"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

MESKHIYA, Shota Arbakovich

(Inst of History of the Acad Sci Georgian ssro) - Academic degree of Doctor of Historical Sciences, based on his defense, 24 January 1955, in the Council of the Inst of History of the Acad Sci USSR, of his dissertation entitled: "Cities and City Structure of Fuedal Georgia (17th and 18th Centuries)."

Academic degree and/or title: Doctor of Sciences

SO: Decisions of VAK, List no. 25, 10 Dec 55, Byulleten' VO SSSR, Uncl. JPRS/NY 547

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

SEVERIN, S.Ye.; MESKHOVA, N.P.

Effect of anserine on respiratory phosphorylation. Doklady akad. nauk SSSR 92 no.4:807-810 1 Oct 1953. (CLML 25:4)

1. Active Member Academy of Medical Sciences for Severin.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

MESKHRIKADZE, R. M.

2

1906. Reflexes from chemoreceptors of the hind limb of the frog affecting respiration. A. N. Bakuradze and R. M. Meskhrikadze. *Biul. eksper. Biol. Med.*, 1954, 38, 10—13; *Referat. Zh. Biol.*, 1956, Abstr. No. 50900.—On perfusion of the hind limbs with Ringer soln. with addition of 5 vol.% CO_2, 50—100 mg.% of lactic acid or adrenaline 1 ml. of 10^{-8} to 10^{-7} increase and acceleration of respiration occurs. Perfusion with ACh., 1 ml. 10^{-8} to 10^{-6}, brings on at first an acceleration and afterwards a slowing of respiration and an increased amplitude of respiratory movements. Injection of novocaine abolishes these reflexes. (Russian) D. H. SMYTH

Chair of Normal Physiology
Tbilisi Med. Inst.

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

MESKHRIKADZE, R.M.

Effect of TSkhaltubo baths on the conditioned reflex activity of dogs with an experimental neurosis. Soob. AN Gruz. SSR 28 no.6:745-752 Je '62. (MIRA 15:7)

1. TSkhaltubskiy filial Instituta kurortologii, Ministerstvo zdravookhrananiya Gruzinskoy SSR, Tbilisi. Predstavleno chlenom-korrespondentom AN Gruzinskoy SSR A.N.Bakuradze.
(TSKHALTUBO--HEALTH RESORTS, WATERING-PLACES, ETC.)
(CONDITIONED RESPONSE) (NEUROSES)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

MESKHRIKADZE, Revaz Mikhaylovich

[Effect of TSkhaltubo mineral water on the organism under normal conditions and in pathology] [Vliianie tskhaltubskoi mineral'noi vody na organizm v norme i patologii. Tbilisi, Gos.izd-vo "Sabchota Sakartvelo"] 1963. 322 p.[In Georgian] (MIRA 17:4)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

MESKHRIKADZE, R.M.

Effect of TSkhaltubo baths on the conditioned response activity in healthy dogs. Soob. AN Gruz. SSR 28 no.4:481-488 Ap '62. (MIRA 18:1)

1. TSkhaltubskiy filial Instituta kurortologii Ministerstva zdravo-okhraneniya Gruzinskoy SSR. Submitted October 15, 1960.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

MES'KIN, B.S.; MISHKEVICH, R.I.; SEROVA, N.Sh.

Change of hardness of commercial-grade, platinum-tungsten and palladium-tungsten alloys. Fiz. met. i metalloved. 12 no.1:140-144 Jl '61. (MIRA 14:8)
(Platinum-tungsten--Metallography) (Palladium-tungsten--Metallography)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

NEYMAN, Yan Markovich, inzh.; MOSYAGIN, Dmitriy Semenovich, inzh.; MESKIN, Boris Yefimovich; ANTONOVA, N.N., inzh.,

[Mechanization and automation of the processes of manufacturing heat insulating materials in renovated brick plants; based on materials of the Main Administration of the Building Materials Industry in Moscow Province] Iz opyta mekhanizatsii i avtomatizatsii protsessov proizvodstva teploizoliatsionnykh materialov na rekonstruirovannykh kirpichnykh zavodakh; po materialam Konstruktorsko-tekhnologicheskoi kontroy Glavmosoblstroimaterialov. Moskva, Gosstroiizdat, 1962. 38 p. (MIRA 17:3)

1. Akademiya stroitel'stva i arkhitektury SSSR. Nauchno-issledovatel'skiy institut organizatsii, mekhanizatsii i tekhnicheskoy pomoshchi stroitel'stvu. 2. Nachal'nik otdela mekhanizatsii i avtomatizatsii Konstruktorsko-tekhnicheskoy kontory Glavnogo upravleniya promyshlennosti stroitel'nykh materialov i stroitel'nykh detaley(for Neyman). 3. Rukovoditel' sektora tekhnicheskoy informatsii Konstruktorsko-tekhnologicheskoy kontory Glavnogo upravleniya promyshlennosti stroitel'nykh materialov i stroitel'nykh detaley (for Mosyagin). 4. Sotrudnik sektora tekhnicheskoy informatsii Konstruktorsko-tekhnologicheskoy kontory Glavnogo upravleniya promyshlennosti stroitel'nykh materialov i stroitel'nykh detaley (for Meskin).

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

VISHNYAKOVA, Ye.S., inzh.; RUMYANTSEVA, N.F., inzh.; BORONICHEV, G.A., inzh.; PITINOVA, L.V., inzh.; PETRUNIN, N.I., inzh.; MESKIN, I.M., inzh.; ANDREYEVA, L.P., inzh.; BISHENKEVICH, G.V., inzh.; RYABININA, A.I., inzh.; MOSHNIN, N.S., red. gazety; KOMKOV, A.I., otv. red.; YUNITSKIY, V.P., red.; FLIGEL'MAN, S.M., red.; ROZHDAYKINA, V., tekhn. red.

[Kalinin Artificial Fiber Combine]Kalininskii kombinat iskusstvennogo volokna. Kalinin, Kalininskoe knizhnoe izd-vo, 1960. 92 p. (MIRA 15:8)

1. Kalininskiy kombinat iskusstvennogo volokna (for all except Komkov, Yunitskiy, Fligel'man, Rozhdaykina).
(Kalinin--Textile fibers, Synthetic)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

GELLER, B.E.; MESKIN, I.M.

Numerical expression of the molecular weight distribution of polymers. Vysokom.soed. 2 no.1:29-34 Ja '60.
(MIRA 13:5)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna.
(Polymers) (Molecular weights)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

GELLER, B.E.; MESKIN, I.M.

Remarks by IU.V. Breatkin and M.M. Choshieva concerning the work "Numerical expression of the molecular weight distribution of polymers." Vysokom. soed. 6 no.11:2100-2101 N '64 (MIRA 18:2)

1. Tashkentskiy tekstil'nyy institut.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

MESKIN, S. S.

Title: Investigation of cupric acid rectifiers at the sonic and ultra-sonic frequencies.

Authors: V. T. Renne, A. V. Bogdanov and S. S. Meskin

Issuing Agency: Published by the Journal "Technical Physics Academy of Sciences of USSR"

Date: 1939 Vol. 9 No. 24

From List ATIC 17413-3

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

MESKIN, S.S., inzhener; GELLER, I.Kh., inzhener.

Conference on semiconductor rectifiers. Elektrichestvo no.6:93-94 Je '56. (MLRA 9:9)

(Electric current rectifiers)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

PHASE I BOOK EXPLOITATION 677

Geller, Isaak Khaimovich and Meskin, Samuil Semenovich

Poluprovodnikovyye vypryamiteli (Semiconductor Rectifiers) [2d ed., rev. and enl.] Leningrad, Leningradskiy Dom nauchno-tekhnicheskoy propagandy, 1957. 94 p. (Series: Obshchestvo po rasprostraneniyu politicheskikh i nauchnykh znaniy RSFSR. Poluprovodniki, vyp. 10) 15,000 copies printed.

Sponsoring Agencies: Akademiya nauk SSSR. Institut poluprovodnikov, and Leningradskiy Dom nauchno-tekhicheskoy propegandy.

Tech. Ed.: Freger, D. P.; Editorial Board: Ioffe, A. F., Academician (Ed. in Chief); Sominskiy, M. S., Candidate of Physical and Mathematical Sciences (Assistant Ed. in Chief); Maslakovets, Yu. P., Doctor of Physical and Mathematical Sciences; Smolenskiy, G. A., Doctor of Physical and Mathematical Sciences; Shalyt, S. S., Doctor of Physical and Mathematical Sciences; Regel', A. R., Candidate of Physical and Mathematical Sciences; Subashiyev, V. K., Candidate of Physical and Mathematical Sciences; Shagurin, K. A., Engineer; Achkinadze, Sh. D., Engineer.

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

Semiconductor Rectifiers

PURPOSE: This brochure is addressed to engineers and technicians working with semiconductor devices and materials.

COVERAGE: This monograph is the 10th of a series entitled "Poluprovodniki" (Semiconductors). A list of the 18 titles constituting the series is given at the end of each brochure. For translation of these titles, see abstract Nr. 674. This is the second edition, revised and enlarged. This brochure gives a description of industrial semiconductor rectifiers now being mass produced by Soviet industry. He briefly reviews the industrial applications of semiconductors, and the theory and operating principle of semiconductor devices. This brochure is intended to be only a broad introduction to the subject of semiconductor rectifiers. There are 10 Soviet sources (including 1 translation).

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Introduction 3

Ch. I. The Physical Bases of Rectification 4

Ch. II. Electrical Parameters and General Properties of Rectifying Cells 12

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

L 13050-63 EWP(q)/EWT(m)/BDS AFFTC/ASD JD

ACCESSION NR: AT3002996 S/2927/62/000/000/0139/0141

AUTHOR: Gulamova, M. A.; Kogan, L. M.; Meskin, S. S.; Mury*gin, V. I.

TITLE: Investigation of titanium-dioxide rectifiers acting as photodiodes [Report of the All-Union Conference on Semiconductor Devices held in Tashkent from 2 to 7 October 1961]

SOURCE: Elektronno-dy*rochny*ye perekhody* v poluprovodnikakh. Tashkent, Izd-vo AN UzSSR, 1962, 139-141

TOPIC TAGS: titanium-dioxide rectifier, photodiode

ABSTRACT: Joint effect of light and applied voltage on a titanium-dioxide rectifier coated with a semitransparent Ag film was investigated. As a photovoltaic cell, such a rectifier had a sensitivity of 0.1 mca per lum, and its photo-emf was 100-200 mv at 10,000 lux. As a photodiode, it had higher reverse currents at all voltages up to 10v, and the light-determined addition to the dark current was found to increase with higher voltages; in some cases it was a few hundred times as high as the photovoltaic-cell current. Photocurrent-voltage curves for 20,000 and 50,000 lux, photocurrent-time (light-dark) curves for 25, 80, and 140C, and a spectral-sensitivity distribution curve are presented in the article. The photodiode effect in titanium-dioxide rectifiers is similar in some

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L 13050-63

ACCESSION NR: AT3002896

respects to the negative photodiode effect in selenium photocells, the difference being that in the former the reverse current increases with illumination. This phenomenon is explained by deep-seated levels that tend to build up the space-charge concentration. Orig. art. has: 3 figures.

ASSOCIATION: Akademiya nauk SSSR (Academy of Sciences SSSR); Akademiya nauk Uzbekskoy SSR (Academy of Sciences UzSSR); Tashkentskiy gosudarstvenny"y (Tashkent State University)

SUBMITTED: 00 DATE ACQ: 15May63 ENCL: 00

SUB CODE: 00 NO REF SOV: 008 OTHER: 000

Card 2/2

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

L 13063-63 BDS/EWP(q)/EWT(m) AFFTC/ASD JD

ACCESSION NR: AT3003009 S/2927/62/000/000/0228/0235 58 57

AUTHOR: Meskin, S. S.; Layner, D. I.; Kogan, L. M.; Trushina, V. Ye.; Libov, L. D.

