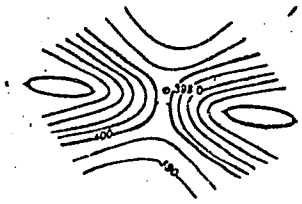
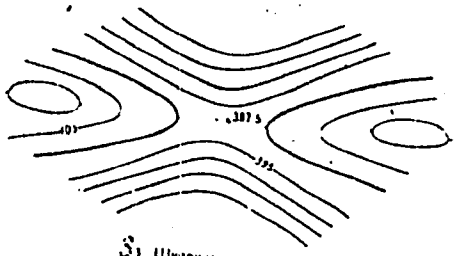
short (Fig. 1). When representing the symmetric cols special importance must be attached to the ratio between length and width of the col. This is done by means of auxiliary contour lines (Fig. 2). The use of arbitrary contour lines, even on topographic maps on a scale of 1 : 25,000 is regarded as inexpedient. The asymmetric cols are formed both on basic rocks as well as on the loosened sediments with inhomogeneous geological structure under the action of various denudation agents and of regressive erosion. They are characteristic of the reliefs of folds and cuesta forms, especially of sandstone and ravine forms. Besides, the asymmetric cols occur in karst, suffosion, solifluction, glacier, and other areas where the valley-side slopes and the slopes of water divides are usually unsymmetrical. The asymmetric cols can be divided into three subforms: asymmetrical with respect to length, asymmetrical with respect to width, and forms with complex asymmetry. The former two are formed in areas where the rock composition changes along a divide or where the axis of tectonic disturbances runs along a divide (Fig. 3a), and in areas with horizontal rock stratification with regressive erosion (Fig. 3b) and in areas with a karst, solifluction, suffosion, and ravine formations. The cols asymmetrical as to their width, are formed in areas

Cols and their representation...

S/006/61/000/002/002/003
B116/B202

where the change of rock composition or the axis of tectonic disturbances lie in transverse direction to the water divide. This anticlinal form is observed in areas where solifluction terraces (Fig. 4) and glacier forms occur as well as in areas with radial water system. Cols with complex asymmetry are mainly formed on loosened accumulations and rocks (Fig. 5). In many cases the asymmetric cols cannot be represented by main contour lines, hence auxiliary contour lines and even arbitrary contour lines must be used. There are 5 figures.





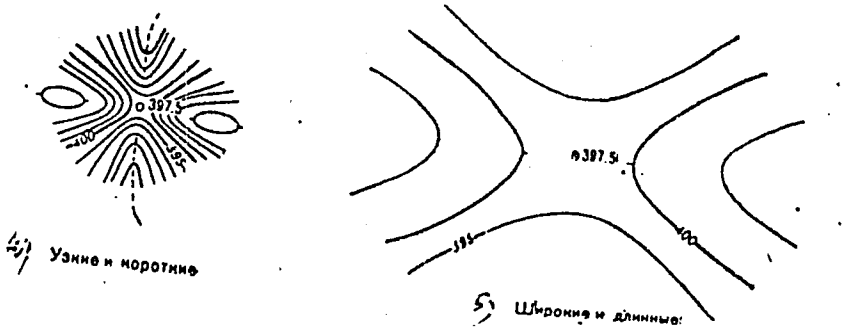
Card 3/9

4) Узкие и длинные

5) Широкие и короткие

Cols and their representation...

S/006/61/000/002/002/003
B116/B202



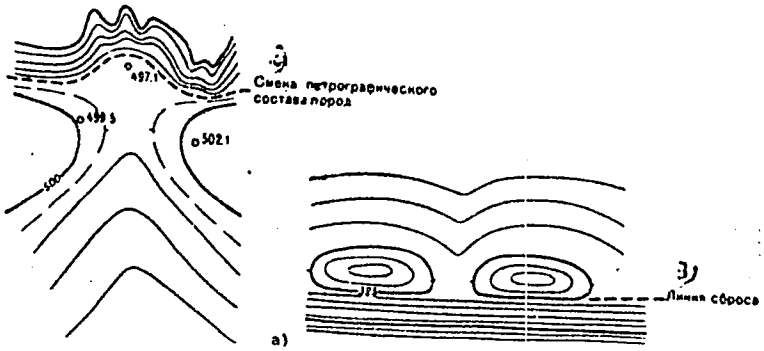
Legend to Fig. 1: 1) symmetric cols; 2) narrow and long; 3) wide and short; 4) narrow and short; 5) wide and long cols.

Card 4/9

Cols and their representation...

S/006/61/000/002/002/003
B116/B202

4) АСИММЕТРИЧНЫЕ СЕДЛОВИНЫ



Card 5/9

Cols and their representation...

S/006/61/000/002/002/003
B116/B202

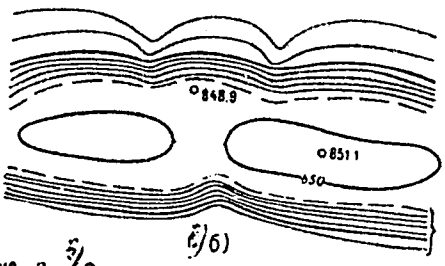


Рис 3 5/Седловины асимметричные по длине

Legend to Fig. 3: 1) asymmetric cols; 2) change of the composition of the rock; 3) dislocation line; 4) solid rock layer; 5) cols asymmetric with

Cols and their representation...

S/006/61/000/002/002/003
B116/B202

respect to their length.

Legend to Fig. 4:
Cols asymmetric with respect to their width,
1) sinter terraces;
2) dislocation line.

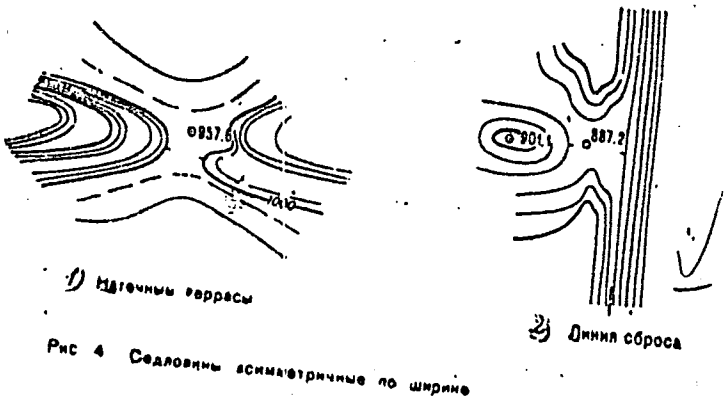
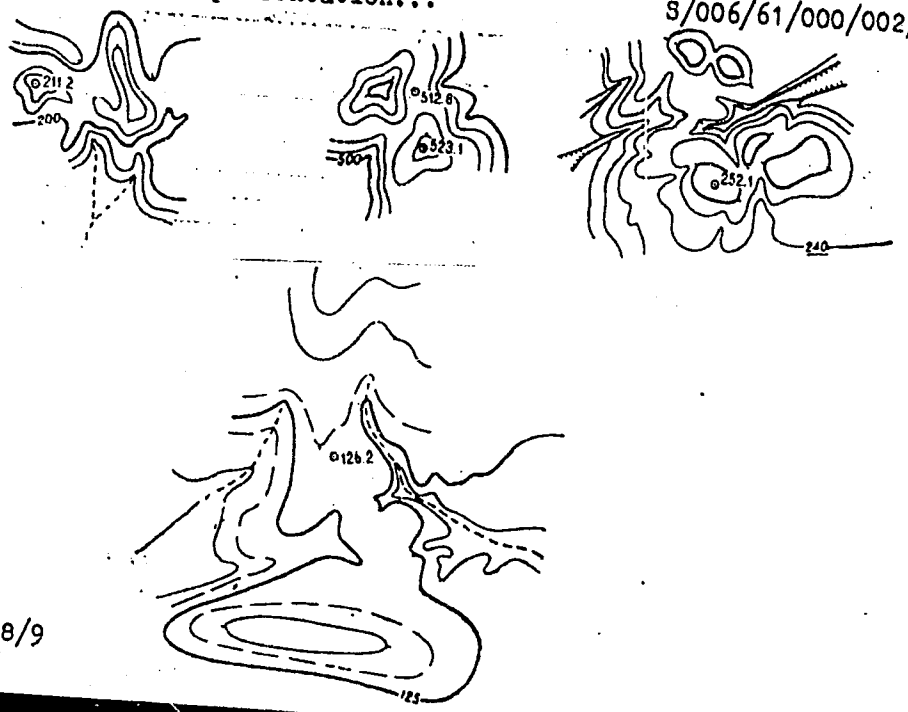


Рис 4 Седловины асимметричные по ширине

Card 7/9

Cols and their representation...

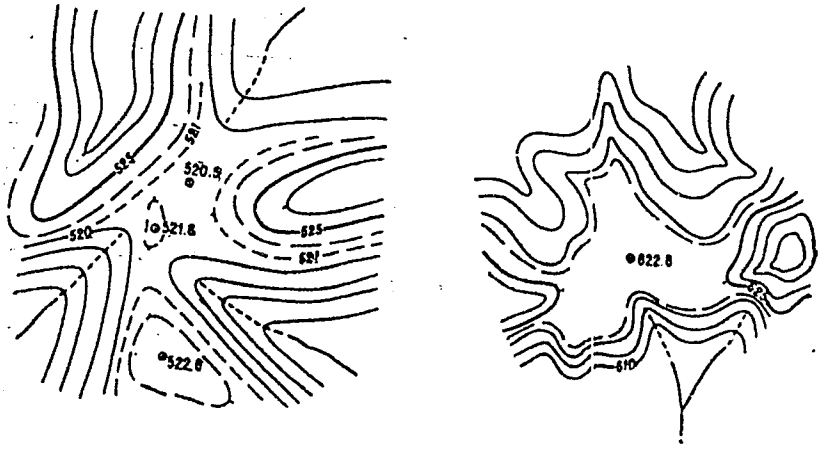
S/006/61/000/002/002/003



Card 8/9

Cols and their representation...

S/006/61/000/002/002/003
B116/B202



Pmc. 5.

Legend to Fig. 5: Cols with complex asymmetry.

Card 9/9

KOSMAKOVA, O.P.

Representation of settling fractures on the 1:25,000 topographic map. Geod.i kart. no.5:35-40 My '61.
(Maps--Symbols) (MIRA 14:6)

GURVICH, D.B.; BALANDINA, V.A.; KOSMAKOVA, R.V.

Determining sodium acetate content of polyvinyl alcohol by the conductometric method. Plast. massy no.2:69-71 '64.
(MIRA 17:8)

GURVICH, D.B.; BALANDINA, V.A.; KOSMAKOVA, R.V.

Direct determination of vinyl acetate content in its copolymers with vinyl chlorides. Plast.massy no.12:51-53 '61. (MIRA 14:12)

(Vinyl acetate polymers)

KOSMAKOVA, V. Ye.

"Some Problems of the Watering Schedule and Fertilization of Wheat on the Kamennaya Steppe." Cand Biol Sci, Moscow Oblast Pedagogical Inst, Moscow, 1953. (RZhBiol, No 4, Oct 54)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (10)

So: Sum. No. 481, 5 May 55

KOSMAL,F., prof.; HOSTOMSKY,J., prof.

Some properties of cellulose chlorided before and after warm alkaline treatment. Cel hirtie 10 no.10:351-354 0'61

1. Scoala Tehnica Superioara, Bratislava. 2. Membru corespondent al Academiei de Stiinta Slovace (for Kosmal).

Kosmal, L

KOSMAL, L.

KOSMAL, L. Tasks in the field of industrial safety and hygiene. p. 6.

Vol. 29, no. 9, Sept. 1955.
LAS POLSKI
AGRICULTURE
Poland

So: East European Accession, Vol. 6, No. 5, May 1957

KOSMALA, S.

KOSMALA, S. Construction of docks by applying modern equipment and new methods of concreting. p. 254.

Vol. 16, no. 6, June 1956
G OSPODARKS WODNA
TECHOLOGY
Warszawa, Poland

So: East European Accession, Vol. 6, no. 2, Feb. 1957

KOSMALA, S.

Most recent achievements in the construction of earthen embankments. p. 451. (Gospodarka Wodna, Vol. 16, No. 10, Oct 1956, Warsaw, Poland)

SO: Monthly List of East European Accessions (EEAL) LC, Vol. 6, No. 8, Aug 1957. Uncl.

KOSMALA, S.

Remarks on A. Ziemkowski's article "The New Building Technique of Raising Stories." p. 24.
(Budownictwo Przemyslowe, Warszawa, Vol. 6, no. 4, Apr. 1957)

SO: Monthly List of East European Accessions (EEAL) LC, Vol. 6, no. 7, July 1957. Uncl.

KOSMALA, Stanislaw, mgr inz.

The atom in civil engineering. Horyz techn 16 no.12: 8-9 D'63.

KOSMALA, Stanislaw, mgr inz.

Atoms in the service of earth-moving works. Inz i bud 21 no.11: 402-403 N '64.

KOSMALA, Urszula; KASZA, Stanislaw

A chromaffin tumor of the adrenal. Pol. tyg. lek. 19 no.47: 1825-1826 23 N'64.

1. Z II Kliniki Chorob Wewnetrznych Akademii Medycznej we Wroclawiu (kierownik: prof. dr. A. Falkiewicz) i z Kliniki Radiologicznej Akademii Medycznej we Wroclawiu (kierownik: doc. dr. Z. Kubrakiewicz).

KOSMALA, Urzula; DUDEK, Zygmunt; KNAPIKOWA, Danuta

Adrenal hyperfunction in isonicotinic acid hydrazide therapy. Gruzlica 32 no.7:523-530 Je '64.

1. Z II Kliniki Chorob Wewntrznych Akademii Medycznej we Wroclawiu (Kierownik: prof. dr A. Falkiewicz) i z Kliniki Gruzlicy Akademii Medycznej we Wroclawiu (Kierownik: prof. dr T. Garbinski).

KOSMALA, Urszula; KNAPIKOWA, Danuta

A case of Cushing's syndrome in a 13-year-old girl with fibro-adenoma of the breast. Pol. tyg. lek. 19 no.6:223-225; 3 F'64

1. Z II Kliniki Chorob Wewnetrznych AM we Wroclawiu; kierownik: prof.dr. A.Falkiewicz.

*

KOSMALA, Urszula

Evaluation of the determination of urinary gonadotropin levels in certain pathelogical syndromes in an internal clinic. Polskie arch. med. wewnetrz. 31 no.2:189-201 '61.

1. Z II Kliniki Chorob Wewnetrznych A.M. we Wroclawiu Kierownik: prof. dr med. A. Falkiewicz.

(GONADOTROPINS PITUITARY urine)

GRUSZKA, Stanislaw; PENAR, Stanislaw; KOSMALA, Urszula

Some anomalies in the clinical course of plasma cell myeloma. Polski tygod. lek. 16 no.36:1390-1393 4 S '61.

1. Z II Kliniki Chorob Wewnetrznych A.M. we Wroclawiu; kierownik: prof. dr Antoni Falkiewicz.

(MYELOMA PLASMA CELL case reports)

KOSMALA, Urszula

Quantitative determination of urinary gonadotropins. Polskie arch. med. wewn. 31 no.6:873-882 '61.

1. Z II Kliniki Chorob Wewnetrznych AM we Wroclawiu Kierownik: prof. dr med. A. Falkiewicz.

(GONADOTROPINS URINARY urine)

PENAR, Stanislaw; GRUSZKA, Stanislaw; KOSMALA, Urszula

Contribution to the problem of plasma cell reticuloma. Polskie arch. med. wewn, 31 no.8:1127-1132 '61.

1. Z II Kliniki Chorob Wewnetrznych AM we Wroclawiu Kierownik: prof. dr med. A. Falkiewicz.

(MYELOMA PLASMA CELL case reports)

GRUSZKA, Stanislaw; KOSMALA, Urszula

A case of collagen disease with Sjögren's disease. Pol. arch. med. wewn. 33 no.3:327-330 '63.

