

VISCRIAN, I.

Contributions to the realization of a  $\beta$  and  $\gamma$  portable detector  
with transistors. Studii fiz tehn lasi 10 no.1:117-118 '59  
(Counters (Electrons, ions, etc.)) (KEAI 9:3)  
(Transistors) (Geiger-Muller counters)  
(Beta rays) (Gamma rays)

WISE, V. Ya.

"The Problem of Long-Term Forecasting of the Amount of Precipitation  
in April and May in the South-Central and Eastern Regions of European  
Russia," Geofizicheskiy zhurnal (Geophysics Manual), No 3, 1925.

PALI, Kalman, dr.; VISEGRADY, Lajos, dr.; REMSEY, Erno, dr.

Our experience with the treatment of incontinence in women.  
Magy.noorv.lap. 20 no.6:301-306 H '59.

1. A Baranya Megyei Tanacs Koshaza (Igazgato: Steinmetz Endre dr.)  
Szuleszeti es Nagygyaszati Osztalyanak (Foorvos: Pali Kalman dr.)  
es Rontgen Osztalyanak (Foorvos: Visegrady Lajos dr.) kozlemenye.  
(URINATION DISORDERS surg)

SKODA, Ervin, dr.,; VISEGRADY, Lajos, dr.

Surgery of benign ulcer of the greater curvature diagnosed by  
roentgen rays. Orv. hetil. 96 no.9:242-246 27 Feb 55.

1. A Magyar Nephadsereg Egészségi Szolgálatának közleménye.  
(PEPTIC ULCER, surgery.)



CHLUMSKY, J.; VISEK, V.

Apropos of the role of primary chronic progressive polyarthritis  
in the pathogenesis of chronic liver diseases. Cas. lek. cesk.  
103 no.45:1246-1250 6 N '64.

1. I interni klinika lekarske fakulty hygienicke Karlovy  
University v Praze (prednosta prof. dr. V. Jonas, DrSc.).

VISEK, V.

Serotyping of urinary strains of *E. coli* in clinical practice.  
Cas. lek. cesk. 103 no.34:950 21 Ag '64.

VISEK, Vlastimil

The problem of clinical use of serotyping of *E. coli* strains from urine. *Whitni lek.* 11 no.6:591-594 Je'65.

1. I. klinika chorob vnitřnich LFH Karlovy University v Praze (prednosta: prof. MUDr. Vratislav Jonas, DrSc.).



RADIOLOGY

CZECHOSLOVAKIA

UDC 616.61-073.916:547.458.4

VISEK, V.; 1st Internal Clinic, Medical Faculty of Hygiene, Charles University (I. Interni Klinika Lekarske Fakulty Hygienicke KU), Prague, Head (Prednosta) Prof Dr V. JONAS.

"Isotope Nephrography Using Inulin I<sup>131</sup>."

Prague, Casopis Lekarů Ceskych, Vol 105, No 19, 13 May 66, pp 497 - 500

Abstract [Author's English summary modified]: Nephrography curves made after an injection of inulin I<sup>131</sup> are similar to the curves that are obtained after an application of hippurate. Their 3rd (excretion) phase is, however, much lower, because inulin is excreted only by glomerular filtration. It may be possible to evaluate partial renal function by comparing renal radioactivity records resulting from consecutive application of labelled inulin and hippurate; it is also possible to administer the 2 substances simultaneously, if they are labelled with different iodine isotopes. 4 Figures, 4 Western, 5 Czech references. (Manuscript received July 65).

1/1

SAPZHNIKOV, D.G.; VISELKINA, M.A.

Exogenous uranium deposit associated with a variegated continental  
formation. Geol.rud.mestorozh. no.3:22-42 Ny-Je '62. (MIRA 15:6)  
(Uranium ores)

I 50199-65 EPA(n)-2 /EWT(m)/EPP(n)-2/T/EWP(t)/EWP(b)/EWA(c) Pu-4  
 IJP(c) WVB/ES/JD/WA/JG  
 AM5014982 BOOK EXPLOITATION UR/553.061:546.79  
 Batulin, S. G.; Golovin, YE. A.; Zelenova, O. I.; Kashirtseva, M. A.;  
 Komarova, G. V.; Kondrat'yeva, I. A.; Lisitsin, A. K.; Perel'man,  
 A. I.; Sindel'nikova, V. D.; Chernikov, A. A.; Shmarlovich, YE. M.

10  
 47  
 34  
 Bf1

Exogenous epigenetic deposits of uranium; formation conditions  
 (Ekzonennyye epigeneticheskiye mestorozhdeniya urana; usloviya  
 obrazovaniya). Moscow, Atomizdat, 1965. 321 p. illus., biblio.  
 Errata slip inserted. 1100 copies printed.

TOPIC TAGS: deposit formation, epigenetic theory, exodiagenetic  
 deposit, surface uranium accumulation, uranium bituminous deposit,  
 uranium deposit, uranium, nuclear fuel.

PURPOSE AND COVERAGE: This book is intended for readers specializing  
 in the geology of ore deposits, in particular for those concerned  
 with atomic raw materials, and also for students of higher-education  
 institutions. In the book, for the first time in Soviet and  
 foreign literatures, the epigenetic theory of uranium-deposit  
 formation is expounded. Many Soviet and foreign source materials

Card 1/4

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AH5014982

13

have been used in this book, and some of the investigations carried out by the present authors are published in this book for the first time. Several names of Soviet scientists working in this field are mentioned. V. A. Uspenskiy collaborated on Ch. X, and M. A. Viselkina on Ch. III. The authors thank A. A. Saukov, deceased, Corresponding Member Academy of Sciences USSR, and F. I. Vol'fon, D. G. Sapozhnikov, V. I. Gerasimovskiy, M. F. Stralkin, G. S. Gritsavenko, and I. P. Kushnarev, Doctors of Geologico-Mineralogic Sciences; V. I. Danchev, Candidate of Geologico-Mineralogic Sciences, and N. A. Volokovykh. There are about 12 pages of references of which about 3/4 are Soviet.

TABLE OF CONTENTS [abridged]:

Introduction -- 4

Ch. I. Epigenetic processes in hypergenesis zone -- 9

Ch. II. Chemistry and crystallochemistry of uranium compounds -- 22

Card 2/4

L 50199-65  
AH5014982

- Ch. III. Associations of nonoxidized uranium minerals in epigenetic deposits -- 37
- Ch. IV. Uranium in surface and ground waters -- 48
- Ch. V. Uranium in stratal waters -- 57
- Ch. VI. Classification of exogenous uranium deposits -- 83
- Ch. VII. Exodiagenetic deposits (Type 5) -- 113
- Ch. VIII. Deposits of Oxygenous sheet oxidation (Type 6) -- 133
- Ch. IX. Deposits of oxygen-free oxidation (Type 7). Deposits in oil-bearing carbonate rocks -- 180
- Ch. X. Uranium-bituminous deposits in nonmetamorphosed sedimentary rocks -- 215

Card 3/4

L 50199-65

AM5014982

Ch. XI. On surface uranium accumulations in regions with arid climate -- 232

Ch. XII. Zone of oxidation in epigenetic deposits -- 239

Conclusion -- 275

References -- 309

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NO KEY SOV: 188

OTHER: 118

Card 4/4

SAPOZHNIKOV, Dmitriy Gavrilovich; VISELKINA, MARIYA ALEKSANDROVNA;  
BEZHUKOV, P.A., otv.red.; BELYAKOVA, Ye.W., red.isd-va;  
VOLKOVA, V.V., tekhn.red.

[Recent sediments of Lake Issyk-Kul' and its bays] Sovremennye  
osadki ozera Issyk-Kul' i ego zalivov. Moskva, Izd-vo Akad.  
nauk SSSR, 1960. 159 p. (Akademiia nauk SSSR, Institut  
geologii rudnykh mestorozhdenii, petrografii, mineralogii i  
geokhimii. Trudy, no.36).

(Issyk-Kul', Lake--Sediments(Geology))

VISANKOV, N.P.

Topography of the bronchial arteries. *Khirurgiia*, Moskva no. 2:17-24 Feb 1953.  
(CLML 24:2)

1. Candidate Medical Sciences. 2. Of the Military Medical Academy  
imeni S. M. Kirov.



KARAVAYEV, Aleksandr Petrovich; VISENS, Khuan, red.; VASIL'YEVA, G.N.,  
red. izd-va; TSAGURIYA, G.M., tekhn. red.

[Spain; economy and foreign trade]Ispania; ekonomika i vnesh-  
naia trgovlia. Moskva, Vneshtorgizdat, 1962. 154 p.

(MIRA 16:1)

(Spain--Economic conditions) (Spain--Commerce)

VISGORDIYSKIY, Ya., shofer

For perfect organization of work. Avt.transp. 40 no.5:12-13  
My '62. (MIRA 15:5)

1. Vil'nyusskoye taksmotornoye avtokhozyaystvo Ministerstva  
avtomobil'nogo transporta i shosseynykh dorog Litovskoy SSR.  
(Vilnius--Taxicabs)

VISH, I. M., Dr. Medic. Sci. (diss) "Psychotherapy for Some Nerve-  
Psychic and Somatic Disorders," Leningrad-Tambov, 1959, 32 pp.  
(Leningrad Inst. Improvem. of Trng of Doctors) 300 copies (KL  
Supp 12-61, 282).

VISH, I.M., kand.med.nauk

Therapeutic significance of suggestion and hypnosis in cerebral vasopathy. Trudy Gos.nauch-issl.inst.psikh. 25:538-550 '61.  
(MIRA 15:12)

1. Tambovskaya psikhonevrologicheskaya bol'nitsa (glavnyy vrach - zaslužhennyy vrach A.M.Pasarnitskaya) i klinika sosudistykh psikhozov (zav. - prof. V.M.Banshchikov) Gosudarstvennogo nauchno-issledovatel'skogo instituta psikiatrii Ministerstva zdravookhraneniya RSFSR.

