84261

9.4174 (3201, 3001, 3002)
24.5500 2209

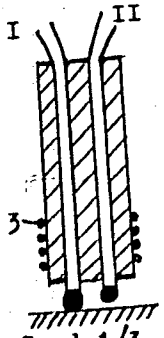
S/170/60/003/010/006/023
B019/B054

AUTHOR: Yemel'yanenko, O. V.

TITLE: The Measurement of the Surface Temperature of Bodies by a Thermocouple With Controllable Preheating

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1960, Vol. 3, No. 10, pp. 54 - 56

TEXT: In the introduction, the author refers to the error in the measurement of the surface temperature of bodies due to the fact that the hot junction of the thermocouple lying on the body surface is also touched by the cooler surrounding medium. In the present paper, the author suggests a variant of thermocouples, shown in the Fig. adjoining, by which it is possible to eliminate virtually the influence of the cooler surrounding medium. This variant consists of two thermocouples, thermocouple I measuring the temperature of the body surface, II that of the surrounding medium. The temperature of the surrounding medium is regulated by means



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The Measurement of the Surface Temperature of Bodies by a Thermocouple With Controllable Preheating

of a small heating element 3. The advantages of this combination of thermocouples become evident in the experimental results shown in Table 1:

T_o	T_x	T_{cor}
35.2 °C	33 °C	35.2 °C
58.2	51	58.2
83	78	82.9
100	90	100.1

T_o is the actual surface temperature, T_x is the temperature measured by an ordinary thermocouple, and T_{cor} is the temperature measured by a combination as is described here. The thermocouple combination described also offers advantages over semiconductor instruments. The author thanks Professor D. N. Nasledov for his interest, and Professor A. F. Chudnovskiy for valuable advice. F. P. Kasemanly, Post-graduate Student, assisted in the experiments. There are 1 figure, 1 table, and 2 non-Soviet references.

Card 2/3

84261

The Measurement of the Surface Temperature of Bodies by a Thermocouple With Controllable Preheating

S/170/60/003/010/006/023
B019/B054

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk SSSR, g. Leningrad (Institute of Physics and Technology of the Academy of Sciences, Leningrad)

SUBMITTED: January 7, 1960

X

Card 3/3

31758
S/058/61/000/011/016/025
A058/A101

24,7600 (1043, 1454, 1537)

AUTHORS: Yemel'yanenko, O. V., Nasledov, D. N.

TITLE: Comprehensive investigation of the mechanism of equilibrium electric conductivity in gallium arsenide

PERIODICAL: Referativnyy zhurnal, Fizika, no. 11, 1961, 232, abstract 11E435 ("Uch. zap. Kishinevsk. un-t", 1960, no. 50, 3-10)

TEXT: One and the same instrument was used to measure the conductivity σ, the Hall constant R, the differential thermo-emf α, and the longitudinal and transverse Nernst-Ettingshausen constants $Q_{\parallel}$ and $Q_{\perp}$. In this instrument a difference in temperatures is produced along a specimen and measured by thermocouples, which are used as current feeds incident to measurement of σ and R. $Q_{\perp}$ is measured on Hall probes, while $Q_{\parallel}$ is measured on the same terminals as α. The instrument has a symmetric heater-cooler system, by virtue of which it is possible to vary the direction of the temperature gradient along the specimen and make the specimen undergo practically any temperature drop. The measured potential differences amount to no less than 10 μv; the sensitivity of the circuit is $\approx$0.3 μv. The principal error of the instrument is in the determina-

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31758
S/058/61/000/011/016 025
A058/A101

Comprehensive investigation of the mechanism ...

tion of the temperature differences ΔT of the ends of the specimen. Two n-type Ga-As specimens were investigated. Specimen size was 12 x 3 x 1 mm. The temperature was measured in the range 0° - 600°K. From the curves of R versus T it is evident that both specimens are in the region of impurity conduction. At high temperatures scattering by phonons plays an essential role; with decrease in temperature ($T < 300^{\circ}$ - 400°K) scattering by the ionized impurity increases.

E. Filippova

[Abstracter's note: Complete translation]

Card 2/2

30634
S/081/61/000/020/010/089
B144/B101

9,4174 (1043,1138,1482)

AUTHORS: Yemel'yanenko, O. V., Nasledov, D. N.

TITLE: Comprehensive investigation of the electrical-conductivity mechanism in gallium arsenide

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 20, 1961, 33, abstract 20B229 (Uch. zap. Kishinevsk. un-t, v. 55, 1960, 3-10)

TEXT: The temperature dependences of the thermo-emf, of the constants of the Nernst-Ettingshausen effect, of the Hall constant and of the Hall mobility were studied in n-type GaAs samples. It has been established that in the range of medium temperatures ($< 300 - 400^{\circ}C$) the scattering from impurity ions plays a fundamental role in n-type GaAs samples containing various amounts of impurities (electron concentration $3 \cdot 10^{16} - 3 \cdot 10^{18}$ cm^{-3}). [Abstracter's note: Complete translation.]

Card 1/1

89286
S/181/61/003/001/025/042
B006/B056

24.7600 (1043,1158,1160)

AUTHORS: Agayev, Ya., Yemel'yanenko, O. V., and Nasledov, D. N.

TITLE: Investigation of the thermomagnetic Nernst-Ettingshausen effects in solid solutions of the InSb-AlSb system

PERIODICAL: Fizika tverdogo tela, v. 3, no. 1. 1961, 194-197

TEXT: Already in earlier papers (Refs. 1-3) the authors reported on studies made of the InSb-AlSb system; the first component is characterized by high carrier mobility, the second by a broad forbidden band. Electrical conductivity, Hall effect and change in resistance in a transverse magnetic field have already been studied; studies of this system were continued, and form the subject of the present report. The principal aim of further investigations was to explain the scattering mechanism of carriers in solid solutions (by means of the Nernst-Ettingshausen effect), and to obtain more exact data on carrier mobility. The measuring method is described in Ref. 4. Fig. 1 shows the temperature dependence of the transverse Nernst-Ettingshausen effect (Q^1) on the basis of several compositions. In the impurity region, the specimens had hole-type conductivity; at room

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Investigation of the thermomagnetic...

temperature the hole concentration of specimens 1 (InSb) was $3 \cdot 10^{15}$ cm^{-3}, and that of 2-4 was about $3 \cdot 10^{17}$ cm^{-3} (2: InSb·AlSb, 3: 2.5InSb·7.5AlSb, 4: AlSb). Measurements were carried out in magnetic fields of 7000 oe, specimen 1 at 1200 oe; (weak fields, $uH/c \ll 1$). The negative sign of the N-E effect in specimens 2-4 at low temperatures indicates that the carriers are scattered on impurity ions, as is natural for semiconductors of the $A^{III}B^{V}$ group. Also the nature of the temperature dependence of the Hall effect is in agreement with this fact. At low temperatures, InSb has a positive $Q^{\perp}$, which indicates that the carriers are scattered on acoustic lattice vibrations. Scattering by impurities is insignificant owing to the high purity of the specimen. Impurity conductivity is conserved in AlSb, and the scattering mechanism may be determined even at high temperatures. At $T > 350^{\circ}K$, $Q^{\perp}$ is positive (carrier scattering by acoustic lattice vibrations), but also in the case of InSb the $Q^{\perp}(T)$ curve becomes positive within the region of intrinsic conductivity. This is possible in spite of the bipolar character of conductivity, because in InSb the electron-to-hole mobility ratio is high, and the forbidden-band width is low. In InSb·AlSb specimens, the part of the $Q^{\perp}(T)$ curves related to mixed conductivity is

shifted toward higher temperatures. In InSb, mixed conductivity begins at about 140°K; in InSb·AlSb, at about 280°K; and in the specimen containing 75% AlSb, at 500-550°K; in AlSb it does not occur at all. This may be explained by the increase in the forbidden-band width in the case of increasing AlSb content. As regards carrier mobility, it was found that in transition from InSb to AlSb hole mobility decreases. On the assumption that at low temperatures in specimens 2-4 only impurity ions act as scattering centers; the hole mobility may be calculated from the N-E effect. At 110°K, 140, 80 and 30 $cm^2/v.sec$ was obtained for specimens 2, 3, and 4. These values are 2-3 times as high as those calculated from Hall effect and conductivity (under the same conditions); however, they appeared to be closer to the true values, because the N-E effect is not disturbed, e.g., by a crystalline structure. In any case, these values may be considered to be limits. Fig. 2 shows the temperature dependence of the longitudinal N-E effect ($Q^{\parallel}$), on InSb (1) and InSb·AlSb (2). The fact that $Q^{\parallel}_{max}$ of (1) surpasses $Q^{\parallel}_{max}$ of (2) by about 2 orders of magnitude (the same may be observed in the case of $Q^{\perp}$) is explained by the much higher mobility and the much higher mobility ratio. Results show that scattering on the

disordered structure of InSb-AlSb alloys is low. Carrier mobility may be increased by an increase of purity. There are 2 figures and 6 Soviet-bloc references.

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut AN SSSR imeni akad. A. F. Ioffe (Leningrad Institute of Physics and Technology AS USSR imeni Academician A. F. Ioffe)

SUBMITTED: June 22, 1960

Investigation of the thermomagnetic...

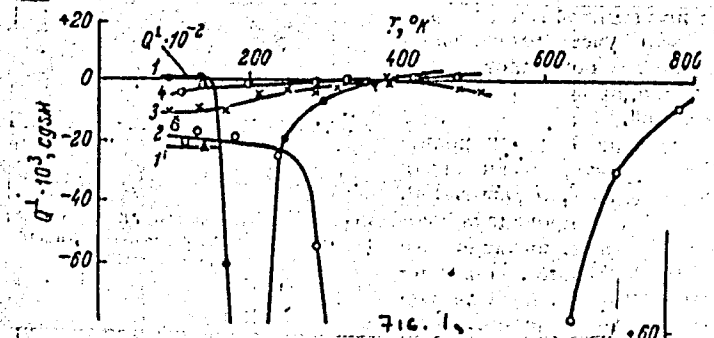

Fig. 1

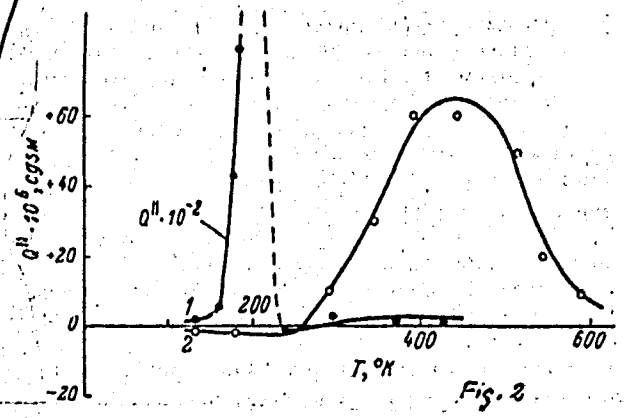

Fig. 2

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89287

S/181/61/003/001/026/042
B102/B204

24.7700 (1043, 1143, 1469)

AUTHORS: Yemel'yanenko, O. V., Lagunova, T. S., and Nasledov, D. N.

TITLE: Impurity band in p- and n-type gallium arsenide crystals

PERIODICAL: Fizika tverdogo tela, v. 3, no. 1, 1961, 198-203

TEXT: The present paper is a continuation of an earlier paper (Ref. 1) in which high-impurity n- and p-type GaAs specimens have been examined. It had been found that, in these specimens, the carrier concentration does not change with decreasing temperature (from room temperature to 1.5 - 2°K), and also the electrical conductivity remains nearly constant. In n-type specimens, the activation energy of impurity levels was equal to zero because of the formation of an impurity band overlapping the conduction band, and the electron gas was degenerate. The effective mass of the holes in GaAs is a multiple of the electron mass. Here, data are given on measurements of the Hall constant and the electrical conductivity of p- and n-type GaAs specimens, which are discussed. The measuring method is described in Ref. 1. The specimens were produced from initial substances of high purity (99.99%); the characteristic properties of the

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various specimens are given in a table. The results of measurement are shown in Figs. 1 and 2. Within the entire range of measurement (2-600°K), the specimens were within the region of impurity conductivity. The temperature dependence of Hall constant electrical conductivity for p-type GaAs is shown in Fig. 1 and Fig. 2, respectively. In the latter, the slope of the curves is constant from 30 to 4.2°K (the apparent breaks are due to the change in scale). Ge, InSb, and other semiconductors show a similar course of the curves, which is explained on the basis of a hypothesis concerning the mobility in the impurity band (Phys.Rev. v.96, p. 1226 and v. 99, p. 400). Here, the existence of two types of carriers of the same sign is assumed: ordinary carriers in the conduction or valence band, and such of lower mobility in a band formed by overlapping impurity levels. The Hall constant R may be expressed as a function of concentration and mobilities of the two types of carriers (1,2):

$R = a_r(u_1^2 n_1 + u_2^2 n_2)/(u_1 n_1 + u_2 n_2)^2$, where $n_1 + n_2 = \text{const}$; the constant r_a differs only little from unity. Figs. 3 and 4 show R(T) and σ(T) for n-type GaAs. The maxima of the R(T) curves may be explained either on the basis of the above formula for $u_1 n_1 = u_2 n_2$, or by a surface conduction

S/181/61/003/001/026/042
B102/B204

Impurity band in p- and n-type...

effect. However, the latter cannot explain all the phenomena observed. The slope of the curves with $T < 30^{\circ}K$ depends on processes occurring in the impurity band, and at higher temperatures on carrier transitions from the impurity band to the conduction or valence bands. The width of the energy gap between acceptor levels and valence band may be calculated from the slope of the R(T) curves or (for pure specimens) from the formula $n_1 \sim \exp(-\Delta E_{gap}/kT)$. Both methods yielded similar results: $\Delta E_{gap} = 0.01 - 0.02$ ev. The gap between donor levels and conduction band was found to be even smaller. Some interesting results were obtained for conductivity; thus, the resistivity of n-type GaAs at low temperatures in a transverse magnetic field does not increase (as is otherwise the case in semiconductors) but decreases. At H = 5000 oe and at helium temperature, the resistivity decrease in some cases attains 0.6 - 0.7%; in the case of pure specimens (5300 oe), even 7.5%; and at $2.4^{\circ}K$, 11%. On p-type specimens, this effect was either very low or did not occur at all. The effect on n-type GaAs cannot be explained by theories available today. There are 5 figures, 1 table, and 4 references: 1 Soviet-bloc and 3 non-Soviet-bloc.

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89287

S/181/61/003/001/026/042
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Impurity band in p- and n-type...

ASSOCIATION: Leningradskiy fiziko-tekhnicheskiy institut AN SSSR imeni akad. A. F. Ioffe (Leningrad Institute of Physics and Technology AS USSR imeni Academician A. F. Ioffe)

SUBMITTED: June 22, 1960

Legend to the table: 1) Number and type of conductivity of the specimen; 2) impurity, % by weight; 3) carrier concentration; 4) carrier mobility.

№ образцов и тип проводимости 1)	Примесь, вес. % 2)	Концентрация носителей тока $n = \frac{1}{eR}$, $см^{-3}$ 3)	Подвижность носителей тока $\mu = Re$, $см^2/в \cdot сек$. 4)
		$T = 300°$ K	
3 *p*	0.1 Cd	$1 \cdot 10^{19}$	75
4 *p*	0.01 Zn	$4.5 \cdot 10^{18}$	95
5 *p*	0.1 Cd	$1.5 \cdot 10^{18}$	140
6 *p*	0.05 Cd	$4 \cdot 10^{17}$	150
7 *p*	0.013 Cd	$1.5 \cdot 10^{17}$	220
8 *p*	0.001 Zn	$1 \cdot 10^{17}$	300
7 *n*	—	$4.5 \cdot 10^{17}$	3000
8 *n*	0.001 Se	$2.1 \cdot 10^{17}$	3300
9 *n*	—	$2.2 \cdot 10^{16}$	3200

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89287

S/181/61/003/001/026/042
B102/B204

Impurity band in p- and n-type...

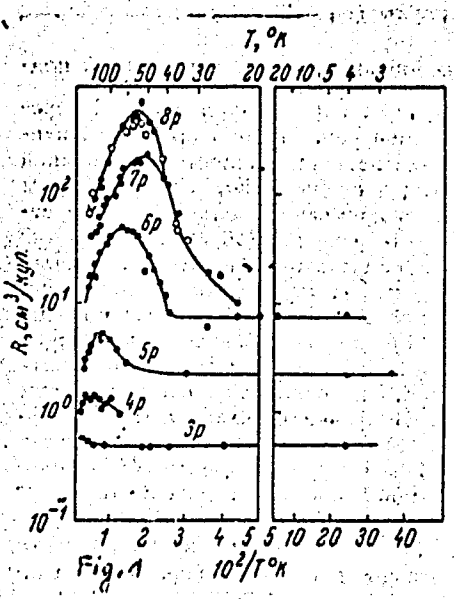

Fig. 1

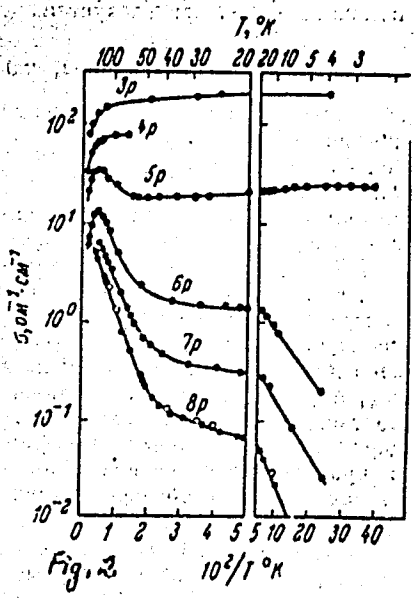

Fig. 2

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B102/B204

Impurity band in p- and n-type

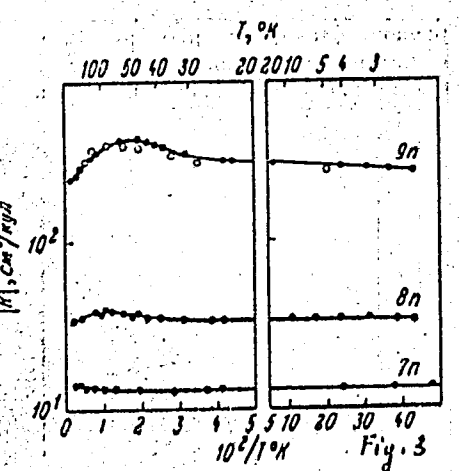

Fig. 3

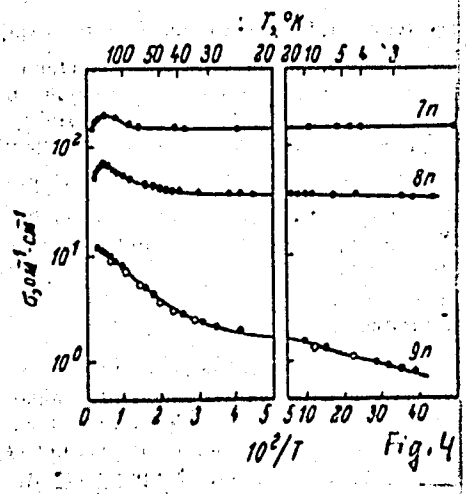

Fig. 4

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22054
S/181/61/003/004/020/030
B102/B214

24.7700 (1035, 1143, 1395, 1469)

AUTHORS: Yemelyanenko, O. V., Kesamanly, F. P., and Nasledov, D. N.

TITLE: The dependence of the effective mass of the electron in n-type InSb on the carrier concentration

PERIODICAL: Fizika tverdogo tela, v. 3, no. 4, 1961, 1161 - 1163

TEXT: The authors give the results of a determination of the effective electron mass in InSb for different carrier concentrations. The determination was done by measuring the differential thermo-emf. The experimental apparatus has been described by the authors in an earlier paper (FTT, II, vyp. 7, 1494, 1960). The samples were prepared by fusing the components in a stoichiometric ratio. They had n-type conductivity, and a carrier concentration $n = 3 \cdot 10^{16}$ cm^{-3} (at room temperature). They were doped with selenium up to an impurity concentration of $2.5 \cdot 10^{19}$ cm^{-3}. The size of the samples was 1 × 3 × 10 mm. They were polycrystalline and sufficiently homogeneous. The differential thermo-emf can be expressed by the relation $\alpha = -\frac{k}{e}\left[\frac{r+2}{r+1}\frac{F_{r+1}(\mu)}{F_r(\mu)} - \mu\right]$ (1), where r is the exponent in

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The dependence of the ....

the scattering law $l \sim \varepsilon^r$, ε the electron energy calculated from the bottom of the conduction band, l the electron mean free path; for the various kinds of scattering, r has the values 0, 1/2, 1, 3/2, 2; μ is the reduced Fermi level, and $F_r(\mu)$ the Fermi-Dirac integral. On the other hand the electron concentration in the conduction band is related to μ:

$n = \left(\frac{m^*}{m}\right)^{3/2} \frac{4}{\sqrt{\pi}} \left(\frac{2\pi mkT}{h^2}\right)^{3/2} F_{1/2}(\bar{\mu})$, where m* is the effective mass of the conduction electron and m the mass of a free electron. From α and r one can determine μ, from which m* can be calculated by the last equation. Since the thermo-emf in each case is a function of the scattering mechanism, the m* values for all InSb samples were calculated for the two extreme r-values 0 and 2. These values are given in the table for $T = 300^{\circ}K$; so also the $\tilde{\mu}$ values. If it is assumed that the scattering mechanism does not vary from sample to sample, the effective electron mass increases significantly with increasing electron concentration. In sample 3n which contains $2.5 \cdot 10^{19}$ electrons/cm^3, m*/m is three times as large as in the pure sample 18n. This result is independent of the r-value. The assump-

Card 2/4

The dependence of the ...

tion that the character of scattering in the samples is independent of the impurity concentration is not very exact. In diamond-type crystals, to which InSb belongs, the electrons are scattered by acoustic lattice vibrations (r=0) and impurity ions (r=2). The role played by the two processes is a function of the temperature, the electron and impurity concentrations, the degeneracy of the electron gas, etc. If the increasing role of lattice scattering with an increase of the carrier concentration is taken into account, the effective mass of the electrons increases with increasing carrier concentration even more rapidly. It can, therefore, be said that in degenerate n-type InSb the effective electron mass increases significantly with increasing carrier concentration. The authors thank V. V. Galavanov for making available the InSb samples. There are 1 figure, 1 table, and 5 references: 3 Soviet-bloc and 2 non-Soviet-bloc. The two references to English language publications read as follows:
S. D. Smith, T. S. Moss, K. W. Taylor, J. Phys. Chem. Sol. 11, 131, 1959;
W. G. Spitzer, H. Y. Fan, Phys. Rev. 106, 5, 882, 1957.

X

Card 3/4

22054

S/181/61/003/004/020/030
B102/B214

The dependence of the ...

ASSOCIATION: Fiziko-tekhnicheskiy institut imeni akad. A. F. Ioffe AN SSSR Leningrad (Institute of Physics and Technology imeni Academician A. F. Ioffe, AS USSR, Leningrad); Institut fiziki AN AzSSR Baku (Institute of Physics, AS Azerbaydzhanskaya SSR, Baku)

SUBMITTED: August 11, 1960

Legend to the Table: 1) Sample, 2) α, μv/deg.

① Образец	n, см⁻³	② α, мкв/град.	β		m*/m	
			r = 0	r = 2	r = 0	r = 2
18 n	$3.0 \cdot 10^{16}$	303	−1.4	1.0	0.029	0.011
14 n	$1.3 \cdot 10^{17}$	220	−0.3	2.7	0.040	0.013
11 n	$9.0 \cdot 10^{17}$	102	2.4	7.7	0.048	0.017
6 n	$6.9 \cdot 10^{18}$	34	8.3	25.0	0.062	0.021
3 n	$2.5 \cdot 10^{19}$	23	12.3	37.0	0.098	0.033

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28074
S/181/61/003/009/006/039
B102/B104

24-7700 also 1114, 2801

AUTHORS: Andronik, I. K., Kot, M. V., and Yemel'yanenko, O. V.

