of throttling become compensated in a
certain degree. On the occasion of throttling 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
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18. 9. 1956
Library of Congress.

Card 2/2

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

and fed via a phase-sensitive detector to an electromagnet oscillograph type MCO-2. The detector and bridge are fed from an oscillator at 10 kc/s. The circuit forms part of an instrument 3TC-23-7 developed by VNIIM MOP for sensometry. When used with the K-38, an obturator with an 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 0.008 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 5 500 atm. Figs. 4 and 5 show the means adopted to sample the piston motion in the K-38 and K-6, respectively. Piston position in K-6 was measured to within 0.1 mm; top-dead-centre was electrically 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. 7 refers to K-38 compressing water into a reservoir with a continuous leak out of a jet. In this case marked oscillations are to be observed; their origin has not been established with certainty. Fig. 8 shows the K-6 Card2/4 results re-plotted in the form of a conventional indicator

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

18 sec. The calculation also neglected the effects of deformation of the cylinder and valve leakage. The K-38 results plotted as indicator diagrams in Fig. 10 appear much steeper because of the lower compressibility of water. The 3 000 atm. diagram starts soon after the dead centre but the 1 500 atm. diagram is delayed for almost half the stroke. During this time, the piston is compressing water vapour. Figs. 11 and 12 show the different behaviour of the two pumps. It is partly explained by the fact that the water pump draws at 10 atm. while the oil pump draws at 90 atm. The relative accuracy of the individual diagrams in a family of curves is considered to be higher than in other methods. As far as absolute accuracy is concerned, the pressure axis is estimated to be within 10% at 3 000 atm. and the volume axis about 2%. There are 12 figures and 3 Slavic references.

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

SUBMITTED: March 8, 1957.

AVAILABLE: Library of Congress
Card 4/4

SEMERCHAN, A. A.

Some investigations of the hydrodynamics of jets of liquid issuing from a nozzle at pressures up to 1500 atmospheres. L. P. Vertinskii, A. A. Semerchan, V. I. Filinov, V. A. Galaktionov, and S. M. Zhurav. Sov. Phys. Tech. Phys. No. 11, 1957, pp. 2484-490. Study of high pressure jets which indicates that even at velocities of the order of 600 m/sec. the jets remain compact. Close to the velocity of sound in air, disturbances appear. The length of standing waves along a jet increases with the velocity and the disturbances disappear.

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SEMERCHAN, A.A.

57-27-7-24/40

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

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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

SEMERCHAN, A. A.

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

TITLE: The Role of the Receiver at the Flow of a Water Flux at Supersonic Velocity (Znachenie 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 ultrahigh-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~~ *cat. for Physics of Ultra-high pressures, AS USSR*

- Growth and Cohesion of Crystals Under the Action of Ionizing Radiation 30-1-11/39

the dose of irradiation. In a scheme the process of crystal production is shown and then discussed. This process can be utilized in various technical fields (for the production of inexpensive tools of high quality from aluminum oxide for metal working, etc.). There is 1 figure.

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1. Electrons-Radiation 2. Crystals-Production

Card 2/2

SEMERCHAN, A. A.

57-2-32/32

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

TITLE: On the Velocity Break in a Water Jet (K voprosu o razryve i razryvnoy struye)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 20, 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

tainty 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 $u = \frac{u_1 + u_2}{2}$. 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 Nizkogo Dавления, Tomskiy Nauchnyy AN 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/57-28-9-30/33

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 nepreryvnoy 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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SOV/57-28.9-30/33

Momentum Distribution in a Continuous Fluid Jet at Supersonic Velocity

combination 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)

Card 2/2

SOV/120-59-1-29/50

AUTHORS: Semerchan, A.A., Vereshchagin, L.F., Isaykov, V.K., Firsov, A.I.
TITLE: A Hydraulic Installation for the Production of a Jet of Liquid Moving with Ultrasonic Speed (Gidravlicheskaya ustanovka dlya polucheniya struy zhidkosti sverkhzvukovoy skorosti)

PERIODICAL: Priboiy i tekhnika eksperimenta, 1959, Nr 1, pp 121-125 and 1 plate (USSR)

ABSTRACT: Figs 1 and 2 show a photograph and the general arrangement of the hydraulic installation. The hydraulic compressor is brought into motion by the MASHR-85/6-0 electrical motor (240 kW, 1000 rpm). From the compressor the liquid passes to a "receiver" with a nozzle through which the liquid is ejected into the atmosphere. The pressure behind the nozzle is 2000-25 000 atm and the speed of the liquid jet is 600-650 m/sec. To achieve this a special high pressure hydro-compressor has been built and is shown diagrammatically in Fig 4. The size of the hydrocompressor is 1100 x 680 x 500 mm³, the working pressure is 2000 atm, consumption 1500-2500 l/hour, number of cylinders = 1, number of excursions of the piston 1000 per minute, diameter of the piston 22, 27 and 33 mm and the distance through which the piston moves is 70 mm. The high pressure hydrocompressor consists of two main parts, namely, a crankgear and a high pressure cylinder (Fig 5). The

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APPROVED FOR RELEASE: 08/09/2001 CIA-RDP86-00513R001547910012-1

A Hydraulic Installation for the Production of a Jet of Liquid Moving with Ultrasonic Speed

high pressure cylinder consists of a thick walled container 5 in which the liquid is compressed. It also includes a pressure valve 4 (shown in greater detail in Fig 6) and inlet valves 3, 6. 7 is the compressing piston. The form of the nozzle is shown in Fig 8. The system has been used with glycerine (Fig 10) and water (Fig 11). There are 10 figures and 3 Soviet references.

ASSOCIATION: Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR (Laboratory for Physics of Ultrahigh Pressures, Academy of Sciences, USSR)
SUBMITTED: February 1, 1958.

Card 2/2

VERESHCHAGIN, L.F.; SEMERCHAN, A.A.; SEKOYAN, S.S.

Disintegration of a high velocity water jet. Zhur.tekh.fiz. 29
no.1:45-50 Ja '59. (MIRA 12:4)

1. Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR.
(Jets—Fluid dynamics)

VERESHCHAGIN, L.F.; SEMERCHAN, A.A.; ISAYKOV, V.K.; RYABININ, Yu.N.

Small laboratory 1,000-ton capacity hydraulic press. Prib.i tekh.
eksp. no.5:93-95 S-0.'60. (MIRA 13:11)

1. Institut fiziki vysokikh davleniy AN SSSR.
(Hydraulic presses)

VERESHCHAGIN, L.F.; SEMERCHAN, A.A.; ISAYKOV, V.K.; RYABININ, Yu.N.

