L 10372-65 EWT(m)/EWP(b) IJP(c)/ASD(a)-5/ESD(gs)/SSD/AS(mp)-2/AFWL/ESD(t)/
ACCESSION NR: AP4046620 RAEM(t) JD S/0181/64/006/010/3065/3069

AUTHORS: Golikova, O. A.; Petrov, A. V.

TITLE: Electron mobility in germanium at temperatures 300--1000K

SOURCE: Fizika tverdogo tela, v. 6, no. 10, 1964, 3065-3069

TOPIC TAGS: germanium, electron mobility, antimony, doping, electron scattering, crystal lattice vibration

ABSTRACT: An investigation, at 300--1000°K of the mobility in germanium heavily doped with antimony ($n \simeq 2 \times 10^{19}$ cm^{-3}) showed that the mobility above the Debye temperature (430°K) fell as $T^{-2.5}$, in sharp conflict with the theory of scattering by the acoustical and optical modes of the lattice vibrations. The effective density-of-states mass, determined from the thermoelectric power at high temperatures, was independent of temperature. The strong temperature dependence of the electron mobility was due to the intervalley scat-

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L 10372-65
ACCESSION NR: AP4046620

3

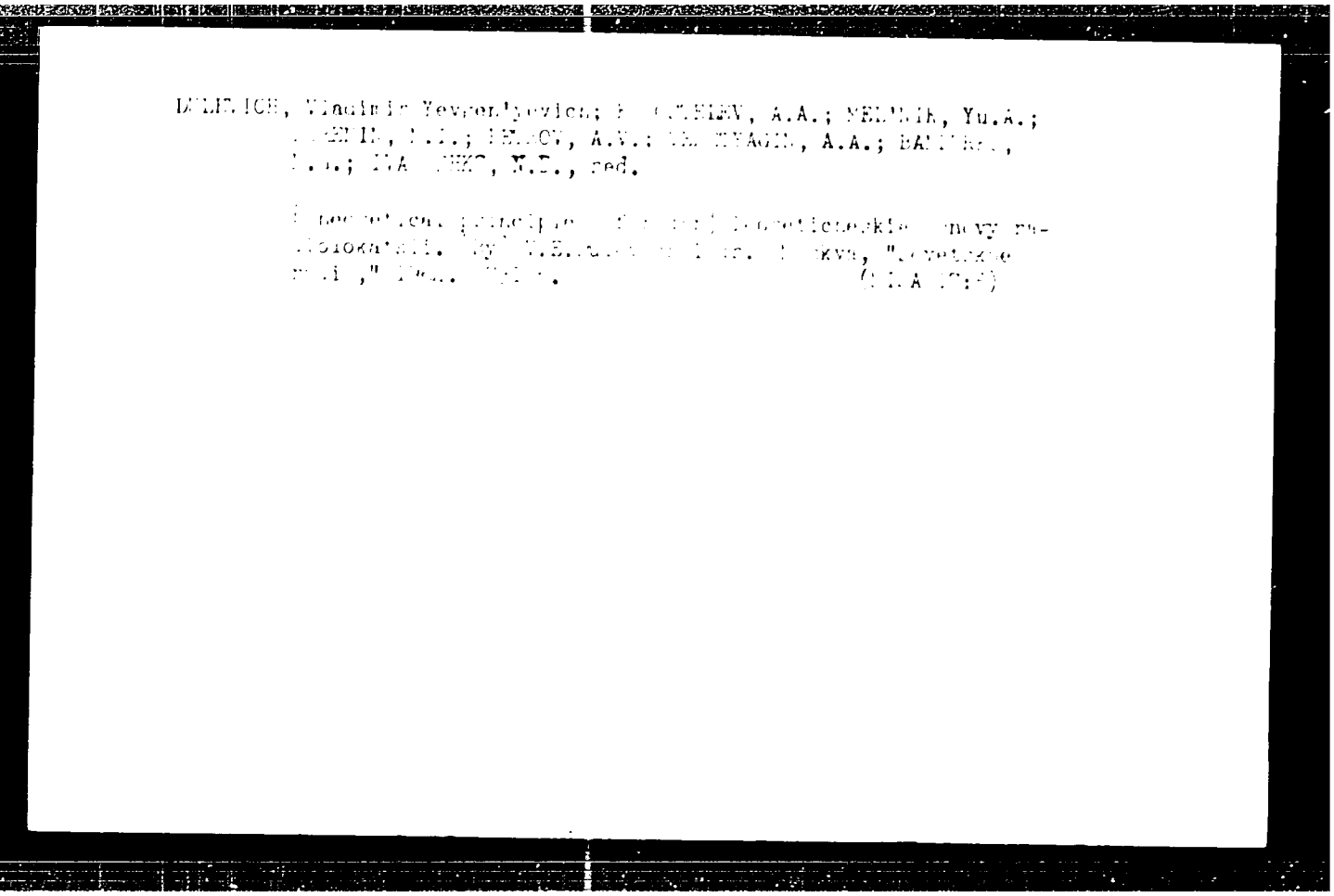
tering, the role of which should increase at high temperatures. Above 800--900°K, two-phonon scattering processes were probably also active, because the parameter representing the contribution of these processes could be regarded as small at these temperatures. "The authors are grateful to B. Ya. Moyzhes and L. S. Stil'bans for their interest in this work." Orig. art. has: 3 figures, 4 formulas, and 1 table.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad (Institute of Semiconductors, AN SSSR)

SUBMITTED: 25Apr64 ENCL: 00

SUB CODE: SS NR REF SOV: 008 OTHER: 010

Card 2/2



PETROV, A.V., kand. tekhn. nauk; LEMARIN'YE, K.N., inzh.

State standard No. [illegible] for "Pure gaseous [illegible]". Standartizatsiia i proizv. no. 7:43 Jl '53.

L 18559-63 EPF(c)/EWP(q)/EWT(m)/BDS AFFTC/ASD Pr-4 JD/JG
ACCESSION NR: AP3003642 S/0135/63/000/007/0043/0043

AUTHORS: Petrov, A. V. (Candidate of Technical Sciences); Lamarin'ye, K. N. (Engineer) 63

TITLE: All-Union State Standard 10157-62 "Argon, gaseous, pure"

SOURCE: Svarochnoye proizvodstvo, no. 7, 1963, 43

TOPIC TAGS: argon, specification, oxygen, nitrogen, moisture

ABSTRACT: According to the new GOST (All-Union State Standard) 10157-62, industrial argon will be distributed in grades A, B and C. Grade A must be 99.99% pure and must contain no more than 0.003% oxygen and 0.01% nitrogen. Grade B must be 99.96% pure, with no more than 0.005% oxygen and 0.04% nitrogen. Grade C must be 99.90% pure, with no more than 0.005% oxygen and 0.10% nitrogen. Moisture content in all grades must not exceed 0.03 g/cm^3. Recommendations are made as to which grade should be used in welding given metals and in doing what type of work. Procedures on testing for impurities are explained. The new standard went into effect July 1, 1963. Orig. art. has: 1 table.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 02Aug63 ENCL: 00
SUB CODE: EL NO REF SOV: 000 OTHER: 000

Card 1/1

TARNOPOL'SKIY, Yu.M.; ARUTIN, F.A.; PETROV, A.V.

Use of [illegible] in the construction of [illegible]
trical machinery. Plast.massy no.[illegible] [illegible]
(Electric machinery) (Plastics)

-/196/61/000/011/025/042
E194/E155

AUTHORS Fish, A Ya Tarnopol'skiy, Yu M Ivanov, A V and
Akants, K A

TITLE Electrical machine commutators with plastic frames

PERIODICAL Referativnyy zhurnal. Elektrotekhnika i energetika
no.11 1961 4 abstract 11I 29 (Vestn
elektroprom-sti no.4, 1961, 22-26)

TEXT The article describes two new constructions of commutator with plastic frame and copper bars having both one and several V pieces. A structural feature of the first type is that the V pieces by which the bars are fixed to the plastic frame are formed in the cross-section of the copper bar over its entire width. When the bar is more than 4 - 5 mm thick the longitudinal V piece is made continuous, and for small thicknesses discontinuous. Then the cut-away pieces in neighbouring bars are so arranged in honeycomb fashion as to avoid the possibility of contact between bars when pressing the commutator frame and to ensure that the jumpers are thick enough. A feature of the

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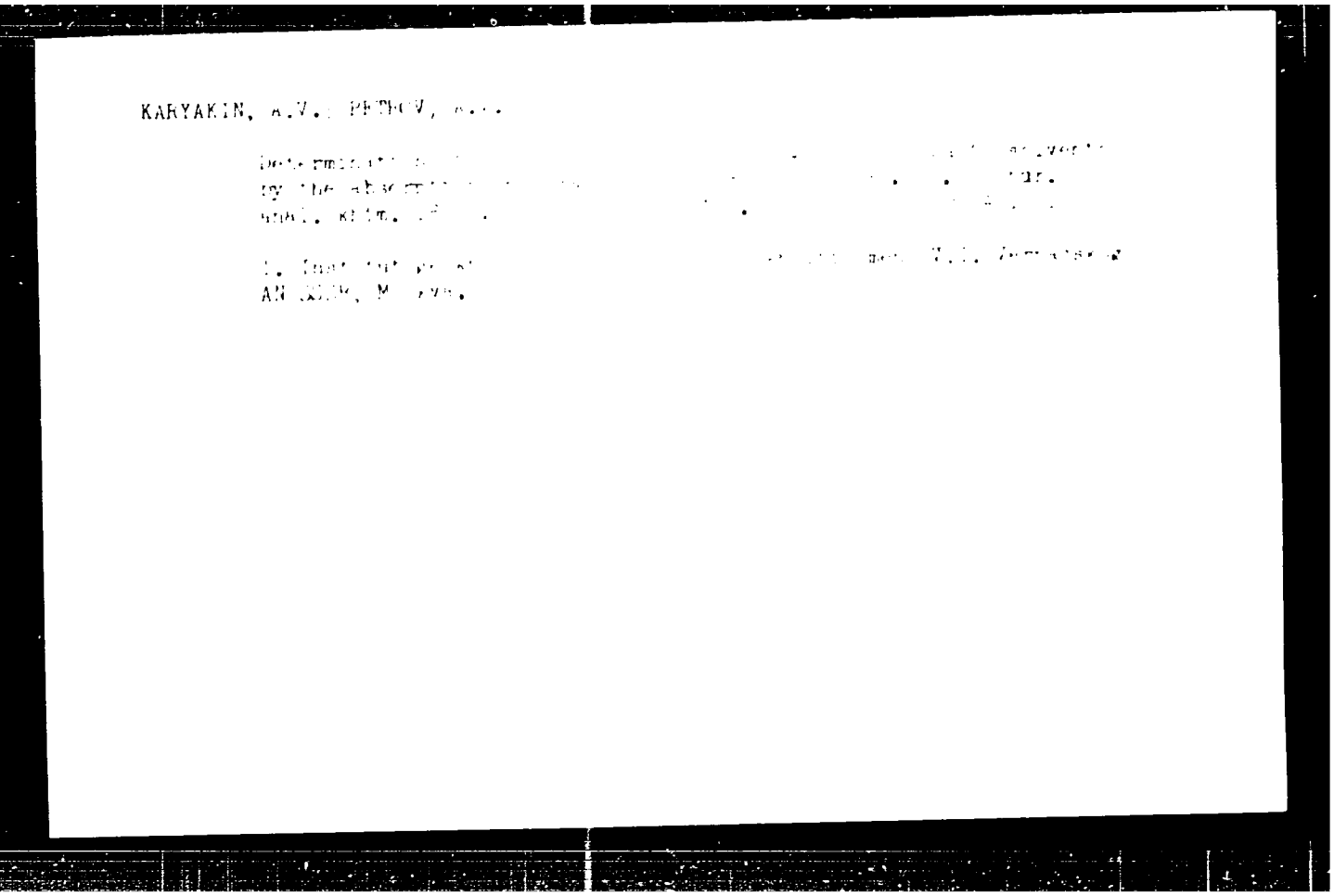
Electrical machine commutators

S/196/61/000/011/025/042
E194/E155

Commutator with multiple V pieces is that the part of the copper bar fixed in the plastic frame is made in the form of several V pieces. In addition to the lugs at the end the latter may have one or several intermediate support elements. This construction of commutators on plastic frames gives an appreciable economy of copper and micanite without loss of structural strength. 5 illustrations. 8 literature references.

[Abstracter's note: Complete translation.]

Card 2/2



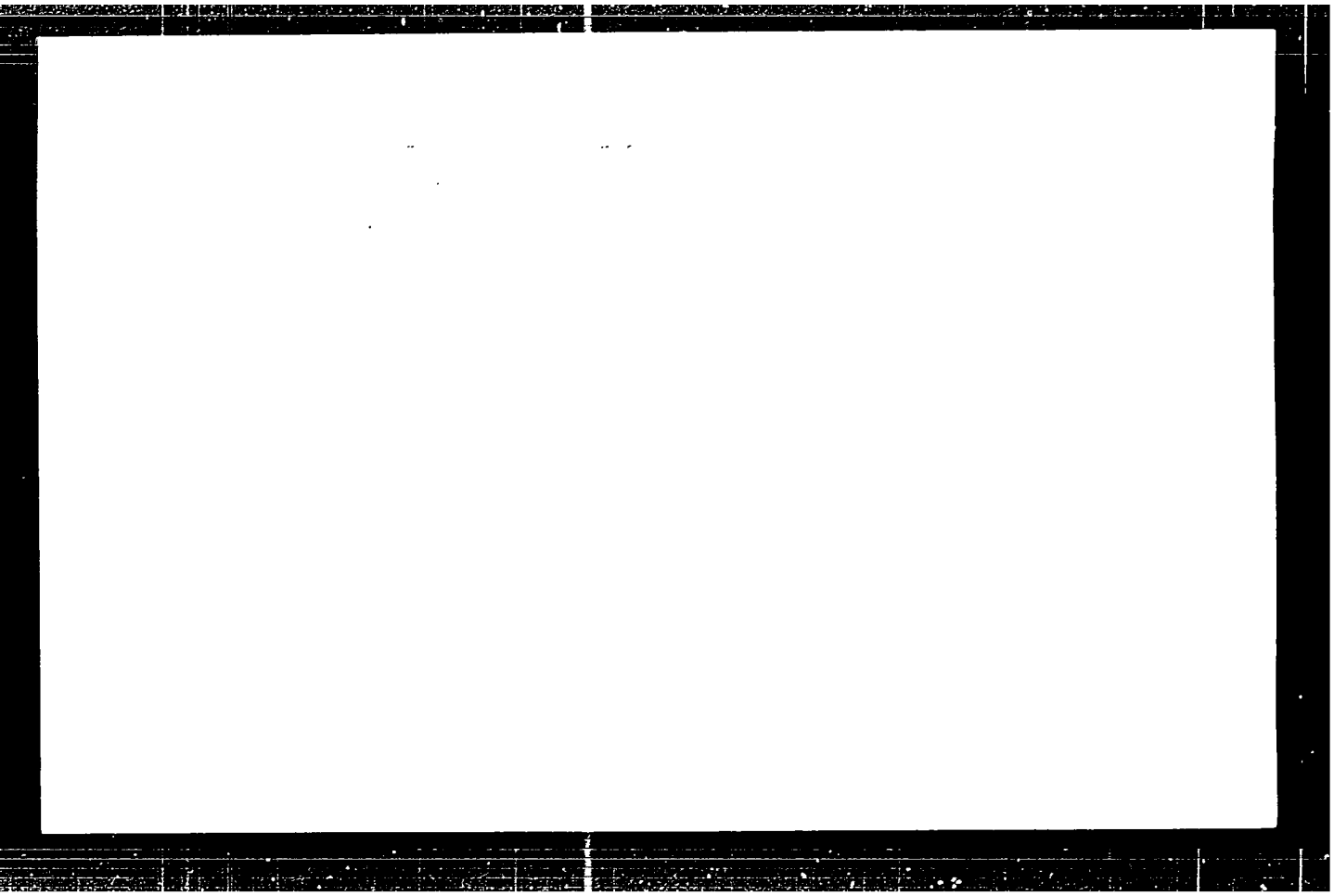
KARYAKIN, A.V.; PETROV, A...