TITLE: Electrical properties of cadmium antimonide single crystals at low temperatures

PERIODICAL: Fizika tverdogo tela, v. 3, no. 9, 1961, 2548 - 2552

TEXT: Pure CdSb single crystals were examined for the temperature dependence of the two components of the conductivity tensor, of the Hall effect, and of the magnetic resistivity between 2.4 and 78°K. The specimens were two blocks of single crystals obtained by the Bridgman method. The crystals had previously been recrystallized three times in H_2 atmosphere. The specimens were 4·4·10 mm large, and the faces were perpendicular to the axes $\vec{a}$[100], $\vec{b}$[010], and $\vec{c}$[001]. V. I. Ded' of the Moldavskiy filial AN SSSR (Moldavian Branch of the AS USSR) checked these data by X-ray structural analysis. One of the specimens was cleft along the $\vec{b}$ axis, and along the $\vec{c}$ axis the other. A measurement of the temperature dependence of the resistivity ($\ln R = f(1/T)$) showed that the

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Electrical properties of...

absolute values of resistivity differ in the axial directions $\vec{b}$ and $\vec{c}$. The type of temperature dependence is the same. The components R_{321} and R_{231} of the Hall-effect tensor are positive over the whole temperature range (R_{321}: current$\parallel\vec{b}$, H$\parallel\vec{a}$, Hall emf$\parallel\vec{c}$; R_{231}: current$\parallel\vec{c}$, H$\parallel\vec{a}$, Hall emf$\parallel\vec{b}$). The curve ln R = f(1/T) shows, for the R_{321} component, a maximum at 1/T = 0.25. While the R-components are independent of $\vec{H}$ at room temperature and liquid-hydrogen temperature, they become smaller at 4.2°K on a rise of $\vec{H}$. At 90°K, the relative change of resistivity in the magnetic field is linearly dependent on H^2. At 4.2°K, $\Delta\varrho/\varrho H^2$ drops with growing H. The anisotropy of the CdSb crystals was also observed in the rotation diagrams $\Delta\varrho/\varrho = f(\varphi)$ constructed at 4.2°K and H = 5300 oe. The most interesting fact revealed by the results is that the curve R(T) passes a maximum at about 4°K, while, at the same temperature, the curve $\delta(T)$ passes from a weakly exponential slope to a steeper one. This behavior reminds of that of the Hall effect in p-type Ge with an acceptor concentration of $\sim 10^{16}$ cm^{-3}, and may be explained with the hypothesis concerning the impurity conductivity

23074
S/181/61/003/009/006/039
B102/B104

Electrical properties of...

(C. S. Hung. Phys. Rev. 79, 727, 1950). An accurate analysis of data obtained allows the following conclusions to be reached: (1) A narrow acceptor band, lying 0.005 - 0.008 ev above the fundamental band, is formed in CdSe single crystals with a defect concentration of $3.10^{15}cm^{-3}$. (2) The hole mobility in the fundamental band is about 3000 times as high as in the impurity band. (3) The hole mobility in the fundamental band increases as temperature drops to 20°K approximately as $T^{-3/2}$. This indicates that the holes are scattered by thermal (acoustic) lattice vibrations. (4) At 4.2°K, the Hall constant and $\Delta\rho/\rho$ H^2 drop with a rise of H. Professor D. N. Nasledov is thanked for help and interest displayed. There are 6 figures and 5 references: 4 Soviet and 1 non-Soviet.

ASSOCIATION: Kishinevskiy gosudarstvennyy universitet (Kishinev State University)

SUBMITTED: February 15, 1961

Card 3/3

31244

S/181/62/004/002/039/051
B102/B138

24.7600 (1035, 1043, 1164)

AUTHORS: Yemel'yanenko, O. V., Kesamanly, F. P., and Nasledov, D. N.

TITLE: Thermomagnetic Nernst-Ettingshausen effects in degenerate indium antimonide

PERIODICAL: Fizika tverdogo tela, v. 4, no. 2, 1962, 546-548

TEXT: The temperature dependence of the longitudinal and the transverse Nernst-Ettingshausen effects was investigated in weakly and strongly degenerate InSb single crystals in the range 100 - 600°K. In+Sb were mixed in stoichiometric ratio, melted and doped with Se; the Czochralski method was used to grow electrically homogeneous single crystals with an electron concentration of 10^{16} - 10^{19} cm^{-3}. The crystals measured had the following characteristic parameters at room temperature:

IX

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34244
S/181/62/004/002/039/051
B102/B138

Thermomagnetic Nernst-Ettingshausen ...

number of specimen	17n	13n	7n
electron concentration	$4 \cdot 10^{16}$	$3 \cdot 10^{17}$	$6 \cdot 10^{18}$ cm^{-3}
mobility	60,000	40,000	6000 $cm^2/v \cdot sec$
degeneracy	0	+4	+14
linearity of N-E effects up to	800	1500	10,000 oe
measurement of temperature dependence of N-E effects	600	1000	4000 oe

13n and 7n had impurity conductivity, 17n - mixed conductivity. Since the hole mobility and the role of the holes in the thermomagnetic effects was much smaller than that of the electrons, the theory of pure impurity conductivity is applicable for all specimens. The results show that for InSb, as for InAs, at higher temperatures the electrons are mainly

Card 2/3

Thermomagnetic Nernst-Ettingshausen ...

scattered from acoustic lattice vibrations ($Q^{\perp}$, $Q^{\parallel}$)0). Lattice scattering increases with the degree of degeneracy. There are 2 figures and 9 references: 7 Soviet-bloc and 2 non-Soviet bloc. The reference to the English-language publication reads as follows: H. Ehrenreich. J. Phys. Chem. Sol. 2, 131, 1957.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR Leningrad (Physicotechnical Institute imeni A. F. Ioffe AS USSR, Leningrad). Institut fiziki AN Az. SSR Baku (Institute of Physics AS Azerbaydzhanskaya SSR, Baku)

SUBMITTED: September 13, 1961

Fig. 1. Temperature dependence of $Q^{\perp}$ for 17n (1), 13n (2) and 7n (3).

Fig. 2. Temperature dependence of $Q^{\parallel}$ for 17n (1), 13n (2), and 7n (3). $Q^{\parallel}$ and $Q^{\perp}$ given in CGSM units.

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81768

S/181/60/002/02/02/033
B006/B067

24,7700

AUTHORS: Yemel'yanenko, O. V., Lagunova, T. S., Nasledov, D. N.

TITLE: Scattering of Carriers in Gallium Arsenide With Strong Degeneration

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 2, pp. 192-197

TEXT: In the present paper, the authors report on experimental investigations of the electrical conductivity and the Hall effect of highly alloyed n-type and p-type gallium arsenide samples with impurity conductivity, in which the electron and hole gases, respectively, are strongly degenerate. The conduction electrons in gallium arsenide have a small effective mass ($m_n^* \approx 0.05$ m), so that the electron gas is degenerate in a wide temperature and electron-concentration range. At room temperature, degeneration ($\mu/kT \geq 0$) occurs at electron concentrations $n \gtrsim 5 \cdot 10^{17}$ cm^{-3}, strong degeneration ($\mu/kT > 2$) with $n > 1.5 \cdot 10^{18}$ cm^{-3}; μ denotes the Fermi level energy. The effective hole

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Scattering of Carriers in Gallium Arsenide With Strong Degeneration

mass in gallium arsenide is $m_p^* \approx 0.5$ m, degeneration occurs at room temperature with $p \gtrsim 10^{19}$ cm^{-3}, strong degeneration with $p > 3.10^{19}$ cm^{-3}. n-Type gallium arsenide in the concentration range 4.10^{17} - 3.10^{18} cm^{-3} has been investigated in a previous paper (Ref. 2). In this paper, measurements of conductivity and Hall constant are again carried out in the temperature range 78-500°K (in some cases at 2-900°K) by using the method described in Ref. 2. The carrier concentration and mobility were determined from the equations $n = 1/eR$ and $u = R\sigma$, which are well satisfied in the case of strong degeneration. The purity of the elements added to the samples was $\geq 99.99\%$, the electron concentration at room temperature was $(1 \div 3).10^{18}$ cm^{-3} and $(3 \div 5).10^{16}$ cm^{-3}; all samples whose characteristics are given in Table 1 were single crystals. Fig. 1 shows the depenience of the carrier mobility on their concentration at 290°K, Fig. 2 the temperature dependence of the resistivity of n-type GaAs in the range 2-900°K, Fig. 3 shows the same for p-type GaAs. Fig. 4 shows $\log u = f(\log T)$ for both types. The investigations yielded the following results: Electron and hole mobility depend only slightly on the con-

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Scattering of Carriers in Gallium Arsenide With Strong Degeneration

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B006/B067

centration of the uncompensated impurities in the sample. In the low-temperature range, n-type and p-type conductivity are practically independent of temperature. Above 50-200°K, the carrier mobility decreases with temperature the more, the stronger the sample is alloyed. At T 400-700°K, however, the mobility decrease in non-degenerate samples is stronger than in degenerate ones. At low temperatures, scattering from impurity ions is dominating in all samples, at high temperatures - by lattice vibrations. With increasing carrier concentration, the scattering from the lattice increases. The most important experimental results can be explained by the general theory of carrier scattering in a simple impurity semiconductor. For a qualitative explanation it is sufficient to assume that the velocity of the scattered electrons in strong degeneration is much higher than the mean thermal velocity which they would have in the non-degenerate case, and that it does not depend on temperature. This velocity increases with electron concentration. There are 4 figures, 2 tables, and 7 references: 3 Soviet, 2 American, and 2 British.

Card 3/4

81768

Scattering of Carriers in Gallium Arsenide With Strong Degeneration

S/181/60/002/02/02/033
B006/B067

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR Leningrad
(Physicotechnical Institute of the AS USSR, Leningrad)

SUBMITTED: May 13, 1959

Card 4/4

YEMEL'YANENKO, O.V.; ZOTOVA, N.V.; NASLEDOV, D.N.

Thermomagnetic Nernst-Ettingshausen effect in indium arsenide.
Fiz.tver.tela 1 no.12:1868-1871 D '59. (MIRA 13:5)

1. Fiziko-tekhnicheskiy institut AN SSSR, Leningrad.
(Indium arsenide--Electric properties)

Report presented at the 3rd National Conference on Semiconductor Compounds, Kishinev, 16-21 Sept 1963

2. Electrical properties of highly degenerate crystals of n- and p-type gallium arsenide. O. V. Yemel'yanenko, F. P. Kesamanly, D. N. Nasledov, V. G. Sidorov, G. N. Talalakin.

Concerning the interaction of electrons with lattice vibrations in gallium arsenide. O. V. Yemel'yanenko, T. S. Lagunova, D. N. Nasledov, V. Ye. Shcherbatov.

Electrical properties of gallium arsenide with different impurities. D. N. Nasledov, G. N. Talalakin.

Investigation of the properties of impurity zones in crystals of p-type gallium arsenide. O. V. Yemel'yanenko, T. S. Lagunova, D. N. Nasledov, V. Ye. Shcherbatov.

Galvanomagnetic properties of indium arsenide in a wide temperature range. Yu. M. Burdukov, I. V. Zatova, T. S. Lagunova, D. N. Nasledov.

Nernst effect in n-type indium phosphide.
F. P. Kesamanly, E. E. Klotin'.
(Presented by O. V. Yemel'yanenko--25 minutes).

S/181/63/005/001/024/064
B102/B186

AUTHORS: Nasledov, D. N., Mamayev, S., and Yemel'yanenko, O. V.