A 1,000-ton capacity hydraulic press. Bnl.tekh.-ekon.
inform. no.7:15-17 '60. (MIRA 13:7)
(Hydraulic presses)

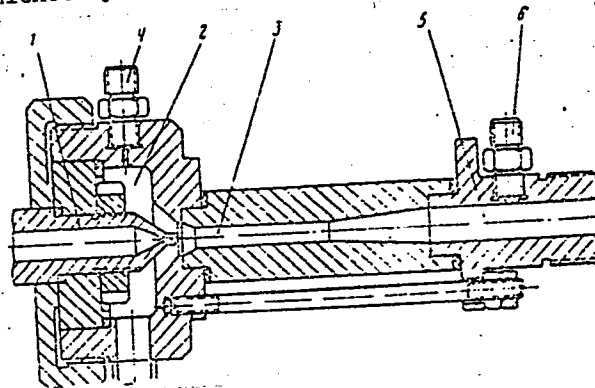
S/193/60/000/012/012/018
A004/A001

AUTHORS: Semerchan, A. A., Kuzin, N. N., Isaykov, V. K.

TITLE: A High-Pressure Fluid Ejector

PERIODICAL: Byulleten' tekhniko-ekonomicheskoy informatsii, 1960, No. 12, pp.35-36

TEXT: The Institut fiziki vysokikh davleniy AN SSSR (Institute of High-Pressure Physics of the AS USSR) has designed and manufactured a high-pressure ejector achieving a pressure of the active fluid up to 1,000 kg/cm². The necessary pressure of the active fluid is produced by the K-17 hydraulic compressor of 1.8 m³/hour capacity at a pressure of up to 2,000 at. The compressor is also a design of the Institute. The illustration shows a longitudinal



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A High-Pressure Fluid Ejector

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section of the ejector. The active fluid is supplied by the hydraulic compressor through nozzle 1 with a central angle of taper of 50° and a cylindrical section with a length-to-diameter ratio of 2.5. The fluid discharge through the nozzle amounts to 0.45 liter/sec. The passive fluid is supplied by the AK-5-15M (LK-5-15M) centrifugal pump to receiver 2 and enters mixing chamber 3 through a ring-shaped slot 10.3 mm in diameter. The pressure of the passive fluid is controlled by a damping pressure gage through connecting branch 4. The mixing chamber, consisting of the conical input part with a central angle of taper of 50° , the cylindrical neck 6.94 mm in diameter and the conical diffusor with a span angle of 8° , is of solid construction and polished. From the diffusor the fluid gets into the cylindrical receiver 5, 15 mm in diameter where the output pressure is measured by a damping pressure gage through connecting branch 6. The ejector parts are made of 45XHMΦA (45KhNMFA) steel, the seals are of teflon. The output pressure and the total fluid discharge are controlled by a valve. At an output pressure of 30 kg/cm^2 the ratio of passive fluid discharge to active fluid discharge is 2:1. The following technical data are given: pressure fluid - water; nozzle diameter - 1.15 mm; neck diameter - 6.94 mm; pressure of active fluid - $1,000 \text{ kg/cm}^2$; pressure of passive fluid - 4 kg/cm^2 ; output pressure - 30 kg/cm^2 ; active fluid discharge - 0.45 liter/sec; passive fluid discharge - 0.9 liter/sec. There is 1 figure.

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S/170/60/003/02/11/026
B008/B005

10.2000
AUTHORS:

Semerchan, A. A., Filler, F. M., Dembo, N. S., Kuzin, N. N.

TITLE:

The Application of Liquid Jets¹ Flowing Out at Ejector
Pressures of up to 1,000 kg/cm²

PERIODICAL:

Inzhenerno-fizicheskiy zhurnal, 1960, Vol. 3, No. 2,
pp. 61-66

TEXT: Peculiarities and rules of ejectors are investigated at a pressure of the active liquid (p_1) between 300 and 1,000 kg/cm², and a pressure of the passive liquid (p_2) between 1 and 7.6 atmospheres. A diagram of the experimental plant is shown by Fig. 1. By exchanging the central ejector part, 4 discharge parts with different diameters could be investigated. The experimental results are given in Figs. 2 and 3. As can be seen, the characteristic of the ejector consists of a working and a cavitation (vertical) part. The limit of the ejection coefficient q^* is determined by the pressures p_1 and p_2 as well as by the form and size of the discharge part. An

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The Application of Liquid Jets Flowing Out at Ejector Pressures of up to 1,000 kg/cm²

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increase in p₁ leads to an approximately proportional pressure increase behind the ejector, at the same time shifting the beginning of cavitation in the direction of lower q-values. The change in p₂ influences only slightly the working characteristic but the more so the critical ejection coefficient. The critical ejection coefficient is well expressed by the formula

$q = (m-1) \sqrt{\frac{p_2 - p_s}{p_1 - p_s}}$ suggested by P. P. Korolev (Ref. 6). p_s = pressure of

the saturated vapors. Table 1 shows that this formula in first approximation permits a determination of the position of the cavitation branch of the characteristic. The formation of cavitation was observed visually. Fig. 4 shows the transparent discharge part of an ejector model under varying working conditions. There are 4 figures, 1 table, and 6 Soviet references.

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR, g. Moskva
(Institute of High-pressure Physics AS USSR, City of Moscow)

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B014/B007

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

TITLE: The Problem of the Destructive Effect of Cavitation

PERIODICAL: Inzhenerno—fizicheskiy zhurnal, 1960, Vol. 3, No. 3,
pp. 87-90

TEXT: The formation of cavities by quickly moved liquids is investigated. Among other things, the authors refer to the opinion expressed by M. Kornfeld (Ref. 3), according to which the destructive effect is caused immediately by the water hitting the metal surface. Besides this purely mechanical theory of the effect produced by cavitation, also the chemical theory is mentioned. Experimental results, in which the time-dependence of the formation of cavities on various factors was investigated, are discussed. As may be seen from Fig. 2, the time for the formation of cavities decreases sharply with increasing velocity. Fig. 3 graphically shows the dependence of the time required for the formation of cavities upon the distance between the metal plate and the nozzle for three different nozzle diameters

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The Problem of the Destructive Effect of
Cavitation

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B014/B007

(0.64-0.84 mm). The rate of outflow was 440 m/sec. For each of the three curves it was found that at a certain distance the time required for the formation of cavities is a minimum. This high intensity of cavitation is connected with the division of the jet. The results obtained tend to confirm the mechanical cavitation theory. There are 3 figures, 3 tables, and 6 references: 4 Soviet and 2 English. ✓

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR, g. Moskva
(Institute of High-pressure Physics of the AS USSR, City
of Moscow)

Card 2/2

S/170/60/003/07/11/011
8012/5034 B223

Verashchirin, L. P., Fedorovskiy, A. Ya., Ianykov, V. I.,
Slashev, V. N., Semerchan, A. A.