(CEREBROVASCULAR DISEASE) (THERAPEUTICS, SUGGESTIVE)  
(HYPNOTISM—THERAPEUTIC USE)

VISH, I.M., prof.

Psychotherapy in reactive states at an advanced age. Trudy Inst. MKI  
(NIRA 17:12)  
25:430-441 '63.

1. Tambovskaya oblastnaya psikhonevrologicheskaya bol'nitsa (glavnyy  
vrach zasluzhennyy vrach RSFSR A.M. Flisarn'tskaya) i kafedra psikhiiatrii  
1-go Moskovskogo ordena Lenina meditsinskogo instituta imeni I.M. Sechenova  
(zav. kafedroy prof. V.M. Banskheikov).

VISH, I.M., prof.

Method of investigating the mechanism of the action of verbal sugges-  
tion while in a wakeful state. Trudy 1-go MMI 25:112-119 '63.  
(MIRA 17:12)

1. Tambovskaya psikhonevrologicheskaya bol'nitsa (glavnyy vrach  
zasluzhennyy vrach RSFSR A.M. Pisarchukaya) i kafedra psikiatrii  
1-go Moskovskogo ordena Lenina meditsinskogo instituta imeni I.M.  
Sechenova (zav. kafedroy prof. V.M. Banskchikov).

VISH, I. M.

PA 59/49T77

USSR/Medicine - Training Jun 49  
Medicine - Nurses and Nursing

"Second Scientific Conference of Students at  
the Tambovka School for Medical Nurses,"  
I. M. Vish, 3/4 p

"Med Sestra" No 6

Second Sci Conf of Students at Tambovka School  
for Med Nurses held 15 Dec 48 was attended by  
140 students and eight supervisors. Reports  
were on chemical neuropathology and psychiatry.  
Conference pointed out necessity of nurses  
gaining a more thorough knowledge of problems  
of neuropsychic disturbances through  
59/49T77

USSR/Medicine - Training (Contd) Jun 49  
postgraduate work. Dir, Tambovka School for Med  
Nurses: Dr M. L. Tsybuk.

59/49T77

VISH, I. M.

Propaganda of psychohygienic knowledge. Nevropat. psikhiat.,  
Moskva 20 no.3 May-June 1951. (CIML 20:11)

1. Candidate Medical Sciences. 2. Of Tambov Oblast Neuro-  
Psychiatric Union (Head Physician -- A. M. Pisarnitskaya).



ZIMIN, P.N.; PISARNITSKAYA, A.M.; VISH, I.M.; MAKSIMENKO, V.I.; SAMORODOVA, A.I.

Immediate results of tissue therapy in psychic disorders. Zh. nevropat.  
psikhiat., Moskva 52 no.1:47-48 Jan 52. (CLML 21:5)

1. Of Tambov Oblast Psychoneurological Hospital (Head Physician--A.M.  
Pisarnitskaya).

VISH, I.M., kand.med.nauk

Psychotherapy in the clinical aspects of cerebral arteriosclerosis.  
Trudy Gos. nauchno-issl. inst. psikh. 22:426-435 '60. (MIRA 15:1)

1. Tambovskaya oblastnaya psikhonevrologicheskaya bol'nitsa (glavnyy  
vrach bol'nitsy • zasluzhennyy vrach RSFSR A.M. Pisarnitskaya)  
Nauchnyy rukovoditel' - professor V.M. Banskikhov.  
(CEREBRAL ARTERIOSCLEROSIS) (PSYCHOTHERAPY)

RUMANIA / Virology. Human and Animal Viruses

E-2

Abs Jour: Ref Zhur - Biol., No 6, 1958, 24009

Author : Vishan, Satmari, Petrushka, Stanku, Bronitskiy,  
Rotshild, Pironkof, Gune

Inst : Not given

Title : Study of Effectiveness in Vaccinations Against  
Influenza.

Orig Pub: Studii si cercetari inframicrobiol., microbiol.,  
si parazitol., 1957, 8, No 1, 57-69

Abstract: No abstract.

Card 1/1

VISHANSKA, IU., inzh.

Theobromine, and the possibility of its production in our country.  
Khim i industriia 34 no.2:79 '62.

VISECHAKAS, Yu. K.: Master Phys-Math Sci (diss) -- "Some optical, electrical, and photoelectric properties of polycrystalline layers of CdSe". Vil'nyus, 1958. 12 pp (Min Higher Educ USSR, Vil'nyus State U im V. Kapsukas), 150 copies (KL, No 15, 1959, 113)



SOV77-4-2-15/18

Successes of Soviet Electrophotography: A Scientific and Technical Conference on Questions of Electrophotography

K.H. Vinogradov described some of the features of the cascade and liquid methods of electrophotographic development. Yu.Ye. Karpashko devoted his report to the criterion of light sensitivity of the electrophotographic process. After the reports, a discussion took place on methods of determining the light sensitivity of electrophotographic layers. A.N. Sharnshev spoke on the prospects of developing polygraphic processes using electric and magnetic forces. O.V. Gromov (speaking for I.I. Zhilovich, A.G. Sukhly, V.A. Gordeyeva, A.S. Puuba) reported on the development of electrophotographic reproducing equipment. A.S. Puuba (speaking also for I.I. Zhilovich, A.S. Borisovich, M.H. Galitskiy and A.S. Kuznetsov) reported on the use of electrophotographic methods in recording oscillographs and other recording instruments.

V.F. Yurtsenko (speaking also for L.A. Shilin) spoke on the possibility of electrophotographically recording images from electron-beam microscopically recording also for G.S. Markovich, T.V. Kozlovskaya, B.I. Kalinauskas, M.K. Maynes, I. Kuznetsov and K.A. Monrinas) gave a detailed description of laboratory and machine methods of producing photomicrographs (zinc oxide was used). A.G. Sukhly (speaking also for I.I. Zhilovich, O.V. Gromov, V.A. Gordeyeva, K.V. Fedotov and T.M. Gr.) described a laboratory and industrial machine for producing photomicrographs. T.A. Zhishkina (speaking also for Ya.A. Genn) reported on a method of examining electrophotographic materials using an A/C bridge. S.I. Khotanovich (speaking also for A.I. Gizens and A.S. Zhilovskas) and ferroemulsiography, including developers giving a reverse image. B.I. Likhov reviewed methods of stabilizing the electrostatic potentials of electrophotographic materials, pointing out that the oscillating electrode should not be placed in direct contact with varying potential as this causes self-discharge. G.I. Kuznetsov (speaking also for B.S. Torvayns, G.I. Kuznetsov and S. Kozlitsa) spoke on the practice of producing wet-vent papers in an electrostatic field and on the samples produced by the Grigashakaya paper factory. Ye.L. Egilovskiy then gave a historical review of the development of electrophotographic methods in which he paid tribute to the work of the Scientific Research Institute of Electrophotography in Vil'nyus and the Institut polygraficheskogo mashinostroeniya (ICAKVA) (Polygraphic Machine-Building Institute (Moscow)). Debates were then held

Card 6/10

on methods of measuring the potential of charged electro-  
 photographic layers, the vibration pick-up most-used  
 was shown in B.I. Tikhonov's report to be not always  
 accurate. S.O. Zingul'in stated that the bad influence  
 of the oscillating electrode can be eliminated if the  
 anode probe above its surface is fixed and the pick-  
 ups are connected to it by a shielded cable. In the de-  
 tails of the research of V.I. Zaitsev's report it was stated that  
 the research should be conducted in the basis of all work  
 on electrophotographic papers at the basis of all work  
 the first to show the stability of photos they were  
 of the internal photoeffect in order to obtain colli-  
 vidual then gave a report on the depositing of charges  
 of a corona discharge. A.I. Kazilskas and A.P.  
 is reviewed some of the results of the use of  
 x-ray methods in radiography. L.I. Kravtchik  
 zing also for I.I. Zhitovich, L. Plavin, Yu. K.  
 zhakas and Yu. A. Zibutis reported on relaxation  
 cases in semiconductor layers, using a vibration electro-  
 meter. Yu. V. Shchegolev gave a report on research on some  
 physical properties of the polycrystalline layers of  
 selenium cadmium. K.P. Nikolayevich spoke on some  
 of the photoelectric properties of Sb<sub>2</sub>S<sub>3</sub> and Sb<sub>2</sub>Se<sub>3</sub>; the  
 absorption maxima of the latter is about 900 m.  
 S.M. Karpan reported on methods of obtaining selenium  
 light-sensitive layers, including sublimation and ther-  
 mal treatment; it was also found that the sensitivity  
 of the layers increased after storage for 1.5 to 2 months  
 at 20 temperature. P.M. Polyakovskii (speaking also  
 at 20 temperature) spoke on research into the elec-  
 trical properties of electrophotographic layers of  
 selenium and powdered zinc oxide. N.K.  
 Shalunov reported also for A.S. Tikhonov's discussed  
 the conductivity of zinc layers and some of their  
 properties. Finally, zinc layers and some of their  
 properties finally zinc layers and some of their  
 magnetography were delivered. V.I. Zaitsev,  
 V.V. Zhigina, "Electric Characteristics of Zinc Layers  
 with Silver Magnetic Characteristics." 3) "Zinc Alloys  
 Graphical Methods." 5) V.V. Zaitsev, "Electrographic Paper  
 of Facsimile Images" 4) V.I. Zhilovskii, "Black Experiments  
 Ye. Buchek, I.I. Karyaise, A.K. Kishin, "Black Experiments  
 also an exhibition during the work of the Electro-  
 graphic Institute. The most important conclusion of  
 the conference was that a solid approach had been made  
 to the possibility of wide technical use of the methods  
 of electrophotography. It was considered that although work  
 in this field really started only in 1955-56 it has covered as much ground  
 as the field in 10 years. This admitting that it was  
 that the first to produce results already achieved than to be  
 the first to produce results already achieved than to be  
 that the Americans took 1950-51 the first to observe  
 information appeared in the literature available.

Card 10/10



VISHCHAKAS YU. K.

