AMIRKHANOV, Kh.I.

AID Nr. 960-11 7 May

QUANTUM OSCILLATIONS OF MAGNETIC RESISTANCE OF n-InSb IN STRONG PULSED MAGNETIC FIELDS

Amirkhanov, Kh. I., R. I. Bashirov, and Yu. E. Zakiyev. IN: Akademiya nauk SSSR, Doklady, v. 148, no. 6, 21 Feb 1963, 1279-1282.
S/020/63/148/006/007/023

Pulsed magnetic fields of up to 400 koe have been used to determine the dependence of the longitudinal and transverse magnetic resistance of InSb single-crystal samples of varying purity on external magnetic fields in the 20 to 77°K range, and to investigate the Shubnikov—de Haas effect in strong magnetic fields. Results were obtained by direct oscillographic recording and are shown to agree (within the range of experimental errors) with theory and with results obtained previously by other methods. It is shown that with 1/H, where H is the external magnetic field, magnetic resistance undergoes quasiperiodic oscillations which disappear with large magnetic fields. Splitting of the Landau levels is taken into account. Small deviations of the results from theory, which persist even after spin effects are accounted for, are explained as being due possibly to the nonparabolic nature of the InSb conductivity zone. [BB]

Card 1/1

AMIRKHANOV, Kh.I., akademik; KERIMOV, A.M.

Heat capacity at constant water and water vapor volumes in single-phase and two-phase regions adjacent to the boundary curve including the critical point. Dokl. AN SSSR 151 no.5:1064-1067 Ag '63. (MIRA 16:9)

1. AN AzerbSSR (for Amirkhanov).

(Calorimetry)

AMIRKHANOV, Kh.I., akademik; KERIMOV, A.M.

Heat capacity c_v of water and water vapor at supercritical state parameters. Dokl. AN SSSR 153 no.3:581-584 N '63. (MIRA 17:1)

1. Dagestanskiy filial AN SSSR. 2. AN AzerSSR (for Amirkhanov).

ACCESSION NR: AP4043389 S/0181/64/006/008/2534/2535

AUTHORS: Amirkhanov, Kh. I.; Bashirov, R. I.; Ismailov, Z. A.

TITLE: Resistance of p-InSb in strong magnetic field

SOURCE: Fizika tverdogo tela, v. 6, no. 8, 1964, 2534-2535

TOPIC TAGS: galvanomagnetic property, indium antimonide, transport property, valence band, carrier scattering

ABSTRACT: Although little attention has been paid heretofore to the magnetoresistance of p-type indium antimonide in strong magnetic fields, this problem is of interest both for the theory of transport phenomena and for the determination of the energy structure of the valence band and the mechanism of hole scattering. The authors investigated the resistance of several single-crystal p-InSb samples in transverse and longitudinal pulsed magnetic field up to 400 kOe at temperatures 20 and 77K. The resistances of the samples were

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L 17120-65 EPA(s)-2/EWT(1) Pi-4/Pt-10 SSD/AFWL/BSD/RAEM(a)/ESD(gs)/ESD(t)/
IJP(c)
ACCESSION NR: AP5000646 S/0181/64/006/012/3524/3528

AUTHOR: Amirkhanov, Kh. I.; Bashirov, R. I.; Ismailov, Z. A.

TITLE: Magnetoresistance of p-InSb in a strong magnetic field

SOURCE: Fizika tverdogo tela, v. 6, no. 12, 1964, 3524-3528

TOPIC TAGS: indium antimonide, magnetoresistance, impurity conductivity, intrinsic conductivity, mixed conductivity, single crystal, galvanomagnetic effect

ABSTRACT: This is a continuation of an earlier investigation (FTT v. 6, 2534, 1964) of the magnetoresistance of p-InSb in a strong magnetic field in the extrinsic conductivity region. The present article describes the results of measurements in the regions of mixed and intrinsic conductivity. The measurements were made in pulsed magnetic fields up to 300 kOe, using single crystals of indium-antimony alloy. The variation of the voltage on potential probes was measured with an oscilloscope as a function of the magnetic field. It is shown that the experimental results agree qualitatively with the classical theory of galvanomagnetic phenomena for semiconductors with carriers of both

Card 1/2

... AP6000846

... However, the experimental results ... theory in the case of the ... a quadratic ... 0K decreases with increasing ... square of the temperature. The mobility calculated ... the experimental magnetoresistance at 300K is ... cm²/v-sec. Orig. art. has: ... figures, 6 formulas, and 1 table.

ASSOCIATION: Institut fiziki Dagestanskogo filiala AN SSSR, Makhachkala (Institute of Physics, Dagestan Branch, AN SSSR)

SUBMITTED: 04May64 ENCL: 00

SUB CODE: EM, IC NR REF SOV: 004 OTHER: 004

Card 2/2

AMERKHANOV, [illegible].I., akademik; [illegible], inzh.; VIKHROV, D.I., inzh.; [illegible]ROV, A.M., [illegible]kor. nauk

Study of the [illegible]apacity of some alkanes.
Teploenergetika 11 no.3:[illegible] M[illegible]. (MIRA 17:6)

1. Lageshskiy filial AN SSSR.

ACCESSION NR: AP4025427 S/0096/64/000/004/0067/0069

AUTHORS: Amirkhanov, Kh. I. (Academician); Kerimov, A. M. (Candidate of physico-mathematical sciences); Alibekov, B. G. (Engineer, Dissertator); Vikhrov, D. I. (Engineer)

TITLE: Investigation of isochoric specific heat of several alkanes in the two-phase region

SOURCE: Teploenergetika, no. 4, 1964, 67-69

TOPIC TAGS: alkanes, isochoric specific heat, alkane specific heat, n octane, n hexane, n heptane

ABSTRACT: The results of direct measurements of c_v of three alkanes (n-hexane, n-heptane and n-octane) in the two-phase region measured in the adiabatic calorimeter described by Amirkhanov (Kh. I. Amirkhanov and A. M. Kerimov "Teploenergetika" No. 6, 1962) are presented. Graphs of the following are shown: a- c_v (two-phase) for n-octane (C_8H_{10}) as a function of temperature (100-300) for different specific

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ACCESSION NR: AP4025427

volumes (2-8 cm^3/gm); b- c_v(two-phase) as a function of v for different T (same range as before); c- c_v (two-phase) for C_6H_{14}, C_7H_{16} and C_8H_{18} as a function of T/T_c (T_c = $T_{critical}$); d- c_v (two-phase) as a function of specific volume (0-70 cm^3/gm) for the three alkanes; e- $\Delta c_v = c_v$ (two-phase) - of specific volume for the three alkanes. It was found that all three alkanes satisfied the equation $v = \frac{v_c}{1 + 0.2062 (T_c - T)^{0.4}}$ within 0.2 % of a specific volume of 7-8 cm^3/gm. Orig. art. has: 6 graphs and 9 equations.

