"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

L 2629-66

ACCESSION NR: AP5026238

SUBMITTED: 00 ENCL: 00 SUB CODE: AA, NP

NO REF SOV: 009 OTHER: 002 ATD PRESS: 4124

Card 3/3

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

ACC NR: AP6033912 SOURCE CODE: UR/0220/66/035/005/0805/0811

AUTHOR: Avakyan, Z. A.; Rabotnova, I. L.

ORG: Soil Biology Department, Moscow State University im. M. V. Lomonosov (Biologo-pochvennyy fakul'tet Moskovskogo gosudarstvennogo universiteta)

TITLE: Determining concentrations of copper toxic for microorganisms

SOURCE: Mikrobiologiya, v. 35, no. 5, 1966, 805-811

TOPIC TAGS: toxicity, bactericide, copper compound, ~~T. utilis~~ pH, MICROORGANISM

ABSTRACT: This study concerned determination of the concentration of copper in various nutrient media, and of the concentration required to kill *T. utilis*. It was found that in nutrient media (I, II, V, VI) with mannitol, sucrose, and glycerol at pH 6.0—7.0, copper is precipitated as a salt and cannot be detected in the solution. However, in the same media at pH 5.0, copper is present in solution.

Card 1/2 UDC: 576.8.095.18:546.56

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

ACC NR: AP6033912

Polarography showed that in media with asparagine and citrates at pH 7.0, copper is found in the solution in the form of an asparagine or citrate complex. Growth of *T. utilis* was found to be completely inhibited on a glycerol-containing medium (VI) with a copper concentration of 40 mg/l. Finally, the resistance of *T. utilis* to copper was not increased after 50 transfers on medium VI containing copper.

[WA-50; CBE No. 14]
[EL]

SUB CODE: 06/ SUBM DATE: 15Mar66/ ORIG REF: 001/ OTH REF: 005

Card 2/2

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAKYAN, Z.A.

Formation of amylase and proteinase of B.Mesentericus "PB" under the conditions of submerged culture. Trudy TSNIISP no.12:31-35 '62. (MIRA 17:3)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAKYAN, Z.A., inzh. (Tbilisi)

I—d diagram in the international system of units (SI).
Vod. i san. tekh. no.12:12-15 D '64 (MIRA 18:2)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AFRIKYAN, E.K.; BOBIKYAN, R.A.; AVAKYAN, Z.G.

Determination and distribution of vitamin B_{12} in various types of soils. Vop.mikrobiol. no.1:271-280 '61. (MIRA 17:10)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AFRIKYAN, E.K.; TUMANYAN, V.G.; SARUKHANYAN, L.B.; BOBIKYAN, R.A.; AVAKYAN, Z.G.

Effect of antibiotics on the causative agents of bacterial diseases of silkworms. Dokl.An ARM SSR 32 no.2:113-116 '61. (MIRA 14:3)

1. Sektor mikrobiologii Akademii nauk Armyanskoy SSR. Predstavleno akademikom AN Armyanskoy SSR V.O. Gulkanyanom.
(SILKWORMS--DISEASES AND PESTS)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AFRIKYAN, E.K.; TUMANYAN, V.G.; CHIL-AKOPYAN, L.A.; BOBIKYAN, R.A.; SARUKHANYAN, L.B.; AVAKYAN, Z.G.

Effectiveness of antibiotics in bacterial diseases of the silkworm and in increasing productiveness. Dokl.AN Arm.SSR 32 no.3:155-158 '61. (MIRA 14:5)

1. Sektor mikrobiologii Akademii nauk Armyanskoy SSR. Predstavleno akademikom AN Armyanskoy SSR V.O.Gulkanyanom.
(Silkworms—Diseases and pests) (Antibiotics)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAKYAN, Z.G.; CHIL-AKOPYAN, L.A.; AFRIKYAN, E.K.

Effect of feeding with vitamins and other growth substances on the development and productivity of the silkworm. Vop. mikrobiol. no.2:333-354 '64. (MIRA 18:3)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

USSR/Farm Animals - Cattle

Q

Abs Jour : Ref Zhur - Biol., No 15, 1958, 69319

Author : Zakharyan, G.P., Avakyan, Z.L.

Inst : Armenian Scientific Research Institute of Animal Husbandry and Veterinary Medicine

Title : On the Mineral Feed Supplementation of Lactating Cows during the Pasture Period

Orig Pub : Byul. nauchno-tekhn. inform. Arm. n.-i. in-ta zhivotnovodstva i veterinarii, 1957, No 1, 7-11

Abstract : One group of cows received from 55 to 100 g of carbide slime per head, daily, in addition to pasture and concentrates, and another group served as a control. It was found that mineral supplementation in the 1st group improved the character of the lactation curve.

Card 1/1

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAKYAN, Z.L., mladshiy nauchnyy sotrudnik

Achievements in the development of rabbit breeding in the Armenian S.S.R. Trudy Arm. nauch.-issl. inst.zhiv. i vet. 4: 35-39 '60. (MIRA 15:5)

(Armenia--Rabbit breeding)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, A.M.

USSR/Electronics - Electronic commutators

Card 1/1 : Pub. 133 - 6/21

Authors : Avak'yants, A. M., Sr. Eng. for the production laboratory of a radio enterprise

Title : An electron commutator for a cathode ray tube with extinguishing interaxial-glow

Periodical : Vest. svyazi 9, 11-13, Sep 1954

Abstract : Operations of an electron commutator, which, being attached to a cathode ray tube, is able to extinguish the so-called interaxial-flow, are described. Commutators of this type are usually used for controlling the telegraph signals. Some practical suggestions for selling the instruments are given. Diagrams.

Institution : ...

Submitted : ...

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, A.M.

USSR/ Electronics - Radio receivers

Card 1/1 Pub. 89 - 21/30

Authors : Avak'yants, A.

Title : Console radio-phonograph

Periodical : Radio 1, 45 - 48, Jan 56

Abstract : Directions are given for making a console radio phonograph containing a 15-tube heterodyne receiver and a universal player driven by a DAG-1 motor, with a piezoelectric sound pickup. The instructions contain technical details and cover such features as the construction and parts, power transformer, output transformer, filter choke, tuning and adjustment. Illustrations; diagrams; tables; graph.

Institution : .....

Submitted : .....

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

SOV/107-59-2-35/55

9(2)

AUTHOR: Avak'yants, A. M.

TITLE: A Four-Channel Electronic Commutator (Chetyrekhkanal'-nyy elektronnyy kommutator)

PERIODICAL: Radio, 1959, Nr 2, pp 42-44 (USSR)

ABSTRACT: This is a description of a characteristic feature of a four-channel commutator (designed by the author of this article) for quenching the interaxial glow. The commutation frequency equals 10 kilocycles (± 5%), the amplitude of the input signal is not less than 0.1 volt, the output voltage approximately 6 volts. The amplitude of the quenching impulses directed on the modulator of the elelectron-beam tube of the oscillograph is 60 volts. The electronic commutator consists of the following basic parts: 1) the generator of the rectangular oscillations with the limiter; 2) the generator of the sawtooth voltage with the phase

Card 1/2

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAKYAN, A.A., inzh.

Expanding the field of application of mining machinery units with non supported face areas. Ugol' 35 no.2:17-19 F '60. (MIRA 13:5)

(Coal mining machinery)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G. M.

Journal of Experimental and Theoretical Physics, USSR, Vol. 18, No. 5, 1948

Avak'yants, G. (P.N. Lebedev Physics Institute, U.S.S.R. Academy of Sciences), Non-elastic dispersion of slow neutrons in ferromagnetics, 444-8

"Non-elastic scattering of slow neutrons in ferromagnetic materials at low temperatures are considered for those cases in which the scattering is conditioned by the excitation and the absorption of the spin waves by the neutrons."

Source: GTRSPL, Vol. 1, No. 5

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G. M.

PA 51/49T45

USSR/Nuclear Physics - Cosmic Rays May 49
Nuclear Physics - Ionization Chambers

"Pulses Caused by Cosmic Rays in an Ionization Chamber," G. M. Avak'yants, Phys Inst imeni P. N. Lebedev, Acad Sci USSR, 10 pp

"Zhur Tekh Fiz" Vol XIX, No 5

Discusses theory underlying Rossi's experiment in which an ionization chamber was set up to record, not average or maximum change in potential but entire course of this change with time, i.e., pulse form. Graphs show pulse form for homogeneous and local ionization in cylindrical and

[redacted] 51/49T45

USSR/Nuclear Physics - Cosmic Rays (Contd) May 49

spherical chambers. Does not consider pulse form for radial ionization. Submitted 15 Jun 48.

[redacted] 51/49T45

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

PA 150T87

AVAK'YANTS, G. M.