TITLE: Investigation of the thermo-emf and the thermomagnetic effects in alloys of the system $CdSnAs_2$-2InAs

PERIODICAL: Fizika tverdogo tela, v. 5, no. 1, 1963, 147-150

TEXT: The authors continue previous investigations (FTT, 2, 176, 1960; 3, 3405, 1961; DAN SSSR, 142, 623, 1962) of the system $CdSnAs_2$-2InAs whose initial components are characterized by a particularly high carrier mobility (>15,000-20,000 $cm^2/v \cdot sec$). In the range 0-50% InAs the alloys have chalcopyrite structure and above 50% InAs sphalerite structure; below 75% InAs they are n-type, above this they are p-type. The thermo-emf and the thermomagnetic Nernst-Ettingshausen effects were measured by a method described in PTE, No. 1, 98, 1960, applying weak magnetic fields ($uH/c \ll 1$). In $CdSnAs_2$, InAs, the Nernst-Ettingshausen effects ($Q_\perp$, $Q_\parallel$), thermo-emf (α), mobility (u) and Hall effect (R) were measured in the

range 100-600°K. For $CdSnAs_2$ and InAs the temperature dependencon of the effects were similar: At low temperatures $Q^{\parallel}$ and $Q^{\perp}$ were negative, changed sign between ~300-400°K and reached maxima at ~600°K. u decreased slowly with increasing temperature and dropped to 6000 $cm^2/v \cdot sec$. R remained almost constant, α was always negative, $|\alpha|$ increased with temperature. The negative sign of Q at low temperature is indicative of carrier scattering from impurity ions; r from the $l \sim v^r$ law is 2. The positive sign at higher temperatures is attributed to carrier scattering from acoustic phonons (r = 0.0 - 0.3). Here l is the mean free path and v the velocity of the carriers (electrons). Corresponding measurements of $2CdSnAs_2 \cdot (2InAs)$ and $CdSnAs_2 \cdot (2InAs)$, having electron concentrations of $1.7 \cdot 10^{18} cm^{-3}$ and $4 \cdot 10^{18} cm^{-3}$ at room temperature, were made in the range 100-700°K. For both alloys $Q^{\parallel}$ and $Q^{\perp}$ were positive in the whole range with maxima at high temperatures. u and R of the first alloy remained almost constant, u of the second one had a distinct maximum at $T \gtrsim 600°K$ (~2000 $cm^2/v \cdot sec$) where R dropped. For both r = 0.3 - 0.9 in the whole

temperature range. The effective carrier mass was always small and almost independent of composition; its most probable value was $\sim 0.045\ m_0$.

There are 4 figures and 1 table.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR, Leningrad (Physicotechnical Institute imeni A. F. Ioffe AS USSR, Leningrad)

SUBMITTED: July 23, 1962

GALAVANOV, V.V.; YEMEL'YANENKO, O.V.; KESAMANLY, F.P.

Electron effective mass in InSb with degenerate electron gas.
Fiz. tver. tela 5 no.2:616-618 F '63. (MIRA 16:5)

1. Fiziko-tekhnicheskiy institut imeni A.F.Ioffe AN SSSR, Leningrad i Institut fiziki AN AzSSR, Baku.
(Indium antimonide) (Electrons)

BURDUKOV, Yu.M.; YEMEL'YANENKO, O.V.; ZOTOVA, N.V.; KESAMANLY, F.P.; KLOTYN'SH, E.E.; LAGUNOVA, T.S.; NASLEDOV, D.N.; SIDOROV, V.G.; TALALAKIN, G.N.; SHCHERBATOV, V.Ye. [deceased]

Transfer effects in $A^{III}B^{V}$ type compounds. Izv. AN SSSR. Ser. fiz. 28 no.6:951-958 Je '64. (MIRA 17:7)

1. Fiziko-tekhnicheskiy institut imeni A.F. Ioffe AN SSSR.

L 4073-66 EWT(1)/T LJP(c) GG

ACC NR: AP5025778 SOURCE CODE: UR/0363/65/001/009/1459/1461

AUTHOR: Burdukov, Yu. M.; Voronina, T. I.; Yemel'yanenko, O. V.; Lagunova, T. S.

ORG: Physicotechnical Institute im. A. F. Ioffe, Academy of Sciences, SSSR (Fiziko-tekhnicheskiy institut, Akademii nauk SSSR)

TITLE: Distribution of impurities in gallium arsenide single crystals grown by the Czochralski method

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 9, 1965, 1459-1461

TOPIC TAGS: gallium arsenide, tellurium, doped gallium arsenide, impurity conductivity

ABSTRACT: A study has been made of the distribution of Te dopant and contaminancs in semiconductor Te-doped GaAs single crystals grown by the Czochralski method. The experiments consisted of determining electrical conductivity and the Hall constant in specimens cut out from ingots perpendicularly to their longitudinal axis. From these data the carrier concentration and mobility and their distribution along and across the ingots were calculated. It was shown that the distribution of Te in ingots, as determined from electron concentration and electrical conductivity, is not uniform. It increases from the top to the bottom of the ingot by a factor of 3 to 5, and from the periphery of the ingot to its center by 20 to 40%. The concentration of contami-

Card 1/2 UDC: 546.681'191:548.55

L 4073-66

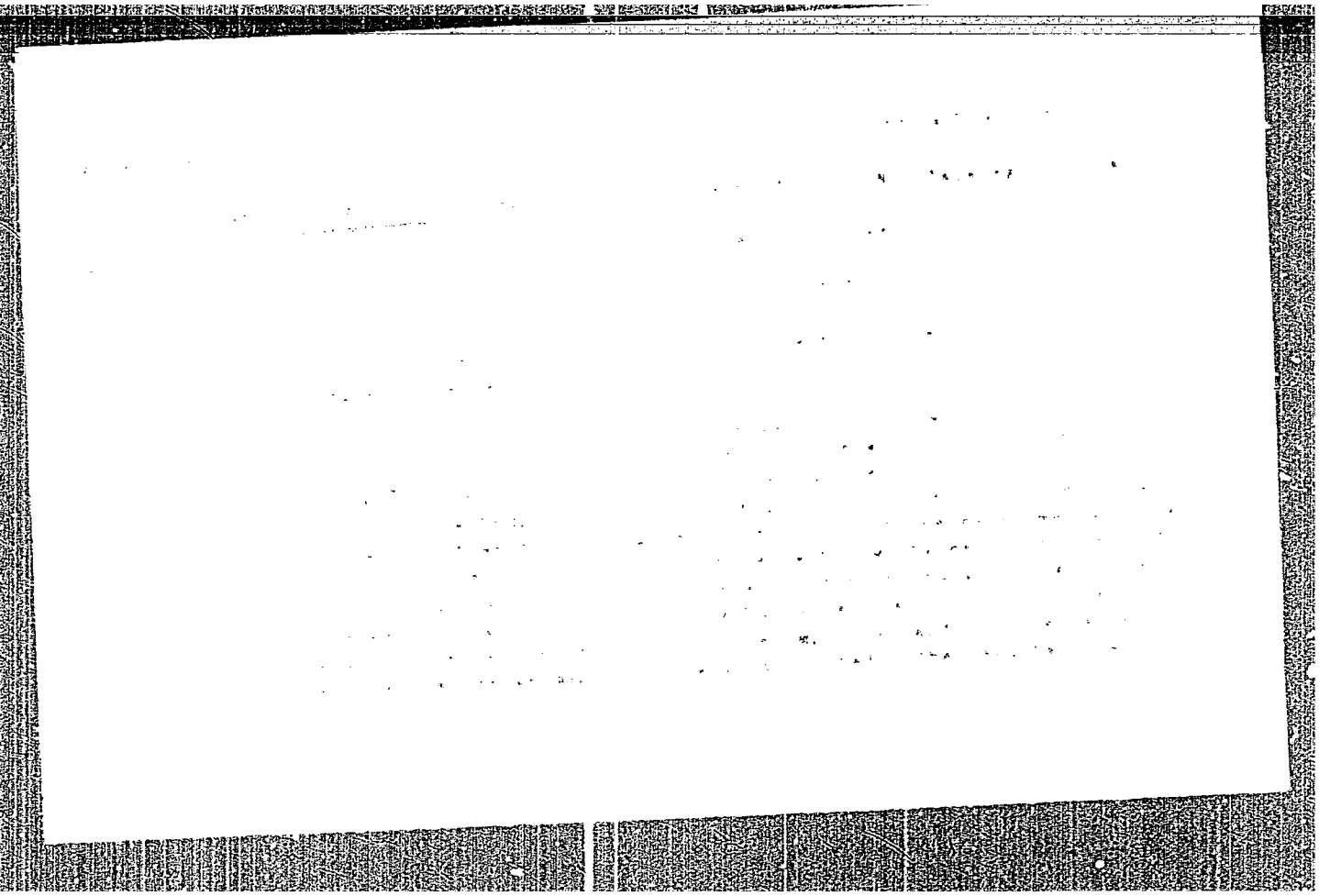
ACC NR: AP5025778 O

nants, as determined from carrier mobility, increases toward the bottom of the ingots faster than that of Te. The nature and penetration course of contaminants in the melt remained unclear. One of the most probable contaminants is Si, which forms acceptor-donor pairs and is a quartz decomposition product. It is concluded that every doped GaAs ingot intended for industrial application should be subjected to individual homogeneity control. Orig. art. has: 3 figures. [BO]

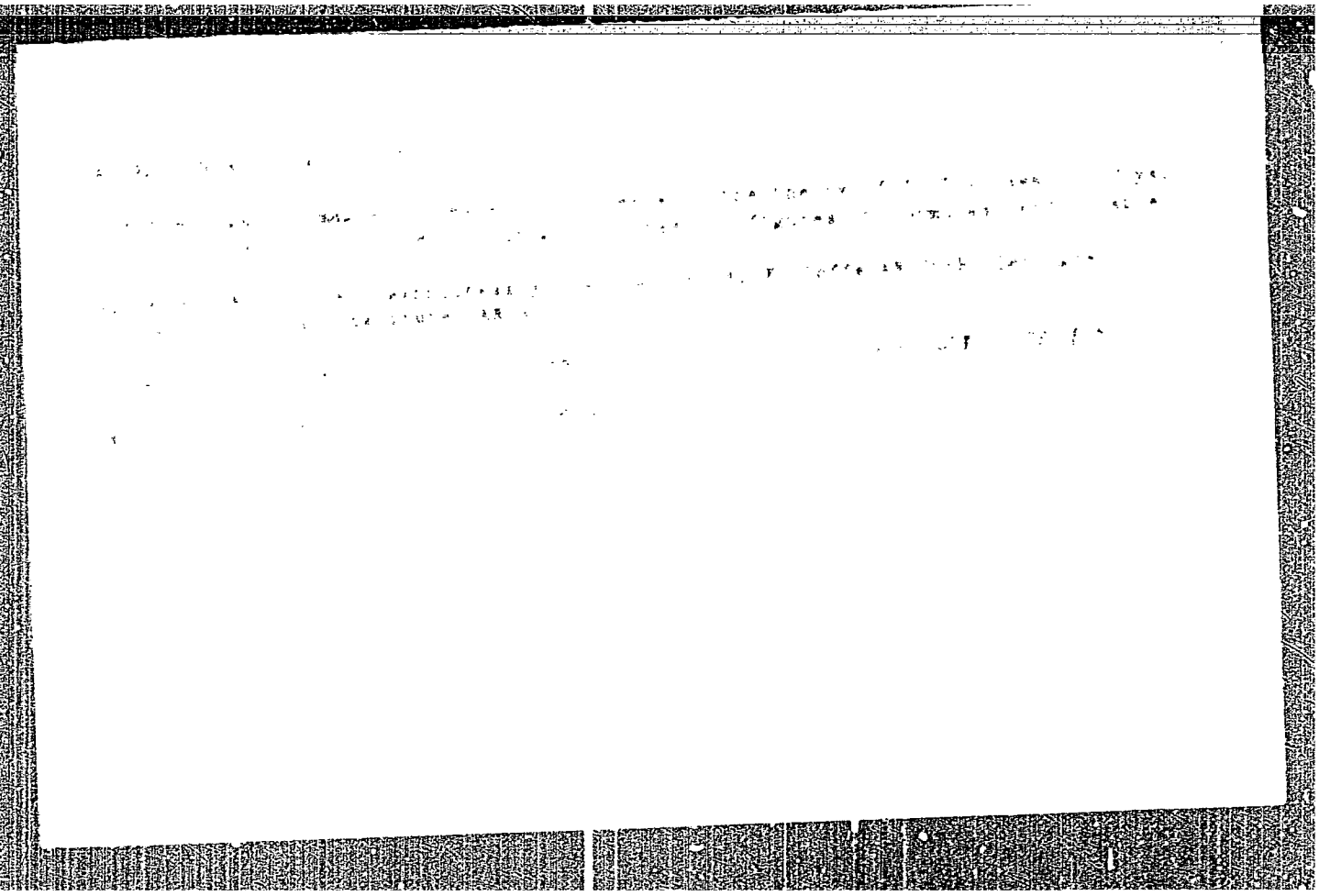
SUB CODE: SS, EM/ SUBM DATE: 15May65/ ORIG REF: 001/ OTH REF: 004/ ATD PRESS: 4127