1. Z II Kliniki Chorob Wewnetrznych AM we Wroclawiu Kierownik: prof. dr med. A. Falkiewicz.

(SJOGREN'S SYNDROME) (COLLAGEN DISEASES)
(BLOOD LIPIDS) (ADRENAL CORTEX HORMONES)

KOSMALYA, V. [Kosmala, W.] (Pol'skaya Narodnaya Respublika)

Significance of studying work methods and conditions in establishing technical standards. Biul.nauch.inform.: trud i zar.plata 5 no.11:49-52 '62. (MIRA 15:12)
(Poland--Machinery industry--Production standards)

KISMALSKA, JADWIGA

Synthesis of [illegible]-carboxyphenol-(N-carbamoylsulfanil)amide. Zygmunt Le[illegible], Jadwiga Ku[illegible], and [illegible] Wojciechowski (Politech. Gdańsk, Poland). Zeszyty Nauk. Politech. Gdańsk, Chem. No. 1, 87-[illegible](1956)(German summary).—p-$HO_2CC_6H_3NHSO_2C_6H_4NHCONH_2$-$p$ (21 g.) was dissolved in 4N HCl and heated for 20 min. to give a yellow, cryst. ppt., which, filtered off and washed with a small amt. of ether, yielded 18 g. crude product. Recrystn. several times from a mixt. of water, EtOH, and amyl acetate gave p-$HO_2CC_6H_3NHSO_2C_6H_4NHCONH_2$-$p$, m. [illegible]80° (decompn.), fairly sol. in cold water, very sol. in hot water and in alkalies, insol. in anhyd. EtOH, MeOH, ether, chloroform, or EtOAc.

F. L. [illegible]

Card : 1/2

16

CIA-RDP86-00513R000825120011-1

POLAND/Organic Chemistry. Synthetic Organic Chemistry. G-2

Abs Jour: Referat Zhur-Khimiya, No 4, 1958, 11280.

added and the solution allowed to stand 3 hrs (~ 20°); at the end of that period IV is precipitated by the addition of HCl and purified by converstion to the ammonium salt and reprecipitation with HCl, decomp. temp. 315°. 21 gms of IV are dissolved in 4N HCl and heated 20 min; the solution is filtered and 18 gms crude I, mp 230° (from a mixture of water, alcohol, and amyl acetate), are obtained.

Card : 2/2

85138

24.1900 2209, 1063, 1147 S/104/60/000/009/002/005
E073/E335

AUTHORS: Korniyenko, A.M. and Kosman, A.S., Engineers

TITLE: Ultrasonic Defectoscopy on Turbine Reductor Gears

PERIODICAL: Elektricheskiye stantsii, 1960, No. 9, pp. 24 - 26

TEXT: Use of various magnetic methods (for instance, magnetisation by an induced current from a closed core or magnetisation by a current pulse) as well as the luminescent method of defectoscopy did not yield positive results since all these methods are essentially suitable for detecting surface defects. Application of ultrasonic defectoscopes is satisfactory for the rim of the gear but it did not prove satisfactory for the teeth. This is attributed to the fact that the quantity of ultrasonic energy entering the gear teeth is too low to produce, even with maximum amplification, a vertical "peak" of the reflected signal on the oscillograph screen. Therefore, the authors applied for this purpose apparatus based on resonance. The instrument works on the following principle: ultrasonic energy of a variable frequency (3 to 6 Mc/s) is beamed into the material to be

Card 1/4

Ultrasonic Defectoscopy on Turbine Reductor Gears

tested, using a piezoelectric transducer. At a certain frequency that corresponds to the frequency of the natural oscillations of the material (with respect to depth) being tested standing waves will form with nodes located at the surface; thereby, ultrasonic waves will be fully reflected from the surface. In this case the oscillator is tuned to be in resonance with the thickness of the material. At maximum reflection of the ultrasonic waves the piezoelectric transducer which is applied to the component will oscillate with an amplitude many times that of oscillations generated in it by a single generator, i.e. a maximum release of power occurs, as a result of which the piezoelectric transducer will be subject to sharp load changes. This, in turn, will affect the operation of the variable frequency oscillator in whose cathode pulses are being formed. These pulses are fed to the vertical plates of the oscillograph. The horizontal plates are fed with a voltage that is proportional to the variable frequency of the ultrasonic oscillations. As a result, pulses will be observed on the screen, the character of which will indicate the presence

85138
S/104/60/000/009/002/005
E073/E335

Ultrasonic Defectoscopy on Turbine Reductor Gears

or absence of a defect in the material. This instrument, B4-8P (V4-8R), is basically intended for measuring the thickness of metallic components in the case that access is available from one side only and is used for determining differences in wall thickness, detection of layering in tubes and rolled sheets, controlling the quality of brazing and glueing of metals. The search for defects is carried out in two stages, one for the teeth, using the above mentioned resonance defectoscope and one for the rims, using an ultrasonic defectoscope operating at a frequency of 2.5 Mc/s and a prismatic probe with a reflection angle $\alpha = 40^{\circ}$. Experimental use of the resonance defectoscope on specimens with artificial defects has shown that the sensitivity of the instrument is sufficiently high and defects in the root of the teeth with an equivalent area of 2 mm^2 could be easily detected by this instrument. Practical experience has shown that reduction gear pairs should be subjected to ultrasonic inspection after having been in operation for 50 000 to 60 000 hours.

Card 3/4

85138
S/104/60/000/009/002/005
E073/E335

Ultrasonic Defectoscopy on Turbine Reductor Gears
There are 6 figures.

Card 4/4

S/262/62/000/020/003/009
E194/E135

AUTHORS: Korniyenko, A.M., and Kosman, A.S.

TITLE: Protecting steam turbine blades against erosion

PERIODICAL: Referativnyy zhurnal, Silovyye ustanovki, no.20, 1962, 22-23, abstract 42.20.132. (Elektr. stantsii, no.6, 1962, 73-74)

TEXT: Blading of reaction turbines is more subject to erosion than that of impulse turbines. The cheapest and simplest way of protecting the blades is electric-spark hardening of the inlet edges proposed by TsNIITMASh, with which the hardening can be carried out directly on the rotor. A process is described which increases the service life of blades by a factor of 2-2.5.

[Abstractor's note: Complete translation.]

Card 1/1

KORNIYENKO, A.M., kand.tekhn.nauk; KOSMAN, A.S., inzh.

Check of the thickness of pipes in electric power plants.
Elek. sta. 33 no.5:80-81 My '62. (MIRA 15:7)
(Pipes—Testing)
(Ultrasonic waves—Industrial applications)

VAYSGANT, A.S.; KOSMAN, D.I.

Use of tarred hemp rope in sealing the sockets of cast iron sewer pipes. Rats. i izobr. predl. v stroi. no.94:37-38 '54. (MLRA 8:8)

1. Trest Transvodstroy Ministerstva stroitel'stva.
(Sewer pipe)

KOSMAN, G. P.

PLAVNIK, M.S.; KOSMAN, G.P.

Candidamycosis and pulmonary tuberculosis [with summary in French]. Probl.tub. 35 no.8:37-42 '57. (MIRA 11:4)

1. Iz rodil'nogo doma No.22 (zav. L.V.Ostrovityanova) i 2-y Moskovskoy infektsionnoy bol'nitsy (glavnyy vrach A.M.Pul'tsova)
(TUBERCULOSIS, PULMONARY, differ. diag.
pulm. moniliasis (Rus))
(MONILIASIS, differ. diag.
lungs, from pulm. tuberc. (Rus))
(LUNG DISEASES, differential diagnosis,
moniliasis, from pulm. tuberc. (Rus))

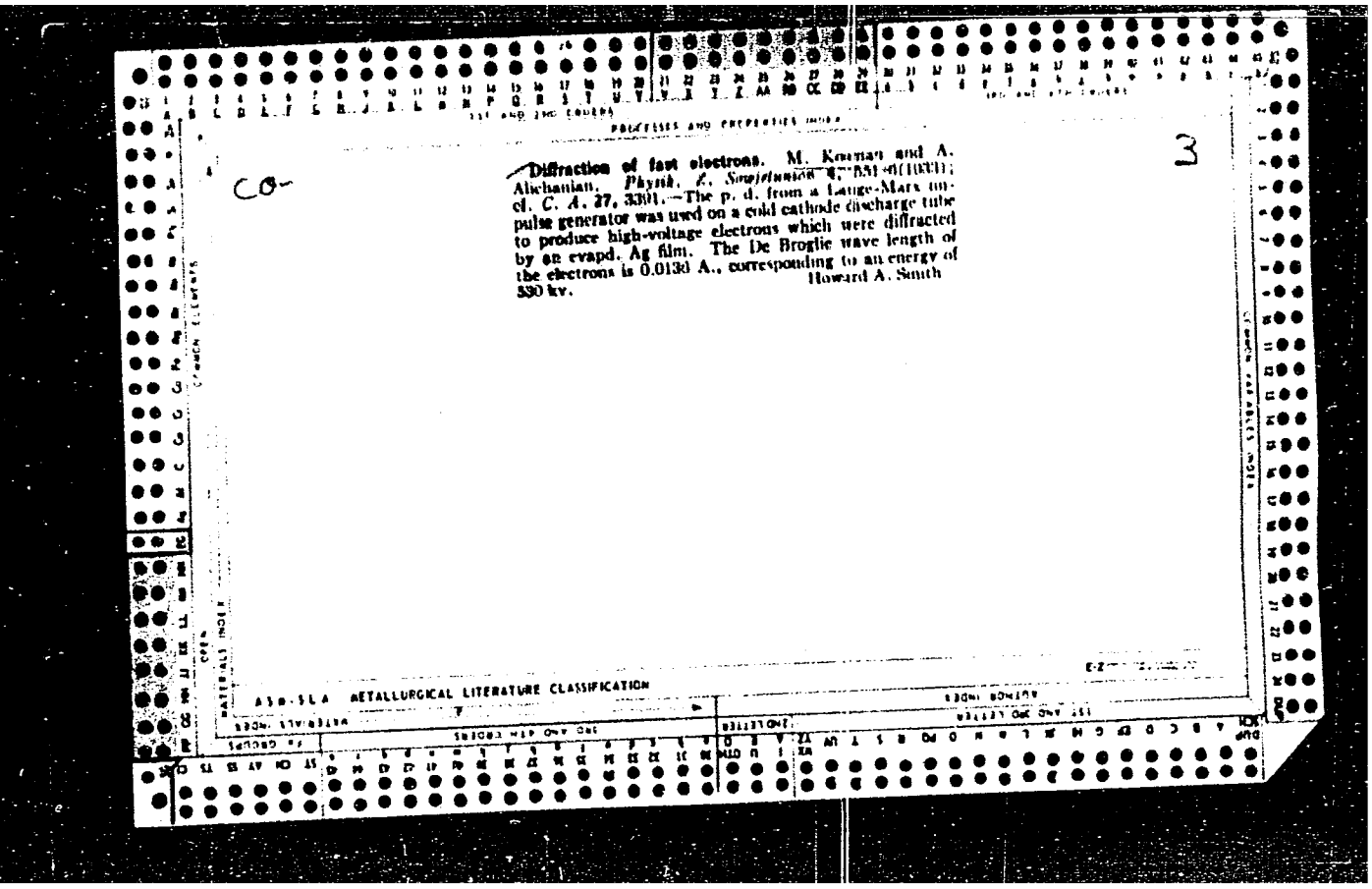
determine the R_T/R_0 cathode resistance [illegible]

Orig. art. has: 22 figures. [Based on author's Eng. abst.] [JPRS]