USSR/Physics - Superconductors
Low Temperatures

Oct 49

"Penetration of a Magnetic Field Into a Superconductor," G. M. Avak'yants, Phys Inst imeni P. N. Lebedev, Acad Sci USSR, 4 pp

"Zhur Eksper i Teoret Fiz" Vol XIX, No 10

Gives approximate method for calculating the penetration of a magnetic field into a superconductor of arbitrary form. Method is based on solution of phenomenological equations describing superconductivity by the method of perturbations. Method of solution was first used by S. M. Rytov in calculation of the skin effect. Submitted 23 Jun 49.

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APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

Cand, Physicomath Sci.

AVAK'YANTS, G. M.

Dissertation: "Spectrum and Angular Distribution of Photons Generated by the Fast Electrons in Thin Plates."

27/3/50
Physical Inst. imeni P. N. Lebedev, Acad. Sci. USSR

SO Vecheryaya Moskva
Sum 71

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YAN, S. G. M.

Avak'yanc, G. M. The interaction of γ-rays with a deuteron. Akad. Nauk SSSR. Zurnal Eksper. Teoret. Fiz. 20, 669–672 (1950). (Russian)

The author calculates the effective crosssection for the disintegration of a deuteron by γ-rays, taking into account the exchange current between the proton and the neutron [R. G. Sachs, Physical Rev. (2) 74, 433–441 (1948)]. He finds that inclusion of the effect of the exchange current leads to a considerable change in the size of the cross-section. For example, with a square-well neutron-proton interaction potential having a depth of 20 mev. and a radius of 2.8×10^{-13} cm., and with the force assumed to be half exchange, the effect of the exchange current is found to increase the disintegration crosssection for 40 mev. photons by about 140%. *N. Rosen* (Chapel Hill, N. C.).

Source: Mathematical Reviews, Vol 12 No. 6

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAKYANTS, G.M.

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1927

ELECTROMAGNETIC RADIATION IN NEUTRON-PROTON COLLISIONS. G. M. Avakyants. Zhur. Eksper. i Teoret. Fiz. 20, 944-6(1950) Oct. (In Russian)

In examining phenomenologically the electromagnetic radiation due both to electric forces and magnetic moments that are involved in a collision between protons and fast neutrons, Ashkin and Marshak (Phys. Rev. 76, 58(1949)) believed they had taken into account all the known factors responsible for the generation of that radiation. It is shown that in the Hamiltonian of the system proton-neutron plus electromagnetic field, within the framework of the phenomenological theory, there exist terms which were not accounted for in the work of Ashkin and Marshak and which contribute considerably to the cross section for the radiation. These terms are related to exchange currents appearing during the collision.

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G. M.

Electricity, General Questions (2699)

Dokl. AN Uzbek. SSR, No. 1, 1953, pp 17-21

Theory of Surface Ionization

Regarding a solid body and an adsorbed atom as a large diatomic molecule, the author calculates the ratio of the number of evaporated ions to the number of evaporated neutrals (n_+/n_0').

SO: Referativnyy Zhurnal -- Fizika, No. 3, 1954 (W-30907)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

UMAROV, S.U.; AVAK'YANTS, G.M.; GURVICH, L.G.

Range of secondary electrons in metals and dielectric materials following electron collisions. Trudy Fiz.-mat. inst. AN Uz. SSR 5 : 3-25 '53. (MLRA 9:1)

1.Deystvitel'nyy chlen AN UzSSR.
(Electrons)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G.M.

On the theory of surface ionization. Trudy Fiz.-mat. inst. AN Uz. SSR 5:33-42 '53. (MLRA 9:1)

(Ionization)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G.M.

4

PH EL

Angular distribution of reflected ions. S. U. Umarov, G. M. Avak'yants, and I. G. Gurevich. *Doklady Akad. Nauk Uzb. S.S.R.* 1953, No. 6, 11-17; *Referat. Zhur., Fiz.* 1955, No. 7312.—A theoretical study of the distribution function according to angles and energy of ions which are reflected from the surface of a solid substance. It is assumed that the dispersion of an ion upon an atom is isotropic and that the intent of the dispersion does not depend upon the energy of the ion. A group of falling ions is normal toward the surface of a metal. In order to calc. the numerous dispersions which are possible, the unknown function of probability for distribution of the ions according to angles and energy can be expressed in the form: $F(\theta,E) = \sum_{n=1}^{n} \varphi_n(\theta)\psi_n(\theta,E)$. Here $\varphi_n(\theta)$ is the probability of the ion's departure from the target at an angle θ after n collisions, $\psi_n(\theta,E)dE$ is the probability that energy of the ion after n collisions lies between E and $E + E$. A calcn. of the function of $\varphi_n(\theta)$ is made for single, double, and triple dispersions, and then a general expression for $\varphi_n(\theta)$ is given.

Marjorie Retner

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAKIYANTS, G. N.

UMAROV, S. U., AVAKIYANTS, G. N., and GURVICH, L. G.

"Distribution of Reflected Ions With Respect to Energies," Dokl. AN UzSSR, No 8, pp 23-27, 1953

A method for computation of energy distribution of ions reflected from the surface of a solid is presented. In the case of a single collision of an ion with an atom of the surface, a single energy value of the reflected ion corresponds to each reflection angle. In the case of a double collision multiple energy values correspond to a single reflection angle. The work is a continuation of the previous one (RZhFiz-7312 (1955). (RZhFiz, No 4, 1955)

SO: Sum, No 606, 5 Aug 55

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G. M. FD 421

USSR/Physics - Electrical field transfer

Card 1/1 Pub. 147-7/16

Author : Avak'yants, G. M.

Title : Theory of the equations of transfer in strong electrical fields. I

Periodical : Zhur. eksp. i teor. fiz. 26, 562-575, May 1954

Abstract : Treats the transfer of heat and electricity in semiconductors under conditions where the electron (hole) gas of the semiconductor is strongly heated in the electrical field connected with the passage of current through semiconductors. Derives equations for the flows of heat and electricity in a form that permits one to take into account the heating of electrons (holes) in the external electrical field. On the basis of these equations the author obtains general formulas for the thermoelectric and galvanomagnetic effects.

Institution : Physicotechnical Institute, Academy of Sciences Uzbek SSR

Submitted : June 13, 1953

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

FD-714

AVAK'YANTS, G.M.

USSR/Physics - Thermo electrodynamics

Card 1/1 : Pub 146 - 2/18

Author : Avak'yants, G. M.

Title : Theory of equations of transfer in strong electric fields. II

Periodical : Zhur. eskp. i teor. fiz., 26, 668-679, Jun 1954

Abstract : General formulas of thermomagnetic effects and the effect of Kikoin-Noskov are derived by using equations of heat flow and electricity in a form that facilitates taking into account the heating up of the electron (hole) has in an external electric field. (See previous article by author [ibid. 26, 562, 1954]). An example is given explaining some peculiarities of heat transfer and electricity in semiconductors in strong electric fields. 4 references.

Institution : Physicotechnical Institute, Acad. Sci. Uzbek SSR

Submitted : June 13, 1953

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

FD-1487

USSR/Physics - Semiconductors

Card 1/1 : Pub 146-10/20

Author : Avak'yants, G. M.

Title : Theory of phenomena near the contact

Periodical : Zhur. eksp. i teor. fiz., 27, 333-346, Sep 1954

Abstract : The heating of electrons in the electric field is taken into account (variation of the mean kinetic energy) in the computation of the near-contact effect. The d. c. resistance of the contact metal semiconductor is analyzed for cases of strong and weak exhaustion of impurity layers. Six references including 2 foreign.

Institution : Physicotechnical Institute, Acad Sci Uzbek SSR

Submitted : September 6, 1953

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G. M.

H

USSR / Electronics

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 9769

Author : Umarov, S.U., Avak'yants, G.M., Gurvich, L.G.
Inst : Not given
Title : Distribution of Reflected Ions by Angles and By Energies

Orig Pub : Tr. Fiz. - tekhn. in-ta, AN UzSSR, 1955, 6, 34-42

Abstract : The energy and angle distribution functions are found for the ions reflected from the surface of a solid body in the case of their normal incidents. For single collision between an ion and an atom, the angle distribution function of the ions has a δ-like character. Upon increase of the multiplicity of the collisions, the δ-nature of the function of distribution is lost. Bibliography, 6 titles.

Card : 1/1

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

АВАКЯНЦ, Г. М.

The theory of electron emission from a metal in an electrical field. G. M. Avak'yants. *Trudy Fiz.-Tekh. Inst., Akad. Nauk Uzbek. S.S.R.* 6, 43-53(1955).—A theoretical analysis of the phenomena of cold and thermoelectronic emission shows that at field strengths of 10^7-10^8 v./cm., where there is a significant penetration of the elec. field into the metal, there is a decrease in the work function of $2eFL$ and eEL, resp., where E is the field strength, and L is a const. $\sim 10^{-4}$ cm. (e is base of natural log).

—J. Boyiar Leach

LFH

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G.M.