36517

S/081/62/000/006/011/117  
B166/B10126.2470  
AUTHORS:

Viščakas, J., Stonkus, S.

TITLE:

Growth of CdSe single crystals and some of their properties

PERIODICAL:

Referativnyy zhurnal. Khimiya, no. 6, 1962, 34, abstract  
6B205 (Uch. zap. Vil'nyussk. un-t. Matem., fiz., v. 33,  
no. 9, 1960, 149 - 160)

TEXT: The single crystals were grown by the Frerichs method (Frerichs, R., Phys. Rev., 1947, 72, 595). It was established that it is most convenient to grow single crystals by the sublimation of CdSe. CdSe single crystals grown in H<sub>2</sub> with an admixture of Cl<sub>2</sub> (type A) have greater dark resistance and greater relative photosensitivity than those grown in pure H<sub>2</sub> (type B).

It was established that the dark current, the photo-current, and the lux-ampere characteristic index  $m$  have maximum values in a certain temperature range. The shift of the maximum of photosensitivity with temperature (1.5 - 1.2 Å/deg) is smaller than that observed by Bube (1.8 Å/deg). The forbidden band width, determined from the boundary of red photoconductivity.

Card 1/2

Growth of CdSe single crystals and ...

S/081/62/000/006/011/117  
B166/B101

according to Moss, decreases with an increase in temperature. In the temperature range of 291 - 78°K it narrows down at a rate of 0.00033 - 0.00023 ev/deg. Relaxation of photoconductivity of CdSe single crystals takes place at room temperature according to an exponential relation. Sometimes two relaxation times of the rise in photo-current are observed: 1 - 2 and 4 - 8 msec. The relaxation time of the drop in photoconductivity is 0.2 - 0.6 msec. [Abstracter's note: Complete translation.]

X

Card 2/2

20971

S/058/61/000/004/318/042  
A001/A101

94170

AUTHOR: Vishchakas, Yu.K.

TITLE: Some physical properties of cadmium selenide polycrystalline layers

PERIODICAL: Referativnyy zhurnal. Fizika, no 4, 1961, 321, abstract 4E467 (V sb. "Elektrofotogr. i magnitografiya", Vil'nyus, 1959, 220-233, Lithuanian summary)

TEXT: The author investigated optical, electrical and photoelectrical properties of thin (0.1 - 0.3  $\mu$ ) polycrystalline layers of CdSe prepared by sublimation in vacuum in order to find out whether they are suitable for electrophotography. The effect of heat treatment at 500°C in vacuum and atmosphere of various gases on the layer properties was investigated. The "surface" and "volumetric" refraction indices were measured in the wavelength range from 0.4 to 1.34  $\mu$ . An additional absorption detected near 0.68  $\mu$  is enhanced after heat treatment; it is ascribed to excitation of excitons. The optical width of the forbidden zone coincides with the value of activation thermal energy as determined from the temperature dependence of electric conductivity. Frequency dependence of electric

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20971

.Some physical properties of cadmium selenide ...

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A001/A101

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conductivity is explained by high specific resistivity of crystallites and low intercrystallite resistance. Two components of photoconductivity were detected: the low-inertia selective one, similar to photoconductivity of CdSe single crystals, and the inertia non-selective one, related to surface phenomena. Relaxation of photoconductivity proceeds according to a hyperbolic law with a variable exponent of hyperbola; this is explained by the presence of several types of local levels with different effective capture cross sections of carriers. There are 22 references.

V. Sidorov.

[Abstracter's note: Complete translation.]

Card 2/2

26-2421

38184  
S/058/62/000/004/116/160  
A061/A1C1

AUTHOR: Vishchakas, Yu. K.

TITLE: Some optical and photoelectric properties of polycrystalline CdSe layers

PERIODICAL: Referativnyy zhurnal, Fizika, no. 4, 1962, 42, abstract 4E364  
(V sb. "Fotoelektr. i optich. yavleniya v poluprovodnikakh", Kiyev, AN USSR, 1959. 74-84)

TEXT: The present results were obtained from a study of the optical, electrical, and photoelectric properties of thin CdSe layers at different temperatures in vacuum, in the air, and in O<sub>2</sub>, N<sub>2</sub>, and H<sub>2</sub>. The causes of the appearance of an index of refraction on the surface, which differs from the volumetric one, are explained. The effect of the medium, in which the thermal treatment takes place, and of the deviation from the stoichiometric ratio on the additional absorption in the 0.68 $\mu$  range is examined. It is concluded from the frequency dependence of electrical conductivity and photoconductivity at different temperatures, as well as from the spectral distribution of photosensitivity, that the electrical properties of CdSe layers in the 1-f region of the electric field

Card 1/2

Some optical and photoelectric properties ...

S/058/62/000/004/116/160  
A061/A101

change are determined by crystals of the polycrystalline layer. The existence of two types of spectral distribution of the layer photosensitivities is established. The effect of gas adsorption and thermal treatment on the electrical and photoelectric properties of CdSe layers is found to be considerable.

[Abstracter's note: Complete translation]

Card 2/2

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be trapped by fast recombination. It is observed that the sensitivity is increased with increased illumination intensity.



L 18048-66 FWT(m)/ETC(f)/EWG(m)/EWP(t) IJP(c) RDW/JD/GS  
ACC NR: AT6001342 SOURCE CODE: UR/0000/65/000/000/0143/0148  
AUTHOR: Vishchakas, Yu. K.; Gal'vidis, N. M.; Matulenis, A. Yu.; Tauraytene, S. A.  
ORG: Institute of Physics AN AzerbSSR (Institut fiziki AN AzerbSSR)  
TITLE: Study of inhomogeneities in electrophotographic layers of selenium <sup>56</sup> <sub>27</sub> B+1  
SOURCE: AN AzerbSSR. Institut fiziki. Selen, tellur i ikh primeniniye (Selenium, tellurium and their utilization). Baku, AN AzerbSSR, 1965, 143-148  
TOPIC TAGS: selenium, crystal growth, crystal growth rate, photoelectric aabsorption, photoelectric property, metal physics

ABSTRACT: The distribution of hexagonal modification in selenium photoelectric layers and its effect on certain photoelectric properties were studied. Experiments were performed on vapor deposited selenium (in vacuo-- $10^{-3}$  to  $10^{-5}$  torr) using aluminum substrates heated to 50-95°C; the thicknesses ranged from 10 to 25  $\mu$ . A continuous crystallized layer of hexagonal modification was formed at substrate temperatures above 85°C, while below this temperature it was disconnected. The spectral distribution ( $\Delta l/l_T$ ) of longitudinal photosensitivity was given as a function of wavelength for rear illumination and for both anodic and cathodic layers; the re-

Card 1/2

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ACC NR: AT6001342

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sults were characteristic of a homogeneous hexagonal modification, a maximum occurring at about 0.7  $\mu$ . The most continuous layer (substrate temperature of 95°C) was tested by an MOM-4 megameter for sensitivity to illumination resistance as a function of sample length both for darkness and a constant illumination of 0.15 w/m<sup>2</sup>. A schematic representation of the macrostructure of the selenium layer is given. This macrostructure is related to the inhomogeneity of resistance to photosensitivity in the modified layers which varied from 10<sup>12</sup> to 10<sup>18</sup> ohms and which was calculated from the following formula:

$$\frac{1}{R} = \frac{1}{R_h} + \frac{1}{R_a} = \frac{S_h}{\rho_h b} + \frac{S_a}{\rho_a b}$$

where  $b$  is the layer thickness along the electric field,  $\rho_h = 10^4$  ohm-m and  $\rho_a = 10^{10}$  ohm-m are the specific resistances of the hexagonal and amorphous modifications of selenium, respectively, and  $S_h$  and  $S_a$  are areas of the cross sections. The dependence of photoresistance to dark resistance was in good agreement with theoretical and experimental results. The above data were discussed in terms of defects and holes in the layers and their reactions with electrons. Orig. art. has: 6 figures, 1 table, 1 formula.

SUB CODE: 11, 20/ SUBM DATE: 10Mar65/ ORIG REF: 002/ OTH REF: 003

Card 2/2 *SM*

L 29609-66 EWT(m)/EWP(t)/ETI IJP(z) JD  
ACC NR: AT6012819

SOURCE CODE: UR/2910/65/005/001/0109/0114

AUTHOR: Vishchakas, Yu. K.; Viscakas, J.; Kavalyauskene, G. S.; Kavaliauskiene, G.

ORG: Vilnius State University im. V. Kapsukas (Vil'nyusskiy Gosudarstvennyy universitet)

57  
B41

TITLE: Investigation of dark relaxation of the electrostatic potential in xerographic selenium layers

SOURCE: AN LitSSR. Litovskiy fizicheskiy sbornik, v. 5, no. 1, 1965, 109-114

TOPIC TAGS: electrophotography, relaxation process, dark current, selenium

ABSTRACT: The authors study the effect of temperature on the dark potential reduction in xerographic layers. The potential relaxation process is studied in selenium from 10 to 60°C. The xerographic films were produced by vaporizing selenium in a vacuum of  $5 \cdot 10^{-4}$  mm Hg on Duralumin substrates. A dynamic electrometer was used for measuring the relaxation in dark potential. An EM-1 oscillograph was used as the indicator at the output of the electrometer amplifier. The potential was measured one second after charging. It was found that dark relaxation of the potential at

Card 1/3

L 29609-66

ACC NR: AT6012819

various temperatures may be described by hyperbolic curves of the type

$$V = \frac{V_0}{(1+at)^2}, \quad (1)$$

where  $V_0$  is the initial potential;  $V$  is the potential at time  $t$ ;  $a$  and  $\alpha$  are parameters of the hyperbola which depend on the temperature and conditions under which the layer was prepared. The change in potential for freshly prepared selenium film conforms to two or, occasionally, three hyperbolas. The time for transition from the first hyperbola to the second depends on temperature. After three or four months, the potential relaxation of the layers conforms to a single hyperbola. The drop in potential is similar for both positively and negatively charged layers, with differences only in the numerical values of the parameters  $a$  and  $\alpha$ . Values of  $a$  were found to vary from 0.05 to 0.90. The rate of dark discharge is a linear function of temperature in most cases. Experimental results showed that instantaneous relaxation time at the given potential is an exponential function of temperature and is determined by the following expression:

$$\Theta = R_{eff} \cdot C_{eff} = \Theta(V) e^{-\frac{\Delta E}{kT}}. \quad (2)$$

where  $R_{eff}$  and  $C_{eff}$  are the effective resistance and capacitance of the layer respectively.  $T$  is the temperature,  $\Delta E$  is the activation energy. This expression holds

Card 2/3

L 29609-66  
ACC NR: AT6012819

for both positively and negatively charged layers. The activation energy differs only slightly for the various layers and the average is  $0.54 \pm 0.05$  and  $0.28 \pm 0.05$  ev for positively and negatively charged layers respectively. A theoretical explanation is given for the experimental results. Orig. art. has: 6 figures, 1 table, 2 formulas.