TITLE: Titanium rectifiers [Report of the All-Union Conference on Semiconductor Devices held in Tashkent from 2 to 7 October 1961]

SOURCE: Elektronno-dy*rochny*ye perekhody* v poluprovodnikakh. Tashkent, Izd-vo AN UzSSR, 1962, 228-235

TOPIC TAGS: titanium rectifier

ABSTRACT: Construction, physical phenomena, and results of testing of titanium rectifiers (manufactured in USSR since 1959) are reported. Electrophysical data of the source material, rutile, is given. Current-voltage characteristics (for 20, 150, and 250C), reverse-current-density, forward-voltage drop, cutoff voltage, differential resistance, capacitance, and barrier-layer width as functions of temperature (20-250C) are presented. Also resistance-voltage curves are given for the above 3 temperatures and within -5 +2 v. The following data that can be considered as ratings are supplied: operating temperature range -60 +250C; working voltage per element 11-25 v amplitude; reverse-current density 4, 6, and 8 ma per sq cm at -60, +20C, 150C, and 200-250C respectively; forward-current density

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ACCESSION NR: AT3003009

100-200 ma per sq cm; life 5,000 hrs or more at 20C. Orig. art. has: 9 figures, 4 formulas, and 2 tables.

ASSOCIATION: Akademiya nauk SSSR (Academy of Sciences SSSR); Akademiya nauk Uzbekskoy SSR (Academy of Sciences UzSSR); Tashkentskiy gosudarstvenny*y universitet (Tashkent State University)

SUBMITTED: 00 DATE ACQ: 15May63 ENCL: 00

SUB CODE: 00 NO REF SOV: 001 OTHER: 007

Card 2/2

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

S/0181/64/006/004/1145/1151

ACCESSION NR: AP4028444

AUTHORS: Kogan, L. M.; Meskin, S. S.; Goykhman, A. Ya.

TITLE: Diffusion of cadmium and zinc into gallium arsenide from the gas phase

SOURCE: Fizika tverdogo tela, v. 6, no. 4, 1964, 1145-1151

TOPIC TAGS: diffusion, gallium arsenide, surface concentration, semiconductor, penetration depth, error function

ABSTRACT: Determinations were made by electrical conductivity. It was found that the distribution of Cd with depth of the diffusion layer is described by error functions. The surface concentration in the temperature interval of diffusion (900-1100C) at a concentration of Cd vapor of $0.65 \cdot 10^{19}$ to $1.5 \cdot 10^{19}$ cm^{-3} is found to be $1 \cdot 10^{19}$ to $4 \cdot 10^{19}$ cm^{-3}. The coefficient of diffusion of Cd is related to temperature by the expression $D = 0.05 \exp(-\frac{2.8}{kT})$. The curve showing penetration of Zn into GaAs is anomalous. At first, the depth of penetration depends on the temperature of the vapor source during diffusion. The latter part of the

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ACCESSION NR: AP4028444

penetration curve may be defined by error functions. For this segment, the coefficient of diffusion is related to temperature by $D = 3 \cdot 10^{-7} \exp(-\frac{1}{kT})$. The surface concentration of Zn depends on the temperature of the vapor source but does not depend on the diffusion temperature (within the investigated interval of 800-1100C). The maximal surface concentration of Zn amounts to $3.5 \cdot 10^{20}$ cm^{-3}. The authors also investigated the effect of vapor pressure of As on the diffusion of Zn. A change in vapor pressure of As from 0.2 to 0.8 atm has no effect on the shape of the penetration curve or on the surface concentration of Zn. Measurements of the Hall constant and the resistivity in samples having the p layer ground off show that the initial properties of the sample do not change during diffusion. "The authors take this opportunity to express their thanks to D. N. Nasledov for his interest in the work and his valuable suggestions, and they thank B. I. Boltaks and B. V. Tsarenkov for their useful discussions on results of the work." Orig. art. has: 8 figures, 2 tables, and 10 formulas.

ASSOCIATION: none

SUBMITTED: 04Nov63 DATE ACQ: 27Apr64

Card 2/3 ENCL: 00

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

ACCESSION NR: AP4028444

SUB CODE: EC, SS NO REF SOV: 003 OTHER: 005

Card 3/3

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

L 18849-65 EWT(m)/EWP(t)/EWP(b) IJP(c)/RAEM(a)/AFWL/ESD(gs)/ESD(t) JD

ACCESSION NR: AP4043341 S/0181/64/006/008/2281/2288

AUTHORS: Imenkov, A. N.; Meskin, S. S.; Nasledov, D. N.; Ravich, V. N.; Tsarenkov, B. V.

TITLE: Electrical properties of pn tunnel junctions in gallium arsenide

SOURCE: Fizika tverdogo tela, v. 6, no. 8, 1964, 2281-2288

TOPIC TAGS: gallium arsenide diode, pn junction, single crystal, tunnel current, temperature dependence, forbidden band

ABSTRACT: Forward and reverse branches of the current-voltage characteristics of p-n tunnel junctions in GaAs were investigated between 77 and 425K. The junctions (10^{-5} cm^2 in area) were produced in single-crystal Zn-doped p-type material by alloying with tin. Direct current or voltage pulses (to avoid heating) were used. The forward (tunnel and recombination) current rose rapidly to a

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ACCESSION NR: AP4043341

maximum at 0.1 V; this was followed by an exponential fall of the current [$I \sim \exp(-qU/\mathcal{E}_1)$] nearly to zero at 0.5--0.7 V and an exponential rise [$I \sim \exp(qU/\mathcal{E}_2)$] on further increase of the voltage. The values of $\mathcal{E}_1$ and $\mathcal{E}_2$ were independent of temperature, which indicated the presence of levels in the forbidden band. The forward current was little affected by temperature due to a weak temperature dependence of the tunnel transition probability and of the Fermi function. The Fermi level at room temperature was $\zeta_p = 0.08$--0.15 eV for the p-region and $\zeta_n = 0.26$--0.32 eV for the n-region. The reverse tunnel current increased, linearly at $U \ll (\zeta_{p,n}/q)$ and quadratically at $U > (\zeta_{p,n}/q)$, with rise of the voltage across the junction. This indicated that at energies $\mathcal{E} \gtrsim \zeta_{p,n}$ the band involved in the reverse tunnel current was parabolic. The reverse

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ACCESSION NR: AP4043341

current varied very little with temperature, again due to a weak temperature dependence of the tunnel transition probability and of the Fermi function. "The authors are grateful to F. Kh. Kreyndel' and G. V. Kuznetsova for help with the work and to R. F. Kazarinov for a discussion of the results." Orig. art. has: 6 figures and 5 formulas.

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

SUBMITTED: 10Jan64 ENCL: 00

SUB CODE: EC, SS NR REF SOV: 004 OTHER: 007

Card 3/3

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

L 15326-65 EWT(1)/EPA(s)-2/EWG(k)/EWT(m)/EPF(n)-2/T/EWP(t)/EWP(b)/EWA(h) Peb/
Pt-10/Pu-4 IJP(c)/SSD/ASD(a)-5/AFWL/RAEM(a)/ESD(t) JD/WW/JG/AT
ACCESSION NR: AP4048890 S/0109/64/009/011/2042/2044

AUTHOR: Kogan, L. M.; Meskin, S. S.; Trushina, V. Ye.

TITLE: Special features of p-n junctions in gallium arsenide produced by cadmium diffusion

SOURCE: Radiotekhnika i elektronika, v. 9, no. 11, 1964, 2042-2044

TOPIC TAGS: p n junction, gallium arsenide, cadmium vapor, arsenic vapor

ABSTRACT: Junctions of the p-n type were produced by diffusing gaseous phase cadmium into n-gallium arsenide. Gallium arsenide plates with an electron concentration within (1 — 3) x 10^{17} cm^{-3} were oriented in the [111] direction. Diffusion was then carried out under an equilibrium pressure of cadmium vapor containing arsenic vapor; diffusion temperature varied between 900—1050C. In all experiments, the vapor-source temperature was 810C, corresponding to a cadmium-vapor concentration of 1.1 x 10^{19} cm^{-3}. Diffusion time varied from 6 to 12 hr. The p-n junctions could be divided into two groups according to their electrical properties: 1) those produced at a diffusion temperature

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ACCESSION NR: AP4048890

of 900—1000C; and 2) those produced at a diffusion temperature of 1020—1050C. The static volt-ampere characteristics for both groups are shown in Fig. 1 of the Enclosure. The characteristic voltage U_{ko} was approx. 1.0 v for the first group, while for the second it often exceeded the width of the forbidden zone. Comparative data obtained for the first and second groups respectively are: width of the space-charge layer at zero-bias, $(1.6 — 3) \times 10^{-5}$ vs $(0.8 — 4) \times 10^{-4}$ cm; width of the space-charge layer at critical voltage, $(3.5 — 5) \times 10^{-5}$ vs $(1.5 — 9) \times 10^{-4}$ cm; gradient of impurity concentration in p-n junction area, $(1.1 — 3) \times 10^{22}$ vs $(0.7 — 2) \times 10^{20}$ cm^{-4} or less; critical voltage, 10 — 14 vs 20 — 100 v or higher; critical gradient, $(1.2 — 5) \times 10^{5}$ vs $(0.8 — 2) \times 10^{5}$ v/cm; differential resistance at 100 mamp, 0.2 — 1.0 vs 0.6 — 5.0 ohm; forward voltage drop at 100 mamp, 1.17 vs 1.2 — 2.5 v.

ASSOCIATION: none

SUBMITTED: 25Nov63 ENCL: 01 SUB CODE: SS, IC

NO REF SOV: 001 OTHER: 000 ATD PRESS: 3139

Card 2/3

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

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ACCESSION NR: AP4048890

ENCLOSURE: 01

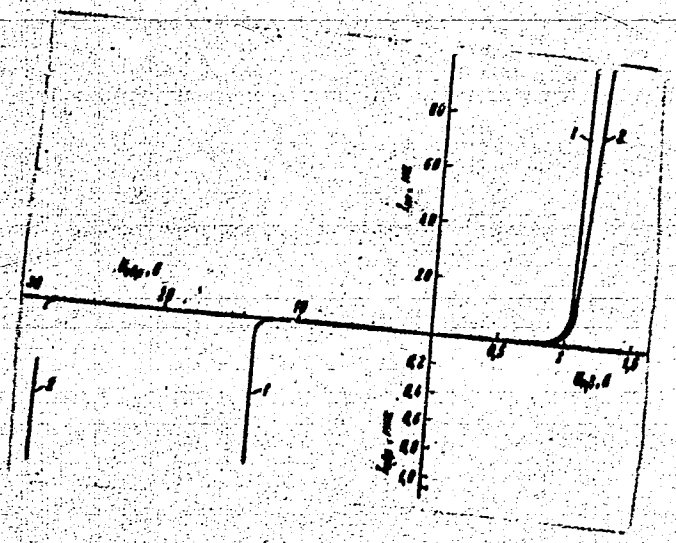

Fig. 1. Volt-ampere characteristics of GaAs p-n junctions at 300K

1 - First group; 2 - second group.

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L 00088-66 EWT(m)/EWP(t)/EWP(b) IJP(c) JD

ACCESSION NR: AP5022338 UR/0149/65/000/003/0086/0092

669.643

31
30
B

AUTHOR: Libov, L. D.; Meskin, S. S.