G-3

Category : USSR/Electricity - Semiconductors

Abs Jour : Ref Zhur - Fizika, No 2, 1957, No 4170

Author : Avak'yants, G.M.
Title : Concerning the Theory of Thermal Effects in Semiconductors

Orig Pub : Izv. AN SSSR, 1955, No 8, 51-58

Abstract : The complex impedance of the metal-semiconductor contact is calculated for the case of a Schottky layer, when an alternating current of frequency ω and a direct current causing a bias voltage in the barrier direction pass through the contact. The calculation is based on the diffusion-thermal theory, formulated by the author earlier (Referat. Zh. Fizika, 1956, 1207). The author considers the lattice temperature, the contact resistance, the electric field in the barrier layer, and the phase shift between the current and voltage. The thermal effects in the barrier layer itself are excluded from the calculation of the electron and lattice temperatures. It is shown that the heating effects the phase shift between the current and the voltage. Under certain conditions, the contact layer will have an apparent inductance, and it may also turn out that the dependence of the capacity of the contact

Card : 1/2

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

Category : USSR/Electricity - Semiconductors

G-3

Abs Jour : Ref Zhur - Fizika, No 2, 1957, No 4170

layer on the impedance of the layer and on the frequency will be qualitatively different than in the case when the capacitance is calculated without allowance for the heating.

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APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G.M.

Theory of contact phenomena in cases of high current density. Izv. AN Uz.SSR no.2:93-99 '56. (MLRA 10:3)
(Electric conductors)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G.M.

USSR/Electronics - Semiconductor Devices and Photoelements H-8

Abs Jour : Referat Zhur - Fizika, No 5, 1957, 12382

Author : Grinberg, A.A., Avak'yants, G.M.

Inst : -

Title : Contribution to the Theory of Non-Stationary Voltage-Current Characteristics of Diodes with Electron-Hole Junctions.

Orig Pub : Dokl. AN UzSSR, 1956, No 7, 31-36

Abstract : The authors calculate theoretically the transient characteristic of an electron-hole transition upon sharp change-over from the forward to the backward direction. Owing to the barrier capacitance, the voltage on the junction is not established instantaneously, and this superimposes definite requirements on the boundary conditions at the transition. Taking these conditions into account, the authors solve the diffusion equation and obtain the transient

Card 1/2

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G. M.

"Theory of Electron-Hole Transitions at High Current Densities," by G. M. Avak'yants, Physicotechnical Institute, Academy of Sciences Uzbek SSR, submitted by Academician (Academy of Sciences Uzbek SSR) S. U. Umarov, Doklady Akademii Nauk UzSSR, No 10, 1956, pp 3-8

In a former article the author (Izvestiya Akademii Nauk, UzSSR, No 2, 1956), explained the necessity of considering the heating of current carriers while studying the process of the penetration of one type of carrier into the field of a semiconductor of the opposite type of current carrier (Lashkarev effect). In the present article this phenomenon is studied analytically for the case of the contact of two semiconductors of opposite conductivity types, i.e., of (n - p) transition. The corresponding equations are derived and solved and, as a result, some discrepancies are found as compared with previous articles which did not take the heating of current carriers into consideration.

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AVAK'YANTS, G. M.

G

USSR / Electricity

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 9668

Author : Avak'yants, G.M.
Inst : Not given
Title : Concerning the Letter to the Editor by I.M. Tsidil'kovskiy and F.G. Bass.

Orig Pub : Zh. eksperim. i teor. fiziki, 1956, 30, No 4, 806

Abstract : An answer was given to critical remarks, made in the letter by I.M. Tsidil'kovskiy and F.G. Bass (Referat Zhurnal - Fizika, 1956, No 1184) concerning the author's work (Referat Zhurnal - Fizika, 1055, 9396).

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AVAK'YANTS, G.M.

Thermal effects in semiconductor devices. Izv.AN Uz.SSR.Ser.fiz-mat.nauk no.1:9-25 '57. (MIRA 13:8)
(Semiconductors)

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G.M.

G-3

USSR/Electricity - Semiconductors

Abs Jour : Ref Zhur - Fizika, No 1, 1958, 1369

Author : Avak'yants, G.M.

Inst : Physical-Technical Institute, Uzbek SSR

Title : On the Theory of Thermal Effect on the Boundary of a Semiconductor Emitter.

Orig Pub : Dokl. AN UzSSR, 1957, No 5, 37-40

Abstract : Under the assumption that the mean free path of the free carriers in a semiconductor is a power function of their momentum, an expression is derived for the electron temperature Θ on the boundary between the semiconductor and a vacuum as a function of the current density, of the carrier concentration, of the lattice temperature T, and of the height of the potential barrier eV on the boundary with a vacuum. When $eV/kT \gg 1$, we always have $\Theta < T$,

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USSR/Electricity - Semiconductors G-3

Abs Jour : Ref Zhur - Fizika, No 1, 1958, 1369

but if the height of the boundary potential barrier (eV) is reduced with the aid of an external electric field, even for a short period, then it is possible to obtain long-duration large emission currents without increasing the lattice temperature of the cathode.

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AVAK'YANTS, G.M.

Thermal effects in transistors. Dokl. AN Uz. SSR no.7:11-15 '57. (MIRA 11:5)

1.Sredneaziatskiy gosudarstvennyy universitet im. V.I. Lenina i Fiziko-tekhnicheskiy institut AN UzSSR. Predstavlena akademikom AN UzSSR S. U. Umarovym.

(Transistors)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G. M.: Doc Phys-Math Sci (diss) -- "Some investigations of the phenomenological theory of semiconductors". Tashkent, 1958, published by the Acad Sci Uzbek SSR. 27 pp (Acad Sci USSR, Phys Inst im P. N. Lebedev), 175 copies (KL, No 1, 1959, 112)

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G.M.

Theory semiconductor instruments. Izv. AN Uz. SSR. Ser. fiz.-mat. nauk no.1:5-13 '58. (MIRA 11:6)

(Transistors)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G.M.

Generalizing the kinetic equations for current carriers in semiconductors. Izv. AN Uz.SSR. Ser. fiz.-mat. nauk no.2 '58. (MIRA 11:10)

1. Fiziko-tekhnicheskiy institut AN UzSSR i Sredneaziatskiy gosudarstvennyy universitet imeni V.I. Lenina.
(Semiconductors) (Differential equations, Partial)

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G.M.

Effect of electron-hole collisions on their mobility. Izv. AN Uz. SSR. Ser. fiz.-mat. nauk no.3:21-39 '58. (MIRA 11:10)

1. Fiziko-tekhnicheskiy institut AN UzSSR.
(Semiconductors)

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G.M.

Theory of phenomena occurring in the proximity of contact. Dokl. AN Uz. SSR no.4:11-17 '58. (MIRA 11:6)

1.Fiziko-tekhnicheskiy institut i Sredneaziatskiy gosudarstvennyy universitet im. V.I. Lenina. Predstavleno akademikom AN UzSSR S.U. Umarovym.
(Photoelectricity) (Semiconductors)

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G.M.

Behavior of semiconductors in strong electric fields. Izv. AN Uz. SSR. Ser. fiz.-mat.nauk no.4:23-36 '58. (MIRA 11:11)

1. Sredneaziatskiy gosudarstvennyy universitet imeni V.I. Lenina i Fiziko-tekhnicheskiy institut AN Uz. SSR.
(Semiconductors) (Electric fields)

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G.M.

Transfer phenomena on the surface of semiconductors. Izv. AN Uz.SSR.Ser.fiz.-mat.nauk no.5:23-41 '58. (MIRA 11:12)

1. Fiziko-tekhnicheskiy institut AN UzSSR i Sredneaziatskiy gosudarstvennyy universitet im. V.I.Lenina.
(Semiconductors)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AZIZOV, M.; AVAK'YANTS, G.M.

Theory of photoelectric cells. Izv. AN Uz. SSR. Ser.fiz.-mat.nauk no.6:5-12 '58. (MIRA 12:2)

1. Fiziko-tekhnicheskiy institut AN UzSSR.
(Photoelectric cells)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AZIZOV, M.; AVAK'YANTS, G.M.

Current-voltage characteristic of a photocell with consideration of the anisotropic layer on the contacts. Izv.AN Uz.SSR.Ser.fiz.-mat.nauk no.1:17-23 '59. (MIRA 12:5)

1. Fiziko-tekhnicheskiy institut AN UzSSR.
(Photoelectric cells)

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

24(3) SOV/166-59-1-2/11

AUTHORS: Azizov, M., and Avak'yants, G.M.

TITLE: Volt-Ampere Characteristic of a Photoelement With Consideration of the Anti-Blocking Layer on the Contacts (Vol't-ampernaya kharakteristika fotoelementa s uchetom antizapornogo sloya na kontaktakh)

PERIODICAL: Izvestiya Akademii nauk Uzbekskoy SSR, Seriya fiziko-matematicheskikh nauk, 1959, Nr 1, pp 17-24 (USSR)

ABSTRACT: The calculations of the authors show that the nature of the contact between metal and semiconductor influences essentially the efficiency of the photoelement. If on the contact surface there appears a blocking layer, then the efficiency decreases with the increase of the potential difference; but if there appears an anti-blocking layer, then the efficiency increases. The authors give an inequation describing the limit of the influence of the potential difference. Beyond of this limit the efficiency depends neither on the potential difference nor on the velocity of the surface recombination. If there exists an anti-blocking layer, then the maximal efficiency (15% for a

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24(5)

AUTHOR: Avak'yants, G.M.