SUB CODE: 20/ SUBM DATE: 15Jun64/ ORIG REF: 002/ OTH REF: 002

Card 3/3 *cc*

L 33762-66 EWT(1)/EWT(m)/T/EWP(t)/ETI IJP(c) RDW/JD/JG/AT

ACC NR: AT6012820

SOURCE CODE: UR/2910/65/005/001/0115/0122

AUTHOR: Vishchakas, Yu. K. -- Viscakas, J.; Kavalyauskene, G. S. -- Kavaliauskiene, G.

ORG: Vil'nyus State University im. V. Kapsukas (Vil'nyusskiy Gosudarstvennyy universitet)

TITLE: Investigation of complex electrophotographic layers with np and pp junctions

SOURCE: AN LitSSR. Litovskiy fizicheskiy sbornik, v. 5, no. 1, 1965, 115-122

TOPIC TAGS: np junction, pp junction, selenium, electrophotography, majority carrier, minority carrier, photosensitivity, ~~7 D16-TV aluminum alloy~~ CADMIUM SELENIDE, SEMICONDUCTIVITY

ABSTRACT: Complex electrophotographic layers of Al-CdSe-Se and Al-Sb<sub>2</sub>Se<sub>3</sub>-Se systems were investigated. The investigation was undertaken owing to the almost complete absence of data on the effect of pp and np junctions on the physical properties of selenium electrophotographic layers. The CdSe and Sb<sub>2</sub>Se<sub>3</sub> layers were prepared by evaporation in vacuum at 10<sup>-3</sup>-10<sup>-4</sup> torr on a substrate of D16-TV aluminum alloy. Selenium layer thicknesses ranged between 0.5 and 50 μ. Selenium (GOST 6738-53) was evaporated in vacuo at 1·10<sup>-4</sup> torr on Sb<sub>2</sub>Se<sub>3</sub> layers; substrate temperatures ranged from +20 to +85°C. Electrical conductivity and photosensitivity of the layers were studied in the photoresistance regime. The Al-CdSe-Au and Al-Sb<sub>2</sub>Se<sub>3</sub>-Pt systems were found to possess an effective specific resistance of 10<sup>8</sup>-10<sup>9</sup> and 10<sup>10</sup>-10<sup>12</sup> ohm·cm, respectively. The

Card 1/2

L 33762-66

ACC NR: AT6012820

Al-Sb<sub>2</sub>Se<sub>3</sub>-Se and Al-CdSe-Se systems sustained a negative surface charge for about one hour. Since the selenium layer acts as an insulator in the dark and the dark current of the majority carriers is slight, the discharge of the systems was thought to be caused principally by such contact phenomena as injection, exclusion, etc. It was found that the potential drop for Al-Cd-Se and Al-CdSe-Se systems slows down in the dark and speeds up in the light. The rate of drop in the dark potential in a positively charged surface decreases owing to the existence of an energy barrier for electrons making the transition from CdSe to Se; the drop is affected by hole drift in a strong electric field (in selenium) and the lifetime of injected minority carriers (holes in CdSe and electrons in Se). It is concluded that Al-CdSe-Se and Al-Sb<sub>2</sub>-Se<sub>3</sub>-Se systems may be charged positively or negatively if the selenium layers are deposited on a hot conducting substrate. Orig. art. has: 4 figures, 2 tables.

SUB CODE: 20/

SUBM DATE: 19Jun64/

ORIG REF: 016/

OTH REF: 004

Card 2/2

BLG

L 29608-66 EWT(1)/EWT(m)/EWP(t)/ETI IJP(c) AT/JD  
ACC NR: AT6012822 SOURCE CODE: UR/2910/65/005/001/0129/0134

AUTHOR: Vishchakas, Yu. K.; Viscakas, J.; Vaytkus, Yu. Yu.; Vaitkus, J.

47  
B+1

ORG: Vilnius State University im. V. Kapuskas (Vil'nysskiy Gosudarstvennyy universitet)

TITLE: Spectral distribution of photoconductivity in polycrystalline cadmium selenide layers

SOURCE: <sup>1</sup>AN LitSSR. Litovskiy fizicheskiy sbornik, v. 5, no. 1, 1965, 129-134

TOPIC TAGS: cadmium selenide, photoconductivity, polycrystalline film, spectral distribution

ABSTRACT: The spectral distribution of photoconductivity parameters was measured in polycrystalline layers of cadmium selenide with a constant number of incident quanta. It was found that the photocurrent yield of the specimens is a complex function of the exposure conditions. Bias lighting gives clear reproducible results. Relaxation time is independent of incident wavelength for a constant photocurrent and the minimum relaxation time corresponds to maximum stationary photocurrent. The

Card 1/2



L 29608-66  
ACC NR: AT6012822

initial differential instantaneous relaxation time is independent of wavelength at high frequencies and increases at lower frequencies. The selectivity of spectral distribution is not significantly affected by an increase in light intensity. Stationary bias lighting reduces selectivity of the spectral distribution by increasing the photosensitivity in the short wave region and reducing it in the long wave region. Maxima in the photoconductivity sometimes appear when the light intensity is increased. The spectral distribution of the photocurrent yield and relaxation time may be due to additional fast recombination centers on the surface and within the layers. The maxima in photosensitivity are due to the structure of the valence band. An increase in the dark conductivity of the layers increases the absolute stationary photocurrent which may be due to filling of capture levels without hole injection. The injection of holes by stationary bias lighting reduces photocurrent since there is an increase in recombination through the electron-filled capture level. This effect is stronger in the case of volume absorption which indicates an increase in recombination speed within the layer. Orig. art. has: 5 figures.

SUB CODE: 20/ SUBM DATE: 18Jun64/ ORIG REF: 006/ OTH REF: 004

Card 2/2 CC

L 39663-66 EWT(l)/EWT(m)/ETG(f)/EWG(m)/EWP(t) IJP(c) RIW/ID/GS/AF-2 - 3+1  
ACC NR: AT6001343 SOURCE CODE: UR/0000/65/000/000/0149/0156

AUTHOR: Matulenis, A. Yu.; Vishchakas, Yu. K.; Yushka, G. V.; Gal'vidis, N. M.

ORG: none

TITLE: Unipolar longitudinal photoconductivity of electrographic selenium films /

SOURCE: AN AzerbSSR. Institut fiziki. Selen, tellur i ikh primeneniye (Selenium, tellurium and their utilization). Baku, AN AzerbSSR, 1965, 149-156

TOPIC TAGS: selenium, semiconductor conductivity, drift mobility, temperature dependence, metal physics

ABSTRACT: Unipolar <sup>21, 44, 51</sup>electrographic properties (higher initial potential or photo-sensitivity for charge of a single sign) of Se films were studied. The specific drift length ( $\mu r$ ) was related to these properties by the relation:

$$\gamma = \Delta i_+ / \Delta i_- = \mu_h \tau_h / \mu_e \tau_e$$

where  $\Delta i_+$  is the photocurrent at the illuminated anode,  $\Delta i_-$  is the photocurrent at

2

L 39663-66  
ACC NR: AT6001343

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the illuminated cathode of the same electrode.  $\mu_e$ ,  $\mu_h$  are the mobilities of the electrons and vacancies, and  $\tau_e$ ,  $\tau_h$  are the respective lifetimes. A schematic of the apparatus used for measuring the relative photocurrents ( $Y$ ) is given. Amorphous and crystalline Se films of 0.8 to 1  $\mu$ m thickness were used. This thickness was much greater than the drift length but much less than the reverse coefficient of saturation. For small voltages,  $Y$  increased linearly with voltage for the amorphous Se, while at higher voltages it saturated rapidly. The specific drift lengths of the carriers were calculated to be  $1.7 \cdot 10^{-11}$  m<sup>2</sup>/v (electrons) and  $2 \cdot 10^{-10}$  m<sup>2</sup>/v (vacancies). The effects of crystallization (hexagonal modification) were studied by comparing the spectral distribution of  $Y$  for both amorphous and hexagonal Se. The amorphous film had much higher values of  $Y$  at the lower wavelengths (0.4 to 0.6  $\mu$ ) but went through a transition at 0.7 $\mu$  and dropped below the hexagonal; the hexagonal had the opposite relationship: it rose with wavelength and saturated at 0.7 $\mu$ . A micrograph (1000x) is given of an initially amorphous film which was subjected to a temperature gradient (10°C on one face and 90°C on the other). The specimen was fractured at the interface of the amorphous-crystalline boundary. Further data are given for the dependence of the longitudinal photocurrent on the temperature of the vaporizing Se substrate. For temperatures below 85°C, the value of  $Y$  increased sharply due to weaker vacancy injection. An explanation of the results based on

Card 2/3

L 39663-66  
ACC NR: AT6001343

special distribution of electron charge and vacancy injection is given. The best sensitivity and lowest dark current were obtained at substrate temperatures of 85°C. However, impurities in the Se lowered crystallization and interfered with getting these optimal conditions. Orig. art. has: 5 figures, 2 tables, 5 formulas.