TITLE: The problem of fusing tin into gallium arsenide

SOURCE: IVUZ. Tsvetnaya metallurgiya, no. 3, 1965, 86-92

TOPIC TAGS: solubility, tin, gallium arsenide, phase analysis

ABSTRACT: The starting materials for the tests were: polycrystalline gallium arsenide and OSCh-00 tin. Before weighing, the gallium arsenide samples were polished with electrocorundum powder and cleansed in a solution of sodium hydroxide and hydrogen peroxide. The weight of the gallium arsenide samples varied from 4 to 8 grams, and the weighed portions of tin from 15 to 27 grams. Temperature variations were ± 10C from the nominal temperature. At the end of the holding time the sample of gallium arsenide was removed quickly from the molten tin and cleansed in hydrochloric acid, in which gallium arsenide is practically insoluble. Several experiments were made at each set of temperature condi-

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

L 00088-66
ACCESSION NR: AP5022338

tions. The tests lasted from three to eighteen hours and equilibrium conditions set in after 9-12 hours. Maximum relative error by the weight method was 5%. Measurements were also made by the drop method. The experimental data obtained by the weight and drop methods are exhibited in the form of sections of the liquidus curves for the system Sn-GaAs in the temperature interval 400-800C. The phase structure was determined by an X-ray method. The liquidus lines and a knowledge of the distribution coefficient of tin at the melting temperature of gallium arsenide made it possible to calculate the specific fusibility of tin into solid gallium arsenide in the temperature range 400-800C. A mathematical formula is given. Orig. art. has: 8 formulas, 6 figures and 1 table

ASSOCIATION: Moskovskiy institut stali i splavov. Kafedra proizvodstva chistykh metallov i poluprovodnikovykh materialov (Moscow Institute for Steel and Alloys. Department for Production of Pure Metals and Semiconductor Materials).

SUBMITTED: 21Jan64 ENCL: 00 SUB CODE: MM, SS

NR REF SOV: 001 OTHER: 006

Card 2/2

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

L 00063-66 EWT(m)/EPF(c)/EWP(t)/EWP(b) IJP(c) JD

ACCESSION NR: AP5021323 UR/0120/65/000/004/0014/0022 621.382.032.27

AUTHOR: Libov, L. D.; Meskin, S. S.; Nasledov, D. N.; Sedov, V. Ye.; Tsarenkov, B. V.

TITLE: Gallium arsenide-metal ohmic contacts

SOURCE: Pribory i tekhnika eksperimenta, no. 4, 1965, 14-22

TOPIC TAGS: gallium arsenide, semiconductor alloy, indium base alloy, indium

ABSTRACT: The article reviews the literature data on the properties of certain impurities in gallium arsenide and the materials and methods used by various authors for preparing ohmic contacts on n- and p-type GaAs. Such contacts are made by fusing in indium, tin, and lead, alloys of indium and gold, and also alloys of silver with zinc and silver with lead. Indium is preferred for ohmic contacts on n-type GaAs with an electron concentration between 1.5×10^{17} and 1×10^{19} cm-3 and on p-type GaAs with a hole concentration $> 2 \times 10^{18}$ cm-3; an alloy of indium with a small amount of zinc (about 1%) is preferred for contacts on p-type GaAs with a hole concentration $< 2 \times 10^{18}$ cm-3 if the contacts are intended for operation at temperatures not above 150C. The advantages of indium and its alloy with a small amount of Zn are: (1) they form low-resistance ohmic

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L 00063-66

ACCESSION NR: AP5021323

contacts on GaAs at relatively low melting points; (2) they are the softest contact materials and hence do not cause mechanical strains in GaAs near the contact; (3) they do not undergo any structural transformations (in contrast to Sn) over a range extending from the melting point to the temperature of liquid helium. Orig. art. has: 1 figure and 3 tables.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR, Leningrad (Physicotechnical Institute, AN SSSR)

SUBMITTED: 22Jan65 ENCL: 00 SUB CODE: IC, MM

NO REF SOV: 018 OTHER: 056

Card 2/2

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

L 33954-65 EWT(1)/EWT(m)/T/EWP(t)/EWP(b)/EWA(h) Pz-6/Peb JD/AT

ACCESSION NR: AP5005313 S/0181/65/007/002/0634/0636

AUTHOR: Imenkov, A. N.; Kozlov, M. M.; Meskin, S. S.; Nasledov, D. N.; Ravich, V. N.; Tsarenkov, B. V.

TITLE: Recombination radiation in GaAs tunnel p-n junctions 21 35 34 B

SOURCE: Fizika tverdogo tela, v. 7, no. 2, 1965, 634-636

TOPIC TAGS: tunnel effect, tunnel p n junction, p n junction, recombination radiation, recombination, gallium arsenide

ABSTRACT: The dependence of the integral intensity of radiation Φ on the current I in the range of current densities $50-10^4$ amp/cm^2 can be represented in the form of the sum of two members $\Phi = \Phi_2 + \Phi_3 = A(T)I^n + \Phi_3(T,I)$, where the member $\Phi_3(T,I)$ is the part of the radiation intensity which is added to the intensity Φ_2. The fact that at a certain voltage the volt-ampere characteristic and the curve of the dependence of the radiation intensity on voltage display a "hump" indicates that the excess currents connected with tunnel transitions contribute to the radiation. Contrary to the findings of other researchers (e.g., Anderson, R., Proc. IEEE, 51, 1963, 610), no radiation in the region of

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

L 33954-65

ACCESSION NR: AP5005313

negative conductivity of the tunnel diode was detected. Orig. art. has: 2 figures and 2 formulas. [ZL]

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe, AN SSSR, Leningrad (Physical-Technical Institute, AN SSSR)

SUBMITTED: 31Jul64 ENCLOSURE: 00 SUB CODE: SS, NP

NO REF SOV: 001 OTHER: 004 ATD PRESS: 3209

Card 2/2

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

L 31082-65 EWT(m)/EWP(t)/EWP(b) IJP(c) JD S/0181/65/007/003/0775/0780

ACCESSION NR: AP5006880

AUTHOR: Imenkov, A. N.; Kozlov, M. M.; Meskin, S. S.; Nasledov, D. N.; Ravich, V. N.; Tsarenkov, B. V.

36

TITLE: Electroluminescence spectra of strongly degenerate gallium arsenide 27 27 35 B

SOURCE: Fizika tverdogo tela, v. 7, no. 3, 1965, 775-780

TOPIC TAGS: gallium arsenide, semiconductor, electroluminescence, p n junction, recombination radiation, radiative recombination

ABSTRACT: An investigation was made of the injection electroluminescence of GaAs tunnel p-n junctions at temperatures of 77 and 293K. In preparing the diodes, zinc was diffused into an n-type GaAs monocrystal up to hole concentrations of $\sim 5 \cdot 10^{19}$ cm^{-3} in a 10—20 micron surface layer. The tunnel p-n junction was fabricated by diffusing tin into the p-side of GaAs. The emission was found to vary strongly with injection current. Recombination radiation spectra showed a peak which with increasing current densities was shifted toward higher photon energies (from 1.0 to 1.445 ev at 77K). Other maxima independent of the injection current were also present. A very distinct peak at 1.42 ev was observed at 77K. Analysis of the experimental data showed that at small injection current densities (less

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L 31082-65

ACCESSION NR: AP5006880

than $1-2\cdot10^4$ amp/cm^2 electroluminescence depends on the properties of tunnel diodes, while at higher current densities it is determined by the properties of the p-region. The current-independent peaks were attributed to tunneling of electrons into deep-lying levels in the forbidden band and subsequent radiative recombination. Orig. art. has: 6 figures. [CS]

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

SUBMITTED: 15Aug64 ENCL: 00 SUB CODE: SS, OP

NO REF SOV: 005 OTHER: 006 ATD PRESS: 3198

Card 2/2

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

L 3928-66 EWT(1)/EWT(m)/T/EWP(t)/EWP(b)/EWA(h) IJP(c) JD/AT

ACC NR: AP5025399 SOURCE CODE: UR/0181/65/007/010/3115/3118

AUTHOR: Imenkov, A. N.; Kogan, L. M.; Kozlov, M. M.; Meskin, S. S.; Nasledov, D. N.; Tsarenkov, B. V.

ORG: Physicotechnical Institute im. A. F. Ioffe, AN SSSR, Leningrad (Fiziko-tekhnicheskiy institut AN SSSR)

TITLE: The effect of impurities on the recombination radiation of gallium arsenide

SOURCE: Fizika tverdogo tela, v. 7, no. 10, 1965, 3115-3118

TOPIC TAGS: recombination radiation, gallium arsenide, pn junction, impurity, acceptor, donor

ABSTRACT: The effect of Zn, Cd, Mn, and Fe impurities on the recombination radiation of GaAs p-n junctions was experimentally investigated. The junctions were formed by direct diffusion of the element, by simultaneous diffusion of Mn and Cd and Fe and Cd, or by diffusion of Mn and then Cd, or Fe and then Cd into n-type GaAs with an electron concentration (N_n) of 5×10^{16}—3×10^{18} cm^{-3} (crystals with $N_n > 7 \times 10^{17}$ cm^{-3} were doped with Te). The junction area was 10^{-3}—10^{-4} cm^2. The recombination spectra were measured at 77 and 293K in the photon energy range between 0.7 and 1.6 ev. The spectra were recorded at direct injection currents at which the energy of the short wavelength band was independent of the current. The experimental data are given in Fig. 1 and Table 1. The band with $h\nu_{max} \approx 1.01$ ev (77K) and $h\nu_{max} = 0.95$—0.98 ev

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ACC NR: AP5025399

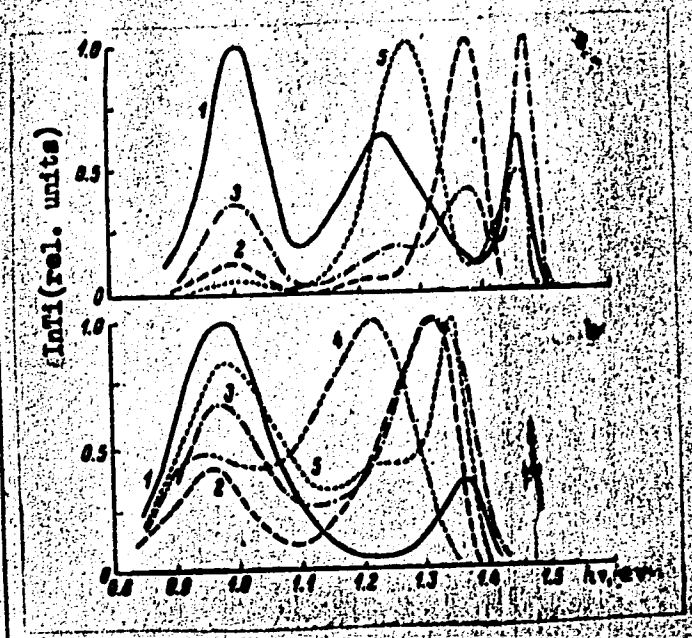

Fig. 1. Recombination radiation of n-GaAs p-n junction doped with:

1 - Cd; 2 - Mn; 3 - Mn and then Cd; 4 - Fe; 5 - Fe and then Cd; a - T = 77K; b - 293K. (The absolute values of intensity differ from specimen to specimen).