TITLE: The Theory of Transfer Appearances on the Surface of a Semiconductor

PERIODICAL: Izvestiya Akademii nauk Uzbekskoy SSR, Seriya fiziko-matematicheskikh nauk, 1959, Nr 5, pp 19-35

ABSTRACT: The paper is a continuation of the author's publication in Izvestiya Akademii nauk Uzbekskoy SSR, Seriya fiziko-matematicheskikh nauk, 1958, Nr 5, in which the general formulas for transfer appearances on surfaces of semiconductors were derived. The present paper is devoted to the investigation of these results. For transfer appearances in the neighborhood of the surface there appear closed currents which run to both sides parallel to the surface of the semiconductor and which close along a direction perpendicular to the surface. If the width of the potential well is smaller than the free length of path in the depth of the semiconductor, then the effective free length of path in the potential well is a complicated function of the velocity. If in the depth of the semiconductor the free length of path is proportional to the velocity, then a series of transfer appearances in the depth may be missing. In the limit case of a narrow potential well the effective mobility increases with

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SOV/166-59-6-4/11

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AUTHORS: Aronov, D.A., Avak'yants, G.M.

TITLE: The Influence of the Depletion (or Antidepletion) Layer at the Contact Metal-semiconductor on the Volt-ampere Characteristic of the p-n Junction.

PERIODICAL: Izvestiya Akademii nauk Uzbekskoy SSR, Seriya fiziko-matematicheskikh nauk, 1959, Nr 6, pp 27 - 40 (USSR)

ABSTRACT: In the first theory [Ref 1] of the p-n junction the influence of the electrodes on the process of the junction was not taken into consideration. In later papers of A.V. Rzhanov [Ref 2] and N.A. Penin [Ref 3] this influence was taken into account, however, the case where the minority carriers of the current meet barriers of the kind of a depletion or antidepletion layer of the semiconductor on their way to the electrodes, was neglected. The present paper deals with the investigation of this case. It is based on a unidimensional rectifier model. In the calculations the authors assume that the hole region is infinite and the electron region is of thickness w ; they do not consider the recombination of the electrons with the holes during the p-n junction ; the eledtrode of the n-region has a depletion

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The Influence of the Depletion (or Antidepletion) Layer at the Contact Metal - semiconductor on the Volt-ampere Characteristic of the p-n Junction SOV/166-59-6-4/11

(or antidepletion) layer. Under these and some further assumptions (as in [Ref 3]) the authors solve the diffusion equation with corresponding boundary conditions. In the stationary case the density of the current through the rectifier is explicitly obtained as a function of the external voltage. The obtained volt-ampere characteristic is discussed in detail. The influence of the surface recombination rate on this characteristic is investigated ; saturation current is considered, its dependence on the surface recombination rate and on a related thickness of the layers is represented.
The authors mention B.I. Davydov and V.Ye. Lashkarev.
There are 3 figures, 1 table, and 8 references, 4 of which are Soviet, 2 German, and 2 American.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN Uz SSR (Physico-Technical Institute AS Uz SSR)

SUBMITTED: March 5, 1959

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PHASE I BOOK EXPLOITATION

Avak'yants, Gedeon Mavsesovich

Fenomenologicheskaya teoriya poluprovodnikov; nekotoryye issledovaniya (Phenomenological Theory of Semiconductors; Some Investigations) Tashkent, Izd-vo AN UzSSR, 1960. 346 p. Errata slip inserted. 1,000 copies printed.

Sponsoring Agency: Akademiya nauk Uzbekskoy SSR. Fiziko-tekhnicheskiy institut.

Resp. Ed.: G. A. Kleyn; Ed.: I. G. Gaysinskaya; Tech. Ed.: Z. P. Gor'kovaya.

PURPOSE: This book is intended for specialists engaged in the field of semiconductor physics, and may be useful to students and aspirants in divisions of physics and mathematics of schools of higher education.

COVERAGE: The author attempts to develop further the phenomenological theory of semiconductors in conformity with the programs suggested by A. F. Ioffe and S. I. Pekar. The book is based on the

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investigations carried out by the author concerning the generalization of the theory for the case when the temperature of current carriers differs from the temperature of the lattice. Besides, in several cases, the author rejects the assumption that the asymmetric part of the distribution function of electrons and holes is small. Kinetic equations for current carriers are also generalized. The theory is compared with experiments. No personalities are mentioned. There are 95 references: 63 Soviet (including 2 translations), 29 English, and 3 German.

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PART I. THEORY OF MIGRATION PHENOMENA IN SEMICONDUCTORS

Ch. I. Concerning the Theory of Migration Phenomena in the Semiconductor Volume 8

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S/166/60/000/01/002/011

24(3)

AUTHORS: Azizov, M., and Avak'yants, G.M.

TITLE: On the Theory of Origination of the Photo-E.M.F. During the p-n Transition in Semiconductors

PERIODICAL: Izvestiya Akademii nauk Uzbekskoy SSR, Seriya fiziko-matematicheskikh nauk, 1960, Nr 1, pp 15-22 (USSR)

ABSTRACT: The authors calculate the photo-e.m.f. of a photocell with p-n transition. At the point of contact of the n-semiconductor or the p-semiconductor with the metallic electrodes the existence of a barrier or an anti-barrier is considered. No simplifying assumptions are made about the dependence of the electrical field strength on the local coordinate, in opposition to the preceding papers of the authors [Ref 1,2]. The dependence of the number of the electron-hole pairs which arise under influence of light etc., on the local coordinate is considered in full. At the other hand it is stated that the generation of the current carriers can

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On the Theory of Origination of the Photo-E.M.F. During the p-n Transition in Semiconductors S/166/60/000/01/002/011

be neglected in the region of the barrier. From the obtained general expressions there follow for special cases the well-known formulas of [Ref 1,2] and [Ref 3].
There are 4 references, 3 of which are Soviet, and 1 American.

ASSOCIATION: Fiziko-Tekhnicheskiy institut ANUz SSR (Physical Technical Institute AS Uz SSR)

SUBMITTED: June 12, 1959

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24(3)

S/166/60/000/01/010/011

AUTHORS: Teshabayev, A., and Avak'yants, G.M.

TITLE: The Calculation of the Mean Energy and the Drift Mobility of the Carrier in Semiconductors for the Presence of Strong Electrical and Magnetic Fields

PERIODICAL: Izvestiya Akademii nauk Uzbekskoy SSR, Seriya fiziko-matematicheskikh nauk, 1960, Nr 1, pp 80-83 (USSR)

ABSTRACT: The authors use the older general results of B.I.Davydov [Ref 1] and I.M.Shmushkevich [Ref 2] on the properties of semiconductors in strong fields in order to calculate in some special cases the distribution function of the electrons, the mean energy, and the drift mobility. Let l be the free length of path of the carrier, let p be its impulse, and let m be its effective mass. The authors introduce the dimensionless variable $x = \frac{p^2}{2mkt}$ and they consider the following cases: 1) $l=l_0$, 2) $l=l_1x^{1/2}$, 3) $l=l_2x$. There are 3 Soviet references.

ASSOCIATION: Fiziko tekhnicheskiy institut AN Uz SSR; Sredneaziatskiy gosuniversitet imeni V.I.Lenina (Physical Technical Institute AS Uz SSR; Central Asiatic State University imeni V.I.Lenin)

SUBMITTED: July 10, 1959

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80239

S/166/60/000/02/08/013

AUTHORS: Avak'yants, G.M., Azimov, S.A., and Umarov, G.Ya.

TITLE: On the Motion of a Charged Particle in a Rarified Gas Being in a Magnetic Field

PERIODICAL: Izvestiya Akademii nauk Uzbekskoy SSR, Seriya fiziko-matematicheskikh nauk, 1960, No.2, pp 68-77

TEXT: Starting from the classical equations of motion, the mean quadratic shift of a charged particle in a gas which is in a magnetic field is calculated by the authors with the aid of statical averaging. Let the direction of the magnetic field agree with the z-axis. Let $\omega_0 = \frac{eH}{mc}$, $s = \frac{1}{\tau} + i\omega_0$, τ - the time in which the particle runs through the free length of path, v_x, v_y, v_z - the components of velocity of the particle, $u = v_x + iv_y$, t - time, $\varrho = x+iy$, $\varrho_0 = x_0+iy_0$, (x_0, y_0, z_0) - initial position of the particle in the moment $t = 0$, (x,y,z) - position of the particle in the moment t, a^* - the magnitude conjugate-complex to a. Then

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On the Motion of a Charged Particle in a Rarified Gas Being in a Magnetic Field S/166/60/000/02/08/013

(24) $$\overline{|\rho-\rho_0|^2} = \frac{|\bar{u}|^2}{|s|^2}\left|(1-e^{-st})\right|^2 + \overline{|F'|^2}\left\{\frac{t_0 t}{|s|^2} + \frac{e^{-(s+s^*)t}}{|s|^4}\left|(e^{st_0}-1)\right|^2 \times \right.$$

$$\left. \times \frac{e^{(s+s^*)t}-1}{e^{(s+s^*)t_0}-1} - \frac{t_0}{ss^{*2}} e^{-s^*t}(e^{s^*t_0}-1)\frac{e^{s^*t}-1}{e^{s^*t_0}-1} - \frac{t_0}{s^*s^2} e^{-st}(e^{st_0}-1)\frac{e^{st}-1}{e^{st_0}-1}\right\},$$

where

(18) $$\overline{|F'|^2} = \overline{|u|^2}\,|s|^2 \frac{e^{(s+s^*)t}-1}{|(e^{st_0}-1)|^2}.$$

From (24) the authors obtain simpler expressions for several special cases (e.g. $|s|t_0 << 1$ or $|s|t >> 1$). The effective coefficient of diffusion is calculated. The distribution of the diffusing particles with respect to velocities and coordinates is determined. There are 3 Soviet references.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN Uz SSR (Physical-Technical Institute AS Uz SSR)

SUBMITTED: June 5, 1959

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S/166/60/000/02/09/013

AUTHORS: Azimov, M., and Avak'yants, G.M.

TITLE: On the Theory of Silicon Photocells

PERIODICAL: Izvestiya Akademii nauk Uzbekskoy SSR, Seriya fiziko-matematicheskikh nauk, 1960, No.2, pp 78-83

TEXT: The authors try to explain the fact that during the work of a silicon photocell under barrier-layer conditions there appears no saturation current. According to the authors' opinion the missing of the saturation current can be led back to the incompleteness of the transition from the electronic to hole-type silicon. During the diffusion in electronic silicon e.g. boron can accumulate nonuniformly at several points of the pn-junction. If the concentration of the boron atoms has the order of magnitude 10^{19}, 10^{20} cm^{-3}, then the pn-junction becomes very sharp, the electrical field inside of the junction becomes very strong (10^6 V/cm). Together with an appearing degeneration because of a high hole-concentration, this leads to a tunnel-leakage through the zone of electrons from the electronic in the hole-type silicon and reversely. At the anomalous points of the pn-junction the usual diffusion currents in the quasineutral domains in the neighborhood of the pn-junction (they show a saturation for a back voltage at the photoelement) are weaker than the current caused by the tunnel-effect which increases with

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On the Theory of Silicon Photocells

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an increasing back direction. For a sufficiently large area of the anomalous regions this leads to a missing of the saturation current.
This general consideration is supported by a calculation. The authors start from the expression for the current caused by the tunnel-effect, given in (ref.1), integrate the appearing complicated integral and calculate the total current through the photocell according to the formula

(12) $I = (1-\alpha)I_n + \alpha I_T - I_L$,

where α is the part of areas of the anomalous regions, I_n is the current density through normal regions, I_L is the light flux and I_T is the current of the tunnel-effect. The obtained expression shows that saturation currents do not appear. There are 3 figures and 3 references: 2 Soviet and 1 American.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN Uz SSR (Physical-Technical Institute AS Uz SSR), Sredneaziatskiy gosuniversitet im. V.I. Lenina (Central Asiatic State University im. V.I.Lenin)

SUBMITTED: September 2, 1959

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24.2120

AUTHOR: Avak'yants, G. M.

TITLE: Scattering of light from a plasma

PERIODICAL: Akademiya nauk Uzbekskoy SSR. Izvestiya. Seriya fiziko-matematicheskikh nauk, no. 4, 1960, 89 - 92

TEXT: The author studies the scattering of light from the electrons of a plasma. He studies the energy portion of the scattered light: $W d\Omega = \frac{c}{4\pi}(\vec{n}\cdot[\vec{E},\vec{H}])r^2 d\Omega$ with the field strengths

$$\vec{E} = \frac{r_o E_o}{r}\left(\left[\vec{n}\left[\vec{n}\left[\vec{e} + \left[\vec{\beta},\vec{h}\right]\right]\right]\right] + \left[\vec{\beta},\left[\vec{n},\vec{e}\right]\right]\right),$$

$$\vec{H} = \frac{r_o E_o}{r}\left(\left[\vec{n},\left[\vec{e} + \left[\vec{\beta},\vec{h}\right]\right]\right] - \left[\vec{\beta},\left[\vec{n},\left[\vec{n},\vec{e}\right]\right]\right]\right).$$

per surface element $dS = r^2 d\Omega$. Here $\vec{\beta} = \vec{v}/c$, $\vec{v}$ is the velocity of the plasma electron, $\vec{r} = r\vec{n}$, $n^2 = 1$, $\vec{r}$ the radius vector of the plasma

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Scattering of light from a plasma

electron, $\vec{E}_0 = E_0\vec{e}$, $\vec{H}_0 = H_0\vec{h}$, $e^2 = 1$, $h^2 = 1$ and $E_0 = H_0$. The author obtains:

$$W = \frac{c}{4\pi} r_0^2 E_0^2 (1 + 2\beta_y \sin\vartheta + 2\beta_z \cos\vartheta)(1 - \sin^2\vartheta \cos^2\varphi)$$

where ϑ is the scattering angle and φ the polarization angle. The author takes account of the formula for the frequency ω of the scattered light: $\omega = \omega_0(1 - (\vec{\beta}\vec{k}))(1 + (\vec{\beta}\vec{n}))$. He determines the mean value of W with respect to the polarization angles φ:

$$\overline{W} = \frac{r_0^2}{\omega_0\sqrt{1-\cos\vartheta}} \frac{c^2 E_0^2}{4\pi} \sqrt{\frac{m}{2\pi kT}} \left\{\frac{1}{2} - \frac{\omega_0 - \omega}{\omega_0(1-\cos\vartheta)}\right\} (1+\cos^2\vartheta) \exp - \left[\frac{(\omega_0-\omega)^2 mc^2}{2kT\omega_0^2(1-\cos\vartheta)}\right].$$

Finally, he considers the case of iterated scattering.

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Scattering of light from a plasma

S/166/60/000/004/007/008
B112/B202

SUBMITTED: March 15, 1960

Card 3/3

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9.4160 (3201,1003,1137)
24.2600 (1043,1160,1395)

S/166/60/000/005/008/008
C111/C222

AUTHORS: Azizov, M., and Avak'yants, G.M.

TITLE: On the Theory of Photoelectric Cells With a Great Radius

PERIODICAL: Izvestiya Akademii nauk Uzbekskoy SSR, Seriya fiziko-matematicheskikh nauk, 1960, No.5, pp.83-85

TEXT: Let the photoelectric cell be a disk of radius r (let the slip ring have the radius r_0). Then, in the distance r from the center of the disk, the electrical field E drawing to the contact is

$$E = \frac{I_n(r)}{2\pi r w} \rho , \quad (1)$$

where $I_n(r)$ is the current through the cross section of the surface layer of the photoelectric cell, w is the thickness of the surface layer, ρ is its specific resistance. Thus it is

$$I_n(r) = 2\pi \int_0^r I(r) \cdot r dr, \quad (2)$$

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C111/C222

On the Theory of Photoelectric Cells With a Great Radius

where

(3) $$I(r) = I_s\left(1-e^{\frac{eV(r)}{kT}}\right).$$

Here $V(r)$ is the potential in the point r, I_s is the saturation current. From (1) and (2), for E one obtains the differential equation

(4) $$E+rE' = \frac{\varrho}{w}\, r\cdot I(r) .$$

Under the assumption

(5) $$E \ll rE'$$

from (4) the authors obtain

(7) $$\frac{1}{2}E^2 = \frac{I_s\varrho}{w}\left[\frac{kT}{e}\left(e^{\frac{eV}{kT}}-1\right)-V\right].$$

For determining V as a function of r it is assumed $\frac{eV}{kT} \gg 1$. Then one obtains

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87,17

S/166/60/000/005/008/008
C111/C222

On the Theory of Photoelectric Cells With a Great Radius

$$(9) \qquad e^{\frac{eV}{kT}} = \frac{e^{\frac{eV_0}{kT}}}{\left[1+\sqrt{\frac{I_s e \varrho}{2wkT}}\left(r_0-r\right)e^{\frac{eV_0}{2kT}}\right]^2},$$

where V_0 is the photo-electromotive force in the point r_0 (i.e. on the slip ring).
(9) shows that the assumption $\frac{eV}{kT} \gg 1$ is satisfied for values r being little different from r_0; then (5) is valid too.
Now it is assumed that $\frac{eV}{kT} \ll 1$. Then it holds

$$(11) \qquad V = V_1 e^{\sqrt{\frac{I_s e \varrho}{wkT}}(r-r_1)},$$

where V_1 is the potential in the point r_1 (here the point is determined by

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0111/0222

On the Theory of Photoelectric Cells With a Great Radius

the condition $\frac{eV}{kT} \sim 1$). If furthermore it is assumed that it holds

(16) $$\sqrt{\frac{I_s e \xi}{2wkT}}\,(r_o - r_1)\, e^{\frac{eV_o}{2kT}} \gg 1$$

then one obtains for this case

(18) $$I_n \simeq -2\pi r_o \sqrt{\frac{2I_s wkT}{e\,\xi}}\, e^{\frac{eV_o}{2kT}}.$$

For an open circuit this current equals the full light flux

(19) $$-\pi r_o^2\, I_L.$$

Herefrom it follows

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C111/C222

On the Theory of Photoelectric Cells With a Great Radius

(20) $$V_o = 2\frac{kT}{e}\ln\left[\frac{I_L}{I_s}\frac{r_o}{2\sqrt{\frac{2wkT}{I_s e\varrho}}}\right],$$

i.e. V_o increases logarithmically with r_o.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN Uz SSR (Physical-Technical Institute of the Academy of Sciences Uzbekskaya SSR)

SUBMITTED: April 25, 1960

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APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G.M.