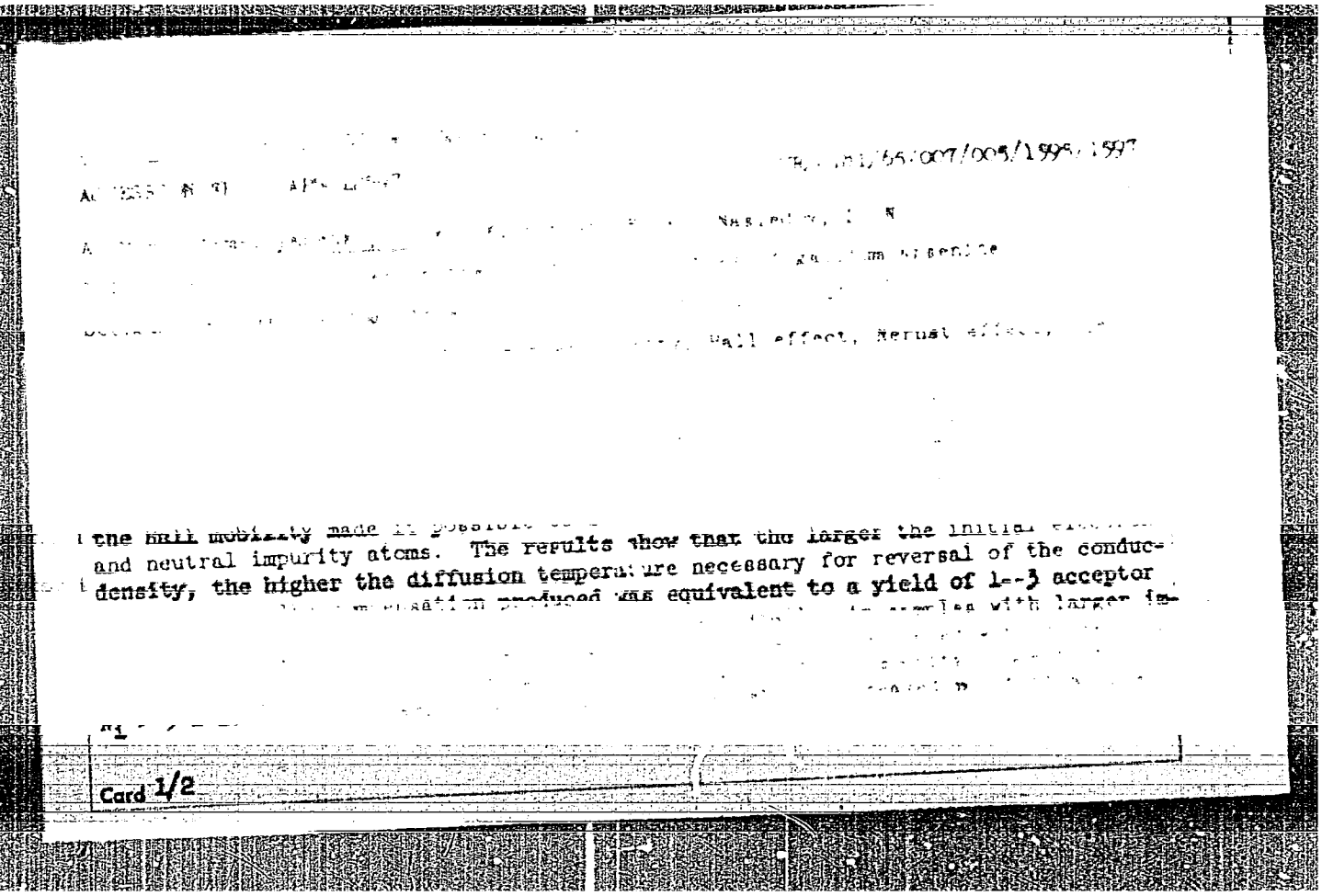
BVK

Card 2/2



APPROVED FOR RELEASE: 03/15/2001 CIA-RDP86-00513R001962620012-2"





[illegible] Hall effect, Nernst effect [illegible]

[illegible] the Hall mobility made it possible [illegible] and neutral impurity atoms. The results show that the larger the initial [illegible] density, the higher the diffusion temperature necessary for reversal of the conduc- [illegible] ...mutation produced was equivalent to a yield of 1--3 acceptor [illegible] ...samples with larger im-

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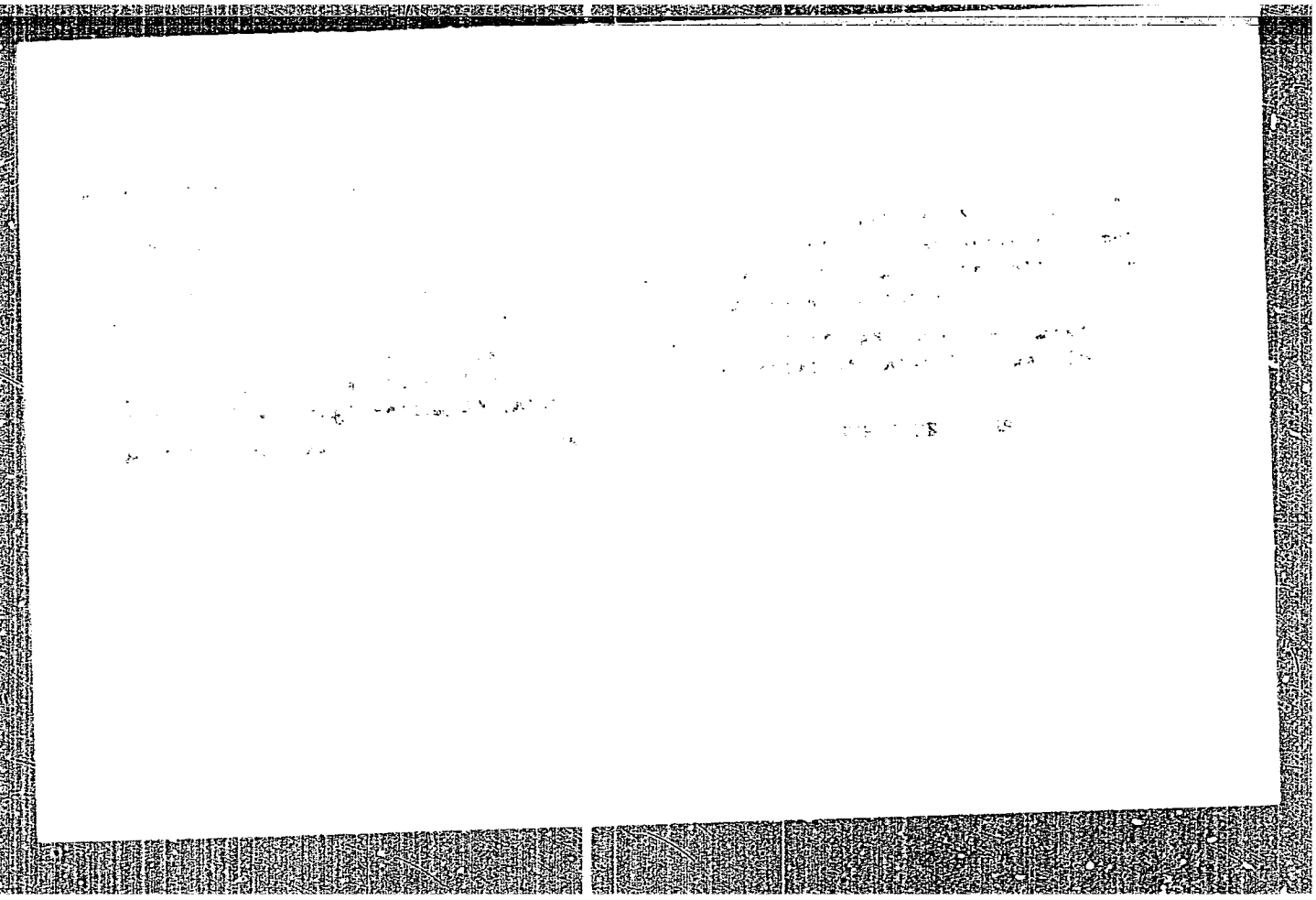
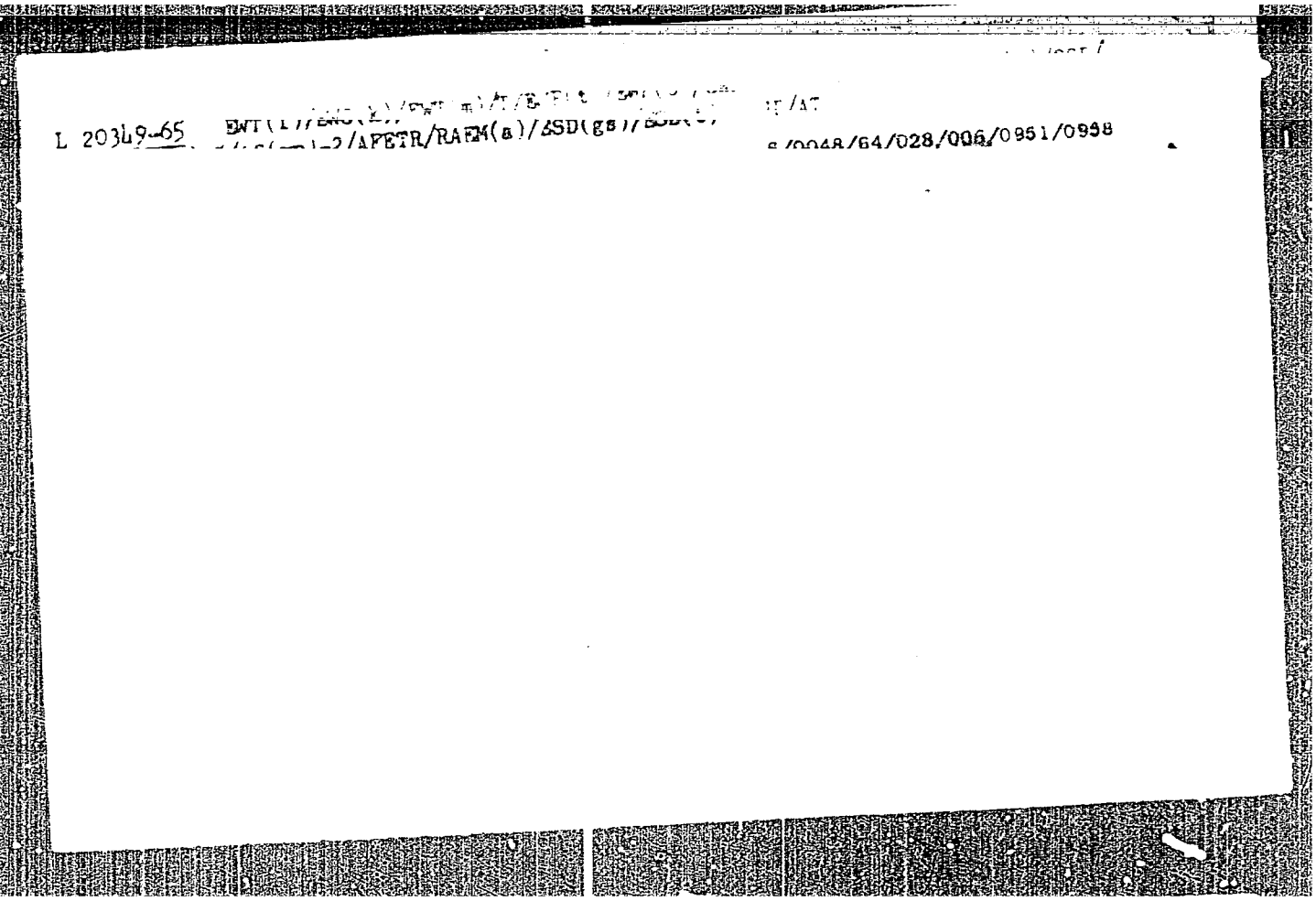
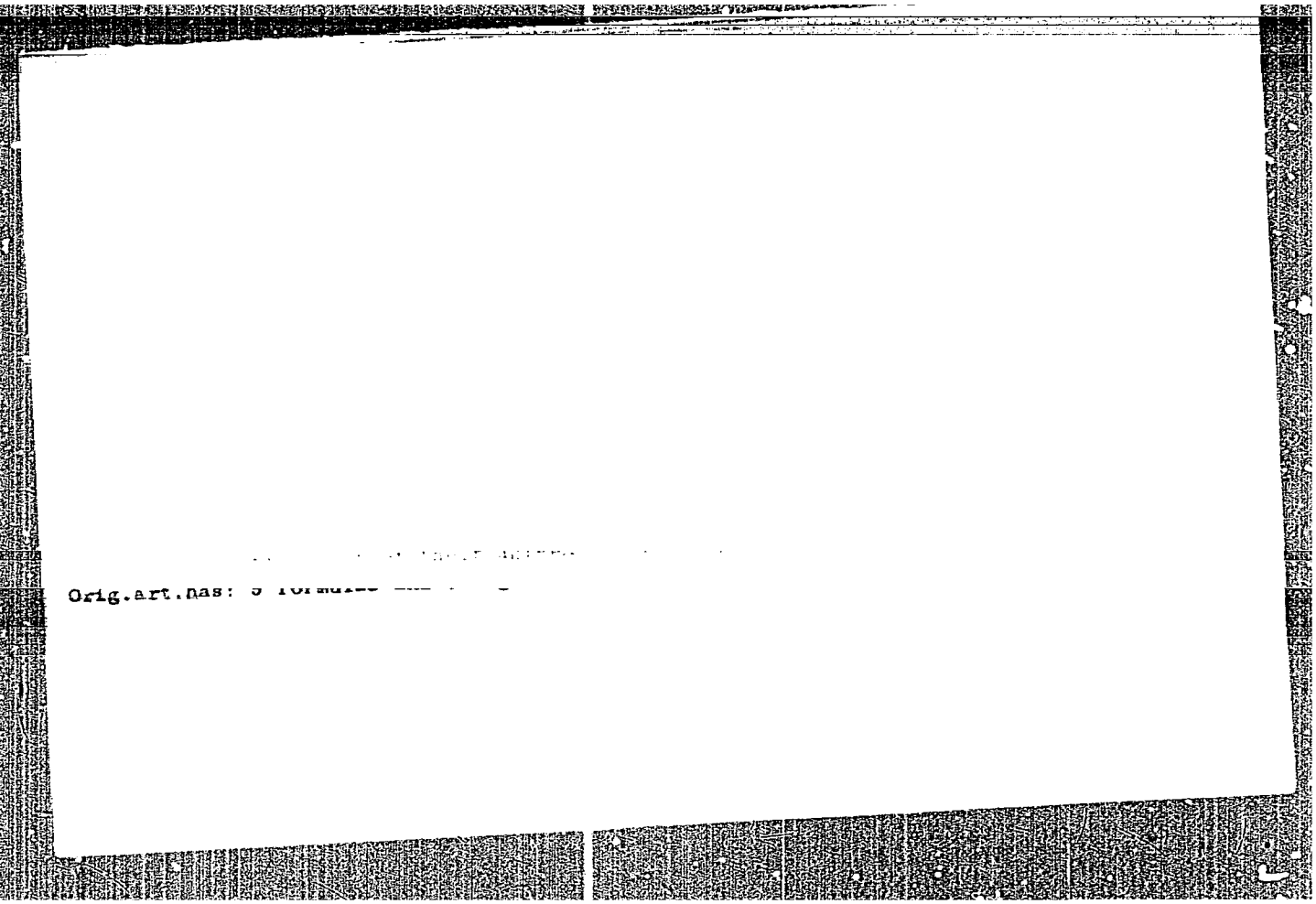