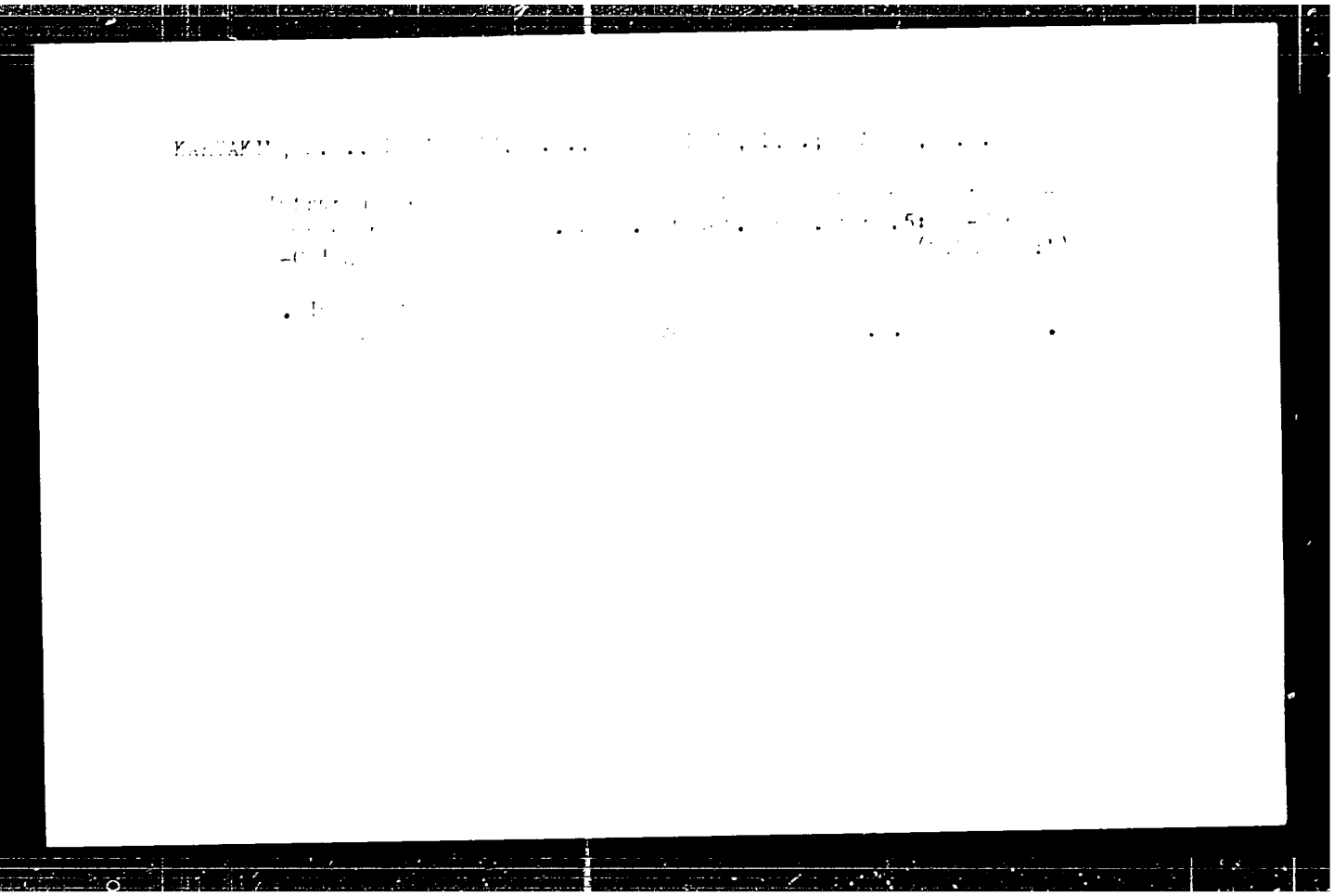
PETROV, A. V., inzh.

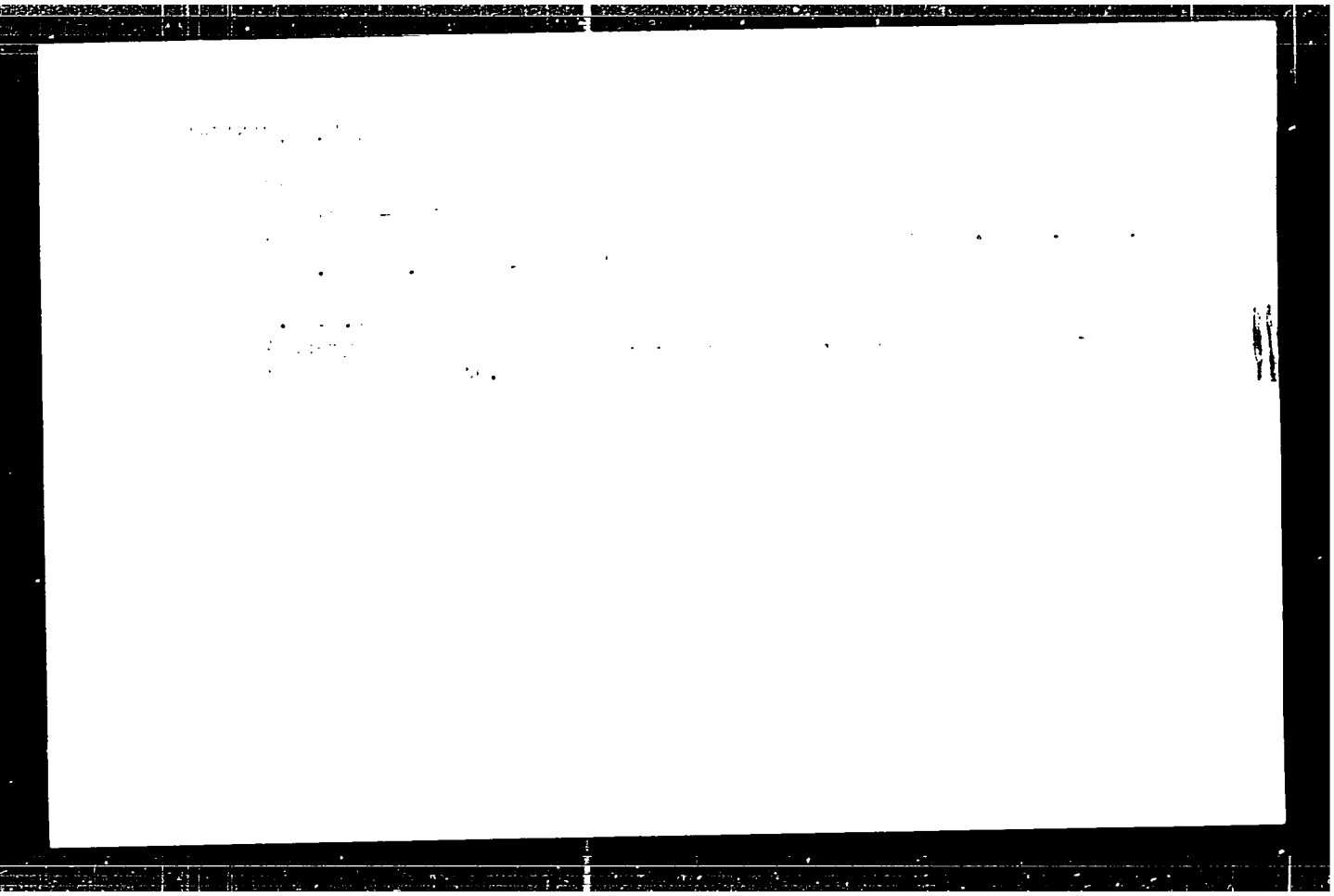
Overall mechanization of intershop conveying. Mekh.i avtom. proizv. 18 no. 5:32-34 My '64. (MIRA 17:5)

TARNOPOL'SKIY, Yu.M.; PETROV, A.V.; AKUNTS, K.A.; Prinimali uchastiye: KAULINYA, R.P., mladshiy nauchnyy sotrudnik; ONISHEV, A.V., inzh.

Effect of compression parameters on the strength of the plastic AG-4. Plast.massy no.4:65-67 '62. (MIRA 15:4)
(Plastics--Molding)







GULTYAYEV, P.V.; PETROV, A.V.

Heat capacity of some semiconductors. Fiz. tver. tela 1 no.3:368-372 Mr '59. (MIRA 12:5)

1.Institut poluprovodnikov AN SSSR, Leningrad.
(Semiconductors--Thermal properties)

DEVYATKOVA, Ye.D.; PETROV, A.V.; SMIRNOV, I.A.; MOYZHES, B.Ya.

Melted quartz as a model material for measuring thermoconductivity. Fiz. tver. tela 2 no.4:738-746 Ap '60. (MIRA 13:10)

1. Institut poluprovodnikov AN SSSR, Leningrad.
(Quartz) (Heat--Conduction)

24.5200 (1164, 1537 only)
26.2421

S/181/61/003/005/006/042
B101, B214

AUTHORS: Devyatkova, Ye. D., Petrov, A. V., and Smirnov, I. A.

TITLE: Heat transfer on bipolar diffusion of heat carriers in lead telluride and lead selenide

PERIODICAL: Fizika tverdogo tela, v. 3, no. 5, 1961, 1338-1341

TEXT: Ye. D. Devyatkova had studied the heat conductivity of PbTe in 1956 (ZhTF, v. 27, no. 3, 461, 1957) and found a deviation from the theoretical dependence $1/\varkappa_1 \sim T$ in the temperature range 250-450°K, $1/\varkappa_1$ being the thermal resistance of the crystal lattice. The object of the work was to study this effect in a larger temperature interval (90-800°K) and extend the investigation also to PbSe. Fine crystalline sintered samples and large crystals were used. They had been obtained by Ye. D. Nensberg by cooling the melt of stoichiometric composition. All samples were annealed at 600-900°K. The apparatuses for the measurements of heat conductivity were those described: Ye. D. Devyatkova, A. V. Petrov, I. A. Smirnov, B. Ya. Moyzhes, FTT, 2, 4, 738, 1960. Apparatus A was used for the measurement at 90-400°K, apparatus B

Card 1/4

at 300-800°K. The electric conductivity and thermo-emf were simultaneously measured in B; only the thermo-emf was measured in A. $\varkappa_l$ was calculated as difference from the measured total heat conductivity $\varkappa_e$. $\varkappa_e$ was calculated according to the Wiedemann-Franz law taking into account the degeneracy. Fig. 1 shows the function $1/\varkappa_l = 1/(\varkappa - \varkappa_e)$ for PbTe at different hole concentrations. PbSe showed the same behavior. It is found that the deviation from the linear course is connected with the degree of purity. An additional heat conductivity by mixed conductivity and heat transfer by means of electron - hole pairs is assumed. The expression is.

$\Delta\varkappa = A\sigma(k/e)^2 T\left[\Delta E/2kT + 2\right]^2$ (1), where σ is the electric conductivity, ΔE the width of the forbidden zone at the temperature T, and e the electronic charge. $A = 4ab/(1 + ab)^2$, where $a = n_-/n_+$, $b = u_-/u_+$ are the ratios, the concentration, and the mobility, respectively, of the electrons and holes. Eq. (1) was checked by measuring the Hall coefficients and the electric conductivity. On the basis of the relations $n_- n_+ = n_{maj}^2 = n_-(n'_+ + N)$ and $n_- = n'_+$; (n_-, n_+ are concentrations of free electrons and holes, N is the

Card 2/4

Heat transfer on bipolar ...

concentration of the minority carriers) it was calculated that $a = n_-/(n_- + N)$ for hole-type sample, and $a = n_+/(n_+ + N)$ for electron-type sample. n_{maj} for PbSe was calculated from $n_{maj} = 2(2\pi kT/h^3)^{3/2}(m_-^* m_+^*)^{3/4}\exp(-\Delta E/2kT)$, where m^* is the effective mass, $m^* \sim T^{0.4}$. Since the temperature dependence of m^* for PbTe is not accurately known, $R\sigma = (3\pi/8)u_+(1 - ab^2)/(1 + ab)$ is taken for the calculation of a, where $u_+ \sim T^{-2.5}$. It was assumed that b = 2.0 for PbTe and b = 1.1 for PbSe. For the calculation of n_{maj} and $\Delta\alpha$ values of ΔE were assumed which were in the neighborhood of values obtained by optical measurements and comparable to the data of Gibbson (R. A. Smith, Physica, 20, 925, 1954) and W. W. Scanlon (see below). In good agreement with the experimental data, the calculation of (1) yielded: for PbTe $\Delta E = 0.32$ ev in the temperature range 436-700°K; for PbSe $\Delta E = 0.30$ ev at 500°K and $\Delta E = 0.34$ ev at 700°K. The additional heat conductivity of PbTe and PbSe is explained as being due to heat transfer as a consequence of bipolar diffusion of majority carriers. The participation of excitons assumed in the previous work is thus not confirmed. There are 2 figures, 2 tables, and

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23101

S/181/61/003/005/006/042
B101/B214

Heat transfer on bipolar ...

7 references: 5 Soviet-bloc and 2 non-Soviet-bloc. The reference to English-language publication reads as follows: W. W. Scanlon, J Phys. Chem. Sol., 8, 423, 1959.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors, AS USSR, Leningrad)

SUBMITTED: December 3, 1960

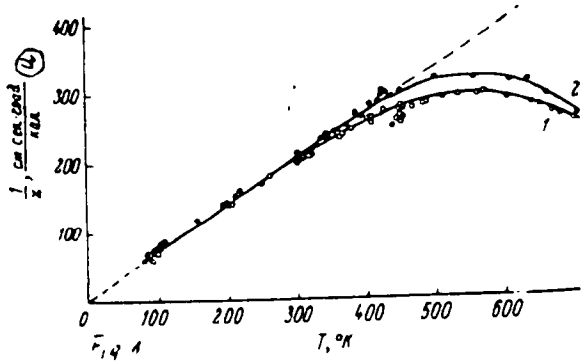


Fig. 1. Heat resistance of the crystal lattice of PbTe as a function of the temperature.
Legend: 1) $n_+ = 5.2 \cdot 10^{17}$ cm^{-1}; 2) $n_+ = 1.2 \cdot 10^{19}$ cm^{-1};
a) cm·sec·deg/cal
(n_+ = concentration of impurity holes).