TITLE: The Possibility of Using Plastic Solids as Working Medium
in Cylinders of Large-sized Hydraulic Presses

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1960, Vol. 3, No. 7,
pp. 132 - 134

TEXT: For scientific research work, it is necessary to produce pres-
sures of 100,000 atmospheres (access pressures) and more in large volume.
Large-sized presses are used for this purpose. At the Institut fiziki
vysokikh davleniy (Institute of High-Pressure Physics of the
USSR) it is possible to increase the working pressure of the liquid
in the P₁ cylinder up to 5,000 atmospheres excess pressure (Ref. 1).
Since further increase in pressure involves great difficulties with
respect to packings, a 1,000-t pressure transformer model was designed
at the same institute. A plastic solid is used instead of a liquid.
Fig. 1 shows the principal scheme of this pressure transformer. First,

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preliminary experiments are made on a 200-t model. Silver chloride,
Teflon, and lead were used in these experiments; it appeared that lead
yielded maximum efficiency. In the experiments on the 1,000-t pressure
transformer, liquid lead was poured into the working room. The per-
formance of the experiment is described in brief. Fig. 2 shows the
experimental curves for the dependence of forces P₂ on forces P₁. The
efficiency with pressures over 10,000 atmospheres excess pressure is
about 90%. The method described permits an increase in working pres-
sure up to the elastic limit of the construction material used. There
are 2 figures and 1 Soviet reference.

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR, E. Moskva
(Institute of High-Pressure Physics of the AN SSSR,
Moscow)

Card 2/2

SEMERCCHAN, R.A.

89609

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B019/B056

1.1210

AUTHORS: Vereshchagin, L. F., Corresponding Member of the AS USSR,
Semerchan, A. A., Kuzin, N. N., and Popova, S. V.

TITLE: Changes in Resistivity of Some Metals at Pressures of up
to 200 000 kg/cm²

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 2, pp. 320-321 X

TEXT: The authors studied the resistivity of antimony, arsenic, and calcium at pressures of up to 200 000 kg/cm². Likewise, bismuth, whose resistivity has hitherto been known up to 140 000 kg/cm², was investigated. The bismuth and calcium specimens were made from wire, the antimony and arsenic specimens were thin single crystals. All specimens were chemically pure. As may be seen from changes in resistivity of the specimens graphically represented in Figs. 1, 2, and 3, arsenic and calcium have a monotonic change of resistivity with rising pressure, bismuth and antimony, however, have not. At 130 000 kg/cm², antimony shows a jump-like change

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Changes in Resistivity of Some Metals
at Pressures of up to 200 000 kg/cm²

S/020/61/136/002/012/034
B019/B056

in resistivity, bismuth at 125 000 kg/cm². The authors point out the possible use of the jump-like change in resistivity of antimony at 130 000 kg/cm² for the calibration of high-pressure devices. A parallel connection of antimony and bismuth (Fig. 1 B) would be particularly suited. There are 4 figures and 2 references: 2 US.

ASSOCIATION: Institut fiziki vysokikh davleniy Akademii nauk SSSR
(Institute of the Physics of High Pressures of the Academy
of Sciences USSR)

SUBMITTED: October 10, 1960

Card 2/2

23807

S/020/61/138/001/011/023
B104/B201

9.4300(1160,1143/136) also 2108

AUTHORS: Vereshchagin, L. F., Corresponding Member of the AS USSR,
Semernan, A. A., Kuzin, N. N., and Popova, S. V.TITLE: Change of resistivity of some metals at pressures up to
250,000 kg/cm²

PERIODICAL: Doklady Akademii nauk SSSR, v. 138, no. 1, 1961, 84-85

TEXT: This is in continuation of an earlier paper by Vereshchagin et al. (DAN, 136, no. 2, (1961)). The authors wanted to find new polymorphous transformations at high pressures in metals being accompanied by an abrupt change of resistivity. Bridgman (Proc. Am. Acad. Arts and Sci., 81, 165 (1952)) and Bundy (Phys. Rev., 110, no. 2, (1958)) have been able to identify a considerable number of polymorphous transformations of various metals and alloys at high pressures. The possibility is pointed out of calibrating high-pressure apparatus with the aid of an abrupt change of the resistivity of different alloys at given pressures. The authors used a high-pressure chamber calibrated with the aid of the known resistivity

Card 1/4

23807

Change of resistivity of some metals...

S/020/61/138/001/011/023
B104/B201

jumps to determine the resistivity of the following metals: Bi I - II (25,600 kg/cm²); Bi II - III (27,000 kg/cm²); Tl (45,000 kg/cm²); Ba (80,000 kg/cm²); Bi VI - VII (125,000 kg/cm²). Pressure above 125,000 kg/cm² was determined by extrapolation (Fig. 1). The specimens were wires 0.6 - 0.8 mm in diameter, the medium transmitting the pressure was silver chloride. Measurements were conducted at room temperature. Measurement results are graphically presented in Fig. 2. R_{30} is the resistivity of the metal concerned at a pressure of 30,000 kg/cm².

Bridgman discovered on zirconium at a pressure above 80,000 kg/cm² a sharp drop of the resistivity. The authors have not been able to ascertain this drop up to 250,000 kg/cm². The difference in results is explained by a possible difference in the purity degree of the metals. The authors used zirconium iodide with 99.7 % purity. The following comparative data are offered: Bridgman obtained for Pb: $R_{100}/R_{30} = 0.694$, for Sn:

$R_{100}/R_{30} = 0.707$, for Cd: $R_{100}/R_{30} = 0.795$. Under the same conditions

Card 2/4

23807

S/020/61/138/001/011/023
B104/3201

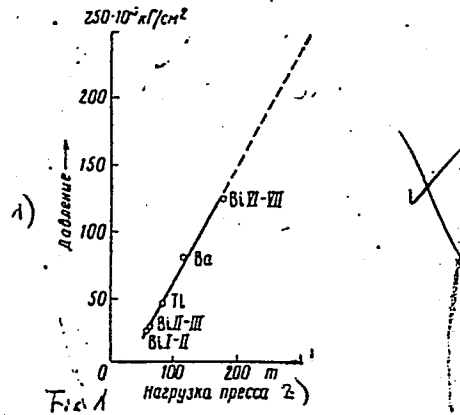
Change of resistivity of some metals...

and in the same succession the authors obtained: 0.683, 0.715, and 0.808.
The difference is not in excess of 2%. There are 2 figures and
3 references: 1 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATION: Institut fiziki vysokikh davleniy Akademii nauk SSSR (Institute
of Physics of High Pressures, Academy of Sciences USSR)

SUBMITTED: January 28, 1961

Legend to Fig. 1: 1, pressure in
units of 10^3 kg/cm^2 ; 2, loading
of press in tons.



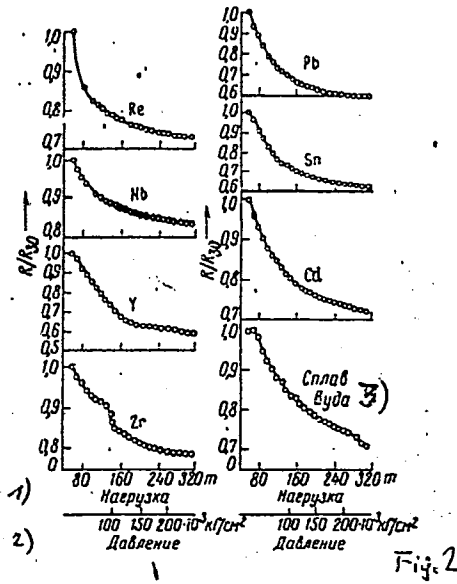
Card 3/4

23807

S/020/61/138/001/011/023
B104/B201

Change of resistivity of some metals...