SUB CODE: 09, 20 / SUBM DATE: 10Jul65 / ORIG REF: 002 / SOV REF: 001
OTH REF: 010

Card 1/1

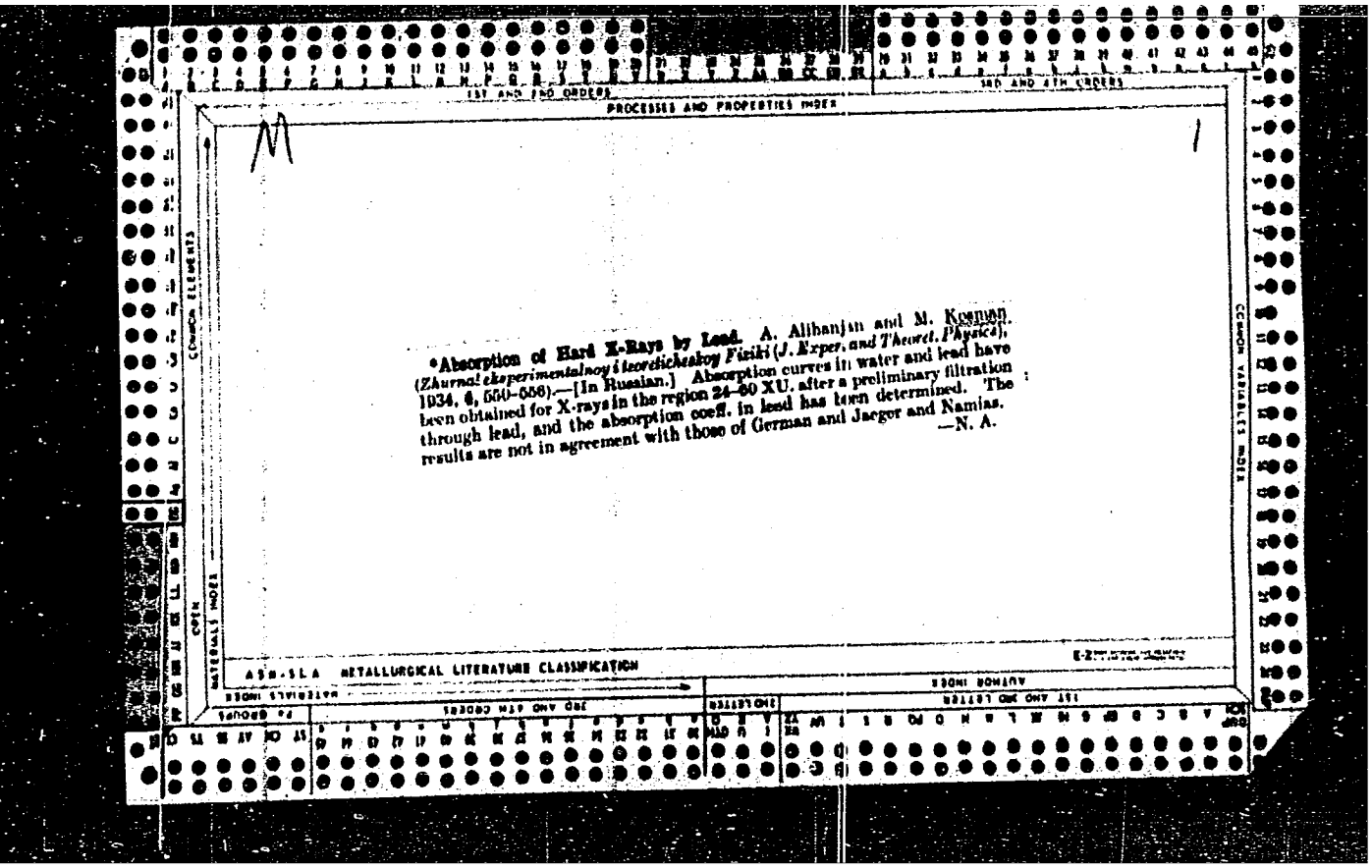
UDC: 621.327.43



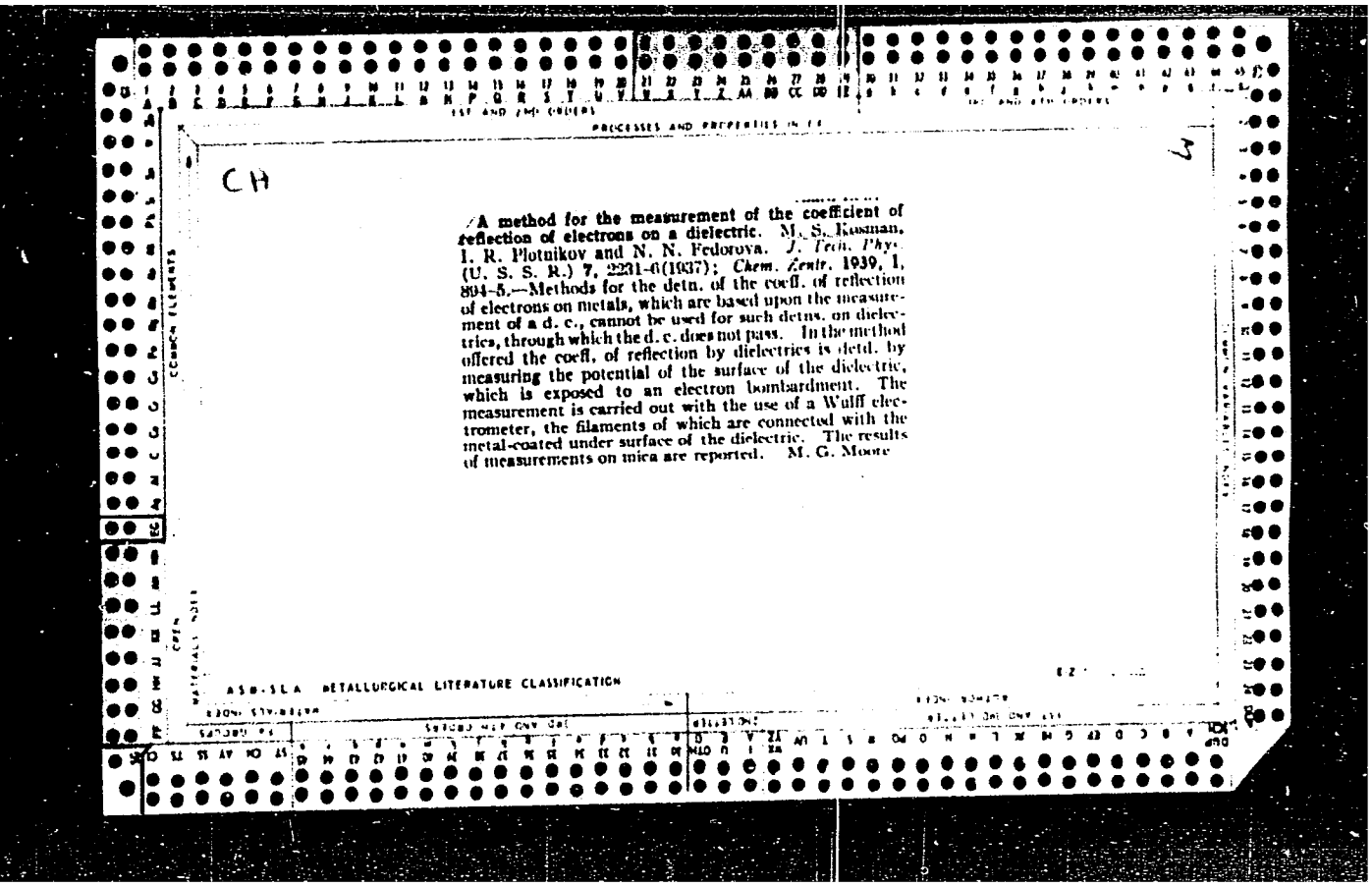
Diffraction of fast electrons. M. Knoran and A. Alichanian. *Physik. Z. Sowjetunion* 3, 551-9(1933); cf. *C. A.* 27, 3301.—The p. d. from a Latge-Marx impulse generator was used on a cold cathode discharge tube to produce high-voltage electrons which were diffracted by an evapd. Ag film. The De Broglie wave length of the electrons is 0.013d A., corresponding to an energy of 530 kv.

Howard A. Smith

A38-SLA METALLURGICAL LITERATURE CLASSIFICATION



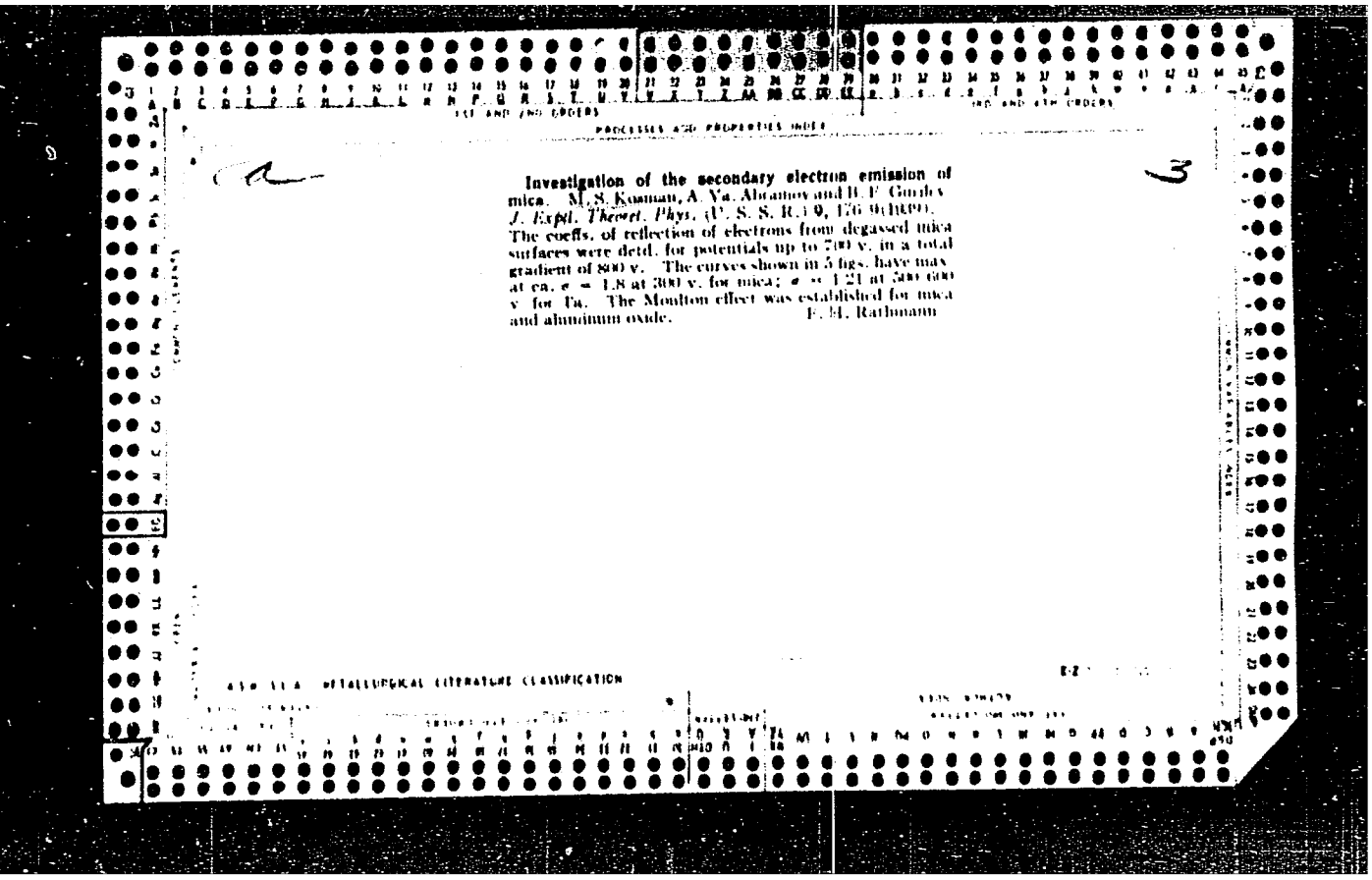
•**Absorption of Hard X-Rays by Lead.** A. Alihanjan and M. Kosman. (*Zhurnal eksperimentalnoy i teoreticheskoy Fiziki* (*J. Exper. and Theoret. Physics*), 1934, **4**, 550–558).—[In Russian.] Absorption curves in water and lead have been obtained for X-rays in the region 24–60 XU. after a preliminary filtration through lead, and the absorption coeff. in lead has been determined. The results are not in agreement with those of German and Jaeger and Namias. —N. A.



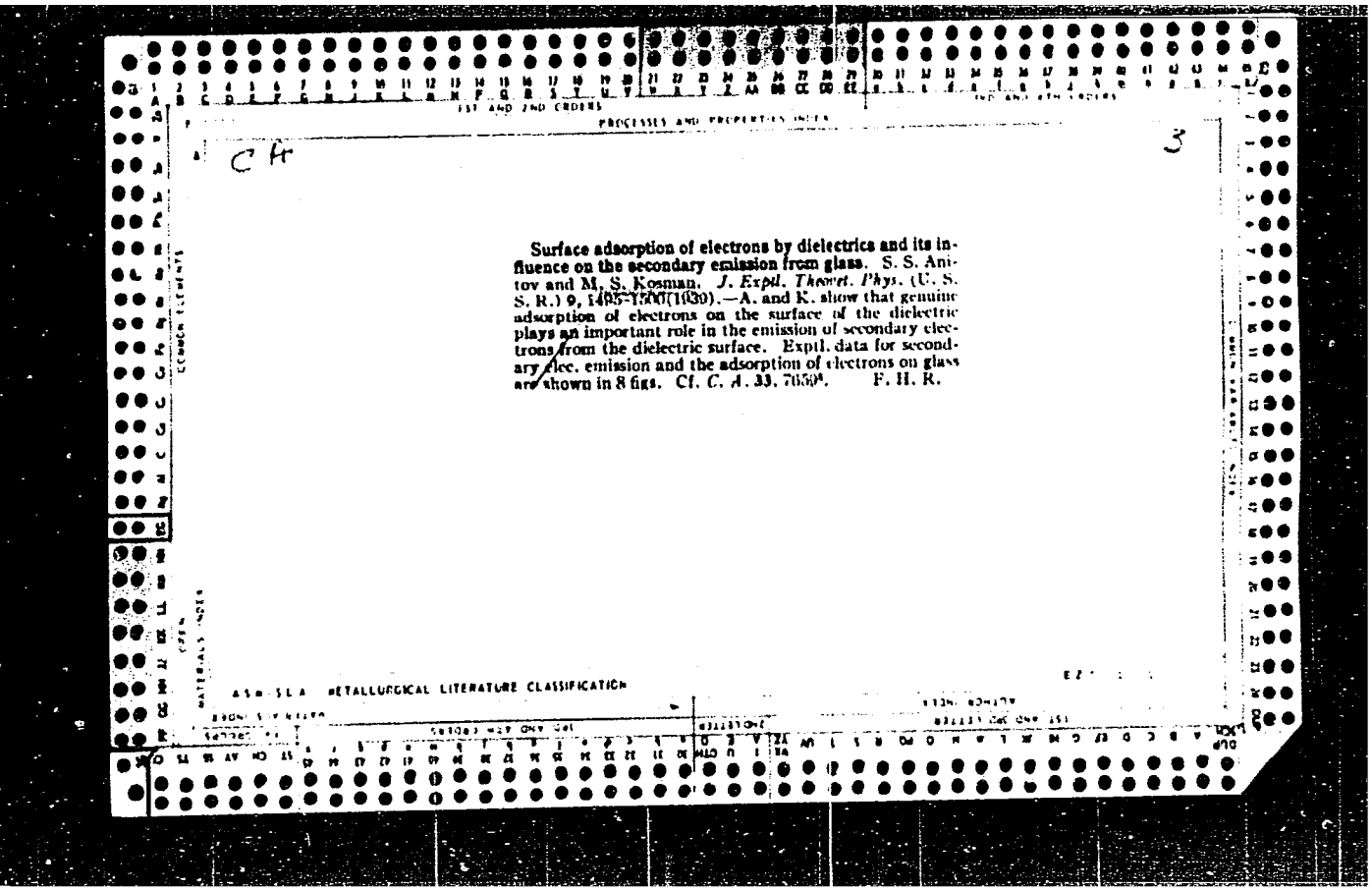
CH

A method for the measurement of the coefficient of reflection of electrons on a dielectric. M. S. Kosman, I. R. Plotnikov and N. N. Fedorova. *J. Tech. Phys.* (U. S. S. R.) **7**, 2231-6(1937); *Chem. Zentr.* **1939**, I, 894-5.—Methods for the detn. of the coeff. of reflection of electrons on metals, which are based upon the measurement of a d. c., cannot be used for such detns. on dielectrics, through which the d. c. does not pass. In the method offered the coeff. of reflection by dielectrics is detd. by measuring the potential of the surface of the dielectric, which is exposed to an electron bombardment. The measurement is carried out with the use of a Wulff electrometer, the filaments of which are connected with the metal-coated under surface of the dielectric. The results of measurements on mica are reported. M. G. Moore

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



Investigation of the secondary electron emission of mica. M. S. Kunman, A. Ya. Akopov and B. F. Gindy. *J. Exptl. Theoret. Phys.* (U. S. S. R.) 9, 176–9(1939). The coeffs. of reflection of electrons from degassed mica surfaces were detd. for potentials up to 700 v. in a total gradient of 800 v. The curves shown in 5 figs. have max. at ca. $\sigma = 1.8$ at 300 v. for mica; $\sigma = 1.21$ at 500–600 v. for Pt. The Moulton effect was established for mica and aluminum oxide. F. M. Rathmann

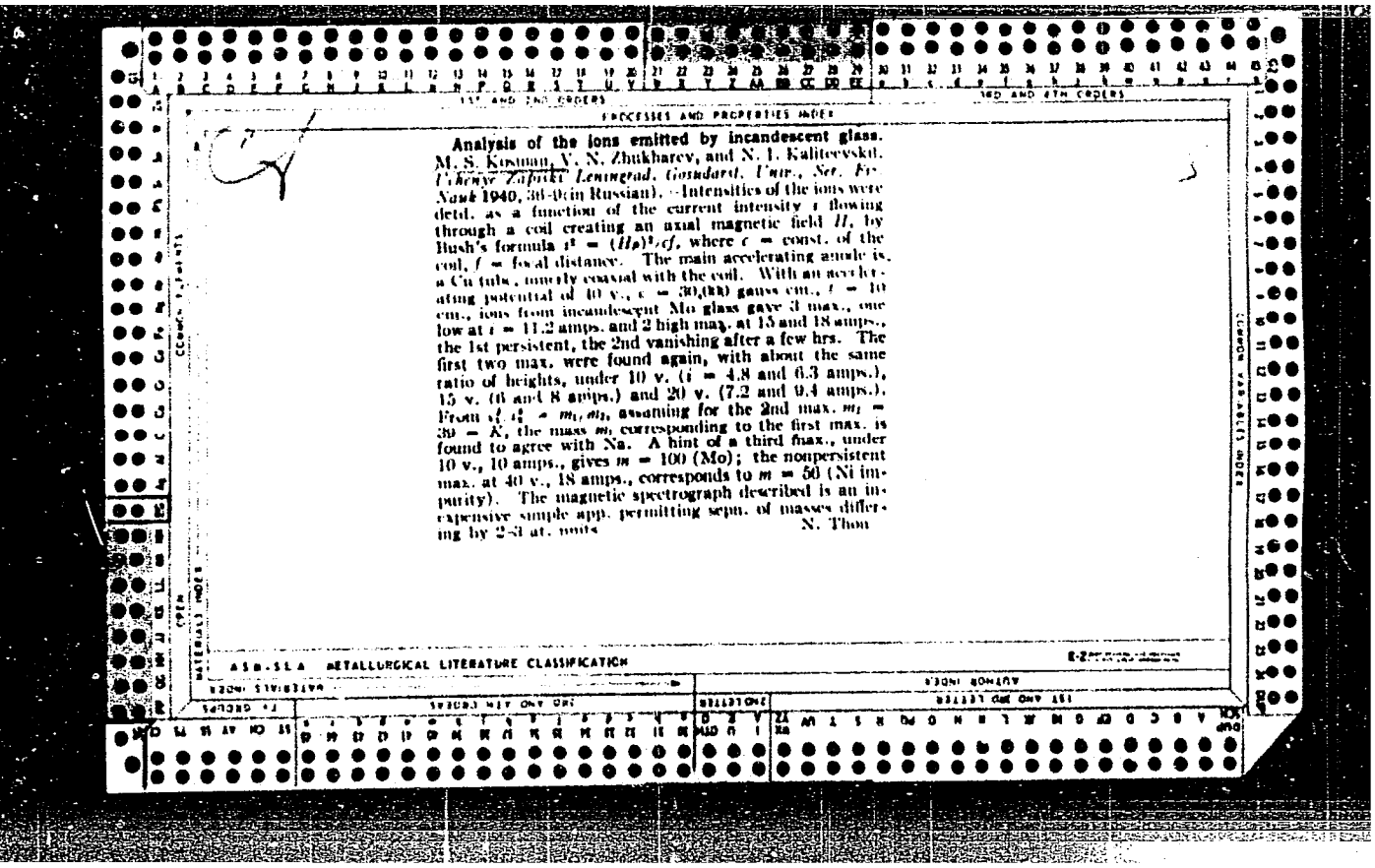


CH

3

Surface adsorption of electrons by dielectrics and its influence on the secondary emission from glass. S. S. Antov and M. S. Kosman. *J. Expil. Theoret. Phys.* (U. S. S. R.) 9, 1495-1500(1939).—A. and K. show that genuine adsorption of electrons on the surface of the dielectric plays an important role in the emission of secondary electrons from the dielectric surface. Exptl. data for secondary elec. emission and the adsorption of electrons on glass are shown in 8 figs. Cf. *C. A.* 33, 7059⁸. F. H. R.