Card 4/4

S/181/62/004/006/009/051
B125 B104

AUTHORS: Petrov, A. V., and [illegible]

TITLE: Thermal conductivity and [illegible] of the type $AB A_2$ [illegible]

PERIODICAL: Fizika tverdogo tela, v. [illegible]

TEXT: The dependence of the thermal conductivity and [illegible] specific heats of some compounds belonging to the groups $A^I B^{III} X_2^{VI}$ and $A^I B^V X_2^{VI}$ on the type of covalent bond was examined. The thermal conductivity, the [illegible] of thermal expansion, and other thermal properties of compounds with mainly covalent bonds are related to the anharmonicity of thermal lattice vibrations. This anharmonicity is determined by the configuration of the valency electrons. For this reason, the thermal properties of compounds of the group $A^I B^V X_2^{VI}$ are entirely different from those of the group $A^I B^{III} X_2^{VI}$. Below 130°K the thermal conductivity of rhombohedral $AgBiTe_2$ crystals is inversely proportional to temperature, but at higher temperatures the

Card 1/3

Thermal conductivity [illegible]

effect of [illegible] ity increases the [illegible] can be determined [illegible] additional thermal [illegible] hole pairs. The value of [illegible] kinds of atoms are statistically [illegible] AbX_2-type compounds, then the thermal [illegible] temperature and the crystal behave [illegible] an NaCl-type lattice at high temperatures, its thermal [illegible] constant between 1/(and 300°K [illegible] to traces of the low-temperature [illegible] The polymorphous transformation [illegible] ordered position of atoms in the [illegible] temperature dependence of the thermal [illegible] 7 figures and 1 table.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad (Institute of Semiconductors AS USSR, Leningrad)

Card 2/3

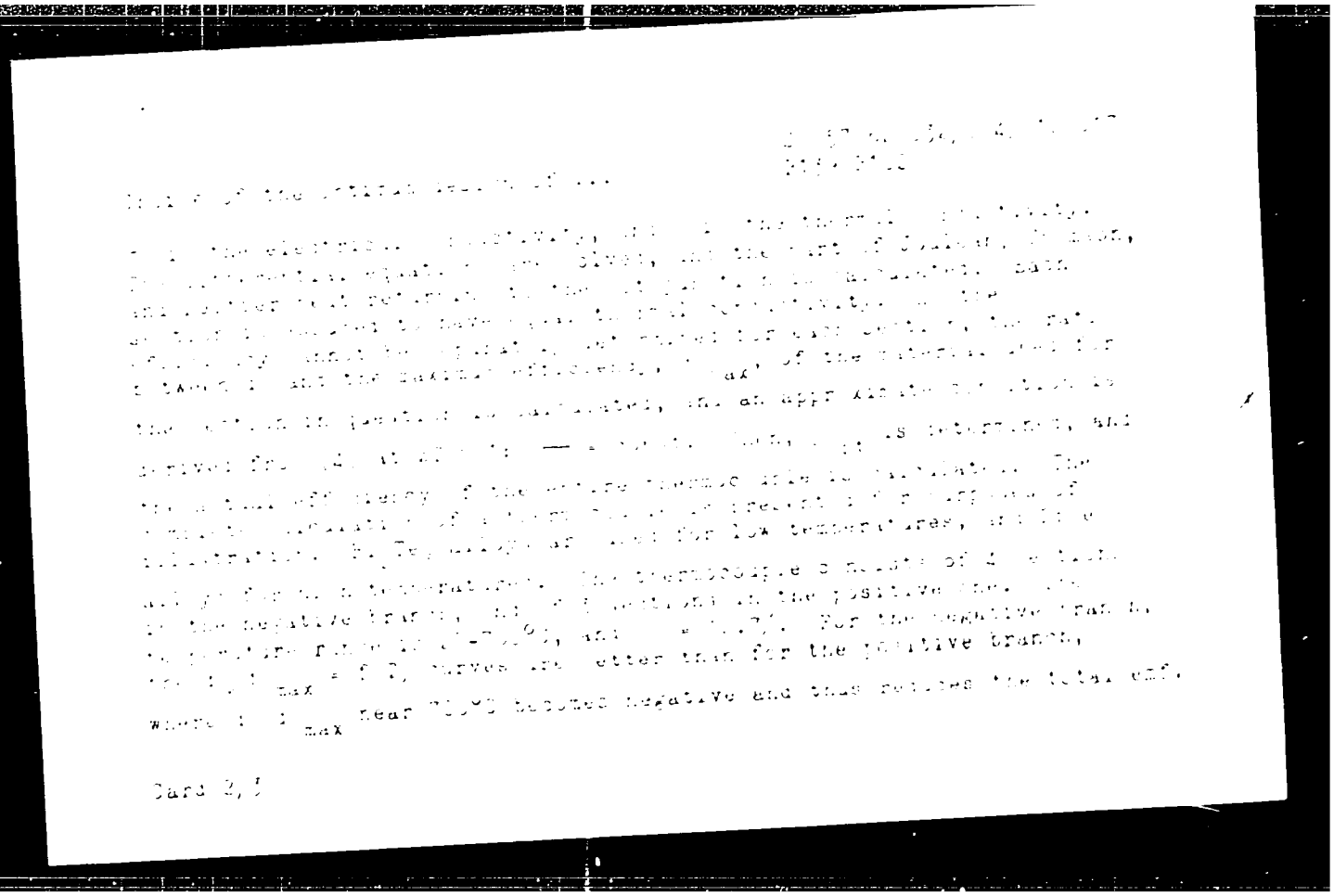
Thermal conductivity ar.....

3/*01/62/004/006/009/051
B125/B104

SUBMITTED: December 2., 1961

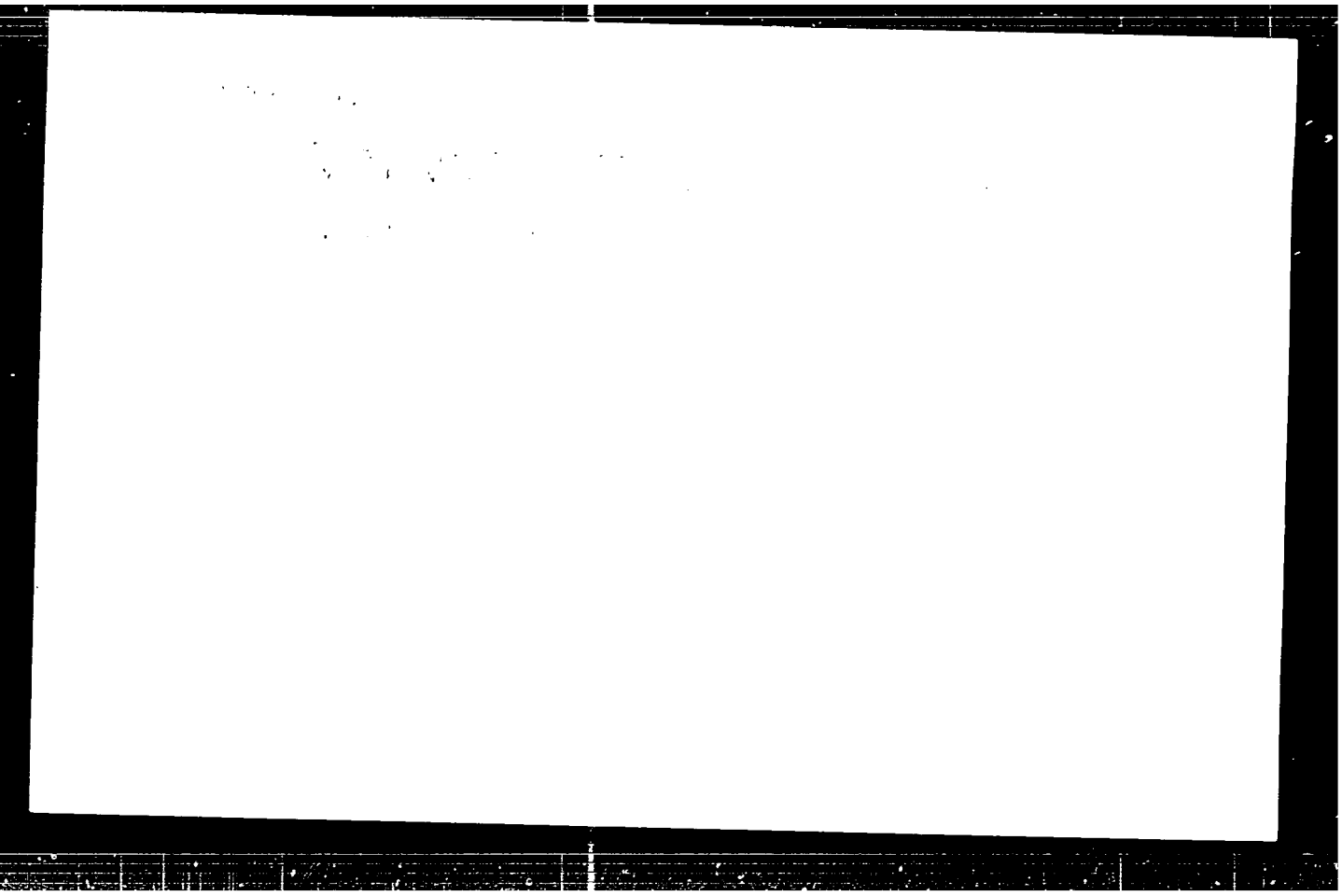
Card 3/3

Card 1/3



Card 2/2

Page 2, 3



L 10583-66 EWT(m)/T/EWP(t)/EWP(b)/EWA(c) IJP(c) JD

ACC NR: AP5025386 SOURCE CODE: UR/0181/65/007/010/3054/3062

AUTHOR: Yerofeyev, R. S.; Iordanishvili, Ye. K.; Petrov, A. V.

ORG: Institute of Semiconductors AN SSSR, Leningrad (Institut poluprovodnikov AN SSSR)

TITLE: Thermal conductivity of alloyed Si-Ge solid solutions

SOURCE: Fizika tverdogo tela, v. 7, no. 10, 1965, 3054-3062

TOPIC TAGS: solid solution, semiconductor research, germanium semiconductor, silicon semiconductor, heat conductivity

ABSTRACT: The authors give some of the results of research undertaken in 1961 on the thermal properties of the Si-Ge system. Thermal conductivity was measured in Si-Ge solid solutions with 5.3, 8.5, 15 and 30 at. % Ge as a function of temperature and dopant concentration. Specimens with 8.5 at. % Ge were studied from 80 to 300°K, while those with other concentrations of germanium were studied in the 80-1100°K range. Boron was used as the doping impurity in all *p*-type specimens, while phosphorus, arsenic and antimony served as dopants in *n*-type specimens. Maximum concentration in *p*-type specimens was $5.4 \cdot 10^{20}$ cm^{-3}, while in *n*-type specimens the maximum concentration was $2.5 \cdot 10^{20}$ cm^{-3}. The *n*-type specimens with carrier concentrations above $1.5 \cdot 10^{20}$ cm^{-3} were unstable above 600-700°K, and data are given for them only

Card 1/2

L 10583-66

ACC NR: AP5025386

at temperatures below 600°K. The thermal conductivity of the crystal lattice is isolated by taking account of various other mechanisms which may be responsible for heat transfer. Curves are given for thermal conductivity of solid solutions of both conductivity types with various Ge concentrations as a function of dopant concentration at various temperatures. It was found that doping causes a considerable reduction in thermal conductivity in all cases. Reliable values of thermal conductivity for pure Si-Ge solid solutions were obtained by studying the temperature relationship of thermal conductivity in lightly doped specimens ($p = 3\text{-}5 \cdot 10^{17}$ cm^{-3}). These values were compared with the Klemens model in a wide temperature range. The reduction in the thermal conductivity of the crystal lattice due to doping is explained as the result of phonon scattering by impurity ions, assuming that the relaxation time in this scattering mechanism is independent of phonon wavelength. The authors are grateful to V. S. Zemskov and V. V. Rozhdestvenskiy for furnishing the p-type Si-Ge specimens, and to N. M. Kochenova for assistance with the measurements. The authors thank L. S. Stil'bans and B. Ya. Moyzhes for discussing the results of the work and for the valuable comments made by them, and also D. N. Mirlin and O. A. Usov for measuring the absorption coefficient. Orig. art. has: 6 figures, 4 formulas, 2 tables.

SUB CODE: 20/ SUBM DATE: 26Mar65/ ORIG REF: 009/ OTH REF: 016

Card 2/2

L 23154-66 EWT(1)/EWT(m)/EWP(t) IJP(c) JD
ACC NR: AP6006837 SOURCE CODE: UR/0181/66/008/002/0500/0506

AUTHOR: Golikova, O. A.; Iordanishvili, Ye. K.; Petrov, A. V.

ORG: Institute of Semiconductors, AN SSSR, Leningrad (Institut poluprovodnikov AN SSSR)

TITLE: Electrical properties of solid solutions in the Si-Ge system

SOURCE: Fizika tverdogo tela, v. 8, no. 2, 1966, 500-506

TOPIC TAGS: solid solution, germanium, silicon, current carrier, conduction band, semiconductor band structure, electric property

ABSTRACT: Experimental data are given on the electrical properties of heavily doped specimens of solid solutions containing 5-30 at % Ge in *p*-silicon and 15-30 at % Ge in *n*-silicon at temperatures from 100 to 1100°K with particular regard to the mechanism responsible for scattering of current carriers by lattice vibrations at high temperatures (above 400°K), by ion impurities for the case of deep alloying and by nonhomogeneities in the solid solution. The authors discuss data on the energy spectrum of holes and electrons at high energies produced by two independent

Card 1/2

L 23154-66
ACC NR: AP6006837

methods: increasing the temperature and filling the bands (deep alloying). Curves are given for thermoelectromotive force as a function of current carrier concentration in silicon-germanium solid solutions of both conductivity types. Graphs are also given showing hole and electron mobility as functions of carrier concentration for various solid solutions. The resultant data are used for calculating the effective mass of the density of electron states. It is found that the effective mass for the density of states in solid solutions of germanium in silicon is comparable to that observed in pure silicon and increases with temperature. This indicates that the parameters of the conduction band in solid solutions with a composition close to that of silicon remain the same as in pure silicon. From this, it may be concluded that the amplification effect in Si-Ge solid solutions is extremely small.
We are sincerely grateful to V. S. Zemskiy, V. V. Rozhdestvenskaya and R. S. Yerofeyev for furnishing the specimens and to B. Ya. Moyzhes for participating in discussion of the work. Orig. art. has: 5 figures, 3 formulas.

SUB CODE: 20/ SUBM DATE: 16Apr65/ ORIG REF: 005/ OTH REF: 015

Card 2/2

ACC NR: AP6024482 SOURCE CODE: UR/0181/66/008/007/2154/2162

AUTHOR: Mal'tsev, Yu. V.; Nensberg, Ye. D.; Petrov, A. V.; Semiletov, S. A.; Ukhanov, Yu. I.

ORG: Institute of Semiconductors AN SSSR Leningrad (Institut poluprovodnikov AN SSSR Leningrad)

TITLE: Electric and optical investigations of PbS

SOURCE: Fizika tverdogo tela, v. 8, no. 7, 1966, 2154-2162

TOPIC TAGS: lead compound, sulfide, conduction band, valence band, Hall constant, thermoelectric power, electric conductivity, Faraday effect, temperature dependence

ABSTRACT: The PbS samples investigated had carrier densities from 10^{18} to 10^{20} cm^{-3} for n-type and 1.4×10^{18} to 4×10^{19} cm^{-3} for p-type, which are higher than those used in earlier investigations. Measurements were made of the Hall coefficient, the thermoelectric power, the electric conductivity, the Faraday effect, and the absorption and reflection spectra in a temperature range from 80 to 900K and in a magnetic field of 6 kOe. The crystals were grown by slowly cooling from the melt. Doping was with chlorine (n-type) or silver (p-type). Tests were also made on epitaxial films with thickness from 2 to 16 microns. The apparatus for the Hall measurements was described earlier (in: Termoelektricheskiye svoystva poluprovodnikov, Izd. AN SSSR,