Legend to Fig. 2:
1, stress; 2, pressure;
3, Wood's alloy.



Card 4/4

S/020/61/138/005/009/025
B104/B205

25309

24,770 also 2108
AUTHORS:

Vereshchagin, L. F., Corresponding Member AS USSR,
Semerchan, A. A., and Popova, S. V.

TITLE:

Study of the electrical resistance of cerium, lanthanum, and neodymium at pressures of up to 250,000 kg/cm²

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 138, no. 5, 1961, 1059-1061

TEXT: This is the continuation of previous papers by the authors (DAN, 136, no. 2, (1961); DAN, 138, no. 1 (1961)), in which the electrical resistance of metals at high pressures (up to 250,000 kg/cm²) has been studied systematically. P. W. Bridgman (Proc. Am. Acad. Arts and Sci., 81, 165 (1952)) proved that cerium, lanthanum, and neodymium have a minimum at pressures ranging from 50,000 to 100,000 kg/cm². Cerium shows a minimum at 70,000 kg/cm² and a maximum at 90,000 kg/cm². Similar results were obtained by Bridgman for the other two metals. The investigations described here were conducted with a high-pressure chamber which had been calibrated with the help of known sudden changes of the electrical resistance of cerium.

Card ~~176~~

25309
Study of the electrical resistance of ...

S/O20/61/138/005/009/025
B104/B205



tain pressures. The results are graphically represented in Figs. 2-4. The change of the electrical resistance R/R_{30} (R_{30} is the electrical resistance at a pressure of 30,000 kg/cm²) shown in Fig. 2 indicates that cerium has a minimum at 55,000 kg/cm² and a maximum at 80,000 kg/cm². The maximum of the electrical resistance is taken as an indication of a polymorphous conversion occurring at this pressure. Fig. 3 shows analogous curves obtained for two specimens of lanthanum of varying purity: La-I (0.75% Nd, 0.70% Pr, 0.04% Fe) and La x u. (0.3% Nd, 0.2% Pr, 0.02% Fe). It may be seen that only the last-mentioned type of (chemically pure) lanthanum has a weakly marked minimum at a pressure of approximately 95,000 kg/cm² and weakly marked maxima at 110,000 and 140,000 kg/cm². It is assumed that a polymorphous conversion takes place also here at 110,000 kg/cm². Fig. 4 indicates that neodymium has indistinct minima and maxima at 80,000 and 90,000 kg/cm², respectively. This maximum is likewise ascribed to a polymorphous conversion. The different values of maxima and minima on the resistance curves are explained as being due to a great calibration error. All measurements were made with specimens in wire form

Card 2/6

Study of the electrical resistance of ...

25309

S/O20/61/138/005/009/025
B104/B205

(1-1.5 mm diameter) at room temperature. Cerium impurities: less than 0.75% Nd, less than 0.75% Pr, $2 \cdot 10^{-2}\%$ Fe, $1 \cdot 10^{-3}\%$ Cd, $1 \cdot 10^{-3}\%$ Pb, $1 \cdot 10^{-3}\%$ Bi, and $1 \cdot 10^{-3}\%$ Sn; neodymium impurities: less than 0.36% Pr and La, and $2 \cdot 10^{-2}\%$ Ca. Following this series of articles, the authors will present a theoretical discussion of their results. There are 4 figures and 3 references: 2 Soviet-bloc and 1 non-Soviet bloc.

ASSOCIATION: Institut fiziki vysokikh davleniy Akademii nauk SSSR
(Institute of Physics of High Pressures of the Academy of Sciences USSR)

SUBMITTED: March 4, 1961

Card 3/6

25713
S/020/61/139/003/012/025
B104/B201

24,2130

AUTHORS:

Vereshchagin, L. F., Corresponding Member of the AS USSR,
Semerchan, A. A., and Popova, S. V.

TITLE:

Change of electric resistance of praseodymium, dysprosium,
erbium, and ytterbium at pressures of up to 250,000 kg/cm²

PERIODICAL:

Akademiya nauk SSSR. Doklady, v. 139, no. 3, 1961, 585 - 586

TEXT: This is the fourth report on studies conducted on changes of electric resistance of metals at high pressures (Vereshchagin et al., DAN, 136, no.2, (1961); DAN, 138, no. 1, (1961); DAN, 138, no. 5, (1961)). The change of relative resistance R/R_{25} (R_{25} being resistance at a pressure of

25,000 kg/cm²) of praseodymium is graphically shown in Fig. 1. Reference is made to the minimum appearing at about 110,000 kg/cm², and it is stated that this pressure dependence of resistance is the same as the one in lanthanum; praseodymium and lanthanum exhibit the same crystal structure. In both of them, a polymorphous transformation of the crystal structure is believed to take place at this pressure. According to measurements by
Card 1/42

S/120/62/000/005/028/036
E194/E535

AUTHORS: Semerchan, A.A. and Fedorovskiy, A.Ye.

TITLE: Automatic recording of electrical properties at high pressures

PERIODICAL: Pribory i tekhnika eksperimenta, no.5, 1962, 164-169

TEXT: The apparatus described is intended for automatic plotting of electrical properties as function of pressure in the range up to 2000 kg/cm² which is recorded with an error of 5%; the diameter of the test space is 3.162 cm. Pressure from a hydraulic press (pumping rate 60 litres per hour at 6000 atm) is applied to a two-stage piston-type manometer and standard single-pen recording potentiometer type ЭПН-09 (EPP-09). The manometer consists of three freely floating pistons: external pressure is applied to the first piston which mechanically drives the second piston operating in the test space; the force acting on the second piston is counter-balanced by driving a third piston which forces fluid into the test space in opposition to the rising cylinder. The third piston is driven by a spring dynamometer and the force applied to the third piston is directly proportional to the piston

Card 1/2

Automatic recording of ...

S/120/62/000/005/028/036
E194/E535

travel. To reduce friction the pistons are rotated by belt drive from an electric motor. Travel of the third piston is transmitted through a cord to a master selsyn which drives the receiver selsyn which rotates the recorder drum through a reduction gear of adjustable ratio to give three different pressure scales. Selsyns are used so that the recorder need not be in the high pressure region. By way of example, curves are plotted of electrical resistance of bismuth and barium wires as function of pressure. There are 5 figures. ✓

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR
(Institute of High-Pressure Physics, AS USSR)

SUBMITTED: July 11, 1961

Card 2/2

16000

3896 G
S/020/62/145/001/009/018
B104/B102

AUTHORS: Vereshchagin, L. F., Corresponding Member AS USSR,
Semerchan, A. A., Zubkov, V. M., and Kuzin, N. N.

TITLE: High-pressure and high-temperature apparatus with several
pairs of electric lead-in wires

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 145, no. 1, 1962, 71-72

TEXT: Difficulties arising in the current feed to high-pressure apparatus were overcome by the device shown in Fig. 1. Specimen 4 is placed in a cylindrical container inside a high-pressure chamber 5. Two pistons 9 compress the specimen. During compression the pyrophyllite seals 2 enter the gaps (~ 0.1 mm) between the four sectors of pistons 9. The current is fed through the piston to the cylindrical graphite or metal container which is used as a furnace. The apparatus was calibrated for pressures of up to $50,000 \text{ kg/cm}^2$ by making use of the jumps known to occur in the electric conductivity of Bi and Tl at certain temperatures. There are 3 figures.