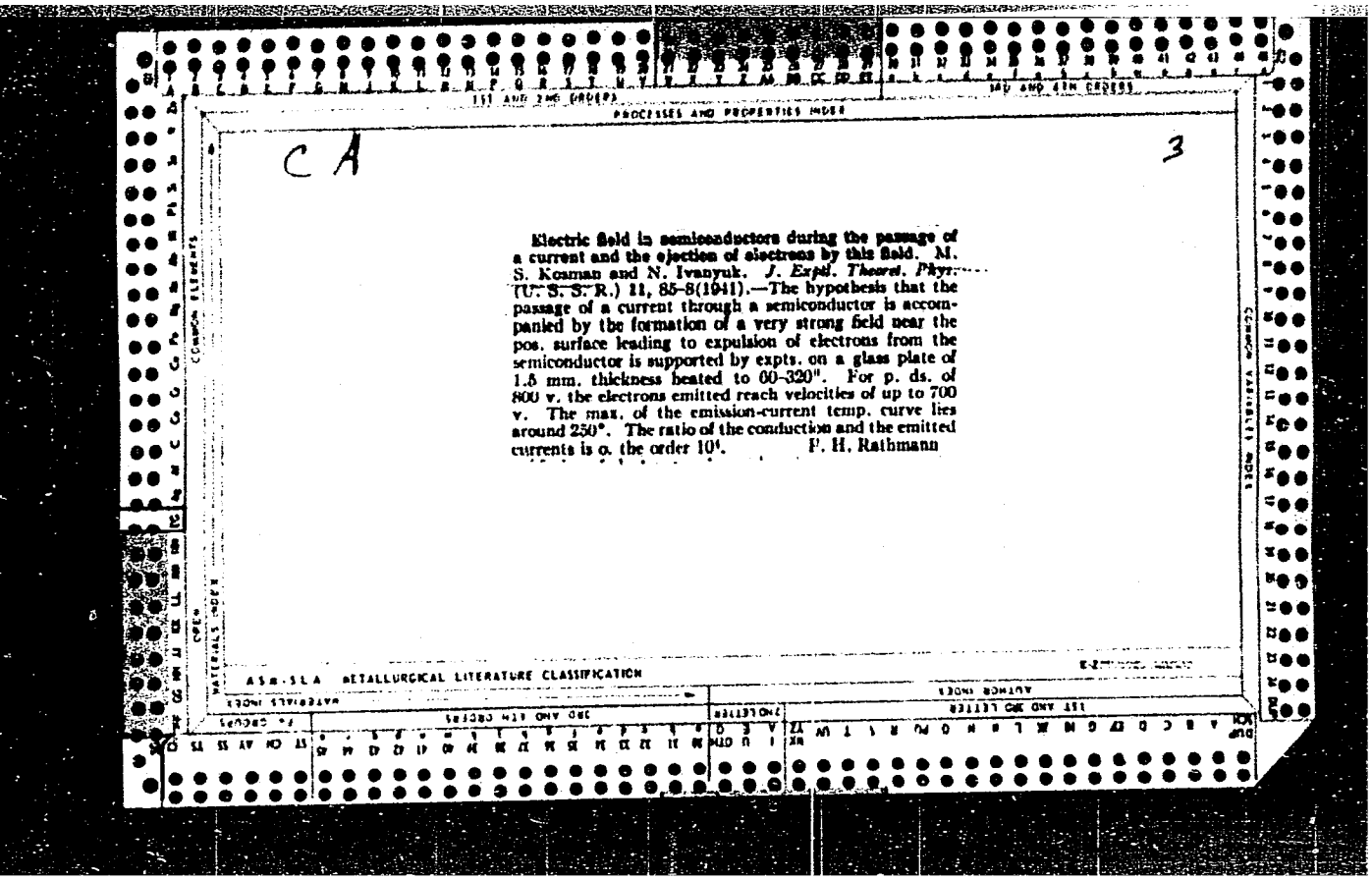
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



Analysis of the ions emitted by incandescent glass. M. S. Kosman, V. N. Zhukharev, and N. I. Kalitcevskii. *Uchenye Zapiski Leningrad. Gosudarst. Univ., Ser. Fiz. Nauk* 1940, 30-9(in Russian).—Intensities of the ions were detd. as a function of the current intensity i flowing through a coil creating an axial magnetic field H, by Bush's formula $i^2 = (Hs)^2/cf$, where c = const. of the coil, f = focal distance. The main accelerating anode is a Cu tube, merely coaxial with the coil. With an accelerating potential of 40 v., $c = 30{,}(\text{illegible})$ gauss cm., $f = 10$ cm., ions from incandescent Mo glass gave 3 max., one low at $i = 11.2$ amps. and 2 high max. at 15 and 18 amps., the 1st persistent, the 2nd vanishing after a few hrs. The first two max. were found again, with about the same ratio of heights, under 10 v. ($i = 4.8$ and 6.3 amps.), 15 v. (6 and 8 amps.) and 20 v. (7.2 and 9.4 amps.). From $i_1^2 : i_2^2 = m_1 : m_2$, assuming for the 2nd max. $m_2 = 39 = K$, the mass m_1 corresponding to the first max. is found to agree with Na. A hint of a third max., under 10 v., 10 amps., gives $m = 100$ (Mo); the nonpersistent max. at 40 v., 18 amps., corresponds to $m = 50$ (Ni impurity). The magnetic spectrograph described is an inexpensive simple app. permitting sepn. of masses differing by 2-3 at. units. N. Thon

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

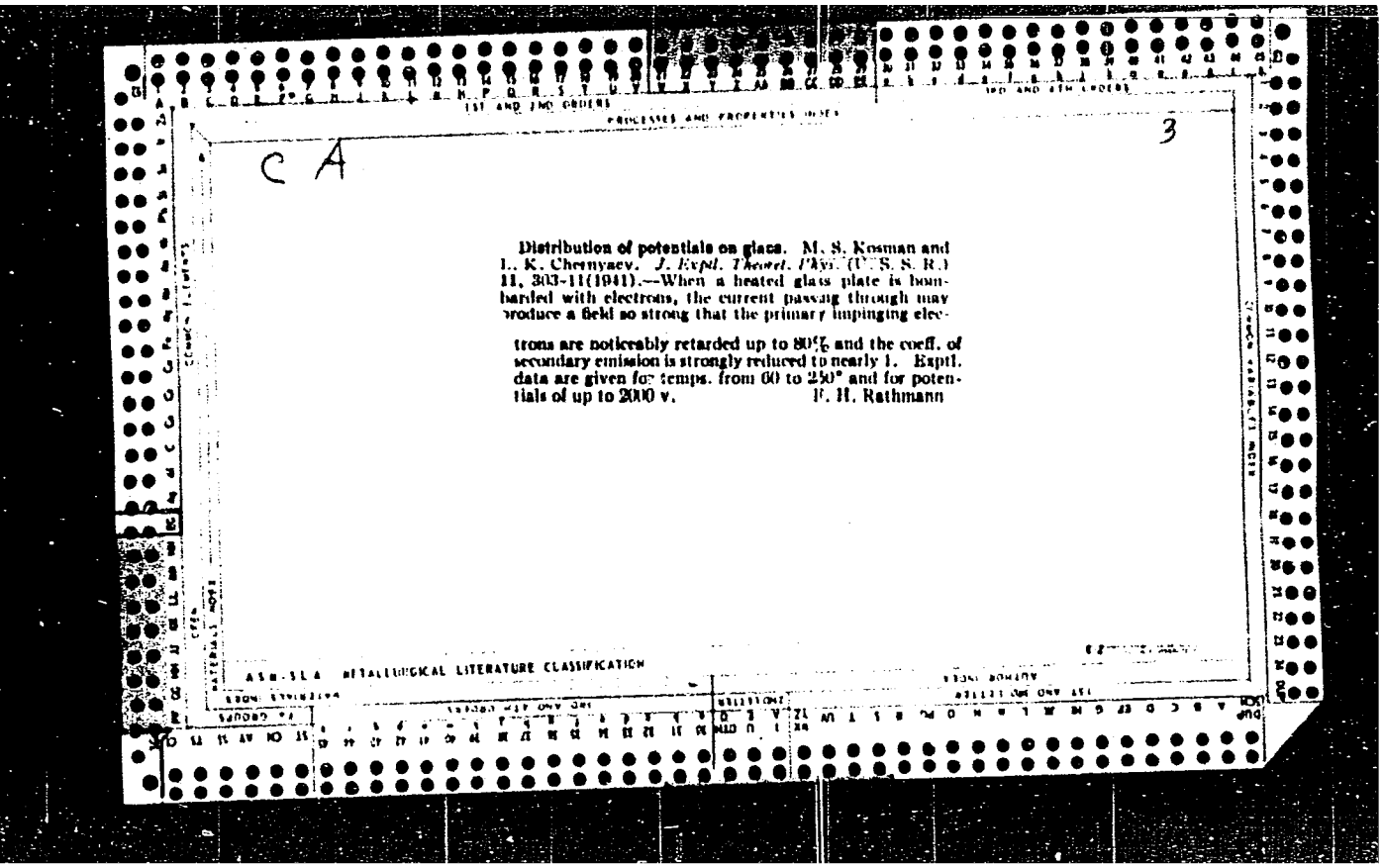
Investigation of the Malter effect. M. S. Kosman, Yu. E. Zal'kind, and M. E. Zal'kind. *Uchenye Zapiski Leningrad. Gosudarst. Univ., Ser. Fiz. Nauk* **1940**, 40-5 (in Russian); cf. Malter, *Phys. Rev.* **50**, 48 (1936).—(1) The abnormally high secondary electron-emission current from Al_2O_3 on Al and the persistence of the effect after the end of the primary bombardment were further confirmed on 4 different dielectrics, Al_2O_3, mica 3 μ and 10 μ thick, and MgO, all on a grounded Ni support. The basic condition for the after-effect appears to be suppression of the elec. surface cond.; with well-outgassed mica, the Malter current intensity i drops only by 2-3% in 30 min., but the drop is much faster with insufficient outgassing. Especially with powders (MgO), because of inhomogeneity of the surface, sudden changes in i occur to the extent of 100% in either direction; in this case, i may persist for up to 4-5 hrs. with only slight fluctuations and then suddenly disappear. (2) At a given primary current intensity I, the Malter current i increases steadily with the collector voltage V; this holds also for the after-effect ($I = 0$), which indicates that at least part of the electrons are emitted by the dielectric. There are evidently 2 processes present, emission from the dielectric without replacement by electrons from the metal support, resulting in raising the potential of the surface, and emission with replacement, the second process detg. the stationary state. Indication for the first process is seen in the observation that the Malter current "revives" spontaneously, that is without primary bombardment, when the collector potential is again applied after having been lowered to $V = 0$; discrete centers in which the pos. potential is concd., assumed to be present on the dielectric, evidently persist at $V = 0$ and on its renewed application give rise to emission by the first mechanism until the surface potential reaches V. Primary bombardment at $V = 0$ liquidates the centers and suppresses subsequent spontaneous revival. (3) Thoroughly outgassed films show no dependence of i on I. With MgO powders with outspoken elec. cond., i increases with I in nearly the same way for various values of V, the effect of cond. tends to diminish with rising I, hence i tends to satn. (4) Electron velocity distribution curves at high i show most of the electrons to have but low velocity, only a negligible fraction having velocities corresponding to the potential drop across the dielec. layer. This indicates that the majority of electrons are emitted from the shallowest depths of the film; the alternative interpretation, namely that electrons are emitted from the metal support but lose energy on traversing the film, is contradicted by the curve of angular distribution showing the majority of electrons to be emitted perpendicular to the surface and absence of any noticeable scattering such as would result from loss of energy through collisions. At low i, there is a substantial no. of electrons having full velocity; this indicates that in this case most electrons are emitted from the metal support. N. Thon



C A

3

Electric field in semiconductors during the passage of a current and the ejection of electrons by this field. M. S. Kosman and N. Ivanyuk. *J. Exptl. Theoret. Phys.* (U. S. S. R.) 11, 85-8(1941).—The hypothesis that the passage of a current through a semiconductor is accompanied by the formation of a very strong field near the pos. surface leading to expulsion of electrons from the semiconductor is supported by expts. on a glass plate of 1.5 mm. thickness heated to 60-320°. For p. ds. of 800 v. the electrons emitted reach velocities of up to 700 v. The max. of the emission-current temp. curve lies around 250°. The ratio of the conduction and the emitted currents is o. the order 10^4. F. H. Rathmann



C A

3

Distribution of potentials on glass. M. S. Kosman and L. K. Chernyaev. *J. Expl. Theoret. Phys.* (U. S. S. R.) 11, 303-11(1941).—When a heated glass plate is bombarded with electrons, the current passing through may produce a field so strong that the primary impinging electrons are noticeably retarded up to 80% and the coeff. of secondary emission is strongly reduced to nearly 1. Exptl. data are given for temps. from 00 to 250° and for potentials of up to 2000 v. F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

KOSMAN, M. S.

PA 34T79

USSR/Physics Apr 1947
Glass - Electrical Properties
Conductivity - Measurements

"The Electrolysis of Glass, High Voltage Polarization and Electrolytic Conductivity," M. S. Kosman, N. N. Sozina, 11 pp

"Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki" Vol XVII, No 4

The process of "molding" glass by passing direct current through it is investigated. The polarization capacities, produced in the molding process, are determined by a ballistic galvanometer. The nonlinear relation of the effective depth of the polarization

ID 34T79

USSR/Physics (Contd) Apr 1947

layer to the quantity of electricity that passed is determined. The effective dielectric constant of the layer depends on the conditions of molding, primarily the temperature. It follows from the results of the investigation that when conventional metal electrodes are used at least 50% of the conductivity of glass is of electronic origin.