Card 1/2

ACC NR: AP6024482

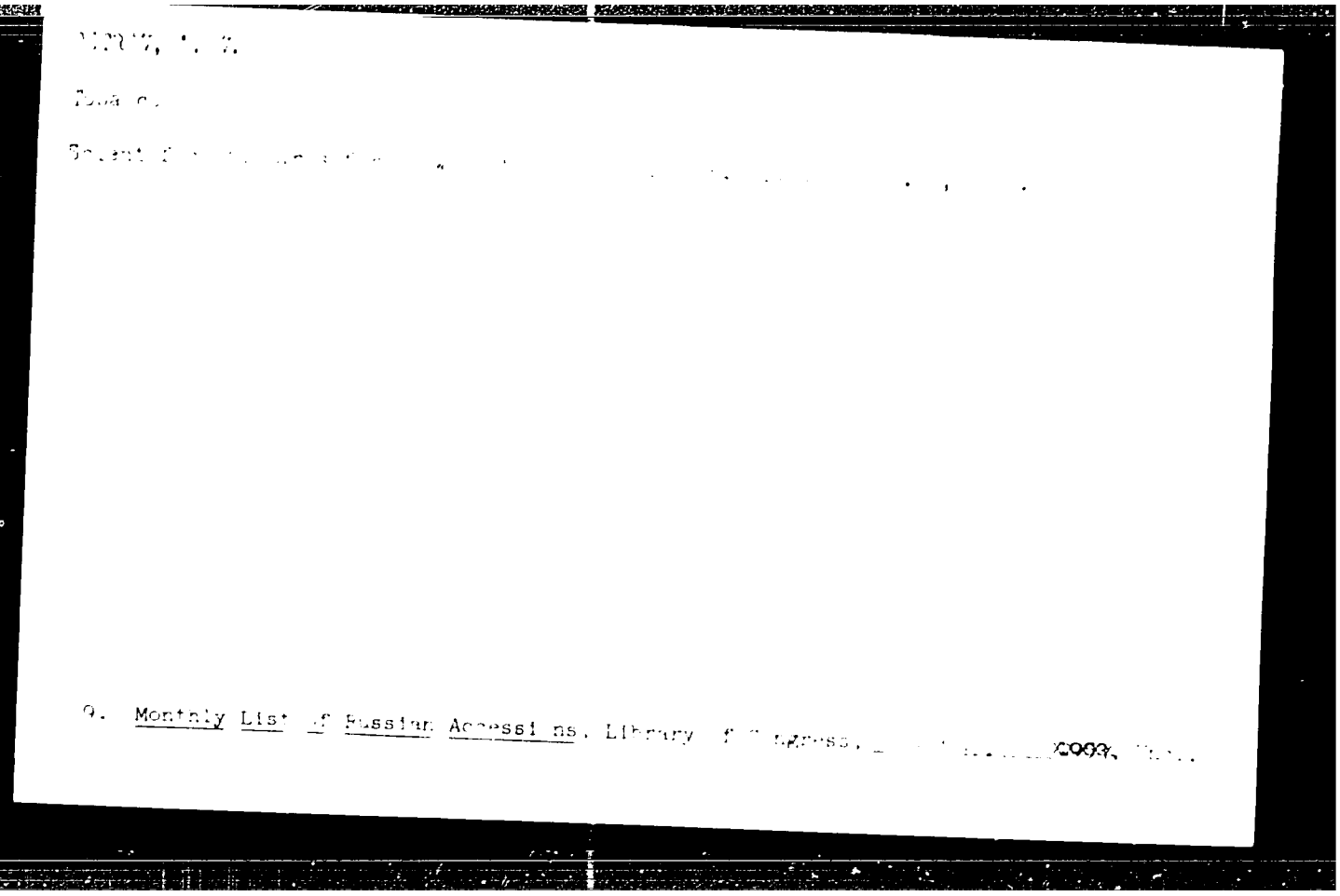
27, M.-L. 1963). Plots of the temperature dependence of the thermoelectric power and of the effective masses, as well as the absorption and reflection spectra, are presented. The values obtained for the effective masses of the state density m_e (0.38 -- 0.48) and of the conductivity m_c (0.13 -- 0.32) agree with the modal of four equivalent minima in the conduction band, with $m_{cn} = m_{cp}$. The agreement is poor for the valence band. Orig. art. has: 5 figures, 4 formulas, and 2 tables

SUB CODE: 20/ SUBM DATE: 23Dec65/ ORIG REF: 009/ OTH REF: 015

Card 2/2

[redacted]

9. Monthly List of Russian Accessions, Library of Congress, June 1958. Unclassified.



9. Monthly List of Russian Accessions, Library of Congress, [illegible]

Name	:	PETROV, A. V.
Dissertation	:	Experiments [illegible]orn irrigation in Rostov Province
Degree	:	Cand Agr Sci
Defended At	:	Moscow Order of Lenin Agricultural Academy imeni K. A. Timiryazev
Publication Date, Place	:	1956, Moscow
Source	:	Knizhnaya Letopis' No 6, 1957

PETR[illegible] V, [illegible].V.

Selectio[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible]

1. M[illegible] [illegible] [illegible]
(Vrilt [illegible])

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001240420002-6"

PETROV, A.V., kand.sel'skokhoz.nauk, laureat Stalinskoy premii;
KAMSHILOV, N.A., otv.red.

[Fruit breeding and new fruit varieties] Selektsiia i novye sorta plodovykh rastenii. Moskva, 1960. 36 p.
(MIRA 14:1)

(Fruit culture)

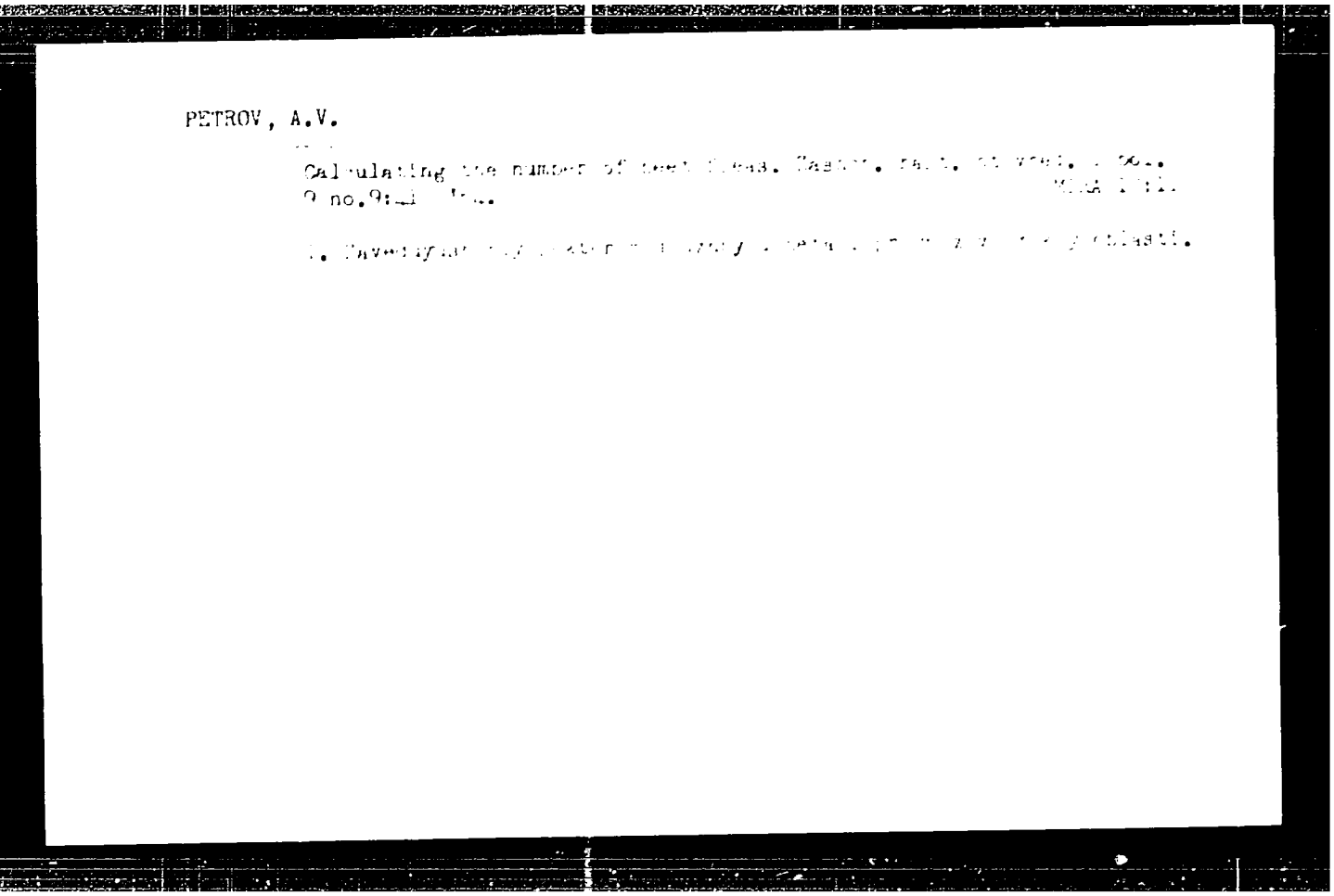
PETROV, Aleksandr Vasil'yevich; ZELENETSKAYA, L.V., red.; SAYTANIDI, L.D., tekhn. red.

[Manual on the complex mechanization of the cultivation and harvesting of sugar beets] Spravochnik po kompleksnoi mekhanizatsii vozdelyvaniia i uborki sakharnoi svekly. Moskva, Izd-vo M-va sel'.khoz.RSFSR, 1961. 131 p. (MIRA 15:7)
(Sugar beets) (Agricultural machinery)

VISHNEVSKIY, A.N.; VISHNEVSKIY, E.A.; KUZNETSOV, T.A.; PETROV, A.V.; RUKEVICH, L.V.; ADEL'FINSKAYA, Ye.N., red.; SAYTANIDI, L.D., tekhn. red.

[Manual on sugar-beet seed production] Spravochnik po sveklovichnomu semenovodstvu. Moskva, Izd-vo M-va sel'.khoz. RSFSR, 1961. 90 p. (MIRA 15:3)

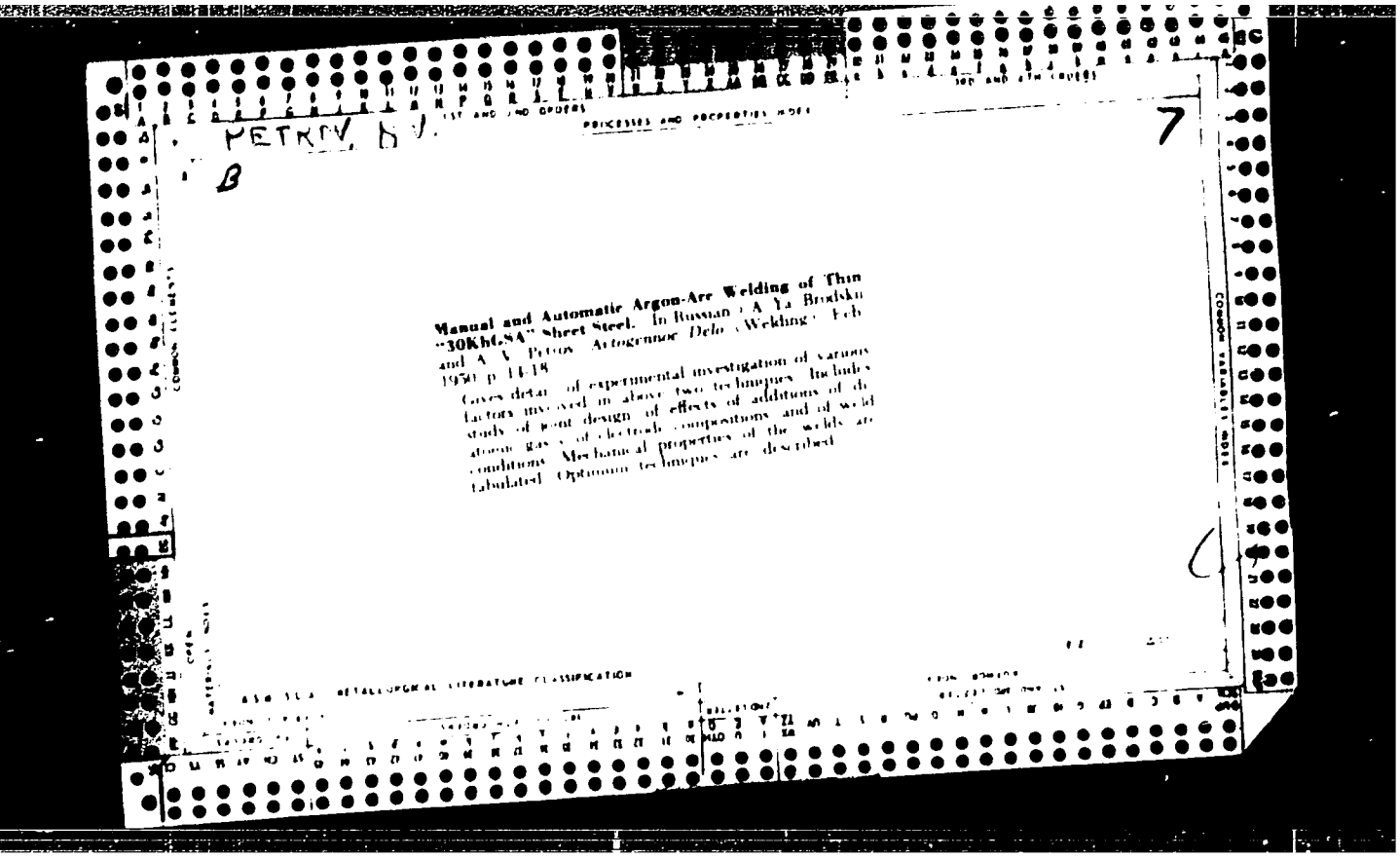
1. Ministerstvo sel'skogo khozyaystva RSFSR (for all except Adel'finskaya, Saytanidi).
(Sugar beets)



PETROV, A.V.

Calculating the number of [illegible]. Zashch. rast. ot vred. i bol. 5 no.9:[illegible]. (MIRA 13:11)

1. [illegible]



PETROV, A. V.

B

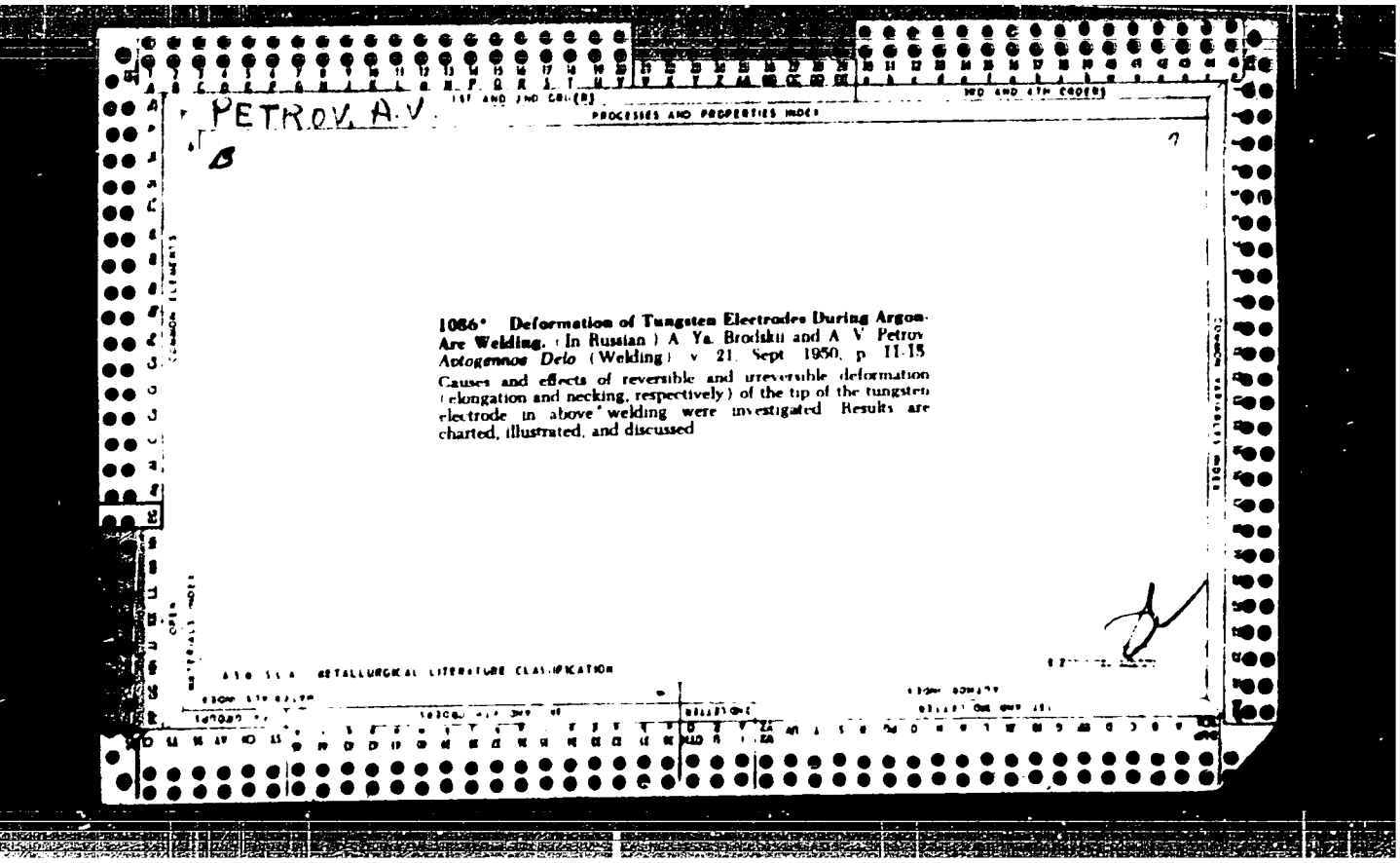
7

Manual and Automatic Argon-Arc Welding of Thin "30Khr.SA" Sheet Steel. In Russian; A. Ya. Brodskii and A. V. Petrov. *Avtogennoe Delo* (Welding), Feb 1950, p. 14-18.