Card 1/2

SEMERCHAN, A.A.; KUZIN, N.N.; ISAYKOV, V.K.

Effect of an electric field on a continuous liquid jet. Inzh.-
fiz.zhur. 6 no.2:114-117 F '63. (MIRA 16:1)

1. Institut fiziki vysokhikh dāvleniy AN SSSR, Moskva.
(Jets--Fluid dynamics) (Electric fields)

KUZIN, N.N.; SEMERCHAN, A.A.; VERESHCHAGIN, L.F.; DROZDOVA, L.N.

Temperature dependence of the electroconductivity of iodine
at pressures up to 200,000 Kg./cm². Dokl. AN SSSR 147
no.1:78-79 N '62. (MIRA 15:11)

1. Institut fiziki vysokikh davleniy AN SSSR. 2. Chlen-
korrespondent AN SSSR (for Vereshchagin).
(Iodine—Electric properties)
(High-pressure research)

VERESHCHAGIN, L.F.; SEMERCHAN, A.A.; POPOVA, S.V.; KUZIN, N.N.

Variations in the electric resistance of certain semiconductors
at pressures up to 300,000 kg./cm.². Dokl. AN SSSR 145 no. 4:757-
760 Ag '62. (MIRA 15:7)

1. Institut fiziki vysokikh davleniy AN SSSR. 2. Chlen-korrespondent
AN SSSR (for Vereshchagin).
(Semiconductors--Electric properties)

SEMERGHAN, A.A.; BALASHOV, D.B.

Design and testing of containers for geophysical investigations
at great depths of the ocean. Dokl. AN SSSR 146 no 13:592-595
S '62. (MIRA 15:10)

1. Institut fiziki vysokikh davleniy AN SSSR. Predstavleno akademikom
V.V.Shuleykinym.

(Oceanographic instruments)

SEMERCHAN, A.A.; KUZIN, N.N.; VERESHCHAGIN, L.F.

Temperature dependence of the electric resistance
of polycrystalline graphite at pressures up to 250,000
kg./cm². Dokl. AN SSSR 146 no.4:803-804 0 '62. (MIRA 15:11)

1. Institut fiziki vysokikh davleniy AN SSSR. 2. Chlen-
korrespondent AN SSSR (for Vereshchagin).
(Graphite crystals--Electric properties)
(High-pressure research)

L 11284-63

EWP(q)/EWT(m)/BDS AFFTC/ASD JD/HW-2/JG

ACCESSION NR: AP3002856

S/0126/63/015/006/0941/0943 64

AUTHOR: Semerchan, A. A.; Baskin, M. L.; Pivovarov, L. Kh. 63TITLE: Effect of high pressure and elevated temperature on hard alloy T15K6 6

SOURCE: Fizika metallov i metallovedeniye, v. 15, no. 6, 1963, 941-943 63

TOPIC TAGS: T15K6 hard alloy, T15K6 alloy composition, T15K6 alloy phase composition, T15K6 alloy hydrostatic compression, T15K6 alloy high-temperature hydrostatic compression, high hydrostatic pressure

ABSTRACT: The effects of high hydrostatic pressure (up to 100,000 kg/cm²) and temperature (up to 1400C) on the W-base alloy T15K6 (12.5% Ti, 7.5% C, 6% Co, 0.1% Fe) were studied. The structure of the alloy consisted of three phases: WC carbide; a TiC-WC solid solution containing 68% WC; and a Co phase, a solid solution of small quantities of W (up to 3%), Ti (up to 0.5%), and C (up to 0.5%) in Co. Cylindrical specimens 6 mm in diameter and 8 mm long were subjected to a pressure of 100,000 kg/cm² and temperature of 1400C for 5 min and then cooled at the rate of 15C/min. Microscopic examination revealed no changes in porosity (up to 0.2%), graphite content (up to 0.5%) or grain size of WC (3.46 μ) and TiC-WC (3.60 μ). Many micro- and macrocracks were found in most

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L 11283-53

ACCESSION NR: AP3002856

specimens. The average specific gravity, 11.25 g/cm^3 , increased to 11.48 g/cm^3 in specimens with few cracks. The Vickers hardness decreased from 1480 kg/mm^2 to 1100 kg/mm^2 . X-ray diffraction patterns revealed that the lattice parameter of the TiC-WC phase decreased from 4.3119 to 4.3105 \AA and that the diffraction lines of both carbide phases broadened. The decrease of the lattice parameter is explained by additional dissolution (up to 5%) of WC in the TiC-WC phase; the broadening of diffraction lines, by an increase of microstresses and block fragmentation. Orig. art. has: 1 table.

ASSOCIATION: Institut fiziki vy*sokikh davleniy AN SSSR (Institute of Physics of High Pressures, AN SSSR)

SUBMITTED: 09Nov62

DATE ACQ: 23Jul63

ENCL: 00

SUB CODE: ML

NO REF SOV: 003

OTHER: 000

Card 2/2

L 10096-63 EPP(c)/EPP(n)-2/EPR/EWP(k)/EWP(q)/BDS/EWT(m) AFFTC/ASD/
SSD Pr-l/Pu-l/Ps-l/Pf-l IJP(C)/GG/WH/JD S/0020/63/150/005/1026/1028
ACCESSION NR: AP3002871

AUTHOR: Semerchan, A. A.; Vereshchagin, L. F. (Corresponding member, AN SSSR);
Kuzin, N. N.; Drozdova, L. N. 84
82

TITLE: Changes in the resistivity of PbTe, CdTe, and Bi sub 2 Te sub 3 at
pressures of up to 200,000 kg/cm sup 2

SOURCE: AN SSSR. Doklady, v. 150, no. 5, 1963, 1026-1028

TOPIC TAGS: semiconductors, lead telluride, cadmium telluride, bismuth telluride,
resistivity, pressure dependence of resistivity, phase transformation

ABSTRACT: An investigation has been made of the pressure dependence of resistivity
of PbTe, CdTe, and Bi sub 2 Te sub 3 semiconductors at room temperature. This is
a continuation of a previous investigation (L. F. Vereshchagin, A. A. Semerchan,
S. V. Popova, N. N. Kuzin, DAN, 145, no. 4, 1962). The resistance-pressure curves
of three specimens of p-type PbTe (differing somewhat from each other in their
dimensions, electrical properties, and purity), though reflecting the differences
in the specimens, all show a minimum at 65,000 kg/cm sup 2 and a maximum at
80,000-85,000 kg/cm sup 2. The resistivity of n-type CdTe which at atmospheric
pressure is high drops abruptly at a pressure of 50,000 kg/cm sup 2, a phenomenon