ASSOCIATION: Dagestanskiy filial AN SSSR (Daghestan Branch of the AN SSSR)

SUBMITTED: 00 DATE ACQ: 20Apr64 ENCL: 00

SUB CODE: CH NO REF SOV: 005 OTHER: 000

Card 2/2

L 20296-65 EWT(m)/EWP(t)/EWP(b) IJP(c) JD

ACCESSION NR: AP5001827 S/0056/64/047/006/2067/2068

AUTHOR: Amirkhanov, Kh. I.; Bashirov, R. I.; Gadzhiyeva, N. M.

TITLE: Shubnikov-de Haas effect in indium antimonide

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 47, no. 6, 1964, 2067-2068

TOPIC TAGS: Shubnikov de Haas effect, spectroscopic splitting factor, spin splitting, Landau level splitting

ABSTRACT: The influence of spin splitting of the Landau level on the Shubnikov-de Haas effect in indium antimonide was investigated at helium temperatures. In magnetic fields up to 20--30 koe, no influence of Landau level splitting at n = 1, 2, 3 was observed in InSb or in InAs, although splitting influence was expected at n = 0. To prove this, the dependance of magnetic resistance on the intensity of the magnetic field was obtained by measuring the ratio $\Delta\rho/\rho_0$ for a series of indium antimonide specimens with the aid of an automatic electronic potentiometer in a transverse magnetic field at temperatures of liquid helium. Values of the spectroscopic splitting factor |g| for

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L 20296-65
ACCESSION NR: AP5001827

fields ranging from 8000 to 24,000 oe varied within a range from 64 to 70. Orig. art. has: 1 figure and 1 table.

ASSOCIATION: Institut fiziki Dagestanskogo filiala AN SSSR (Physics Institute of the Dagestan Branch, AN SSSR)

SUBMITTED: 10Jun64 ENCL: 00 SUB CODE: NP

NO REF SOV: 004 OTHER: 004 ATD PRESS: 3162

Card 2/2

AMIRKHANOV, Kh.I.; BASHIROV, R.I.; ISMAILOV, Z.A.

Magnetoresistance of p-InSb in a strong magnetic field. Fiz. tver. tela 6 no.12:3524-3528 D '64 (MIRA 18:2)

1. Institut fiziki Dagestanskogo filiala AN SSSR, Makhachkala.

L 65466-65 EWT(l)/EWT(m)/EWP(t)/EWP(b) IJP(c) JD
ACCESSION NR: AP5014196 UR/0386/65/001/002/0017/0021

AUTHOR: Amirkhanov, Kh. I.; Bashirov, R. I.

TITLE: New data on the Shubnikov-de Haas spin effect in InSb

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilosheniye, v. 1, no. 2, 1965, 17-21

TOPIC TAGS: single crystal, magnetoresistance, indium compound, antimonide, arsenide, semiconductor crystal, transverse magnetic field

ABSTRACT: An interaction between spin splitting on the zero Landau level and the Shubnikov-de Haas effect was first observed experimentally in InSb and InAs at 20°C in pulsed magnetic fields. This phenomenon has also been studied at 4.2°K. However, up until now it has not been possible to observe spin splitting of Landau levels with $N = 1$. The authors managed to do this by increasing the measurement sensitivity and using homogeneous single crystal specimens of InSb. The transverse magnetoresistance was measured at 4.2°K in a pulsed field of up to 300,000 oersteds. Curves for magnetoresistance in a transverse magnetic field are shown in fig. 1 of the Enclosure. Resonance values of the magnetic fields H_0, H_1 and H_1' which corre-

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L 65256-65

ACCESSION NR: AP5014196

3

spond to split levels with $N = 0$ and 1, are given in table 1 of the Enclosure (at $T = 4.2°K$). The error in determining the resonance values of the magnetic field is 7-10%. The g-factor calculated from the experimental data agrees quite well with theoretical calculations. Orig. art. has: 1 figure, 1 table, 3 formulas.

ASSOCIATION: Institut fiziki Dagestanskogo filiala Akademii nauk SSSR, Makhachkala (Institute of Physics, Dagestan Affiliate, Academy of Sciences, SSSR)

SUBMITTED: 02Mar65 ENCL: 02 SUB CODE: SS

NO REF SOV: 006 OTHER: 000

Card 2/4

L 65256-65

ACCESSION NR: AP5014186

ENCLOSURE: 01

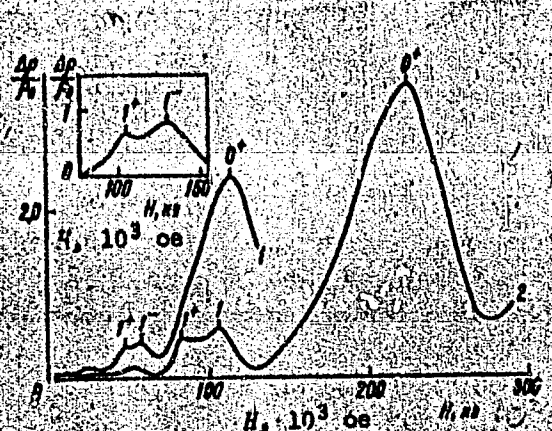

Fig. 1. Transverse magnetoresistance in InSb samples. $T = 4.2°K$. 1--specimen No 5; 2--specimen No 6; upper left hand corner--specimen No 7.

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L 65256-65
ACCESSION NR: AP5014196 ENCLOSURE: 02

TABLE 1

Specimen No.	n, cm^{-3}	H_0^+, 10^3 oe	m/m	H_1^-, 10^3 oe	H_1^+, 10^3 oe	$\|g\|_0^+$	$\|g\|_0^-$	$\|g\|_1^+$	$\|g\|_{pot}$
1	$2.0 \cdot 10^{15}$	7.90	0.0130	-	-	60	-	-	53
2	$5.7 \cdot 10^{15}$	17.0	0.0135	-	-	55	-	-	51
3	$3.7 \cdot 10^{16}$	57	0.015	-	-	45	-	-	44
4	$7.5 \cdot 10^{16}$	94	0.019	-	-	33	-	-	36
5	$9.4 \cdot 10^{16}$	113	0.020	58	47	29	-	-	33
6	$2.7 \cdot 10^{17}$	223	0.022	105	82	30	32	32	29
7	$3.8 \cdot 10^{17}$	-	0.024	130	104	-	23	20	27

MER

Card 4/4

AMIRKHANOV, Kh.I., doktor fiz.-matem. nauk, BAKULIN, V.N., kand. fiz.-matem. nauk, STAROVOY, G.V., inzh., MEDZHIDOV, E.A., inzh.

Thermodynamic properties of water and water vapor. Teploenergetika 12 no.3:56-59 Mr '65. (MIRA 18:6)

1. Dagestanskiy filial AN SSSR.

L 65265-65

ACCESSION NR: AR5014008 UR/0058/65/000/004/E007/E007

SOURCE: Ref. zh. Fizika, Abs. 4E46

AUTHOR: Amirkhanov, Kh. I.; Adamov, A. P.

TITLE: Thermal conductivity of carbonic acid from the liquidus curve, including the region of the critical state

CITED SOURCE: Sb. Primeneniye ul'traakust. k issled. veshchestva. Vyp. 18. M., 1963, 65-72

TOPIC TAGS: carbonic acid, thermal conduction, compressible gas

TRANSLATION: The thermal conductivity of CO_2 is studied from 7 isochors, including the critical curve. The results agree well with N. B. Vargaftik's equation for compressed gases. Unusual behavior is detected in the thermal conductivity when the critical temperature is approached on isochors close to the critical curve. This behavior is due to the effect of gravitation and the high compressibility of the material in the critical state. A relationship was found between the thermal conductivity of the substance in the critical state and the height of a column of

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L 65265-65

ACCESSION NR: AR5014408 0

the substance above the measurement space. Density distribution along the height of the column is calculated from the values obtained for the thermal conductivity. In the critical state, the value of the thermal conductivity of the liquid and gaseous state at the same height connect smoothly; no increase was observed in the thermal conductivity.

SUB CODE: TD, IC ENCL: 00

Card 2/2

L 01291-66 EWT(m)/EWP(t)/EWP(b) IJP(c) JD

ACCESSION NR: AP5021738 UR/0386/65/002/002/0100/0102

AUTHOR: Amirkhanov, Kh. I.; Bashirov, R. I.

TITLE: Effect of spin on longitudinal magnetoresistance in indium antimonide at 4.2°K

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 2, no. 2, 1965, 100-102

TOPIC TAGS: magnetoresistance, indium compound, antimonide

ABSTRACT: Experimental evidence is given for the effect of spin on quantum oscillations of longitudinal magnetoresistance in specimens of indium antimonide at 4.2°K. Results of measurements of $\Delta\rho_{\parallel}/\rho_0(H)$ for three specimens are given in fig. 1 of the Enclosure. Curves for longitudinal and transverse magnetoresistance of specimen No 3 are given in fig. 2 of the Enclosure. These data confirm the theory of longitudinal magnetoresistance developed by A. L. Efros (*FTT*, 7, 1501, 1965). Orig. art. has: 2 figures.

ASSOCIATION: Institut fiziki Dagestanskogo filiala Akademii nauk SSSR, Makhachkala

Card 1/4

L 01291-66

ACCESSION NR: AP5021738

(Institute of Physics, Dagestan Affiliate, Academy of Sciences SSSR)

SUBMITTED: 04Jun65 ENCL: 02 SUB CODE: EM

NO REF SOV: 004 OTHER: 002

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L 01291-66

ACCESSION NR: AP5021738

ENCLOSURE: 01

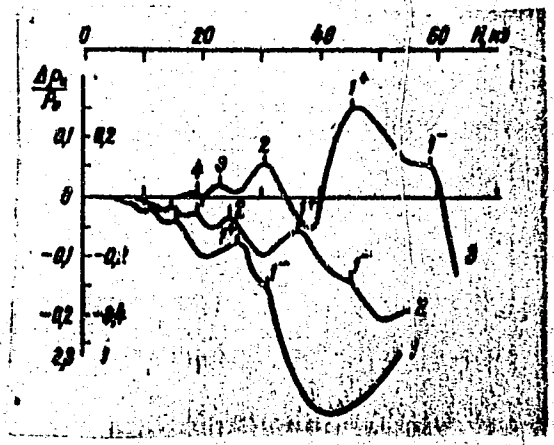

Fig. 1. $\Delta\rho_{11}/\rho_0(H)$: 1--$n = 4\cdot10^{16}$ cm^{-3}; 2--$n = 7.35\cdot10^{16}$ cm^{-3}; 3--$n = 9.6\cdot10^{16}$ cm^{-3}.