Covers detail of experimental investigation of various factors involved in above two techniques. Includes study of joint design, effects of additions of diatomic gas, of electrode compositions and of weld conditions. Mechanical properties of the welds are tabulated. Optimum techniques are described.

C

METALLURGICAL LITERATURE CLASSIFICATION



PETROV, A.V.

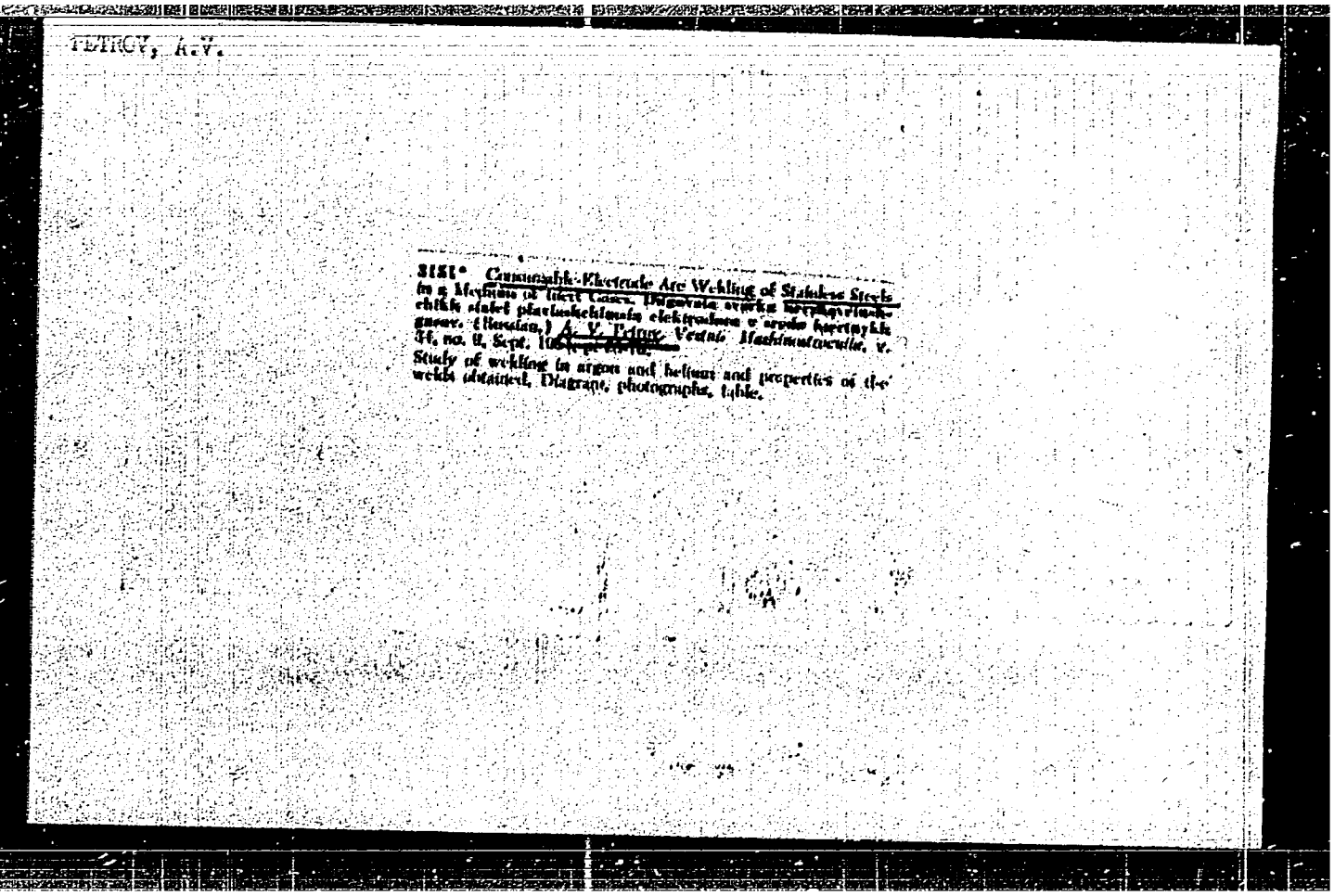
B

PROCESSES AND PROPERTIES INDEX

1086* Deformation of Tungsten Electrodes During Argon-Arc Welding. (In Russian) A Ya. Brodskii and A V Petrov. *Avtogennoe Delo* (Welding) v 21, Sept 1950, p 11-15

Causes and effects of reversible and irreversible deformation (elongation and necking, respectively) of the tip of the tungsten electrode in above welding were investigated. Results are charted, illustrated, and discussed

METALLURGICAL LITERATURE CLASSIFICATION



PETROV, A.V.

3151* Consumable-Electrode Arc Welding of Stainless Steels in a Mixture of Inert Gases. Doklady [illegible] chikh stalei plavlenkoshchimsia elektrodom v srede [illegible] gazov. (Russian.) A. V. Petrov. Vestnik Mashinostroeniia, v. 34, no. 8, Sept. 1954.

Study of welding in argon and helium and properties of the welds obtained. Diagrams, photographs, table.

USSR/Metallurgy - Welding, Argon-Shielded Arc — Sep 52

"Effect of Impurities in Argon on the Quality of Argon-Shielded Arc Welding," A. V. Petrov, Engr, Stalin Prize Laureate

"Avtogen Delo" No 9, pp 5-8

Studies effect of N and O, basic impurities in A, on quality of joints obtained in welding aluminum alloys which are considered as materials requiring highest purity of A. Presence of up to 1.0% N and 0.5% O in A have no effect on

232T76

formation of pores and cavities in weld metal. These defects are possibly caused by gases dissolved in base metal. Recommends 99.7% pure A as optimum compn. Impurities in amt of 0.3% must consist of N and O. Max concn of O has to be 0.05%

232T76

PETROV, A. V.

YEROKHIN, A.A.; PETROV, A.V.; BOGACHEV, M.N.

Examining rapid phenomena in the welding arc by taking motion pictures. Avtom. svar. 7 no.1:59-63 Ja-F '54. (MLRA 7:7)
(Electric welding) (Moving-pictures in industry)

USSR/Engineering - Welding

Card 1/1 : Pub. 128 - 18/38

Authors : Petrov, A. V.

Title : Arc welding of stainless steels with a melting electrode under an atmosphere of inert gases

Periodical : Vest. mash. 9, 68-70, Sep 1954

Abstract : The author points out the advantages of the argon arc welding with a melting electrode. He claims that the above mentioned method is more economical than the tungsten electrode method and more adaptable than welding under flux. Drawings and illustrations depicting welding procedures are presented, and a table is given on technical specifications. Graph.

Institution : .....

Submitted : .....

PETROV, A. V.

USSR.

8548* Melting of Electrode Wire During Automatic Argon-Arc Welding. Plavlenie elektrodnoi provoloki pri avtomaticheskoi argono-dugovoi svarke. (Russian.) A. V. Petrov. *Svarochnoe Proizvodstvo*, 1955, no. 2, Feb., p. 4-7.

Relations between applied current, size of electrode, and physical properties of the wire on melting. Diagrams, graphs. 3 ref.

MG

PETROV, A.V.

Transfer of metal in the arc during welding by melted electrode in a gas atmosphere. A. V. Petrov. *Avtomat. Svarka* 8, No. 2, 26–33(1955).—With the aid of high-speed photography the author investigated the nature of the process of metal transfer in a welding arc in relation to the current, polarity, and compn. of the gas envelope. It is shown that there is a crit. current for each electrode size which is also influenced by the type of gas atm. The specific effects of A and N are mentioned. Excessive spraying of the transfer metal is caused by using the direct polarity.
I. R. Behrman

PETROV, A.V.

Arc pressure on a weld bath in protective atmosphere. Avtom.svar.8 no.4:84-89 Jl-Ag'55 (MLRA 8:11)
(Electric welding) (Protective atmospheres)

PETROV, A.V.

1818* Influence of Nitrogen on the Metal During Argon-Arc Welding of a Stainless Steel Seam. Vliianie azota na metall shva pri argonodugovoi svarke nerzhaveiushchei stali. (Russian.) A. V. Petrov. Svarochnoe proizvodstvo, 1955, no. 10, Oct., p. [illegible]

Welding of 1Kh18N9T steels, when N is present in A, results in a N saturation of the metal at the seam, with the formation of stable Ti nitrides; eliminates the stabilization properties of Ti as a carbide forming element; and attributes to the formation of hot cracks. Tables, graphs, micrographs. 9 ref.

AID P - 5067

Subject : USSR/Engineering-Welding

Card 1/1 Pub. 107-a - 7/11

Authors : Verchenko, V. R., A. V. Petrov, and M. I. Baranov

Title : Automatic welding of non-turning stationary pipes

Periodical : Svar. proizv., 6, 22-26, Je 1956

Abstract : The authors describe the technique and equipment for automatic welding of non-turning tubing of stainless steel up to 219 mm in diameter. The ATV automatic welders with melting electrodes and with infusible tungsten electrodes were used and the test results are given. Four tables, 3 graphs, 6 photos, 6 diagrams and GOST standards.

Institution : Scientific Research Institute of Technology and Production

Submitted : No date

SUBJECT: USSR/Welding 135-8-3

AUTHOR: Petrov, A.V., Candidate of Technical Sciences.

TITLE: Shielding Gases for Arc Welding. (Zashchitnyye gazy dlya dugovoy svarki).

PERIODICAL: "Svarochnoye Proizvodstvo", 1957, #8, pp 6-10 (USSR)

ABSTRACT: The article represents a summary of data on effects of inert shielding gases, obtained in many years of experimental investigation at the welding laboratory of "VIAT". The effect of argon, CO_2, N_2, H_2, with additions of oxygen and CO_2 to the shielding gas in welding of aluminum alloys and of low and high alloy steel ("ЗОХГСА", "1Х18Н9Т") has been investigated. The process of metal transfer inside the arc in various shielding mediums was studied with a high-speed photo-camera. The welding conditions leading to formation of cracks and pores in weld metal, and those producing sound welds have been established.

Addition of 3-5% of oxygen into argon stabilized the arc and resulted in sound welds even with increased welding speed.

Card 1/6

135-3-3 29

TITLE: Shielding Gases for Arc Welding (Zashchitnyye gazy dlya dugovoy svarki).

Welding in CO_2 - with other conditions identical - was accompanied with frequent exploding of metal drops on the electrode tip and caused splatter. Minimum splatter was observed with additions of 2-3% O_2, or 5% CO_2, or 1-2% H_2 into argon. Different welding technologies had different effects on splatter in different shielding gases. Reduced arc length led to increase of splatter in argon, but to less splatter in CO_2. The cross section area of welded beads varied with varying concentration of CO_2 in mixtures of AR-CO_2. Addition of 5 % nitrogen into argon resulted in a dense mass of pores below the surface forming a pine-twig pattern, whereas the weld surface remained sound and smooth. Addition of 5 % air into argon had similar effect. Single pores were detected in specimens which were welded with wire "20ХГСА" in argon; an addition of 5 % O_2 or CO_2 did not markedly change the density.

Sound welds were obtained by welding in argon with 20% CO_2, and by welding in carbon dioxide with wire "20ХГСА" and "20ХМА". Apparently, the reaction C+FeO CO+Fe (the basic cause of pore formation in welding of low-carbon and low-alloy steels in argon medium) is inhibited in carbon dioxide medium.

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135-3-3/19

TITLE: Shielding Gases for Arc Welding (Zashchitnyye gazy dlya dugovoy svarki).

Dense welds in steel "30ХГСА" were obtained by multi-layer welding only in carbon dioxide, or in argon with admixture of over 20% carbon dioxide. Steel "1Х 18Н9Т" is less prone to formation of pores, and dense welds were obtained in argon, CO_2, and in mixtures of argon with nitrogen or oxygen (up to 20%).

Presence of oxygen and CO_2 in shielding gases leads to losses of alloying elements.

The analysis results of weld metals, welded in different mediums, are presented in form of a table. It can be seen that titanium partly burns out and forms stable nitrides. Welds fully stabilized by titanium were only obtained in pure argon. The active titanium did not provide full stabilization of weld metal against intercrystalline corrosion when welding was done in CO_2. Satisfactory intercrystalline corrosion-resistance after a two-hour heat treatment at 650°C was only obtained when welding in pure argon or pure helium. The welds made in CO_2 and in mixtures of argon with CO_2 and with oxygen were prone to intercrystalline corrosion. Increased content of oxygen, CO_2, and particularly of nitrogen in the shielding medium led to increased tendency to

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135-2-4,19

TITLE: Shielding Gases for Arc Welding (Zashchitnyye gazy dlya dugovoy svarki).

formation of cracks.

The tendency to formation of cracks in welds is stronger in CO_2 than in argon, which is to be taken into account in multi-layer welding of corrosion-resistant steel.

The following recommendations are made concerning the use of the different shielding gases:

Low-alloy construction steels may be welded in carbon dioxide. The gases can be mixed in the process of welding with rotameters "PC -3". For gas admixtures up to 10% rotameters "PC -3a" are recommended.

Many stainless steels, not stabilized by titanium, can also be welded in CO_2. Steel "1Kh18N9T" for service at temperatures above 350°C should be welded in pure argon, but may be welded in CO_2 for service at temperatures below 350°C.

Arc welding with melting electrodes is used for welding materials of over 1.5 mm thickness. Stock thinner than that can be welded in shielding gas with tungsten electrodes. The use of multi-atom

Card 4/6

135-8-3/19

TITLE: Shielding Gases for Arc Welding (Zashchitnyye gazy dlya dugovoy svarki).

shielding gases is often advantageous, as they are inexpensive and possess positive properties. But these gases are not suitable for tungsten electrodes because tungsten disintegrates in them (H_2 is an exception) at high temperatures. Combined shielding by feeding argon through the inner nozzle of the torch will shield the tungsten electrode against destruction, and feeding other gases (CO_2 or nitrogen) through the outer nozzle will shield the welding puddle from the air. The velocity ratio of argon and multi-atom gas of 1:4 up to 1:3 gives sufficient stability of tungsten and arc.

Combined shielding with argon and carbon dioxide is applicable in welding of thin-sheet, low-alloy, and some stainless steels; combined shielding with argon and nitrogen can be used in welding of copper.

The experiments were carried out in the Institute for Physical Chemistry of the USSR Academy of Sciences by M.M. Kurtepov and A.S. Gryaznova.

Card 5/6

L 33994-65 EWI(l)/EWI(m)/T/EEC(b)-2/EWP(b)/EWA(c)/EWP(t) IJP(c) JD

ACCESSION NR: AP5007658 S/0020/65/160/006/1304/1306

AUTHORS: Nensberg, Ie. D.; Petrov, A. V.