Card 1/2

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ACCESSION NR: AP3002871

also noted by other observers (G. A. Samara, H. G. Drickmaker, ²The Physics and Chemistry of Solids, 23, no. 5, 457, 1962). With further increase of pressure to 200,000 kg/cm sup 2, the resistivity decreases slowly to about 25% of the original, and CdTe becomes a good conductor with a resistivity of 10 sup -4 to 10 sup -5 ohm-cm. The resistivity of p-type Bi sub 2 Te sub 3 decreases 75% between atmospheric pressure and 30,000 kg/cm sup 2. At 200,000 kg/cm sup 2, resistivity is only 1/30 of that at 30,000 kg/cm sup 2. Changes in the patterns of the curves indicate that polymorphic transformations take place in these semiconductors at certain pressures (at room temperature): in PbTe at 75,000--80,000 kg/cm sup 2, in CdTe at 50,000 kg/cm sup 2, and in Bi sub 2 Te sub 3 at 100,000 kg/cm sup 2. These transformations are reversible: with restoration of atmospheric pressure the specimens regain their original resistivity (except for a small decrease caused by changes of dimensions). X-ray diffraction patterns, however, did not show the formation of any new phase. "The authors thank A. A. Averkin for his comments on the results of the investigation." Orig. art. has: 4 figures and 1 table.

ASSOCIATION: Institut fiziki vy'sokikh davleniy Akademii nauk SSSR (Institute of Physics of High Pressures, Academy of Sciences SSSR)

SUBMITTED: 11Mar63

DATE ACQ: 15Jul63

ENCL: 00

SUB COLE: 00

NO REF SOV: 001

OTHER: 003

Card 2/2 *adm/74*

SEMERCHAN, A.A.; PLOTNIKOV, M.A.

Methodology of high-pressure liquid jets. Inzh.-fiz. zhur. 6
no.8:82-87 Ag '63. (MIRA 16:10)

1. Institut fiziki vysokikh davleniy AN SSSR, Moskva.

SEMERCHAN, A.A.; SHISHKOV, N.Z.; ISAYKOV, V.K.

Large-scale apparatus for high-pressure research. *Frib. i tekhn.*
eksp. no.4:152-154 J1-Ag '63. (MIRA 16:12)

1. Institut fiziki vysokikh davleniy AN SSSR.

SEMERCHAN, A.A.; KUZIN, N.N.; DROZDOVA, L.N.; VERESHCHAGIN, L.F.

Variations in the electric resistance of PbS, PbSe, and PbTe at pressures up to 200,000 kg./cm². Dokl. AN SSSR 152 no.5:1079-1081 0 '63. (MIRA 16:12)

1. Institut fiziki vysokikh davleniy AN SSSR. 2. Chlen-korrespondent AN SSSR (for Vereshchagin).

ACCESSION NR: AP4018391

S/0120/64/000/001/0194/0195

AUTHOR: Semerchan, A. A.; Kuzin, N. N.

TITLE: Outfit for elevated-temperature high-pressure investigations

SOURCE: Pribory* i tekhnika eksperimenta, no. 1, 1964, 194-195

TOPIC TAGS: pressure chamber, high pressure chamber, Bridgeman anvils, temperature pressure tester

ABSTRACT: A new high-pressure device which can operate at temperatures of from room up to 200C is described. Two steel sockets 1 and 13 (see Enclosure 1) are joined by a screw thread. A high-pressure apparatus 10, 11 is placed into the lower socket 13. A plunger 6 is equipped with gaskets 2 and 3; the plunger stroke is 15 mm. The press was tested for 60 t. A hydrocompressor supplies the necessary pressure of the working fluid. Electrical connections are passed through holes 7 and 16 which also serve to fill the lower socket with the

Card, 1/3

ACCESSION NR: AP4018391

thermostat liquid. The high-pressure apparatus is of the Bridgeman anvils type. The specimen has a volume of about 0.05 cm^3 . The electrical resistance of metallic polycrystalline selenium was measured under a pressure of 30 kat which corresponded to 8 t on the press. A temperature range of from room up to 188C was used. "The authors wish to thank L. F. Vereshchagin for discussing the results." Orig. art. has: 3 figures.

ASSOCIATION: Institut fiziki vy*sokikh davleniy AN SSSR (Institute of High-Pressure Physics, AN SSSR)

SUBMITTED: 31Jan63

DATE ACQ: 18Mar64

ENCL: 01

SUB CODE: PH

NO REF SOV: 004

OTHER: 003

Card 2/32

s/0126/64/017/004/0606/0607

ACCESSION NR: AP4034059

AUTHORS: Pivovarov, L. Kh.; Yanshin, S. I.; Smerchan, A. A.; Baskin, M. L.

TITLE: Influence of high pressures and temperatures on tungsten monocarbide

SOURCE: Fizika metallov i metallovedeniye, v. 17, no. 4, 1964, 606-607

TOPIC TAGS: tungsten monocarbide, high pressure, high temperature, tungsten monocarbide properties, microhardness, hardness tester PMT 3, line diffusion, diffraction line, dislocation density, crystal lattice

ABSTRACT: The results of experiments on the influence of high pressures and high temperatures on the properties of WC are presented. Investigations were performed on cylindrical specimens made of powdered WC containing 6.06% C (by weight). This material was pressed, then baked at 2400K in hydrogen. The specimens were subjected to pressures up to 100 000 atm (acting quasi-hydrostatically) while being heated to 2400K. Some specimens were annealed for 1.5 hours at 1800K. Standard specimens were left in their original condition. The microhardness was investigated with apparatus PMT-3 under a 50-kg load, at atmospheric pressure and at room

Card 1/2

ACCESSION NR: AP4034059

temperature. The diffusion of the x-ray diffraction lines was determined by comparison with the width of line 211 recorded in the Ni-K α radiation. It was observed that the application of pressure and heat led to an increase of the micro-hardness from 1800 to 3200 kg/mm² and to a substantial broadening of the diffraction lines. After annealing, these properties returned nearly to those of the standard specimens. The change in the properties of the simultaneously compressed and heated WC may be explained by the increase in the density of dislocations and of other defects the crystalline lattice of this material suffered under the influence of plastic deformation. Orig. art. has: 1 table.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut tverdykh splavov
(All-Union Scientific Research Institute of Hard Alloys)

SUBMITTED: 23Jun63

DATE ACQ: 20May64

ENCL: 00

SUB CODE: SS, MM

NO REF SOV: 002

OTHER: 000

Card 2/2

L 22634-65 EPF(c)/EPF(n)-2/EPR/EPA(s)-2/EWP(k)/EWT(l)/EWA(d) pi-4/pr-4/ps-4/
 Pt-10/Pu-4/Pz-6 IJP(c) GG/WW S/0181/65/007/001/0244/0250
 ACCESSION NR: AP5003442

AUTHOR: Kuzin, N. N.; Semerchan, A. A.