81885
S/181/60/002/05/04/041
B008/B058

24.7700

AUTHOR: Avak'yants, G. M.

TITLE: The Properties of Germanium in a Strong Electric Field

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 5, pp. 810-814

TEXT: It was the aim of the paper under review to show that the theory by Paranjape (Ref. 2) is not applicable to the measurements carried out by Bray and Mendelson (Ref. 1); these authors investigated at 77°K the dependence of the carrier mobility μ in p-type germanium on the electric field strength E, which occurs as the consequence of a current flowing through the semiconductor. Whilst there is $\mu \sim E^{-0.8}$ in strong fields (E > 600 v/cm), there is $\mu \sim E^{-0.5}$ in fields of 200 to 600 v/cm. These results first seem to agree with the theory by Paranjapes, which considers only the interaction between holes and acoustic lattice vibrations. The author of the paper under review now points out, however, certain discrepancies: Thus, for instance, the temperature dependence of the hole mobility in p-type germanium in the temperature range 70-240°K is not representable by the law $\mu \sim T^{-3/2}$, a fact generally known. An investigation

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81885

The Properties of Germanium in a Strong Electric Field

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B008/B058

of the range of transition from the law $\mu \sim E^{-0.5}$ to $\mu \sim E^{-0.8}$ (~600 v/cm) shows further that the mean hole energy $\bar{\varepsilon}$ in this range ought to reach approximately 40 times the amount of that in the range ~200 v/cm; it is, however, known that $\bar{\varepsilon}$ changes linearly with E if the interaction between holes and acoustic lattice vibrations is considered. The author for his part develops a theory of the E-dependence of μ, defining a hole "temperature"

$$\Theta = \frac{2\bar{\varepsilon}}{3k}$$

and describing the mean free time of the carriers by the ansatz $1/\tau = aT\sqrt{\Theta} + bT^2$. If both the interaction between holes and acoustic lattice vibrations and between holes and optical lattice vibrations are considered, $\mu(\Theta)$ can be represented by $\mu^{-1} = c\Theta^{1/2} + d\Theta^{3/2}$ (c, d - constants), and $E^2 = F(c\Theta^2 + d\Theta^3)$. The general law (4): $\mu \sim T^{-\alpha}$ is satisfied with $\mu^{-1} = QT\Theta^{3/2-K}$, where K = 0 for optical vibrations and K = 0.5 for $\alpha = 2$; Q is a constant. $\mu \sim E^{-0.8}$ is thus obtained in strong fields, and the dependence of the carrier mobility on the lattice

Card 2/3

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The Properties of Germanium in a Strong Electric Field

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B008/B058

temperature T - (4) - and on the field strength can be determined by the selection of the one parameter K. $\mu \sim E^{-0.83}$ is for $\alpha = 1.1$, and $\mu \sim E^{-0.92}$ for $\alpha = 2.3$, whereby the experiments are described relatively well. There are 10 references: 5 Soviet and 5 English.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UzSSR (Institute of Physics and Technology of the AS of the Uzbekskaya SSR). Sredneaziatskiy gosudarstvennyy universitet im. V. I. Lenina ((Soviet) Central Asia State University imeni V. I. Lenin)

SUBMITTED: June 23, 1959

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

26.1410

S/166/60/000/004/007/008
0111/0222

AUTHOR: Avak'yants, G.M.

TITLE: On the Question of Light Scatter by the Plasma

PERIODICAL: Izvestiya Akademii nauk Uzbekskoy SSR. Seriya fiziko-matematicheskikh nauk, 1960, No.4, pp. 89-92.

TEXT: The author considers the light scatter at free electrons of the plasma. The light is assumed to be plane-polarized or natural. The author establishes a Thomson's formula for the case where the electron has a constant initial velocity different from zero. The coefficient of refraction of the plasma is considered.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN Uz SSR (Physical-Technical Institute of the Academy of Sciences Uzbekskaya SSR)
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SUBMITTED: March 15, 1960

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APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

AVAK'YANTS, G.M.; ARONOV, D.A.; KARAGEORGIY-ALKALAYEV, P.M.

Reverse volt-ampere characteristic of semiconductor diodes. Fiz. tver.tela 3 no.5:1400-1410 My '61. (MIRA 14:6)

1. Fiziko-tekhnicheskiy institut Akademii nauk UzSSR, Tashkent.
(Voltammetry) (Germanium diodes)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

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AVAK'YANTS, G.M., doktor fiziko-matem. nauk, prof., otv. red.; KISELEVA, V.N., red.; BAKLITSKAYA, A.V., red.; MAKAROVA, A.A., red.; KARABAYEVA, Kh.U., tekhn. red.

[Electron-hole junctions in semiconductors]Elektronno-dyrochnye perekhody v poluprovodnikakh. Tashkent, Izd-vo Akad. nauk Uzbekskoi SSR, 1962. 320 p. (MIRA 16:3)

(Semiconductors) (Transistors)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8"

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L 11145-63 EDS

ACCESSION NR: AT3002914 S/2527/62/000/000/0017/0029 45

AUTHOR: Avak'yants, G. M.; Grinberg, I. S.; Zaugol'nikova, Ye. G.; Mury*gin, V. I.

TITLE: Inductive properties of selenium rectifiers [Report at the All-Union Conference on Semiconductor Devices, Tashkent, 2-7 October 1961]

SOURCE: Elektronno-dy*rochny*ye perekhody* v poluprovodnikakh. Tashkent, Izd-vo AN UzSSR, 1962, 17-29

TOPIC TAGS: selenium rectifier, selenium rectifier inductance

ABSTRACT: High-inductance semiconductor devices play a decisive role in development of subminiature apparatus. It was reported elsewhere that specially processed germanium diodes behave as inductance. The article offers a theoretical and experimental investigation of inductive properties of selenium rectifiers. Generation and recombination of carriers in the space charge of a hole-type-semiconductor rectifier are investigated matematically. Under the conditions of deep impurity levels and non-saturated reverse current, the semiconductor diode behaves as an inductance; deep impurities deter the carriers, and the energy is stored in the form of electric field of the space charge. The inductance of types AVS and TVS selenium rectifiers was measured, at audio frequency, on an a-c bridge with a 25-mv

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ACCESSION NR: AT3002974

a-c signal and a d-c bias up to 30 v. "Investigation was carried out within -100 +120C temperature range." [Abstracter's note: only the data at +17, +35, +60, and +95C are reported]. It was found that at low temperatures and high bias voltages the selenium rectifiers behave as inductance. Special rectifiers prepared in the laboratory exhibited inductance at room or higher temperatures and at low bias voltages. Rectifier reactance vs. bias, inductance vs. frequency, inductance vs. admittance, and reverse current vs. frequency curves are presented. Inductance of selenium rectifiers can be made very high; however, such rectifiers have a low (not over 1) Q-factor. Orig. art. has: 9 figures and 12 formulas.

ASSOCIATION: Akad. nauk SSSR(Academy of Sciences SSSR); Akad. nauk UzSSR(Academy of Sciences UzSSR); Tashkentskiy gosuniversitet im. V. I. Lenina (Tashkent State University)

SUBMITTED: 00 DATE ACQ: 15May63 ENCL: 00

SUB CODE: 00 NO REF SOV: 007 OTHER: 003

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B163/B104

24 7700

AUTHORS: Avak'yants, G. M., Grinberg, I. S., Karageorgiy-Alkalayev, P. M.