TITLE: A comparative study of the electrical and thermal properties of single crystals and pressed samples of lead sulfide

SOURCE: AN SSSR. Doklady, v. 160, no. 6, 1965, 1304-1306

TOPIC TAGS: electric property, thermal property, single crystal, lead, sulfide

ABSTRACT: The authors' objective is to explain the differences in thermal and electrical conductivity in single crystals and pressed aggregates of PbS having electron conductivity and to consider the error resulting from computing thermal conductivity of the crystal lattice and the mobility of current carriers in pressed samples. Single crystals were obtained by slow cooling of a melt of $PbCl_2$ with excess S. Pressed specimens were obtained from crushed single crystals, sintered at 400°. The specimens were annealed for 70 hours at 650° and then for 150 hours at 300°. After this the electrical conductivity, thermal emf, Hall effect, and thermal conductivity were measured (at room temperature). The pressed specimens were found to have somewhat higher electrical resistance than single crystals. This difference is due to the effect of layers between individual

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L 33994-65
ACCESSION NR: AP5007658

grains, the resistance of these layers proving to be 10 to 40% of that of single crystals. The mobility of carriers in pressed samples was found to be but two-thirds the value for single crystals (400 as against 600 cm^2/v sec). The thermal conductivity of single crystals is also greater than that of pressed specimens, and the difference is again due to the conductivity of the intergranular layers. The thermal conductivity computed for single crystals declines with increase in current carriers, but for pressed samples, computations from experimental data show the reverse--an increase in thermal conductivity with increase in current concentration. The error comes from neglecting the effect of the intergranular layers. Orig. art. has: 2 figures and 5 formulas.

ASSOCIATION: Institut poluprovodnikov, Akademii nauk SSSR (Institute of Semiconductors, Academy of Sciences SSSR)

SUBMITTED: 09Sep64 ENCL: 00 SUB CODE: SS, EC
NO REF SOV: 003 OTHER: 001

Card 2/2

PETROV, A.V.

Metal transfer in the arc and base metal fusion in welding in a protective gas atmosphere. Avtom.svar. 10 no.4:19-28 Jl-Ag '57. (MIRA 10:10)

1. Nauchno-issledovatel'skiy institut tekhnologii i organizatsii proizvodstva aviatsionnoy promyshlennosti.

(Electric welding) (Protective atmospheres)

PETROV, A.V., kand.tekhn.nauk

Arc welding in an atmosphere of protective gases. Svar.proizv. no.11:21-24 N '57. (MIRA 10:12)

(Electric welding)

21090

AUTH:

TITLE

PERIODICAL

TEXT:

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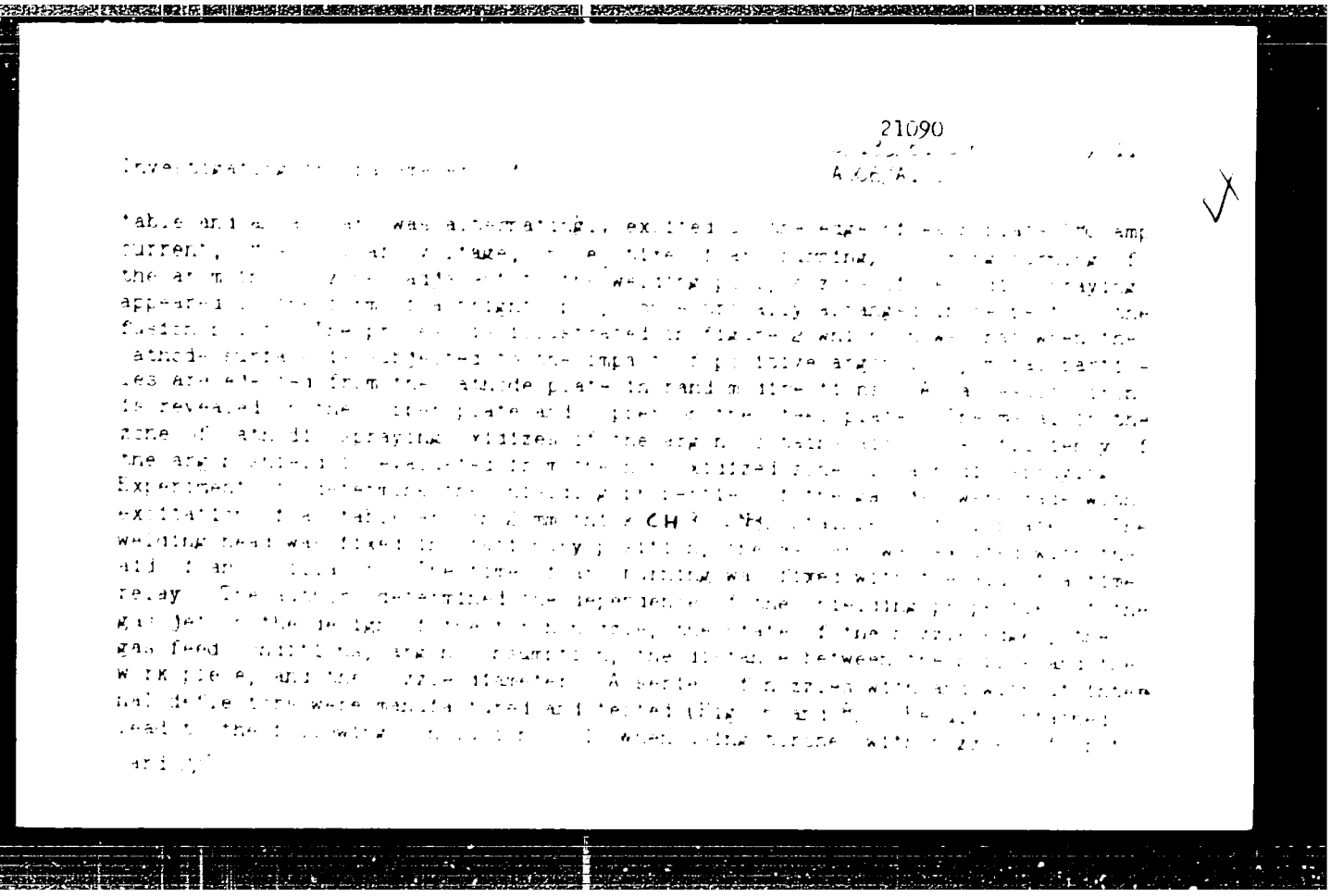

20 - 25 mm diameter, the non-oxidized zone of cathodic spraying on the surface of the welded work piece is in the majority of cases characteristic of the argon-jet shielding properties. Measurements of the non-oxidized zone of the cathode spraying when exciting an a-c arc with tungsten electrode can be taken as a basis for determining efficient parameters of the shielding gas jet. 2. The basic requirements to the design of a torch nozzle for arc welding in shielding gas, assuring optimum shielding effects, are as follows: a) the nozzle should be determinated by a cylindrical part whose length must not be below the diameter of the outlet aperture; b) the diameter of the nozzle outlet aperture when welding with tungsten electrodes, must be 12 - 18 mm under welding conditions generally used. Large diameter nozzles (24 - 28 mm) should be used for welding with consumable electrode due to the internal jet disturbance of the jet by the arc. Torches of manual argon-arc welding of thin sheet materials should be supplied with about 8 mm diameter nozzles. c) Inside the nozzle the formation of separate jets with high outlet speed should be absolutely prevented; for this purpose the insertion of deflectors is recommended or the arrangement of the channels perpendicularly to the nozzle wall; d) the internal nozzle edge should be unrounded and clean, without metal splashings; 3. At the given nozzle diameter, increased gas consumption raises the shielding properties of the jet only up to a certain limit;

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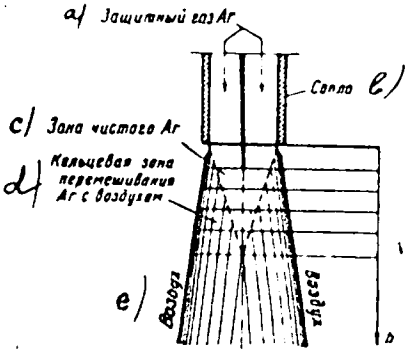
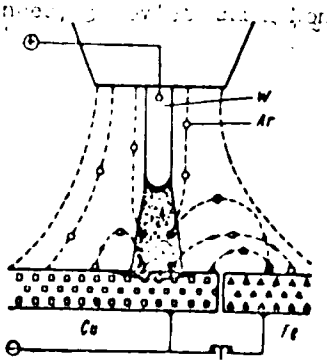
Beyond this limit further increase of gas consumption impairs the shielding properties. For 6 - 7 mm diameter nozzles, best shielding properties of the jet are observed at 10 l/min argon consumption. Higher current intensity raises the disturbing effect of the arc on the gas jet. Therefore, it is imperative to increase the nozzle diameter and gas consumption at higher current intensities. For 8 - 18 mm diameter nozzles, the distance from the work piece should not exceed 15 - 16 mm At 25 mm distance even better shielding properties of the gas jet are ineffective at any gas consumption. There are 2 figures and 5 references, 3 [illegible] Soviet.

Figure 1:



Schematic drawing of free argon flow from the nozzle a - shielding gas (argon); b-nozzle; c-pure argon zone; d-circumferential zone of argon and air mixing; e-air

Figure 2:



Schematic representation of the cathodic spraying process

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12300 also 1513

AUTHORS: Petrov, A. V., Candidate of Technical Sciences, Shtrikman, M. M., Engineer

TITLE: The effect of rolling welded joints on the properties of welds of heat-resistant CrNiN) type steels

PERIODICAL: Svarochnoye proizvodstvo, no. 7, 1961, 1-4

TEXT: The authors investigated the possibility of raising the strength of weld joints of austenite-martensite stainless steels by rolling with subsequent aging at 480°C. Grade 1H2 (3N2) and 1H3 (3N3) steel specimens (δ = 1 mm) were joined by automatic argon arc welding without and with filler wire under the following conditions: without filler metal: I = 70 amps; U = 9 v; v = 15 m/h; with 1 mm-diameter filler wire I = 90 amps; U = 12 v; v = 35 m/h. Cold working of the welds was performed by rolling on a cantilever machine. A system of compressing the weld is shown in Fig. 1. The deformation of welds was approximately evaluated from their thinning. Rolling was performed after full cooling-off of the welded specimens. The effect of fastening the specimens, and of the rolling force on the degree of deformation was studied on devices designed by

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23280

The effect of rolling welded

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S. A. Kurkin and others at MVTU im. Bauman. The specimen was fastened either on a backing plate or in a frame (Fig. 2). The possibility of strengthening weld joints by ultrasonic treatment was also investigated, using 3.6 mm thick SN[illegible] steel specimens and a 10 kw ultrasonic generator at 20 cycles frequency. As a result of the tests performed the following conclusions are drawn: The strength of weld joints of the investigated steels is below that of the base metal due to their austenitic structure. The welds can be strengthened by cold working with steel rolls and subsequent aging at 480°C. During cold working the dendritic structure of the weld is destroyed and a martensite phase is formed, which is subjected to dispersion hardening at 400-500°C. The degree of strengthening of the weld (i.e. the efficiency of rolling) is raised with rolling force increasing up to 3,000-4,000 kg. Its further rise entails greater warping of the specimen without noticeable increase of the weld strength. The number of passes and the system of rolling the weld have only a slight effect on its mechanical properties. The method of fastening the specimen affects the strength of the weld. Highest strength is shown by specimens rolled in a frame (Fig. 2). Rolling and aging considerably raise the mechanical properties of the weld joint at higher test temperatures (by a factor of 1.5 at 400°C). Ultrasonic treatment of the weld produces surface strengthening of the metal without raising the strength of the weld joint.

Card 2/4

AUTHORS: Petrov, A. V. and Shtrikman, M. M. Moscow

TITLE: The properties of welded joints of CN heat-resistant steels

PERIODICAL: Avtomaticheskaya svarka, no. , 1961, [illegible]

TEXT: Information is presented on the properties of welded joints of the argon arc method from CH (SN) steel, and a heat treatment of the specimens uniform strength of the welded joints. The heat-resistant CN steel of the austenite-martensite class is widely employed in the machine-building industry. The composition of three "CN" grades is given (Table 1):

Percentage chemical composition

Steel	C	Cr	Ni	Al	Mo	Mn	Si	S	P
SN2	0.05-0.09	14.0-15.[illegible]	[illegible].0-[illegible].4	0.7-1.[illegible]	-	-	-	-	-
SN3	0.06-0.10	16.0-17.5	4.5-5.5	-	[illegible]	[illegible]	[illegible]	-	-
SN4	0.05-0.10	14.[illegible]-1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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[illegible]

The properties of welded joints [illegible]

This steel has an austenitic [illegible] structure after normalization [illegible]. Additional normalization at 950-[illegible]°C causes austenite [illegible] treatment at -70°C or cold hardening easily transforms austenite into martensite. The presence of Al and Mo causes the formation of a third phase (according to data developed by Ya.M. Potak, V.V. Sachkov and [illegible] Popova) in aging at 4[illegible]0-500°C. In strengthened state, the resistance and plasticity modulus of SN at elevated temperatures is 1.5-2 times higher than of any other steel or alloys containing aluminum and titanium. Careful shielding is necessary in welding to protect the metal from oxidation. Heat treated metal near the welds consists of austenite, martensite and separated carbides, and its maximum strength is reduced to [illegible] kg/mm², the weld metal like the base metal also has lowered strength and acquires a coarse-dendritic austenite structure, while the base metal retains its original martensite-austenite structure with a clearly expressed rolled texture. It was experimentally impossible to raise the strength of joints by welding with stronger current and correspondingly higher steel. Rolling of welds with subsequent aging at 4[illegible]°C raised the strength of the joints to [illegible] kg/mm². It was

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24777

The properties of welded joints...

proved that the joints could be greatly strengthened by normalization at 950-975°C with subsequent cold treatment for 2 hours at -70°C and aging for 1 hour at 450-480°C. Cold treatment and aging alone was practically ineffective. Full treatment (normalization, cold treatment and aging) was particularly effective in strengthening SN4 steel, but did not markedly increase the vibration strength. The resistance of welds to general corrosion was high; however, intercrystalline corrosion developed in heat-treated metal at the welds in the area where the carbides were more separated. Heating to about 900°C caused increased formation of carbides and the highest intercrystalline corrosion. The SN3 steel was the grade most prone to intercrystalline corrosion, particularly after normalization and cold treatment prior to welding. Full thermal treatment after welding fully eliminated this concentrated corrosion; by increasing the aging temperature to 500-600 C, the carbides were separated in the weld metal where intercrystalline corrosion was observed. The following conclusions were drawn: (1) Welded joints of SN steel have a maximum strength of 95-100 kg/mm^2 and a yield limit of 35-60 kg/mm^2 after welding, regardless of the state of welded elements prior to welding. (2) Full heat treatment (normalization, cold treatment and aging) may raise the maximum strength and yield point of welded joints

Card 1/4

The properties of welded joints...

to about the strength and yield limit of the base metal at room temperature and above. (x) Welding does not reduce the general corrosion resistance of SN steel, but welded joints made of this steel are prone to intercrystalline corrosion in the zone of increased carbide formation. Full heat treatment raises the intercrystalline corrosion resistance if the aging temperature does not exceed 500°C. Welds in SN4 steel have the highest corrosion resistance [Abstracter's note: Essentially complete translation]. There are 5 figures, 4 tables and 1 Soviet reference.

SUBMITTED: September 2, 1960

Card 4/4

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A006/A101

I 2300

AUTHORS: Petrov, A V., Candidate of Technical Sciences, Slavin, G A , Engineer

TITLE: Automatic welding of thin steel sheets with a pulsating arc in argon atmosphere

PERIODICAL: Svarochnoye proizvodstvo, no. 2, 1962, 18 - 21

TEXT: Difficulties in welding thin steel sheets (less than 0.6 mm) are widely eliminated with the aid of a pulsating arc combined with an "auxiliary" arc in argon atmosphere. The peculiarity of this method is the maintenance of an independent 0.8 - 2 amp arc between the tungsten electrode and the part to be welded. The pulsating arc is superposed onto the auxiliary arc. The continuous burning of the auxiliary arc eliminates "straying" of the pulsating arc during its repeated excitation and assures constant electric parameters of the process and stable spot dimensions. On the basis of special investigations, a power supply source and a technology were developed for welding with a pulsating arc. The process is performed on a copper backing plate in pneumatic rose key-type clamps. The backing plate has a longitudinal groove 0.15 - 0.2 mm deep and 1.8 - 2.0 mm wide. To reduce warping of the edges, it is recommended to use "rigid" welding conditions. However, an excessive reduction of the pulse duration may cause undercuttings or

Card 1/2

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A006/A101

Automatic welding of thin steel sheets

the periphery of spots. To raise the stable burning of the auxiliary and the pulse arc, it is recommended to employ a tungsten electrode of 1.0 mm in diameter, tapered at 30 - 40°. Approximate welding conditions are given in Table 1. The new method assures high stability of the welding process, satisfactory formation of butt welds on thin steel sheets, least warping of edges, absence of sagging of seams during welding without filler wire, and absence of craters in the welded spots. Mechanical tests of 0.2 - 0.5 mm thick specimens showed that ultimate strength of welds subjected to tension was equal to that of the base metal in annealed state. The specimens broke down in the weld-adjacent zone, the bending angle was 180°. There are 2 tables and 10 figures.

ASSOCIATION: NIAT

Card 2/2

L 22054-66 EWT(m)/EWA
ACC NR: AP6006178 SOURCE CODE: UR/0135/66/000/002/0001/0004

AUTHOR: Petrov, A. V. (Candidate of technical sciences); Slavin, G. A. (Candidate of technical sciences)

ORG: none

TITLE: A study of the technical potential of the pulse arc

SOURCE: Svarochnoye proizvodstvo, no. 2, 1965, 1-4

TOPIC TAGS: arc welding, pulse welding, alloy steel, mechanical strength, welding equipment

ABSTRACT: The pulse arc welding method was evaluated by studying certain process parameters, the character of the welded seam and the heat affected zone. Equations for the heat flow rate q_p and the welding current I_p as a function of impulse time t_i and pause time t_p are given. Experiments were done on 1Kh18N9T steel of 3.0 mm thickness and the efficiency was given as a function of cycle stability $G = t_p/t_i$, welding current I_p (this was calculated from $I_p = I/(1 + t_p/t_i)$ where I is pulse current) and pulse vs continuous arc. The temperature field was obtained from the

Card 1/3 UDC: 621.791.8.004.12

following equation:

$$T(r, x, z) = m(r, z)\frac{q_p}{2\pi\lambda\delta} e^{-\frac{vx}{ra}} K_0\left(\frac{vr}{2a}\right).$$

The field was plotted as a function of x-y coordinates for G = 0, 1, 3. The pulse method is deemed better than continuous welding since it melted the metal more efficiently with a smaller heat affected zone. Residual stresses were found to be much lower in pulse welded samples and mechanical properties and seam densities higher. The thermal cycle at various points from the seam axis is given as a function of time (again calculated by the above equation) for continuous and pulse welding. For pulse welding, the metal was much hotter at equivalent distances (0 to 6 mm); the solidification time (1 to 3 sec) was given as a function of G for pulse cycles of 0.35 and 0.48 sec and a maximum was reached at $G \approx 0.5$ (3 sec for 0.36 sec and 1.7 sec for 0.48 sec). The maximum density of welds made from AMg6 aluminum also occurred at G = 0.5. Mechanical property data are given for pulse and continuous welding of 30KhGSNA steel (1.0 mm thick) as a function of the process parameters. The maximum strength (119.5 kg/mm^2) was obtained for pulse arc welding at 240 a, t_p = 6.00 sec, t_i = 0.38 sec and G = 16. Seam dimensions are given for stainless

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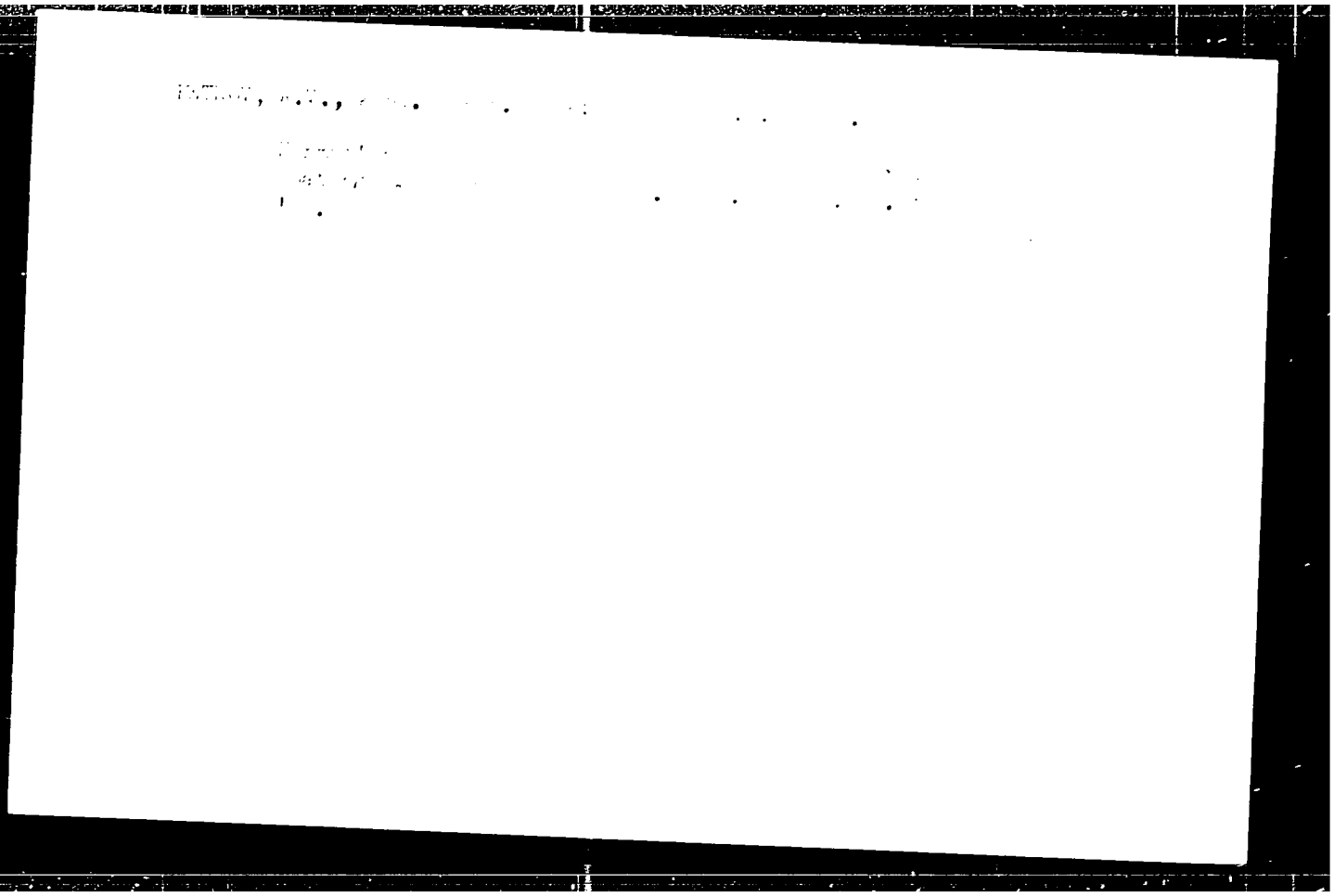
L 22[illegible]-66
ACC NR: AP6006178

steel as a function of metal thickness (0.2 to 0.6 mm), displacement, and dimensions of the fusion zone. Orig. art. has: 8 figures, 2 tables, 5 formulas.

SUB CODE: 13,11/ SUBM DATE: 00/ ORIG REF: 002/ OTH REF: 000

Card 3/3



L 22976-66 EWT(m)/EWP(w)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k) IJP(c) JD/HM/HW
ACC NR: AP6011537 SOURCE CODE: UR/0135/66/000/004/0026/0027

AUTHOR: Shtrikman, M. M.; Petrov, A. V.

ORG: none

TITLE: Improving the properties of welded VN52 steel joints by planishing

SOURCE: Svarochnoye proizvodstvo, no. 4, 1966, 26-27

TOPIC TAGS: precipitation hardenable steel, martensitic steel, stainless steel, steel weld, weld planishing/VNS2 steel, SN3 steel

ABSTRACT: The effect of planishing on the properties of welded VNS2 and SN3 steel joints has been investigated. Specimens 1 mm thick were TIG welded without filler metal. During planishing, SN3 steel welds were found to be under tension and the weld-adjacent zones, under compression. The welds of VNS2 steel, unlike the majority of steels, are under compression and the weld-adjacent zones are under tension stresses. VNS2 steel undergoes the martensitic tranformation with a volume increase in the temperature range 250—350C. The absolute values of residual stresses in the case of VNS2 steel were found to be 35—50% lower than those of SN3 steel. The planishing was done in one pass with rollers 80 mm in diameter. Planishing with a pressure of 1500—2000 kg almost completely eliminated the internal stresses and distortion. No structural changes were observed in planished metal. Planishing with a pressure of 1000—3000 kg increases somewhat the tensile strength of VNS2 steel joints. Subsequent

Card 1/2 UDC: 621.791.052.004.12:621.771

L 22976-66

ACC NR: AP6011537

aging brings about a further increase of 15—20 kg, to about 140 kg/mm^2. The bend angle was not affected by planishing and remained unchanged at 80—100C. The fatigue strength increased from 27 for unplanished welds to 39 kg/mm^2 for planished welds. The strength of VNS2 welds increased with increasing planishing pressure up to 3000—4000 kg. Further increase of pressure had no effect. For the reduction of distortion in SN3 steel joints, planishing pressure must be applied to welds, and in VNS2 steel, to the heat-affected zones. Orig. art. has: 5 figures. [WW]

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 002/ ATD PRESS: 4/238

Card 2/2

ACC NR: AP7013136 SOURCE CODE: UR/0139 66/000 006/0141 0143

AUTHOR: Kessenikh, R. M.; Pokholkov, Yu. P.; Petrov, A. V.

ORG: Tomsk Polytechnical Institute im. S. M. Kirov (Tomskiy politekhnicheskiy institut)

TITLE: Peculiarities of thermal aging of epoxide compound of hot hardening

SOURCE: IVUZ. Fizika, no. 6, 1966, 141-143

TOPIC TAGS: thermal aging, epoxy resin, phthalic anhydride, hardening, thermal stability

SUB CODE: 11,07

ABSTRACT: It has been established for some time that with such dielectrics as polystyrol, polyethylene-terephthalate, and others which have bulky groups in their structures such as a benzene ring, $COOCH_3$ group, etc, the dependence of the specific resistance on the temperature passes through a minimum in the region of the temperature of vitrification. A minimum temperature for the specific resistance of polymers is explained by superimposing the polarization current on the conductance current (B. I. Sazhin; "Dependence of Electric Conductance of Polymers on the Temperature;" Vysokomolekulyarnyye Soyedineniya No 6, 1961).

0933 0832

ACC NR: AP7013136

In this article, the authors discover similar laws governing the hot hardening of an epoxide compound containing 100 parts by weight of ED-6 resin and 60 parts by weight of phthalic anhydride. The hardening took place over a 24-hour period at a temperature of 140°C. Thermal stability of the compound obtained was 120°C. A minimum temperature was found for the specific resistance of a pure thermo-reactive epoxide compound which shifted into the region of higher temperatures as the aging continued. Orig. art. has: 2 figures.
[JPRS: 40,207]

Card 2/2

ACC NR: AT6022245 SOURCE CODE: UR/0000/66/000/000/0028/0033

AUTHOR: Petrov, A. V.

ORG: none

TITLE: Calculation of certain parameters of a semipermanent inductive memory storage element

SOURCE: Vsesoyuznaya nauchnaya sessiya, posvyashchennaya Dnyu radio. 22d, 1966. Seksiya elektronno-vychislitel'noy tekhniki. Doklady. Moscow, 1966, 28-33

TOPIC TAGS: Electromagnetic memory, computer memory, computer storage

ABSTRACT: The effect of eddy currents induced in the semipermanent inductive memory metallic punched cards is investigated. The magnitude of these currents depends on the respective position of excitation and read windings, the rate of magnetic flux change, and the permeability and conductivity of the metallic cards. The effect of these eddy currents on the output signal may be expressed by a system of linear equations relating these currents and the card geometry (i.e. punched hole dimensions and spacing between them). Thus, the current density distribution on the card surface may be found from which the minimum allowable spacing between adjacent bit apertures may be calculated. The noise interference in neighboring read wires may also be estimated. Orig. art.:has: 7 formulas and 1 figure.

SUB CODE: 09/ SUBM DATE: 26Apr66

Card 1/1

L 06401-67 EWT(d)/EWP(l) IJP(c) BB/GG
ACC NR: AT6024279 SOURCE CODE: UR/2976/66/000/005/0038/0050

AUTHOR: Petrov, A. V.; Vinogradov, V. I.

ORG: none

TITLE: Permanent memory based on metal cards

SOURCE: Moscow. Vysshaye tekhnicheskoye uchilishche. Vychislitel'naya tekhnika, no. 5, 1966, 38-50

TOPIC TAGS: electromagnetic memory, data storage, computer storage device, magnetic circuit, punched card

ABSTRACT: Principles, construction, and performance of a permanent electromagnetic computer storage system based on perforated metal cards are discussed. Figure 1 shows two wire loops coupled by a common magnetic field. The voltage induced in L_2 due to the current flowing in L_1 is given as

$$e_2 = M_{21} \frac{di_1}{dt} = 0.$$

where M_{21} is the mutual inductance determined by the geometry of the circuit and magnetic permeability of the medium. Hence for a given current pulse in the primary, the voltage output of the secondary depends on the mutual inductance or, for a fixed geometry, on the magnetic permeability of the medium between the two loops. A permanent memory system utilizes this physical relation. The loops are mounted on two

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L 06401-67

L 06401-67
ACC NR: AT6024279

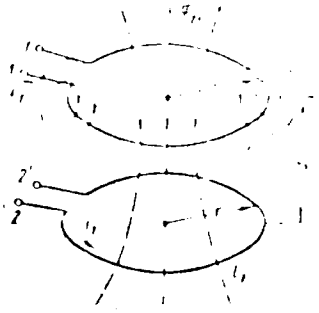

Fig. 1.

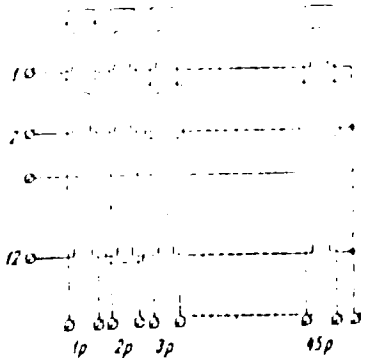

Fig. 2.

SUB CODE: 09/ SUBM DATE: 00/ ORIG REF: 003/ OTH REF: 002

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L 32689-66 EWT(m)/EWP(v)/T/EWP(t)/EWP(k) IJP(c) JD/HM

ACC NR: AP6012284 SOURCE CODE: UR/0125/65/000/011/0063/0067

AUTHOR: Slavin, G. A.; Petrov, A. V.; Korotkova, G. M.; Filippov, M. A.