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L 01291-66

ACCESSION NR: AP5021738

ENCLOSURE: 02

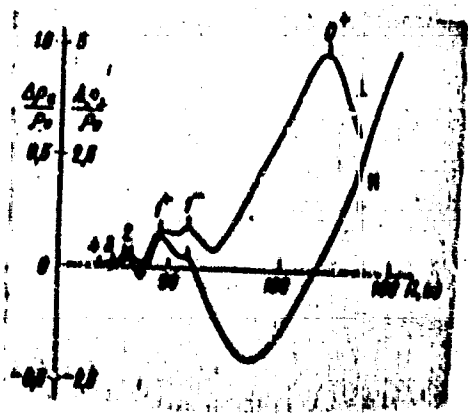

Fig. 2. Curves for longitudinal and transverse magnetoresistance of specimen No 3

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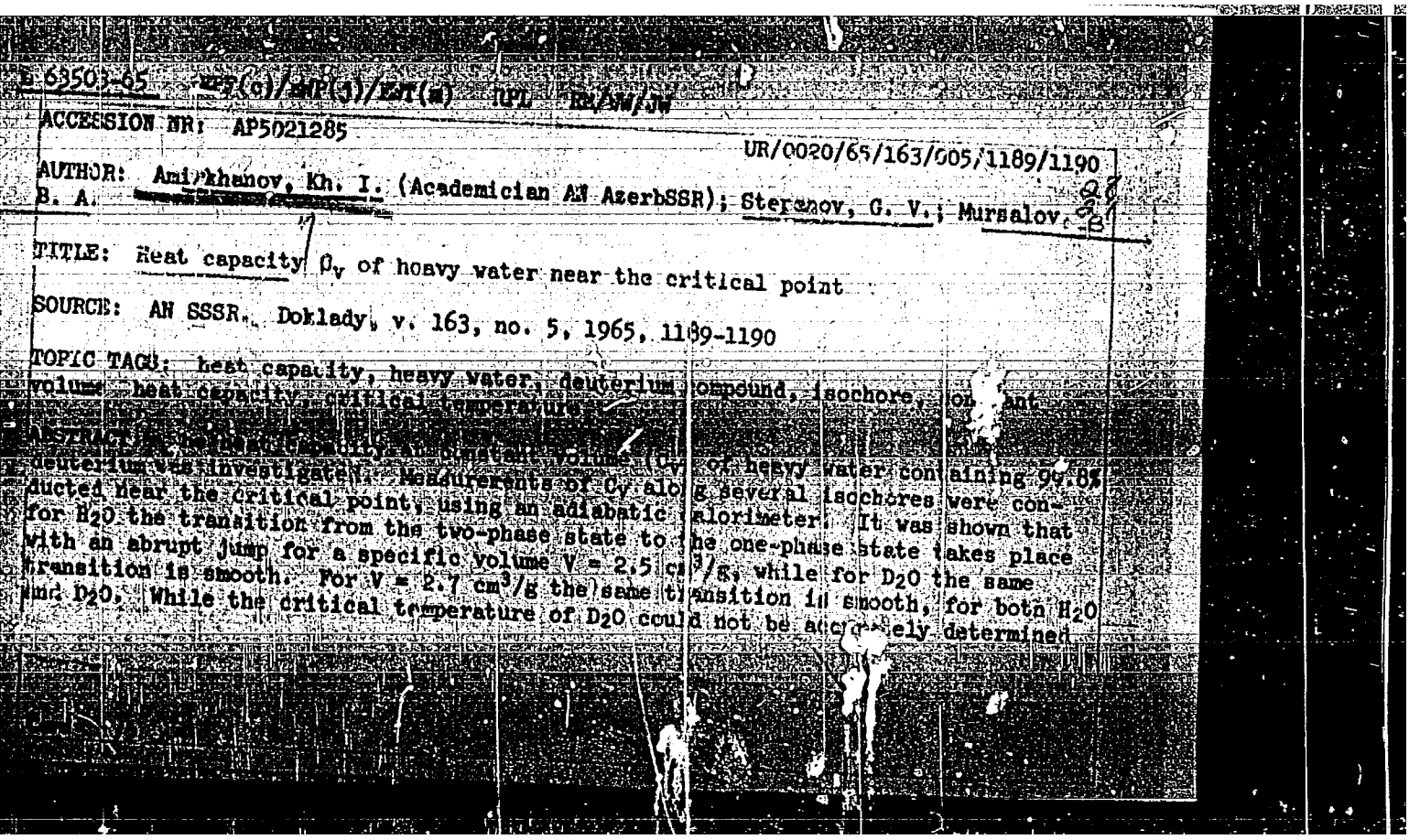
AMIRKHANOV, Kh.I.; MAGOMEDOV, Ya.B.

Thermal conductivity of indium antimonide in the solid and liquid states. Fiz. tver. tela 7 no.2:637-640 F '65.

(MIRA 18:8)