SUB CODE: 11, 20/    SUBM DATE: 10Mar65/    ORIG REF: 005/    OTH REF: 007

Card 3/3

L 05688-67 EWT(l)/EWT(m)/EWP(t)/ETI IJP(c) AT/JD

ACC NR: AT6012821

SOURCE CODE: UR/2910/65/005/001/0123/0128

AUTHOR: Vishchakas, Yu. K. -- Viščakas, J.; Vaytkus, Yu. Yu. -- Vaitkus, J.

50  
BT1

ORG: Vil'nyus State University imeni V. Kapuskas (Vil'nyusskiy Gosudarstvennyy uni-  
versitet)

TITLE: Effect of background illumination on the steady state photoconductivity of polycrystalline CdSe layers

27 27

SOURCE: AN LitSSR. Litovskiy fizicheskiy sbornik, v. 5, no. 1, 1965, 123-128

TOPIC TAGS: photoconductivity, photoconducting film, cadmium selenide

ABSTRACT: The differential photocurrent output and the relaxation time of the exponential segment of the photoconductivity curve were measured in CdSe layers in order to determine the intensity background illumination on the photoconductivity of the samples. The thickness of the CdSe layers varied from 0.3 to 1.0 μ. Measurements indicate that recombination occurs across traps with activation energies of 0.28, 0.23 and 0.19 ev. Orig. art. has: 3 figures, 1 table, 2 formulas.

SUB CODE: 20/

SUBM DATE: 18Jun64/

ORIG REF: 007/

OTH REF: 005

Card 1/1

I. 03545-67 ENT(m)/EWP(t)/STI IJP(c) JD

ACC NR: AR6031887

SOURCE CODE: UR/0058/66/000/006/E095/E095

AUTHOR: Vaytkus, Yu. Yu.; Vishchakas, Yu. K.; Persianov, I. S.; Smilga, A. A.

TITLE: Photoconductivity anisotropy of cadmium selenide single crystals 19

SOURCE: Ref. zh. Fizika, Abs. 6E743

REF SOURCE: Lit. fiz. sb., v. 5, no. 4, 1965, 491-494

TOPIC TAGS: cadmium selenide, cadmium selenide photoconductivity, photoconductivity anisotropy

ABSTRACT: The anisotropy of photoconductivity in CdSe single crystals is investigated. In the (1010) plane the photoconductivity relationship in the direction of axes a and c is 2:1, while in the (0001) plane anisotropy varies periodically as a function of the shape of the crystal cross-section. [Translation of abstract]

SUB CODE: 20/

Card 1/1 nst

L 46938-66 EWT(1)/EWT(m)/EWP(t)/ETI IJP(c) JD/AT  
 ACC NR: AP6015492 (N) SOURCE CODE: UR/0181/66/008/005/1616/1617 61

AUTHOR: Vishchakas, Yu. K.; Yushka, G. B.; Petravichus, A. D.; Matulenis, A. Yu. B

ORG: Vil'nyus State University im. V. Kapsukas (Vil'nyusskiy gosudarstvennyy universitet)

TITLE: The kinetics of forward photocurrent limited by a spatial charge in amorphous selenium 21

SOURCE: Fizika tverdogo tela, v. 8, no. 5, 1966, 1616-1617

TOPIC TAGS: selenium, photoconductivity, current carrier, hole mobility

ABSTRACT: Amorphous Se with a specific resistivity of  $10^{10}$  ohm-cm, a hole drift of  $>10^{-7}$  m<sup>2</sup>/v, a quantum yield of 0.1 to 1 (photon energy 2.5 to 3.0 ev), and a free-to-captured-holes ratio of  $>0.01$  was examined. The experimental equipment included a pulse light source (ISSh-15, ISSh-100-3), a monochromator, and an oscillograph (input impedance 10 kohm, and capacitance 50 picofarad). Photocurrents were generated by constant voltage and by intermittent light. The density of the maximum photocurrent depends on the voltage, according to

$$j_0 = 1.21 \cdot \frac{9}{8} \epsilon_0 \epsilon_{00} \frac{U^2}{d^3}$$

Card 1/2

L 46938-66  
ACC NR: AP6015492

where  $\epsilon$  is the relative dielectric constant,  $\epsilon_0$  is the dielectric constant of the vacuum,  $\mu$  is mobility,  $U$  is voltage, and  $d$  is the specimen thickness in the direction of the electric field. A possible break in the curve and further linear increase at high voltages indicate that the divergence of the hole current reaches the generation tempo of the carriers. The determined quantum yield agrees with the results obtained by other authors. The calculated curves correspond to a hole mobility  $\mu = 1.4 \cdot 10^{-5} \text{ m}^2/\text{v} \cdot \text{sec}$ . Trapping and recombination in the specimens are insignificant. Orig. art. has: 2 figures, 2 formulas.

SUB CODE: 20/

SUBM DATE: 20Sep65/

ORIG REF: 001/

OTH REF: 005

*clm*  
Card 2/2



ACC NR: AR6035047 SOURCE CODE: UR/0058/66/000/008/D120/D120

AUTHOR: Beltryshaytene, V. P.; Vishchakas, Yu. K.; Parkhomenko, M. V.

TITLE: Relaxation of longitudinal photoconductivity of electrophotographic layers

SOURCE: Ref. zh. Fizika, Abs. 8D935

REF SOURCE: Sb. Elektrofotogr. i magnitografiya, Vil'nyus, 1965, 17-25

TOPIC TAGS: photoconductivity, electrophotography, electrophotographic layer, longitudinal photoconductivity, relaxation, photography, zinc oxide, eosine sensitizer, stickiness

ABSTRACT: An investigation was conducted of the volt-ampere and lux-ampere characteristics of longitudinal photoconductivity (PC) in electrophotographic zinc oxide layers (binders: polyvinyl-butyl aldehyde) sensitized with eosine. The former were found to be linear under low stress and saturated under higher stress; the latter were found to be linear. The increase in PC occurred either along the hyperbola and exponent, or along the parabola and exponent, depending on the history of the sample, the concentration of eosine, and the applied stress. The decrease in PC occurred along the hyperbola, first with an index of  $< 1$  and then

Card 1/2

ACC NR: AR6035047

$> 1$ , these indices further more, depended on the level of illumination, the concentration of eosine, and the applied stress. The parameters  $M$  (concentration of trapping levels),  $N_{cm}$  (effective density of states in the conductivity zone, reduced to the  $M$  levels), and  $\Delta E_M$  (distance of levels  $M$  from the bottom of the conductivity zone) were determined from the initial sections of photocurrent increment curves. Values obtained for different samples were  $10^7-10^{10} \text{ cm}^{-3}$ ,  $10^6-10^9 \text{ cm}^{-3}$  and  $0.52-0.55 \text{ ev}$ . The effect of the sensitizer on the formation and position of trapping levels is discussed on the basis of the data obtained.

A. Kartuzhanskiy. [Translation of abstract]

[SP]

SUB CODE: 20/

Card 2/2

L 22987-66 EWT(1)/EWT(m)/ETC(f)/EWP(t), EWG(m) IJF(s) RDW/JE/AT

ACC NR: AT6012825

SOURCE CODE: UR/2910/65/015/001/0154/0156

AUTHOR: Smilga, A. A.--Smilga, A.; Vishchakas, Yu. K.--Viscakas, J.

46  
B+1

ORG: Vilnius State University im. V. Kapsukas (Vil'nyusskiy Gosudarstvennyy universitet)

TITLE: High-voltage <sup>2/</sup>photovoltaic effect in cadmium selenide polycrystalline films

SOURCE: AN LitSSR. Litovskiy fizicheskiy sbornik, v. 5, no. 1, 1965, 154-156

TOPIC TAGS: photoelectric effect, photo emf, cadmium selenide

ABSTRACT: Larger-than-gap photovoltages reaching more than 20 v per 1 cm of sample length have been discovered in cadmium selenide thin films. The samples were prepared by vacuum evaporation, with the temperature of the glass substrate varied between +20 to 250C, and the angle of deposition from 0° to 75°. The value of the photovoltages depends strongly on the angle of deposition and on the thickness of the films, and is directly proportional to the size of the samples. The polarity of the emf depends on the position of the substrate with regard to the molecular beam, with the + sign present on the substrate's far end. Orig. art. has: 2 figures. [ZL]

SUB CODE: 10/ SUBM DATE: 16Jun64/ ORIG REF: 008/ OTH REF: 005/ ATD PRESS:

4237

Card 1/1

L 1118-66 EWT(1)/EWT(m)/ETC/EWG(m)/T/EWP(t)/EWP(b)/EWA(c) IJP(c) RDM/JD/GG/GS

ACCESSION NR: AT5020482

UR/0000/64/000/000/0362/0371

AUTHORS: Vishchakas, Yu. K. ; Smilga, A. A.

75  
B+1

TITLE: Contact resistance of cadmium selenide and an electrode

SOURCE: Mezhevuzovskaya nauchno-tehnicheskaya konferentsiya po fizike poluprovodnikov (poverkhnostnyye i kontaktnyye yavleniya). Tomsk. 1962. III 49,55  
Poverkhnostnyye i kontaktnyye yavleniya v poluprovodnikakh (Surface and contact phenomena in semiconductors). Tomsk, Izd-vo Tomskogo univ., 1964, 362-371

TOPIC TAGS: cadmium selenide, contact resistance, photoconductivity, silver, gold, aluminum, indium, gallium, single crystal

ABSTRACT: Contact resistance between an electrode and CdSe and the methods of obtaining an ohmic contact were investigated in the kinetic study of the photoconductivity of CdSe. Preparation of polycrystalline films of CdSe and application of electrodes have been described by Yu. K. Vishchakas, A. A. Smigla, P. P. Brazdzhynas (Uchenyye zapiski Vil'nyusskogo gosudarstvennogo universiteta, 33, 139, 1960) and also by P. P. Brazdzhynas and Yu. K. Vishchakas (Trudy AN Lit. SSR, seriya B4, 21, 1956). One portion of polycrystalline films underwent

Card 1/3

L 1118-66

ACCESSION NR: AT5020482

thermal treatment. Ag, Au, Al, In, and Ga electrodes were applied by evaporation in vacuum. Irradiation of the specimens with electrons or ions was conducted in a gas-discharge tube fed by a high voltage rectifier. By using a proper diaphragm it was possible to irradiate either the total surface of the semiconductor or only the subelectrode region. The contact resistance of the specimens was determined by the ratio  $\gamma = \frac{R_0}{R_3}$ , where  $R_0$  is electrical resistance measured

by the usual method, and  $R_3$  is electrical resistance measured by the double-sounding method. Au, Ag, and Al electrodes and the film form a stable, time-independent contact resistance, which constituted about 60% of the resistance of the film for the contact Au-CdSe, 20% for Al-CdSe, and 10% for Ag-CdSe. Ga and In electrodes plus CdSe formed a time-dependent contact resistance constituting about 30% of the film resistance for In-CdSe and Ga-CdSe. To obtain an ohmic contact of CdSe single crystal and an electrode, the subelectrode region was bombarded with a glow discharge and was covered with an evaporative film of In and then with an In amalgam (95% In + 5% Hg). The observed phenomenon of the ohmic contact was previously explained by the model of F. A. Kroger, G. Diemer, and H. A. Klasens (Phys. Rev. 103, 279, 1956). Orig. art. has: 3 tables and 4 figures.

Card 2/3

L 1118-66

ACCESSION NR: AT5020482

ASSOCIATION: *3*  
Katedra fiziki poluprovodnikov, Vil'nyusskiy gosuniversitet in.  
Kapsukasa (Department of Semiconductor Physics, Vilnius State University)

SUBMITTED: 06Oct64

ENCL: 00

SUB CODE: EC

NO REF SOV: 009

OTHER: 007

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Card 3/3

L 2671-66 EWT(1)/EWT(m)/EWP(w)/EPP(c)/ENP(1)/ETC/ENG(1)/2/EPF(c)/EPP(c) IJP(c)

ACCESSION NR: AT5020483 RDW/JD/WR/CG/CS UR/0000/64/000/000/0372/0379

AUTHORS: Vishchakas, Yu. K.; Medeyshis, A. S.; Stonkus, S. I. 44.55 69 60 131

TITLE: Effect of gas sorption upon the electroconductivity and coefficient of light reflection of cadmium selenide films 16

SOURCE: Mezhevuzovskaya nauchno-tekhnicheskaya konferentsiya po fizike poluprovodnikov (poverkhnostnyye i kontaktnyye yavleniya). Tomsk, 1962. 21 44.55 21 2)

Poverkhnostnyye i kontaktnyye yavleniya v poluprovodnikakh (Surface and contact phenomena in semiconductors). Tomsk, Izd-vo Tomskogo univ., 1964, 372-379 41.57

TOPIC TAGS: sorption, electroconductivity, light reflection coefficient, cadmium selenide, oxygen, nitrogen, hydrogen

ABSTRACT: Electroconductivity of polycrystalline films of cadmium selenide was studied in vacuum and in oxygen, nitrogen, hydrogen, and air atmospheres. This is a summary and an extension of previous publications by the authors in which the effect of the above gases upon the electroconductivity, light sensitivity, and coefficient of light reflection was discussed. It is stated that the

Card 1/3

L 2671-66

ACCESSION NR: AT5020483

coefficient of reflection depends largely upon the gaseous medium which causes the greatest changes in the electroconductivity. Specimens were prepared by evaporative deposition of CdSe in vacuum on glass with attached electrodes. The setup and the method of measurement were described earlier by Yu. K. Vishchakas and A. Medeyshis (Uch. zap. Vil'nyusskogo gosuniv., 33, 161, 1960). The measurements were taken without removing the specimen from the vacuum. The contact potential differential was measured by means of a vibrating condenser which also served for measuring electroconductivity. The coefficient of the light reflection was measured with a polarizing goniometer. All the measurements were performed at room temperature. It was found that electroconductivity of the films, prepared at  $10^{-6}$  mm Hg is comparatively large ( $1 \text{ ohm}^{-1} \text{ cm}^{-1}$ ), but is considerably smaller ( $10^{-6} \text{ ohm}^{-1} \text{ cm}^{-1}$ ) for those prepared at  $10^{-3}$  mm Hg. Among the gases studied the greatest effect was obtained with  $\text{O}_2$ , which considerably decreased the conductivity, while nitrogen had no effect. The ratio of electroconductivity in vacuum to that in air varies inversely with the thickness of the film and depends upon the pressure at which the specimen was prepared. The work function was found to increase concurrently with decreased electroconductivity in dry air and oxygen. Angular function of the light reflection coefficient in vacuum and in air was studied in polarized light, but the values obtained for the changes in the reflection coefficient could not be correlated with those of skin conductivity. Further experiments should

Card 2/3



L 2671-66

ACCESSION NR: AT5020483

3

be conducted in this field, taking in account volume conductivity as well as the presence of a transition layer. It is assumed that the variations of quasi-skin conductivity are the most important factor in changes occurring in the coefficient of light reflection. Orig. art. has: 4 figures, 1 table, and 7 formulas.

ASSOCIATION: Vil'nyusskiy gosudarstvennyy universitet im. V. Kapsukasa,  
Kafedra fiziki poluprovodnikov (Vilnius State University, Department of Physics  
of Semiconductors)

44.55

SUBMITTED: 06Oct64

ENCL: 00

SUB CODE: SS, GC

NO REF SOV: 007

OTHER: .002

Card 3/3

VISHCHINSKAYA, M.V.

Wastes of the chemical industry of the Armenian S.S.R. used as  
larvicides. Izv.AN Arm.SSR.Biol.i sel'khoz.nauki 8 no.5:75-81  
My '55. (MLRA 9:8)  
(Flies) (Armenia--Chemical industry--By-products)  
(Insecticides)

BONDARENKO, T.M.; GORBOV, V.G. [Horbov, V.H.]; KOMAROV, I.Z.; VOYTOVICH, O.S. [Voitovych, O.S.]; KAMINSKIY, P.T. [Kamins'kyi, P.T.]; YAKOVLEVA, Ye.O. [IAkovlieva, IE.O.]; YAKOVLEV, S.B. [IAkovliev, S.B.]; YAVONENKO, O.Ya. [IAvonenko, O.IA.]; VISHCHUN, I.A... red.; ALEKSANDROV, M.O., tekhn.red.

[Our territory; brief guide-reference book] Nash kraj; korotkyi putivnyk-dovidnyk. Mykolaiv, Mykolaivs'ke obl.upr.kul'tury, 1958. 94 p. (MIRA 13:2)

1. Nikolayev. Oblastnyi kraieznavchyi muzei. (Nikolayev Province--Guidebooks)

VISHERSKIY, Ya.D.

Meckel's diverticulum pathology. Khirurgia, Moskva no. 2:48-52  
Feb 1953. (GLML 24:2)

1. Of the Surgical Division, Kurgan Oblast Hospital.

KARANDHEYEV, K.B., doktor tekhn.nauk, prof.; VISHENCHUK, I.M., starshiy  
nauchnyy storudnik; SHEREMET'YEV, V.A.

Electronic phase-angle meters used for recording measurements and  
oscillograms of the angle of overshoot of synchronous machine rotors.  
Izv. vys. ucheb. zav.; pri. no.1:22-27 '58. (MIRA 11:5)

1.L'vovskiy politekhnicheskoy institut. 2.Chlen-korrespondent  
AN USSR (for Karandeyev). 3.Nauchno-issledovatel'skiy sektor  
L'vovskogo politekhnicheskogo instituta (for Vishenchuk). 4.Starshiy  
inzhener Instituta mashinostroyeniya AN USSR (for Sheremet'yev).  
(Electronic instruments)

VISHENCHUK, I.M.; KOTYUK, A.F.; SHEREMET'YEV, V.A.

Electronic phase-measuring instruments used in industrial  
frequency circuits. Izv.tekh. no.2:58-59 Mr-Ap '58. (MIRA 11:3)  
(Electronic instruments)

VISHENCHUK, I.M., inzh.; KOTYUK, A.F., inzh.; SHEREMET'YEV, V.A., inzh.

Device for measuring and oscillographing the runaway angle of  
synchronous-machine rotors. Elek. sta. 29 no.7:43-45 J1 '58.  
(MIRA 11:10)

(Electric machinery, Synchronous--Measurement)

9(4, 6)

PHASE I BOOK EXPLOITATION

SOV/1985

Vishenchuk, Igor' Mikhaylovich, Yevgeniy Panteleymonovich Sogolovskiy,  
and Bentsion Iosifovich Shvetskiy

Elektronno-luchevoy ostsillograf i yego primeneniye v izmeritel'noy tekhnike (Cathode-ray Oscillograph and Its Use in Measuring Technique) Moscow, Fizmatgiz, 1959. 220 p. 10,000 copies printed. (Series: Fiziko-matematicheskaya biblioteka inzhenera)

Ed. (Title page): K.B. Karandeyev; Ed. (Inside book): A.I. Kostiyenko; Tech. Ed.: N.Ya. Murashova.

PURPOSE: The book is intended for engineers, scientific personnel, and graduate and undergraduate students engaged in the design and operation of electronic measuring equipment.

COVERAGE: The authors discuss the principle of operation and construction of low-voltage cathode-ray oscillographs. They also describe methods of design and measurement with the aid of oscillographs. The authors thank R.S. Kravtsov and N.M. Kogan for reviewing the text. There are 33 references: 31 Soviet (including 9 translations) and 2 English.

Card 1/5



## Cathode-ray Oscillograph (Cont.)

SOV/1985

## TABLE OF CONTENTS:

Foreword	5
Ch. 1. Block Diagram of a Cathode-ray Oscillograph	7
Ch. 2. Cathode-ray Tube	10
Principle of operation of a cathode-ray tube	11
Electron gun	11
Deflecting systems	19
Screen	26
Special cathode-ray tubes	30
Ch. 3. Sweep	32
Saw-tooth voltage generators	33
Thyratron oscillator	37
Slave sweep thyatron oscillator	41
Example of calculation of a thyatron oscillator circuit	41
"Pakkl" oscillator	44
Slave sweep "Pakkl" oscillator	52
Selection of tubes and procedure for calculating circuit elements	54
Multivibrator with capacitive cathode coupling	58
Synchronization	60

Card 2/5

Cathode-ray Oscillograph (Cont.)	SOV/1985
Ch. 4. Amplifiers	68
A-c amplifiers	70
Output circuits	71
Amplifier stage with a noncompensated plate load	77
Compensation for low-frequency distortions by means of a filter	80
Compensation for frequency distortions by means of a negative feedback	86
Inductive compensation	93
Amplifier input circuits	98
D-c amplifiers	100
Ch. 5. Auxiliary Elements of a Cathode-ray Oscillograph	108
Voltage stabilizers	108
Electromagnetic stabilizers	109
Example of calculation of an electronic stabilizing circuit	116
Calibration	125
Time divisions	134
Delay lines	140

Card 3/5

Cathode-ray Oscillograph(Cont.)	SOV/1985
Electronic switches	142
Blacking out the return sweep. Modulation of brightness	148
Photographing oscillograms	149
Ch. 6. Applications of a Cathode-ray Oscillograph	156
Measurement of voltages	156
Measurement of resistance	160
Measurement of power	163
Measurement of frequency	166
Measurement of phase	171
Analysis of characteristics of tubes and semiconductor devices	176
Analysis of amplifier characteristics	182
Measurement of the degree of modulation	188
Analysis of pulses	193
Obtaining a magnetization curve	196
Measurement of pressure	198
Checking of gears	199
Testing of camera shutters	199
Representing three-dimensional objects on the screen of an oscillograph	201

Card 4/5

Cathode-ray Oscillograph (Cont.)	SOV/1985
Appendix 1. Example of Designing the Basic Units of a Cathode-ray Oscillograph	204
Appendix 2. Characteristics of Some Types of Domestic (Soviet) Oscillographs	216
Appendix 3. Basic Parameters of Electrostatic Cathode-ray Tubes	218
Bibliography	219

AVAILABLE: Library of Congress

Card 5/5

JP/ad  
8-28-59

S/263/62/000/011/019/022  
1007/1207

AUTHOR: Vishenchuk, I. M.

TITLE: Reduction of measuring errors in two-channel phase angle meters

PERIODICAL: Referativnyy zhurnal, otdel'nyy vypusk. 32. Izmeritel'naya tekhnika, no. 11, 1962, 52-53.  
abstract 32.11.396. "Nauchn. zap. L'vovsk. politekhn. in-t", no. 78, 1961, 5-52

TEXT: Among the errors (E) inherent in electronic phase angle meters, most important are methodical E; E connected with inaccuracies in the determination of the moment of transition through the zero point of the function to be found (in phase-angle meters provided with limiters); E, appearing in the phase measuring circuit; and errors of the output measuring device. Each of the error sources is given ample consideration, and methods are suggested for the reduction of E in the amplifying-limiting system by using cathode-coupling limiters supplemented with positive and negative feedback circuits. The most efficient method of reducing errors in phase-measuring circuits is the use of bipolar circuits which compensate for the shift of the zero line. The L'vovskii politekhnicheskii institut (Lvov polytechnic Institute) designed a bipolar trigger circuit for two phase-angle meters that ensures maximum accuracy and stability of readings. Thus, for instance, the low-frequency phase-meter for a frequency band ranging from 10 c to 100 kc has a measuring error not exceeding 1.5% of the scale range, for scales of 25°, 50°, 100° and 180°; this gives an accuracy of 0.75°, 1.5°, 3° and 5° respectively. The dynamic range of the device is 0.3 to 50 v. Another type of phase-angle

Card 1/2

Reduction of measuring errors in...

S/263/62/000/011/019/022  
I007/I207

meter has been designed for infra-acoustic frequencies with a frequency band ranging from 3-1000c. Complete description is given of the phase meter circuits considered, and the error sources are analyzed. The design of the most important phase meter components is studied and their distinctive features are compared. There are 16 references.

[Abstracter's note: Complete translation.]

Card 2/2

VISHENCHUK, Igor' Mikhaylovich; KOTYUK, Andrey Fedorovich; MIZYUK,  
Leonid Yakovlevich; LYUSTIBERG, V.F., red.; YEMZHIN, V.V.,  
tekhn. red.

[Electromechanical and electronic phase meters] Elektrome-  
khanicheskie i elektronnye fazometry. Moskva, Gosenergoiz-  
dat, 1962. 206 p. (MIRA 15:7)  
(Electric measurements) (Electronic measurements)

VISHENKOV, S.

Test pilots, Vypel 11 no.13:5-7 J1 '48. (MIRA 12:9)  
(Airplanes--Flight testing)



VISHENKOV, S., inzh.-major

Inventor of hydroplanes. Vypel 11 no.11:19 Je '48.  
(MIRA 12:9)

(Grigorovich, Dmitrii Pavlovich)

VISHENKOV, S.

Ispytateli. Moskva, Voenizdat, 1949. 182 p., illus.

Title tr.: Test pilots.

TL540.V57

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

VISHENKOV, S.

PA 40/49T15

USSR/Aeronautics  
Aircraft - Design  
Biography

Feb 49

"An Outstanding Constructor of the Soviet Multi-  
engined Airplane," S. Vishenkov, Engr, 5 pp

"Vest Vozdush Flota" No 2

Briefly describes achievements of Andrey Nikolayevich  
Tupolev, one of foremost Soviet designers of multi-  
engined planes. Gives educational and practical  
background. Sketchily describes some of the more  
famous of his 80 plane designs. Awarded Order of  
Lenin in Jan 49.

FEB

40/49T15

VISHENKOV, S.

Aleksandr Mozhaitskii, Moskva, Voenmorizdat, 1952. 127 p.

SO: Monthly List of Russian Accessions, Vol 7, No. 8, Nov. 1954

VISHENKOV, S.

Outstanding Russian scientist. Sov.mor.15 no.7:15 Ap'55.  
(MIRA8:10)  
(Mozhaiskii, Aleksandr Fedorovich, 1825-1890)

VISHENKOV, S.A.; VELEMITSINA, V.I.

Hardening machine part surfaces by chemical nickel plating.  
Trudy Sem.po kach.poverkh. no.5:146-155 '61. (MIRA 15:10)  
(Nickel plating)

VISHENKOV, S.A.

Subject : USSR/Aeronautics - maintenance AID P - 4755  
Card 1/1 Pub. 135 - 13/31  
Author : Vishenkov, S. A., Eng.-Lt.Col.  
Title : How to prevent corrosion in aircraft parts  
Periodical : Vest. vozd. flota, <sup>39</sup>8, 52-59, Ag 1956  
Abstract : The author describes in detail the cause of corrosion and how to prevent the corrosion of various parts of aircraft. Three illustrations. The article is of informative value.  
Institution : None  
Submitted : No date

S/129/62/000/012/007/013  
E193/E383

AUTHORS: Vishenkov, S.A., Candidate of Technical Sciences,  
Gostenina, V.M., Yekatova, V.S., Faykina, L.A. and  
Filimonova, L.V., Engineers

TITLE: Electro-less nickel-plating of soldered aluminium parts

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov,  
no. 12, 1962, 33 - 36

TEXT: The object of the present investigation was to explore  
the possibility of improving the corrosion-resistance of soft-  
soldered joints in aluminium and aluminium alloys by means of  
electro-less nickel-plating of the aluminium parts before soldering.  
The optimum thickness of the nickel deposit was determined in the  
first stage of the investigation. The experiments were carried out  
on AMr (AMg), AMu (AMts),  $\Delta 1$  (D1) and  $\Delta 16$  (D16) alloys. Flat  
test pieces were cleaned with emery paper, washed in kerosene at  
40 - 50 °C, dried, degreased with French chalk, rinsed in cold  
water, pickled for 1 min in a 25% solution of sulphuric acid at  
70-75 °C, rinsed in cold water, given a bright dip (12-15 sec) in  
a 1:1 solution of nitric acid and rinsed again in cold water.

Card 1/4



Electro-less nickel-plating ....

S/129/62/000/012/007/013  
E193/E383

After depositing a coating of Zn by a 15-sec dip in a solution containing 500g/l. sodium hydroxide and 100 g/l. zinc sulphate (at 20-25 °C), followed by a thorough wash in running water, nickel-plating was carried out in a bath of the following composition: nickel chloride 21 g/l.; sodium hypophosphate 24 g/l.; ammonium chloride 35 g/l.; citric acid 25 g/l.; 25% NH<sub>4</sub>OH solution 30-70 ml./l.; pH of the bath was 8.3 - 8.5 and its temperature 80-85 °C. The rate of nickel deposition was 12 - 15 μ/h at a charging density of 2 dm<sup>2</sup>/l. The specimens were held, after washing and drying, at 200 °C for 2 hours to improve the strength of the bond between the aluminium alloy and the nickel deposit. The corrosion-resistance of various test pieces was determined by measuring the loss in weight after a 160-hour test in a 3% solution of sodium chloride at room temperature. The minimum weight loss (0.002 - 0.003 g) corresponded to the following thickness of the Ni deposits: 15 - 16 μ on alloy AMg; 22-23 μ for alloy AMts; 24-25 μ for alloy D1; 28-30 μ for alloy D16. In the second stage of the investigation the corrosion-resistance of the soldered joints was determined. Strips of the alloy D1, nickel-plated to a depth of 1-3, 5-10 and 19-25 μ, were joined with ПОС-61 (POS-61)

Card 2/4

Electro-less nickel-plating ....

S/129/62/000/012/007/013  
E193/E383

solder under a zinc chloride/ammonium chloride flux. Similar test pieces were prepared using unplated D1 strips soldered by the abrasive technique with the tin-zinc eutectic. The corrosion tests (of 30 days duration) were carried out in a 3% sodium-chloride solution whose temperature was raised each day to boiling point and kept there for one hour. The extent of corrosion was determined and after the tests. Joints made in unplated specimens started to lose their strength after immersion for one day and had no load-carrying capacity after 7 days. Joints made on specimens nickel-plated to a depth of 18 - 25  $\mu$  were the most resistant to corrosion; their strength before and after corrosion tests was 4.8 and 4.7 kg/mm<sup>2</sup>, respectively. Comparative tests of one-year duration, conducted in a 3% sodium-chloride solution, in a humidity chamber and in outdoor and indoor atmospheres yielded similar results. Complex components of various wireless equipment made by soft-soldering nickel-plated AD1 (AD1), D1 and D16 alloys passed the following tests satisfactorily: 4-hour test at -50 °C; testing for resistance to frost and condensation (2 hours at -20 °C); stability at elevated temperatures (10 hours at 50 °C, Card 3/4

Electro-less nickel-plating ....

S/129/62/000/012/007/013  
E193/E383

4 hours at 65 °C); resistance to humidity (30 days at 30 °C with humidity of 95-98%). It was concluded that preliminary electro-less nickel-plating was the most promising method of ensuring good corrosion-resistance of soft-soldered joints in aluminium alloys.



Card 4/4

1.1800

23861  
S/123/61/000/010/006/016:  
A004/A104

AUTHORS: Borisov, V. S., and Vishenkov, S. A.

TITLE: The effect of chemical nickel plating on the fatigue strength of parts

PERIODICAL: Referativnyy zhurnal, Mashinostroyeniye, no. 10, 1961; 86, abstract 10B607 (V sb. "Povysheniye iznosostoykosti i sroka sluzhby mashin. v. 2", Kiyev, AN UkrSSR, 1960, 214-219)

TEXT: The authors present the results of investigating the effect of chemical nickel plating on the fatigue strength of parts. It is shown that the chemical nickel plating of steel specimens without subsequent heat treatment practically does not lower the fatigue strength. In the field of limited endurance the fatigue strength of nickel-plated specimens is reduced considerably. After tempering at 400°C for one hour and a nickel coat of 0.03 mm on the sides, the fatigue strength is lowered by 45%. Chemical nickel plating increases the fatigue strength of the Al-4 aluminum alloy with a nickel layer thickness of 0.03 mm on the sides up to 38%.

[Abstractor's note: Complete translation]

N. Savina

Card 1/1.

1.1800

24600

S/137/61/000/005/060/060  
A006/A106

AUTHOR: Vishenkov, S. A.

TITLE: Raising the wear resistance of ferrous and non-ferrous metal components by the method of chemical nickel plating

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 5, 1961, 67, abstract 51515 (V sb. "Povysheniye iznosostoykosti i sproka sluzhby mashin", v. 2, Kiyev, AN USSR, 1960, 220-228)

TEXT: The precipitation of Ni by the chemical method was studied. Cu, Fe and their alloys were nickel-plated. The method is valuable because of its applicability to Al alloys. The composition of an alkaline solution is given (in g/l): NiCl<sub>2</sub> - 21; NaH<sub>2</sub>PO<sub>2</sub> - 24; citric acid Na - 45; NH<sub>4</sub>Cl - 30; Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> - 0.32 and NH<sub>4</sub>OH (25%) - 135 ml/l. Heat treatment conditions for Ni-P coatings are recommended and methods of machining heat treated Ni-P coatings.

Ye. L.

[Abstracter's note: Complete translation]

Card 1/1

5.1310

1087. 1160, 1454

23477

S/123/61/000/009/014/027  
A004/A104

AUTHOR: Vishenkov, S.A.

TITLE: Increasing the resistance to wear of parts from ferrous and non-ferrous metals by chemical nickel plating

PERIODICAL: Referativnyy zhurnal, Mashinostroyeniye, no. 9, 1961, 92, a bstract 9B683 (V sb. "Povysheniye iznosostoykosti i broka sluzhby mashin, v. 2", Kiyev, AN UkrSSR, 1960, 220 - 228)

TEXT: The author comments on various investigation works of Soviet authors studying the mechanism of processes taking place during chemical nickel plating, effect of additives, concentration and interrelation of constituents and temperature on the plating rate of the nickel coat in acid and alkali baths. The author presents the results of investigations carried out with the aim to establish the optimum solution composition and correction methods for acid and alkali baths of hard nickel plating. The tests in acid baths were carried out with 30 XГСА (30Kh GSA) and grade St.3 steel specimens at 90 - 93°C ensuring the maximum plating rate. The obtained results are listed in tables and graphs. It is shown that changes of the nickel deposition rate are taking place most smoothly in baths in which the

Card 1/ 3

23477

Increasing the resistance ...

S/123/61/000/009/014/027  
A004/A104

molecular nickel-to-hypophosphite ratio amounts to 0.4, and it is in these baths that a maximum thickness of the nickel plating is obtained. The optimum conditions for the correction of acid baths are produced if the nickel plating process is carried out in two operations: preliminary plating of the part with a 5 - 6  $\mu$  coat in one bath and final building up of the coat up to the required thickness in the second. Alkali baths were investigated with the aid of specimens from the AK-6 aluminum alloy. The analysis showed that the best electrolyte for the nickel-plating of aluminum alloys is a solution of the following composition (gram/liter): nickel chloride - 21; sodium hypophosphite - 24; sodium citrate - 45; ammonium chlorate - 30; 135 milliliter/gram ammonia and 0.32 gram/liter aluminum sulfate. The surface has to be prepared in the following way: pickling in a 2-3% solution of hot (60 - 70°C) alkali, saturated with sodium chloride for 25 - 30 seconds, washing in hot (65 - 70°C) and cold running water, clarification in a 50% nitric acid solution at room temperature, washing in cold water and contact galvanizing in a solution of 500 gram/liter caustic soda and 100 gram/liter zinc oxide at 20 - 25°C for 25 - 30 seconds. The chemical nickel plating of aluminum alloys is of special interest. The author recommends a process in which at the beginning a 7 - 8  $\mu$  coat of alkali solution is applied with subsequent plating with a second layer up to the necessary thickness in an electrolyte of the following composition (gram/liter):

Card 2/3

23477

S/123/61/000/009/014/027  
A004/A104

Increasing the resistance ...

nickel sulfate - 30; sodium hypophosphate - 10; sodium acetate - 10, at a pH-value of 5.3 - 5.5 and a nickel deposition rate of 35 - 40  $\mu$ /hour and more. The author presents graphs of the change in the microhardness of nickel platings depending on the heat-treatment temperature. The physical-chemical properties of the obtained nickel platings are analyzed.

N. Savina

[Abstraster's note: Complete translation]

X

Card 3/3



VISHENKOV, S.A., kand. tekhn. nauk

Deposition of nickel and other metals with the aid of  
chemical reduction. Zhur. VKHO 8 no.5:547-554 '63.  
(MIRA 17:1)

RYABCHINKOV, Aleksey Vasil'yevich; VELEMITSINA, Valeriya Ivanovna;  
VISHENKOV, S.A., kand. tekhn.nauk, retsenzent

[Hardening and protection of parts against corrosion by  
the chemical nickel coating method] Uprochnenie i zashchita  
ot korrozii detalei metodom khimicheskogo nikelirovaniia.  
Moskva, Mashinostroenie, 1965. 127 p. (MIRA 18:12)

VISHENKOV, S.A., kand. tekhn. nauk; KASPAROVA, Ye.V., inzh.; Prinima-  
li uchastiye: RYABCHENKOV, A.V., doktor khim. nauk, prof.;  
VELEMITSINA, V.I., inzh.; ZUSMANOVICH, G.G., kand. tekhn.  
nauk; TUTOV, I.Ye., kand. tekhn. nauk, retsenzent; KUBAREV,  
V.I., inzh., red.; TAIROVA, A.L., red. izd-va; MAKAROVA, L.A.,  
tekhn. red.; MEL'NICHENKO, F.P., tekhn. red.

[Increasing the reliability and durability of machine parts by  
chemically nickel coating] Povyshenie nadezhnosti i dolgovech-  
nosti detalei mashin khimicheskim nikelirovaniem. Moskva,  
Mashgiz, 1963. 205 p. (MIRA 16:6)

(Protective coatings) (Nickel)

VISHENKOV, S.A.

Increasing the Wear Resistance of Ferrous and Nonferrous Metal Parts by Chemical Nickel Plating.

Povysheniye iznosostoykosti i sroka sluzhby mashin. t. 2 (Increasing the Wear Resistance and Extending the Service Life of Machines. v. 2) Kiyev, Izd-vo AN UkrSSR, 1960. 290 p. 3,000 copies printed. (Series: Its: Trudy, t. 2)

Sponsoring Agency: Vsesoyuznoye nauchno-tekhnicheskoye obshchestvo mashinostroitel'noy promyshlennosti. Tsentral'noye i Kiyevskoye oblastnoye pravleniya. Institut mekhaniki AN UkrSSR.

Editorial Board: Resp. Ed.: B. D. Grozin; Deputy Resp. Ed.: D.A. Draygor; M. P. Braun, I. D. Faynerman, I. V. Kragel'skiy; Scientific Secretary: M. L. Barabash; Ed. of v. 2: Ya. A. Samokhvalov; Tech. Ed.: N. P. Rakhlina.

COVERAGE: The collection contains papers presented at the Third Scientific Technical Conference held in Kiyev in September 1957 on problems of increasing the wear resistance and extending the service life of machines. The conference was sponsored by the Institut stroitel'noy mekhaniki AN UkrSSR (Institute of Structural Mechanics of the Academy of Sciences Ukrainian SSR), and by the Kiyevskaya oblastnaya organizatsiya nauchno-tekhnicheskogo obshchestva mashinostroitel'noy promyshlennosti (Kiyev Regional Organization of the Scientific Technical Society of the Machine-Building Industry).