ORG: none

TITLE: Power source for pulsed DC arc

SOURCE: Avtomaticheskaya svarka, no 11, 1965, pp 63-67

TOPIC TAGS: electric power source, electric arc, arc welding, pulse welding, circuit design

ABSTRACT: The pulsed DC arc welding method is a variation of shielded arc welding with a nonconsumable electrode, which can be used to weld stainless and high-temperature steels with wall thickness of 0.3-2.5 mm. It requires a power source that must assure the required range of the control of pulse time t_p and pause time t_{pa}, the required extent of current regulation, the ionization of the arc gap during the pauses and a definite front of current rise during the pulse. In this connection, the authors determined experimentally the optimal parameters of a power source of this kind by welding specimens of 1Kh18N9T steel 0.4, 0.8, 1.0 and 3.0 mm thick, the criterion used being the melting power of the pulsed arc, characterized by its thermal

Card 1/2 UDC: 621.791.03:621.311.6

L 32689-66
ACC NR: AP6012284

efficiency. On the basis of experimentally plotted curves of thermal efficiency as a function of current-pulse time it is established that the power source must assure a pulse time of 0.06-0.4 sec and hence also a pause time of 0.06-0.4 sec; the pulse shape must be rectangular and hence the approximate current rising and drooping time may not exceed 0.02 sec. Accordingly, the power source should assure the regulation of current within the range of from 15 to 350 a. The circuit of the power source should include a welding-current rectifier, a three-phase power transformer and a thyratron-type breaker designed to turn on and off the current in the primary winding of the transformer, to which it is connected in series, and to regulate the current-pulse time. Orig. art. has: 7 figures.

SUB CODE: 09 SUBM DATE: 29Apr65/ ORIG REF: 001

Card 2/2

L 52696-66 EWT(m)/EWP(v)/EWP(t)/T/ETI/EWP(k) IJP(c) JD/HM/HW
ACC NR: AP6015104 (N) SOURCE CODE: UR/0135/66/000/005/0018/0019

AUTHOR: Petrov, A. V. (Candidate of technical sciences); Slavin, G. A. (Candidate of technical sciences)

ORG: none

TITLE: Warping of thin sheet edges during welding

SOURCE: Svarochnoye proizvodstvo, no. 5, 1966, 18-19

TOPIC TAGS: arc welding, argon shielded arc, thin sheet welding, thin sheet warping, warping prevention, stainless steel sheet, aluminum alloy sheet

ABSTRACT: A serious problem in arc welding of thin (less than 0.6 mm thick) sheets is the warping of sheet edges which unavoidably leads to burned through holes in the weld. A special gage has been devised for measuring the magnitude of warping. The data obtained with this device indicated that in 1Kh18N9T, EI654, and SN-3 stainless-steel sheets 0.3—0.5 mm thick, warping begins ahead of the arc at a distance of 16—20 mm and reaches a maximum at a distance of 3—5 mm. The magnitude of the warping increases with decreasing sheet thickness and in 0.3—0.5 mm thick sheets, is about 1 mm. Cold-rolled sheets, as a rule, preserve the direction of warping (up or down) in which they have warped at the beginning of welding. On the basis of these observations, several methods for preventing warpage or for minimizing its negative effects have been developed. One method is based on the use of clamping devices.

Card 1/2 UDC: 621.791.753.93.011

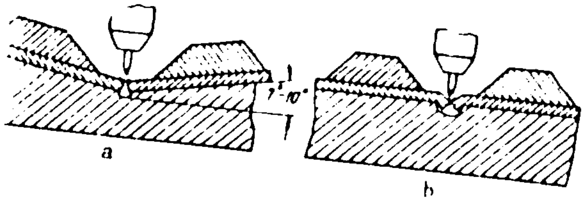

Fig. 1. Setup for welding with controlled direction of warping by angular backing bar (a) or by flanging the sheets (b)

Since the distance between the clamps must be very short for sheets 0.1—0.5 mm thick (4—8 mm) and is consequently impractical, a traveling clamping device has been designed which moves at a certain fixed distance from the arc, pressing the sheet edges to the backing bar. Another method (see Fig. 1) is based on the tendency of sheets to warp in the direction of the initial warping. This method is especially effective with materials which have a relatively low yield strength, such as AMts or AMg aluminum alloys. AMg6 alloy tanks with a wall thickness of 0.3—0.5 mm were successfully welded by this method. Helium added to the shielding argon increases the depth of penetration, reduces the width of the weld and heat-affected zone, and thus reduces warping. Pulsed-power arc welding or constricted-arc welding reduces warping by 40 or 43% respectively compared to conventional TIG welding. Orig. art. has: 6 figures.

SUB CODE: 11/ SUBM DATE: none/ ATD PRESS: 5123 [DV]

L 15734-66 EWT(1)/T IJP(c) GG
ACC NR: AP6000895 SOURCE CODE: UR/0181/65/007/012/3691/3693

AUTHOR: Petrov, A. V.

ORG: Institute of Semiconductors, AN SSSR, Leningrad (Institut poluprovodnikov AN SSSR)

TITLE: Phonon scattering by large lattice distortions

SOURCE: Fizika tverdogo tela, v. 7, no. 12, 1965, 3691-3693

TOPIC TAGS: phonon scattering, crystal lattice distortion, crystal impurity, sodium chloride, relaxation process, heat resistance

ABSTRACT: The purpose of the investigation was to check on a model proposed by the author earlier (with R. S. Yerofeyev and Ye. K. Iordanishvili, FTT v. 7, 3054, 1965), according to which the deviation of the phonon scattering from the Rayleigh law is due to the presence of appreciable deformation regions in the crystal lattice around the impurity atoms. To verify this assumption, tests were made on substances for which it is known beforehand that the impurity

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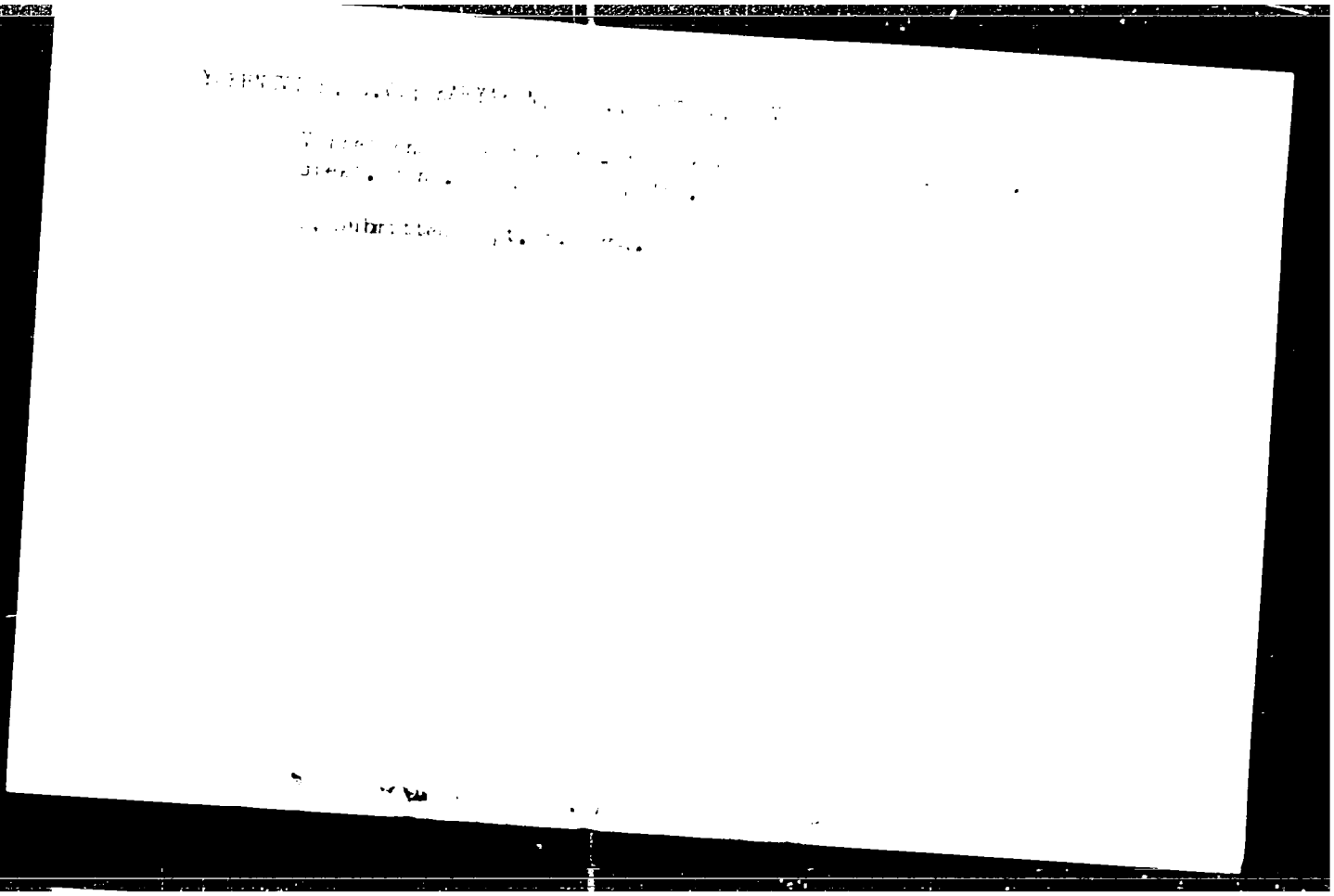
ACC NR: AP6000895

produces large crystal-lattice deformations, namely solid solutions of NaCl with other alkali-halide salts. The dependence of the relative change in the thermal resistance on the impurity concentration was calculated for different assumptions concerning the relaxation time, and compared with the experimental data for different impurity ions, as well as with the Rayleigh-law distribution. The results show that calculations based on the proposed model agree with experiment and that the investigation of the dependence of the thermal resistance on the impurity concentration yields additional information concerning the size of the deformation around the impurity ions. Orig. art. has: 2 figures, 1 formula, and 1 table.

SUB CODE: 20/ SUBM DATE: 15Jul65/ ORIG REF: 004/ OTH REF: 003

Card 2/2



L 7909-66 EWT(m)/T/EWP(t)/EWP(b)/EWA(c) IJP(c) JD
ACC NR: AP5025783 SOURCE CODE: UR/0363/65/001/009/1498/1501

AUTHOR: Nensberg, Ye. D.; Petrov, A. V.

ORG: Semiconductor Institute of the AN SSSR (Institut poluprovodnikov Akademii nauk SSSR)

TITLE: Thermally generated current carriers in lead sulfide

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 9, 1965, 1498-1501

TOPIC TAGS: lead compound, sulfide, single crystal, current carrier, thermodynamics, Hall effect, electric conductivity

ABSTRACT: Investigations were made of single crystals of lead sulfide, obtained by slow cooling of a melt. Samples 10x10x20 mm were cut from monocrystalline ingots. The samples were annealed in vacuum, quenched in ice water, and held for from 40 to 150 hours at the annealing temperature. On these samples, measurements were made of the electrical conductivity and the Hall effect, at room temperature. The article shows graphically and in tabular form the inverse dependence of the concentration of current carriers on the annealing temperature.

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L 7909-66
ACC NR: AP5025783

The maximum concentration of thermally generated current carriers attains a magnitude of $1x10^{19}$ cm^{-3} in the case of annealing at 1043 K, and the minimum, at 573 K, was $2x10^{18}$ cm^{-3}. It was found that the concentration of electrons generated in unalloyed samples, with heating, obeys the law:

$$n = A \exp -\frac{\Delta E}{kT}.$$

where n is the Hall concentration of current carriers; T is the annealing temperature, in K; k is the Boltzmann constant; and ΔE is the activation energy of the given process. A table exhibits the results of the annealing of unalloyed and alloyed samples of PbS. The experimental data permit the conclusion that unalloyed and weakly alloyed PbS of the p-type contains a considerable amount of excess lead (not less than $1x10^{19}$ atoms of Pb/cm^3) which makes it unstable under heat treatment. Strongly alloyed PbS of the p-type (with a concentration of $1x10^{19}cm^{-3}$ and above) do not contain excess lead; this makes it possible to carry out measurements at high temperatures. Data on the Hall mobility can be regarded as a confirmation of the above conclusions. Orig. art. has: 3 figures and 1 table
SUB CODE:IC,EM/ SUBM DATE: 09Apr65/ ORIG REF: 006/ OTH REF 009
Card 2/2

L 51052-65 EEO-2/EWT(l)/EEC(t)/EED-2 Pm-4/Pn-4/Pac-4/Pi-4/Pj-4/Ir-4/ 2
Pi-4 WR
ACCESSION NR AM5001448 BOOK EXPLOITATION S/ 60 B+/

Dulevich, Vladimir IEvgen'yevich; Korostelev, A. A.; Mel'nik, YR. A.; Burenin, N. I.; Petrov, A. V.; Veretyagin, A. A.; Bandurko, N. G.

Theoretical principles of radar (Teoreticheskiye osnovy radiolokatsii), Moscow, Izd-vo "Sovetskoye radio", 1964, 731 p. illus., biblio., index. Errata slip inserted. 12,600 copies printed.

TOPIC TAGS: radar

PURPOSE AND COVERAGE: This book is intended for students in the radio engineering faculties of higher technical educational institutions and can serve as an aid to engineers and graduate students specializing in radar. The book examines the principles of radar, methods of coordinate measurement and scanning and circuits for radar stations of three types: with an operator, a continuous computer installation and a digital computer. It presents the characteristics of radar signals with a consideration of the statistical regularities that occur in the reflection of radio waves, their propagation, and the presence of noise on the signal. The book describes methods of building optimal and near optimal receivers considering statistical, spatial and frequency time characteristics of the signal and interference. The book estimates the maximum capacities

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of radar in detecting and measuring target coordinates. It gives a statistical evaluation of target position or trajectory on the basis of radar measurement data. In conclusion, the book describes methods of combating various types of interference and the operating principles of passive radar systems. All of the factual and numerical material is taken from the open domestic and foreign press.

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ACCESSION NR AM5001448

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SUBMITTED: 25May64 SUB CODE: DC

NO REF SOV: 250 OTHER: 041

Card 3/3

PETROV, A.V.; SHTRUM, Ye.L.

Thermal conductivity and chemical bonding in type ABI_2 compounds. Fiz. tver. tela 4 no.6:1442-1448 Je '62. (MIRA 16:6)

1. Institut poluprovodnikov, AN SSSR, Leningrad.
(Semiconductors—Thermal properties) (Chemical bonds)

S/726/58/000/001/003/004
E195/E385

3

AUTHORS: Galkin, A.M., Gorlov, O.G., Kotova, A.R., Kosov, I.I., Petrov, A.V., Serov, A.D., Chernov, V.N. and Yakovleb, V.I.

TITLE: Investigation of the vital activity of animals during flight in an airtight rocket cabin to an altitude of 212 km

SOURCE: Predvaritel'nyye itogi nauchnykh issledovaniy s pomoshch'yu pervykh sovetskikh iskusstvennykh sputnikov Zemli i raket; sbornik statey. no. 1. XI razdel programmy MGG (rakety i sputnik). Moscow, Izd-vo AN SSSR. 112 - 129

TEXT: The behavior of animals during high-altitude flight in rockets as well as their state of health and changes registered after the flight have been studied in the USSR since 1949. The results of investigations carried out on 14 dogs of 5 - 7 kg in weight are described. Their blood pressure, pulse, respiration, before, during and after the flight were registered, cardiograms were made and their behavior during the flight filmed. A short

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Investigation of S/726/58/000/001/003/004
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description of the airtight cabin and its equipment is given. The conditions of rocket flights to altitudes of 100 to 212 km did not produce sudden changes from the normal in the physiological functions of animals nor in their behavior and health, kept under control after the flight. Some of the animals used in the tests were narcotized. During the active part of the flight the heart-beats, breathing and blood pressure of the non-narcotized animal usually increased. In the period of dynamic weightlessness the registered physiological parameters reached a high level with a decreasing tendency during the first 2-3 minutes. The return to the starting level of physiological conditions took place after 5 -6 min. of the action of dynamic weightlessness. There are 12 figures and 5 tables.

Card 2/2

FISH, Aron Yakovlevich; TARNOPOL'SKIY, Yuriy Matveyevich; AKUNTS, Karlen Armenakovich; PETROV, Aleksandr Vasil'yevich; POPOV, K.K., red.; BUL'DYAYEV, N.A., tekhn. red.

[Collectors of electrical machines using plastic materials] Kollektory elektricheskikh mashin na plastmasse. [By] A.IA. Fish i dr. Moskva, Gosenergoizdat, 1963. 191 p. (MIRA 16:4)

(Electric machinery) (Plastics)