YEMEL'YANENKO, O.V.; KLOTYN'SH, E.E. [Klotins, E.]; NASLEDOV, D.N.

Effect of copper on the electric properties of gallium arsenide. Fiz. tver. tela 7 no.5:1595-1597 My '65. (MIRA 18:5)

1. Fiziko-tekhnicheskiy institut imeni Ioffe AN SSSR, Leningrad i Institut energetiki AN Latviyskoy SSR, Riga.





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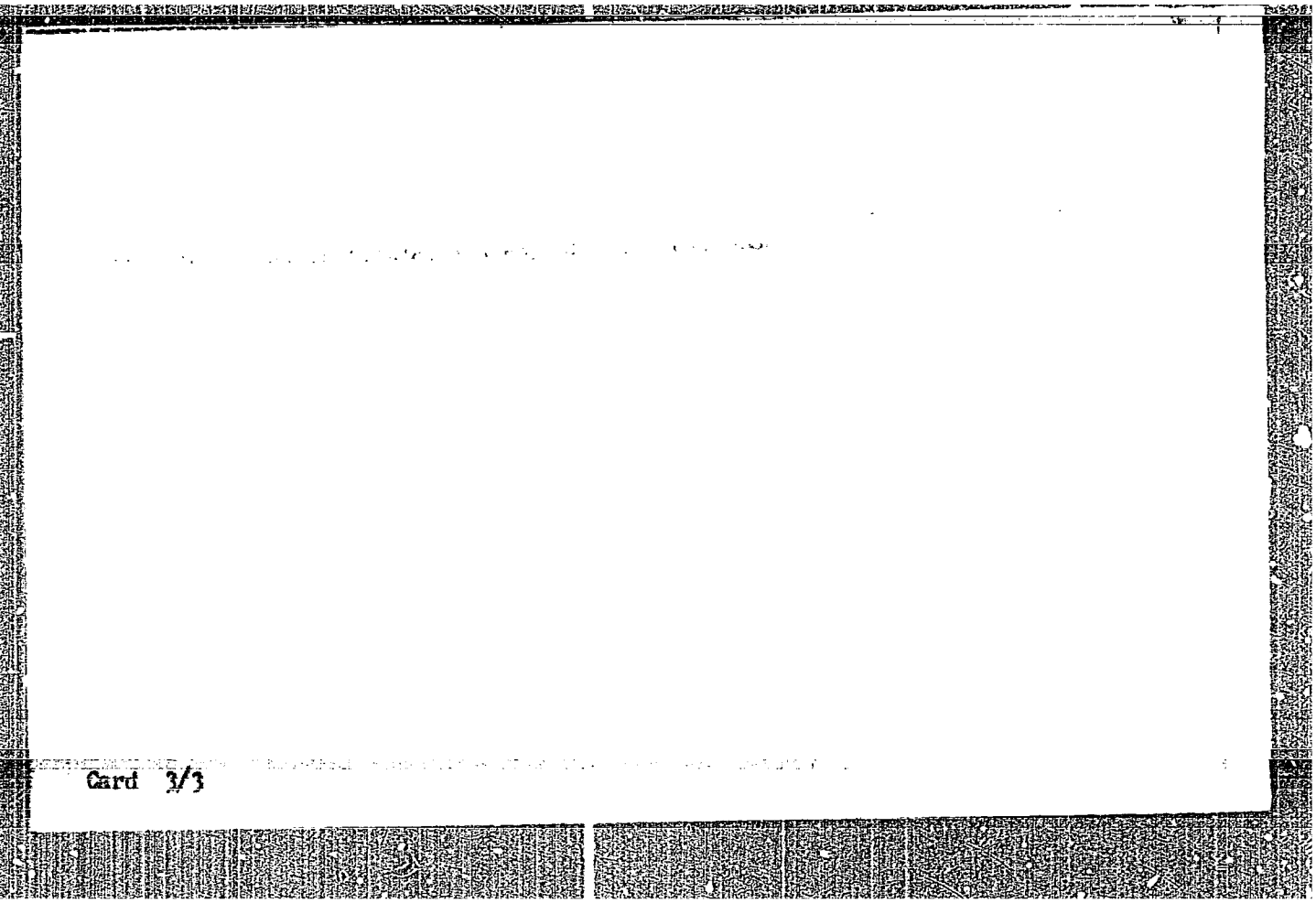

YEMEL'YANENKO, P.A., starshiy nauchnyy sotrudnik

Treating the skin of animals infected with anthrax. Veterinariia 41 no.9:98-100 S '64. (MIRA 18:4)

YEMEL'YANENKO, P.A.

Arrangement for group ultrafiltration. Lab.delo 7 no.11:56-57 N '61. (MIRA 14:10)

(ULTRAFILTRATION--EQUIPMENT AND SUPPLIES)

Yemel'yanenko, P.F.

SUBJECT: USSR/Geology

5-2-19/35

AUTHOR: Yemel'yanenko, P.F.

TITLE: Karamendinskaya and Terektinskaya Intrusions of Granitoids in Kazakhstan (Karamendinskaya i Terektinskaya intruzii granitoidov v Kazakhstane)

PERIODICAL: Byulleten' Moskovskoge Obshchestva Ispytateley Prirody, Otdel Geologicheskiy, 1957, # 2, pp 152-153 (USSR)

ABSTRACT: The Karamendinskaya and Terektinskaya granitoid intrusions are located in the medium flow of the Sary-su River. The area of the Karamendinskaya massif is about 700 km^2 and that of the Terektinskaya is about 540 km^2.
In the tectonic respect the both massifs belong to horstanticlines bearing the same names as intrusions.

Their age was estimated by Velin as not later than Middle-Devonian.
Both of the intrusions are similar in petrographic composition, regularities of formation and phenomena of tourmalinization.

No references are cited.

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5-2-19/35

TITLE: Karamendinskaya and Terektinskaya Intrusions of Granitoids in Kazakhstan (Karamendinskaya i Terektinskaya intruzii granitoidov v Kazakhstane)

ASSOCIATION: Moskva Society of Investigaters of Nature

PRESENTED BY:

SUBMITTED: On 6 December 1956

AVAILABLE: At the Library of Congress.

Card 2/2

YEMEL'YANENKO, P.F.

Spectral absorption curves of biotite from granitoids of the middle Ishim Valley in northern Kazakhstan. Vest. Mosk. un. Ser. biol., pochv., geol., geog. 12 no.4:189-193 '57. (MIRA 11:5)

1. Kafedra petrografii Moskovskogo gosudarstvennogo universiteta.
(Ishim Valley--Biotite--Spectra)

SOBOLEV, R.N.; YEMEL'YANENKO, P.F.

Age of granitoid intrusions in the Sary-su--Tengiz upland.
Sov. geol. no.62:154-157 '57. (MIRA 11:6)

1.Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Kazakhstan--Rocks, Igneous)

YEMEL'YANENKO, P.F.

Mesozoic basalts and dolerites in the Ishim Valley (northern Kazakhstan). Biul.MOIP.Otd.geol. 34 no.4:156 Jl-Ag '59. (MIRA 13:8)

(Ishim Valley--Basalt)
(Ishim Valley--Dolerites)

YEMEL'YANENKO, P.F.

Vein rocks of certain graintoid intrusions in northern and central Kazakhstan. Biul. MOIP. Otd. geol. 34 no.6:134 N-D '59. (MIRA 14:3)

(Kazakhstan—Rocks, Igneous)

YEMEL'YANENKO, P.F. (Severnyy Kazakhstan)

Geology of the Dal'nenskiy granite massif (northern Kazakhstan). Vest.Mosk.un.Ser.4: Geol. 15 no.1:15-25 '60. (MIRA 14:4)

1. Kafedra petrografii Moskovskogo universiteta.
(Dal'nenskiy massif (Northern Kazakhstan)--Geology, Structural)

YEMEL'YANENKO, P.F.

Petrography of granitoids in the Sary-Su—Tengiz watershed of central Kazakhstan. Biul.MOIP.Otd.geol. 35 no.2:152-153 Mr-Ap '60. (MIRA 14:4)

(Kazakhstan—Granite)

YEMEL'YANENKO, P.F.

Potash feldspars in the Devonian granitoids of the Sary-su-Tengiz watershed (central Kazakhstan). Vest.Mosk.un.Ser. 4: Geol. 16 no.3; 44-50 My-Je '61. (MIRA 14:6)

1. Kafedra petrografii Moskovskogo universiteta.
(Kazakhstan—Feldspar)

YEMEL'YANENKO, Vladislav Georgiyevich, inzh.

Contribution to the theory of a frequency transducer based on silicon stabilizers. Izv. vys. ucheb. zav.; elektromekh. 7 no.2:253-258 '64. (MIRA 17:4)

KOPTEV-DVORNIKOV, V.S.; YEMEL'YANENKO, P.F.; PETROVA, M.A.

Magmatic activity in the Sary-Su--Tengiz water parting (central Kazakhstan). Biul.MOIP.Otd.geol. 36 no.6:101-102 N-D '61. (MIRA 15:7)

(Kazakhstan--Geology, Structural)

YEMEL'YANENKO, P.F.; NESMEYANOV, S.A.

Cenotypal igneous fomations in the middle Ishim Valley.
Sov.geol. 5 no.6:121-126 Je '62. (MIRA 15:11)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Ishim Valley--Rocks, Igneous)

KOPTEV-DVORNIKOV, V.S.; YEMEL'YANENKO, P.F.; PETROVA, M.A.

Effusive and intrusive complexes in the western part of the Sary-Su—Tengiz watershed. Sov. geol. 6 no.7:24-51 Jl '63. (MIRA 16:8)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

YEMEL'YANENKO, P.F.; KARZANOVA, A.Ya.; KUZNETSOV, Ye.A.

Biotites and amphiboles of the Akkuduk intrusive (Kazakhstan). Vest. Mosk. un. Ser. 4: Geol. 19 no.3:46-54 My-Je '64. (MIRA 17:12)

1. Kafedra petrografii Moskovskogo universiteta.

GORBACHEVA, T.B.; YEMEL'YANENKO, P.F.

Potash feldspar in the Inagli intrusive (Aldan Plateau). Vest.Mosk.un. Ser.4: Geol. 19 no.5:47-54 S-O '64. (MIRA 17:12)

1. Kafedra dinamicheskoy geologii Moskovskogo universiteta.

137-58-4-6528

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 4, p 29 (USSR)

AUTHORS: Yemel'yanenko, P.M., Makovskiy, V.A.

TITLE: Measuring the Temperature of the Roof of an Open-hearth Furnace (Izmereniye temperatury svoda martenovskoy pechi)

PERIODICAL: Tr. Donetsk. otd. Nauchno-tekhn. o-va chernoy metallurgii, 1957, Nr 5, pp 55-68

ABSTRACT: Established formulas are used to calculate the errors in measuring the temperature of the roof of an open-hearth furnace (OF) by means of optical and radiation pyrometers (RP). A system of measurement of roof temperature by RP employing sighting through a hole in the front wall of the OF is recommended. In addition, a protective tuyere to assure normal functioning of the RP, an efficiently-designed sighting aperture, and a measuring circuit employing two RP and a single electronic potentiometer with automatic switching of either RP to the potentiometer in accordance with the direction of the flame, and the employment of a time relay connected with the throw-over circuit, are provided.

M. L.

Card 1/1

1. Furnace--Temperature--Measurement 2. Pyrometers--Applications

YEMEL'YANENKO, P. T. DECEASED 1967

Metallurgy

see ILC

YEMEL'YANENKO, V.

Once deficient, now in the number of the progressive. Sov.sviaz. 2 no.12:11 D '52. (MLRA 7:8)

1. Chlen Prezidiuma Severo-Osetinskogo obkoma profsoyuza rabotnikov svyazi.
(Telecommunication)

YEMEL'YANENKO, V., insh.

Repairing differential carriers. Avt. transp. 37 no.12:21 D '59. (MIRA 13:3)
(Motortrucks--Transmission devices)

1(0); 19(0) PHASE I BOOK EXPLOITATION SOV/3269

Glukhov, M.K., M.M. Danilevskiy, P.G. Yermakov, V.B. Yemel'yanenko, V.M. Lozovoy-Shevchenko, P.F. Plyachenko, V.I. Sekachev, and A.A. Shukayev.

Voyenno-vozdushnyye sily (Air Force) Moscow, Voyen. izd-vo M-va obor. SSSR, 1959. 202 p. (Series: Biblioteka ofitsera) No. of copies printed not given.

General Ed.: M.K. Glukhov, Docent, General-Major of the Air Force; Eds.: A.S. Mirnyy, Colonel, and N.P. Gordeyev, Colonel, (ret.); Tech. Ed.: M.A. Strel'nikova.

PURPOSE: The book is intended for military personnel. It will be of interest to all those interested in the role of air power in modern warfare.

COVERAGE: The book surveys the history of the Soviet Air Force and discusses its organizational set-up, types of aircraft, combat characteristics, tasks, and armament. The role of aviation in modern military strategy is analyzed and the cooperation necessary between air, ground, and naval forces defined. Future prospects of development of Soviet aviation are outlined. Some attention is paid to the development and possible use of nuclear weapons by the Air Force and in anti-aircraft defense. Photos and specifications of the

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following Soviet aircraft are given: AN-10 turboprop transport aircraft, Tu-110 transport jet, Mi-6 turboprop helicopter, Yak-24 two-engined helicopter, Mi-4 helicopter, Tu-104 turbojet transport aircraft, Il-14 transport aircraft, ANT-35 (Ps-35) transport aircraft, MiG-15bis fighter, Tu-14 bomber, Be-6 bomber, Il-28 bomber, Pe-2 bomber, DB-3F (Il-4) bomber, Il-10 fighter, La-5 fighter, and the Yak-3 fighter. There are 40 Soviet references.

TABLE OF CONTENTS:

Air Force

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SOV/3269

AVAILABLE: Library of Congress

AC/jb
2-29-60

Card 5/5

YEMEL'YANENKO, Vasiliy Borisovich, polkovnik, Geroy Sovetskogo Soyuza

My comrades-in-arms fought here. Av.i kosm. 45 no.2:66-72 F '63. (MIRA 16:2)

(World War, 1939-1945—Aerial operations)

S/144/62/000/005/003/005
D289/D308

AUTHOR: Yemel'yanenko, V.G., Engineer

TITLE: Theory of frequency sensitive pick-up constructed from ferromagnetic material with rectangular hysteresis loop

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Elektromekhanika, no. 5, 1962, 512 - 520

TEXT: The device consists of peaking transformer feeding a bridge connected rectifier. The basic principle is the fact that the mean rectified emf output from an iron-cored coil carrying current is $4Wf\Phi_{max}$, where W - number of turns; f - frequency; Φ_{max} - max. flux. The output does not depend on the form of the flux but only on the maximum value. The basic element of the apparatus is the peaking transformer having toroidal core of material with rectangular hysteresis loop. The primary winding of the transformer is heavily saturated at normal input voltages so that the current is practically constant with respect to the applied voltage and depends on frequen-

Card 1/2

cy only. Operation without load is corrected by compensating the reactive component of the current with reactance for narrow frequency band operation and with resistance, for wide frequency band operation. B/H curve is approximated by $B = 2B_{h/\sqrt{}}$. $\tan^{-1} H/H_o$ where B_h - saturation density; H_o - field at half of the saturation density. The author proves that the output of the device is proportional to frequency and evaluates the degree of variation of output with the change of magnetizing current. The operation of the apparatus on load is analyzed and equations for flux and secondary rectified current are deduced. Temperature compensation of the rectified output is obtained with resistors. Proportionality of output to frequency and independence from applied voltage in the range of 400-2000 volts is shown in a graph for the range of 20-60 c/s.

SUBMITTED: December 18, 1961

S/144/63/000/002/002/004
A055/A126

AUTHOR: Yemel'yanenko, V.G. (Vladislav Georgiyevich)

TITLE: Frequency pickups and pointer-type frequency meters designed on the basis of materials with a rectangular magnetic loop

PERIODICAL: Elektromekhanika, no. 2, 1963, 237 - 245

TEXT: In an earlier article (Elektromekhanika, no. 5, 1962), the author described a frequency pickup whose design is based on the use of materials with a rectangular magnetic loop and of the specific properties of the peak transformer working in the heavy-saturation condition. The precision of this pickup is impaired by the fluctuations in the voltage applied to its input, these fluctuations affecting the mean value of the rectified emf and current. In the present article, the author describes a method permitting the elimination of this defect by inserting a choke in the circuit of the secondary transformer winding. Starting from the equation

$$w_2 \frac{d\Phi}{dt} - w_{ch} \frac{d\Phi_{ch}}{dt} = i_2 (r_2 + r_{ch} + r_3 + r'_{load}), \quad (1)$$

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Frequency pickups and pointer-type frequency ....

where Φ and Φ_{ch} are respectively the instantaneous values of the flux in the transformer core and the choke, r_2 and r_{ch} are respectively the resistances of the secondary winding and the choke, r'_{load} is the equivalent resistance of the rectifier bridge and the pickup load circuit (w being the number of turns), he explains analytically (under some simplifying assumptions) the regulating effect of the choke. Integrating (1) and replacing Φ and Φ_{ch} by well-known expressions, he obtains:

$$I_{mean\ rect.} = \frac{4f}{(r_2 + r_{ch} + r_3 + r'_{load})} (\Psi_{2\ max} - \Psi_{ch\ max}), \qquad (3)$$

where $\Psi_{2\ max} = w_2 \Phi_{max}$ and $\Psi_{ch\ max} = w_{ch} \Phi_{ch\ max}$ are respectively the amplitudes of the secondary winding and choke flux linkage. Assuming that $\Psi_{ch\ max} \simeq \Psi_{2\ max}$ ($\Psi_{2\ max}$ being the equivalent value of the amplitude of the secondary winding flux linkage, account taken of the choke winding), the final formula is:

$$I_{mean\ rect.} = \frac{8\Phi_{sat}}{\pi} w_2 f \left[\operatorname{arctg} \frac{\sqrt{2}\, I_1}{H_0\, l_{av}} w_1 - \operatorname{arctg} \frac{\sqrt{2}\, I_1}{H_0\, l_{av}} w_1\, 8.35 \cdot 10^{-5} w_{ch}\right], \qquad (5)$$

Frequency pickups and pointer-type frequency ....

where Φ_{sat} is the saturation flux, l_{av} is the average magnetic line length, H_0 is the base field strength. This formula explains the regulating effect of the choke. Three curves show $I_{mean\ rect.} = f(U_1)$ for w_{ch} equal respectively to 0, 100 and 150. An appropriate choice of w_{ch} permits a practically complete elimination of the effect of the input voltage fluctuations. This essential part of the article is followed by a brief examination of the pickup errors due to the ambient temperature fluctuations and of some possibilities of temperature autocompensation. Two pointer-type frequency meters using the described pickup are suggested and their circuit diagrams are reproduced. There are 8 figures.