TITLE: Temperature dependence of the electrical resistance of germanium at pressures up to 90 kbar

SOURCE: Fizika tverdogo tela, v. 7, no. 1, 1965, 244-250

TOPIC TAGS: germanium single crystal, germanium semiconductor, ultra-high pressure study, quasihydrostatic pressure, electrical property

ABSTRACT: Measurements of the electrical resistance of n-type germanium single crystals have been made at temperatures from room to 122C and at pressures in the 20-90 kbar range, in order to determine the forbidden energy gap, E_g , at ultrahigh quasihydrostatic pressures. Literature data on E_g are available for pressures up to 100,000 kg/cm². The measurements were made in a high-pressure apparatus previously described by L. F. Vereshchagin, A. A. Semerchan, N. N. Kuzin, and S. V. Popova (DAN SSSR, 136, 320, 1961). Silver chloride was used as the pressurizing medium. The x-ray diagram of the sample after pressurizing showed that the single-crystal structure

Card 1/3

L 22634-65

ACCESSION NR: AP5003442

was not altered significantly even at 90 kbar, if the sample position was perpendicular to the axis of the silver chloride cylinder. The procedure for temperature measurements was described. Resistance of the sample was measured potentiometrically. Electrical contacts between sample and compressing dies were described, and the effect of the ohmic resistance of contacts on experimental data was evaluated. Intrinsic conductivity was shown to be preponderant in Ge samples at temperatures above 80—85°C. E_g of germanium was calculated by the method of least squares from the plot of $1/2 kT$ versus $\ln R$, where k is the Boltzmann constant and R is the resistance of the sample. The plot of E_g versus pressure showed a 0.84 eV max E_g for $40 + 2.5$ kbar of pressure. The experimental E_g values obtained were estimated to be a little too high because the effect of pressure on the mobility of carriers was neglected. Nevertheless, the slope of the curve of E_g versus pressure is close to the slope of the initial portion of the corresponding curve obtained from literature data for hydrostatic pressure. It is noted that the pressure dependence of resistance, i.e. of E_g , might be different in highly doped germanium and ought to be studied by a different method. A cautious approach is recommended in dealing with pressures at which E_g approaches zero. Orig. art. has: 5 figures, 1 table, and 1 formula.

[JK]

Card 2/3

L 22634-65
ACCESSION NR: AP5003442

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR, Moscow
[Institute for High-Pressure Physics, AN SSSR]

SUBMITTED: 20Apr64

ENCL: 00

SUB CODE: SS, EM

NO REF SOV: 004

OTHER: 011

ATD PRESS: 3170

Card 3/3

L 53989-65 EWT(1)/EWT(m)/EWP(w)/EPP(c)/EPP(n)-2/EWA(d)/EPR/EWP(t)/EWP(k)/
 EWP(b)/EWA(c)/ETC(m) Pz-b/Pf-l/Pr-l/Pe-l/Pu-l IJF(c) JD/WW/RR/EM/GG
 UR/0286/65/000,009/0016/0016
 541.12.034.2

ACCESSION NR: AP5015233

AUTHOR: Semerchan, A. A.; Vereshchagin, L. F.; Zubkov, V. M.; Kuzin, N. N. 52 B

TITLE: High pressure and temperature unit. Class 12, No. 170469

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 9, 1965, 16

TOPIC TAGS: high pressure unit, ultrahigh pressure unit, high temperature unit 21

ABSTRACT: This Author Certificate introduces a high pressure and temperature unit consisting of an electrically insulated, ultrahigh-pressure chamber, reinforced with concentric rings and of two punches, also reinforced with rings. The chamber is split and equipped with two or more electric connections. It is designed to study behavior of a solid at high pressures and temperatures. Orig. art. has: 1 figure. [ND]

ASSOCIATION: none

SUBMITTED: 20Mar62

NO REF SOV: 000
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AUTHORS: Kuzin, N. N.; Semerchan, A. A.

69
68
B

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TITLE: Temperature dependence of the electric resistance of
p-type germanium at pressures up to 90 kbar

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 50,
no. 2, 1966, 320-322

TOPIC TAGS: germanium, semiconductor conductivity, pressure effect,
temperature dependence, resistivity, impurity conductivity, forbidden
band

ABSTRACT: To explain the decrease of the resistance of p-type ger-
manium with increasing pressure, whereas the resistance of n-type
germanium increases, the authors investigated the temperature de-
pendence of the resistance of p-type germanium at pressures up to
90 kbar, and at temperatures ranging from room temperature to 152C.
The heat was produced by a current-carrying coil and the temperature

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was measured with a thermocouple. The measurements have shown that in p-type germanium the impurity conductivity predominates at room temperature throughout the investigated range of pressures. At room temperature the characteristic maximum at 40 kbar is observed. A maximum is observed at higher temperatures when the intrinsic conductivity begins to play the dominant role. The different pressure dependence of the two types of germanium is attributed primarily to the unequal ratio of the intrinsic and impurity conductivity, which depends on the pressure, temperature, and on the number of types of impurities. The width of the forbidden gap is obtained at temperatures from 127 to 152C, being equal to the slope of the plots of the logarithm of the resistance against the temperature. A plot of the gap against the pressure is presented and is seen also to have a maximum at 40 kbar. The plot of the gap is somewhat lower for p-type germanium than that obtained earlier (FTT v. 7, 144, 1965) for n-type germanium, but the difference is attributed to the difference in the temperature intervals within which the gap was measured. The authors thank Professor L. F. Vereshchagin for a discussion of the results. Orig. art. has: 2 figures

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2/2 *la*

SEMERDZHIEV, Atanas, inzh.; DIMITROV, Deicho, inzh.

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(FRACTURES, surgery.
errors (Bul))

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SEMERDZHIEV, Boian, d-r.; OGHIANOV, D.; MAKAVEEVA-SIMOVA, Ek.

Culture of the ovine abortion virus in experimental animals.
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OGNIANOV, D.; ZHELEV, V.; SEMERIZHIEV, Boian, d-r.; PAVLOV, N.; MAKAVEEVA
SIMOVA, Ek.

Isolation of the virus, and some studies on the ovine abortion
virus in Bulgaria. Izv Vet inst virus 1:37-51 '62

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Bulg 11 no. 1:92-94 Ja-F 62.

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for metals. Mashinostroene 13 no.1&43-45 Ja'64

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A new method for quantitative determination on total protein and its fraction in the blood serum by the use of a stable turbidity standard. Izv. AN Arm. SSR. Biol. nauki 14 no.3:45-53 Mr '61.

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SEMERDZHIAN, S.P.

Ways of improving hybrid corn. Izv. AN Arm. SSR. Biol. nauki 12
no.7:89-94 J1 '59. (MIRA 12:10)
(CORN BREEDING)

NOR-AREVYAN, N.G.; SEMERDZHIAN, S.P.; NALBANDYAN, Dzh.M.; ATAYAN, R.R.;
AVAKYAN, TS.M.

Effect of the gibberellin solution concentration on the penetration of radioactive phosphorus into pea sprouts. Izv. AN Arm. SSR. Biol. nauki 16 no.5:95-97 My '63. (MIRA 17:6)

1. Laboratoriya biofiziki Armyanskogo instituta zemledeliya.

NOR-AREVYAN, N.G.; SEMERDZHIAN, S.P.

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Izv. AN Arm. SSR. Biol. nauki 17 no.4:25-31 Ap '64.