ID 34T79

KOSMAN, M. S.

PA 9T9

USSR/Potential Theory
Potential electric

May 1947

"An Investigation of the Distribution of the Potential in Rock Salt at Temperatures of 300 - 600° C," M. S. Kosman, S. L. Rappoport, 6 pp

"Zhur Eksp Teor Fiziki" Vol XVII, No 5-p. 460-65

Investigations by sounding of the distribution of the potential in rock salt at temperatures of 300 - 600° C, showing that in different specimens of NaCl there are abrupt variations of potential, comprising from 15 to 60% of the potential applied.

9T9

KOSMAN, M. S. FA 9T10

USSR/Dielectrics - Constants May 1947
Dielectrics - Thermal instability

"Dielectric Constants of Solid Dielectrics at High Temperatures," M. S. Kosman, N. N. Sozina, 4 pp

"Zhur Eksp Teor Fiziki" Vol XVII, No 5 · pp. 472-5
Leningrad State Pedagogic Inst. im. Gertsen.

Determination of effective dielectric constants for a number of substances at high temperature by the ballistic method, showing ultra-high values (103 - 105) for many substances, due, not to ferromagnetic properties, but to a non-uniform potential distribution.

9T10

KOSMAN, M. S.

PA 11T59

USSR/Hysteresis, Magnetic
Dielectrics, Solid

Jun 1947

"Dielectric Hysteresis," M. S. Kosman, 2 pp

"Zhur Eksp i Teor Fiz" Vol XVII, No 6 pp. 507-8

Studies by Tower and Sawyer on Rochelle salt and by Worl on barium titanate discussed and defects mentioned. Photographs of H-curves.

11T59

KOSMAN, M. S.

PA 150T65

USSR/Physics - Dielectrics Oct 49
Piezoelectricity

"Nature of Piezoelectricity in Rochelle Salt," M. S. Kosman, Leningrad Pedagogical Inst, 9 pp

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

C-899-907

Shows that most effective values of the dielectric constant for Rochelle salt are determined not only by their volumetric, but by their surface properties. Shows that influence of the surface state cannot be ascribed to interlayers arising between electrodes and crystal. Submitted 21 Feb 49.

[redacted]

150T65

KOSMAN, M. S.

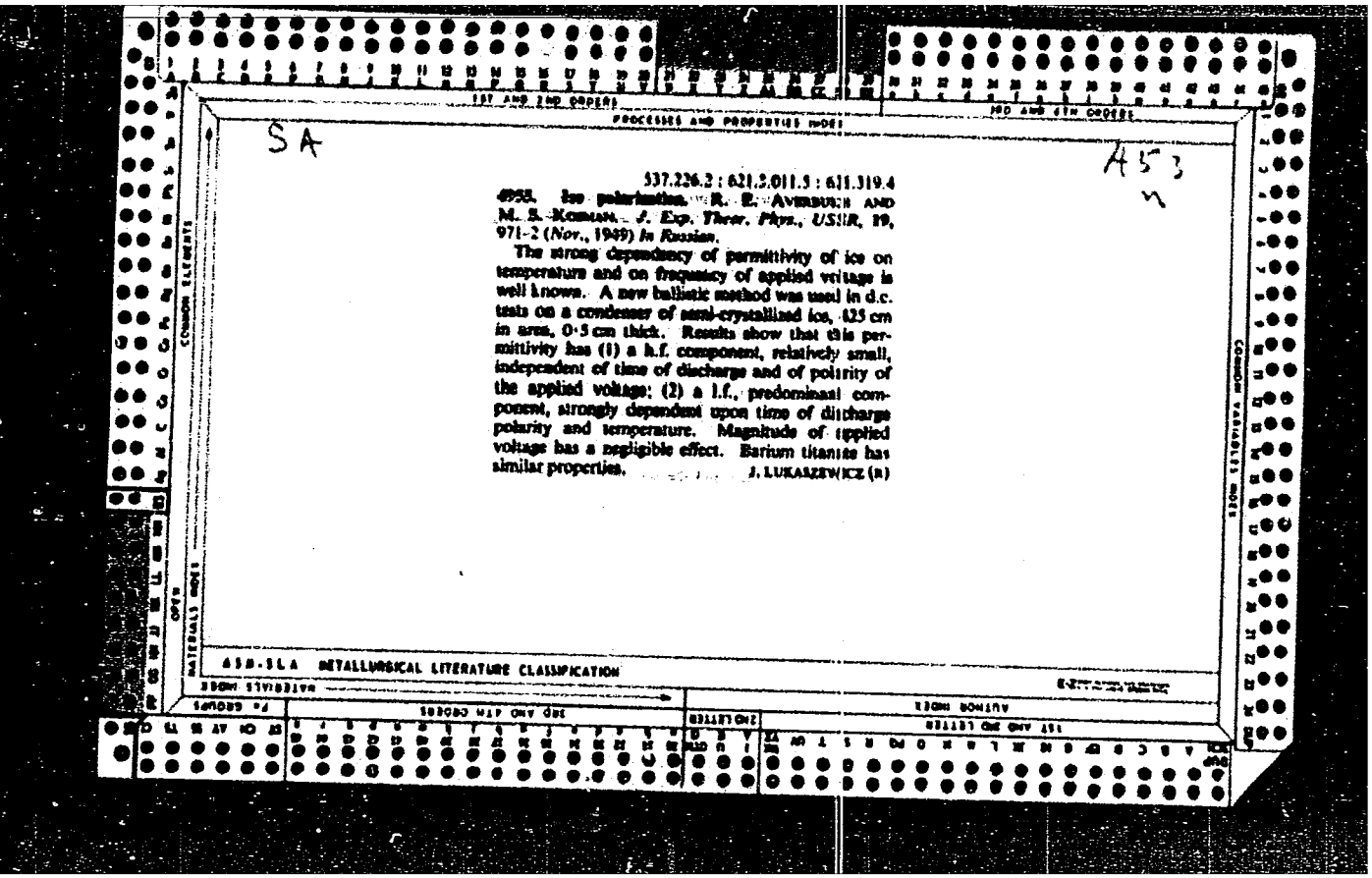
Dielectric properties of barium titanate. R. E. Averbukh and M. S. Kosman. *Zhur. Eksptl. Teoret. Fiz.* 16, 965-70(1946).—(1) Dielec. consts. ϵ are detd. in d.c. by the deflection Q of a ballistic galvanometer, in a setup involving a two-electron tube circuit and commutator which permits variation of the time of the discharge from $\tau = 10^{-7}$ to 10 sec. (the period of the galvanometer was identified with $\tau = \infty$). This makes it possible to conduct the discharge by steps, i.e. to measure the quantities of electricity Q discharged for each given part of the voltage, and thus to det. the differential ϵ. With Ba titanate disks of 15 mm. diam., 1–1.3 mm. thick, ϵ at room temp. 800–1000, Ag electrodes, plots of Q/S (where S = surface area) against the back voltage U (= potential down to which the condenser is discharged), consist of 2 linear portions of different slopes; that of the less sloping portion is independent of τ, whereas the slope of the steeper branch varies with τ. With decreasing τ, that part moves to lower U, decreases in height, and, at a certain min. τ depending on temp. and voltage, disappears altogether. These results indicate that the polarization, and, consequently, ϵ, consist of 2 parts; the one independent of τ is termed the "high-frequency" ϵ_h, the other, the "low-frequency" ϵ_l. The effective or total ϵ is detd. by the ratio of the Q discharged at $U = 0$ to the total charge voltage E. (2) At a given E, the low-frequency ϵ_l begins to manifest itself at a certain min. temp., thus, with one of the samples, at 60° and at 15°, at 0.5 and 1.8 kv./cm., resp. The temp. dependence of ϵ_h is the same as that observed by Vul and Gol'dman (*C.A.* 42, 6001*f*) in a.c. The rapid increase of ϵ_h with the temp., reaching 10,400 at 110° at 1.8 kv./cm., is due to the increase of ϵ_l; on further increase of the temp., to 270°, ϵ_h oscillates within 10% of its value at 150°. (3) The temp. dependence curves of ϵ_h at $E = 5.5$ and 0.5 kv./cm. have different shapes; consequently a plot of the ratio of the ϵ_h at these 2 values of E, as a function of the temp., is complex, with 2 max. Below 100°, ϵ_l and ϵ_h increase with E, but they decrease with increasing E above 100°; thus, at 200°, ϵ_h at 1.8 kv./cm. is 40% of its value at 0.5 kv./cm. (4) A frequency dependence of ϵ, as detd. in a.c., manifests itself under the very conditions of the appearance of ϵ_l. At const. E, with increasing temp., ϵ_l appears at increasingly shorter τ and more markedly; thus, at $E = 1.8$ and 15°, ϵ_l appears at $\tau = 0.1$ sec., whereas at the same E and at 270° it appears at 10^{-4} sec. At const. temp., an increase of E lowers the threshold τ of the appearance of ϵ_l, and increases its size, more markedly than does an increase of the temp. at const. E; thus, at 15°, at $E = 1.8$, ϵ_l appears only on prolonged discharge, whereas at $E = 7.3$ it appears at $\tau = 10^{-4}$ sec. (5) The apparent conflict between these results and those of V. and G. (*loc. cit.*) is explained by their expti. conditions under which ϵ_l was negligible. This accounts in particular for the failure to detect a dispersion of ϵ.

N. Thon

CA

2

Contact potential differences between liquid mercury



SA

A53

537.226.2 : 621.3.011.5 : 611.319.4

4955. Ice polarization. R. E. AVERBUCH AND M. S. KOMISAR. *J. Exp. Theor. Phys., USSR*, 19, 971-2 (*Nov.*, 1949) *In Russian.*

The strong dependency of permittivity of ice on temperature and on frequency of applied voltage is well known. A new ballistic method was used in d.c. tests on a condenser of semi-crystallized ice, 425 cm in area, 0·5 cm thick. Results show that this permittivity has (1) a h.f. component, relatively small, independent of time of discharge and of polarity of the applied voltage; (2) a l.f., predominant component, strongly dependent upon time of discharge polarity and temperature. Magnitude of applied voltage has a negligible effect. Barium titanate has similar properties. J. LUKASZEWICZ (n)

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

KOSMAN, M. S.

USSR/Physics - Electrical Conductivity Polarization — Jan 50

"Influence of a Transverse Electrical Field Upon Electrical Conductivity and the Mechanism of Polarization in Rochelle Salt," M. S. Kosman, A. N. Sozina, Leningrad State Pedagogical Inst, 9 pp

155T61

"Zhur Eksper i Teoret Fiz" Vol XX, No 1. p. 39-47

Studies variation in resistance of electrodes, which are the plates of a condenser, when a field is imposed upon this condenser. Shows when graphite electrodes are applied, variations in resistance are fully measurable. Results indicate magnitude of

[redacted] 155T61

USSR/Physics - Electrical Conductivity (Contd) — Jan 50

effect is directly related to quantity of electricity stored on the plates, which agrees with theory. Studies using layers of Rochelle salt show variations in resistance of cathode and anode in many cases differ sharply. This indicates that at least part of the charge bound on the plates is provided not by classical mechanism of polarization, but by migration of charges in the Rochelle salt crystal. Submitted 30 Jul 49.

[redacted] 155T61

CA

2

New temperature-dependence relations in Seignette salt. M. S. Kosman and N. N. Sozina (Leningrad Pedagog. Inst.). *Zhur. Eksptl. Teoret. Fiz.* 20, 1116-22(1950).—Below the lower Curie point (24°), the current flowing through a crystal of Seignette salt under a const. applied voltage decreases continuously with time, without reaching a steady value even after 24 hrs. That this continuous growth of the elec. resistance is due to the passage of current, and not to drying, is demonstrated by the observation that on reversal of the field the current first increases sharply, and then again begins to fall. In a crystal 0.06 cm. thick, under a const. voltage of 100 v., the resistance increased by a factor of ~1000 within 24 hrs., as compared with the data of Valasek (*C.A.* 16, 2632; 17, 688) for the range 15-25°. The quantity of electricity that must pass through the crystal in order to raise its resistance is of the same order as the total charge stored; consequently, the phenomenon consists in the formation of a blocking layer. This layer can be formed only at temps. below the Curie point, but it persists for a long time even at higher temps. (30-40°). In crystals with a blocking layer formed, the resistance is so high that losses of charge, even in intense fields, do not exceed a few percent per hr. "Fatigue" and "unipolarity" are, identically, detd. by that blocking layer; the pyroelec. effect consists merely in a depolarization of the residual charges produced by the application of the field. These results invalidate the assumption of a spontaneous polarization in Seignette salt, unless mutual compensation of opposed domains is assumed. Such assumption, however, is contradicted by the failure to reveal domains with the aid of powders of Pb_3O_4 or S. The high potential differences arising in the crystal on depolarization can be put to use for purposes of measuring very small temp. differences; thus, change of the temp. by 1° can give rise to a potential difference of 100 v. In contrast to thermoelec. currents, depolarization currents can easily be amplified. N. Thon

1/37

KOSMAN, M. S.

180T42

USSR/Electricity - Piezoelectricity Apr 51

"Piezoelectric Properties of Seignette Salt at Direct Piezo-Effect," M. S. Kosman, K. N. Karmen, Leningrad State U

"Zhur Eksper i Teoret Fiz" Vol XXI, No 4, pp 524-527

According to data from lit, direct piezo-effect modulus is 10 times smaller than the reverse. Authors show that both moduli do not differ. They point out some other erroneous assumptions on piezoelectric properties of Seignette salts.

LC

180T42

USSR/Electricity - Conductivity Apr 51

"Investigation of Polarization of Barium Titanate by Method of Transverse Electric Field," M. S. Kosman, T. D. Goldshteyn, Leningrad State Pedagogical Inst

"Zhur Eksper i Teoret Fiz" Vol XXI, No 4, pp 528-531

Examn of effect of transverse elec fld on cond of highly conducting layers shows this effect does not consist in direct action of variation in concn of current carriers, but depends on secondary effect: mech deformation of layer, produced by space charge generated in the layer.

LC

180T43

KOSMAN, M. S.