SUBMITTED: April 21, 1962

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ACCESSION NR: AP4025744 S/0144/64/000/002/0253/0258

AUTHOR: Yemel'yanenko, Vladislav Georgiyevich (Engineer)

TITLE: Theory of silicon-stabilivolt-type frequency sensor

SOURCE: IVUZ. Elektromekhanika, no. 2, 1964, 253-258

TOPIC TAGS: stabilivolt, voltage stabilization, sensor, frequency sensor, silicon stabilivolt, D-808 stabilivolt

ABSTRACT: An Italian circuit of semiconductor-diode frequency meter (Gasparini, F., Merigliano, L. Frequenziometro a diodo Zener. L'Energia Elettrica, 1959, no. 11) was used for developing a new frequency sensor with D-808, D-813 Soviet-made silicon stabilivolts. Laboratory hookups with both wideband (20-55 cps) and narrow-band (45-55 cps) frequency characteristics were tested. The characteristics are claimed to be independent of the applied voltage. Fundamental formulas are discussed. Orig. art. has: 6 figures and 16 formulas.

ASSOCIATION: none

SUBMITTED: 26Jul62 DATE ACQ: 16Apr64 ENCL: 00

SUB CODE: EC NO REF SOV: 002 OTHER: 002

Card 1/1

YEMEL'YANENKO, V.Ya., inzh.

Swinging boom which can be attached to a standard self-propelled power shovel. Stroi. i dor. mash. 7 no.12:18-19 D '62. (MIRA 16:1)

(Hoisting machinery)

YEMEL'YANENKO, Ye., inzh.

Repairing the countershaft of the ZIL-164 gearbox. Avt.transp. 40 no.5:33-34 My '62. (MIRA 15:5)
(Motor vehicles--Transmission devices)

YEMEL'YANENKO, Ye. I.

Cand Med Sci - (diss) "Study of several immunological indices in rheumatism as partial manifestation of collagenosis." Khar'kov, 1961. 16 pp; (Ministry of Public Health Ukrainian SSR, Khar'kov State Med Inst); 200 copies; price not given; (KL, 7-61 sup, 258)

KHAN, B.Kh.; TARANOV, Ye.D.; YEMEL'YANENKO, Yu.G.

Improving the technology of converter steel deoxidation. Lit. proizv. no.11:44-45 N '61. (MIRA 14:10)
(Steel—Metallurgy)

PROKHORENKO, K.K., kand.tekhn.nauk; YEMEL'YANENKO, Yu.G.; NAKONECHNYY, N.F.; VVEDENSKIY, V.S.

Production of stainless steel with the use of high-carbon ferrochromium. Met.i gornorud. prom. no.6:20-23 N-D '63. (MIRA 18:1)

ZABALUYEV, Yu.I.; SMOLYAKOV, V.F.; VUL'FOVICH, M.S.; KAGANOVSKIY, G.P.; STETSENKO, N.A.; YEMEL'YANENKO, Yu.G.; MEDOVAR, B.I., doktor tekhn. nauk; LATASH, Yu.V., kand. tekhn. nauk

Improving the macrostructure of electric-slag refined steel. Met. i gornorud. prom. no.2:24-26 Mr-Ap '65.

(MIRA 18:5)

L 15577-63 EWP(q)/EWT(m)/BDS AFFTC/ASD JD/JG

ACCESSION NR: AT3002167

AUTHORS: Prokhorenko, K. K.; Svistunov, A. M. (deceased); Vvedenskiy, V. S.; Verkhovtsev, E. V.; Yemel'yanenko, Yu. O.; Nakonechnyy, N. F.; Pastukhov, V. N.

TITLE: Technological improvements in melting and pouring of stainless steel

SOURCE: AN Ukr RSR. Viddil tekhnichnykh nauk. Voprosy* proizvodstva stali, no. 9, 1963, 51-64

TOPIC TAGS: stainless steel, technological improvement, melting, pouring

ABSTRACT: The old methods of melting and pouring steel are criticized. New procedures used in both processes and the results obtained are described and discussed. The furnace charge used in the improved method of melting consisted of 30-70% scrap steel (stainless carbon steel low in P and carbon ferrochrome). The total content of C, Cr, and Si in the charge was 0.3-0.5%, 17-19%, and 0.4% respectively. Oxygen was blown in under a pressure of 15 atm., after which the metal temperature was raised to 1850-1880C. As a result, the carbon content was lowered to 0.05% and that of Cr to 12.9%. The slag formed was fluid, homogeneous, and contained 48.6% Cr_2O_3. The amount of silicochrome, which was introduced at the end of blowing, was calculated in such a way that the metal contained 3% Si and

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L 15577-63

ACCESSION NR: AT3002167

0

1.5% of lime by weight of metal. After 10 minutes 15% (wt) of blooms were introduced for the cooling purposes. The new method provides for the melting of stainless steel containing a minimum of 0.06% carbon by using carbon ferrochrome or a 100% high-chromium scrap (without the use of carbon-free ferrochrome). The improved method of pouring is based on the formation of a slag layer on the open surface of the ingot, preventing metal oxidation in the ingot. Moreover, the liquid slag solidifies on the ingot walls, thus serving as a lubricant that protects the walls. It also dissolves floating nonmetallic inclusions and prevents formation of a coarse crust on the ingot surface by moderating the surface cooling of the metal. Orig. art. has: 4 tables and 4 figures.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 10May63 ENCL: 00

SUB CODE: ML NO REF SOV: 004 OTHER: 001

Card 2/2

L 18061-63 EWP(q)/EWT(m)/BDS AFFTC/ASD Pad JD/HW/JG
ACCESSION NR: AT3002169 S/2921/63/000/009/0073/0078

AUTHORS: Yemel'yanenko, Yu. G.; Prokhorenko, K. K.; Tyutina, A. Yo. 60

TITLE: Electrolytic extraction of nonmetallic inclusions from stainless steel 14 16

SOURCE: AN Ukr RSR. Viddil tekhnichnykh nauk. Voprosy proizvodstva stali, no. 9, 1963, 73-78

TOPIC TAGS: stainless steel, nonmetallic inclusion , electrolytic extraction

ABSTRACT: A new method for separating carbide inclusions from steel is discussed in detail. The method is based on the principle of a simultaneous solution of metal and carbide, which can be achieved by a proper choice of the electrolyte composition. A scheme for the device used in the experiment is presented, and the working procedure is explained. This method is characterized by the full preservation of the oxide fraction and by the solution of carbides contained in steel. The carbide solution occurs because of the polarization of metallic surface and an increase in the anode passivation (which does not affect the carbides). The author concludes that the new method provides a rapid and accurate determination of oxide inclusions in stainless steel. Orig. art. has: 1 table and 3 figures.

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L 18061-63
ACCESSION NR: AT3002169

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 10May63 ENCL: 00

SUB CODE: ML NO REF SOV: 001 OTHER: 000

Card 2/2

3

L 63975-65 EWT(m)/EWP(z)/EWP(b)/EWA(d)/EWP(t) MJW/JD

ACCESSION NR: AP5014242 UR/0383/65/000/002/0024/0026 48
669.187.6 47

AUTHOR: Zabaluyev, Yu. I.; Smolyakov, V. F.; Vul'fovich, M. S.; Kaganovskiy, G. P.; Stetsenko, N. A.; Yemel'yanenko, Yu. G.; Medovar, B. I. (Doctor of technical sciences); Latash, Yu. V. (Candidate of technical sciences)

TITLE: Improving the macrostructure of electroslag steels

SOURCE: Metallurgicheskaya i gornorudnaya promyshlennost', no. 2, 1965, 24-26

TOPIC TAGS: electroslag melting, steel

ABSTRACT: Crystallization bands (layers)--regions which are more resistant to etching than the base metal--are observed in the macrostructure of ball bearing and structural steels melted by the electroslag method using ANF-6 flux. In the ingot, these layers reproduce the contour of the bottom of the metal bath, and in rolled products they appear as rings. These crystallization layers are caused by sharp changes in the rate at which the crystallization front advances due to disturbance of the thermal balance between the metal and slag baths. The authors studied the effect of substituting AN-291 flux for ANF-6. 12Kh2N4A, 18Kh2N4A, ShKh15, ShKh15SG

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L 63975-65

ACCESSION NR: AP5014242

and 30KhGSNA steels were melted. The working current was reduced by 15-20% and rate of flux consumption was increased by 15-25% over that of ANF-6. The macrostructure of forged and rolled specimens (circular and square, 100-150 mm) was dense and uniform without traces of layered crystallization. Contamination by nonmetallic inclusions is about the same with both fluxes. The elimination of the crystallization layers when AN-291 flux is used is due to the higher electrical resistance of this flux which makes hotter smelting possible, increasing the heat content (enthalpy) and consequently the thermal inertia of the melting zone. This effect acts as a "choke" which smooths out fluctuations in electrical conditions and results in a more uniform ingot. Orig. art. has: 2 figures, 3 tables.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 002 OTHER: 000

IVC

Card 2/2

ISHCHUK, N.Ya., kand. tekhn. nauk; PROKHORENKO, K.K., kand. tekhn. nauk; YEMEL'YANENKO, Yu.G., inzh.

Using exothermic mixtures to obtain slag during steel pouring. Met. i gornorud. prom. no.5:72-75 S-O '63. (MIRA 16:11)

1. Institut ispol'zovaniya gaza AN UkrSSR.

L 35339-66 EWT(m)/EWP(w)/T/EWP(t)/ETI/EWP(k) IJP(c) JD

ACC NR: AP6011826 (N) SOURCE CODE: UR/0383/66/000/002/0035/0039

AUTHOR: Faybisovich, L. I.; Varakin, N. I.; Larichkin, M. S.; Medovar, B. I.; Latash, Yu. V.; Yemel'yanenko, Yu. G.; Maksimov, I. P.; Koval', S. I.; Akulinin, M. A.

ORG: none

TITLE: Quality of heavy forgings of 36KhN1MFAR electroslag rotor steel

SOURCE: Metallurgicheskaya i gornorudnaya promyshlennost', no. 2, 1966, 35-39

TOPIC TAGS: steel forging, steel, nonmetallic inclusion, brittleness, temper brittleness

ABSTRACT: The study deals with the effect of electroslag melting on the quality of vacuum-degassed and nondegassed open-hearth steel. Forgings of 36KhN1MFAR steel, obtained from electroslag ingots weighing 13 tons, have a compact structure and a homogeneous chemical composition. The content of sulfur, gas, and nonmetallic inclusions in them is considerably lower than in similar forgings from metal made the conventional way. The mechanical properties of the remelt metal are characterized by high stable values in the length and cross section of the forging both in longitudinal and diametrical directions. Electroslag melted 36KhN1MFAR steel does not possess a tendency to temper brittleness. Its nul ductility transition temperature is below -70C. Orig. art. has: 5 figures and 4 tables. [NT]

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 003

UDC: 669-13:658.562

Card 1/1

SUSHKO, A.M.; YEMEL'YANENKO, Z.A.

Mercurometric determination of table salt in food products.
Soob.Prim.otd.VKHO no.3:73-77 '57. (MIRA 13:6)

1. Kafedra khimii Dal'nevostochnogo tekhnicheskogo instituta rybnoy promyshlennosti i khozyaystva.
(Salt) (Mercury nitrate) (Food--Analysis)

SUSHKO, A.M.; YEMEL'YANENKO, Z.A.

Tryptic activity of the sperm whale pancreas. Soob.Prim. otd.VKHO no.3:135-144 '57. (MIRA 13:6)

1. Kafedra khimii Dal'nevostochnogo tekhnicheskogo instituta rybnoy promyshlennosti i khozyaystva.
(Trypsin) (Pancreas) (Whales)

LASKINA, Ye.D.; SIMANOVSKAYA, E.A.; BELOV, V.N.; BYCHKOVA, Z.N.; SHILINA, R.F.; YEMEL'YANENKO, Z.T.; MIKHAYLOVA, Z.V.

Intermediate products of the synthesis of odorous substances. Report No.10: Preparation of guaiacol, guäthol, veratrole, and o-diethoxybenzene from pyrocatechin. Trudy VNIISNDV no.5:25-30 '61. (MIRA 14:10)

(Piperonal)

ORLOV, V.; YEMEL'YANOV, A.

Devices for repairing storage batteries. Avt.transp. 35 no.9:16-17 S '57. (MIRA 10:10)

(Automobiles--Batteries)

YEMEL'YANOV, A. (Ufa).

An ultrashortwave radio station. Radio no.1:23-26 Ja '58.
(Amateur radio stations) (MIRA 11:1)