1. Dagestanskiy filial AN SSSR, Makhachkala.



L 63503-65 EWP(e)/EWP(j)/EWT(m) IJP(c) RM/WW/JW

ACCESSION NR: AP5021285 UR/0020/65/163/005/1189/1190

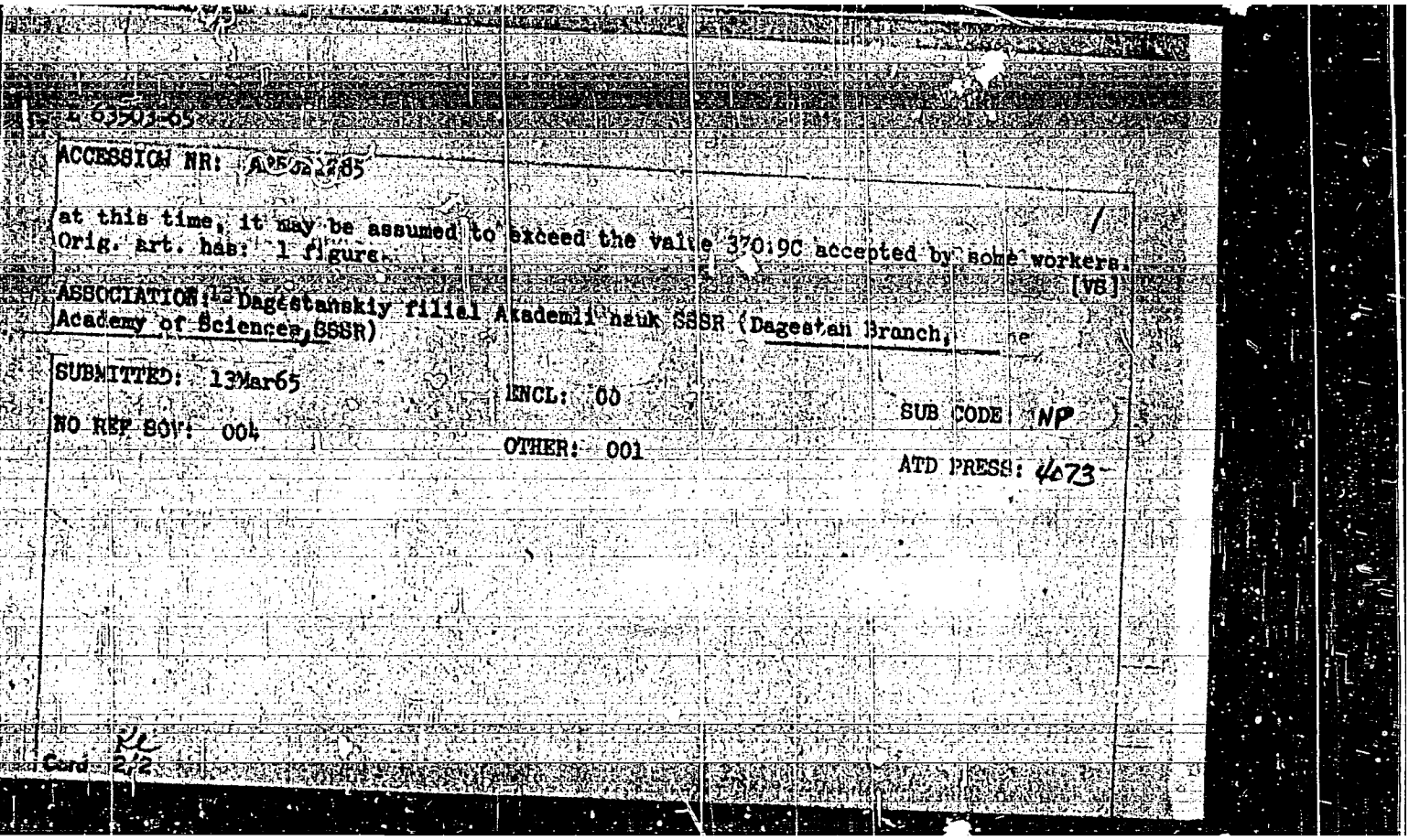
AUTHOR: Amirkhanov, Kh. I. (Academician AN AzerbSSR); Stepanov, G. V.; Mursalov, B. A.

TITLE: Heat capacity C_v of heavy water near the critical point

SOURCE: AN SSSR, Doklady, v. 163, no. 5, 1965, 1189-1190

TOPIC TAGS: heat capacity, heavy water, deuterium compound, isochore, [illegible] volume, heat capacity critical temperature

ABSTRACT: [illegible] deuterium was investigated. Measurements of C_v of heavy water containing 99.8% duced near the critical point, using an adiabatic calorimeter. It was shown that for H_2O the transition from the two-phase state to the one-phase state takes place with an abrupt jump for a specific volume $V = 2.5$ cm^3/g, while for D_2O the same transition is smooth. For $V = 2.7$ cm^3/g the same transition is smooth, for both H_2O and D_2O. While the critical temperature of D_2O could not be accurately determined



L 63503-65

ACCESSION NR: AP5022785

at this time, it may be assumed to exceed the value 370;9C accepted by some workers.
Orig. art. has: 1 figure. [VB]

ASSOCIATION: Dagestanskiy filial Akademii nauk SSSR (Dagestan Branch, Academy of Sciences, SSSR)

SUBMITTED: 13Mar65 ENCL: 00 SUB CODE: NP

NO REF SOV: 004 OTHER: 001 ATD PRESS: 4073

Card 2/2

L 05616-67 EWT(1) IJP(c)

ACC NR: AP6[illegible]487 SOURCE CODE: UR/0181/66/008/007/2189/2196

49

AUTHOR: [illegible]anov, Kh. I.; Bashirov, R. I.

B

ORG: Institute of Physics, Dagestan Branch AN SSSR, Makhachkala (Institut fiziki Dagestanskogo filiala AN SSSR)

TITLE: Influence of spin on quantum oscillations of galvanomagnetic coefficients in n-InSb

SOURCE: Fizika tverdogo tela, v. 8, no. 7, 1966, 2189-2196

TOPIC TAGS: indium compound, antimonide, galvanomagnetic effect, quantum oscillation, magnetoresistance, Hall constant, spin phonon interaction

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ABSTRACT: This is a continuation of earlier experimental studies of galvanomagnetic phenomena in n-InSb, and is devoted to a measurement of the longitudinal and transverse magnetoresistances and of the Hall effect in degenerate single-crystal samples of n-InSb (electron density from 10^{16} to 1.3×10^{18} cm^{-3}). Some of the results of this investigation have already been published (ZhETF, Pis'ma v redaktsiyu, v. 1, no. 2, 17, 1965; v. 2, 100, 1965). The measurements were made at 70, 20, and 4.2K in pulsed magnetic fields up to 300 kOe, at two opposite directions of the current and of the magnetic field, by directly recording the measured phenomenon as a function of the magnetic-field intensity. The tests disclose the theoretically predicted spin splitting of the second oscillation maximum of the magnetoresistance, and the magnetic fields at which these splittings are observed are determined. The influence of the

Card 1/2

L 03[illegible]-67

ACC NR: AP6024487

temperature and of the electron density on the position of the spin-splitting oscillation maxima is also investigated. At 77K, when the correction for incomplete degeneracy can be theoretically made, the results yield a quantitative experimental confirmation of the theory of the zeroth spin maximum in a transverse magnetic field. The Hall constant was found to oscillate little at 4.2 and 20K, but extrema were observed in the longitudinal magnetic resistance at 77K. It is proposed that these extrema are the result of the sufficiently large number of transitions with spin flip between the zero Landau sublevels as a result of the scattering of electrons by phonons. Orig. art. has: 7 figures, 6 formulas, and 1 table.