(MIRA 17:6)

1. Laboratoriya biofiziki Instituta zemledeliya Armyanskoy SSR.

SEMERDZHIAN, S.P.

Cand Biol Sci - (diss) "Production of hybrid corn plants under conditions of the Araratskaya Depression." Yerevan, 1961. 20 pp; (Committee of the Council of Ministers Armenian SSR for Higher And Secondary Specialist Education, Yerevan State Univ.) 210 copies; price not given; (KL, 7-61 sup, 228)

SEMERDZHIAN, S.P.; NOR-ARUVIAN, N.G.

Action of X rays on horse bean seedlings under different oxygen pressures. Radiobiologia 3 no.5:644-645 '63. (MIRA 17:4)

1. Nauchno-issledovatel'skiy institut zemledeliya, Echmiadzin, Armyanskoy SSR.

AVARYAN, T.S.: 1968. (1968), 8, 11; 1969, 1, 2.

Some results of breeding the period of dormancy in tubers of
harvested potatoes. Raschikhozhis. no.3:463-464. 1968. (MIRA 17:117)

In: Anpanskiy nauchno-issledovatel'skiy institut zemledeliya,
g. Sverdlovsk.

ACCESSION NR: AP4036501

s/0298/64/017/004/0025/0031

AUTHOR: Nor-Arevyan, N. G.; Semerdzhyan, S. P.

TITLE: Effect of different oxygen pressures on radiation damage

SOURCE: AN ArmSSR. Izvestiya. Biologicheskije nauki, v. 17, no. 4, 1964, 25-31

TOPIC TAGS: oxygen pressure, radiation damage, X-irradiation, radioprotective oxygen pressure, oxidation chain reaction, oxygen pressure limit

ABSTRACT: First, the effects of high oxygen pressures on the vital activities of bean (*vicia faba*) and pea (*Pisum sativum*) sprouts were determined in a special chamber with oxygen pressures ranging from 1 to 50 atm. Results showed that high oxygen pressures up to 50 atm do not affect the growth of bean and pea roots. Then the effects of high oxygen pressures (1 to 50 atm) were investigated during X-irradiation (RUM-11 unit, 185 kv, 13 ma, 45 r/min) with single 90 r doses for 3 day old bean sprouts and 150 and 200 r doses for pea sprouts. Findings showed that the radiation damage for bean sprouts continued

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to increase up to a certain level (30 atm) with increased oxygen pressure, and higher pressures protected the bean sprouts from penetrating radiation. Radiation damage for pea sprouts (150 r) was highest with oxygen pressure of 1 atm, and higher pressures protected the sprouts from radiation. Radiation damage for pea sprouts irradiated with 200 r was highest at oxygen pressures of 1 to 3 atm and pressures below 1 atm and over 3 atm were radioprotective. The findings on radiosensitivity change in relation to oxygen pressure during radiation may be explained in terms of oxidation chain reactions with branching of chains. The anomalous dependence of the reaction rate on oxygen pressure appears to be based on certain oxygen pressure conditions in which reactions do not take place, and which are known as the upper and lower oxygen pressure limits. Decrease or increase of oxygen pressures beyond these limits at time of radiation protects the plant from radiation damage and this position is supported by literature data. Orig. art. has: 3 figures and 3 tables.

ASSOCIATION: Laboratoriya biofiziki Instituta zemledeliya ArmSSR (Biophysics Laboratory of the Agriculture Institute ArmSSR)

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AUTHOR: Semerdzhyan, S. P.; Nor-Arevyan, N. G.; Megroyan, Sh. G.

16

B

TITLE: Effect of elevated oxygen pressures on radiation injury of silkworm eggs

SOURCE: AN ArmSSR. Biologicheskije nauki, v. 17, no. 11, 1964, 91-95

TOPIC TAGS: radiobiology, irradiation, radiation biologic effect, radiation damage, oxygen, pressure effect

Abstract: According to the theory put forward by B. N. Tarusov, the biological effect of ionizing radiation is weakened by chain oxidation reactions. This is confirmed by the existence of a protective effect of elevated oxygen pressures during irradiation. The authors investigated the effect of various oxygen pressures (up to 50 atmospheres) at the moment of irradiation on the degree of radiation injury of silkworm eggs. The radiation doses were 1,000 r and 1,500 r (185 kilovolts, 15 milliamperes, R = 100 r/min). Oxygen pressures during irradiation were: 0, 0.2, 1, 2, 5, 10, 15, 20, 30, 40 and 50 atmospheres. Silkworm eggs of the third and sixth cycles of cleavage were used. After irradiation the silkworm eggs were placed in a thermostat at a temperature of 22°C and kept there for 17 days. Then the surviving eggs were counted. Drops in radiation injury were observed at 5 and 30 atmospheres.

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of oxygen, which indicates the possibility that aftereffects follow two bifurcated chain reactions. The authors conclude that 1) elevated oxygen pressures, up to 50 atmospheres, have no effect on the survival percentage of silkworm eggs; 2) the radiobiological effect depends on oxygen pressure at the moment of irradiation; 3) the effectiveness of oxygen during irradiation depends on the radiation dosage; and 4) the protective effect of high oxygen pressures in irradiation shows that bifurcated chain oxidation reactions are the basis of the radiobiological effect. Orig. art. has 2 tables.

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SEMERDEHYAN, S.P.; NOR-AREVYAN, N.G.; MEGROYAN, Sh.G.

Effect of higher oxygen pressures on the radiation injury of
silkworm eggs. Izv. AN ArmSSR. Biol. nauki 17 no.11:91-95
N '64 (MIRA 18:2)

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Effect of gibberellin on the incorporation of radioactive phosphorus p^{32} into various phosphorus compounds. Fiziol. rast. 12 no.4:730-731 J1-Ag '65. (MIRA 18:12)

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Use of linen thread in surgery as suture and ligature material.
Med.sestra 21 no.12:50-51 D '62. (MIRA 16:4)
(LIGATURE (SURGERY)) (SUTURES)

MIKAYELYAN, A.L.; SEMERDZHIAN, V.V.

Hypoxic bradycardia of the heart in artificial blood circulation; an experimental and clinical examination. Zhur. eksp. i klin. med. 3 no.2:25-31'63. (MIRA 16:10)

1. Institut kardiologii i serdechnoy khirurgii AN ArmSSR.
(BLOOD — CIRCULATION, ARTIFICIAL)
(HEART — SURGERY)

L 24538-65 EED-2/EEO-2/EWT(d)/EWT(1)/FCS(k)/EWA/T/EWA(d)/EWP(1)/FSS-2 Pg-4
AK5005248 IJP(c) BOOK EXPLOITATION B/

Semerdzhiyev, Stefan (Engineer)

Adhesive bonding of metals (Lepene na metalite) Sofia, "Tekhnika", 1964. 191 p.
illus., biblio., tables, index. 2282 copies printed.

TOPIC TAGS: adhesive bonding, metal adhesive bonding, structural joint

PURPOSE AND COVERAGE: This book is intended for engineering and technical personnel.
The book discusses theoretical fundamentals and practical applications of adhesive metal-to-metal and metal-to-nonmetal bonding.

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