$ALEKS\ ANDROV, B.N.$

Category : USSR/Solid State Physics - Morphology of Crystals. Crystallization   E-7

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3933

Author   : Aleksandrov, B.N., Verkin, B.I., Lazarev, B.G.
Title   : Obtaining Pure Metals by the Zone Crystallization Method.II. Obtaining
            Pure Tin by a Combination of the Zone Crystallization Method with Puri-
            fication of Metal from Volatile Impurities by Prolonged Heating in High
            Vacuum.

Orig Pub : Fiz. metallov i metallovedeniye, 1956, 2, No 1, 100-104

Abstract : High temperature heating of tin in vacuum reduces noticeably the contents
           of impurities with $K > 1$, and further multiple zone crystallization
           guarantees a more effective removal of the impurities of this kind re-
           maining in the ingot. The use of fractionized multiple zone crystalliza-
           tion for the purification of chemically pure tin with initial value of
           $\delta = (1.4 -- 1.6) \times 10^{-3}$ has made it possible to obtain a metal with $\delta =
           2.7 \times 10^{-4}$. A subsequent 10-hour heating of this metal at $1000°$ and a
           pressure of 10^{-6} mm mercury reduced the residual resistance to $(2.0 --
           2.1) \times 10^{-4}$.

Card   : 1/1

ALEKSANDROV, B.N.

Category : USSR/Solid State Physics - Morphology of Crystals. Crystallization   E-7

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 1296

Author   : Aleksandrov, B.N., Verkin, B.I., Lifshits, I.M., Stepanova, G.I.
Inst   : Physical-Technical Inst. Academy of Sciences Ukrainian SSR ,
Title   : Investigation of The Mechanism for Cleaning Metals of Admixtures Using the
           Zonal-Recrystallization Method

Orig Pub : Fiz. metallov i metallovedeniye, 1956, 2, No 1, 105-119

Abstract : A detailed theoretical and experimental study is made (using alloys of the
           $Pb-Sn^{113}$ and Sn-Bi systems) of the mechanism for purifying metals by the
           zonal-recrystallization method. The impurity distribution was studied by
           measuring the activity of specimens, taken from various parts of the ingot, or
           by using the contrast-radiography or the residual-resistance methods. The
           role of the absence of equilibrium on the crystallization boundary and the
           role of diffusion and convective displacement in the zone are examined.

Card   : 1/1

SOV/137-59-12-26631

Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 12, p 124 (USSR)

AUTHORS: Aleksandrov, B.N., Verkin, B.I., Lazarev, B.G.

TITLE: Preparation of Pure Metals by the Method of Multiple Zonal-Recrystalliza-
                tion and the Use of Radioactive Isotopes to Investigate the Mechanism of
                Purifying the Metal From Admixtures by the Indicated Method

ABSTRACT: The authors analyze the methods of metal purifying by recrystallization,
                and the equipment for multiple zonal melting developed at FTI of AS
                UkrSSR; they discuss results obtained by investigating the mechanism
                of the process (distribution of the admixture over the zone, non-
                stability of the process, and deviations from the equilibrium) with the
                use of radioactive isotopes (Sn^{113}, Zn^{65}, Ag^{110}, Fe^{59}, In^{114}). It was
                established that the design of an installation with a ring-shaped crucible,
                divided by a partition, proved convenient. In this installation the motion
                of the ingot is performed by the continuous rotation at a required speed
Card 1/2   of a horizontal disk and the crucible. The authors describe a variant of

SOV/137-59-12-26631

Preparation of Pure Metals by the Method of Multiple Zonal Recrystallization and the Use of Radioactive Isotopes to Investigate the Mechanism of Purifying the Metal From Admixtures by the Indicated Method

the installation for smelting easily-melted and low-melting substances (the latter with a refrigerator) and of high-melting metals. An installation for zonal melting by electronic bombardment is described. Information is also given on the possible preparation of an ingot with a constant concentration of the admixture over the length, on account of the circulation through the liquid zone of a metal with an initial content of the admixture.

Yu.Sh.

Card 2/2

SOV/126-6-1-22/33

AUTHORS: Aleksandrov, B. N., Verkin, B. I., Lifshits, I. M. and Stepanova, G. I.

TITLE: On the Possible Causes of the Non-uniform Distribution of Admixtures in a Crystallising Casting (K voprosu o vozmozhnykh prichinakh neodnorodnogo raspredeleniya primesey v kristallizuyemom slitke)

ABSTRACT: In a paper published in 1956 by the authors (Ref.1) the mechanism was investigated of purification of metals from admixtures by means of zonal recrystallisation. There it was assumed that in front of the crystallisation front the conditions are such that solidification of the melt does not take place; in this paper the possible consequences are mathematically analysed of the non-validity of this assumption. Numerical evaluation for the system lead-tin (about 1% tin) indicates that for this system a periodic "blocking up" of admixtures in the solid phase can be anticipated. Indeed, exposures obtained by contact radiography of $Pb-Sn^{113}$ castings showed a large number of transverse bands corresponding

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SOV/126-6-1-22/33

On the Possible Causes of the Non-uniform Distribution of
Admixtures in a Crystallising Casting

> to excess Sn admixture in these spots (Ref.1).
> There is one Soviet reference.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN Ukr. SSR
             (Institute for Physics and Technology,Ac.Sc. Ukr.SSR)

SUBMITTED: January 7, 1957

Card 2/2

1. Metals--Purification   2. Metals--Crystallization
3. Mathematics--Applications

AUTHORS: Aleksandrov, B. N.,   Verkin, B. I.   SOV/56-34-6-47/51

TITLE: The Free Path Length of Electrons in Tin of High Purity
             (Dlina svobodnogo probega elektronov v olove vysokoy chistoty)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958,
             Vol. 34, Nr 6, pp. 1655-1659 (USSR)

ABSTRACT: The purification of the tin from admixtures was controlled
             by measuring the remanent resistance $S = R_{4,2}/R_{room}$ of speci-
             mens taken from various regions of a heated and recrystallized
             bar. $R_{4,2}$ denotes the resistance of the specimen at $4,2^{\circ} K$
             and R_{room} - its resistance at room temperature. A diagram
             shows the dependence of δ on the diameter of cylindric wires
             for tin with $\delta_{\infty} = 1,8.10^{-5}$. A second diagram shows the de-
             pendence of σ/σ_{∞} for $p = 0$, σ denotes the conductivity of
             the specimen, σ_{∞} - the conductivity of the massive metal,
             and p - the probability that the electron is scattered elasti-
             cally. The best consistency between the experimental and theo-

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The Free Path Length of Electrons in Tin of High Purity   SOV/56-34-6-47/51

retical data may be obtained for the free path length
λ = 0,65 mm. A table compares the data of this paper with
those of other authors. All these data completely correspond
with the results obtained by investigating the anomalous skin
effect of tin. There are 2 tables and 8 references, 4 of
which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR
(Physico-Technical Institute of the AS, UkrSSR)

SUBMITTED: March 26, 1958

Card 2/2

B. IV. Aleksandrov

24(0)

SOV/53-67-4-1/7

AUTHOR: Chenzov, B.

TITLE: The Fifth All-Union Conference on the Physics of Low Temperatures (5-ye Vesoyuznoye soveshchaniye po fizike nizkikh temperatur)

PERIODICAL: Uspekhi fizicheskikh nauk, 1959, Vol 67, Nr 4, pp 745-750 (USSR)

ABSTRACT: This conference took place from October 27 to November 1 at Tbilisi; it was organized by the Otdeleniye fiziko-matematicheskikh nauk Akademii nauk SSSR (Department of Physico-mathematical Sciences of the Academy of Sciences, USSR), the Akademiya nauk Gruzinskoy SSR (Academy of Sciences, Gruzinskaya SSR); and the Tbilisskiy gosudarstvennyy universitet im. Stalina (Tbilisi State University imeni Stalin). The conference was attended by about 300 specialists from Tbilisi, Moscow, Khar'kov, Kiyev, Leningrad, Sverdlovsk, and other cities as well as by a number of young Chinese scientists at present working in the USSR. About 50 lectures were delivered which were divided according to research fields.

            III. Galvanomagnetic phenomena.

(10 lectures). I. M. Lifshits and D. D. Peschanskiy (KhFTI, Khar'kov Physico-technical Institute, Khar'kov University) showed that the most important part in connection with the galvanomagnetic properties of metals is played by the concrete form of the Fermi surface of conductivity electrons. Yu. P. Gaydukov (IFP) spoke about experiments he carried out together with Yu. P. Gaydukov. He investigated the variation of the resistance in the transversal magnetic field at helium temperatures of Au, Cu, Pt, Zn, Cd, Tl and (together with Y. S. Borovik and Y. P. Tolstoluzhskiy) of Bi, Zn, Cd, Pb, In. V. I. Khotkevich (KhFTI) investigated the galvanomagnetic properties at low temperatures of chromium and found that the resistance of chromium grows with field strength without attaining a saturation value. I. S. Kan and B. G. Lazarev (KhFTI) investigated the resistance minimum in gold at low temperatures and found that if the sample is heated, the minimum disappears. Yu. P. Gaydukov (IFP) said in this connection that in the course of the discussion that the minimum effect does not occur in gold in the case of very pure samples; the disappearance of the minimum is explained by the plastic deformation of the sample at helium temperatures. M. Ya. Azbel' (KhFTI) gave a report of his work in connection with the quantum theory of the high-frequency resistance of metal in a constant magnetic field at low temperatures. M. I. Kaganov and V. M. Tsukernik (KhFTI) spoke about a theoretical investigation of the influence exercised by thermoelectric forces upon the skin-effect in various conductors. B. I. Verkin and I. F. Mikhaylov (KhFTI) spoke about measurements of the electric resistance of thin wires made from highly-pure indium and cadmium, and computed the free length of path at 4.2°K in these metals as amounting to 1/5 to 2/5 mm. B. I. Verkin and I. F. Mikhaylov (KhFTI) investigated the influence exercised by the hydro-static pressure (of 1000 atmospheres absolute pressure) upon the behavior of metals at low temperatures and investigated the quantum oscillations of the magnetic susceptibility of bismuth at 1.6 – 4.2°K. G. Ye. Zilberman and A. M. Kossevich (KhFTI) gave a theoretical explanation of the fact that relatively small deformation effects in metals considerably influence upon oscillation effects in metals. IV. Magnetism. B. G. Lazarev (IFP) delivered a report on investigations he carried out of the anisotropy of the weak ferromagnetism in monocrystal samples of the antiferromagnetic MnCO₃ (the effect of anisotropy was predicted by the thermo-gradical theory developed by Dzyaloshinskiy). In the course of the discussion E. A. Aizkmanov (IFP) spoke about neutron-graphical investigations he carried out of the magnetic structure of MnCO₃ and FeCO₃ at low temperatures. P. L. Kapitza stressed the importance of the method based upon Dzyaloshinskiy's theory. Y. K. Korgus (VNIIFRI), whose lecture was read by A. S. Borovik-Romanov, reported on measurements carried out by him (in the IFP) of the magnetic anisotropy of the antiferromagnetic CuSO₄ and CoSO₄ monocrystals. Ye. A. Turov (IFM AN SSSR, Sverdlovsk) spoke about his theoretical

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S/126/60/009/01/010/031
E111/E191

AUTHOR: Aleksandrov, B.N.