SUB CODE: 20/ SUBM DATE: 14Dec65/ ORIG REF: 008/ OTH REF: 001

Card 2/2 egt

L 21225-66 EWT(m)/EWP(t) IJP(c)

ACC NR: AP6000382 SOURCE CODE: UR/0181/65/008/001/0290/0292

AUTHOR: Amirkhanov, Kh. I.; Magomedov, Ya. B.

ORG: Institute of Physics, Dagestan Branch AN SSSR, Makhachkala (Institut fiziki Dagestanskogo filiala AN SSSR)

TITLE: Thermal conductivity of gallium antimonide in solid and liquid states

SOURCE: Fizika tverdogo tela, v. 7, no. 1, 1965, 290-292

TOPIC TAGS: gallium alloy, thermal conduction, ordered alloy, semiconductor alloy, electric conductivity, heat change of state, melting, temperature dependence

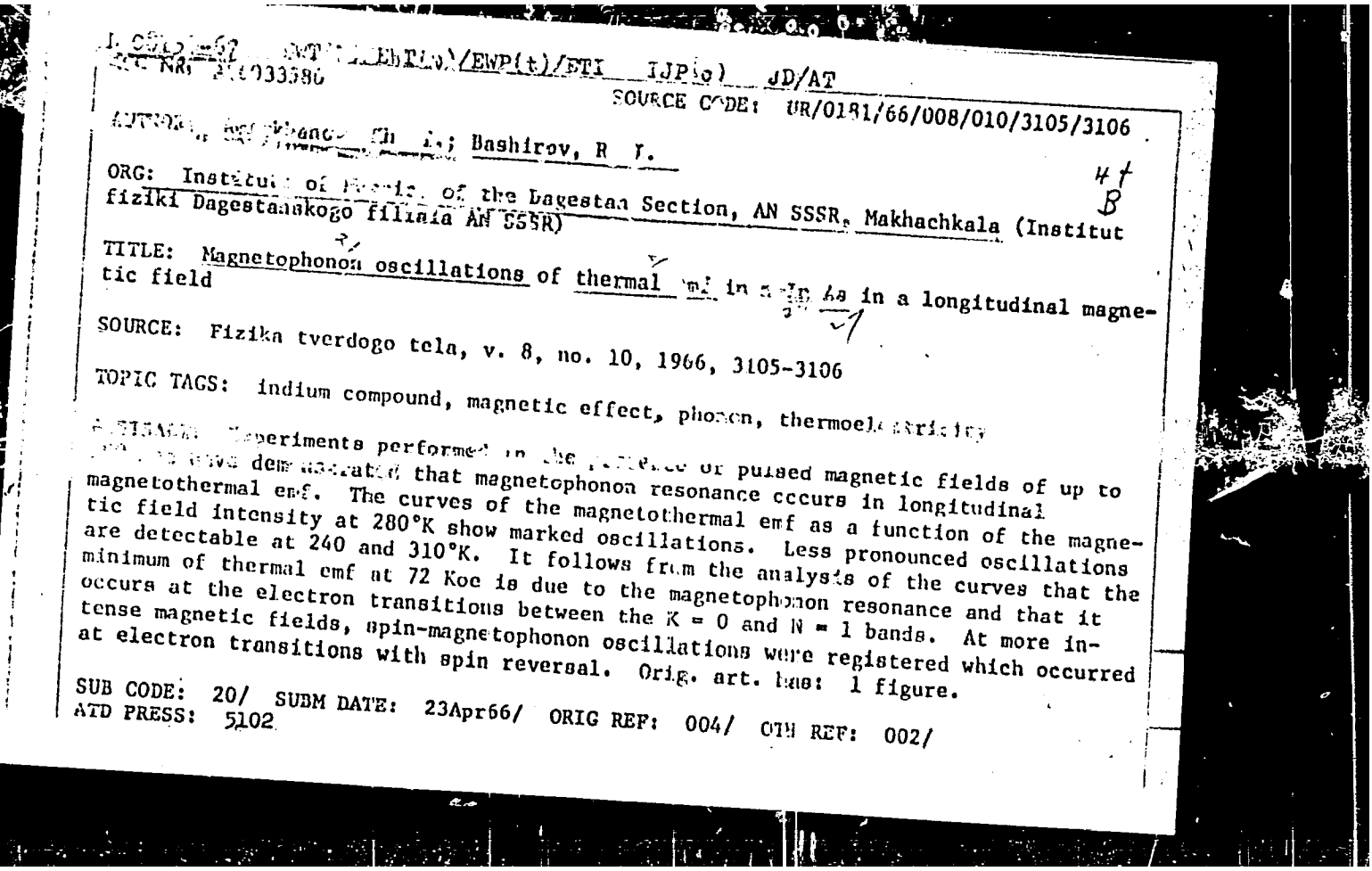
ABSTRACT: The purpose of the investigation was to clarify the mechanism of the thermal conductivity and the effect of short-range order on its component parts. The thermal conductivity was measured by an absolute method under stationary thermal conditions, as described elsewhere (Izv. AN ASSSR v. 4, 3, 1956) in an argon atmosphere. Single polycrystalline samples of p-type GaSb with carrier density 3.6×10^{10} [illegible] were used. The data obtained at room temperature agree well with the published results. This is claimed to be the first information on the temperature dependence of the thermal conductivity of GaSb at high temperatures in the liquid states. The results are interpreted from the point of view that there are several

Card 1/1

L 21225-66
ACC NR: AP6003821

different mechanisms (electronic and phonon) of thermal conductivity in semiconductors. A jump in the thermal conductivity by a factor of two is observed during melting, and a jump in the electric conductivity by a factor of 5.4. Further heating in the liquid state is accompanied by an increase in the electric conductivity and thermal conductivity. The latter reaches a maximum at 985K. The electric conductivity continues to rise with increasing temperature and is connected with the metallization of the bonds between the elements of the compound. It is concluded that gallium antimonide is a semiconductor in the solid state and in the melting region, and has metallic properties in the liquid state. The variation of the short-range order during melting influences all the components of the thermal conductivity. Orig. art. has: 2 figures and 1 formula.

SUB CODE: 20/ SUBM DATE: 20Feb65/ ORIG REF: 019/ OTH REF: 002



ACC NR: AT6033586 SOURCE CODE: UR/0181/66/008/010/3105/3106

AUTHOR: [illegible]; Bashirov, R. Y.

ORG: Institute of Physics of the Dagestan Section, AN SSSR, Makhachkala (Institut fiziki Dagestanskogo filiala AN SSSR)

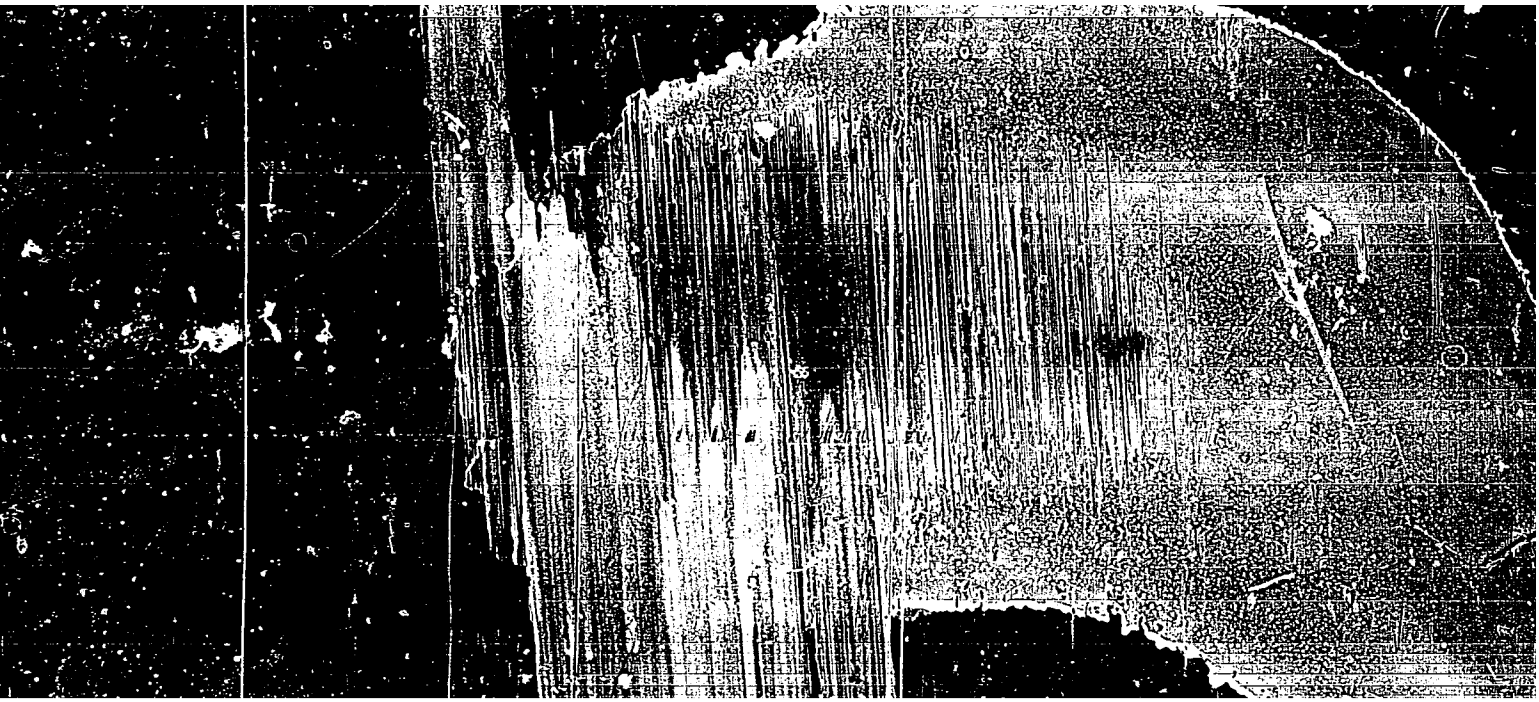
TITLE: Magnetophonon oscillations of thermal emf in InSb in a longitudinal magnetic field

SOURCE: Fizika tverdogo tela, v. 8, no. 10, 1966, 3105-3106

TOPIC TAGS: indium compound, magnetic effect, phonon, thermoelectricity

ABSTRACT: Experiments performed in the presence of pulsed magnetic fields of up to [illegible] demonstrated that magnetophonon resonance occurs in longitudinal magnetothermal emf. The curves of the magnetothermal emf as a function of the magnetic field intensity at 280°K show marked oscillations. Less pronounced oscillations are detectable at 240 and 310°K. It follows from the analysis of the curves that the minimum of thermal emf at 72 Koe is due to the magnetophonon resonance and that it occurs at the electron transitions between the K = 0 and N = 1 bands. At more intense magnetic fields, spin-magnetophonon oscillations were registered which occurred at electron transitions with spin reversal. Orig. art. has: 1 figure.

SUB CODE: 20/ SUBM DATE: 23Apr66/ ORIG REF: 004/ OTH REF: 002/
ATD PRESS: 5102



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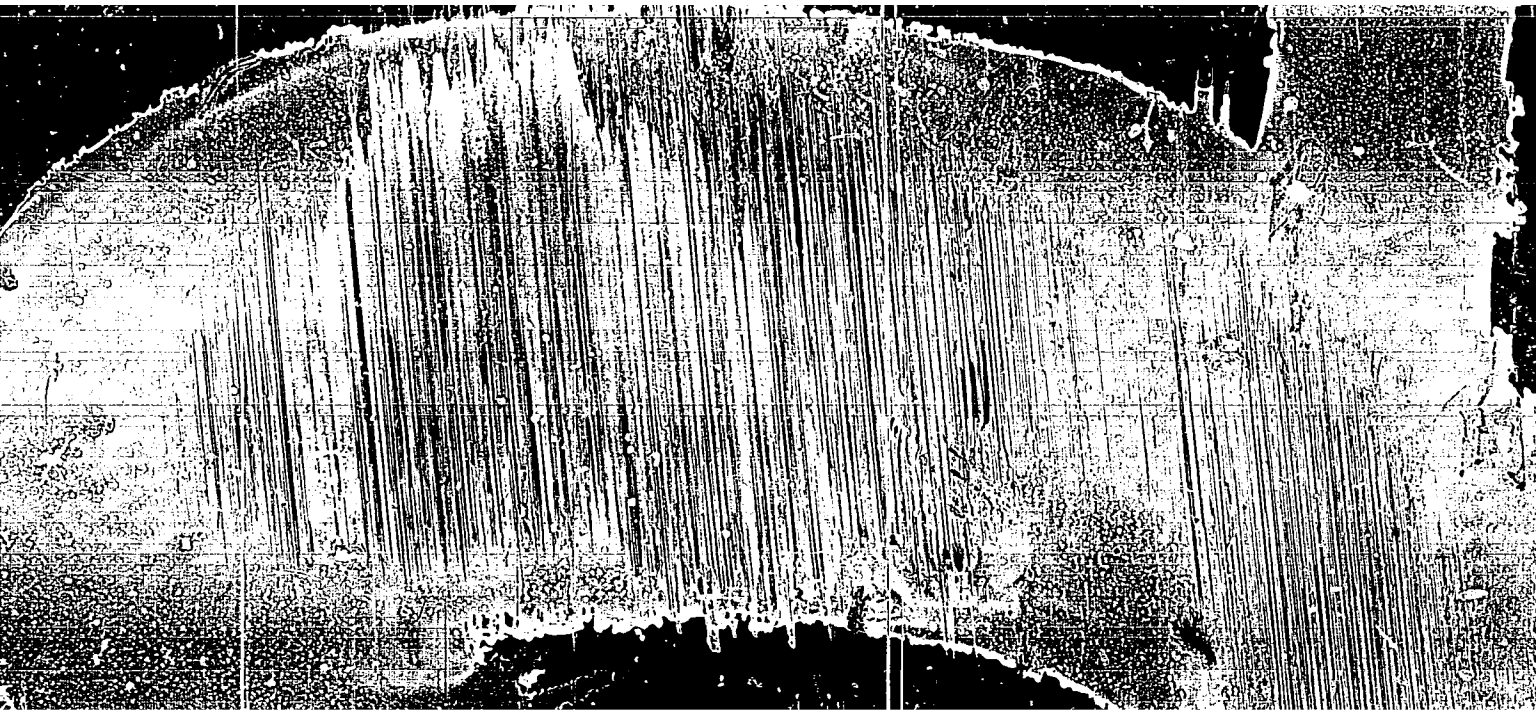

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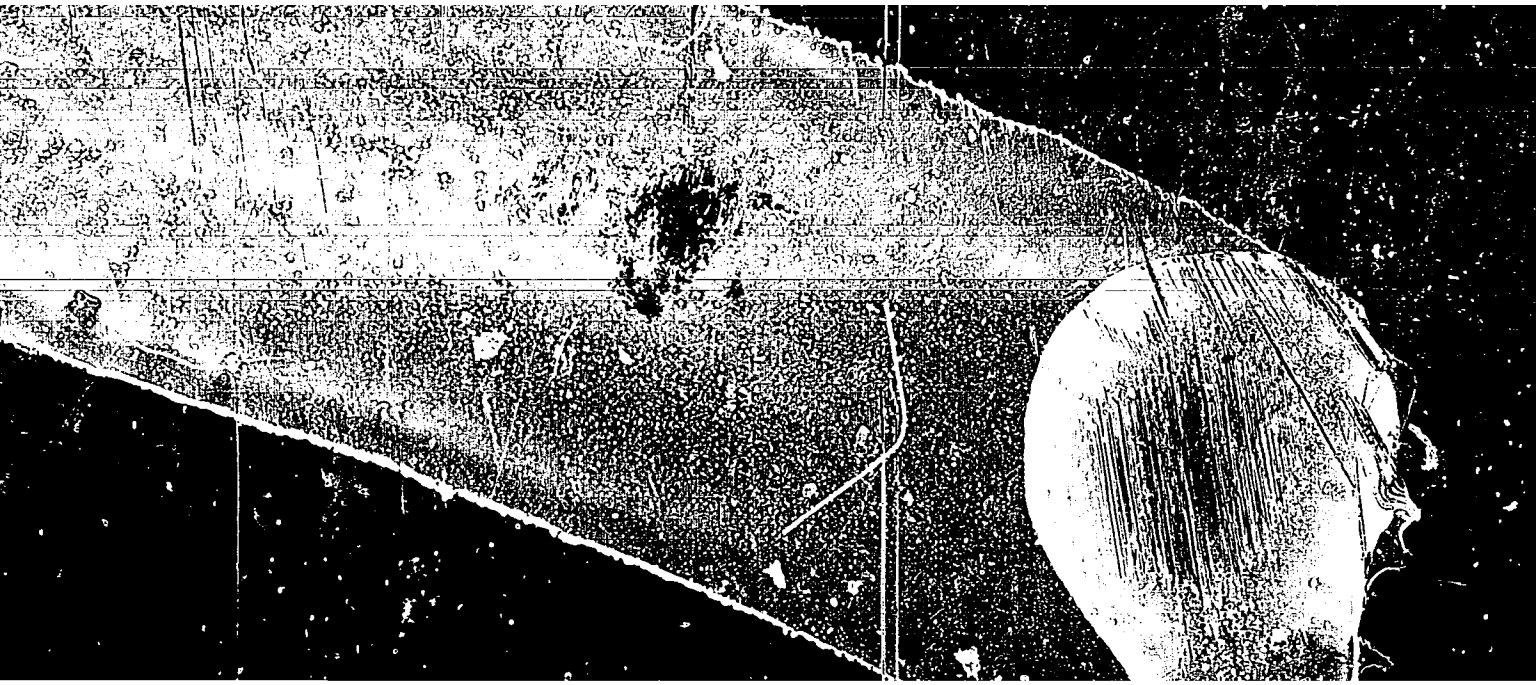

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