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ACC NR: AP5025399

Table 1. Photon energy in the band peaks ($h\nu_{max}$) and band halfwidths

Impurity	T, °K	Emission Band			
Zn, $5 \cdot 10^{16} < n_0 < 1 \cdot 10^{17}$ cm^{-3}	77	1.46–1.47 (0.015–0.022)	—	1.27 (0.12)	1.02 (0.12)
	293	1.30÷1.36 (0.035÷0.050)	—	—	0.97 (0.14)
Zn, $5 \cdot 10^{16} > n_0 > 10^{16}$ cm^{-3}	77	1.47–1.46 (0.022–0.030)	—	1.30–1.36	1.02 (0.12)
	293	1.30–1.36 (0.035–0.050)	—	—	0.97 (0.14)
Cd	77	1.46–1.46 (0.025–0.045)	—	1.25 (0.15)	1.01 (0.12)
	293	1.30–1.35 (0.040–0.050)	—	—	0.97 (0.14)
Mn	77	—	1.39–1.38 (<0.10)	—	1.02 (0.12)
	293	—	1.33–1.32 (0.13)	—	0.96 (0.15)
Mn + Cd	77	≃1.47 (0.045)	1.385 (<0.10)	1.36	1.01 (0.12)
	293	1.37–1.32 (0.14–0.08)	—	—	0.98 (0.15)
Fe	77	—	1.28	—	1.01
	293	—	1.22 (0.18)	—	0.97–0.95
Fe + Cd	77	~1.46 (0.045)	1.28 (0.12)	—	1.02
	293	1.36	1.21	—	0.97 (0.16)

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ACC NR: AP5025399

(293K) and the band with $h\nu_{max} \approx 1.25$ ev, clearly defined only at 77K in junctions doped with Zn and Cd and less sharply defined in those doped with Mn and Fe, were attributed to recombination radiation of excess carriers via the deep levels with activation energies of 0.5 and 0.25 ev, respectively. Orig. art. has: 2 figures and 1 table. [CS]

SUB CODE: 88/ SUBM DATE: 06May65/ ORIG REF: 003/ OTH REF: 009 / ATD PRESS: 4120

Card 4/4

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

[illegible], [illegible]; MESKIN, [illegible]

Diffusion of [illegible] into gallium arsenide. Izv. vys. [illegible] zav.: tsvet. met. 8 no. [illegible] '65. (M[illegible])

1. Moskovskiy institut stali i splavov, kafedra proizvodstva chistykh metallov i poluprovodnikovykh materialov.

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L 37017-65 EWT(1)/EWT(m)/T/EWP(t)/EWP(b)/EWA(h) Pz-6/Peb IJP(c) JD/JG/A

ACCESSION NR: AP5007092 S/0109/65/010/003/0468/0475

AUTHOR: Burdukov, Yu. M.; Meskin, S. S.; Nasledov, D. N.; Tsarenkov, B. V.

TITLE: Investigation of gallium-arsenide p-n junctions on the basis of the curve of differential capacitance vs voltage

SOURCE: Radiotekhnika i elektronika, v. 10, no. 3, 1965, 468-475

TOPIC TAGS: pn junction, gallium arsenide semiconductor

ABSTRACT: Alloy and diffusion junctions and diodes were prepared from GaAs single crystals having these characteristics at room temperature: electron concentration, $5 \times 10^{16} - 10^{17}$ per cm ; electron mobility, 3000—3500 cm^2/v sec; resistivity, 0.02—0.04 ohm-cm; resistivity variation in a single plate, 10—20%. Plots of the differential capacitance and conductance vs frequency within 5—200 kc are presented; the effects of both forward and reverse voltages on the differential capacitance are reported. It is found that the differential capacitance is independent of the frequency within 5—200 kc when the diffusion p-n junctions have a breakdown voltage under 35 v, and is dependent on the frequency when the junction breakdown voltage is over 35 v. The frequency-independent differential

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L 37017-65

ACCESSION NR: AP5007092

capacitance of an alloy or diffusion junction is given by: $C \sim (U_{co}^{c} - U)^{-1/\gamma}$; ($\gamma = 2 - 3$) and is due to the space-charge layer. The impurity concentration in the space-charge layer varies: a) abruptly ($\gamma = 2$) if Zn was quickly alloyed at 500C; b) linearly ($\gamma = 3$) if Cd or Zn was slowly diffused at 1000 or 750C; c) moderately ($2 < \gamma < 3$) if Zn was quickly diffused at 750C. It is also found that the greater the thickness W_0 of the space-charge layer, the smaller is the maximum electric-field strength E_{m0} and the smaller is the impurity-concentration gradient "a," which agrees with an elementary theory of p-n junctions. The capacitive cutoff voltage U_{co}^{c} has no clear connection with W_0. The effect of temperature within 77—540K on U_{co}^{c}, W, and E_m agrees with the p-n junction theory. Orig. art. has: 6 figures, 10 formulas, and 2 tables. [03]

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

SUBMITTED: 04Oct63 ENCL: 00 SUB CODE: SS, EC

NO REF SOV: 005 OTHER: 003 ATD PRESS: 3222

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APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

E 14941-66 EWT(m)/EWP(t)/EWP(b) IJP(c) JD/JG

ACC NR: AP5026913 SOURCE CODE: UR/0109/65/010/010/1912/1914

41
39
B

AUTHOR: Kogan, L. M.; Meskin, S. S.

ORG: none

TITLE: Electrical characteristics of gallium-arsenide p^+-p-n diodes

SOURCE: Radiotekhnika i elektronika, v. 10, no. 10, 1965, 1912-1914

TOPIC TAGS: semiconductor diode, GaAs diode

ABSTRACT: The results of an experimental investigation of GaAs diodes are reported. The p^+-p-n-structure was prepared by diffusing Mn and Cd into n-GaAs with $n_n = (1-2) \times 10^{17}$ per cm^3 and $\mu_n = 3100-3400$ $cm^2/v.sec$. At 300—373K, the forward branch of the d-c-measured I-V characteristic was similar to that of conventional p-n junctions prepared by Zn or Cd diffusion. The depletion region thickness was found to be 3—8 microns and 20—25 microns at 293K and 77K, respectively. A negative-resistance region appears in the forward branch at low temperatures, such as 77K (as was observed by K. Weiser et al., Bull. Am. Phys. Soc., 1963, 8, 3, 201); at a positive bias of 1—2 v, the I-V characteristic is linear; at a

Card 1/2 UDC: 621.382.2

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

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L 14941-66

ACC NR: AP5026913

higher bias, the characteristic becomes nonlinear. The reverse branch of the I-V characteristic at room temperature obeys the law $I \approx U^n$, where $n = 1.1-1.5$ for 0—30 v; at 77K, the characteristic is linear within a considerable voltage interval. Similar characteristics were observed in p-n junctions prepared by diffusing Fe into n-GaAs. "The authors wish to thank B. V. Tsarenkov for his useful advice, and D. N. Nasledov for his interest in the work." Orig. art. has: 3 figures.

SUB CODE: 09 / SUBM DATE: 21Oct64 / ORIG REF: 001 / OTH REF: 003

Card 2/2

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

L 4[illegible] -66 EWT(1)/[illegible](m)/T[illegible](t)/ETI IJ(c) AT JD JJ

ACC NR: AP6026705 SOURCE CODE: UR/0181/66/008/008/2462/2465

AUTHOR: Danilova, T. N.; Kogan, L. M.; Meskin, S. S.; Nasledov, D. N.; Tsarenkov, B.V.

ORG: Physics-Engineering Institute im. A. F. Ioffe, AN SSSR, Leningrad (Fiziko-tekhnicheskiy institut AN SSSR)

TITLE: Comparative investigation of the recombination radiation of GaAs p-n junctions with and without a Fabry-Perot resonator

SOURCE: Fizika tverdogo tela, v. 8, no. 8, 1966, 2462-2465

TOPIC TAGS: ~~Fabry-Perot~~ resonator, recombination radiation, pn ~~diode~~ transition, gallium arsenide, diode

ABSTRACT: The published literature contains information on the investigation of spontaneous, stimulated, and coherent radiation of GaAs p-n junctions pertaining to the characteristic radiation parameters as a function of the current for diodes with or without resonators. The purpose of the present article is to compare the dependences of the maximum energy $h\nu_M$ and the half-width δ of the fundamental radiation band on the current density through a single p-n junction with and without a Fabry-Perot resonator. The authors studied diodes in which the p-n junctions were obtained by diffusion of zinc in Te-alloyed n-GaAs with electron concentration $7\cdot10^{17}$--$3\cdot10^{18}$ cm^{-3}; the area of the p-n junction $\approx10^{-3}$cm. The current through the diode and the spectral distribution of radiation intensity were measured. It was found that $h\nu_M$, starting

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ACC NR: AP6026705

from the lowest current densities (>5 a/cm^2), increases with increasing current and then becomes practically independent of the current. The dependence of δ on current density is given for small current densities (5--70 a/cm^2). It is concluded from the results presented that the primary narrowing of the spectrum occurs as a result of population inversion at the rarefied states which are responsible for the secondary narrowing of the spectrum, i.e., beyond the conventional stimulated and coherent radiation with maximum energy ≈1.47 ev. The "tails" in the forbidden zone are probably the rarefied states responsible for the primary narrowing of the spectrum. The authors thank O. V. Konstantinov, V. I. Perel', and A. L. Efros for discussing the results of this work. Orig. art. has: 2 figures. [26]

SUB CODE: 20/ SUBM DATE: 26Jan66/ ORIG REF: 001/ OTH REF: 001/ ATD PRESS: 5064

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APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

L 46952-66 EWT(1)/EWT(m)/EEC(k)-2/T/EWP(t)/ETI IJP(c) JD/JG
ACC NR: AP6031029 SOURCE CODE: UR/0109/66/011/009/1645/1650

AUTHOR: Kogan, L. M.; Meskin, S. S.; Nasledov, D. N.; Trushina, V. Ye.; Tsarenkov, B.V.

ORG: Physico-Technical Institute im. A. F. Ioffe, AN SSSR (Fiziko-tekhnicheskiy institut AN SSSR)

TITLE: Electron-photon GaAs transistor

SOURCE: Radiotekhnika i elektronika, v. 11, no. 9, 1966, 1645-1650

TOPIC TAGS: transistor, electron photon transistor, gallium arsenide transistor, GALLIUM ARSENIDE, ELECTRON, PHOTON

ABSTRACT: The results of an experimental investigation of GaAs electron-photon transistors (R. Rediker et al., Proc. IEEE, 1763, 51, 1, 218) at 77 and 293K are reported. The transistors were made from Te-doped n-GaAs. Source material parameters: electron concentration, 7×10^{17} -- 5×10^{18} per cm^3; mobility, 1800--3200 cm^2/v sec; dislocation density, 10000 per cm^2; p-n-p structure was produced by Zn diffusion; plate thickness, 300 μ; base thickness, 100-200 μ; p-region thickness, 50--100 μ. Collector current vs. collector voltage characteristics (for 0--100 amp/cm^2 emitter current) and collector current vs. emitter current characteristics are shown. The emitter-collector current transfer ratio was found to increase from 0.05 to 0.075 with the collector voltage increasing from 0 to 8 v, at 77K. At room temperature, the transfer ratio amounts to 1/20-th of the liquid-nitrogen ratio. When the emitter

Card 1/2 UDC: 539.293.011.43

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ACC NR: AP6031029

current increases from 0.1 to 0.5 amp, the power gain decreases from 12 to 4 and the voltage gain, from 350 to 80 (at 77K). The estimated total quantum yield of photons is 0.1 at 77K. Desirability is noted and ways are indicated for making the electron-photon transistor a practical amplifier. Orig. art. has: 4 figures and 1 formula.

[03]

SUB CODE: 09 / SUBM DATE: 29Mar65 / ORIG REF: 003 / OTH REF: 006 / ATD PRESS: 5089

Card 2/2 afs

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

Ca

9

Thermal treatment of Russian chrome-magnetic steel. V. S. MERKIN AND E. S. TOVPENETS. *Sovetskaya Vsesoyuznogo Inst. Metal* 1931, Nos. 1, 2, 7, 11.—Cr steel, contg. about 2% Cr, combines the advantages of cost and higher magnetic quality over C or W steel. A study was made of the heat treatment of Cr steels having the following compn.: C 1.23, P 0.048, Ni 0.06–0.07, Cr 2.15, Si 0.30–0.38, Mn 0.53–0.57, S 0.032–0.034, W 0, V 0%. It was found that this steel, when treated in oil at 850°, is superior in magnetic properties even to foreign steels. S. L. MADOVSKY

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

Copper-containing steels for dynamos and transformers

V. S. Mes'kin. *Soobshchenye Vsesoyuznogo Inst. Metal* No. 8, 55-65(1931).—Up to 0.8% of Cu in dynamo steel and 0.6% in transformer steel exists in the form of a solid soln. Consequently, with such Cu concns., the magnetic properties of the respective steels do not decrease. The elec. resistance of the steel remains the same. The addn of Cu to dynamo and transformer steel greatly increases the resistance to corrosion. The hardness likewise increases, amounting to 8-10% for steel with 1% Cu.

H. Cohen

METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES

COMMON ELEMENTS

Nonmagnetic cast iron V. S. Meskin and [illegible] Somin Russ [illegible], Sept [illegible] The cast iron contains Mn [illegible], Cu [illegible], C [illegible] and Si [illegible]

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Nonmagnetic manganese steel V. S. Meskin, B. I. Somin and Yu. M. Margolin. Russ. 33,547, Dec. 31, 1933. Nonmagnetic Mn steel composed of 15-22% Mn and up to 1% C is characterized by the introduction of [illegible] Si and 1.4% Cu.

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Hydrogen in transformer steel. V. S. Meskin and Yu. M. Margolin. *Repts. Inst. Metals, Leningrad* 1933, No. 13, 42-79 (in German 80-81). cf. *C. A.* 27, 2407. As starting material for most of the expts. transformer steel having the following compn. served: open-hearth steel, C 0.11, Si 3.94, Mn 0.11, P 0.011, S 0.012%; elec. steel, C 0.07, Si 3.87, Mn 0.09, P 0.017 and S 0.001%. In one series of expts. samples of transformer sheet iron were heated together with H_2 in a bomb at 170-615 atm. pressure and 200-455° temp. for periods of 62-738 hrs. In another series of expts. H_2 was bubbled through molten transformer steel. Tests showed that H_2 lowered the magnetic properties of the steel, increasing its coercive force and magnetic losses and decreasing its permeability. Permanent changes in the properties of the steel are produced only when the H_2 is introduced above 450° and at a pressure exceeding 500 atm. In other cases the metal regains its original properties after lying for some time at room temp. or after a brief heating at 100-150°. Samples having undergone a permanent change due to H_2 absorption lose most of the gas on heating at 800° for 4-6 hrs. and regain their original properties. Treatment of transformer steel with H_2 at high temp. and pressure and subsequent removal of H_2 by a second heating, is recommended, because the hydrogen tends to remove some of the impurities from the metal, this improving its magnetic properties. Aging of the steel is not affected by the hydrogen. S. L. Madorsky

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Nonmagnetic cast iron V. S. Mes'kin and B. F. Somin. *Repts. Inst. Metals* (Leningrad) No. 14, 13-33 (in German 34-6, 1933). A resume of an extensive investigation of the prepn. of nonmagnetic cast iron (not contg. Ni). This is prepd. in 3 grades having the following compns.: (1) for small and medium-size castings, C 3.4-3.7, Si 2.5-3, Mn 7-9, Cu 1.5-2 and P 0.5-0.7%; (2) for large castings, C 3.4-3.7, Si 2.5-3, Mn 9-11, Cu about 1 and P 0.5-0.7%; (3) for rheostats (of medium and large size) Mn content varies between 7-8%. Magnetic permeability of the above products varies between 1.1 and 1.5 sp. elec. resistance between 160 and 220 microhms, resistance to bending 22-30 kg. per sq. cm. at a radius of bend 8-16 mm. The microstructure should consist of austenite and graphite; martensite and carbides should be absent as these increase magnetic permeability, decrease elec. resistance and render the metal less machinable. Graphitization should be carried out during casting, so the graphite is obtained in the form of interconnecting veins. The nonmagnetic cast iron is a finished product after casting and does not require any heat treatment. The Si aids graphitization, but it should not be used in greater amts. than indicated above. Cu aids in the formation of austenite and increases its stability during cooling, but it interferes with graphitization, rather than aiding it, as was hitherto assumed. P increases magnetic permeability, but is used here to lower the m. p. of the Fe. Owing to the vein-like graphite structure, this cast iron could be used as nonmagnetic wrought iron. In this case the thermal treatment should consist in heating for 3-4 hrs. at 1000° and then cooling in air. S. I. Madorsky

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1ST AND 2ND ORDERS

PROCESSES AND [illegible]

Austenite steels. I. Material for cable armor. V. S. Mes'kin, B. E. Somin and Yu. M. Margolin. *Repts. Inst. Metals* (Leningrad) No. 15, 97-131 in German 1-2 (1936). Thirteen kinds of austenite steel were investigated for their mech., magnetic, elec. and technological properties, with the view of using them for drawing wire for cable armor. The compns. of the steels were as follows: Mn steel, C 0.32-0.42 and Mn [illegible]; Mn-Cu steel, C [illegible], Mn 14.0-20.0 and Cu [illegible]; Ni steel, C 0.26 and Ni 24.12; Ni-Mn steel, C [illegible], Mn [illegible] and Ni [illegible]; Cr-Ni steel, C [illegible], Cr 18.0 and Ni 18.[illegible]; Cr-Mn steel, C [illegible], Mn [illegible] and Cr 18.0; Cr-Mn-Cu steel, C [illegible], Mn [illegible], Cr 18.0 and Cu 1.0; Mn-Si steel, C [illegible], Mn [illegible] and Si 1.0-2.0%. The magnetic permeability of the steels varied between [illegible] and [illegible] and remained const. up to a certain temp. of tempering, ranging between 800° and 1100°, above which it increased. This is explained on the basis of a partial change of austenite into magnetite, under the influence of thermal strains. The sp. resistance varied between [illegible] and [illegible] microhms. A gradual decrease of resistance took place with increase of temp. of tempering. The Mn, Mn-Cr and Mn-Si steels did not offer any more difficulties in wire drawing than ordinary C steel. Steel contg. 14% Mn and Ni steels can be drawn into wire only after homogenization, i.e., heating to remove dendritic segregation. The Cr-Ni, Cr-Mn and Cr-Mn-Cu steels could not be drawn at all. The other [illegible] were drawn cold. Steel analyzing C [illegible], Mn 20 and Cu [illegible] was found most suitable for cable armor. [illegible]

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Alloy with a constant initial magnetic permeability. V. S. Mes'kin and Yu. M. Margolin. Russ. 39,702, Nov. 30, 1951. An iron alloy contains Cu 1.5-30, Al 0.2-6.0, Mn 0.1-6, Si up to 6, and C less than 0.35%.

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MES'KIN, V. S.

The nickel-aluminum magnetic steel "MK." V. Mes'kin, B. E. Somin and Yu. M. Margolin. *Rept. Central Inst. Metals* (Leningrad) No. 16, 60-75 (in German 76)(1934), cf. *C. A.* 20, 2133[2]. "MK" steel has the following characteristics: compn. Ni 10-49, Al 1-20, C < 1.5, Mn < 10, Cr < 5, Co < 40 and W < 8%; it cannot be forged; its magnetic properties depend on its treatment. It is annealed at 450-700° to obtain structural stability. An exptl. investigation was made of the effect of compn. and treatment on magnetic properties of this class of steels. It was found that although Ni as such reduces magnetic properties, when in combination with Al, it increases these properties, probably owing to the formation of a compd. between Ni, Al and Fe. This compd. seps. out on etching in alc. HNO_3 as a white phase. The more abundant this phase and the larger the grain, the greater the max. and residual induction of the alloy and the lower its coercive force and elec. resistance. The highest coercive force, at a moderate residual magnetism, corresponds to a particle size of this white phase below microscopic visibility. The high coercive force of these steels is explained on the basis of the age hardening process. The effect of metals other than Ni-Al on the "MK" steels consists in the fact that they help in fixing the supersatd. solid soln. in a state of very fine dispersion. The best compn. was found to be 25% Ni and 10% Al.

S. I. Madorsky

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The influence of precipitation hardening in alloys on the magnetic stability and uniformity of the permeability. S. Mes'kin and Yu. M. Margolin. *Kachestvennaya Stal* 1935, No. 4, 22-7; *Chem. Zentr.* 1936, I, 4706; cf. C. A. 30, 7032[9]. —Tests are reported on ferrite Fe alloys capable of pptn. hardening which contained either 1.86% P or 2.25% Cu or several alloying elements, as Mn (0.56-0.90%), Si (1.17-2.20%), Al (2.19-3.12%), Cu (1.47-0.04%) and Cr (1.32-1.71%). Still another alloy contg. 10.2% Mn, 10.6% Al, 0.1% C and the remainder Fe was investigated. Pptn. hardening increased the uniformity of permeability of these alloys but greatly reduced the magnetic stability. M. G. Moore

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PROCESSES AND PROPERTIES INDEX

Austenite manganese steel that can be machined. A. S. Meskin and B. F. Somin. *Kachestvennaya Stal* 1935, No. 7, 19-22. *Chem. Zentr.* 1936, I, 1356-7. Investigations are reported on the influence of Al, Cu and other metals on the machinability as well as the mech., magnetic and chem. properties of austenite Mn steel. The addn. of Al greatly increases the ease with which this steel can be worked although the ability to acquire greater hardness by cold working is reduced. The addn. of Cu improves the mech. properties without influencing the ease of working or machining. A steel contg. C 0.4, Mn 14, Al 3 and Cu 2.1%, is recommended as a substitute for Ni-contg. nonmagnetic types of steel. M. G. Moore

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MES'KIN, V. S.

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INFLUENCE OF COLD-ROLLING AND SUBSEQUENT RECRYSTALLISATION ON THE MAGNETIC PROPERTIES OF TRANSFORMER STEEL. V. Mes'kin and Yu. Margolin. (Kachestvennaya Stal, 1937, No. 5-6, pp. 16-23). (In Russian). The effects of cold-rolling and subsequent recrystallisation, as well as of the thickness of the sheet on the magnetic properties of transformer steel containing 3.2-4.7% of silicon were studied. No definite relationship between the thickness of the sheet and the coercive force could be discovered. It was found possible, by means of a single-stage cold-working treatment, followed by recrystallisation head treatment with slow cooling, to lower considerable the coercive force and magnetic losses and at the same time to increase slightly the permeability of the steel, especially that quality containing 4.3-4.5% of silicon.

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The influence of the cooling velocity on the magnetic properties of transformer plates V. S. Mes'kin and Yu. M. Margolin. *Kachestvennaya Stal* 5, No. 7, 57(1937); *Chem. Zentr.* 1938, I, 1850; cf. *C. A.* 32, 4490[illegible]. A transformer plate contg. 4.18% Si was first heated to 820° and then cooled at varying velocity. The rapid cooling was begun at various temps. from 300 to 800°. Rapid cooling from 700 to 800° greatly impaired all the essential magnetic properties, especially the initial and max. permeability. Reduction of the cooling velocity increased the permeability. Rapid cooling from 600° had relatively slight effect. Cooling in oil from 500° had a favorable effect on the initial permeability. M. G. M.

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1ST AND 2ND ORDERS PROCESSES AND PROPERTIES INDEX

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THE INFLUENCE OF SMALL ("HOMEOPATHIC") ADDITIONS ON TRANS-FORMER STEEL. V.S. Mes'kin and Yu. M. Margolin. (Kachestvennaya Stal, 1937, No. 8, pp. 22-26). (In Russian). A study was made of the effect of small additions (less than 0·05%) of titanium, vanadium, aluminium and beryllium on the structure of ingots and on the magnetic properties of vacuum-melted transformer steel, and also on transformer steel melted under ordinary conditions. Alloys prepared by vacuum melting were also used to study the effect of these small additions on the corrosion-resistance of transformer steel in an atmosphere containing sulphur dioxide and carbon dioxide. It was found that small additions, in particular of titanium and vanadium, had a marked effect on the structure of the ingots by promoting grain refinement and reducing piping. Such additions also favoured the growth of secondary grains in transformer steel, and resulted in a considerabel reduction of its coercive force and, consequently, a reduction of the hysteresis losses. The amount of alloying constituent necessary to produce the effect magnetic properties is not the same as that required to cause primary crystallisation, and the experiments should therefore

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be repeated on a large scale.

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PROCESSES AND PROPERTIES INDEX

18

Achievements in the Field of Ferro-Magnetic Alloys in Russia during the Past 20 Years. V. S. Mes'kin. (Kachestvennaya Stal, 1937, No. 11, pp. 32–40). (In Russian). The author reviews research work and practical developments in Russia in the field of permanent magnet steels, soft magnetic alloys and alloys with special magnetic properties. The latter include special non-magnetic cast irons and steels. Nickel-free non-magnetic cast iron and a machineable non-magnetic steel which also does not contain nickel (analysis: Carbon 0·35–0·45%, manganese 13–14%, aluminium 3–3·5% and copper or chromium 2–2·5%) are of special interest. Another interesting recent development is the production of an alloy of the "Calmalloy" type (nickel 60%, copper 30%, iron about 2·5%) which, however, contains half the amount of nickel (which has to be imported) and is also free from copper. The alloy is claimed to be superior to "Calmalloy" in some respects. Finally some reference is made to work on high-permeability alloys. A very useful list of 46 references to publications on Russian research work on magnetic alloys is appended.

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18

The Influence of Phosphorus and Arsenic on Dynamo and Transformer Steel. V. S. Mes'kin. (Kachestvennaya Stal, 1938, No. 3, pp. 23–30). (In Russian). The influence of phosphorus alone, and together with arsenic, on the mechanical and magnetic properties of Armco iron, two dynamo steels containing 1% and 2·5% of silicon and transformer steel containing 4% of silicon was studied. Additions of up to 0·5% of phosphorus were made in one series of alloys, and in another the phosphorus was kept constant at 0·3%, while the arsenic was varied up to 1%. In addition, a number of alloys containing varying proportions of silicon, aluminium and arsenic were investigated. In the presence of 0·8–1% of silicon a marked drop in coercive force was caused by the addition of 0·2–0·25% of phosphorus. At this phosphorus concentration the mechanical properties were still quite satisfactory. Phosphorus-bearing dynamo steel is more readily worked than the plain silicon steel at temperatures above 1000 C., the optimum rolling temperature being 1200 C. The magnetic properties of transformer steel and more highly alloyed silicon steel are not affected by additions of phosphorus. Encouraging mechanical and magnetic properties were also obtained with the quaternary iron-silicon-aluminium-arsenic alloy

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MES'KIN, V.S.

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Composition and Treatment of Martensitic Steels for Permanent Magnets. V. Mes'kin and B. Somin. (Stal, 1938, No. 6, pp. 32–38). (In Russian). The object of the investigation was to study the possibility of improving the magnetic properties of chromium-bearing steel by adopting a suitable heat treatment, by changes in the carbon and chromium contents, by alloying with titanium (in the absence of chromium) and by additions of copper. In the course of their investigation, the authors showed that the magnetic properties of martensitic steels containing an excess of carbides depend (apart from quenching conditions) on the state of these carbides. Controlled tempering prior to the final quenching of the heat-treated material resulted in a gradual change in the properties of the martensite, the coercive force passing through a maximum, the latter presumably being characterised by a critical degree of dispersion. By utilising this "dispersion-hardening of the martensite" a plain carbon steel with 1·27% of carbon had a remanence of 9500 gauss and a coercive force of 72 oersted (after ageing by boiling for 11 hr.), i.e., properties equivalent to those of chromium-bearing steel. "Dispersion hardening" treatment also gave excellent results when applied to chromium and chromium-silicon steels. Finally, the authors conclude that the deterioration of magnetic properties in permanent magnet steels as a result of certain heat treatments is due to the coagulation of the precipitated excess carbides.

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

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P

3-184. THE EFFECT OF SMALL ADDITIONS ON THE CRYSTALLIZATION AND PHYSICAL PROPERTIES OF SOME SPECIAL ALLOYS. V. S. Mes'kin and Yu M. Margolin. Stal. no. 5, '41, pp. 47-53. Chem. Zentr. no. 2, '42, p. 1284. Alloy Metals Review, v. 3, March '44, p. 2.

In heat resisting Cr-Al alloys having high electrical resistance, small additions of vanadium and fireclay retard grain growth at high operating temperatures. Small additions of Ti, Ta and V to 14% Cr stainless steel increase resistance to corrosion by sea water and boiling HNO_3 solutions and also improve the mechanical properties. Small additions of Ti and V to Permalloy affect primary crystallization and the magnetic properties, the initial permeability being more than double while the coercive force is decreased one-third.

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CA

Magnetostriction of alloys. J. S. Men'kin, B. E. Somin and A. S. Nekhamkin. *J. Tech. Phys.* (U. S. S. R.) 11, 918-35(1941).—The magnetostriction (α) defined as $10^6 \times \Delta l/l$, where l = length, is measured in terms of magnetic field intensity H up to 2000 oersteds, with the aid of an interferometric device. The alloys were either annealed at 900° and cooled in the furnace, or quenched in water from 1000° (or a higher temp.); some samples were tempered. (1) Ni-Be alloys: α is neg.; with increasing concn. of Be, α of annealed alloys corresponding to magnetic satn. decreases markedly, from −35.5 for pure Ni to −11.5 for an alloy with 2% Be. Quenching causes α of the 1% Be alloy to increase slightly; however, with the heterogeneous 1.5% and 2% Be alloys, α decreases markedly on quenching (from 1100°). Tempering at 550° (2 hrs.) of the quenched 2% alloy causes α and the satn. to exceed the values shown by the annealed alloys. (2) Fe-Mo alloys: in terms of the magnetic field H, the magnetostriction α first rises to a pos. max., then drops to neg. values. The behavior of the annealed alloys is similar to that of pure Fe. The Villari point disappears at 8% Mo: the magnetostriction is pos. throughout. The Villari point reappears for the annealed alloys beyond the sely. limit (above 12% Mo); for the quenched alloys α remains pos. after the drop from the max., the curve lying above that of the corresponding annealed alloys. (3) Fe-W alloys: in the annealed state, the shape of the curves is the same as of those for the Fe-Mo alloys; increased heterogeneity leads to diminution of the neg. part of the striction curve as compared with pure Fe. Tempering of the alloys, amounting to soln. of the Fe_3W_3 phase, shifts the Villari point to stronger fields and displaces the α-curves upward. (4) Fe-P alloys: similar behavior to the foregoing system. (5) Fe-Ti alloys: investigated only in the annealed state, same behavior. (6) Fe-Al alloys: α becomes neg. in the case of 4% Al alloys, from 800 oersteds up; above 6% Al, the magnetostriction is pos. throughout; quenching lowers the α-curves relative to those of the annealed metals. (7) Fe-Si alloys: up to 4% Si, the α-curves shift upward with increasing concn. of Si, the Villari point disappears; the behavior is similar to that of the Fe-Al alloys below 14% Al. Further increase of the Si content leads to a decrease of α. At 6% Si, a neg. branch appears at low H, at 7% Si, the magnetostriction is neg. throughout. (8) As a rule, for all the alloys investigated, increase of the concn. of the solid soln. in the alloy results in an upward shift of the α-H curve, that is neg. values of α diminish (in the case of Ni alloys) and come nearer to zero, pos. values are raised (in the case of Fe alloys). (9) There is no general relationship between the behavior of α and that of the coercive force and magnetic satn. of the same alloys, except in the cases where the change of intensity of satn. reflects the formation and decompn. of solid solns. (10) Magnetostriction is highly sensitive to superstructure: appearance of the latter enhances α, superstructure accounts for the behavior observed on Fe-Si alloys. Magnetostriction can thus serve as a sensitive detector of superstructure in ferromagnetic alloys. (11) Fe-Al alloys show abs. values of α and a dependence of α on H comparable to those of Ni and may therefore be of interest for application in magnetostriction vibrators. N. Thon

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

CA

9

Quantitative effect of alloying elements on the hardenability of steel. V. S. Mackin and L. P. Kopp. *Stal* 6, 574-83(1946).—This study concerns the effect of Cr, Si, Mn, and small quantities of V, Ti, and Al on the hardenability of steel. It was aimed at establishing coeffs. which will permit calcn. of the diam. of a piece of steel of a given compn. which will harden throughout when quenched in any medium. The max. hardness attainable by a steel depends on its C content (*C.A.* 32, 3736[1]). The alloying elements and the austenite grain size, by lowering the crit. rate of cooling, det. the degree of difficulty with which the max. hardness at a given C content is attainable. To attain the best mech. properties after tempering, structural alloy steel need not be hardened to its max. hardness, it suffices to harden the steel to a point not below the crit. hardness. This conclusion, contradicting that of French (*Metal Progress* 44, 950(1943)), is only tentative, more work is needed for its confirmation. The coeffs. for calcg. the penetration effect were for Cr (up to 1.6%), $K = 1 + 2.25$ Cr; for Si up to 1%, $K = 1 + 0.05$ Si, above 1 and up to 2.5%, $K = 1.05$ Si; for Mn (up to 1.6%) with quenching from 830° $K = 1 + 5.0$ Mn, with quenching from 870° $K = 1 + 5.5$ Mn. The effect of V, Ti, and Al when present in quantities of traces to several hundredths of 1% is to block the growth of austenite grain and consequently to lower the penetration effect.

M. Hosch

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MES'KIN, V.S., professor, doktor tekhnicheskikh nauk; MARGOLIN, Yu.M, kandidat tekhnicheskikh nauk.

"Physical properties of alloys". B.G.Livshits. Reviewed by V.S.Mes'kin, IU.M.Margolin. Stal' 7 no.3: 286 '47. (MLRA 9:1)
(Alloys--Testing) (Livshits, Boris Grigor'evich)

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1ST AND 2ND CODES

3RD AND 4TH CODES

PROCESSES AND PROPERTIES INDEX

5

PROCE ES IN STEELS FOR PERMANENT MAGNETS. VS Meskin. Stal 1947, vol. 7, pp 429-435. In Russian. Chemical abstracts 1949, vol. 43, Apr. 10, col. 2560. A discussion is presented on the relationship between the thermal treatment and magnetization properties of carbon steel chromium tungsten steel, and cobalt steel.

COMMON ELEMENTS

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3RD AND 4TH ORDERS

7

S

Precision Alloys in the Soviet Union. (Attainments during the last 30 Years). V. S. Meshkin. (Stal, 1947, vol. 7, pp. 1012-1020 [in Russian]; Chemical Abstracts, 1949, vol. 43, [illegible] 25, col. 4614). The production of magnetic and other special-property alloys from 1917 to 1947 is reviewed.

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MOS'KIN, V. S. (Reviewer)

TA 57T63

USSR/Metals Dec 1947
Steel Alloys
Steel - Hardness

"Ya. S. Umanskiy's Book, 'Carbides of Hard Alloys'," Prof V. S. Mos'kin, Dr Tech Sci, 1 p

"Stal'" No 12

Reviews 132-page book published in 1947 by Metallurgical Publishing House. States that this book will be great contribution not only to specialists in the field of hard alloys, but also to those in the field of metal studies, metallurgy, and machine construction. Will be of particular value to those engaged in production or handle steel alloys.

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PA - 3T84

Mes'kin, V.S.

Sep 1947

USSR/Metallurgy, Powder
Iron Powders

"Durable Ferro-Ceramic Machine Parts," V. S. Mes'kin, P. P. Shipulin, G. M. Vayshteyn, B. R. Mitrenin, 11 pp

"Vestnik Mashinostroyeniya" Vol XXVII, No 9

The manufacture of machine parts out of metallic powder is still a relatively new method. The author goes into the various types of power used and results obtained in great detail. Presents several microscopic studies of powdered metal. Methods in use for the manufacture of parts and also a picture of some parts produced by means of pressing powdered metal.

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Meskin, V. S.

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Influence of high-temperature annealing and repeated heating on the magnetic properties of electrical steels. V. S. Mes'kin and N. I. Lapkin. *Fiz. Metal. i Metalloved.*, [illegible] S.S.S.R., *Urnt. Filial* 1, No. 1, 158-60(1955). The steels tested were: dynamo steel E1AA, 0.50 × 30 × 500 mm., contg. 0.08% C, 1.20 Si, 0.28 Mn, 0.040 P, 0.025 S, 0.30 Cu, 0.05 Al, 0.08 Cr; hot-rolled transformer steel E4AA, 0.35 × 40 × 700 mm., 0.05 C, 4.36 Si, 0.11 Mn, 0.014 P, 0.006 S, 0.25 Cu, 0.03 Al, 0.04 Cr; cold-rolled transformer steel KhVP, 0.08 × 25 × 2000 mm., 0.08 C, 3.20 Si, 0.20 Mn, 0.025 P, 0.016 S, 0.20 Cu, 0.03 Al, 0.04 Cr. Only steel KhVP was pickled, and that was before being cold-rolled. The specimens were heated in special atm. in coiled form for 4 hrs. at temps. of 1150 to 1400° and then cooled at a rate of 500 to 600° per hr. The A atm. was purified by using Cu turnings at 700°, a series of absorbents, and Mg turnings at 500 to 550°. The pure H_2 atm. was obtained by the action of HCl on Zn. Vacuum of 0.02 to 0.06 mm. Hg was used with and without a Cu or Mg getter. For steel E1AA the coercive force, H_c, fell from 1.0 oersted after annealing in A at 1150° to 0.65 at 1400°; the corre- [illegible] 0.22, and for vacuum [illegible] steel rose from 310 gausses/oersted at 1150° for H_2 to 600 at 1350°. These values for vacuum were 200 and 590, and for A were 200 and 305. The max. permeability, $\mu_{max.}$, also increased with increasing temp. and had its largest value, 12,000, after an anneal at 1350° in H_2. Similar results were obtained for the other steels. After annealing steel E4AA at 1250° the values of μ_0, $\mu_{max.}$, and H_c were, resp.; for A, 400, 6500, 0.36; for vacuum, 650, 11,200, 0.17; for H_2, 1100, 12,600, 0.16. The corresponding values for steel KhVP were, for A, 1100, 12,000, 0.25; for vacuum, 1250, 17,500, 0.19. A second annealing in vacuum at 750° for 2 hrs. followed by cooling at 30°/hr. was given to the specimens previously annealed in H_2 or in vacuum. The purpose was to study the influence of H_2 content and cooling stresses. For specimens previously annealed in H_2 the induction, B, changed on annealing from 209 to 262 gausses at 0.237 oersted in steel E1AA, from 710 to 805 at 0.278 in steel E4AA, and from 548 to 956 at 0.246 in steel KhVP. A significantly smaller change occurred in specimens previously annealed in vacuum. The superior properties obtained by annealing at 1150 to 1400° rather than at the customary 1100 to 1150° were due in part to removal of impurities. The high-temp. annealing was recommended for com. use. A. G. Guy

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MIKHAYLOV-MIKHEYEV, Prokopiy Borisovich, doktor tekhnicheskikh nauk; MES'KIN, V.S., doktor tekhnicheskikh nauk, retsenzent; VYAZNIKOV, N.F., kandidat tekhnicheskikh nauk, redaktor; VASIL'YEVA, V.P., redaktor izdatel'stva; POL'SKAYA, R.G., tekhnicheskiy redaktor; SYCHEVA, O.V., tekhnicheskiy redaktor

[Thermal brittleness of steel] Teplovaia khrupkost' stali. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1956. 114 p. (MLRA 9:10)
(Steel--Brittleness)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

BULOVSKIY, P.I.; MES'KIN, V.S., otvetstvennyy redaktor; AKSENOV, D.D., red.; BLINOV, V.I., red.; VORONOVSKAYA, Ye.V., red.; GOLOVCHANSKIY, P.M., red.; ZAVALISHIN, D.A., red.; EPSHTEYN, M.O., red.; BORKHVARDT, G.K., red.; PAVLOV, V.A., red.; POVALYAYEV, A.V., red.; SIVERS, A.P., red.; FILIPPOV, P.I., red.; MISHIN, V.I., red.; EL'KIN, Ye.G., tekhn.red.

[Theoretical bases for the technology of assembling aeronautical instruments] Teoreticheskie osnovy tekhnologii sborki aviatsionnykh priborov. Leningrad, 1956. 122 p. (Leningrad. Institut aviatsionnogo priborostroeniia. Trudy no.15) (MIRA 10:11)
(Aeronautical instruments)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

MES'KIN, V.S., dokter tekhnicheskikh nauk, professor.

The nature of reversible and irreversible temper brittleness of structural steel. Metalloved. i obr.met. no.7:24-35 Jl '56. (MIRA 9:9)

1.Leningradskiy institut aviatsionnogo priborostroyeniya.
(Steel alloys--Brittleness)

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MES'KIN, V.S.

3

Ways of decreasing the instability of electromagnetic precision apparatus. V. S. Mes'kin and I. S. Simkhovich. *Priborostroenie* 1957, No. 5, 8-11. — Time instability of electromagnetic precision instruments is dependent not only on physico-chemical processes which affect the constancy of the [illegible] processes in the materials of which the [illegible] Hence for precision instruments, [illegible] and an accuracy of 0.2%, this precision can be guaranteed for about [illegible] for an accuracy of 0.5%, for a much longer time. For app. with magnets of Alni and Alnico in the 0.2% class, this accuracy can be guaranteed for about 4 years. The stability of app. with Alnico magnets is practically the same as with Alni magnets, i.e., magnets with Co content do not increase the stability of magnetic app. V. H. G.

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

SOV/163-58-1-43/53

AUTHOR: Mes'kin, V. S.

TITLE: On the Role Played by the Granular Boundary in the Destruction of Metals at High and Low Temperatures (O roli granits zeren v razrushenii metallov pri vysokikh i nizkikh temperaturakh)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 1, pp 233-238 (USSR)

ABSTRACT: Investigations showed what purpose the boundary layer of metal crystals has in the destruction of metals at higher temperatures. The typical mechanical properties of the amorphous mass had to be determined in order to explain the boundary layer in the destruction of the alloys.
With a decrease in the pressure and an increase in its effective time a deformation of the boundary layer in metal crystals occurs, and a viscous flow starts. As soon as this viscous flow occurs a slow decrease of the metal crystals can be observed. The metal crystals themselves, however, remain undeformed in this process.
The activation energy causing the destruction of the boundary layer is smaller than the binding energy of the metal crystals; it is, however, considerably greater than the binding energy of

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SOV/163-58-1-43/53

On the Role Played by the Granular Boundary in the Destruction of Metals at High and Low Temperatures

the boundary layer. The mechanism of the destruction of the metals at higher temperature is proved by numerous experimental facts.
At higher temperatures another effect occurs in the boundary layer of the metal crystals which is typical for the properties of the amorphous bodies: a rapid increase in the viscosity. Maintaining the temperatures (0,15 - 0,4 T melt) for a longer time causes a decomposition to occur among the crystals.
There are 3 figures, 1 table, and 18 references, 3 of which are Soviet.

ASSOCIATION: Leningradskiy institut aviatsionnogo priborostroyeniya (Leningrad Institute of Aviation Instrument Manufacture)

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

SOV/163-58-3-36/49

AUTHOR: Mes'kin, V. S.

TITLE: On the Role Played by the Grain Boundary in the Destruction of the Metals at High and Low Temperatures (O roli granits zeren v razrushenii metallov pri vysokikh i nizkikh temperaturakh)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 3, pp 220 - 225 (USSR)

ABSTRACT: The structure as well as the properties of the grain boundary layer were taken into account in the investigation of the plastic deformations and the destruction at high and low temperatures. The destruction of the alloys and the plastic deformation depend on the structure and the strength of the grain boundary layer, and especially on the crystal structure of the metal. The experiments were carried out with α-iron and steel samples In the viscous destruction the grain boundary layers cause the formation of axes. In the case of a destruction of the boundary layer at the stress σ = 1 along the surface the possibility of a free deformation

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SOV/[illegible]-3-36/49

On the Role Played by the Grain Boundary in the Destruction of the Metals at High and Low Temperatures

exists In figure 2 the change of the stress in the crystal grains and in the boundary layer is given with its simultaneous deformation. A slow destruction of the boundary layer also occurs at a slower rate of deformation. In the destruction of the crystal grains the stress applied is transferred to the boundary layer. In the case destruction by breaking the breaking strength of the boundary layer is determined by the value of the breaking stress. It is assumed that for the breaking strength in the steel alloys not the crystal grains but the boundary layers are important. This role of the boundary layer in the destruction of metals at high and lower temperatures may be of importance in the classification of the strength of steel samples and alloys. There are 4 figures and 16 references, 14 of which are Soviet.

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

On the Role Played by the Grain Boundary in the Destruction of the Metals at High and Low Temperatures SOV/163-58-3-36/49

ASSOCIATION: Leningradskiy institut aviatsionnogo priborostroyeniya (Leningrad Institute for the Building of Aircraft Instruments

SUBMITTED: October 1, 1957

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SOV 137-58-11-23682

Translation from: Referativnyy zhurnal. Metallurgiya 1958 Nr 11 p 258 (USSR)

AUTHORS: Mes'kin, V. S., Simkhovich, I. S.

TITLE: Searching for Ways to Diminish the Instability of High Precision Magnetoelectric Measuring Devices With Magnets of Steel Tempered to the Martensite Phase (Izyskaniye putey umen'sheniya nestabil'nosti magnitoelektricheskikh izmeritel'nykh priborov vysokikh klassov tochnosti s magnitami iz zakalivayemoy na martensit stali)

PERIODICAL: Tr. Leningr. in-t, aviats. priborostr., 1958, Nr 20, pp 3-14

ABSTRACT: Methods are described for diminishing the time instability of high precision magnetoelectric measuring apparatus (A) with magnets (M) of EKh3A chromium steel tempered to the martensite phase. In the analysis of ways for the stabilization of EKh3A steel M attention was centered on the study of the processes which cause the aging in time of M, which phenomenon is essentially explained by processes of the transformation of residual austenite (RA) which take place even at room temperature. As a result of that process the coercive force of the M decreases, whereas the true residual induction does not change. Preliminary tempering stabilizes the RA to a greater degree in

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Searching for Ways to Diminish the Instability of High Precision Magnetoelectric (cont)

proportion to the heating temperature and the soaking time For high precision A the structural stabilization of M should be carried out at 150°C for 20 hours followed by a 15% demagnetization. To eliminate the main cause of the aging in time of M it is necessary first to transform the greatest possible amount of RA obtained during tempering without causing, however, a decomposition of the martensite or a change in the degree of dispersion of the carbides during this process. With this in view the authors recommend a cold treatment of M at 60° for a total of 1.5-2 hours It is indicated that the time instability of A is caused not only by physicochemical processes taking place in a permanent M, but also by processes occurring in the materials of which other parts of the A are made The new stabilizing treatment of the main parts and units of A with EKh3 steel M, which is recommended on the basis of investigation and shop verification ensures their maintenance of a 0.2% reading accuracy for a year and a 0.5% reading accuracy for an extended period of time Bibliography: 12 references

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

SOV/137-59-1-1488

Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 1, p 197 (USSR)

AUTHORS: Mes'kin, V S, Simkhovich I S

TITLE: Exploration of Means for Reducing the Instability of High-precision Magnetoelectric Measuring Devices Employing Magnets of Fe-Ni-Al Alloys (Izyskaniye putey umen sheniya nestabil nosti magnitoelektricheskikh izmeritel nykh priborov vysokikh klassov tochnosti s magnitami iz zhelezonikel-alyuminiyevykh splavov)

PERIODICAL: Tr. Leningr. in-t aviats priborostr, 1958, Nr 20, pp 15-23

ABSTRACT: A description of the results of research dealing with means of reducing the instability of high-precision magnetometric measuring devices (D) employing magnets (M) made of the Fe-Ni-Al alloys Alni and Alnico. A direct cause of the gradual decrease in the magnetic flux of a M is the reduction of the coercive force (aging of the M) occurring as a result of the relaxation of stresses of the first and second kind at room temperature. Experiments carried out on alloys which had been subjected to various stabilizing heat-treatment procedures and investigations of the performance of experimental measuring Ds under operational conditions made it

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Exploration of Means for Reducing the Instability of High precision (cont.)

possible to establish optimal procedures for stabilization treatment of D's employing M's made of Fe-Ni-Al alloys. Preliminary to magnetization, the Alni and Alnico M's should be subjected to tempering at a temperature of 500°C for a period of ~2 hours with subsequent slow cooling. It is recommended that Magnico M's, which are normally tempered at 600-650° in the course of their manufacture be allowed to cool slowly from that temperature. Other components (beside the M) must undergo the same stabilizing treatment as that applied to corresponding components of D's with M's made of Cr steel. The stabilizing treatment procedure recommended for principal components and subassemblies of D's employing Alni and Alnico M's ensures that the change in the accuracy of their readings will not exceed 0.2% over a period of approximately 4 years. The stability of D's which had been in operation for very long periods of time and which employ Alnico M's is virtually identical to that of D's with Alni M's not containing any Co. Bibliography. 8 references.

A. G.

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18(3,5) PHASE I BOOK EXPLOITATION SOV/3087

Mes'kin, Veniamin Semenovich

Osnovy legirovaniya stali (Fundamentals of Steel Alloying) Moscow, Metallurgizdat, 1959. 688 p. Errata slip inserted. 4,500 copies printed.

Ed.: Yu. M. Lakhtin; Ed. of Publishing House: Ye. N. Berlin; Tech. Ed.: M. K. Attopovich.

PURPOSE: This book is intended for scientific and technical personnel in the metallurgical, machine-building, and instrument-manufacturing industries. It may also be used as a reference book by students taking advanced courses in metallurgy and machine design.

COVERAGE: The book deals with the theory and practice of steel alloying. The material presented is based on experimental data. Information is given on the structure and properties of alloy steel and on the effect of chemical elements on processes taking

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place in steel. Principles of alloying various types of steel are discussed, and the possibilities of influencing steel properties are surveyed. The author thanks the following persons for their assistance in preparing the manuscript: S. T. Kishkin, S. Z. Bokshteyn, A. A. Zhukhovitskiy, G. L. Livshits, Yu. A. Geller, A. G. Ivanov, A. M. Borzdyka, A. A. Babakov, L. A. Glikman, A. I. Shultin, A. L. Nemchinskiy, S. S. Shurakov, A. V. Smirnyy, L. A. Popova, F. A. Bogachev, L. P. Makarova, and D. D. Aksenov, Director, LIAP. There are 917 references: 678 Soviet, 156 English, 72 German, 5 French, 2 Czech, 2 Swedish, 1 Italian, and 1 Japanese.

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1. Structure and properties of iron 7

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SOV/105-59-8-21/28

8(5)

AUTHOR: Mes'kin, V. S., Professor, Doctor of Technical Sciences

TITLE: On the Book by A. S. Zaymovskiy, V. V. Usov, and L. A. Chudnovskaya "Metals and Alloys in Electrical Engineering", Gosenergoizdat Publishing House, 1957

PERIODICAL: Elektrichestvo, 1959, Nr 8, pp 82-83 (USSR)

ABSTRACT: This book is described as a valuable contribution to the publications on metals and alloys because it combines an excellent style with an easily readable representation. The main disadvantage of the book is that a few important alloys have not been sufficiently dealt with and others not at all. A few examples are quoted. The book also contains many misprints. Its advantage is the great number of references and illustrations. It is recommended to students and experts in the field of metal science, metal physics, and metallurgy.

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21 (3)

AUTHORS: [illegible]

TITLE: [illegible]

[illegible]: [illegible]

[illegible]

In the [illegible] iron-nick[illegible] [illegible] mallo[illegible] [illegible] and [illegible] molybdenu[illegible] [illegible]. The dependence of [illegible] properties of the Fe-Ni-alloys on the temperature of annealing (up to 1350°) are given in figures 1, [illegible] and [illegible] may be seen all properties are considerabl[illegible] in the case of annealing in argon. [illegible] further [illegible] the properties is attained by the annealing [illegible] medium. In this case in the vacuum [illegible] total effect of the refining medium in the case [illegible] Fe-Ni-alloys is smaller than with Fe-Ni. The ef[illegible] medium on the maximum permeability which increases [illegible] rising temperature (Fig 2) is apparently due to the [illegible]

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On the Influence of High Temperature Annealing on the [illegible]
Magnetic Properties of Magnetically Soft Alloys

that the [illegible] permeability of the [illegible] alloys [illegible]
to the non[illegible] phases is extremely sensitive [illegible]
absolute v[illegible] of the magnetic properties which [illegible]
obtained after high temperature annealing in the [illegible]
medium are especially striking (Table). The curve [illegible]
magnetic permeability for [illegible] thick bands of [illegible]
after the annealing at different temperatures [illegible]
by means of gas absorb[illegible] shown in figure [illegible]
shows the magnetization curves for cold rolled [illegible]
after the annealing at [illegible] in the protective [illegible]
11[illegible]0° in the vacuum. The fact that the anisotropy [illegible]
cold rolled dynamo steel after the annealing at [illegible]
lower than after the annealing at 850° is especially [illegible]
(Fig [illegible]). The difference in the texture after the an[illegible]
at 850 and 1120° probably depends on the fact that [illegible]
is below and the latter above the temperature of [illegible]
transformation in the dynamo steel with 1.[illegible]

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On the Influence of High Temperature Annealing on [illegible]
the Magnetic Properties of [illegible] Alloys

Figure 5 shows the influence of the annealing temperature on the properties of hot rolled transformer steel. It appears from laboratory experiments, conducted by G. A. Zykov (Fig 6a) that in weak fields induction increases, while losses decrease. The induction B_{25} as was shown already earlier - (Refs 1, 5) somewhat decreases. The properties (except B_{25}) change in the same direction also at a temperature increase up to 1160° after the shop annealing (Fig 6b) at a residual pressure of 40-50 mm torr. The absolute values - especially in weak fields - are considerably higher after the annealing under laboratory conditions which can be explained by the stronger refining effect of the medium. There are 6 figures, 1 table, and 5 references, 1 of which are Soviet.

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R001033710007-9

18.7500

AUTHORS: Mes'kin, V. S. (D[illegible], Professor), Mishk[illegible] (Technical Sciences), Ala[illegible], A. A., [illegible], Y. I. (Engineers)

TITLE: Kinetics of Precipitation Hardening of Annealed Commercial Iron

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1960, Nr 2, pp 2-6 (USSR)

ABSTRACT: Precipitation hardening or 'thermal aging' of rimmed commercial iron has an adverse influence on several of its properties. In the parts of magnetic circuits it causes an intolerable increase of coercive force which is often observed during assembly and tests. Unfavorable distribution of precipitating phases (mainly carbides and nitrides) along grain boundaries causes considerable brittleness. The above phenomenon is particularly undesirable if the parts are intended for performance

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Kinetics of Precipitation Hardening [illegible]
Annealed Commercial Iron

at elevated temperatures. After reviewing German and U.S. literature on the subject, the authors describe their investigation of commercial iron EA containing 0.036% C; [illegible]% Mn; [illegible]% S; [illegible]% P; [illegible]% Cu; traces of Si; [illegible]% [illegible]; [illegible]% H; [illegible]36% N. Telephone relay armatures were prepared from [illegible]-mm-thick sheet, annealed in sealed boxes at [illegible] C for 3 hr, cooled with the furnace [illegible] C ([illegible]ling rate 40° C/hr), and eventually air cooled. Kinetics of precipitation hardening were studied on annealed armature held in thermostats at [illegible] C (±5° C) with [illegible] C intervals. Holding time was varied from [illegible] min to 400 hr, and coercive force was measured for each holding period (see Fig. [illegible]). As seen from Fig. [illegible], the maximum coercive force [illegible] persisted, was double that of the annealed iron, after heating at [illegible] C for 300 hr. As a result of this study, the following conclusions have been made: (1) Annealed rimmed commercial iron is subjected to precipitation hardening even after cooling at

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Kinetics of Precipitation Hardening of
Annealed Commercial Iron

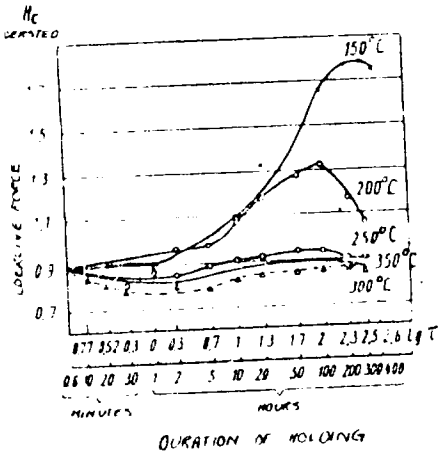

Fig. 1. Kinetics of [illegible] force [illegible] of commercial iron EA during holding at [illegible] C.

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Kinetics of Precipitation Hardening of Annealed Commerical Iron

SOV/[illegible]

low rate [illegible] temperature. [illegible] temperature for [illegible] hr [illegible], the coercive force is almost double that [illegible] annealed iron. (2) Heating of commercial iron at temperatures up to 150° C decreases the coercive force to the initial value due to [illegible] of particles [illegible] precipitating phases. However, at the same time, especially during prolonged heating, the [illegible] dissolving of phases occurs which results in a considerable increase of coercive force during reheating at 150° C (50 hr). Short-time heating at 150-250° C of parts which were preliminarily held at room temperature for 20,000 hr causes reverse process, and reheating at 150° C (50 hr) also increases the coercive force considerably. (3) Heating at 250° C and holding for 4 hr stabilizes the annealed iron since only a little reverse dissolving of phases occurs. The value of coercive force will approximately equal that of iron after annealing. However, it is [illegible] to determine the conditions of stabilizing treatment separately for each batch of iron. (4) [illegible]

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Kinetics of Precipitation Ha[illegible]
Annealed Commercial Iron [illegible]

and dissolving [illegible] more intensely at [illegible] (in the intercrystalline layer). [illegible] figures, 4 tables; and 11 references, 3 Soviet, [illegible] German, 3 U.S. The U.S. references are: Rada[illegible], [illegible], Journ. Applied Physics, Nr 4, Vol [illegible], [illegible], Davenport, E., Bain, E., Trans. Am. Soc. Metals, [illegible], Stanley, I., Journ of Metals, Nr [illegible], [illegible].

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