USSR/Physics - Semiconductors, Thin-Laminar

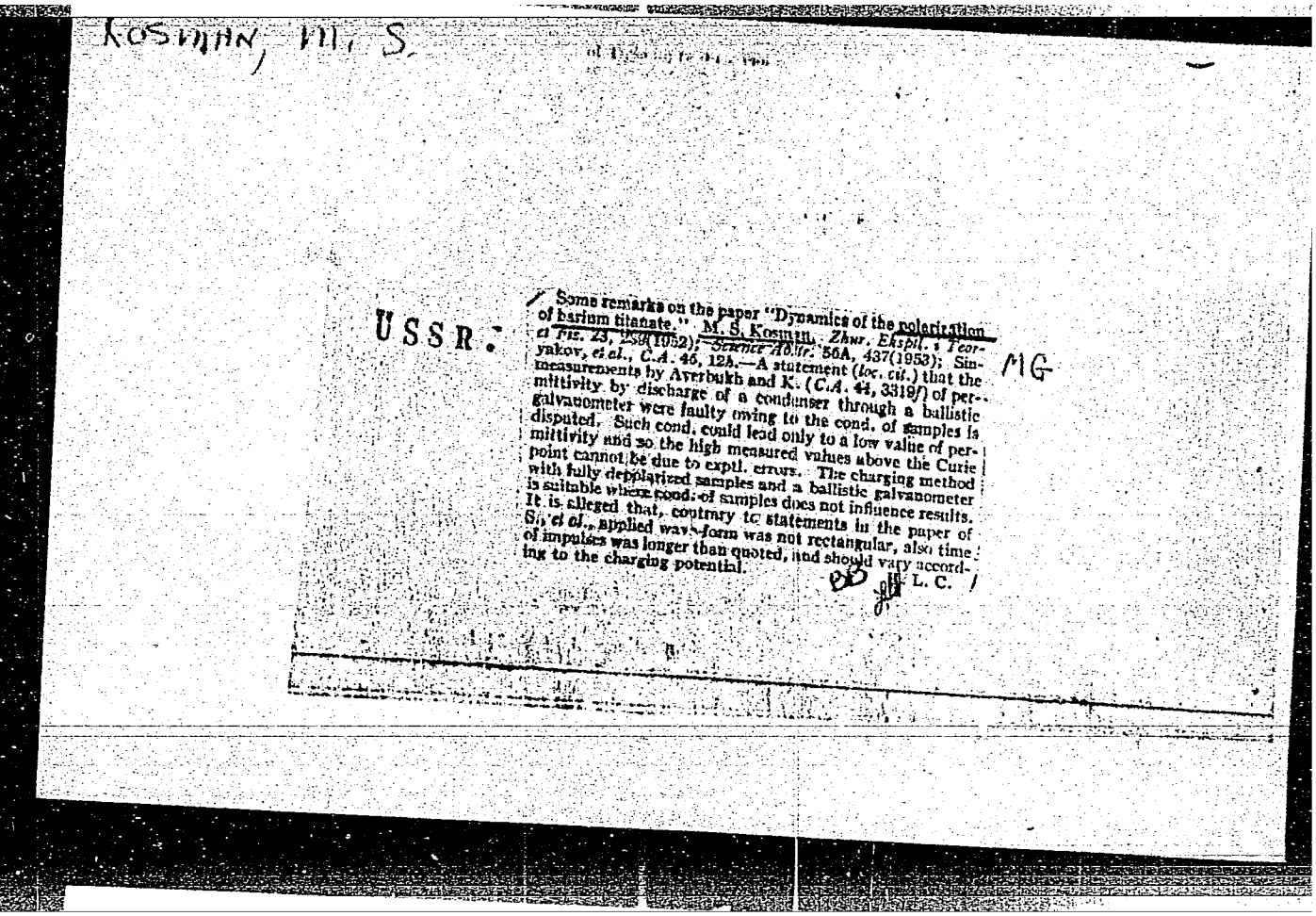
Mar/Apr 52

"Effect of Volume Charges on Conductivity of Thin Layers of Semiconductors and Metals," M.S. Kosman

"Iz Ak Nauk, Ser Fiz" Vol XVI, No 2, p 202

Abbreviated text of report published in "Zhur Eksper i Teoret Fiz" 21, 528, 1951. Tested layers were laid on both sides of insulating plate. The sign of effect on semiconductor T_e agrees with theory by V. Ye Lashkarev and with expts by V.I. Lyashenko and I.I.Stepko. Graphite, Sb, Bi and Pb showed an opposite sign of effect, besides the resistance of one of electrodes passed through a max with increasing field. The behavior of the resistance depends on the presence of initial charge.

220T93



KOSMAN, M. S.

USSR

Some remarks on the paper "Dynamics of the polarization of barium titanate." M. S. Kosman, *Zhur. Eksptl. i Teor. Fiz.* 23, 258(1952); *Science Abstr.* 56A, 437(1953); Sinyakov, *et al.*, *C.A.* 46, 128.—A statement (*loc. cit.*) that the measurements by Averbukh and K. (*C.A.* 44, 3319f) of permittivity by discharge of a condenser through a ballistic galvanometer were faulty owing to the cond. of samples is disputed. Such cond. could lead only to a low value of permittivity and so the high measured values above the Curie point cannot be due to exptl. errors. The charging method with fully depolarized samples and a ballistic galvanometer is suitable where cond. of samples does not influence results. It is alleged that, contrary to statements in the paper of S., *et al.*, applied wave-form was not rectangular, also time of impulses was longer than quoted, and should vary according to the charging potential.

L. C.

MG

KOSMAN, M. S

USSR

11835. Investigation of lasting polarization processes in glass at temperatures up to 70°C. M. S. KOSMAN AND R. T. PARANYUK. Zh. eksper. teor. Fiz., 25, No. 6, 721-9 (1953) In Russian.

Presents graphed results of investigations on the electric properties of glass at room temperature, conducted by using the following methods: (1) transverse electric field [cf. Abstr. 8736 (1950) and 6945 (1951)] applied to Te films (on mica and glass); (2) self-discharge of the individual elements of an equivalent system; (3) direct determination of the polarization capacities; and (4) probe measurements. It has been found that (a) charges induced on condenser plates may decrease although polarization charges in the dielectric remain unchanged, (b) the transverse-field method enables the lasting polarization processes to be determined in glass at relatively low temperatures (17-47°C), and (c) the conductivity of both the glass and a-Ag_2S may be of electronic nature because the large low-voltage polarization capacities revealed cannot be attributed to ionic processes. F. LACHMAN

KOSMAN, M.S.,

USSR/Electricity - Semiconductors G-3

Abs Jour : Referat Zhur - Fizika, No 5, 1957, 12142

Author : Kosman, M.S., Shevardin, A.N.
Inst :
Title : The Upper Curie Point for Rochelle Salt.

Orig Pub : Zh. tekhn. fiziki, 1956, 26, No 7, 1443-1450

Abstract : The hysteresis loops of Rochelle salt crystals (I) were investigated at temperatures from 18 to 40° in electric fields up to 45 kv/cm at a frequency of 50 cycles. It is shown that the hysteresis phenomenon in strong fields continues to exist also at $T > 24°$. In the authors' opinion, the spontaneous and residual polarization at the Curie point do not cease, and the magnitude of the polarization is connected with the intensity of the electric field. Since the spontaneous polarization turned out to be the same fro various electric field intensities for all the investigated temperatures, it is concluded that the

Card 1/2

KOSMAN, M.

USSR/Physical Chem. Crystals B-5

Abs Jour : Ref Zhur - Khimiya, No 7, 1957, 22170

Author : M. S. Kosman, A. N. Shevardin
Inst : Not given
Title : The Curie Point for Seignette's Salt.

Orig Pub : Uch. Zap. Leningr. Gos. ped. in-ta, 1956, 125, 55-64.

Abstract : Hysteresis loops of Seignette's salt were studied at 18-40° on frequencies of 50 hertz and in fields up to 45,000 v/cm. It is shown that the hysteresis phenomenon lasts in strong fields even at temperatures above the upper Curie point (24°). In strong fields, the values of spontaneous and residual polarizations are equal at all temperatures, i.e. the mechanism of polarization at temperatures < 24 and $> 24°$ is the same. The higher the temperature, the stronger the fields must be to produce manifestation of ferro electric properties, i.e. the authors suppose that the time of relaxation of the processes of polarization grows with the increase in temperature. In conclusion it appears that there is no upper Curie point for Seignette's salt and it is supposed that a low Curie point does not exist either. It is demonstrated that there is no analogy

Card 1/2

SUBJECT: USSR/Luminescence 48-3-17/26

AUTHORS: Kosman M.S. and Shamro Z.A.

TITLE: Pyroeffect and Piezoeffect in Polycrystallic Barium Titanate (Piroeffekt i p'yezoeffekt v polikristallicheskom titanate bariya)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya fizicheskaya, 1957, Vol 21, #3, pp 399-401 (USSR)

ABSTRACT: The pyroeffect in polycrystallic samples of barium titanate and its connection with the piezoeffect was investigated.

One of the experiments ran as follows: a barium titanate sample was subjected to polarization during 5 minutes with a field of 1,600 v/mm intensity at 20°C, and then its electrodes were connected by a circuit with a galvanometer. Immediately after polarization, a current could be detected in the circuit, even at the constant temperature of the sample, but very soon, in 30 min., it became immeasurably small. The statical piezomodulus of the sample was measured and proved to be 1.2×10^{-6} CGSU.

Card 1/3

48-3-17/26

TITLE: Pyroeffect and Piezoeffect in Polycrystallic Barium Titanate (Piroeffekt i p'yezoeffekt v polikristallicheskom titanate bariya)

Then the sample was heated and pyrocurrent was generated. The curve of current intensity, shown by Curve 1 in Fig 1, had 2 maxima: one corresponding to the transition of the titanate lattice from the orthorhombic modification into tetragonal one, and the other, at Curie point, i.e. 120°C, corresponding to the transition into cubic modification.

The sample was cooled down and then subjected to the second polarization under the same conditions but during 30 min. The piezomodulus was measured to be 1.56×10^{-6} CGSU. By heating the sample, the pyrocurrent was generated again, and its run was shown by Curve 2 in Fig 1.

The quantity of electricity generated was proportional to the value of initial piezomodulus.

If a sample subjected to polarization is heated to a temperature lower than the Curie point, and then is cooled down, the pyrocurrent arises both during heating and cooling; the quantity of electricity flowing in the circuit during heating

Card 2/3

48-3-17/26

TITLE: Pyroeffect and Piezoeffect in Polycrystallic Barium Titanate (Piroeffekt i p'yezoeffekt v polikristallicheskom titanate

KOSMAN, M.S.

20-3-16/59

AUTHORS: Kosman, M.S., Bursian, E.V.

TITLE: The Coloring of Single $BaTiO_3$ Crystals (Okrashivaniye monokristallov $BaTiO_3$)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 115, Nr 3, pp. 483-485 (USSR)

ABSTRACT: In the growing of barium metatitanate crystals light yellow to dark brown (almost black) crystals are obtained. The nature of the coloring of these crystals is similar to the nature of the coloring of the alkali-halide crystals and the halide salts of silver. The already earlier observed blackening is connected with the partial reduction and elimination of the metal. The coloring discovered by the authors proceeds otherwise and is a merely physical process which is connected with the displacement of the current carriers. The samples were produced according to Mattias's method, the properties of these samples are shortly enumerated here. The absorption was measured by the photospectrometer CF-4. A diagram illustrates the absorption spectrum of a dark brown single crystal. This crystal was annealed after the growing in hydrogen (or simply in the reducing part of the flame of an alcohol burner), whereby it became almost transparent with a slightly yellowish coloring. For this case the absorption spectrum is also illustrated by a curve. After the heating in air or oxygen the spectrum anew takes a brown-red color. This color can, an analogy to the alkali-halide crystals, be designated as additive. The coloring, known from the alkali-halide salts, under the influence of a field is also observed in $BaTiO_3$. The various changes of coloring are described. These crystals can be colored by means of an alternating field. The velocity of the spreading of the brown color is strongly dependent on temperature. (At room temperature 1 mm per day at an electric field strength of E = 10 kV/cm). The coloring under the influence of the field and the coloring by oxygen might be due to the same coloring centers (Farnsworth centers?). The color of the single crystals changes their electric properties. There are 2 figures and 7 references, 5 of which are Slavic.

Card 1/2

APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000825120011-1

ASSOCIATION: Leningrad State Pedagogical Institute imeni A.I.Gertsen (Leningradskiy gosudarstvennyy pedagogicheskiy institut imeni A.I. Gertsena)

PRESENTED: by A.F. Ioffe, Academician, February 18, 1957
SUBMITTED: February 7, 1957
AVAILABLE: Library of Congress

Card 2/2

KOSMAN, M.S.

AUTHORS: Kosman, M. S., Pisarenko, V. F. 20-4-16/60

TITLE: Phenomena Within the Electrode Region in Alkali Halide Crystals at High Temperatures (Prielektrodnyye yavleniya v shchelochno-galoidnykh kristallakh pri vysokikh temperaturakh).

PERIODICAL: Doklady Akad.Nauk SSSR, 1957, Vol 115, Nr 4, pp. 693-695 (USSR)

ABSTRACT: The investigation of the optical properties of the region near the electrode of crystals during electrolysis is of great interest. The authors investigated samples of NaCl-, KCl-, KBr- and KJ-crystals. The largest surfaces of these 12x15x5 mm samples were polished and then electrodes of a 10 μ thick aluminum foil were tightly pressed to them. The symples produced in this manner were heated to constant temperatures between 450 and 600°C and exposed to a constant electric field of 50 to 400 V/cm for some minutes to one hour. In this connection the following was measured: the intensity of the current passing through and of the inverse current, the potential difference at the unshortened sample. The variations of amperage and field strength in time are illustrated by a diagram. These processes may be subdivided into two phases: In the first phase the amperage first decreases and then remains constant. The intensity of the inverse current and the potential difference at the ends of the unshortened sample attain

Card 1/2

Phenomena Within the Electrode Region in Alkali Halide Crystals at 20-4-16/60
High Temperatures

their maximum during that time and then stay constant. During the second phase the amperage usually increases and the sample is on that occasion colored by F-centers. The duration of the first phase depends on the duration of the cathode- crystal contact and on the applied voltage. When the contact is increased the phase decreases to a certain minimum value and it also decreases with increasing voltage. The absorption spectrum of the sample was investigated before and after the electrolysis at room temperature. In the absorption layer of a thin ($<0{,}05$ mm) layer near the cathode 2 to 3 weak absorption bands occur in all materials investigated after the first phase of the electrolysis. The position of the corresponding maxima corresponds to the maxima of the V_{2-4}, V_5 V_7-bands. The corresponding wave lengths are compiled in a table. Finally the mechanism of the passage of the current through a dielectric suggested by these facts is shown.There are 3 figures, 1 table and 13 Slavic references.

ASSOCIATION: Leningrad State Pedagogical Institute imeni A.I.Gertsen(Leningradskiy gos. pedagogicheskiy institut imeni A.I.Gertsena)

PRESENTED: December 17, 1956 by A.N.Terenin, Academician
SUBMITTED: November 19, 1956
AVAILABLE: Library of Congress

Card 2/2

KOSMAN, M. S.

Kosman, M.S. and N.A. Petrova [Leningrad, Pedagogicheskiy institut imeni A.I. Gertsena (Pedagogical Institute imeni A.I. Gertsen)] The Dielectric Constant of Rock Salt at High Temperatures

Kosman, M.S. and I.A. Gesse. [Leningrad, Pedagogicheskiy institut imeni A.I. Gertsena (Pedagogical Institute imeni A. I. Gertsen)] The Dielectric Constant of Zinc Oxide With an admixture of Bismuth Oxide

Kosman, M. S. and Pisarenko, V. F. "Phenomena Occurring in Alkaline-Haloid Salts Near the Electrodes at High Temperatures."

(The Physics of Dielectrics; Transactions of the All-Union Conference on the Physics of Dielectrics) Moscow, Izd-vo AN SSSR, 1958. 245 p. 3,000 copies printed.

This volume publishes reports presented at the All-Union Conference on the Physics of Dielectrics, held in Dnepropetrovsk in August 1956, sponsored by the "Physics of Dielectrics" Laboratory of the Fizicheskiy institut imeni Lebedeva An SSSR (Physics Institute imeni Lebedev of the AS USSR), and the Electrophysics Department of the Dnepropetrovskiy gosudarstvennyy universitet (Dnepropetrovsk State University).

KOSMAN, M. S. (Dr. Physical & Mathematical Sci.), KOLESOVA, O. I. (Eng.)

"Photoresistors Made of PbO"

(Use of Semiconductors in Instrument Making; Transactions of a Conference) Moscow, Mashiz, 1958. 258 p.

54600

68189
SOV/58-59-5-10862

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 5, p 137 (USSR)

AUTHORS: Kosman, M.S., Pisarenko, V.F.

TITLE: Phenomena Near the Electrodes in Alkali Halide Salts at High Temperatures

PERIODICAL: V sb.: Fiz. dielektrikov. Moscow, AS USSR, 1958, pp 89 - 93. Diskus., p 99

ABSTRACT: The authors studied the absorption spectra of single crystals of KI, KBr, KCl, and NaCl which had been subjected to electrolysis at 450° - 600°C in fields ranging from 40 to 100 V/cm. They observed two phases of change in the current passing through the sample: the first phase was an insignificant initial decrease and subsequent stabilization of the current; the second phase was an increase of current, connected with a coloration of the crystal. V_2-, V_4-, and V_3-bands of weak intensity were detected in samples that had undergone the first phase of change in current in the region near the cathode. After the layer near the cathode has been abrased to a thickness of ~ 0.05 mm the spectrum of the crystal becomes identical with the initial spectrum. The spectrum of samples that have undergone the second phase of change

Card 1/2

68189
SOV/58-59-5-10862

Phenomena Near the Electrodes in Alkali Halide Salts at High Temperatures

in current consists of M-, F-, U-, and V-bands. When colored samples are switched to a circuit with a galvanometer at a high temperature, they deliver 10^{-4} - 10^{-3} coulombs/cm^3 into the external circuit. In this connection the color departs from what had been the anode, and the samples become decolorized. The spectrum of decolorized crystals contains V- and U-bands. The emergence of V-centers can be explained by processes that break out in the thin layer near the cathode and on the boundary between the colored and uncolored parts of the crystal. (Pedagogich.in-t im. Gertsena, Leningrad)

V. Lozovskiy

Card 2/2

AUTHORS: Kosman, M. S., Petrova, N. A. 48-22-3-18/30

TITLE: The Dielectric Constant of Rock Salt at High Temperatures (Dielektricheskaya pronitsayemost' kamennoy soli pri vysokikh temperaturakh)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1958, Vol. 22, Nr 3, pp. 311-314 (USSR)

ABSTRACT: The authors show in the present report that the high-voltage polarization of rock salt does not disappear at high temperatures as was presumed until recently. It degenerates into a low-voltage polarization (fig. 3). The increase of the capacity of absorption according to the increase in temperature is more rapid in this case than the decrease in voltage, so that the absorption charges increase according to the increase in temperature. Also the course of the absorption processes increase in velocity according to the rise in temperature. They can exercise an effect also on the high-frequency--characteristics at sufficiently high temperatures. It hence results that with measurements at high temperatures without corresponding control tests, absorption processes ought not to be completely abandoned, even when the measurements are

Card 1/4

carried out at high frequencies. The nature of the absorption processes cannot be considered fully explained, either in rock salt, or in other dielectrics. The fact that these processes are observed without exception in all substances which can be heated up to a corresponding temperature without melting or decomposing, makes the assumption of their electronic- and non-ionic-nature appear to be more probable. As it was shown by the last tests, the potential distribution in rock salt is not linear, contrary to the prevailing opinion: Potential differences causing the capacity of absorption, are concentrated in the vicinity of the two electrodes. The existence of these differences can be determined at high temperatures only some time after the self--discharge of the sample, since they are to small as to influence sensibly the distribution of the potential below the field. The existence of these differences may be of essential practical importance, since the strong electrode--near fields are able to influence the ion-processes and even to give a wrong idea on the conductivity of the substance. Effective E values which were calculated according to the charge voltage are shown in the last figure. The real difference of the potentials on the sample during the

discharge is essentially smaller. For this reason, the ε- -value which was calculated according to this voltage, may be discussed. The ε calculated in this way are excessively high at correspondingly high temperatures, even at a short discharge: e.g. the ε for one of the samples at 350°C and a discharge period of $2,5.10^{-2}$ sec is equal 3.10^5. Contrary to a wide-spread opinion, these excessive ε-values have a certain physical sense: the relaxation-time with charges at self-discharge of any substance is $\tau = \frac{\varepsilon\rho}{4\pi}$. Consequently, when the voltage on the sample decreases e-times due to a specific resistance of the sample of $10^8\ \Omega\ cm^{-1}$ in 100 sec, this signifies that the ε of the sample is not smaller than 10^7. The numbers given as example correspond to the experimental values and are observed also with substances with a macroscopic linear distribution of the potential (without remarkable electrode-near differences) with which the correctness of the determination of their specific resistance leaves not doubt open, e.g. with barium-titanate and zirconium dioxide. There are 5 figures and 2 references, 1 of which is Soviet.

Leningrad State Pedagogical Inst. im. A. I. Gertsen

AUTHORS: Kosman, M. S., Gesse, I. A. 48-22-3-19/30

TITLE: The Dielectric Constant of Zinc-Oxide With an Addition of Bismuth-Oxide (Dielektricheskaya pronitsayemost' okisi tsinka s primes'yu okisi vismuta)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1958, Vol. 22, Nr 3, pp. 315-318 (USSR)

ABSTRACT: The authors investigated in the present article some electric properties of the mixture of electronic semi-conductor-zinc--oxide with porous semi-conductors-cupric-oxide, copper--peroxide, bismuth oxide. One of the most interesting properties of such mixtures is the great ε. A great number of materials with great ε are known at present. Most of them contain, however, rutile which has $\varepsilon \approx 100$ in pure state. The investigated mixtures, on the other hand, with ZnO as basis, have the ε of the initial substances of the order of 10. The mixture ZnO with Bi_2O_3 was investigated most carefully. The dependence of E on the content of the admixture of Bi_2O_3, on the temperature and on the calcination-period was investigated. Each of the given ε-values represents the average for a whole series of samples which were produced under specific

Card 1/4

conditions. The deviation from the average does not exceed 10% in most of the cases. The ε-values do not change automatically according to time. ε-values which were obtained under different conditions, are shown in the table from which may be seen that depends on the concentration of Bi_2O_3. The ε-values given in the table also show the value of the dependence of ε on the calcination temperature. The prolongation of the calcination period causes an increase in ε. It was found that with numerous samples ε does not depend on the frequency within the range $10^3 \div 10^6$ Hertz. With some samples ε decreases according to an increase in frequency. The addition of Bi_2O_3 to ZnO changes also other electric properties of ZnO. A lower conductivity is observed - in comparison with pure ZnO - besides the increase in ε. This resistance is too low, however, for classifying these mixtures as dielectrics, and that they could be practically used. At room-temperature the resistance remains unchanged for months. Subjectes to thermal treatment it changes, however, very readily. The sample can be retransferred to the state of lower conductivity by repeated heating up to

the same temperature and by slow cooling down. A reduction of the conductivity below $10^{-10}\Omega^{-1}cm^{-1}$ was not achieved, however, The conductivity is presumably correlated with the influence of oxygen. The change of conductivity with thermal treatment of the sample is accompanied parallel to its capacity: higher conductivity involves an increase in capacity and vice-versa. The piezoelectric effect and the dependence of ε on the tension are lacking. Hence it may be concluded that the mixture ZnO with Bi_2O_3 is no piezoelectric. The X-ray analysis shows that the mixture maintains the lattice ZnO up to inclusively 15% Bi_2O_3. It is not impossible that the presence of a great ε is caused by relaxation processes of electronic character. It is possible that these processes are analogous to the phenomena observed by Ya. M. Ksendzov in pure TiO_2 with few admixtures. This assumption should be complementarily examined. There are 4 figures and 1 table.

ASSOCIATION: Gos. pedagogicheskiy institut im. A. I. Gertsena (State Pedagogical Institute imeni A. I. Gertsen)

24(2)
AUTHORS: Kosman, M. S., Bursian, E. V. SOV/48-22-12-12/33

TITLE: On the Nature of the Farnsworth Centers in Barium Titanate Crystals (O prirode tsentrov okraski v kristallakh titanata bariya)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1958, Vol 22, Nr 12, pp 1459-1461 (USSR)

ABSTRACT: It had been already earlier reported (Ref 1) that a similar phenomenon as in the dyeing of alkali-halide crystals could be observed in $BaTiO_3$ single crystals. Two kinds of color changes were investigated by the authors on samples, prepared in accordance with an earlier description (Ref 2): a color change of crystals from light yellow to red-brown (v-center) in oxidizing atmosphere (oxygen) and from light yellow to bluish grey (f-center) in the reducing medium (hydrogen, vacuum). The color change can be explained by a sufficient number of defects in the crystal, into which holes from the anode penetrate systematically, thus always forming new v-centers. In order to maintain the neutrality of any crystal part, it will be necessary to assume the original presence of the same amount of positive defects as well as an electrolytic conductivity.

Card 1/2

The latter allows the displacement of defects. The displacement of the f-cloud is conditioned by the movement of electrons. Thus, defects (void spots) are required for dyeing $BaTiO_3$ crystals. In such a case, the concentration of such defects can be determined on the basis of the maximum color density, by measuring the absorption coefficient. This is one method by which the quality of single crystals is determined. Thus, for example, it was found that the crystals prepared with Fe_2O_3 addition according to the method by Remeyki hardly undergo a color change. This proves their perfection on micro-structure. There are 3 figures and 2 Soviet references.

ASSOCIATION: Leningradskiy gos. pedagogicheskiy institut imeni A. I. Gertsena (Leningrad Pedagogical State Institute imeni A. I. Gertsen)

67195

SOV/58-59-7-15739

24.7800

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 7, p 154 (USSR)

AUTHORS: Kosman, M.S., Novosel'tsev, V.S.

TITLE: Some Regularities in Breakdown in Semiconductors

PERIODICAL: Uch. zap. Leningr. gos. ped. in-ta im. A.I. Gertsena, 1958, Vol 148, pp 51 - 54

ABSTRACT: The authors made an experimental study of electrical resistance (E_r) in Cu_2O. The magnitude of E_r increases with a drop in the temperature and electrical conductivity of the sample. Although the sample is not subject to electrolysis before breakdown voltages are attained, the formation of a Cu-"bridge" between the electrodes was observed in the region of both the electrical and the thermal form of breakdown. In the case of breakdown by square voltage pulses, a delay time of $\approx$ 0.1 sec was observed. This delay time decreases with an increase in the pulse amplitude.

Yu.S. Ryabinkin

Card 1/1

67194

SOV/58-59-7-15707

24.7800

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 7, pp 149 - 150 (USSR)

AUTHORS: Kosman, M.S., Shamro, Z.A.

TITLE: The Pyro- and Piezo-Electric Effect in Polycrystalline Barium Titanate

PERIODICAL: Uch. zap. Leningr. gos. ped. in-ta im. A.I. Gertsena, 1958, Vol 148, pp 55 - 57

ABSTRACT: The pyro- and piezo-electric properties of polycrystalline samples of $BaTiO_3$ with various degrees of polarization were studied in the 18° to 260°C temperature range. The samples were polarized at various temperatures ranging from room temperature to temperatures somewhat below the Curie point; the duration of polarization also varied from sample to sample. As the temperature varied within the above-mentioned limits the charge variation on the faces of the samples amounted to 10^{-6} q/cm^2, so that it proved possible to study the pyro-effect with the aid of a galvanometer. The high capacitance of the samples made it possible to measure the voltage on the faces in an open circuit, using an electrometer. It was found that the rate of temperature variation, the temperature, the duration of polarization of the given sample, and the interval of temperature variation all affected the course of the curve

Card 1/ 3

The Pyro- and Piezo-Electric Effect in Polycrystalline Barium Titanate

of the pyro-current versus the temperature. When a sample is heated, the current is opposite to what it is when the sample is cooled; however, the absolute values of the current are equal in the two cases. The curves of samples polarized at room temperature exhibit two maxima: a sharply expressed maximum at the Curie point (which is 158°C for the samples under investigation) and a less pronounced one at $\approx 50^{\circ}C$. If such a sample is cyclically heated and cooled without overstepping the Curie point, all the cycles beginning with the second one repeat themselves (a maximum at 50°C develops only in the first cycle). Overstepping the Curie point during heating leads to the depolarization of the sample, and when it is subsequently cooled, it loses all its pyro- and piezoelectric properties. If the samples are polarized at temperatures somewhat below the Curie point, the curves of the pyro-current versus the temperature do not exhibit a maximum at 50°C. More protracted polarization at these temperatures strongly alters the properties of the samples: heating such samples at temperatures exceeding the Curie point (up to 260°C), even for a long period of time, does not lead to complete depolarization. The residual piezo-modulus reveals a whole spectrum of values that have differing depolarization temperatures (depolarization time has practically no effect on the magnitude of these values). Different conditions of polarization result in samples with different piezo-modulus temperature dependences. We may conclude that in $BaTiO_3$ several ferro-

67194

SOV/58-59-7-15707

The Pyro- and Piezo-Electric Effect in Polycrystalline Barium Titanate

electric states exist, which are separated by energy barriers having different permeabilities. In addition to polarization connected with ferroelectric properties, the authors also observed non-ferroelectric "absorption" polarization with high relaxation times and an effective dielectric constant attaining values of 10^7 to 10^8.

Yu.S.K.

Card 3/3

SOV/58-59-9-20508

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 9, p 145 (USSR)

AUTHORS: Kosman, M.S., Nevdachina, V.B.

TITLE: The Dielectric Constant of Lead Oxide and its Temperature Dependence

PERIODICAL: Uch. zap. Leningr. gos. ped. in-ta im. A.I. Gertsena, 1958, Vol 148, pp 77 - 84

ABSTRACT: The capacitance of sintered polycrystalline samples of PbO was studied in the 20° to 400°C temperature range. Measurements were carried out by means of the usual bridge method and the ballistic-galvanometer method. This permitted the determination of the effective, as well as the differential, capacitance of the sample investigated. The bridge measurements were carried out at a frequency of 10^{3} c, and the ballistic measurements at a discharging time of $\approx 10^{-12}$ sec. The diagram of the capacitance measurements enabled the authors to determine the total amount of electricity in the polarized sample, as well as the emf of the polarization (the emf was obtained by compensating for the ballistic back-thrust). When PbO is heated up, its capacitance remains invariable up to approximately 200°C, after which it increases slowly at first, then more rapidly. At

Card 1/2

The Dielectric Constant of Lead Oxide and its Temperature Dependence

a temperature of 400°C the capacitance, calculated according to the charging voltage, is about 10 times greater than at room temperature. In the opinion of the authors, the great rise in capacitance with high temperatures is caused by absorption processes occurring in the sample. The authors established that the difference in potentials, which causes the ballistic thrusts, decreases with a rise in temperature: a sharp drop to a magnitude amounting to some percent of the initial value takes place in the 200° to 300°C interval, but the decrease slows down at higher temperatures. The capacitance calculated according to that low-voltage emf of the polarization which actually causes the ballistic back-thrust, may exceed the value of the effective capacitance by hundreds of times. It was found that the absorption capacitance amounts to a few thousand centimeters at 300°C but to tens of thousands of centimeters at 350°C. The dielectric constants corresponding to these capacitances have magnitudes of the same order. Polarization studies carried out by the self-discharge method, which permits one to single out the various polarization components by means of the variation in the self-discharge time, also showed that in PbO high-voltage polarization changes into low-voltage polarization at high temperatures. The authors conclude that the high capacitance of PbO at high temperatures is due to the low-voltage polarization, the emf of which amounts to, say, 1 to 2 V at 300° to 400°C.

L. Uvarov

SOV/58-59-9-20571

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 9, p 155 (USSR)

AUTHORS: Kosman, M.S., Gesse, I.A.

TITLE: The Electrical Properties of a Mixture of Zinc Oxide and Bismuth Oxide

PERIODICAL: Uch. zap. Leningr. gos. ped. in-ta im. A.I. Gertsena, 1958, Vol 148, pp 85 - 90

ABSTRACT: The dielectric constant (ε), the electrical conductivity (σ), and the temperature dependence of σ were measured in a mixture of ZnO and Bi_2O_3. The distinctive property of this mixture is the high value of ε (up to 2,000), as compared with $\varepsilon \approx 10$ in the case of the initial substances. The capacitance of the samples was measured at a frequency of $\sim 10^6$ c with the aid of the circuit suggested by M.S. Kosman (RZhFiz, 1959, Nr 2, 3624). The curve of ε versus the concentration of Bi_2O_3 exhibits a maximum which shifts towards the lesser concentrations when the roasting temperature of the samples increases. When the temperature and the roasting time increase, ε increases. It was found that the σ of ZnO decreases by 1 to 4 orders of magnitude when Bi_2O_3 is added, the minimum value of σ being recorded at a 3 to 5% content of Bi_2O_3. The authors

Card 1/2

The Electrical Properties of a Mixture of Zinc Oxide and Bismuth Oxide

observed a strong dependence of σ and its temperature characteristics on the pre-treatment of the sample (in particular, on the temperature and duration of the preceding heating, the cooling conditions, and so fourth). They advance the hypothesis that the effect of temperature treatment on σ is connected with a change in the content of oxygen in the sample. In the opinion of the authors, the observed parallel variation of ε and σ during heating indicates that the high value of ε for the investigated mixture is due to electronic processes.

L.A. Uvarov

67196

SOV/58-59-7-15740

24.7700

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 7, pp 154 - 155 (USSR)

AUTHORS: Kosman, M.S., Tazenkov, B.A.

TITLE: Study of the Electrical Conductivity of Cuprous Oxide

PERIODICAL: Uch. zap. Leningr. gos . ped. in-ta im. A.I. Gertsena, 1958, Vol 148, pp 191 - 202

ABSTRACT: The authors studied the electrical conductivity of polycrystalline Cu_2O in a weak electric field in the temperature range from -150° to 300°C. Especial attention was devoted to the prolonged processes that go by the name of "aging" and "creep". The samples of Cu_2O were prepared by oxidizing sheets of electrotechnical Cu over a period of several days by atmospheric oxygen in a muffle electric furnace at a temperature of 1,000°C. The electrical conductivity was measured by the compensation method, using probes and electrodes made of graphite and Ag. A photo effect with a very high relaxation time was observed, which is called the phosphoric photo effect. At room temperature the relaxation time of the phosphoric photo effect amounts to years, at -150°C it does not exceed a few seconds, and at temperatures above 200°C it does not occur

Card 1/2

Study of the Electrical Conductivity of Cuprous Oxide SOV/58-59-7-15740

at all. The photo effect takes place in the spectral region from 700 to 900 m μ and exhibits a maximum at a temperature of $\sim$ 100°C. The current carriers are holes. The temperature dependence of the electrical conductivity was studied down to a temperature of -150°C. At low temperatures the activation energy amounts to 0.2 ev and does not depend on the concentration of impurities. The authors advance the hypothesis that the temperature dependence of the electrical conductivity at $T < 60°C$ is due to an exponential dependence of current-carrier mobility when the carrier concentration remains invariable. The phosphoric photo effect is considered to be the main cause of the "aging" and "creep" processes in Cu_2O with $\sigma > 10^{-6}$ ohm^{-1} . cm^{-1}, while surface phenomena play the decisive role in the case of samples with a lower specific conductivity. A qualitative explanation of the obtained results is given in terms of a hypothesis concerning the excitation of the valence electrons of the Cu-lattice ions to phosphoric impurity levels involving two types of adhesion. The latter are connected with the excess oxygen in the crystal lattice. The excitation of the electrons to phosphoric levels may be brought about through the action of light, as well as by a thermal means. In this study it has been demonstrated for the first time that cuprous oxide is a typical phosphor.

A. Poletayev

Card 2/2

67201

SOV/58-59-7- 15779

24.7700

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 7, p 160 (USSR)

AUTHORS: Kosman, M.S., Chistyakova, R.V.

TITLE: Experimental Study of Photoconductive Relaxation Times in Cuprous Oxide

PERIODICAL: Uch. zap. Leningr. gos. ped. in-ta im. A.I. Gertsena, 1958, Vol 148, pp 231 - 236

ABSTRACT: Using the taumeter method, the authors studied the temperature dependence of photoconductive relaxation times in Cu_2O in a range of temperatures from room temperature to 300°C. A Kerr cell was used in order to obtain square light pulses. The utilization of a "GIS-2" generator made it possible to vary the duration of light signals within the limits of 2×10^{-3} to 2×10^{-5} sec, as well as to vary the duration of dark intervals. Two components of photoconductivity were observed in Cu_2O samples with a specific resistivity of 3×10^4 ohm · cm: a short-lived component, prevailing at room temperature, with $\tau_1 \approx 2 \times 10^{-5}$ sec, and a long-lived component, prevailing at raised temperatures, with τ_2' (build-up of photocurrent) = 8.5×10^{-5} sec and τ_2'' (fall-off of photocurrent) = 1×10^{-4} sec at 200°C. The relaxation time of the long-lived component

Card 1/2

Experimental Study of Photoconductive Relaxation Times in Cuprous Oxide

displayed an exponential temperature dependence. The extrapolation of the resultant curves to the region of room temperature yielded values of $0.8 \div 1.4 \times 10^{-3}$ sec for τ_2. At 200°C a break occurs in the curve depicting the dependence $\lg \tau_2(1/T)$. In a sample with a specific resistivity of 1×10^3 ohm · cm only the short-lived component of photoconductivity, with $\tau_1 = 3 \times 10^{-5}$ sec, was observed at 20°C, while at 100°C the second component was observed, with $\tau_{2'} = 2 \times 10^{-3}$ sec and $\tau_{2''} = 6 \times 10^{-3}$ sec. The extrapolation of the curves of $\lg \tau_{2'}(1/T)$ and $\lg \tau_{2''}(1/T)$ to the region of room temperature yielded $\tau_{2'} = 9 \times 10^{-3}$ sec and $\tau_{2''} = (3\text{-}6) \times 10^{-2}$ sec. Only one component of photocunductivity, with $\tau = (3 \div 5) \times 10^{-5}$ sec, was observed in all samples of Cu_2O annealed in a vacuum and having a specific resistivity of $1 \div 5 \times 10^5$ ohm·cm.

A. Poletayev

Card 2/2

KOSMAN, M.S.; ABKEVICH, I.I.

Long-time changes of the contact potential and the conductivity of germanium under the action of light and a perpendicular electric field. Fiz. tver. tela 1 no.3:378-387 Mr '59. (MIRA 12:5)

1. Leningradskiy pedagogicheskiy institut im. A.I. Gertsena.
(Germanium--Electric properties)

33682
S/058/61/000/012/052/083
A058/A101

9,4174 (1043, 1114, 1138)

AUTHORS: Kosman, M.S., Aleksandrova, M.S.

TITLE: Photoelectric effects near electrodes on zinc oxide

PERIODICAL: Referativnyy zhurnal. Fizika, no. 12, 1961, 375, abstract 12E620 (Sb. statey po matem. i fiz. Orenburg, 1961, 233 - 238)

TEXT: Photoelectric effects in sintered polycrystalline ZnO specimens with specific resistance (ρ) $\approx 10^2 \div 10^3$ ohm · cm were studied by the method of recording probe characteristics. The relative variation of ρ with lighting differs for different sections of the same specimen but is not associated with specimen inhomogeneity. The change in form of the probe characteristics incident to lighting depends strongly on the wavelength of the incident light and on the polarity of the applied voltage. The greatest changes of ρ take place at the cathode. The observed effects can be explained by assuming that a deeply-penetrating space charge arises near semiconductor electrodes, a charge that distorts the distribution of potential. The action of light reduces to dissipation of the space

Card 1/2

33682
S/058/61/000/012/052/083
A058/A101

Photoelectric effects ...

charge. The penetration depth of the space charge amounts to 1 - 2 mm.

M. Lyubin

[Abstracter's note: Complete translation]

Card 2/2

S/181/61/003/001/013/042
B006/B056

9.4160 (also 1137)

AUTHORS: Kosman, M. S. and Izvozchikov, V. A.

TITLE: Photoelectric coloring of lead oxide

PERIODICAL: Fizika tverdogo tela, v. 3, no. 1, 1961, 119-122

TEXT: The authors report on an effect discovered by them: the photoelectric coloring of polycrystalline PbO. This effect occurs only if the PbO specimen is also subjected to an electric field during exposure. From PbO powder, more than 100 specimens were pressed and thermally activated. X-ray examinations showed that red PbO has a distorted lattice, and that lines exist, which must be ascribed to yellow PbO. A noticeable coloring (blue coloring of red PbO and green coloring of yellow PbO) could be observed at an average electric field strength of 10^3 v/cm. Coloring could be observed at inhomogeneities and defects on the exposed parts of the specimen. Intensity and extent of coloring increased with increasing E and light intensity. Specimens exposed to monochromatic light displayed a noticeable coloring only at wavelengths, at which the photocurrent was comparatively strong (436, 546, 579 mμ). The character of the coloring

Card 1/4

S/181/61/003/001/013/042
B006/B056

Photoelectric coloring of lead oxide

was independent of the electrode material, but its position depended on the electrode shape. Blue coloring occurred nearly on equipotential surfaces, and was most intensive at places of maximum E. A narrow (up to 10^{-2}cm) region round the cathode remained uncolored. The specimens, which at first were cinnamon-brown, showed apart from the blue coloring, also red coloring near the anode in the form of streamers along the field lines. The colorings turned out to be rather stable at room temperature, but when heated to 200 - 300°C, they could quickly be removed. Along with the coloring, also the temperature dependence of electrical conductivity changed. At a moderately high E, the photocurrent dropped at the beginning of coloring, and conductivity decreased. Coloring also changed the optical properties of the specimen, which was detected when studying the reflection spectra in the visible range. With coloring, the reflection coefficient decreased, and photosensitivity in the visible decreased by 40-60%. Moisture produced a considerable effect upon electrical properties and colorability. Adsorption of water vapor caused an increase of dark conductivity and a considerable decrease of photosensitivity. These specimens were, however, easily and intensively colorable. Well dried

Photoelectric coloring of lead oxide

specimens had good photosensitivity and were hardly colorable. Thoroughly dried specimens were highly photosensitive and could hardly be colored. Liquid water produced another effect. Under a drop of distilled water, the blue color vanished and reddening occurred, whereas the remaining part of the specimen became deep blue. The process of PbO coloring is analogous to the occurrence of F-centers in alkali-halide crystals and of latent-image centers in silver halides. In alternating fields no coloring occurs. Water vapor diminishes the number of centers and the lifetime of minority carriers. A further investigation of these effects is of importance for the study of the intrinsic photoeffect, of the aging of photoresistors, and of the photodisintegration of semiconductors. The authors thank A. N. Terenin for interest, and A. R. Regel', E. V. Bursian, and B. A. Tazenkov for discussions. Ye. K. Putseyko is mentioned. There are 2 figures and 15 references: 7 Soviet-bloc and 5 non-Soviet-bloc.

ASSOCIATION: Leningradskiy gosudarstvennyy pedagogicheskiy institut im. A. I. Gertsena (Leningrad State Pedagogical Institute imeni A. I. Gertsen)

89280

S/181/61/003/001/013/042
B006/B056

Photoelectric coloring of lead oxide

SUBMITTED: February 18, 1960 (initially)
June 18, 1960 (after revision)

Card 4/4

KOSMAN, M.S.; MURAVSKIY, B.S.

Current oscillations arising in silicon at high pulse voltages.
Fiz. tver. tela 3 no.8:2504-2506 Ag '61. (MIRA 14:8)

1. Leningradskiy gosudarstvennyy pedagogicheskiy institut im.
A.I. Gertsena.
(Silicon)

S/181/61/003/011/016/056
B102/B138

AUTHORS: Kosman, M. S., and Gorodetskiy, S. M.

TITLE: Long-time variations in the contact potential of certain metals under the action of light

PERIODICAL: Fizika tverdogo tela, v. 3, no. 11, 1961, 3347-3353

TEXT: The authors used an arrangement (Fig. 1) similar to one used in previous investigations (Ref. 4: M. S. Kosman, I. I. Abkevich. FTT, 1, 378, 1959; Ref. 5: I. I. Abkevich. DAN SSSR, 127, 1199, 1959) to measure the contact potentials of the pure (99.99 %) metals Al, Mg and Zn. The arrangement is described in detail. The specimens were polycrystalline plates of 20·6·1 mm^3 stuck on to a dielectric backing with epoxy glue. Their surfaces were treated in different ways: polished, etched, exposed to the air or heated in air for different periods. The conditions were such that the experiments were reproducible within the limits of error. The absolute error in voltage measurement was $5 \cdot 10^{-4}$ v, in measurement of light intensity 5 %, and of illumination time 0.1 sec. After illumination all specimens showed an increased electron work function. In one case the

Card 1/5

Long-time variations in the contact...

contact potential had varied by 0.5 v; after illumination a relaxation effect could be observed: the contact potential reached its initial value only after a certain time (some minutes to some hours). The change in contact potential ΔV_k as a function of the lapse of time after illumination is described by $\Delta V_k = A - B \log t$. The constants A and B depend on the surface treatment of the metal, the atmosphere, the light intensity and the illumination period. This law does not hold for high or low t values. The results were compared for several differently-treated specimens and the times t_p, i.e. the sections of the abscissa between origin and the intersection of the curves $\Delta V_k = \log t$ were measured. The shape of these curves was found to be highly dependent on the humidity of the atmosphere: the higher the humidity, the smaller was t_p. In all cases the curves were independent of the wavelength of the illumination. ΔV_k, 10 sec after illumination, was found to be a function of illumination intensity: $(\Delta V_k)_{10} = CI$. $(\Delta V_k)_{10}$ denotes the deviation of the contact potential from its equilibrium after 10 sec, C a constant depending on illumination period and wavelength. This law holds for all wavelengths and all

Card 2/5

Long-time variations in the contact...

illumination periods. A comparison between these experimental results and various theories shows that the theory put forward by R. H. Kingston and A. L. McWhorter (Phys. Rev. 103, 534, 1956) and that by Abkevich (Ref. 5) agree well. The quantity $D = \alpha n$ kv/sec $= \beta J$, which is proportional to the electron flux reaching the oxyde coating of the metal, is, at any initial moment, proportional to ΔN_s so that $\Delta V_k = \frac{q \Delta N_s}{c}$, c being the capacitance metal - slow traps and q the electron charge; α and β are constants. If τ denotes the relaxation time of the free slow states, $\Delta V_k = (\Delta V_k)_o \, e^{-t/\tau}$, where $\tau = (2 - 10) \cdot 10^3$ sec. For the action of adsorbed water molecules the following is assumed: The dipole molecules are adsorbed on positively charged surface sites and are blocking traps with relatively high relaxation times. Due to this, the slow-trap distribution is changed and also the time dependence of the contact potential. There are 4 figures and 17 references: 10 Soviet and 7 non-Soviet. The four most recent references to English-language publications read as follows: R. H. Kingston, A. L. McWhorter. Phys. Rev. 103, 534, 1956; W. Brattain, J. Bardeen. Bell. Syst. Techn. J., 32, 1, 1953; S. R. Morrison. Sem. Surf. Phys.

Card 3/5 4

Philadelphia, 1957; G. W. Pratt, H. H. Kolm. Sem. Surf. Phys. Philadelphia, 1957.

ASSOCIATION: Leningradskiy pedagogicheskiy institut im. A. I. Gertsena (Leningrad Pedagogical Institute imeni A. I. Gertsen)

SUBMITTED: July 4, 1961

Fig. 1. Experimental arrangement. Legend: СВДШ - light source (hydrogen lamp of type СВДШ-250-3 (SVDSh-250-3)), СФ-4 (SF-4) spectrophotometer, Л - quartz lens, ЦЗ and ПЗ - aluminum mirrors, Г - galvanometer, ЗГ-10 (ZG-10) andio-frequency oscillator, УС - amplifier, ЭО-7 (EO-7) oscilloscope, РМ, ВТ, ВИ manometers, СЛ-steel tape, ПУС - cathode follower, $ЭМ_{1,2}$ - electromagnets, Э - platinum plate, 0 - 0' positions of specimen, П - potentiometer, $БФ_1$, $БФ_2$ - filter blocks, СЗ - catch.

Card 4/5