TITLE: Influence of direct currents on reverse currents in selenium rectifiers

PERIODICAL: Akademiya nauk Uzbekskoy SSR. Izvestiya. Seriya fiziko-matematicheskikh nauk, no. 3, 1962, 45 - 55

TEXT: If an alternating voltage is applied to a selenium rectifier, the parts of the semiconductor at the boundary between the space charge region and the quasineutral region are periodically emptied and refilled with mobile charge carriers according to the sign of the voltage. Experimental data (I. S. Grinberg, DAN UzSSR, 1959, no. 1; 1960, no. 8) show that the reverse current which flows through the rectifier during the halfperiod of reverse voltage is smaller if the forward current flows during the other half period (dynamic regime) and larger if there is no forward current during the other half period (pulsed regime). As a model for the selenium rectifier, a thin diode is studied theoretically which has a space charge

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in the n-region separated from the metallic electrode by a gap of given width. It is further assumed that apart from the impurities determining the type of conductivity the p- and n-regions of this diode include deep, weakly ionized impurity levels with a high activation energy, uniformly distributed over the depth of the junction. Theoretical reverse current-voltage characteristics are calculated under these assumptions with a forward current either present or absent, whence a condition is derived which the carrier generation and recombination coefficients must fulfill in order that the sign denoting the influence of the forward current on the reverse current may be correct. In experiments on several rectifiers of ABC-(AVS-) and TBC-(TVS-) type, it is generally found that the difference Δj of the reverse currents in the dynamic and pulsed regimes is slightly negative for voltages between 5 and 15v but changes its sign to positive and becomes much larger for higher voltages. The temperature dependence of Δj was measured between -100 and +100°C. At low voltages (15v) this temperature dependence is weak but at higher voltages (35v) it is much stronger and the sign of Δj can change with temperature. A qualitative explanation of the observed effects is possible in terms of the theory as developed, though in fact the experimental reverse current-

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40062
S/166/62/000/003/010/010
B178/B102

24.7700

AUTHORS: ~~Avak'yants, G. M.~~, Karageorgiy-Alkalayev, P. M., Teshabayev, A.

TITLE: Theory of space charge in semiconductors

PERIODICAL: Akademiya nauk Uzbekskoy SSR. Izvestiya. Seriya fiziko-matematicheskikh nauk, no. 3, 1962, 81 - 84

TEXT: The contact between an n-type semiconductor and a metal is considered. In the expression for the space charge density $\rho(E) = N_+ + N_0 g E^n$, n is made equal to 1/2, 1, 3/2, and 2, and the solution of Poisson's equation $\frac{dE}{dx} = \frac{4\pi e}{\varepsilon}\rho$ is investigated, where $\rho = \rho(x)$, x = depth in the semiconductor; N_+ = concentration of completely ionized, shallow impurities, N_0 = concentration of deep impurities ionized without a field, and g is a coefficient. It is assumed that $E(x=X_1) = 0$, where X_1 = width of the space charge zone. When n = 1/2, one obtains:

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$$E(0) = -\left(\frac{6\pi e N_0 g'}{\varepsilon}\right)^{1/3} |V - V_k|^{1/3}. \quad (5)$$

$$X_1 = 3^{1/3}\left(\frac{\varepsilon}{2\pi e N_0 g'}\right)^{1/3} |V - V_k|^{1/3}. \quad (6)$$

where E(0) = contact field strength; when n = 1:

$$E(0) = \frac{4\pi e}{\varepsilon} N_0 g \left|V - V_k\right| + \frac{N_+}{N_0 g} \ln\left(1 + \frac{N_0 g}{N_+} E(0)\right), \quad (9)$$

$$X_1 = -\frac{\varepsilon}{4\pi e N_0 g} \ln\left(1 + \frac{N_0 g}{N_+} E(0)\right). \quad (10)$$

and when n = 3/2, the effect of the field strength on the space charge density is negligible. When the Schottky model is taken into account, one obtains $E = \frac{4\pi\rho}{\varepsilon} N_+(x - X_1)$. When $E_f = E(x = X_f)$, one finds that

$$|E(0)| = \left(\frac{2\pi e}{\varepsilon} N_0 g\right)^2 \left[(V - V_k) - \frac{\varepsilon}{2\pi e N_0 g}\sqrt{|E_f|} + \frac{\varepsilon |E_f|^2}{8\pi e N_+}\right]^2. \quad (14)$$

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and when n = 2:

$$E(0) = -\sqrt{\frac{N_+}{N_0 g}}\sqrt{\exp\left[\frac{8\pi e}{\varepsilon}N_0 g\left|V - V_k\right|\right] - 1}. \quad (15)$$ and

$$X_1 = \frac{\varepsilon}{4\pi e N_+}\sqrt{\frac{N_+}{N_0 g}}\arccos\left\{\exp\left[\frac{4\pi e N_0 g}{\varepsilon}(V - V_k)\right]\right\} \quad (17)$$

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UzSSR (Physicotechnical Institute of the AS UzSSR)

SUBMITTED: May 20, 1961

Card 3/3

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

40947

S/109/62/007/007/015/018
D256/D308

AUTHORS: Avak'yants, G. M., Grinberg, I. S. and Murygin, V. I.

TITLE: Inductance of semiconductor diodes

PERIODICAL: Radiotekhnika i elektronika, v. 7, no. 7, 1962, 1214-1222

TEXT: Following a previous investigation of the inductive properties of semiconductor diodes induced by thermal effects (G. M. Avak'yants, AN SSSR. Izvestiya. Seriya fiz.-mat. 1955, 8), a theory of the inductive properties is developed considering the influence of the relaxation processes accompanying the impact ionization of impurities in the space-charge region of the diode. The phase-shift of the current against the voltage is expressed in terms of the transfer of electrons from the valence band on to the donor levels, neglecting the effects of the recombination of the holes by the donor level electrons as well as the thermal transitions of electrons from the donor levels into the conductivity band. It is shown that the energy can be stored in the semiconductor diodes as

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the energy of the space-charge field. Changes in the potential energy are induced by applying a small alternating potential due to the changes of the ionized impurity concentration following the impact ionization. The properties of inductive diodes in oscillatory circuits are discussed. There are 2 figures.

ASSOCIATION: Tashkentskiy gosudarstvennyy universitet im. V. I. Lenina, Fiziko-tekhnicheskiy institut AN UzSSR (Tashkent State University im. V. I. Lenin, Institute of Applied Physics AS UzSSR)

SUBMITTED: August 4, 1961

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

40918

S/109/62/007/007/016/018
D256/D308

AUTHORS: Avak'yants, G. M., Grinberg, I. S., Zaugol'nikova, Ye. G. and Murygin, V. I.

TITLE: Inductive properties of selenium rectifiers

PERIODICAL: Radiotekhnika i elektronika, v. 7, no. 7, 1962, 1223-1229

TEXT: Inductive effects were observed experimentally when a bias voltage was applied in the reverse direction across the elements. The impedance of the selenium rectifiers was measured by a bridge method for temperatures ranging from -100 to +120°C in the presence of reverse bias voltages up to 30 V. The inductive properties were described in terms of the 'negative capacitance' of the rectifier defined by: $\omega L = 1/\omega C^{-}$. The results are presented in the form of inductance and capacitance curves as functions of the bias voltage for various temperatures. The inductive properties of selenium rectifiers occur at low temperatures, though rectifiers showing negative capacitance at room temperature were pointed out by the

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authors. It is also pointed out that the Q-values of selenium rectifiers are always below unity. The frequency characteristics of selenium and germanium diode rectifiers in oscillatory circuits were also investigated. The results of the experiments are compared with the theory of Avak'yants et al. (Radiotekhnika i elektronika, v. 7, no. 7, 1962, 1214-1222). Conclusions: Inductance of selenium and germanium rectifiers can reach large values, their Q-values being rather low. The latter disadvantage can be compensated for by including a negative resistivity element in series with the diode. There are 10 figures. The most important English-language reference reads as follows: M. Schuller and W. Gartner, Electronics, 1960, 33, 17, 60.

ASSOCIATION: Tashkentskiy gosudarstvennyy universitet im. V. I. Lenina, Fiziko-tekhnicheskiy institut AN UzSSR (Tashkent State University im. V. I. Lenin, Institute of Applied Physics AS UzSSR)

SUBMITTED: June 21, 1961

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

S/109/62/007/008/013/015
D409/D301

9.4310

AUTHORS: Avak'yants, G.M., Pavlinov, A.B., Sablikov, V.A., Sinyukov, M.P. and Yurovskiy, A.V.