TITLE: Production of Pure Tin by Prolonged Heating in Vacuum
          and Repeated Zone Recrystallization

ABSTRACT: The present work is a continuation of the author's
          previous work (Refs 1, 2) and is devoted to the
          production of pure tin by heating in a vacuum of 10^{-5}
          mm Hg at 1000 °C, the oxide film being removed by drawing
          through a die at 10^{-4} mm Hg, and by zone recrystalliza-
          tion. For the latter, crystallization speed was 20 mm
          per hour, liquid-zone width 30 mm and specimen length
          500 mm. Purity was estimated from the ratio of
          resistivity at 4.2 °K to that at room temperature.
          Purity has been shown (Ref 3) to be related to minimum
          permissible cylindrical-specimen diameter; this is shown
          as a function of the resistivity ratio in Fig 1.
          Several grades of tin were used. Fig 2 shows the
          resistivity ratio along a specimen of 0-2 grade (99.8% Sn)
          after 60-fold zone refining without and with (curves 1 and

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E111/E191

Production of Pure Tin by Prolonged Heating in Vacuum and Repeated
Zone Recrystallization

2, respectively) preliminary vacuum heating. The
corresponding curves for O-1 grade (99.94% Sn) tin after
55-fold zone refining are shown in Fig 3, and Fig 4
gives the ratio curves for "high-purity" (> 99.999% Sn)
tin without vacuum heating. The distribution of
impurities along a specimen of electrolytic
(> 99.99% Sn) grade was similar to that shown in Fig 4;
the curves in Figs 2 and 3 show a minimum while that in
Fig 4 does not. Qualitative spectroscopic analysis
(by Ye.V. Livshits) and the use of radioactive tracers
showed that in zone refining antimony, calcium and
manganese concentrate at the starting end of the
specimen and lead, copper, bismuth, cadmium, iron,
silver, indium, zinc, gold (Ref 4), nickel, aluminium,
magnesium and silicon at the finishing end: the method
is least effective for silicon, aluminium and iron.

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99.99998% Sn material is obtainable comparatively easily.
Ye.K. Pogrebnyak assisted in experimental work.

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E111/E191

Production of Pure Tin by Prolonged Heating in Vacuum and
Repeated Zone Recrystallization

      Details of apparatus and procedure are given elsewhere
(Refs 1, 2).
There are 4 figures, 1 table and 5 references, of which
4 are Soviet and 1 is English.

ASSOCIATION: Khar'kovskiy fiziko-tekhnicheskiy institut AN USSR
            (Khar'kov Physico-Technical Institute, Acad.Sci.
            Ukr.SSR)

SUBMITTED: June 19, 1959

Card 3/3

69688

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18.7500

AUTHORS: Aleksandrov, B.N. and Verkin, B.I.

TITLE: Purification of Electrolytically Pure Cadmium by Zone Recrystallization and Vacuum Distillation

ABSTRACT: This work is a study of the possibilities of further purification of electrolytically refined cadmium. Electrolytic cadmium of the following original composition was used: Tl, As, Sb, Bi, Ni, Cu less than $1 \times 10^{-4}\%$ each; Pb $2 \times 10^{-4}\%$; Fe $(3-5) \times 10^{-4}\%$, Zn $(5-7) \times 10^{-4}\%$ (ie it is more than 99.998% pure). The

ratio $\delta = \dfrac{R_{4.2}}{R_{kom}}$ (where $R_{4.2}$ is the electrical resistance

of the metal at the boiling point of liquid helium ($4.2°$K) and R_{kom} is the electrical resistance of the same specimen at room temperature) and the free run of electrons in the helium temperature range are properties sensitive to the total quantity of chemical impurities.

Card 1/4   The value of δ was measured by means of a low-resistance

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E091/E435

Purification of Electrolytically Pure Cadmium by Zone
Recrystallization and Vacuum Distillation

compensator and a high-sensitivity galvanometer on a
few polycrystalline wires of 2 to 3 mm diameter which
had been annealed in air at 120°C for 6 to 10 hours.
The length of the free run was estimated by methods
described by Riedel (Ref 5) and Andrew (Ref 6) in which
the dependence of δ on the thickness of a plate of
electrolytically pure cadmium is measured at 4.2°K. The
plates were prepared by rolling with subsequent pickling
and annealing in air at 120°C for many hours. After
annealing, the grain size was greater than the thickness
of the plate. The results of these measurements are shown
in Fig 1b. By using Fuchs's theoretical table (Ref 7)
for the diffusion scattering of electrons at the boundary
of the specimen and adopting the relationship $\delta_{\infty} = 1.5$
x 10^{-4} for a massive specimen, good agreement between
the experimental results and the theoretical curve was
obtained at a free electron run length of 0.4 mm (Fig 1a).
From Sondheimer's formula (Ref 4), the number of electrons
per atom of metal can be calculated and in this case is
Card 2/4   0.1. The results of the estimation of the value of δ

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Purification of Electrolytically Pure Cadmium by Zone
Recrystallization and Vacuum Distillation

and of the length of free run of electrons in cadmium
of various chemical purities are shown in the table on
p 363. Zone refinement of cadmium ingots weighing 150
to 170 g was carried out in tantulum boats (0.1 mm thick
and 350 mm long) which were placed inside a quartz tube
(35 mm diameter and 1200 mm long); three resistance
furnaces were placed in position around the tube which
simultaneously created three liquid zones, each 40 mm
long. The rate of crystallization was 25 mm/hour. The
boat was placed at an angle of 1 to 1.5° to the horizontal
in order to avoid overflow of the metal into the head of
the ingot, thus causing multiple crystallization (Ref 11).
In view of the great volatility of cadmium at its
melting point, the purification was carried out in an
argon atmosphere at a pressure of 760 mm Hg. The results
of purification of two ingots are shown graphically in
Fig 2. The purity of the original cadmium ingot is
shown by a line of dashes. The distillation of cadmium
Card 3/4   was carried out in a quartz tube in a vacuum of 10^{-4} mm Hg

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Purification of Electrolytically Pure Cadmium by Zone
Recrystallization and Vacuum Distillation

at 450 to 500°C. It was found that after distillation
δ_{ω} for cadmium was 7×10^{-5}. The authors express
gratitude to <u>D.P.Zosimovich</u> for the preparation of
electrolytic cadmium. There are 2 figures, 1 table and
11 references, 4 of which are Soviet, 4 English and
3 German.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR
             (<u>Institute of Physics and Technology AS UkrSSR</u>)

SUBMITTED: June 19, 1959

Card 4/4

ALEKSANDROV, B. N.

82596
S/056/60/039/01/04/029
B006/B070

$\mathcal{Q}4.7600$

AUTHORS: Aleksandrov, B. N., Verkin, B. I., Svechkarev, I. V.

TITLE: The Temperature Dependence of the Susceptibility of Indium, Lead, and Tin Crystals

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 1 (7), pp. 37-43

TEXT: The temperature dependence of the susceptibility of a number of elements is related directly to their position in the periodic system, that is with the presence of small electron groups and must, therefore, be characteristic of all elements which show a de Haas- van Alphen effect with large period. To test this hypothesis, the authors investigated the temperature dependence of the susceptibility of Pb, In, and Sn which crystallize in cubic or tetragonal forms. The samples investigated were of high purity and in the form of small spheres of 0.35-0.5 g weight. Determination of the principal values of susceptibility was done with the help of a modification of Faraday's balance method. Fig. 1 shows a scheme of the experimental arrangement and the position

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The Temperature Dependence of the Susceptibility S/056/60/039/01/04/029
of Indium, Lead, and Tin Crystals   B006/B070

of the sample in the magnetic field. To eliminate the effect of the
medium, the measuring apparatus is evacuated and filled with low pressure
hydrogen. The apparatus and the experiment are very minutely described
in the introduction. The measurements were made between room temperature
and 20.4°K, where the liquids CH_4, O_2, N_2 and H_2 served as coolants. The χ
observed values of $\chi_{\parallel}$, $\chi_{\perp}$ and $\Delta\chi$ are compiled in a table, and compared
with the results of other authors. The results are represented
graphically in Fig. 2. Indium: $\chi_{\perp}(T)$ and $\Delta\chi(T)$ were measured for two
samples and identical results were obtained. Fig. 2 shows $\chi_{\perp}(T)$ and the
calculated values of $\chi_{\parallel}(T)$. $\chi_{\perp}$ increases by 20% during a temperature drop
of from room temperature to 80°K, goes to a maximum, comes down, and at
20.4°K still lies 15% higher than the value at room temperature.
$\chi_{\parallel}$ increases monotonously to 20°K reaching about thrice the value, and
at ~100°K has a point of inflection. Lead: $\chi(T)$ and the anisotropy in
the (110) plane were investigated for two samples. χ increases practical-
ly linearly with a fall of temperature and is 20% higher at 20.4°K.

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The Temperature Dependence of the Susceptibility S/056/60/039/01/04/029
of Indium, Lead, and Tin Crystals   B006/B070

No anisotropy is observed. Tin: This shows a positive susceptibility. $\chi_{\perp}(T)$ was investigated along the normal to (010) plane, and $\Delta\chi(T)$ in the (100) plane. It was found that, in contrast to other elements of this group, $|\chi|$ decreases linearly with fall of temperature down to $20.4°K$ ($\chi_{\parallel}$ by 6% and $\chi_{\perp}$ by 15%). These results are discussed in conclusion and are compared with the theoretical and experimental results of other authors (Fig. 2). G. Ye. Zil'berman and F. I. Itskovich are mentioned. There are 3 figures, 1 table, and 23 references: 9 Soviet, 4 British, 4 American, 1 German, 1 French, and 2 Dutch.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademiya nauk Ukrainskoy SSR (Physicotechnical Institute of the Academy of Sciences of the Ukrainskaya SSR)

SUBMITTED: February 13, 1960

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21364

5.2220 1087, 1160, 1273

S/126/61/011/004/013/023
E021/E435

AUTHOR: Aleksandrov, B.N.

TITLE: Zone Purification of Zinc and Cadmium

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.4,
            pp.588-595

TEXT: The starting materials were three types of zinc (99.998,
99.9996 and 99.9997%) and vacuum distilled cadmium (99.9996%).
The purity was followed by measurements of the ratio
$\delta = R 4.2 /R$ room temperature.   The lower this ratio, the purer is
the metal.   Zone melting was carried out in quartz tubes in a
helium atmosphere with an excess pressure (0.5 to 1 atm).   A
tantalum boat was used for the cadmium and a graphite boat for the
zinc.   The technical data for the zone melting operation are
given in Table 2.   The furnace was fed from a special voltage
stabilizer.   Fig.4, 5 and 6 show the values of δ along the zone-
purified bars of the pyrometallurgical (99.998%), electrolytic
(99.9996%) and vacuum-distilled (99.9997%) zinc.   Curve 1 is after
11 passes and curve 2 is after 20 passes.   In the case of Fig.6,
the single curve is after 20 passes.   The dotted lines show the

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Zone purification ...   S/126/61/011/004/013/023
                                     E021/E435

original values of δ.   The curves for pyrometallurgical and
vacuum-distilled zinc have a linear portion whereas the
electrolytic zinc has a minimum.   Thus in the latter there must be
impurities with a coefficient of distribution K greater than 1.
Fig.7 shows the values of δ along the bar of cadmium after
30 passes.   Table 3 gives the results of the zone purification for
the three types of zinc, and for the distilled cadmium and
electrolytic cadmium previously investigated (Ref.3).
Acknowledgments are expressed to graduate I.G.D'yakov,
A.A.Kruglykh, I.I.Papirov and V.L.Kheyfets for their assistance in
the work.   There are 7 figures, 3 tables and 16 references:
10 Soviet and 6 non-Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR
             (Physicotechnical Institute AS UkrSSR)

SUBMITTED: July 2, 1960

Card 2/6

9,2165 (1001, 1331, 1482)

AUTHORS: Aleksandrov, B. N., Kaganov, M. I.

TITLE: Resistivity of thin monocrystalline wires

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 4, 1961, 1333-1336

TEXT: Measuring the resistivity is of interest for the determination of the free path. The standard method worked out by R. B. Dingle (Ref. 2: Proc. Roy. Soc., A201, 545, 1950) is, however, only applicable to an isotropic quadratic dispersion law of electrons. B. N. Aleksandrov used wires made from tin previously subjected to zone purification (99.99986 %) to measure the dependence of specific resistivity on the diameter. Results are shown in a figure. It is shown that $\delta = R_{4.2}/R_{293}$ ($R_{4.2}$ resistivity at 4.2°K, R_{293} at 293°K) is a linear function of the reciprocal diameter d. If the axis of the wire is parallel to the principal axis of the crystal, the slope of the straight line will be smaller than in perpendicular position. The theoretical treatment can be only concluded if

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Resistivity of thin monocrystalline wires

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B111/B112

the path $\lambda > d$. If the wire axis is perpendicular to the symmetry plane of the crystal, the following holds for the electrical conductivity $\sigma(d)$, without particular assumptions:

$$\sigma(d) \approx \frac{8de^2}{3\pi(2\pi\hbar)^3} I, \quad I = \oint \frac{(\vec{N}\vec{b})^2}{\sqrt{1-(\vec{N}\vec{b})^2}} dS,$$

where $\vec{b}$ is the unit vector in the direction of wire axis, $\vec{N}$ the unit vector, perpendicular to the Fermi surface, dS the element of area. Computing the integral necessitates assumptions on a dispersion law. An anisotropic and an isotropic law are dealt with. In the latter case, the authors obtain $I_{\parallel} = 2.2 \cdot 10^{-37}$ CGSE and $I_{\perp} = 1.1 \cdot 10^{-37}$ CGSE, respectively, for the two crystallographic directions. The difference in slope of the straight line $\delta = f(d)$ is due to different forms of the Fermi surfaces for tin. It is of interest to establish this difference experimentally in the directions [100] and [111] for various metals such as Pb, Cu, Au, Ag, and possibly Al. According to computations performed, every tin atom, for instance, should possess 1.2 conductivity electrons. This value has been derived under extremely idealized assumptions.

Card 2/3   *Phys Tech Inst AS Ukr SSR*

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$I\!\!\!P.5\iota\iota\iota\mathcal{O},$

AUTHORS: Aleksandrov, B.N., D'yakov, I.G.

TITLE: Zone refining of aluminium and lead

PERIODICAL: Fizika metallov i metallovedeniye, v.14, no.2, 1962,
            267-270

TEXT: The initial materials were of high purity, the aluminium
being 99.997%, containing less than 10^{-3}% Fe, 9×10^{-4}% Si and
5×10^{-4}% Cu; the lead 99.994%, containing less than 4×10^{-3}% Bi,
1×10^{-3}% Mg, Zn, Sn, Fe, 5×10^{-4}% Cu, As, Sb, 3×10^{-4}% Ag
and 2×10^{-4}% Ca, Na.   The purity was determined by the ratio (6)
of the electrical resistance of 4.2°K to that at 20°C. · The lead
was treated in a lightly oxidized tantalum boat and the
aluminium in a boat of electrode graphite.   Heating was carried
out in quartz tubes, using multiple resistance heaters which gave
liquid zones 55 to 60 mm long with Al and 40 to 50 mm long with Pb.
The lead was refined in vacuo, the aluminium in a helium atmosphere.
The rates of traverse were 10 mm per hour for Al and 25 mm per hour
for Pb. With Al, 16 to 18 passes were employed and a single
crystal was usually obtained, but with Pb the number of passes
varied from 10 to 65 and single crystals were never obtained.
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Zone refining of aluminium and lead

S/126/62/014/002/011/018
E114/E435

Curves showing the variation of δ along the length of the bar
after refining were obtained.   For aluminium, it was shown that
there were no impurities with K > 1 in the first part of the
purified zone extending for 50% of the length;   the number of
passes required was 16 or less.   For lead, however, the optimum
number of passes was 65 or more and the purified zone was only
25% of the total length.   In further experiments with lead,
specimens were refined with 35 passes and the pure portion of
several bars were combined and further zone refined with an
additional 50 to 60 passes;   50% of the final bar was then of
high purity.   A list of the impurities which are difficult to
remove by zone refining gives those for aluminium as Cr, Mn (K ~1),
Ti, V (K > 1) and Bi, Mg (K = 0.3 to 0.6) and for lead as
Sn (K = 0.7) and Sb, Bi, Mg, Na (K = 0.4 to 0.6).   There are
2 figures and 2 tables.

SUBMITTED: November 28, 1961

Card 2/2

41521

S/126/62/014/003/013/022
E021/E435

18.8100

AUTHOR: Aleksandrov, B.N.

TITLE: The relation between the residual resistance of tin,
            indium, lead, cadmium and zinc and the quantity and
            type of impurity

PERIODICAL: Fizika metallov i metallovedeniye, v.14, no.3, 1962,
            434-442

TEXT: The relation between residual resistance and impurity
content was found by the method of successive dilution of alloys
prepared from pure materials.   Measurements were carried out to
obtain $\delta_{4.2} = R_{4.2}/R_{293}$ (where $R_{4.2}$ and R_{293} are respectively
the resistances at 4.2 and 293°K) and $\delta_{3.4}$, $\delta_{7.2}$, δ_{14} and
$\delta_{20.4}$.   In the majority of cases the residual resistance was
determined by measuring $\delta_{1.6}$.   For two of the purest indium
samples, values of δ_0 were obtained by extrapolation.   The
purity of the initial metals was found by measuring $\delta_{4.2}$.
Results of $\delta_{4.2} \times 10^5$: Zn $<$ 4,   Cd $<$ 5,   Sn 1.5,   In 5.0, Pb 7,
Bi 280, Sb 40 - 80.   Alloys were then prepared based on indium,
lead, zinc and cadmium containing total impurities of 2.3, 3.8,
Card 1/2

The relation between the residual ...   S/126/62/014/003/013/022
E021/E435

2.9 and 1.96 wt.% respectively. Resistances were measured (by a
compensating method) and then the alloys were successively diluted .
and the resistances were measured again. The accuracy of $R_{4.2}$
measurements was about 1% for the alloys containing the least
amount of impurities and greater for alloys with more impurities.
The resistance of superconducting alloys was measured in the
longitudinal field of a solenoid. Results: The relation between
the residual resistance and total impurity content was linear for
indium and lead and quadratic for zinc and cadmium. By introducing
different impurities it was shown that the ratio of the residual
resistance of tin, indium and lead to the atomic concentration of
impurities in them increases with increasing atomic radius of the
impurity. The results are in qualitative agreement with
Norbury's rule for indium, tin and lead but not for zinc and
cadmium. There are 4 figures and 5 tables.

SUBMITTED: March 15, 1962

Card 2/2

S/126/62/014/004/013/017
E193/E383

AUTHORS: Aleksandrov, B.N. and D'yakov, I.G.

TITLE: Purification of technical-grade cadmium by vacuum
distillation with the application of a preheated
condenser

PERIODICAL: Fizika metallov i metallovedeniye, v. 14, no. 4,
1962, 569 - 573

TEXT: The object of the present investigation was to
establish the conditions under which vacuum-distillation would
yield cadmium as pure as the material obtained by the more
expensive method of zone-refining. The chemical analysis and
the purity ($\delta = R_{4.2}/R_{288}$, where R is the electrical resistivity
at 4.2 and 288 ^{o}K, respectively) of the starting materials are
given in Table 1. Distillation was carried out in a vacuum of
about 10^{-4} mm Hg in a distillation column placed under a glass
bell. The construction of the column is shown schematically in
Fig. 1; its main parts were a quartz crucible provided with an
electric-resistance heater and a tantalum condenser whose lower
Card 1/4

Purification of ....　　　　　S/126/62/014/004/013/017
　　　　　　　　　　　　　　　E193/E383

part (approximately 1/3 of its length) could also be heated to
various temperatures. The area of the condenser was about ten
times that of the area of the melt. The experimental conditions
varied as follows. The temperature of the metal: 315 - 505 ^{o}C;
temperature of the lower part of the condenser: 165 - 280 ^{o}C;
temperature gradient between the lower and upper part of the
condenser: 0 - 55 ^{o}C. The effect of the temperature on the
effectiveness of the method studied is demonstrated in Fig. 2,

where the purity of the condensed metal (8×10^{5}) is plotted
against the distance (h, mm) from the lower end of the condenser;
the figures and the bottom and top of each of the three curves
indicate, respectively, the temperature of the lower part of the
condenser and the temperature of the molten metal. Several
conclusions were reached. 1) 99.99994% pure cadmium

($\delta = 4.2 \times 10^{5}$) can be obtained by vacuum distillation. 2) The
optimum temperature of the melt is 450 - 500 ^{o}C. 3) Preheating
the condenser to 280 ^{o}C brings about an increase in the purity

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Purification of ....

S/126/62/014/004/013/017
E193/E383

and yield of the condensate. 4) Up to 80% of the starting
material can be distilled without the purity of the condensate
being adversely affected. The purity of the condensate sharply
decreases on increasing this quantity to 95%.
There are 3 figures and 2 tables.

SUBMITTED: November 28, 1961

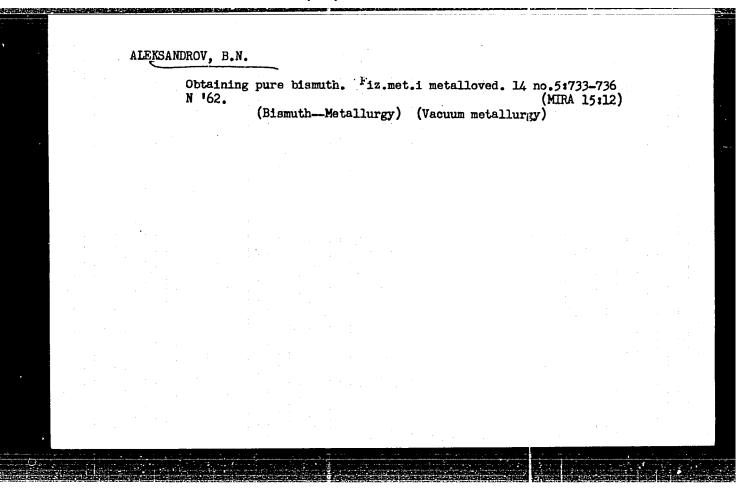Table 1:   (Sledy = traces)

Материал	Pb	Zn	Cu	Ni	Fe	· Cd	8 · 10⁴
Cd-I	0,014	0,003	0,008	—	Следы	99,975	50
Cd-II	0,011	0,004	0,006	0,002	Следы	99,977	6

Card 3/4

ALEKSANDROV, B.N.

Obtaining pure bismuth. Fiz.met.i metalloved. 14 no.5:733-736
N '62.   (MIRA 15:12)
        (Bismuth—Metallurgy) (Vacuum metallurgy)

45640

S/126/63/015/001/028/029
E073/E151

AUTHORS: Aleksandrov, B.N., and Vasil'yeva, N.M.

TITLE: Determination of the purity of aluminium from its
               residual resistance

PERIODICAL: Fizika metallov i metallovedeniye, v.15, no.1, 1963,
               156-158

TEXT: It has been shown that the residual resistance b_0 of
a metal varies with the concentration of added elements according
to the equations $c = A b_0$ (where c = amount of the addition and
A = constant) for cubic or tetragonal metals, and $c = A b_0^2$ for
hexagonal metals. (The residual resistance b_0 is the
ratio of the resistance of the metal at $0\ ^\circ K$ to the resistance at
293 $^\circ K$). To determine whether Al obeyed the linear equation,
resistance measurements were made of polycrystalline aluminium of
varying purity at 4.2 $^\circ K$ and 293 $^\circ K$, it being already known that
the resistance at 4.2 $^\circ K$ was identical with that at $0\ ^\circ K$. The
resistance measurements at 4.2 $^\circ K$, made on carefully annealed strip
2 mm thick, were accurate to $\pm$ 2%. (The heat-treatment and
experimental techniques at 4.2 $^\circ K$ are not described, having been

Card 1/2

Determination of the purity of ...   S/126/63/015/001/028/029
E073/E151

described in an earlier paper). The Si content of the samples was determined chemically, Fe and Cu were determined both chemically and spectroscopically, and Ti, Mg, Mn and Ni were determined spectroscopically. A linear relationship between impurities and residual resistance was found, $c = 6.2 \, \delta_0$, the value 6.2 differing by 50% from earlier results. For pure Al, $\delta_0 = 3.4 \times 10^{-5}$. The ratios of the resistances at 14 and 20.4 °K to the resistance at 293 °K (i.e. δ_{14} and $\delta_{20.4}$) was also found to follow a linear law with impurity concentration. It was found possible to estimate the purity of Al from plotted curves of δ_0, δ_{14} or $\delta_{20.4}$, provided that the relative proportions of the individual impurity elements did not change greatly; since some impurities had a much bigger effect than others, changes in the proportions could alter the value of A. In spite of this, impurities can be estimated to within one order of magnitude. Measurements of δ_0 on very pure Al should be made with thick well-annealed single crystals to avoid excessively high values being obtained.   There are 1 figure and 1 table.

Card 2/2   SUBMITTED: March 15, 1962

24.7700

39478
S/056/62/043/002/008/053
B102/B104

AUTHOR: Aleksandrov, B. N.

TITLE: Effect of the size of pure metal samples on their electric
            resistance

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43,
            no. 2(8), 1962, 399-410

TEXT: The dependence of the relative resistance on the sample diameter
(size effect) was measured for high-purity metals in the range of helium
temperatures. The effect of the sample diameter on properties of electrons
determined by their mean free path λ was also measured. The measurements
were made on cylindrical Cd, Zn, Al, Sn, Pb, In, and Bi single crystals
2.5-7 mm thick and 120-230 mm long. Their orientation and purity was
determined accurately (the latter from the residual resistance). The
resistance was measured as described in FMM, 11, 588, 1961, using a low-
resistance compensator. The errors in measurement varied from 1 to 10 %
(4.2-1.65°K). The dependence $\delta = f(1/d)$ was studied in all cases where
$\delta = R/R_{293}$ is the resistance and d the sample diameter. $\varrho = \varrho_{\infty}(1+a\lambda/d)$ is

Card 1/3

Effect of the size of pure...

assumed for the resistivity of wire of thickness d, which is accurate to $< 5 \%$ for the range $0 < \lambda/d \leqslant \infty$; ϱ_∞ is the resistivity of infinitely thick wire, and α is the temperature-dependent surface reflection coefficient for electrons. As to the anisotropy in the size effect, the metals investigated can be classified as weakly anisotropic (In, Pb, Al) and anisotropic. The results of measurement are given graphically and numerically in great detail. In the case of Al, $\tan \psi$ increases with temperature. From the relation $(\varrho_\infty \lambda)^{-1} = 7.1 \cdot 10^7 \, n^{2/3}$ the number of conduction electrons per atom (n/n_a) is estimated at ~ 0.6-0.7. This value holds for In, Pb, and Al. With anisotropic metals, the angle of inclination (ψ) of the straight line $(1/d)$ is greater for perpendicular orientation than for a parallel one. $n/n_a = 1.26$ for Sn; for all others it is less or much less than unity. In the range with purely residual resistance, $\lambda\varrho$ is temperature-dependent. It is assumed for thin wire that $\varrho = \varrho(T) + \varrho_0 + \varrho_s + \varrho_{ph}(d,T)$: the resistance is composed of a temperature-dependent part for massive metal (electron-phonon scattering), a part (ϱ_0)

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Effect of the size of pure...

$3/056/62/043/002/006/033$
$B102/B104$

due to electron-impurity and electron-defect scattering, a part due to surface scattering of electrons, and a part (ϱ_{ph}) due to electron-phonon scattering through small angles.

$$\varrho_{ph} = \left[8\pi(\varrho\lambda)^2_\infty\right]^{1/3}(T/\theta)^{2/3}\left[\varrho(T)\right]^{1/3}d^{-2/3}, \quad \theta = \text{Debye}$$

temperature. For Al of $d = 0.5$ mm and $(\varrho\lambda)_\infty = 5.5\cdot10^{-12}$ ohm·cm^2,

$\varrho_{ph}(14^\circ K) = 2.8\cdot10^{-5}$ ohm·cm, $\varrho(20.4^\circ K) = 5.6\cdot10^{-5}$ ohm·cm. There are 8 figures and 5 tables.

SUBMITTED: March 9, 1962 (initially),
July 27, 1962 (after revision)

Card 3/3

40418

S/056/62/043/003/019/063
B102/B104

AUTHORS: Aleksandrov, B. N., D'yakov, I. G.

TITLE: Variation of the electrical resistivity of pure metals with
           decrease of temperature

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43,
              no. 3(9), 1962, 852-859

TEXT: In order to verify a prediction of the modern theory of metals,
namely the law $\varrho(T) \sim T^5$ at low and $\varrho(T) \sim T^2$ at ultralow temperatures, the
authors measured the $\varrho(T)$ dependence of very pure Sn, In, Al, Pb, Zn and
Cd samples in the form of wires with 2-4 mm diameter. For In these
samples were polycrystalline. For Al they were single crystals with the
wire axis parallel to the main axis or $\parallel [110]$. For Sn, Cd, Zn they were
single crystals with the wire axis either parallel or perpendicular to
the main axis. In all cases the resistivity of the wire material, $\varrho_{4.2}$,
was higher than that of the massive material, the excess being least for Pb
(4 %) and most for $Zn_\perp$ (55 %). The resistance of the samples was measured

Card 1/3

Variation of the electrical...

with a ППТН-1 (PPTN-1) low-resistance compensator with a sensitivity of $\sim 10^{-8}$ v. The measurements were made between 1.65 and 14°K. The resistivity was calculated from the relative resistance $\delta_T = R_T/R_{293}$, R_{293} being the sample resistance at 293°K. The accuracy of the δ-measurements at 4.2°K was between 1 and 10 %, for Pb $\ll$ 1 %. For $\delta(T)$ the law $\delta = \delta_o + AT^n$ was assumed and A and n were determined from the measurements. For In, $Sn_{\parallel}$, $Sn_{\perp}$ and Cd $\delta = \delta_o + AT^{5\pm0.05}$, and only for Al in the range $20 \leqslant T \leqslant 58^{\circ}$K was n = 4.6 ± 0.1. Therefore for Al at $T \leqslant 58^{\circ}$K, the law $\rho = \rho_o + AT^2 + BT^5$ can be assumed; whilst for Sn at $T \leqslant 12^{\circ}$K, for In at $T \leqslant 10^{\circ}$K and for Cd at $T \leqslant 14^{\circ}$K, $\rho \sim T^5$. For Zn n = 4.9 ± 0.1 at $T \leqslant 19^{\circ}$K, for Pb n = 5 ± 0.1. The temperature of 1.65°K was not low enough to observe any $\sim T^2$ law. The decrease of the factor A with increasing purity explains the n < 5 results obtained by many authors as an impurity effect. There are 6 figures and 4 tables.

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Variation of the electrical...

S/056/62/043/003/019/063
B102/B104

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR
(Physicotechnical Institute of the Academy of Sciences
Ukrainskaya SSR)

SUBMITTED: April 20, 1962

Card 3/3

41330

S/056/62/043/004/017./061
B102/B180

AUTHOR: Aleksandrov, B. N.

TITLE: The effect of size and purity on the electrical resistivity
of metals in a longitudinal magnetic field at helium
temperatures

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43,
no. 4(10), 1962, 1231 - 1241

TEXT: The size effect was studied via resistivity measurements of mono-
crystalline Sn, Al, Zn, and Cd, with impurity .contents of $1.5 \cdot 10^{-4}\%$,
$2 \cdot 10^{-4}\%$, $5 \cdot 10^{-6}\%$, and $6 \cdot 10^{-6}\%$, respectively. The purity effect was studied
with An, Al, Zn, Cd, Pb, and In. Unlike Bi the carrier-concentration
effect, is negligibly small in these metals. The measurements were made
at $H \leqslant 2.25$ koe and $T \leqslant 4.22°$K at normal and reduced pressure. For Sn and
In at $1.65°$K and $H=0$, where both are superconductive, calculated resistivi-
ty data published in FMM, v. 14, no. 3 and no. 4 were used. Scale,
orientation and impurity effects were assessed from the course of the $\Delta R/R$ depen-
Card 1/2

The effect of size ...

s/056/62/043/004/017/061
B102/B180

dencey on H. ΔR is the difference of resistances with and without magnetic field, R is the resistance at H=0 extrapolated to zero current. For $Sn_\perp$ the ΔR/R curves rise up to H$\simeq$0.5 koe, being steeper for thicker specimens. At 4.22°K they tend to saturation and lie higher than at 1.65°K. Negative values are only assumed for the thinnest samples (0.2 mm) at 1.65°K H$\not>$0.75 koe. For $Sn_{||}|\Delta R/R|$ is also higher at 4.22°K, but assumes mostly negative values, except for the thickest samples (2.21 mm) at 4.22°K. The curves for $Zn_\perp$ and $Zn_{||}$ are similar. For Al(4.22°C) all ΔR/R values are positive, rising with thicker samples. Except for d=3.6 mm, all curves have maxima at H$<$1 koe. For Sn, Cd, and Zn the resistivity increase shows considerable anisotropy. The purity effect was similar for all the metals; with increasing purity resistivity increases and the ΔR/R curves become steeper. From a Kohler diagram it is seen that for ΔR/R$<$0.3 the curves are linear and have the same slope. At large effective fields the curves tend to saturation. There are 11 figures and 3 tables.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk Ukrainskoy SSR
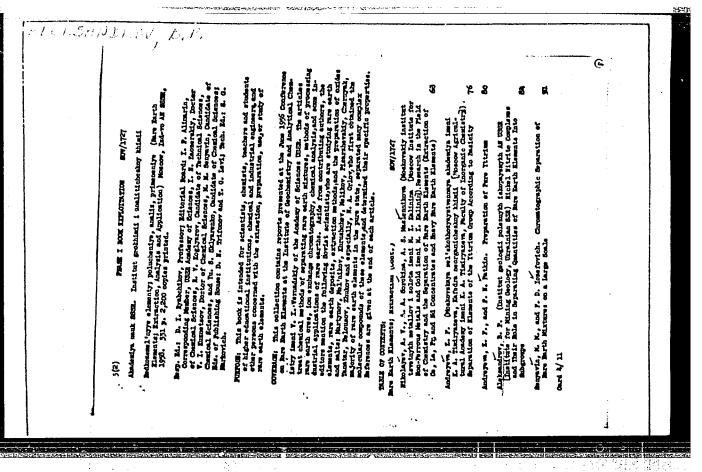   (Physicotechnical Institute of the Academy of Sciences
              Ukrainskaya SSR)
SUBMITTED: May 17, 1962
Card 2/2

ALEKSANDROV, B. P.

S(2)

PHASE I BOOK EXPLOITATION SOV/1727

Akademiya nauk SSSR. Institut geokhimii i analiticheskoy khimii

Redkozemel'nyye elementy; polucheniye, analiz, primeneniye (Rare Earth Elements; Extraction, Analysis and Application) Moscow, Izd-vo AN SSSR, 1959. 331 p. 2,200 copies printed.

Resp. Ed.: D. I. Ryabchikov, Professor; Editorial Board: I. P. Alimarin, Corresponding Member, USSR Academy of Sciences, I. R. Zazmerskiy, Doctor of Chemical Sciences, L. V. Koslovev, Candidate of Technical Sciences, V. I. Kuznetsov, Doctor of Chemical Sciences, M. M. Senyavin, Candidate of Chemical Sciences, and Yu. S. Sklyarenko, Candidate of Chemical Sciences; Eds. of Publishing House: D. H. Tritsoov and T. G. Levi; Tech. Ed.: K. G. Matviets.

PURPOSE: This book is intended for scientists, chemists, teachers and students of higher educational institutions, chemical and industrial engineers, and other persons concerned with the extraction, preparation, use, or study of rare earth elements.

COVERAGE: This collection contains reports presented at the June 1956 Conference on Rare Earth Elements at the Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy of the Academy of Sciences USSR. The articles treat chemical methods of separating rare earth mixtures, methods of processing rare earth ores, ion exchange chromatography, chemical analysis, and some industrial applications of rare earths. Aside from contributing authors, the editors mention the following Soviet scientists, who are studying rare earth elements, rare earth deposits, extraction methods, and the preparation of oxides and salts: Martynov, Molodkov, Khrushchov, Khariovskiy, Carpel, Tumkar, Belousov, Zubov and especially, N. A. Orlov, who first obtained the majority of rare earth elements in the pure state, separated many complex molecular compounds of these elements, and determined their specific properties. References are given at the end of each article.

TABLE OF CONTENTS:

Card 1/11

ALEKSANDROV, B.P.; ANDREYEV, G.A.

Effect of impurities on the density of LiF single crystals.
Fiz. tver. tela 3 no.8:2445-2450 Ag '61.   (MIRA 14:8).

1. Fiziko-tekhnicheskiy institut im. akademika A.F. Ioffe
AN SSSR, Leningrad.
                    (Lithium fluoride crystals)

ALEKSANDROV, B.P.; ANDREYEV, G.A.

Formation of an (OH)⁻impurity during the growth of LiF crystals
from a melt. Fiz. tver. tela 3 no.9:2835-2840 S '61.
                                                      (MIRA 14:9)
1. Fiziko-tekhnicheskiy institut imeni A.F. Ioffe AN SSSR,
Leningrad.
           (Lithium fluoride crystals—Growth)

ANDREYEV, G.A.; ALEKSANDROV, B.P.

Solubility of lithium oxalate in water at various temperatures.
Zhur. neorg. khim. 6 no.7:1727-1728 Jl '61.   (MIRA 14:7)

1. Fiziko-tekhnicheskiy institut imeni A.F. Ioffe, AN SSSR
                (Lithium oxalate)

ALEKSANDROV, B.P.; ANDREYEV, G.A.; BORISOV, S.A. [deceased]; IVANOV, I.A.

Increasing the accuracy and speed of the flotation determination of single crystal density. Zav.lab. 28 no.6:707-709 '62.
(MIRA 15:5)
1. Fiziko-tekhnicheskiy institut imeni A.F. Ioffe AN SSSR.
(Crystals)

L 25111-65   EWT(m)/T/EWP(t)/EWP(b)   IJP(c)   JD

ACCESSION NR: AP5003432   S/0181/65/007/001/0177/0182

AUTHOR: Andreyev, G. A.; Aleksandrov, B. P.

TITLE: Flotation investigation of the distribution of impurities of singly-
charged ions in the growth of NaCl single crystals

SOURCE: Fizika tverdogo tela, v. 7, no. 1, 1965, 177-182

TOPIC TAGS: impurity distribution, distribution coefficient, single crystal,
crystal growth, sodium chloride, electron configuration, ionic radius

ABSTRACT: A method is proposed for finding the distribution coefficient (the
ratio of the impurity concentrations in the solid and liquid phases, respective-
ly) by measuring the density of crystals after each of two successive crystalliza-
tions from a melt containing the impurity. The method is a refinement of the
flotation method and is used to determine the distribution of impurities of
singly-charged ions in NaCl crystallized from the melt. The impurities were ions
of alkali metals and halogens, which have, like the ions of the host substance,
a spherically-symmetrical electron configuration. The single crystal was grown

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L 25111-65

ACCESSION NR: AP5003432   /

by the Kiropoulos method. A study of the dependence of the effective distribu-
tion coefficient on the impurity concentration and on the crystal growth rate has
shown that the impurities have a practically equilibrium distribution at growth
rates 0.5 mm/min and below, and that the crystal density depends linearly on the
impurity content in the melt. A correlation was observed between the impurity
distribution coefficient and the amplitude difference between the ionic radii of
the impurity and substitutional ions. A list of the obtained distribution coef-
ficients is given in Table 1 of the enclosure. Orig. art. has: 4 figures, 5
formulas, and 1 table.

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

SUBMITTED: 08Jul64   ENCL: 01   SUB CODE: SS, NP

NR REF SOV: 006   OTHER: 012

Card 2/3

L 25111-65

ACCESSION NR: AP5003432

Table. 1.   Distribution coefficients of impurities
between the melt and the crystal

Impurity.	Concent-ration in salt, at. %	Distribution coeffic.		Concent-ration in melt, at. %	Distribution coeff.
F⁻ . . .	4	{ 0.09 ± 0.01 0.08 ± 0.01	Li⁺ . .	1	{ 0.190 ± 0.01 0.189 ± 0.01
Br⁻ . .	0.1	{ 0.645 ± 0.005 0.648 ± 0.005	K⁺ . . .	1	{ 0.190 ± 0.008 0.189 ± 0.008 0.19 ± 0.01 0.20 ± 0.01
Br⁻ . .	0.2	{ 0.657 ± 0.005 0.655 ± 0.005			
J⁻ . . .	0.5	{ 0.061 ± 0.006 0.069 ± 0.006	K⁺ . . .	2	{ 0.17 ± 0.01 0.18 ± 0.01
J⁻ . . .	1	{ 0.056 ± 0.008 0.054 ± 0.008	Rb⁺ . .	4	{ 0.036 ± 0.006 0.039 ± 0.006

Card 3/3

L 40635-66   EWT(m)/EWP(t)/ETI   IJP(c)   JD/JG

ACC NR: AP6023626   (N)   SOURCE CODE: UR/0192/66/007/002/0179/0183

AUTHOR: Bakulin, Ye. A.; Aleksandrov, B. P.

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

TITLE: Effect of structure of solution on the mobility of isotopic ions $Li^{(6)}$+ and $Li^{(7)}$+

SOURCE: Zhurnal strukturnoy khimii, v. 7, no. 2, 1966, 179-183

TOPIC TAGS: lithium, isotope, solution property, solvation, hydration

ABSTRACT: The method of ionic mobilities was used to study the dependence of the relative mobility difference ε of isotopic ions $Li^{(6)}$+ and $Li^{(7)}$+ on the concentration (in the range of 3.45—22.6 g-eq/1000 g H_2O) and temperature (20—70°) of $LiNO_3$ solutions in which the measurements were made. The calculations were carried out by using the formula

$$\varepsilon = \frac{C_0 - \bar{C}}{C_0(1 - C_0)} \cdot \frac{l}{vt},$$

where l is the length of the column of the solution studied, v the average velocity of lithium ions, t the time of the experiment, C_0 the relative content of the light Li isotope in the original $LiNO_3$ solution, and $\bar{C}$ the relative content of the light Li

Card 1/2   UDC: 541.123.22

L 40835-66

ACC NR: AP6023626

isotope after the experiment. ϵ was found to be independent of the solution tempera-
ture at all the temperatures, indicating that changes in the solution temperature can-
not appreciably affect the immediate surroundings of the isotopic ion, which deter-
mine its mobility. At a concentration of 9.20 g eq/1000 g H_2O, a sharp change is ob-
served in the dependence of ϵ (Li$^{(6)}$+, Li$^{(7)}$+) on the concentration of $LiNO_3$. This
is apparently due to the fact that the so called "total solvation limit" is reached:
all the water in the solution is used for a monolayer hydration of the ions present in
the solution, and the arrival of new ions causes the start of an impairment of the
existing hydration, i. e., of the structure of the solution. Orig. art. has: 4 fig-
ures, 2 tables, and 2 formulas.

SUB CODE: 07/ SUBM DATE: 15May64/ ORIG REF: 008/ OTH REF: 006

Card 2/2 mlp

ALEKSANDROV, Boris Sergeyevich; ALEKSEYEV, A.P.; ZABOLOTSKIY, F.D.;
KONDAKOV, A.Yu.; NEGODAYEV, V.I.; RYB'YEV, I.A.; SARSATSKIKH,
P.I.; CHARUYSKIY, A.P.; SHOMINOV, I.S.; BABKOV, V.F., doktor tekhni-
cheskikh nauk, professor, redaktor; CHVANOV, V.G., redaktor; MAL'KO-
VA, N.V., tekhnicheskiy redaktor.

[Handbook for road foremen] Spravochnoe rukovodstvo dlia dorozhnogo
mastera. Pod red. V.F.Babkova. Moskva, Nauchno-tekhn. izd-vo avto-
transportnoi lit-ry, 1954. 450 p. [Microfilm]   (MLRA 8:2)
        (Roads)

ALEKSHNDROV, C.S.

C A

An electrical high-pressure manometer. B. S. Aleksandrov and L. F. Vereshchagin. *J. Tech. Phys.* (U.S.S.R.) 9, 843-6(1939); *Chem. Zentr.* 1940, I, 1080.—The construction and calibration of a manganin manometer are described.   H. R. Wirth

AUTHOR: Aleksandrov, B. S.   SOV/32-24-7-57/65

TITLE: A Laboratory Vibration Mill (laboratornaya vibromel'nitsa)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol. 24, Nr 7, pp. 902 - 902
              (USSR)

ABSTRACT: At the institute mentioned below a simple and convenient
              vibration mill of low capacity was constructed. From the
              diagram given may be seen that the mill has a motor of 0,25 kW
              with a fly wheel and an excentric bolt, the excentricity of
              which was fixed empirically. The bolt on a ball bearing fits
              into the opening of a rod the lower part of which moves in a
              bronze slider mounted in a support. The support and the motor
              are mounted on a common base. The upper part of the rod supports
              a container of a content of about 150 cm^3, which is filled to
              3/4 of its content with steel balls of a diameter of 8 mm. When
              the motor is switched on the container makes circular motions
              with an amplitude of about 7 mm and a frequency of 1500 per
              minute. The mill is used for the crushing of salts; after a
              10 minutes operation a fineness is obtained which lets pass 60%
Card 1/2   of the ground material through a 250 mesh netting. A lid with

A Laboratory Vibration Mill   SOV/32-24-7-57/65

         openings of 6 mm can be screwed onto the container for the
         purpose of sieving. Thus the ground material passes but the
         balls do not.
         There is 1 figure.

ASSOCIATION: Khar'kovskiy filial Vsesoyuznogo nauchno-issledovatel'skogo
         instituta khimicheskikh reaktivov (Khar'kov Branch of the
         All-Union Scientific Research Institute of Chemical Reagents)

Card 2/2

IGOLKIN, N.I., red.; GRIGORENKO, M.G., red.; STANKEVICH, V.A., red.;
TELEGIN, M.Ya., red.; SOROKIN, B.S., red.; ALEKSANDROV,
B.S., red.; BYALOBZHESKIY, G.V., red.

[Technical specifications for the maintenance and repair of
automobile roads] Tekhnicheskie pravila soderzhaniia i re-
monta avtomobil'nykh dorog (VSN 22-63). Moskva, Transport,
1965. 264 p.   (MIRA 18:10)

1. Russia (1917- R.S.F.S.R.) Ministerstvo avtomobil'nogo
transporta i shosseynykh dorog.

ALEKSANDROV, B. S.

PHASE I BOOK EXPLOITATION   SOV/2355

Akademiya nauk SSSR. Institut kristallografii

Rost kristallov, tom 2 (Growth of Crystals, Vol. 2) Moscow, 1959. 298 p.
Errata slip inserted.   3,000 copies printed.

Resp. Ed.: A. V. Shubnikov, Academician, and N. N. Sheftal', Doctor of
Geological and Mineralogical Sciences; Ed. of Publishing House:
I. S. Aleksandrov; Tech. Ed.: T. V. Polyakova.

PURPOSE: This book is intended for scientists and researchers engaged in
crystallography and in growing industrial monocrystals.

COVERAGE: This is the second of two volumes on crystal growth. The first
volume contained reports delivered at the First Congress on Crystal Growth,
while the present volume also contains an extensive study of corundum synthesis
by E. F. Poyer (deceased). These studies reflect the development of Soviet
research in crystallography in the period following the first congress.
The studies contain some essentially new results obtained by Soviet scientists.
The editors express the hope that these studies will unite the efforts of Sov-
iet scientists engaged in studying the process of crystal growth and in grow-
ing industrially valuable monocrystals. No personalities are mentioned.
References are given at the end of each article.

ALEKSANDROV, B.S.

Methodology for filling and sealing ampules of unstable injection
solutions. Apt. delo 13 no.3:19-21 My-Je '64.   (MIRA 18:3)

1. Khar'kovskiy nauchno-issledovatel'skiy khimiko-farmatsevticheskiy
institut.

SPENDIAROV, N.N.; DOBROKHOTOVA, V.K.; PAVLOVA, Ye.N.; NABOYKIN, Yu.V.;
ALEKSANDROV, B.S.

Zone refining of anthracene. Trudy IREA no.23:3-10 '59.
(MIRA 13:7)

(Anthracene)

STARTSEV, V.I., otv. red.; ALEKSANDROV, B.S., red.; BELYAYEV, L.M.,
     red.; BRUDZ', V.G., red.; VOYTOVETSKIY, V.K., red.;
     GALANIN, M.D., red.; DISTANOV, B.G., red.; KLIMOV, A.P.,
     red.; SEMENENKO, M.G., red.; SHAMOVSKIY, L.M., red.

[Scintillators and scintillation materials] Stsintilliatory i
stsintilliatsionnye materialy. Moskva, Gos. komitet Soveta
Ministrov SSSR po khimii, 1960.   319 p.   (MIRA 15:4)

1. Koordinatsionnoye soveshchaniye po stsintilliatoram. 2nd, 1957.
          (Scintillation counters)

/8.9500

S/058/62/000/006/066/136
A061/A101

AUTHORS: Aleksandrov, B. S., Dobrokhotova, V. K., Naboykin, Yu. V.,
             Spendiarov, N. S., Uglanova, V. V.

TITLE: Zone purification of substances for scintillation single crystals

TEXT: A system of short tubular heaters on a vertical unit was used to
perform the zone purification of naphthalene, stilbene, anthracene, and other
substances for scintillation single crystals. The effect of purification proved
positive in nearly all cases. In particular, the intensity of luminescence in
the maximum was enhanced by 1.5 - 2.5 times.

[Abstracter's note: Complete translation]

Card 1/1

9.7000

AUTHORS: Aleksandrov, B. S., Dobrokhotova, V. K., Naboykin, Yu. V.,
             Spendiarov, N. S., Uglanova, V. V.

TITLE: Zonal purification of substances for scintillating single
             crystals

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 15, 1962, 30, abstract
             15B182 (Sb. "Rost kristallov. v. 3", M., AN SSSR, 1961,
             332 - 337)

TEXT: An apparatus for purifying substances obtained by fractional re-
crystallization from a fusion (zonal melting method) was developed. Zonal
melting as a method of fine purification can be used for various organic
substances. It was used for purifying the following substances which are
scintillation materials: naphthalene, stilbene, anthracene, di-β-naphthyl
ethylene, 2,5-dibiphenylyl-1,3,4-oxadiazol, 2,5-di-α-naphthyl-1,3,4-oxadia-
zol and phenanthrene with impurities. The effect of zonal purification
was observed from the formation of the coarse-grained structure and from
the increase in intensity of luminescence. As the degree of zonal purifi-
Card 1/2

Zonal purification of ...

S/081/62/000/015/002/038
B168/B101

cation decreases sharply if the raw material is highly impure, purifica-
tion by chemical methods is advisable before applying the zonal melting
method.   [Abstracter's note: Complete translation.]

Card 2/2

ALEKSANDROV, B.S.

Combined mechanization in the production of injectable solutions
in ampules. Med.prom. 16 no.5:25-33 My '62.   (MIRA 15:9)

1. Khar'kovskiy nauchno-issledovatel'skiy khimiko-farmatsevtiche-
skiy institut.
                    (DRUG INDUSTRY)   (SOLUTIONS (PHARMACY)

NOVIKOV, A.I., inzh.; ALEKSANDROV, B.S., inzh.

Automatic testing of solutions in ampules. Mekh. i avtom.
proizv. 18 no.1:16-18 Ja '64. (MIRA 17:8)

ALEKSANDROV, B.T. inzh.

Inspection of municipal gas agencies. Bezop.truda v prom. 4 no.6:
28-29 Je '60.   (MIRA 14:3)

1. Upravleniye Moskovskogo gorodskogo okruga Gostortekhnadzora
RSFSR.   (Gas companies—Safety measures)

ALEKSANDROV, B. V.

86-58-3-37/37

AUTHOR: Aleksandrov, B.V., Lt Col

TITLE: The Use of Rocket and Jet Weapons in Combat (Boyevoye primeneniye raketnogo i reaktivnogo oruzhiya)

PERIODICAL: Vestnik vozdushnogo flota, 1958, Nr 3, pp 91-96 (USSR)

ABSTRACT: On the basis of foreign literature, the author reviews the various types of rocket and jet weapons of the USA, and their use in combat. Five photos.

AVAILABLE: Library of Congress

Card 1/1

ALEKSANDROV, B.V.

Radiographic studies of the variability and nature of the
inheritance of the number of vertebrae in crossbreeding the
Large White breed with the Swedish Landrace for market pro-
duction. Biul.MOIP. Otd.biol. 65 no.3:157 My-Je '60.
(MIRA 13:7)

(SWINE BREEDING)   (SPINE)

MASLIY, L.K.; ALEKSANDROV, B.V.

> Silicon-containing acid amides. Part 1: Preparation of methyldialkyl
> (ethylacetamido)methylsilanes. Zhur. ob. khim. 35 no.6:1058-
> 1060 Je '65.   (MIRA 18:6)

L 61483-65   EWT(m)   JAJ/RM

ACCESSION NR: AP5016410   UR/0079/65/035/006/1058/1060
                                       547.298.1.546.287

AUTHOR: Masliy, L.K.; Aleksandrov, B.V.

TITLE: Studies of silicon-containing acid amides. Part 1. Synthesis of methyldialkyl (ethylacetamido)methylsilanes

SOURCE: Zhurnal obshchey khimii, v. 35, no. 6, 1965, 1058-1060

TOPIC TAGS: silane, organosilicon compound, amide, plasticizer synthesis, repellent synthesis

ABSTRACT: A series of silyl-substituted ethylacetamides was obtained by reacting methyldialkylhalomethylsilanes (I) with sodium ethylacetamide (II). The compounds obtained are of interest as potential repellents, plasticizers, etc.

$$CH_3(R)_2SiCH_2X + CH_3CON(Na)C_2H_5 \rightarrow CH_3(R)_2SiCH_2N(C_2H_5)COCH_3 + NaX$$
$$\text{(I)} \qquad\qquad \text{(II)}$$

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L 61483-65

ACCESSION NR: AP5016410

The reaction with lower representatives occurred with relative ease and high yields. As the length of the alkyl radicals at the silicon atom increased, the reaction rate dropped rapidly. The reaction is accelerated significantly in the presence of small amounts of diethylaniline. All the synthesized amides (whose properties are tabulated) are transparent liquids with a very specific menthol odor. The synthetic procedure employed is described. Orig. art. has: 1 table and 1 formula.

ASSOCIATION: none

SUBMITTED: 31Jan64   ENCL: 00   SUB CODE: OC

NO REF SOV: 003   OTHER: 005

Card 2/2

ALEKSANDROV B YE.

121-8-20/22

AUTHOR   ALEKSANDROV, B.Ye.,
TITLE   The Experimental Use of Thread-Cutting Die Heads on Lathes under
             the Conditions of Small-Series Production.
             (Opyt primeneniya rezbonareznykh golovok na tokarnykh stankakh v
             usloviyakh melkoseriynogo proizvodstva - Russian)
PERIODICAL   Stanki i Instrument, 1957, Vol 28, Nr 8, pp 40-41, (U.S.S.R.)
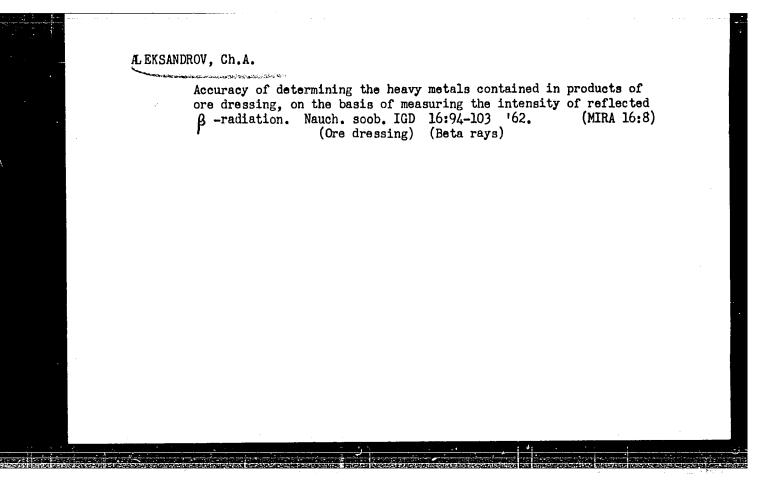
ABSTRACT   The "Frezer" works produce thread-cutting die heads which are in-
             tended for use on turret lathes. In order to make them capable of
             being used for the thread-cutting of centers on lathes a certain
             change of the construction is necessary. In Fig.1 the changed thread-
             cutting die head of the 2K type is shown in a skeleton sketch and
             explained. During work the thread-cutting die head moves in the
             jacket 3). The work piece is clamped by the centers of the head-
             stock as well as that of the thread-cutting die head. The transfor-
             mation of the type 3 K die head was carried out analogously. In
             Fig.2) a device for the automatic shifting of the thread-cutting
             die head during operation is shown; it is mounted in the blade
             holder on the support. The wage for piecework of this operation
             could be decreased 2 fold compared with thread-cutting by means of
             a threading tool. At the same time the cleancut of the thread was
             improved. The maximum thread lenght of the type 2 K is up to 80 mm
             and of the 3 K type up to 100 mm.

Card 1/2

121-8-20/22

The Experimental Use of Thread-Cutting Die Heads on Lathes under
the Conditions of Small-Series Production.

ASSOCIATION   Not given.
PRESENTED BY
SUBMITTED
AVAILABLE   Library of Congress
Card 2/2

ALEKSANDROV, Ch.A.

Accuracy of determining the heavy metals contained in products of
ore dressing, on the basis of measuring the intensity of reflected
β -radiation. Nauch. soob. IGD 16:94-103 '62.   (MIRA 16:8)
(Ore dressing) (Beta rays)

DIMITROVA, St., inzh.; ALEKSANDROV, Ch., inzh.

There are good prospects for obtaining zinc high-grade concentrate at the state Mining Enterprise "Ustrem". Min delo 17 no.1:22-25 Ja '62.
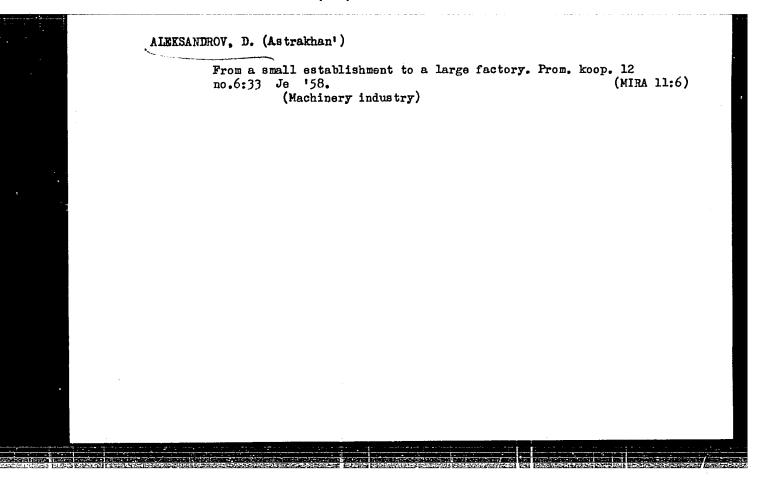
1. Nauchnoizsledovatelski institut po minnoto obogatiavane, Sofia.

ALEKSANDROV, D.

and M. SZNAJDERMAN

"Treatment of Lipoid Nephrosis by Means of ACTH." (Second Internal Clinic
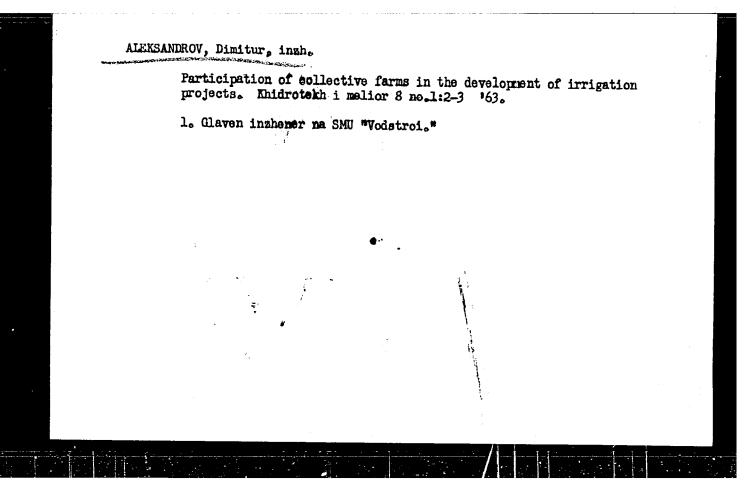of the Medical Academy in Warsaw).

SO:Polskie arch. med. wewnetrz., Vol. 23 (1953), No. 5, pp. 635-642.

ALEKSANDROV, D. (Astrakhan')

From a small establishment to a large factory. Prom. koop. 12
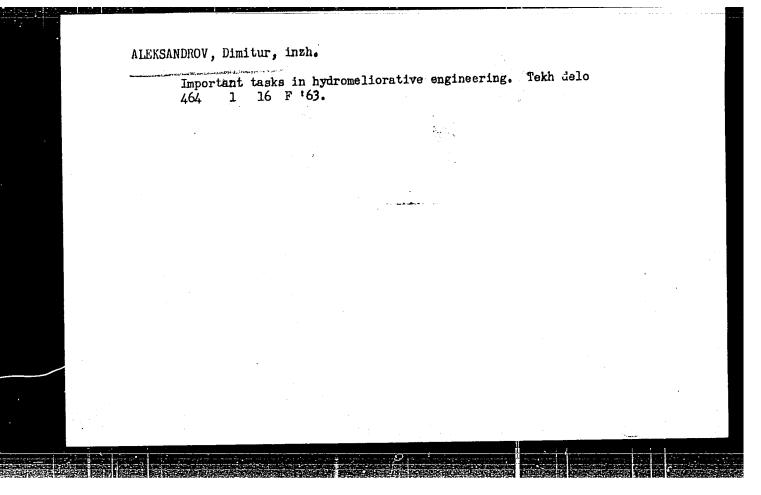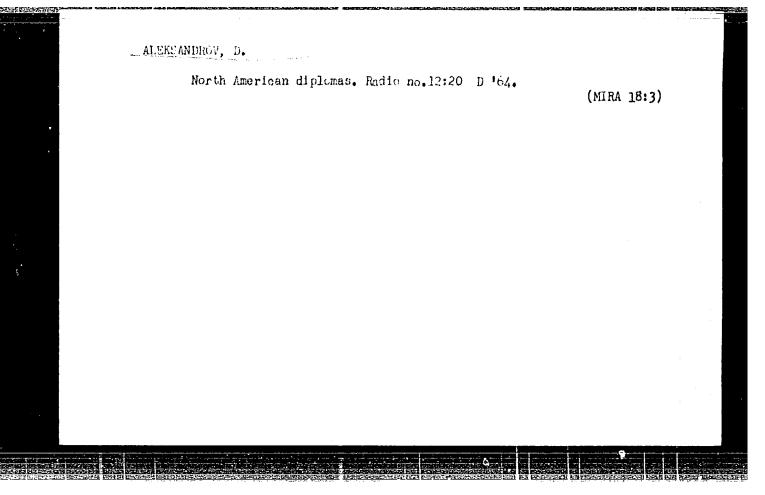no.6:33   Je '58.   (MIRA 11:6)
(Machinery industry)

ALEKSANDROV, D., inzh.

The GI1-10 generator for induction heating. Mashinostroene 11
no.12:42-44 D '62.

1. Razvoinoto predpriiatie "Promishlena elektronika," Gabrovo.

ALEKSANDROV, Dimitur, inzh.

Participation of collective farms in the development of irrigation projects. Khidrotekh i melior 8 no.1:2-3 '63.

1. Glaven inzhener na SMU "Vodstroi."

ALEKSANDROV, Dimitur, inzh.

Important tasks in hydromeliorative engineering. Tekh delo
464   1   16   F '63.

ALEKSANDROV, D.

North American diplomas. Radio no.12:20 D '64.

(MIRA 18:3)

ALEKSANDROV, D.D.; PTITSYN, S.V.

Measurement of gas pressure in apparatus with mercury. Izv.
NIIPT no.1:60-66 '57.

Control of gas separation in the formation of high-voltage
rectifiers. Ibid.:67-73 '

(MIRA 18:9)

ALEKSANDROV, D.D.

8(3) $\phi \nu$ PHASE I BOOK EXPLOITATION   SOV/1386

Moscow. Nauchno-issledovatel'skiy institut postoyannogo toka

Peredacha energii postoyannym i peremennym tokom (Power Transmission by Direct
   and Alternating Current) Moscow, Gosenergoizdat, 1958. 334 p. (Series:
   Its: Izvestiya, sb. 3) 3,350 copies printed.

Ed.: Pintsov, A.M.; Tech. Ed.: Voronetskaya, L.V.; Editorial Board: Shchedrin,
   N.N., Doctor of Technical Sciences, Corresponding Member, Uzbek SSR Academy
   of Sciences, Professor (Chief Ed.); Gertsik, A.K., Engineer; Yemel'yanov, V.I.,
   Candidate of Technical Sciences; Pimenov, V.P., Candidate of Technical
   Sciences; Pintsov, A.K., Candidate of Technical Sciences; Posse, A.V.,
   Candidate of Technical Sciences; Sena, L.A., Doctor of Physical and Mathemat-
   ical Sciences, Professor; Sonin, M.R., Engineer; Shekhtman, M.G., Candidate
   of Technical Sciences.

PURPOSE: This collection of articles, issued by the USSR Ministry of Electric Power
   Stations, is intended for scientists, engineers and designers of high-voltage
   overhead transmission lines.

Card 1/13

Power Transmission by Direct and Alternating (Cont.)   SOV/1386

COVERAGE: The collection covers various problems connected with d-c and a-c high-voltage transmission lines, gives theoretical fundamentals of these problems and describes experimental investigations and practical conclusions. References appear separately after each article.

TABLE OF CONTENTS:

SECTION I. DIRECT CURRENT

Experimental investigation of mercury rectifiers was extensively carried out recently by NIIPT of MES (Direct-Current Scientific Research Institute of USSR Ministry of Electric Power Stations) in substations of the Kashira-Moscow and Stalingrad-Donbass electric transmission systems. The "circulation manometer", recently developed by NIIPT, made it possible to investigate the effect of foreign gas admixtures in mercury vapor on the electric strength of a high-voltage rectifier. The results of this investigation have now been introduced in practice. There are 9 diagrams and drawings, and 13 references, of which 5 are Soviet, 5 English and 3 French.

/1

Power Transmission by Direct and Alternating   (Cont.)   SOV/1386

Panov, I.P. Dielectric Ignitor for Cathode Spot Firing   20
    Experimental investigation of cathode spot firing carried out in the
    laboratories of NIIPT has proved that dielectric ignitors are free of
    the many disadvantages characteristic of semiconductor ignitors.
    Dielectric ignitors are recommended for use not only in mercury recti-
    fiers, but also in various gas-discharge devices where forced repetitive
    firing is required. There are 9 diagrams and drawings and 7 refer-
    ences, of which 4 are English and 3 Soviet.

Matyashevich, V.V. Formation of Mercury Condensate in an Operating
    Rectifier   31
    Investigation has been carried out on the effect of mercury condensate
    droplets on the operating stability of mercury rectifiers. Experi-
    mental results made it possible to make recommendations on operating
    techniques and some design changes as well. There are 7 diagrams and
    drawings and 5 references, all Soviet.

Dolgikh, V.A., and N.I. Lavrov. Investigation of Voltage Distribution in
    the Plate Circuit of a High-voltage Mercury Rectifier   43

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Power Transmission by Direct and Alternating (Cont.)   SOV/1386

Investigations carried out by V.D. Andreyev and B.G. Mendelev in
1949-1950 at VEI on voltage distribution in the plate circuit of a type
V-1(VR-50/120) mercury rectifier showed considerable unevenness of
distribution. The recommendation was to increase the power of the
plate voltage divider. In 1953 at the Electrovacuum Laboratory of
NIIPT a series of measurements was completed by V.A. Dolgikh, I.G.
Goloshchekin and N.I. Lavrov (and in 1954 V.A. Ivanchenko) on the
dependence of voltage distribution on operating conditions. The
measurement method was developed by L.N. Volkov and D.D. Knyazev and
was based on the use of an oscillograph and a capacitive voltage-
divider. In conclusion, the authors recommend some changes in operat-
ing practice and in design. There are 3 tables of oscillograms,
4 diagrams and 5 Soviet references.

Gertsik, A.K. Ionization Characteristics of Paper-Oil Capacitor
Insulation During Application of Voltage With a Distorted Wave Form   62
    The above characteristics were obtained as a result of experimental
    investigation carried out in NIIPT laboratories by the author and
    junior scientists V.P. Matveyev and D.S. Lavrov. There are 13
    diagrams and drawings and 14 references, of which 7 are Soviet and 7

Card 4/13

Power Transmission by Direct and Alternating (Cont.)   SOV/1386

Merkhalev, S.D. Wet Flashover Voltage Characteristics of Insulators
in D-C Transmission Lines   89
    The investigation was carried out at NIIPT by the author on P-7, Sht-35,
    IShD-35, KO-400 and MT-220 type insulators. There are 6 diagrams and
    drawings and no references.

Groys, Ye.S. Insulation Test Voltage Requirements in the Stalingrad
GES-Donbass Transmission System   100
    This article is the result of the author's experience gained from
    his participation in designing the Stalingrad GES-Donbass transmis-
    sion system. D-c transmission is planned for a distance of 470 km at
    800 KV and transmitted power of 750 Mw. There are 3 tables, 3 draw-
    ings and 5 Soviet references.

Posse, A.V. and A.M. Reyder. Series Connection of Bridge Rectifiers
and Rectifiers in a D-C Transmission System   115
    Mercury rectifiers produced today for d-c power transmission are
    designed for a voltage of about 100 kv. For transmission at 400 kv

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Power Transmission by Direct and Alternating (Cont.)   SOV/1386

up to 600 kv, it is necessary to employ a cascade connection of bridge
rectifiers, with one or several rectifiers in the arm of each bridge.
The best combination of the number of bridges and the number of rectifi-
ers in the arm of each bridge has not yet been definitely chosen.
The difficult problems connected with this choice were investigated by
NIIPT in the Kashira-Moscow h-v d-c transmission line. This article
gives the results of investigation and makes recommendations. There
are 2 tables, 7 oscillograms, 1 diagram and 3 references, of which 2
are Soviet and 1 German.

Shekhtman, M.G. and N.A. Shipulina. Parameters of Equipment of Con-
version Substations in the Kashira-Moscow D-C Transmission Line   129
    Firing of mercury rectifiers causes current oscillations in a tens
    and hundreds kc/sec frequency range. Study of this source of radio
    interference requires exact knowledge of equipment parameters for
    frequencies up to 1 Mc. The authors describe methods of measuring
    parameters and discuss the results obtained in the experimental
    Kashira-Moscow d-c transmission line. The three data tables are recom-
    mended for practical use for those working in radio interference sup-
    ·   ·· ··· ··· 6 diagrams and no references.

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Power Transmission by Direct and Alternating (Cont.)   SOV/1386

Shekhtman, M.G. Damping of Plate Voltage Oscillations After Extinction of
of Mercury Rectifiers in Conversion Substations   143
   Experimental investigation was carried out by NIIPT in the Kashira-
   Moscow d-c transmission line on damping of voltage oscillations caused
   by extinction of one or more mercury rectifiers in substations. The
   author describes this investigation and discusses the results. He also
   explains Engineer V.A. Merzheyevskiy's method of calculating the parameters
   of damping circuits, especially of power transformers. There are 3 tables,
   3 diagrams, 1 appendix and no references.

Leshukov, N.D. Damping of Voltage Oscillations in Overhead D-C Transmission
Lines (as applied to the Stalingrad-Donbass transmission line)   161
   Theoretical and experimental investigations were carried out by VEI and
   NIIPT in the experimental Kashira-Moscow d-c transmission line on damping
   of voltage oscillations. Technical data from the Sweden-Gotland d-c
   transmission line were used by the author. The results of these investi-
   gations were put into practice in the Stalingrad-Donbass transmission line,
   chiefly according to recommendations of M.G. Shekhtman, V.M. Kvyatkovskiy,
   V.N. Vyatkin, N.A. Kanashchenko and A.A. Akopyan. There are 11 oscillo-
   grams and diagrams and 5 references, of which 2 are Soviet, 1 English,
   1 Swedish, and 1 German.

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Power Transmission by Direct and Alternating (Cont.)   SOV/1386

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Power Transmission by Direct and Alternating (Cont.)   SOV/1386

Berlin, Ye.M. Current Regulator for H-V D-C Transmission Lines   201
A current regulator, developed by Tekhbyuro MES and installed in the
Kashira-Moscow d-c line, proved to be too complicated and not sufficiently
reliable because of the great number of tubes required (about 20). An-
other type of current regulator (a contactless type developed in 1944
by Professors I.L. Kaganov and A.A. Sakovich) also was found unsuitable
due to its lag and narrow zone of regulation (50°-60°). The author was
commissioned to design a "tubeless" current regulator, which he completed
in 1952. Experimental investigations on it proved that the previous dis-
advantages were removed. There are 5 diagrams and 3 Soviet references.

Melik-Sarkisov, B.S. Investigation of Shunting Devices for D-C Transmission
Lines   210
Investigations were carried out by NIIPT in the Kashira-Moscow transmis-
sion line on the use of shunting devices during repair of mercury rectifiers,
and without interruption of electric transmission. Shunt rectifiers
and shunt disconnectors were tested and approved for use in the Stalin-
grad-Donbass system. There are eleven diagrams and no references.

Card 9/13

Power Transmission by Direct and Alternating (Cont.)   SOV/1386

Shekhtman, M.G. Electromagnetic Power of a Synchronous Machine
Operating With a Rectifier as a Load   225
    The author explains the theory of synchronous machines operating at
    full power against mercury rectifiers, and discusses the conditions of
    operation of synchronous machines from the point of view of their electro-
    magnetic power. There are two diagrams and no references.

Shipulina, N.A. Bridge System With Capacitors Connected in Series To
Circuit Windings of the Transformer   234
    The author explains the theory and discusses the results of experi-
    mental investigation on the above problem. There are 12 diagrams and
    no references.

Mel'gunov, N.M. Basic Features of a System With Bridge Converters
Connected Through Capacitors in D-C Transmission Lines   255
    The author explains the theory and practical application of this
    system, which consists in the possibility of connecting bridge converters
    to an a-c network not through transformers, as is usually done, but
    through a bank of capacitors (N.M. Mel'gunov holds author's certificate
    No.105207, 1952,on this method). There is 1 appendix, 16 oscillograms
    and 5 Soviet references.

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Power Transmission by Direct and Alternating (Cont.)   SOV/1386

Kuchinskiy, G.S. The Possibility of Using Cable Paper in the Manufacture of Power
Capacitors For D-C Transmission Lines   282

The author describes a method of reducing the cost of capacitor batteries
operating in ripple voltage circuits by using cable paper in their manufac-
ture. Cable paper costs 10 times less than conventional capacitor paper
but its electric strength also is less and therefore its thickness must be
greater. In determining the cost of Kva capacitors the author draws on
the experience of the high-voltage laboratory of LPI (Leningradskiy poli-
tekhnicheskiy institut) where cable-paper capacitors for d-c and ripple
voltages have been produced on a semi-industrial scale since 1938. The
technical editor suggests that plants manufacturing capacitors consider
the author's results when producing capacitors for the above-mentioned
conditions. He notes, however, that the cost relationships advanced by
the author cannot yet be considered justified owing to the lack of operating
experience which would indicate a long service life of cable-paper capacitors
in comparison with conventional capacitors. In his comparisons the
author used 35-40 KV/mm as the working voltage density. There are 2
diagrams and 4 Soviet references.

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Power Transmission by Direct and Alternating (Cont.)   SOV/1386

Kraychik, Yu.S. and A.M. Pintsov. Electrical Parameters of D-C Transmission
Lines With Single-core Metal-sheathed Cables   289
   The author obtains design parameters and equivalent circuits of d-c
   transmission lines consisting of single-core cable with a viscous saturant
   and lead or aluminum sheathing. There are 6 diagrams and 3 Soviet ref-
   erences.

            SECTION II. ALTERNATING CURRENT

Koshcheyev, L.A. and Yu.A. Rozovskiy. