

LITOVCHENKO, V. G.

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S/185/60/005/003/006/020  
D274/D303

AUTHORS: Prymachenko, V. Ye., Lytovchenko, V.G., Lyashenko, V.I. and Snitko, O.V.

TITLE: The study of fast and slow electron states on a germanium surface

PERIODICAL: Ukrayins'kyy fizychnyy zhurnal, v. 5, no. 3, 1960, 345-356

TEXT: The effect of an external electric field is studied on the dark conductivity (the field effect) and on the surface recombination of thin germanium plates in vacuo. The field effect was investigated at a d.c. voltage, as well as by applying rectangular pulses; this made it possible to determine separately the parameters of the fast and slow surface states. The method of investigation used is more advantageous than earlier methods; in particular, it permits studying all the surface states on a single specimen. The size of the specimens was approximately 1.5 x 0.5 x 0.015 cm. The specimens

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were treated with CP-4 and, after measurements, with boiling H<sub>2</sub>O<sub>2</sub>. The germanium plates were p-type with specific resistance 40 - 50 Ohm. The specimen served as one plate of a capacitor to which a d.c. voltage of 2500 v was applied as well as an a.c. voltage (rectangular pulses). The dark conductivity  $\sigma$  was measured by a compensation method. The change in conductivity  $\Delta\sigma$  (following the application of the rectangular pulses), was measured by a special circuit. The rate of surface recombination was determined by the effective relaxation time  $\tau$  of the photoconductivity, following the illumination of the middle part of the specimen by the rectangular pulses of light. The relaxation of the photocurrent followed an exponential law. A diagram is given of the circuit used for the investigation. Curves are given for  $\Delta\sigma$  as a function of the charge  $Q$  induced on the germanium surface. The presence of a minimum on the experimental curve  $\Delta\sigma(Q)$  permitted determining the surface potential  $\chi$  for each  $Q$ . The total surface potential reaches 15 kT/e  $\approx 0.38$  eV., i.e. it is approximately equal to half the width of the forbidden germanium zone. Further, the field effect makes it

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possible to determine the charge  $Q_s$  in both fast and slow states, ( $Q_s = Q - Q_0$ , where  $Q_0$  is the space charge). The surface charge in fast states changes relatively little for small  $Y$ , whereas for large  $Y$  it changes rather sharply. The dependence of  $Q_s$  on  $Y$  leads to the interpretation of the energy levels (discrete vs. continuous). The authors assume discrete interior levels; this assumption is supported by the results of recombination measurements and is also in agreement with A. Many's results (Ref. 21: J. Phys. Chem. Solids. 8, 87, 1959). Therefore, the results obtained from the field effect for the fast states are interpreted by the authors by means of a model of four discrete levels, whose parameters are given in a table; for the slow states, two discrete levels are assumed. The charge of the slow states is much greater than that of the fast states. Hence the slow states are of basic importance in screening the constant external field. Further, the dependence of the rate of surface recombination  $s$  on the surface potential  $Y$  is plotted and discussed. The fast levels are responsible for the recombination; two or even three such levels can substantially contribute to it; but, in gen-

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eral, one of the fast levels is predominant in surface recombination. The values of the capture cross-sections of electrons and holes are given in the table. The measured values of the parameters of the surface levels depend on the etching method (by means of CP-4 or by H<sub>2</sub>O<sub>2</sub>) and on whether the surfaces were freshly etched or a long time ago (their previous history); thereby the difference in the parameters is, however, not as considerable as should have been expected; the concentration of the fast states, and especially their recombination capacities show considerable dependence on the previous history of the specimens. Finally, the presence of an oxide layer on the germanium surface is considered as definitely established; this layer has a complex chemical and polycrystalline structure. The layer is the main reason for the complex system of surface states of germanium. The slow states are found on the outer surface of the oxide, being mainly determined by adsorbed atoms, whereas the fast states are on the interface Ge-oxide, being mainly due to imperfections of structure and extraneous atoms. There are 5 figures, 1 table and 36 references: 14 Soviet-bloc and 22 non-Sov-

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S/185/60/005/003/006/020

The study of fast and slow electron...

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iet-bloc. The 4 most recent references to English-language publications read as follows: E. Harnik. G. Margoninski, Phys. a.Chem. Solids, 8, 96, 1959; A. Many, J. Phys. Chem. Solids, 8, 87, 1959; R.E. Schlier, H.E. Farnsworth, J. Chem. Phys., 30, 917, 1959; G.A. Barnes, P.C. Banbury, J. Phys. Chem. Solids, 8, 111, 1959.

ASSOCIATION: Instytut fizyki AN USSR (Physics Institute, AS Ukr SSR)

SUBMITTED: November 5, 1959

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Card 5/5

89276  
S/181/61/003/001/008/042  
B102/B212

24.7600 (1043,1158,1160)

AUTHORS: Litovchenko, V. G. and Lyashenko, V. I.

TITLE: Investigation of the properties of a germanium surface at different temperatures. I. Amplitude characteristics

PERIODICAL: Fizika tverdogo tela, v. 3, no. 1, 1961, 61-72

TEXT: The properties of a real germanium surface at room temperature are well known, but those at low temperatures have hardly been investigated; and it is uncertain whether the energy distribution of the surface levels in the forbidden band is discrete or continuous. A knowledge of the temperature dependence of the electron surface-state parameters ( $E$ ,  $N$ , and the trapping cross sections  $C_p$  and  $C_n$ ) could clarify this problem, but the

$T$ -functions had to be known for each single surface level in a large temperature interval. The authors investigated several parameters in the region of 170-305°K, which are characteristic of the surface properties of germanium, and this paper reports on the results. The experimental method has been described in Refs. 4, 6, 7. 70-300 $\mu$  thick n-type Ge specimens of

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Investigation of the properties...

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quadratic shape have been investigated; they had been cut in the (110) plane, and had a resistivity of 20-45 ohm.cm (at 300°K), a volume lifetime of  $\tau_0 \approx 250 \cdot 10^3 \mu\text{sec}$ , and  $s = 100\text{-}200 \text{ cm/sec}$ . The following measurements were made: initial change of the conductivity  $\Delta\sigma_0$  of the specimen due to field pulses ( $10^{-6} \text{ sec}$ ); the change  $\Delta\sigma_2$  after the relaxation processes; the change  $\Delta\sigma_3$  30 sec after the field had been turned on; the proper time  $\tau_p$  of the short-period relaxation of the field effect, and the proper time  $\tau_e$  of the relaxation of photoconductivity. The dependence of these quantities upon a constant transverse electric field has been measured for a number of fixed T-values between 170 and 305°K, and the temperature dependence of kinetic characteristics without a transverse field ( $E_t=0$ ) has been recorded. The results of the measurements are illustrated in diagrams. Fig. 1 shows  $\Delta\sigma_3$  as a function of a charge  $Q_1$  which had been induced on the semiconductor by a constant transverse field for n-type Ge,  $n_0 = 5.4 \cdot 10^{13} \text{ cm}^{-3}$  in a vacuum. Fig. 2 shows the initial bend of the band,

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$Y_0(T)$ , and the work function  $\chi(T)$  of different surface states as functions of temperature. For n-type specimens,  $Y_0$  changes to negative values with a decreasing temperature (at  $T \approx 175^\circ\text{K}$ ,  $Y_0 \approx -5.5 \text{ kT/e}$ ) but increases for p-type specimens in the positive range. Measurement of the quantities  $\Delta\sigma_0$  and  $\Delta\sigma_2$  made it possible to determine the mobility of the field effect ( $\mu_{f.e.} = \Delta\sigma_p / \Delta Q_1$ ). Fig. 3 shows the initial mobility  $\mu_{f.e.0}$  and the quasi-steady  $\mu_{f.e.2}$  as functions of the surface potential  $Y$  for various values of  $T$ . The parameters of the fast surface levels have been calculated from experimental data on  $\mu_{f.e.}(Y)$ ; results are given in Table 1. ✓

Analogous computations were made for slow surface levels, Table 2 gives the results. The investigations showed that fast and slow surface levels have the following in common: They are discrete, show the same number, and the concentration of the mean surface levels is about one order of magnitude smaller than that of the outer ones. The position of the fast surface energy levels does not fully agree with that of the slow levels, but this deviation is less than 2 kT/e. The concentrations of the slow surface

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Investigation of the properties...

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B102/B212

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levels are in all cases 2-4 times higher than those of the fast surface levels. There are 5 figures, 2 tables, and 38 references: 14 Soviet-bloc and 24 non-Soviet-bloc.

ASSOCIATION: Institut fiziki AN USSR Kiyev (Institute of Physics,  
AS UkrSSR, Kiyev)

SUBMITTED: May 30, 1960

Legend to Tables: 1) Number of specimen; 2) surface state; 3) within 24 hr after etching; 4) aged specimen; 5) within 3 hr after etching.

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LITOVCHENKO, V.G.; LYASHENKO, V.I.

Investigating the properties of the surface of germanium at various temperatures. Part 2: Kinetics of processes. Fiz. tver. tela 3 no.1:73-88 Ja '61. (MIRA 14:3)

1. Institut fiziki AN USSR, Kiyev.  
(Germanium)

24.7700

S/181/62/004/004/001/042  
B108/B102

AUTHORS: Litovchenko, V. G., Frolov, O. S., and Pao Shchih-mao

TITLE: Study of long-period variations in electrical properties of germanium surfaces

PERIODICAL: Fizika tverdogo tela, v. 4, no. 4, 1962, 833 - 845

TEXT: A method of studying surface-sensitive effects in semiconductors is presented. The basic idea is to examine the long-period relaxation of conductivity and work function in the case of adsorption. A specific feature of this method is that not one but two quantities characterizing the surface space charge are to be determined by experiment, namely, the surface conductivity and surface flexure of the bands. The results of experiments on the electrical surface properties of n-type germanium were consistent with theory. The method is therefore recommended for the quantitative investigation of catalytic reactions in gases and of the electronics of metal and semiconductor surfaces. The most important results of this work (numerous numerical data on Ge are given) have been reported at the Vsesoyuznoye soveshchaniye po poverkhnosti poluprovodnikov

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Study of long-period variations...

S/181/62/004/004/001/042  
B108/B102

(All-Union Semiconductor Surface Conference), Moscow, June 5 - 6, 1961. Professor V. I. Lyashenko, I. I. Stepko, Candidate of Physics and Mathematics, and O. V. Snitko are thanked for discussions. There are 8 figures, 2 tables, and 27 references: 9 Soviet and 18 non-Soviet. The four most recent references to English-language publications read as follows: J. N. Zemel, R. F. Green. Proc. Int. Conf. Semic., Prague, 549, 1960; R. F. Green et al. Phys. Rev., 118, 967, 1960; R. F. Green. J. Phys. a. Chem. Sol. 14, 291, 1960; Amith. J. Phys. a. Chem. Sol. 14, 271, 1960; G. Dorda. Czechoslov. J. Phys., B10, 406, 1960.

✓B

ASSOCIATION: Institut poluprovodnikov AN USSR, Kiyev (Institute of Semiconductors, AS UkrSSR, Kiyev)

SUBMITTED: September 20, 1961

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S/181/62/004/008/001/041  
B125/B104

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AUTHORS: Litovchenko, V. G., and Lyashenko, V. I.

TITLE: Adhesion of non-equilibrium carriers on the surface of germanium

PERIODICAL: Fizika tverdogo tela, v. 4, no. 8, 1962, 1985-1993

TEXT: The temperature dependence of the relaxation of photoconductivity of thin germanium specimens was investigated. The adhesion of minority carriers was proved by the following results: (1) The filling of the traps with carriers produced by a constant light of high intensity excludes the recombination mechanism of the relaxation of photoconductivity at low temperatures. (2) The carriers produced by the pulse itself fill the traps completely. At 200°K the relaxation curve is exponential when  $\gamma_{inj}$  is small, but becomes less exponential with increasing  $\gamma_{inj}$ . (3) With weak signals and low trap concentrations the mobile pairs responsible for photoconductivity are extracted from the specimen by a sufficiently strong longitudinal electric field. In the presence of carriers adhering to the

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surface, the excited carriers near the adhesion center are localized and cannot be extracted. (4) If injection is achieved by a rectifying contact, the relaxation of non-equilibrium conductivity has a long-wave component at very small  $\gamma_{inj}$  and low temperatures. This component is destroyed by weak illumination. (5) If pairs are injected into well-developed inverse or accumulation layers, long-lasting relaxation is observed at small  $\gamma_{inj}$  and low temperatures. (6) Long-lasting relaxation occurs primarily in the case of n-type conductivity. Further experiments indicate the occurrence of carriers on the surface, and not inside the germanium specimen. Adhesion of carriers of one sign on the surface automatically excludes carriers of the other sign from carrier conduction in the interior, and the free carriers will move only parallel to and in the vicinity of the surface. Adhesion occurs at temperatures which are the higher the thinner the specimen. The lifetime of free electrons adhering to the surface is given by

$$\tau_n = \frac{\sigma \frac{U_B - E_{it}}{C_n v n_0} \frac{N_{it}}{2n_i L} \frac{F}{\text{sh } U_s - \text{sh } U_B} + \frac{1 - f_n}{1 + \exp(E_{it} - Y_s - U_B)}}{f_n^{-1}} \quad (2)$$

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with illumination it is

$$\tau_{n\gamma} = (C_n v n_0)^{-1} \left[ \left( \frac{\Delta \sigma_1}{\Delta \sigma_2} \right)_{\gamma} + \frac{1 + \exp(E_{11} - Y_s - U_B)}{f_{n\gamma}^{-1}} \right]^{-1} \frac{f_{n\gamma}}{e^{Y_s}} \frac{1}{1 + \gamma_n} \quad (3)$$

The notations are obviously taken from W. Shockley, W. Read. Phys. Rev., 87, 835, 1952. There are 4 figures.

ASSOCIATION: Institut poluprovodnikov, AN USSR Kiyev (Institute of Semiconductors AS UkrSSR, Kiyev)

SUBMITTED: December 25, 1961

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9.4177  
26.1512

S/181/62/004/010/045/063  
B102/B112

AUTHORS: Primachenko, V. Ye., Litovchenko, V. G., Lyashenko, V. I.,  
and Snitko, O. V.

TITLE: Minority carrier adhesion on the silicon surface

PERIODICAL: Fizika tverdogo tela, v. 4, no. 10, 1962, 2925-2930

TEXT: This paper is aimed to show that under certain conditions a charge accumulation may occur on the silicon surface and that the bipolarity ( $\Delta n = \Delta p$ ) may be disturbed. This is, however, contradictory to the observations made by other authors (see e.g. Phys.Rev.101, 1272, 1956; Semic.Surf.Phys.,85,1957). The disturbance of bipolarity of the intrinsic photoconductivity observed is attributed to minority carriers accumulating on fast surface levels. The same method of investigation was used as described in previous papers (FTT 1,980,1959; FTT 2, 591, 1960; UFZh,5,345,1960). The specimens were n-type Si single crystal platelets 200-400 $\mu$  thick with resistivities of 30 - 200 ohm $\cdot$ cm and volume lifetimes of  $\sim$ 1000 $\mu$ sec, the surfaces of which had been etched with CP-8. In germanium the bipolarity of the surface photocurrent may be disturbed

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only at low temperatures, but in etched silicon it may be disturbed even at room temperature. This is proved (1) by the nature of the photo-conductivity relaxation of thin samples if the oscillogram shows two exponents with widely differing time constants; (2) by the constant  $\tau_{sh}$  of the short-term photocurrent component being inversely proportional to the electric field applied; whereas the constant of the long-term component is independent of it; (3) by the fact that the long-term component can be caused to vanish by the usual method of trap filling; (4) by the long-term component increasing as the temperature decreases, while the short-term component decreases and almost vanishes completely, this being related to the intensified charge accumulation; in both cases  $\ln \tau = f(1/T)$  follows a linear course; (5) by the results obtained in a study of the kinetics of the field effect also indicating a disturbance of bipolarity. This bipolarity is also indicated by the field dependence of  $\tau_{sh}$  and  $\tau_1$  and (7) it is particularly pronounced in samples kept on air for a longer period of time after they had been etched. (8) Experiments on the condenser photo-emf proved that the disturbance of the photocurrent bipolarity of Si is related to a change in the surface charge. Such a

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disturbance occurs when  $\frac{C_n}{C_p} \exp \frac{E_{tv} - \mu_{nc}}{kT} \ll 1$  and  $\tau_c N_v C_p \exp(-E_{tv}/kT) \ll 1$

where  $C_p$  and  $C_n$  are the electron and hole trapping cross sections,  $E_{tv}$  the energy of the levels relative to the valence band,  $\mu_{nc}$  the electron Fermi quasilevel relative to the conduction band,  $\tau_c$  the recombinative lifetime and  $N_v$  the effective number of levels in the valence band.

There are 3 figures.

ASSOCIATION: Institut poluprovodnikov AN USSR, Kiyev (Institute of Semiconductors AS UkrSSR, Kiyev)

SUBMITTED: February 6, 1962 (initially) June 12, 1962 (after revision)

Card 3/3

LITOVCHENKO, V.G. [Lytovchenko, V.H.]

Kinetics of monopolar nonequilibrium conductivity in the  
region of a space charge. Ukr. fiz. zhur. 8 no.10:1117-1127  
0 '63. (MIRA 17:1)

1. Institut poluprovodnikov AN UkrSSR, Kiyev.

LITOVCHENKO, V.G. [Lytovchenko, V.H.]; LYASHENKO, V.I.

Electric properties of a silicon surface at various temperatures. Ukr. fiz. zhur. 8 no.10:1170-1171 0.'63.

Effect of heating on recombination surface levels in silicon.  
Ibid.:1171-1172 (MIRA 17:1)

1. Institut poluprovodnikov AN UkrSSR, Kiyev.

LITOVCHENKO, V.G.; LYASHENKO, V.I.

Electrophysical properties of the actual surface of silicon at  
varying temperatures. Fiz. tver. tela 5 no.11:3207-3214 N  
'63. (MIRA 16:12)

1. Institut poluprovodnikov AN UkrSSR, Kiyev.

BONDARENKO, V.N. [Bondarenko, V.M.]; ZHINDULIS, A.I. [Zhyndulis, A.I.];  
LITOVCHENKO, V.G. [Lytovchenko, V.H.]; SNITKO, O.V.;  
FROLOV, O.S.

Effect of an external electric field on the work function  
of thin lead sulfide films. Ukr. fiz. zhur. 8 no.10:1110-  
1116 0 '63. (MIRA 17:1)

1. Institut poluprovodnikov AN UkrSSR, Kiyev.

L 01283-66 E/P(m)/E/P(t)/E/P(b) IJP(c) JD/GS

ACCESSION NR: AT5020445

UR/0000/64/000/000/0020/0021

AUTHOR: Litovchenko, V. G.; Lyashenko, V. I.

50  
B+1

TITLE: Investigation of the natural surface of silicon at various temperatures

SOURCE: Mezhvuzovskaya nauchno-tekhnicheskaya konferentsiya po fizike poluprovodnikov (poverkhnostnyye i kontaktnyye yavleniya). Tomsk, 1962. Poverkhnostnyye i kontaktnyye yavleniya v poluprovodnikakh (Surface and contact phenomena in semiconductors). Tomsk, Izd-vo Tomskogo univ., 1964, 20-21

TOPIC TAGS: silicon, surface property, crystal surface, electron recombination, photoconductivity, semiconductivity

ABSTRACT: In spite of the wide use of silicon in scientific research and for practical purposes, its surface properties have been insufficiently studied. The authors conduct studies at temperatures  $T$  where the forbidden zone interval on the surface is considerably broadened. Studies at low temperatures where the system of surface layers is stable can be used for solving several theoretical problems: 1) determining the nature of energy distribution in the layers (discrete or continuous); 2) the effect of temperature on the probability characteristics of capture by a

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ACCESSION NR: AT5020445

local electron or hole center; 3) the effect of temperature on the other parameters of the levels: energy state  $E_i$  and concentration  $N_i$ ; 4) the effect of temperature on the band curvature  $\phi_g$  and work function  $\chi$  must be known for design purposes. The silicon surface was studied in the 180-620°K range. The authors measured the field effect at constant voltage, the pulsed field effect for small signals and photoconductivity in darkness and under constant illumination. At low temperatures,  $\phi_g$  is usually shifted toward the region of minus values in p-silicon, becoming approximately constant at the lowest temperatures. Sometimes  $\phi_g \approx \text{const}$  throughout the entire temperature range. The differences are caused by differences in surface layer systems. It was found that  $N_i \approx \text{const}$  and the  $E_i$  decreases linearly with a reduction in  $T$ . The data support a discrete model for fast surface levels. Charge capture is an important factor in photoconductivity at low temperatures, while the recombination mechanism is the sole factor ordinarily at room temperature. There is little change in the fast surface level system up to 100°C. There is a considerable change in the system of surface electron states after heating for 0.5-2.5 hours at 100°C in a vacuum:  $N_t$  may be changed by a factor of  $\sim 10$ , and the same applies to the speed of surface recombination. The changes are stable, only slightly sensitive to ambient atmospheric conditions, and almost completely restored when the system is re-evacuated after admitting air into it. The effect of temperature on the electron system

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L 01283-66  
ACCESSION NR: AT5020445

of the silicon surface is presently being studied in detail.

ASSOCIATION: none

SUBMITTED: 06Oct64

NO REF SOV: 000

ENCL: 00

OTHER: 000

SUB CODE: SS

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LITOVCHENKO, V.G.; FROLOV, O.S.; ZHINDULIS, A.I.; YAKOVKIN, V.N.

Study of slow changes in the work function and surface conductivity of Si and Ge. Radiotekh. i elektron. 9 no.6:1047-1054  
Js '64. (MIRA 17:7)

L 24157-65 EPA(2/ENT(1) Pt-4/Pt-10 S/0185/64/000/010/1045/1050  
ACCESSION NR: AP40411860

AUTHOR: Ly\*to\*chenko, V. G. (Litovchenko, V. G.)

TITLE: Kinetics of unipolar nonequilibrium conductivity in the region of the space charge in the case of degeneration

SOURCE: Ukrayins'ky\* y fizy\*chny\*y zhurnal, v. 8, no. 10, 1964, 1045-1050

TOPIC TAGS: unipolar nonequilibrium conductivity, kinetics of conductivity, semiconductor, space charge, surface degeneration

ABSTRACT: The kinetic and the amplitude characteristics of the nonequilibrium unipolar conductivity in the region of the space charge are considered for the case when the semiconductor may be degenerated at the surface (atomically clean surface), or in the bulk. The relaxation is determined by capture on traps located in one plane, such as surface centers, linear dislocations, etc. Relationships are derived for the rate of surface recombination in the dark and with bias lighting, and for the stationary lifetime of the pairs. Orig. art. has: 17 equations

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L 24157-65

ACCESSION NR: AF 1048860

ASSOCIATION: Institut napivpovidnykiv AN URSS, Kiev (Institute of Semi Conductors, AN URSS)

SUBMITTED: 30 Jan 64

ENCL: 00

SUB CODE: GP, EC

NO REF SOV: 011

OTHER: 015

Card 2/2

L 12615-65 EWT(l)/EWT(m)/EWA(d)/ESP(s)/EEC(t)/T PC-4/P2-6 IJP(c) AT/RW  
ACCESSION NR: AP5005102 8/01/65/007/002/0565/0512

42  
37  
B

AUTHOR: Litovchenko, V. G.; Corban', A. P.; Kovbasynuk, V. P.

TITLE: Investigation of the effect of adhesion of photocarriers on the surface of silicon

SOURCE: Fizika tverdogo tela, v. 7, no. 2, 1965, 565-572

TOPIC TAGS: adhesion, photoconductivity, photoconductivity, relaxation, surface layer, electron transition, recombination, photocarrier adhesion

ABSTRACT: The purpose of the investigation was to establish the electronic and chemical-structure surface states for which the minority carriers can adhere to the surface of silicon, to determine the detailed mechanism of the electronic exchanges between the local level and the band which leads to violation of the bipolar nature of the intrinsic photoconductivity, and to ascertain which of the investigated or new surface levels determine the carrier adhesion effect. The test procedure was based on violating the equilibrium of a small section of the forbidden band on the surface and investigating the kinetics of the photoconductivity and the kinetics of the field effect. The surface potential was changed by applying to the surface

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ACCESSION NR: AP5005302

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large amplitude rectangular electric-field pulses. The measurements were made in vacuum ( $\sim 10^{-6}$  torr) on thin samples ( $\sim 300\mu$ ) of p-type silicon ( $\sim 10^3$  ohm-cm,  $\tau_{inv} \sim 10^2$  usec), cut along the (111) plane and etched. A detailed description of the procedure and the equipment, and of data on the band model of the real surface of the silicon, is contained in a separate article (UFZh v. 10, no. 2, 1965). The results show that the form of the photoconductivity relaxation may be connected with the character of the space-charge surface layer. A model is proposed for the electronic transitions, according to which the accumulation of carriers in the band is due to the "delayed recombination" level. According to this model, illumination transfers the "delayed recombination" levels into pure combination levels, and therefore the long-time relaxation is eliminated by illumination. When the temperature is increased, to the contrary, the number of levels going over to the "delayed recombination" levels increases, in agreement with experiment. It is shown that an appreciable effect on the formation of adhesion centers is due to the presence of water molecules on the surface. "We thank Professor V. I. Lyashenko, K. D. Glinchuk, O. V. Snitko, and V. Ye. Primachenko for a discussion of the results." Orig. art. has: 3 figures, 3 formulas, and 2 tables.

ASSOCIATION: Institut poluprovodnikov AN UkrSSR, Kiev (Institute of Semiconductors)

Card 2/3

LITOVCHENKO, V.G. [Lytovchenko, V.H.]; GORBAN', A.P. [Herban', A.F.];  
KOVBASYUK, V.P.

Use of the method of small pulse perturbations in studying a  
real silicon surface. Ukr. fiz. zhur. 10 no.3:287-297 Nr '65.  
(MIRA 18:6)

1. Institut poluprovodnikov AN UkrSSR, Kiyev.

LITOVCHENKO, V.G. [Lytovchenko, V.H.]; LYASHENKO, V.I.; FROLOV, O.S.

Method for determining the surface potential of semiconductors  
within a wide range of resistivities. Ukr.fiz.zhur. 10 no.12:  
1334-1340 D '65. (MIRA 19:1)

1. Institut poluprovodnikov AN UkrSSR, Kiyev. Submitted  
January 16, 1965.



L 29956-66

ACC NR: AP6012476

SOURCE CODE: UR/0181/66/008/004/1147/1155  
78  
EAUTHOR: Litovchenko, V. G.; Kovbasyuk, V. P.; Sviridenko, P. T.

ORG: Institute of Semiconductors, AN UkrSSR, Kiev (Institut poluprovodnikov AN UkrSSR)

TITLE: Spectra and kinetics of the infrared surface photoconductivity of silicon

SOURCE: Fizika tverdogo tela, v. 8, no. 4, 1966, 1147-1155

TOPIC TAGS: silicon, ir photoconductor, crystal surface, surface property, ir absorption, resonance absorption, impurity center, activation energy

ABSTRACT: The spectra of surface infrared photoconductivity were investigated at room temperature and at 120K using chemically etched surfaces of p- and n-type silicon. The purpose of the investigation was to establish the type of energy distribution of the surface traps, to determine the activation energy of the centers, to estimate their concentration, and to obtain information on the type of photon absorption by the centers (resonant or nonresonant). The spectra were obtained with an IKS-12 spectrometer with slit width 0.05-2 mm. The intensity was varied with the aid of round diaphragms calibrated for each wavelength. The illumination was with an incandescent lamp, square-wave modulated at 9 cps. The samples were in the form of thin plates (20 x 6 x 0.6 mm). The impurity concentration was kept low to ensure that the influence of the surface centers on the impurity photoconductivity will dominate. The obtained spectra exhibited at low wavelengths ( $> 2.5 \mu$ ) a nonmonotonic variation with several maxima, a set of clearly pronounced "ledges" at medium wavelength, and a

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L 29956-66

ACC NR: AF6012476

0

smooth rise in photoconductivity with decreasing wavelength to the absorption edge. At low temperatures the spectra exhibited a more monotonic behavior. The presence of the structure in the spectra indicates a discrete character of the energy distribution for the main surface traps. The activation energies calculated from the spectra agreed with those obtained from the differential field effect. The dependence of the infrared conductivity of the illumination, its kinetics, and the influence of illumination with white light on the spectra and on the kinetics were also investigated. In the latter case it is possible to determine the surface potential without knowing the minimum of the surface conductivity. It is concluded that detailed investigations of the spectra of surface infrared conductivity and its kinetics as well as its temperature and field dependence, can serve as an effective new method of investigating the properties of surface centers and the laws governing the non-equilibrium processes which occur in the space-charge region. Orig. art. has: 6 figures and 3 formulas.

SUB CODE: 20/      SUBM DATE: 01Sep65/      ORIG REF: 015/      OTH REF: 007

Card 2/2 CC

L 06264-67 EWT(1)/EWT(m)/EWP(t)/ETI IJP(e) JD

ACC NR: AP6030975 SOURCE CODE: UR/0181/66/008/009/2765/2767

AUTHOR: Kovbasyuk, V. P.; Litovchenko, V. G.

60  
B  
16

ORG: Institute of Semiconductors, AN UkrSSR, Kiev (Institut poluprovodnikov AN UkrSSR)

TITLE: Effect of external electric field on the infrared photoconductivity of "pure" silicon 27

SOURCE: Fizika tverdogo tela, v. 8, no. 9, 2765-2767

TOPIC TAGS: photoconductivity, electric field, IR radiation

ABSTRACT: The article describes the effect of an external electric field on the IR photoconductivity observed in thin (~0.5 mm) samples of n- and p-type silicon containing impurities in amounts less than  $10^{13}$  cm<sup>-3</sup>. This effect is important in determining the mechanisms of formation of extrinsic photoconductivity. The field E was  $5 \times 10^5$  V/cm, and the photoconductivity was measured in the 0.9-3  $\mu$  wavelength range at 297°K. IR photoconductivity spectra obtained in the absence and presence of the external field are compared with the spectrum of surface traps obtained from the differential field effect. It is shown that in most cases the photoactive absorption of IR light on surface centers is due to "impurity center - majority carrier band" transitions. Orig. art. has: 1 figure and 2 formulas.

SUB CODE: 20/ SUBM DATE: 22Feb66/ ORIG REF: 007/ OTH REF: 001

Card 1/1 *ecj/k*

ACC NR: AP7002665

SOURCE CODE: UR/0109/67/012/001/0076/0086

AUTHOR: Litovchenko, V. G., Frolov, O. S., Vengris, S. A., Serba, A. A.  
Sadovnichiy, A. A.

ORG: none

TITLE: Photoelectric characteristics of the capacitance of a surface charge varicap

SOURCE: Radiotekhnika i elektronika, v. 12, no. 1, 1967, 76-86

TOPIC TAGS: varactor diode, silicon semiconductor, *photoelectric property*

ABSTRACT: The photoelectric properties of the spacecharge capacitance of metal-oxide-silicon (MOS) varicaps were studied. The varactors were made from rectangular high-resistance ( $5 \times 10^1 - 5 \times 10^2$  ohms/cm) photosensitive silicon chips (dimensions,  $15 \times 5 \times 0.5$  mm). The varicap was made from one part of the chip (area of the semitransparent metallic electrode,  $\sim 10^{-2} - 1$  mm<sup>2</sup>; thickness of the oxide,  $\sim 0.3 \mu$ ). The other part of the chip was used for photoconductance measurements from which the level of injunction of electron-hole pairs  $\Delta n$  was calculated. The varicap was illuminated with a tungsten incandescent lamp; the intensity was varied with platinum filters. The capacitance of the samples was

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UDC: 621.383.5

ACC NR: AP7002665

measured with a resonance circuit in the 50-100-Mc frequency range at different bias voltages; the maximum amplitude of the measuring a-c signal applied to the varactor was 25 mv. Two types of varactors were studied: 1) those with low lateral resistance (the dielectric layer had  $\rho_{ok} \approx 10^8$  ohms/cm); 2) those with high lateral resistance ( $\rho_{ok} \approx 10^{11}$  ohms/cm). Capacitance was found to increase with increasing light intensity and to decrease with increasing reverse bias in both cases. Capacitance was also found to decrease with increasing frequency in both types of varactor. Orig. art. has: 10 figures and 3 formulas.

SUB CODE: 0930/ SUBM DATE: 03Aug65/ORIG REF: 004/ OTH REF: 007/

Card 2/2

LITOVCHENKO, V. I.  
ЛИТОВЧЕНКО, В.И.

Organization of excursions by tenth grade students to industrial enterprises. Politskh.obuch. no.9:11-14 Ag '57. (MIRA 10:9)  
(School excursions)

LITOVCHENKO, V.M.

Rare case of damage of a corpse by an animal. Sud.-med. ekspert.  
2. no.3:54 JI-S '59. (MIRA 13:4)

1. Belgerodskoye oblastnoye byuro sudebnomeditsinskoy ekspertizy.  
(INFANTS--MORTALITY)

LITOVCHENKO, V.M.; MASTEROV, V.F.

Unusual case of mechanical asphyxia. Sud.-med. ekspert. 8  
no.2:38-39 Ap-Je '65. (MIRA 18:8)

1. Belgorodskoye oblastnoye byuro sudebnomeditsinskoy ekspertizy  
(nachal'nik V.M. Litovchenko).



LITOVCHENKO, V.M.; MASTEROV, V.F.

Unusual case of a tooth penetrating into the cranial cavity as a  
result of an accident. Sud.-med.ekspert. no.4:45-46 O-D '65.  
(MIRA 18:12)

1. Belgorodskoye oblastnoye byuro sudebnomeditsinskoy ekspertizy  
(nachal'nik V.M.Litovchenko). Submitted January 12, 1965.

LITOVCHENKO, V.N.

Studying the slide and wrapping mechanisms of an automatic soap wrapping machine. Trudy KIPP no.16:83-86 '57. (MIRA 12:7)

1. Krasnodarskiy institut pishchevoy promyshlennosti, Mekhanicheskiy fakul'tet, kafedra tekhnicheskoy mekhaniki.  
(Wrapping machines)

LITOVCHENKO, V. P.

AID P - 2971

Subject : USSR/Electricity  
Card 1/1 Pub. 29 - 21/35  
Author : Litovchenko, V. P., Eng.  
Title : ~~Preparation of switchboard panels from asbestos-~~  
cement sheet'lg, textolite, and hetonax  
Periodical : Energetik, 5, 26-27, My 1955  
Abstract : The author describes the method of removing the  
hygroscopic capacity of such panels.  
Institution : None  
Submitted : No date

LITOVCHENKO, V.P.

Determining the position of a normal to the profile of a cam in linear motion. Trudy KIPP no.16:81 '57. (MIRA 12:7)

1. Krasnodarskiy institut pishchevoy promyshlennosti, Mekhanicheskiy fakul'tet, kafedra tekhnicheskoy mekhaniki.  
(Machinery, Kinematics of)

BELYAYEV, V.P.; BELTADZE, T.G.; LITOVCHENKO, V.P.; LITVINOVA, V.D.;  
LOMINADZE, V.P.; PINUS, N.Z.; SOFIYEV, Ye.M.; SHUR, G.N.

Some results of experimental investigations of atmospheric  
turbulence using radiosondes. Trudy TSAO no.54:4-52 '64.  
(MIRA 17:6)

ACCESSION NR: AT4038390

S/2789/64/000/054/0004/0052

AUTHOR: Belyayev, V. P.; Baltadze, T. G.; Litovchenko, V. P.;  
Litvinova, V. D.; Lominadze, V. P.; Pinus, N. Z.; Sofiyev, Ye. M.;  
Shur, G. N.

TITLE: Some results of experimental studies of atmospheric tur-  
bulence by means of radiosondes

SOURCE: Tsentral'naya aerologicheskaya observatoriya. Trudy\*,  
no. 54, 1964. Atmosfernaya turbulentnost' (Atmospheric turbulence),  
4-52

TOPIC TAGS: meteorology, atmospheric turbulence, radiosonde, air  
route turbulence

ABSTRACT: A description is given of methods and equipment for  
measuring air turbulence over Moscow, Sukhumi (Caucasus), and  
Tashkent (Kazakhstan). One of the noteworthy features of the  
method is the synchronization of measurements of air turbulence with

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ACCESSION NR: AT4038390

such parameters as air temperature, humidity, pressure, wind velocity and wind direction. Turbulence was measured mostly by balloon-borne radiosondes with an A-22-III accelerometer attached. Sufficient data have been collected (457 radiosonde ascents in 1961-62) to determine a turbulence pattern over the aforementioned localities. Turbulence occurs with the highest frequency in the 1-2 km ground layer, it then decreases reaching a minimum at 6-7 km and then reaches a maximum again at 10-12 km. Data were analyzed to determine other turbulence characteristics depending on location, season, altitude, etc. It was noted that turbulence generally depends on thermal and dynamic stratification in the atmosphere and frequently occurs during pronounced vertical wind and temperature gradients. Two turbulent layers are frequently observed: one above the jet stream and one below it. Turbulence is minimal on the jet stream level. It was also observed that over Moscow and Sukhumi the turbulent layer seldom exceeds 200-400 m and only over Tashkent at 5-7 km is it ever more than 1000 m thick. The experimental work was carried out by the Central Aerological Observatory, Moscow. Also

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ACCESSION NR: AT4038390

cited are turbulence data for the United States and data collected by E. A. Hyde (1954) for air routes from London to the Far East and back, and London to North Africa. Orig. art. has: 12 tables, 20 figures, and 36 formulas.

ASSOCIATION: none

SUBMITTED: 00

SUB CODE: ES

DATE ACQ: 11Jun64

NO REF SOV: 019

ENCL: 00

OTHER: 006

Card 3/3



SHKURKO, Yu.P.; LITOVCHENKO, V.P.

Use of particle boards for the manufacture of door panels.  
Bum. i der. prom. no.3:41-42 J1-S '64.

(MIRA 17:11)

LITOVCHENKO, V.V.; ZOROKHOVICH, A.Ye., kand. tekhn. nauk

Recovery of electric power during rheostatic testing. Elek.  
i tepl. tiaga 7 no.9:26-28 S '63. (MIRA 16:10)

1. Rukovoditel' gruppy Giprozavodtransa (for Litovchenko).

L 4301-66 EWT(1)/FCC GW

ACCESSION NR: AT5022877

UR/2789/65/000/063/0031/0036  
551.551.5;551.557.5

AUTHORS: Krupchatnikova, T. P.; Litovchenko, V. P.

44.55

44.55

51  
48  
B+1

TITLE: Computing the distribution of turbulence in jet streams

SOURCE: Tsentral'naya aerologicheskaya observatoriya. Trudy, no. 63, 1965.  
Voprosy dinamiki atmosfery (Problems of atmospheric dynamics), 31-36

TOPIC TAGS: turbulence coefficient determination, turbulence, turbulent flow,  
turbulent jet, jet stream, approximation method

12.44.55

ABSTRACT: The authors study the problem of determining the parameters of turbulence in jet streams. The investigation takes into account the nonuniformity of the wind field in the horizontal plane. A first approximation to the solution of the system of equations for jet streams is taken for the case where the members

$\frac{\partial u}{\partial t}$ ,  $\frac{\partial v}{\partial t}$ ,  $u \frac{\partial u}{\partial x}$ ,  $u \frac{\partial v}{\partial x}$ ,  $v \frac{\partial u}{\partial y}$  and  $v \frac{\partial v}{\partial y}$  are small with respect to the other members of the equation of motion; a further assumption is that the direction of the geostrophic wind is essentially invariant with altitude. The equations of motion under these circumstances may be written as

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ACCESSION NR: AT5022877

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$$k(x, y) \frac{\partial^2 u}{\partial z^2} + 2\omega_s v = 0$$

$$k(x, y) \frac{\partial^2 v}{\partial z^2} - 2\omega_s (u - u_g) = 0$$

$$\int_0^H \left[ \left( \frac{\partial u}{\partial z} \right)^2 + \left( \frac{\partial v}{\partial z} \right)^2 \right] dz - \int_0^H \frac{g}{T} (\gamma_s - \gamma) dz = 0$$

$$v(z)|_{z=H} = 0$$

where axis  $x$  is in the direction of jet stream flow,  $y$  is the perpendicular horizontal axis, and  $z$  is the vertical, positive in the upward direction. The functions  $u(x, y, z)$  and  $v(x, y, z)$  are the real wind components;  $k(x, y)$  - the turbulence coefficient which is viewed as being independent of altitude  $z$ ;  $u_g(x, y, z)$  is the velocity of the geostrophic wind. Boundary conditions are

$$\frac{\partial u}{\partial z} = \frac{\partial v}{\partial z} = 0 \text{ at } z=0$$

$$u(z) \neq \infty, v(z) \neq \infty \text{ at } z \rightarrow \infty$$

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The solution of this system for  $z > 0$  is

$$u(x, y, z) = \frac{ab(x, y)}{2a(n^2 + 1)} e^{-az} [(n-1) \cos az + (n+1) \sin az] + \frac{b(x, y)}{n^2 + 1} e^{-az}$$

$$v(x, y, z) = \frac{ab(x, y)}{2a(n^2 + 1)} e^{-az} [(n+1) \cos az - (n-1) \sin az] - \frac{nb(x, y)}{n^2 + 1} e^{-az}$$

where

$$b(x, y) = (u_m - u_1) \left( \frac{r}{r + x \sqrt{g}} \right)^2 e^{-\gamma y} \equiv (u_m - u_1) f(x, y),$$

$$n = \frac{ka^2}{2\omega_s},$$

$$a = \sqrt{\frac{\omega_s}{k}},$$

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ACCESSION NR: AT5022877

3

The dimensionless parameters m and n are related to the turbulent layer thickness 2H by the equations

$$(n + 1) \cos m - (n - 1) \sin m = \sqrt{2n} e^{(1 - \sqrt{2n}) m}$$

$$m = \frac{n(\sqrt{2n} - 1) + 1}{M \sqrt{2n} (n^2 + 1) |1 + (1 + \sqrt{2n})^2|} f^2(x, y)$$

$$m = aH$$

$$M = \frac{\epsilon \bar{v}}{(u_m - u_1)^2 \sigma^2}$$

The function f(x, y) is related to m and n as plotted in Figure 1 on the Enclosure, where the parametric curves correspond to variations of x and y. Further curves are plotted to indicate the variation of turbulence coefficient with f(x, y) and M. Figure 2 on the Enclosure is a three-dimensional plot of the parameter variation in the x-y plane. Orig. art. has: 3 figures and 6 equations.

ASSOCIATION: Tsentral'naya aerologicheskaya observatoriya (Central Aerological Observatory)

SUBMITTED: 00

ENCL: 04

SUB CODE: ES

NO REF SOV: 004

OTHER: 000

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L 1301-66

ACCESSION NR: AT5022877

ENCLOSURE: 01

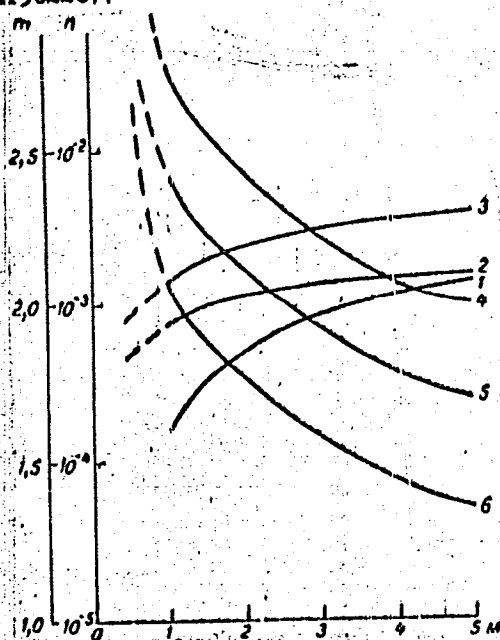


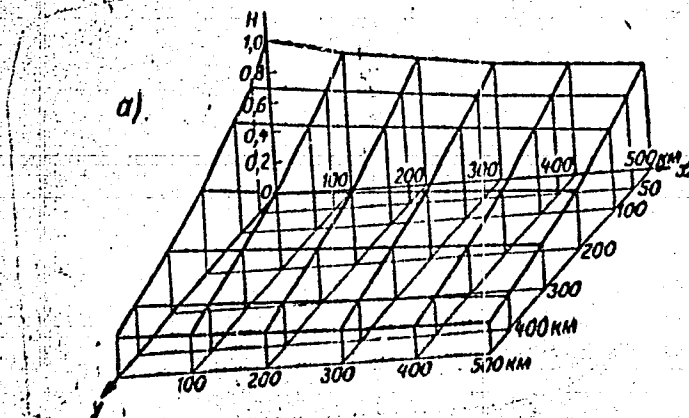
Fig. 1. Variation of dimensionless parameters  $m$  and  $n$  with the number  $M$  and the function  $f(x, y)$

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L 4301-66

ACCESSION NR: A15022877

ENCLOSURE: 02



to card 7/8

Card 6/8

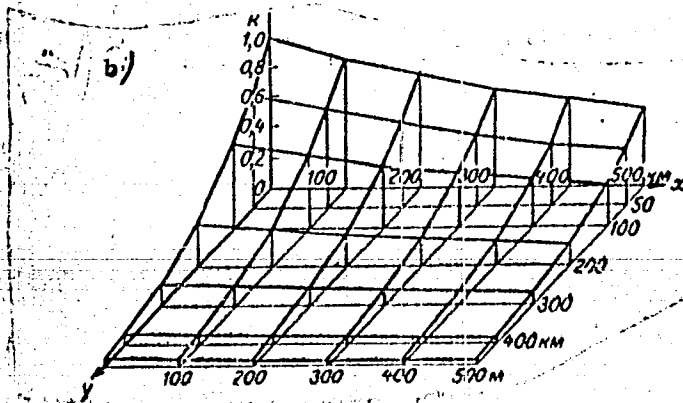


L 4301-66

ACCESSION NR: AT5022877

ENCLOSURE: 03

from card 6/8



Card 7/8

to card 8/8

L 4301-66

ACCESSION NR: AT5022877

ENCLOSURE: 04

from card 7/8

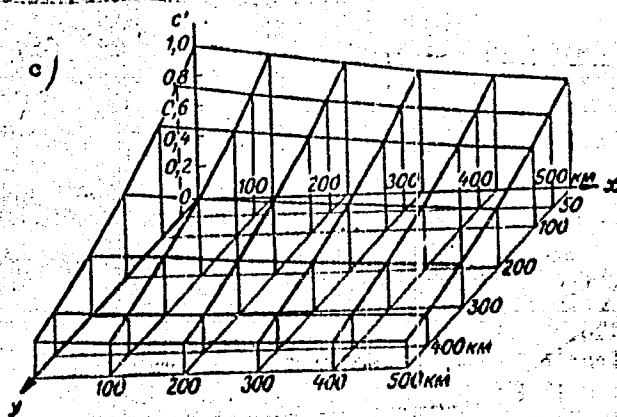


Fig. 2.

Spatial distribution of the turbulent layer  $H(e)$ , the turbulence coefficient  $k(b)$ , and the wind gust  $c$  (c)

Card 8/8

L. Litovchenko, In.

ROSLYAKOV, F.V.; KAZANSKIY, N.V.: LITOVCHENKO, Ya. redaktor; RUSHKOV-  
SKIY, N., tekhnicheskiy redaktor.

[Master the technique of receiving radio messages rapidly]  
Ovladevai skorostnym radiopriemom. Moskva, Izd-vo DOSARM,  
, 1951/. 27 p. [Microfilm] (MIRA 10:6)  
(Telegraph, Wireless)

LITOVCHENKO, Ya.  
USSR/Electronics - Literature  
Communications - Literature

Jan 53

"Radio Engineering Literature in 1953"

"Radio," No 1, pp 58-60

Gives plans of Dosaaf Publishing House (Ya. Litovchenko, Chief), Svyaz'izdat (V. Shipov, Chief), and Gosenergoizdat (D. Kalantarov, Director) for 1953. Dosaaf will publish books on radio equipment of aircraft (K. A. Babenko and B. L. Gol'dberg) and radar (V. I. Simonov) among others. Svyaz'izdat will publish a series of books on communications, broadcasting, and radiofication. Gosenergoizdat intends to publish 50 issues in the "Mass Radio Library" series.

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TEZ

LITOVCHENKO, Ya.

New radio reception and rediffusion centers on collective farms.  
Radio no.2:5-6 F '54. (MLRA 7:2)  
(Radio--Receivers and reception)

DIKOV, V.A., st. inzh.; KOLKOTIN, N.M., st. inzh.; KUVYRKIN, N.I.,  
st. inzh.; LITOVCHENKO, Ya.A., st. inzh.; SULOTSKIY, B.P.,  
st. tekhnik; ABDULINA, Kh.M., st. tekhnik; SHIROKOVA, G.M.,  
red.izd-va; MIKHEYEVA, A.A., tekhn. red.

[Instructions (U 5-62) for the major repair of machinery  
used in construction] Ukazania po kapital'nomu remontu ma-  
shin, zaniatykh v stroitel'stve (U 5-62). Moskva, Gosstro-  
izdat. No.1. [Requirements and general technical specifica-  
tions for the major repair of machinery] Trebovaniia i ob-  
shchie tekhnicheskie uslovia po kapital'nomu remontu mashin.  
1962. 14 p. (MIRA 16:3)

1. Akademiya stroitel'stva i arkhitektury SSSR. Institut orga-  
nizatsii, mekhanizatsii i tekhnicheskoy pomoshchi stroitel'stvu.  
(Construction equipment—Maintenance and repair)

DIKOV, V.A., st. inzh.; KUVYRKIN, N.I., st. inzh.; LITOVCHENKO, Ya.A.,  
st. inzh.; SULOTSKIY, B.P., st. tekhnik; ABDULINA, Kh.M.,  
st. tekhaik; ZAYTSEV, B.D., otv. za vypusk; SHIROKOVA, G.M.,  
red. izd-va; MIKHEYEVA, A.A., tekhn. red.

[Instructions U5-62 for the major repair of machinery used in  
construction] Ukazaniia po kapital'nomu remontu mashin, za-  
niatykh v stroitel'stve (U 5-62). Moskva, Gosstroizdat.  
No.2. [Technical specifications for the major repair of truck-  
mounted cranes and loaders; the K-32 LAZ-690 and K-51 truck-  
mounted cranes and the T-107 loader] Tekhnicheskie uslovia na  
kapital'nyi remont avtomobil'nykh kranov i pogruzchikov; avto-  
krany K-32, LAZ-690 i K-51 pogruzchiki T-107. 1963. 119 p.  
(MIRA 16:6)

1. Akademiya stroitel'stva i arkhitektury SSSR. Institut orga-  
nizatsii, mekhanizatsii i tekhnicheskoy pomoshchi stroitel'stvu.  
(Construction equipment—Maintenance and repair)

DIKOV, V.A., st. inzh.; KUVYRKIN, N.I., st. inzh.; LITOVCHENKO,  
Ya.A., st. inzh.; SULOTSKIY, B.P., st. tekhnik; ABDULINA,  
Kh.M., st. tekhnik; SHIROKOVA, G.M., red. izd-va;  
MIKHEYEVA, A.A., tekhn. red.

[Instructions for the overhauling of construction machinery  
(U 5-62)] Ukazaniia po kapital'nomu remontu mashin, za-  
niatykh v stroitel'stve (U 5-62). Moskva, Gosstroizdat.  
No.3. [Specifications for the overhauling of road machinery  
( D-144 and D-265 motor graders, D-159B and D-271 bulldozers,  
D-211 and D-260 motor rollers, D-183B and D-222 scrapers).]  
Tekhnicheskie uslovia na kapital'nyi remont dorozhnykh ma-  
shin (avtogreidery D-144 i D-265, bul'dozery D-159B i D-271,  
katki motornye D-211 i D-260, skrepery D-183B i D-222). 1963.  
309 p. (MIFA 16:8)

1. Akademiya stroitel'stva i arkhitektury SSSR. Institut or-  
ganizatsii, mekhanizatsii i tekhnicheskoy pomoshchi stroi-  
tel'stvu.

(Road machinery--Maintenance and repair)



DIKOV, V.A., st. inzh.; KUVYRKIN, N.I., st. inzh.; LITOVCHENKO, Ya.A.,  
st. inzh.; SULOTSKIY, B.P., st. tehnik; ABDULINA, Kh.M., st.  
tehnik; KOLKOTIN, N.M., st. inzh.; SHIROKOVA, G.M., red.;  
PEREVALYUK, M.V., red.izd-va; BOROVNEV, N.K., tekhn. red.;

[Instructions for the capital repair of machinery used in  
construction] Ukazaniia po kapital'nomu remontu mashin, zania-  
tykh v stroitel'stve (U5-62). Moskva, Gosstroizdat, 1963.

No.4. [Technical specifications for major repairs on excavators  
with a shovel capacity of 0.35 m<sup>3</sup>; excavators E-255, E-353, E-  
257, E-358, E-301, and E-352] Tekhnicheskie uslovia na kapital'-  
nyi remont ekskavatorov s kovshom emkost'iu do 0,35 m<sup>3</sup>: ekskava-  
tory E-255, E-353, E-257, E-258, E-301, E-352. 180 p.

No.5. [Technical specifications for major repairs on excavators  
with a shovel capacity of 0.5<sup>3</sup>; excavators E-505, E-505A] Tekh-  
nicheskie uslovia na kapital'nyi remont ekskavatorov s kov-  
shom emkost'iu 0,5 m<sup>3</sup> : ekskavatory E-505, E-505A. 146 p.

(MIRA 16:8)

1. Akademiya stroitel'stva i arkhitektury SSSR. Institut organi-  
zatsii, mekhanizatsii i tekhnicheskoy pomoshchi stroitel'stvu.  
(Excavating machinery--Maintenance and repair)

ЛИТОВЧЕНКО, Ye.I. [Lytovchenko, K.I.]

Distribution of accessory lithium in the pegmatite minerals  
of the western region of the Sea of Azov. Trudy Inst. geol.  
nauk AN URSR. Ser. petr., min. i geokhim. no.20:94-98 '63.  
(MIRA 16:8)

KALMYKOV, V.G., kand.tekhn.nauk; LITOVCHENKO, Ye.P., inzh.

Test results of the new self-emptying dump car. Vest.TSNII  
MPS 20 no.4:48-51 '61. (MIRA 14:7)  
(Railroads--Freight cars)

BORKOVSKAYA, L.V.; GULYANSKAYA, Ye.A.; ZYKUNOVA, K.I.;  
LITOVCHENKO, Ye.P.; PERK, M.G.; RASSOKHIN, V.V.;  
 ~~Kand. tekhn. nauk;~~  KACHENKO, A.I.; STANKOV, N.V.,  
inzh., retsenzent; ALEKSEYEVSKIY, G.V., inzh., retsenzent;  
PIONTEK, Ye.I., inzh., red.

[Album of assignments for executing assembly drawings] Al'-  
bom zadaniy dlia vypolneniya sborochnykh chertezhei. [By]  
L.V.Borkovskaia i dr. Moskva, Mashinostroenie, 1964. 72 p.  
(MIRA 17:9)

LITOVCHENKO, Ye. T.

"Antigenic and Immunogenic Properties of the Individual Component Parts of Bacterium Paratyphosum A. " Card Med Sci, Ukrainian Inst of Epidemiology and Microbiology, Kiev, 1953. (RZhBiol, No 7, Apr 55)

SO: Sum. No. 704, 2 Nov 55 - Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (16).

*LITOVCHENKO, Ye. T.*

YELSHINA, M.A.; ZATULOVSKIY, B.G.; LITOVCHENKO, Ye.T.; SHUBS, Z.V.

Identification of atypical intestinal bacteria. Lab.delo 3 no.3:  
38-42 My-Je '57. (MIRA 10:9)

1. Iz laboratorii kischechnykh infektsiy (zav. - M.A.Yelshina)  
Kiyevskogo instituta epidemiologii i mikrobiologii  
(INTESTINES--BACTERIOLOGY)

USSR/Microbiology. Microbes Pathogenic for Man and  
Animals

F

Abs Jour : Ref Zhur-Biol., No 13, 1958, 57647

Author : Yelshina M. O., Zaydenberg Ye. G., Zatulovs-  
kiy B. G., Litovchenko Ye. T., Shubs Z. V.

Inst : Not given

Title : On Atypical Strains of Microbes of the Coli  
Group Isolated from Healthy Persons

Orig Pub : Mikrobiol. zh., 1957, 19, No 2, 43-48

Abstract : In the course of bacteriological investigation  
of 72,342 practically healthy persons for dy-  
senteria, 265 atypical cultures (0.3% were iso-  
lated from the bacillus vectors (0.9%). 256 of  
the 265 atypical strains belonged to the non-  
agglutinating group; the remainder agglutinated  
with the Sonne and Flexner sera, but were

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USSR/Microbiology. Microbes Pathogenic for Man and  
Animals

F

Abs Jour : Ref Zhur-Biol., No 13, 1958, 57647

Abstract : atypical in their biochemical properties. 98  
atypical strains were studied in detail. By the  
use of various methods--passages through meat-  
peptone media, bile bullion, organism of mice--  
it was possible to identify a part of the cul-  
tures. Particularly useful for the purposes of  
identification of atypical strains, in the au-  
thors' opinion, is the diagnostic method of  
cultivating cultures on a synthetic medium with  
or without nicotinic acid, which they proposed;  
with the help of this method they succeeded in  
relating most of the atypical strains they had  
studied to the coli bacillus.

Card 2/2



LITOVCHENKO, Ye.T.

YELSHINA, M.A.; ZAYDENBERG, Ye.G.; ZATULOVSKIY, B.G.; LITOVCHENKO, Ye.T.;  
SHUBS, Z.V.

Study and detection of atypical strains. Zhur.mikrobiol.epid. i  
immun. 28 no.5:62-67 My '57. (MIRA 10:7)

1. Iz Kiyevskogo instituta epidemiologii i mikrobiologii.  
(SHIGELLA  
atypical strains, study & detection methods)

YELSHINA, M.A.; ZATULOVSKIY, B.G.; LITOVCHENKO, Ye.T.

Origin of atypical strains isolated during bacteriological examination for dysentery; experimental study. Zhur. mikrobiol. epid. i immun. 29 no.12: 101-106 D '58. (MIRA 12:1)

1. Iz Kiyevskogo instituta epidemiologii i mikrobiologii.  
(DYSENTERY, BACILLARY, microbiology,  
atypical strains (Rus))

Litovchenko, YE. T., and Dronchuk, S. V.

Improved precipitation reaction with hapten for accelerated diagnosis  
of dysentery. p. 30

Materialy nauchnykh konferentsii, Kiev, 1959. 288pp  
(Kievskiy Nauchno-issledovatel'skiy Institut Epidemiologii i Mikrobiologii)

Litovchenko, E. T.

Biological properties of polysaccharides and lipoids of smooth and rough surfaces of the paratyphoid A microbe.

Materialy nauchnykh konferentsii, Kiev, 1959. 288pp  
(Kievskiy Nauchno-issledovatel'skiy Institut Epidemiologii i Mikrobiologii)

< LITOVCHENKO, Ye.T.; DEBOT'KO, S.V.

Improved method of precipitation reaction with haptens for the  
accelerated diagnosis of dysentery. Zhur.mikrobiol.epid.i immun.  
31 no.1:92-97 Ja '60. (MIRA 13:5)

1. Iz Kiyevskogo instituta epidemiologii i mikrobiologii.  
(DYSENTERY BACILLARY diagnosis)

KALYUZHNAYA, L.D.; BRYANSKAYA, A.M.; LITOVCHENKO, Ye.P.; DZHALA, I.G.;  
LYSENKO, Z.A.; MAYKO, I.I.; BOBROV, S.M.

Isolation and study of actinomycetes-antagonists from soils of  
some Ukrainian provinces. Mikrobiologiya 31 no.4:654-661 J1-Ag  
'62. (RIRA 18:3)

1. Kiyevskiy Institut epidemiologii i mikrobiologii.

LETOCHENKO, Ye.T.; KALYUZHNYAYA, L.D.; KOZHUKHAR', I.G.

Actinomyces of the root system of the apple tree. *Mikro-  
biologiya* 34 no.5:876-882 S-SO '65. (MIRA 18410)

1. Krymskaya ocytanya abantsiyya s drevodatom.

ROZENGART, Yu.I., dotsent, kend.tekhn.nauk; TAYTS, N.Yu., prof., doktor tekhn.  
nauk; EPSHTEYN, V.A., inzh.; LITOVCHENKO, Yu.K., inzh.; KHUDIK, V.T.,  
inzh.; MININZON, R.D., inzh.

Study of nonoxidizing heating of alloy steels. Stal' 25 no.5:469-  
473 My '65. (MIRA 18:6)

1. Dnepropetrovskiy metallurgicheskiy institut i zavod  
"Dneprospetsstal'".



LITOVCHENKO, Yu. V.

Experimental studies on losses of flood runoff during the subsidence of high waters; following the termination of the rain. Pratsi Od. un. zbir. mol. vchen. un. 148 no.3:327-335 '58 (MIRA 13:3)  
(Runoff)

BARANOV, K.; LITOVCHENKO, Z.; YAKOVENKO, L.

Oligocene barite and quartz concretions of the Nikopol' region.  
Uch. zap. IAGU no.9:83-86 '61. (MIRA 15:7)  
(Nikopol' region (Dnepropetrovsk Province)--Barite)  
(Nikopol' region (Dnepropetrovsk Province)--Quartz)  
(Concretions)

1. LITOVCHIN, B. (Eng.)
2. USSR (600)
4. Stability of Ships
7. Graphic solution of the problem of increasing dynamic stability.  
Mor. flot. 12. no. 12. 1952.

9. Monthly List of Russian Accessions, Library of Congress, February 1953. Unclassified.

LITVINICHIN B. D.

721. Litvinichin B. D. Problem of dynamic stability in respect to lateral roll (in Russian). *Mosk. inzh. tekhn. in-ta im. M. V. Lomonosova*, 1954, no. 2, 290-293, 1954. ISSN 0013-788X. WPA 1956, 147-5316

Examination of the problem of determining the minimum transverse metacentric height at which a vessel will remain in a state of dynamic stability. The cases are examined to which the loss of the vessel's stability is connected with the roll of the vessel.

The relationship is determined between the known diagrams of static and dynamic stability for a vessel in an unsatisfactory state and the unknown diagrams of dynamic stability.

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CIA-RDP86-00513R000930210004-2

APPROVED FOR RELEASE: 03/13/2001

CIA-RDP86-00513R000930210004-2"

LITOVCHIN, B.D., inzh.

Joint operation of ships' loading booms. Nanch.trudy OIMF  
no.16:143-148 '58. (MIRA 11:11)  
(Loading and unloading) (Cargo handling)



ACC NR: AP6021797

(A)

SOURCE CODE: UR/0113/66/000/012/0061/0062

INVENTORS: Paton, V. Ye.; Esibyan, E. M.; Shnaydor, B. I.; Mutsenko, B. S.;  
Svetsinskiy, A. S.; Litovchuk, V. B.

ORG: none

TITLE: A device for arc welding under argon. Class 21, No. 162809 [announced by  
Institute of Electric Welding im. Ye. O. Paton (Institut elektrosvarki)]

SOURCE: Izobreteniya, promyshlennyye obrabotki, tovarnyye znaki, no. 12, 1966, 61-62

TOPIC TAGS: welding, arc welding, inert gas welding, welding equipment, welding  
technology

ABSTRACT: This Author Certificate presents a device for arc welding (under argon) of  
capillary and thin-walled tubes of small diameters. The device contains a driving  
mechanism, feeding and positioning rollers, a torch, and a protecting chamber (see  
Fig. 1). To produce a high quality of welding, the positioning rollers are located  
directly under the electrode of the welding head, while the protecting chamber is  
made in the form of a closed pipe cooled with water and provided with a gas-supplying

WDC: 621.791.753.93.037

Card 1/2



ACC NR: AP6021797

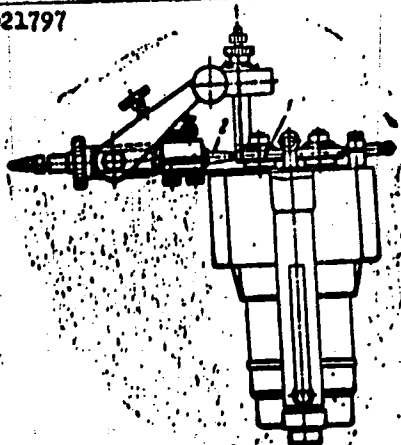


Fig. 1. 1 - positioning rollers; 2 - protecting chamber

flexible hose. Orig. art. has: 1 figure.

SUB CODE: 13/

SUBM DATE: 11Jul65

Card 2/2

LITOVCHUK, V.S. (Leningrad, D-28, Liteynyy prospekt, d.26, kv.255)

Case of intralobar sequestration of the lungs. Grad. khir. 6  
no.5:115-116 S-0 '64. (MIRA 18:4)

LITOVINOVA, N. Yu.; UTKINA, M. I.; CHETSOV, V. P.

"Morfologicheskaya kharakteristika pekotorykh grupp sportmenov."

report submitted for 7th Intl Cong, Anthropological & Ethnological Sciences,  
Moscow, 3-10 Aug 64.

KALININ, N.V.; LITOVINSKIY, A.K.

Investigating the rigidity of the gear-rolling head for rolling  
low-module gear wheels on automatic multispindle lathes.  
Priborostroenie no.1:18 Ja '65. (MIRA 18:3)

s/0119/64/000/003/0014/0018

ACCESSION NR: AP4022906

AUTHOR: Kalinin, N. V. (Engineer); Litovinskiy, A. K. (Engineer)

TITLE: Technological peculiarities of the process of cold shaping of small gears

SOURCE: Priborostroyeniye, no. 3, 1964, 14-18

TOPIC TAGS: gear shaping, gear rolling, small pitch gear, multispindle lathe, cold gear rolling

ABSTRACT: A discussion of cold rolling of small pitch gears from bar stock on an automatic multiple spindle machine (1240-6). Small steel gears with straight teeth may be made on this machine to the eighth class of accuracy (GOST 9178-58). The gear shaping head may be adjusted for various gear pitches and numbers of teeth. Further testing should be done on this machine for broadening the sizes and configurations of rolled gears and obtaining a higher degree of accuracy. Orig. art. has: 6 figures.

ASSOCIATION: none

Card 1/1

MARGULIS, V.S.; LITOVKA, A.V.

Technical and economic indices of ore grinding at mining  
and ore dressing combines of the Krivoy Rog Basin. Gor. zhur.  
no.7:62-67 J<sup>1</sup> '63. (MIRA 16:8)

1. Institut Mekhanobrchermet, Krivoy Rog.

LITOVKA, O.P.

Polish maritime shore as a forming economic region and characteristics  
of its development. Vest. LGU 20 no.18 '65 Seria geologii i geografii  
no.3:107-111 (MIRA 18:10)

SHINKORENKO, S.F.; LITOVKA, V.G.

Testing the OMP jiggling machine without piston with iron ore.  
Met. i gornorud. prom. no.2:67 Mr-Ap '65.

(MIRA 18:5)



VOLOSHCHENKO, M.V.; RIDNYI, A.A.; LITOVKA, V.I.; ZELENYY, B.G.; MAKEYEVA,  
V.P.

Effect of silicon on the mechanical properties of isothermally  
hardened magnesium cast iron. Metalloved. i term. obr. met. no.  
7147-48 J1 '64. (MIRA 17:11)

1. Institut liteynogo proizvodstva AN UkrSSR.

VOLOSHCHENKO, M.V.; LITOVKA, V.I.

Phosphide eutectifs in magnesium cast iron. Lit. proizv. no.10;  
22-25 0 '63. (MIRA 16:12)

LITOVKIN, M.V.

Truck transportation of sugar beets in metal bins. Sakh.prom. 29  
no.4:30-32 '55. (MLRA 8:9)

1. Kiyevskiy sakhsveklotrest  
(Sugar beets--Transportation)

LITOVKIN, M.V.

Greater attention should be given to the storage of sugar  
beets. Sakh.prom. 33 no.10:57-58 0 '59. (MIRA 13:3)

1. Kiyevskiy sakharnyy zavod.  
(Sugar beets--Storage)