TITLE: Study of thermal effects in germanium power transistors

PERIODICAL: Radiotekhnika i elektronika, v. 7, no. 8, 1962, 1421-1426

TEXT: The dependence of the triode parameters on the heat, released at the collector junction, is studied theoretically and experimentally. The condition for the appearance of falling characteristics in the non-stationary regime, is obtained. Formulas are derived for the emitter and collector currents, the current gain α, the feedback coefficient μ, the collector conductivity g_c, and the emitter conductivity g_e. As a result of the heat release, falling characteristics appear in both the emitter and collector circuits. The experimental setup for the study of the non-isothermic current-voltage characteristics is described. The transistors П209 (P209)

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and П210А (P210A) were used in the experiments. It was experimentally confirmed that the cooling of the transistors follows Newton's law. It was found that the current gain α depends weakly on temperature and that μ changes by almost one order of magnitude as a result of the heating. (The temperature increase amounted to 20 - 30°K). The experimental and theoretical curves for g_c were in good agreement. The conditions for the appearance of falling characteristics in the non-stationary regime, are analyzed by means of the graph W_c versus Δt (W_c denoting the power dissipated by the collector at the critical point). Conclusions: Formulas are derived for the dependence of the transistor parameters on the heat, released at the collector; these formulas can be simplified in actual conditions. The heat release at the collector junction and in the collector and emitter circuits, is accompanied by the appearance of falling characteristics. There are 7 figures.

SUBMITTED: November 4, 1961

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

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ACCESSION NR: AP3006463 S/0109/63/008/009/1594/1601

47

AUTHOR: Avak'yants, G. M.; Atakulov, B.; Mury'gin, V. I.; Ozharedov, A. D.; Teshabayev, A.

TITLE: Active and reactive currents in an asymmetrical electron-hole junction with high injection levels

SOURCE: Radiotekhnika i elektronika, v. 8, no. 9, 1963, 1594-1601

TOPIC TAGS: semiconductor, electron-hole junction, asymmetrical junction

ABSTRACT: A theoretical investigation is presented of the majority-carrier (electron) current in the base of an asymmetrical p-n junction. It is claimed that no "adequately complete and rigorous statement of this problem" has ever been published. It is assumed that: (a) the hole band is highly alloyed; (b) the electron (base) band is relatively lightly alloyed; (c) a strong electron recombination band exists within the junction. On the basis of the expressions for generation/recombination hole and electron currents in the junction, an equation for the voltage drop across the p-n junction is set up and solved. Static and dynamic current-voltage characteristics are described analytically; diode reactance

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ACCESSION NR: AP3006463

is evaluated, as well as the inductance of "short" diodes. A combination of inductive characteristics of the diode with the negative resistance to the forward current is held possible. I. Landany's work (IRE Trans. Electron Devices, 1960, ED-7, 303) is criticized. Orig. art. has: 63 formulas.

ASSOCIATION: Tashkent"skiy gosudarstvenny"y universitet im. V. I. Lenina (Tashkent State University)

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AVAK'YANTS, G.M.; MURYGIN, V.I.; SANDLER, L.S.; TESHABAYEV, A.; YUROVSKIY, A.V.

Properties of an electron-hole junction in the straight-line direction at large current densities. Radiotekh. i elektron. 8 no.10:1776-1782 O '63. (MIRA 16:10)

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AVAK'YANTS, G.M.; MURYGIN, V.I.; SANDLER, L.S.; TESHABAYEV, A.; YUROVSKIY, A.V.

Straight branch of the voltampere characteristic of thin diodes at high injection levels. Radiotekh. i elektron. 8 no.11:1919-1926 N '63. (MIRA 17:1)

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L 21348-65 EEC(b)-2/EEC(k)-2/EWA(h)/EWG(k)/EWT(1)/EWT(m)/EWP(b)/T/EWP(t) Pm-4/
Pz-6/Peb ESD/ASD(a)-5/AFWL/ESD(t)/IJP(c) RDW/JD
ACCESSION NR: AP5000869 S/0166/64/000/005/0053/0057

AUTHOR: Avak'yants, G.M.; Zaugol'nikova, Ye. G.; Murygin, V.I.; Tserfas, R.A.

TITLE: Some properties of inductive selenium rectifiers

SOURCE: AN UzSSR. Izvestiya. Seriya fiziko-matematicheskikh nauk, no. 5, 1964, 53-57

TOPIC TAGS: selenium rectifier, audio frequency generator, semiconductor, inductive rectifier, semiconducting inductance

ABSTRACT: The present work continues the investigation of the previously reported inductive effect observed in selenium rectifiers (Avak'yants et al., Radiotekhnika i elektronika, 1962, No. VII, vol. 7, pages 1214 and 1223). Measurements have shown that the inductive properties of selenium rectifiers are related to the exponential current-voltage dependence reported by Karageorgiy-Alkalayev (Izvestiya AN UzSSR, Seriya fiziko-matematcheskikh nauk, 1961, 2, 12). The dynamic volt-ampere curves of the inductive selenium rectifier have a peculiar "figure-eight" shape as shown in Fig. 1 of the Enclosure. For small instantaneous voltages the element gives a capacitive phase shift, for large values—an inductive phase shift. Selenium rectifiers biased in the region of large inverse currents possess a semiconducting inductance, i.e. they can store the energy of an electric field and transfer it to other parts of a circuit. Although the impedance of the

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ACCESSION NR: AP5000859

rectifier is found to have an appropriate frequency dependence, the element cannot be used as a choke filter, because of its high DC resistance. With the addition of external circuitry to provide compensating negative resistance, the selenium rectifier can be used to generate audio frequencies. Under certain conditions the deep levels do not act to impede the carriers and give an inductive effect, but, as a result of the intense ionization in the presence of a strong electric field in the contact region, they form a region with an increased concentration of ionized impurities which leads to an anomalous frequency-dependent growth of reverse current and capacitance. Orig. art. has: 6 figures.

ASSOCIATION: Tashkentskiy gosuniversitet im. V.I. Lenina (Tashkent State University)

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"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102520012-8

ACCESSION NR: AP4038618 S/0109/64/009/004/0670/0675

AUTHOR: Avak'yants, G. M.; Leyderman, A. Yu.

TITLE: Effect of the rate of recombination in a nonrectifying electrode upon the current-voltage characteristic of an abrupt p-n junction

SOURCE: Radiotekhnika i elektronika, v. 9, no. 4, 1964, 670-675

TOPIC TAGS: semiconductor, semiconductor device, pn junction, current voltage characteristic, recombination rate

ABSTRACT: An estimation of the finite rate of recombination in the ohmic contact of a long diode was not made rigorously enough by D. A. Aronov (Izv. AN UzSSR, Ser. fiz-mat. n., 1960, no. 6, p. 68). The present article offers a rigorous method for calculating the current-voltage characteristic of a diode with a finite rate of recombination of minority carriers in the back contact which is assumed to be nonrectifying. i.e., noncreating a space charge in the near-contact region.

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ACCESSION NR: AP4038618

The authors' rigorous formulas take into account the effect of the electric current field upon the motion of the carriers near the contact. This effect is very substantial in cases when $p(d) \gg N$ (high injection level). Orig. art. has: 1 figure and 26 formulas.

ASSOCIATION: none

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L 20016-65 ASD(a)-5/AFWL/ESD(c)/ESD(t)
ACCESSION NR: AP4038647 S/0109/64/009/005/0868/0875

AUTHOR: Avak'yants, G. M.; Atakulov, B.; Mun'y*gin, V. I.; Teshabayev, A.; Tserfas, R. A.

TITLE: Some patterns in the current-voltage characteristics of long diodes

SOURCE: Radiotekhnika i elektronika, v. 9, no. 5, 1964, 868-875

TOPIC TAGS: diode, semiconductor diode, current voltage characteristic, Ge diode, Si diode

ABSTRACT: New approximate formulas are offered which describe the linear segment of the current-voltage characteristic of a long-base diode with the assumption that a greater part of the applied voltage drops in the diode body. The formulas are valid for three intervals of high-level injection. Experimental verification was performed with n-Ge long-base (1.5-5 mm) diodes with a resistivity of 27-28 ohms.cm and a diffusion length of 2.5×10^{-2} cm. The current-voltage

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characteristics of a 3.5-mm-thick base were also measured at +20, 0, -20, and -60C. Generally, a good agreement between the theoretical and experimental curves is noted. The current-voltage characteristic of an n-Si Au-alloyed long-base (0.1 mm) diode was also measured. Orig. art. has: 8 figures, 18 formulas, and 2 tables.

ASSOCIATION: Tashkent"skiy gosudarstvenny*y universitet im. V. I. Lenina (Tashkent State University)

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L 10808-65 EWT(1)/EWG(k)/T Pz-6 IJP(c)/AFWL/ASD(a)-5/ESD(t) AT
ACCESSION NR: AP4046693 S/0109/64/009/010/1898/1899

AUTHOR: Avak'yants, G. M.

TITLE: Properties of p-n junctions at large currents

SOURCE: Radiotekhnika i elektronika, v. 9, no. 10, 1964, 1898-1899

TOPIC TAGS: p-n junction, injection current, semiconductor, high current density

ABSTRACT: The present paper is an extension of the author's earlier work in which he developed the theory of a forward-biased p-n junction at high injection currents. In particular, a more detailed analysis is conducted of the effect of the current on the distribution of charge carriers resulting in removal of the primary potential barrier at sufficiently high currents. Formulas are derived for the current and the voltage at which the potential barrier is removed. The calculations were conducted for the case when electon-hole collisions can be neglected. Orig. art. has: 10 formulas.

ASSOCIATION: none

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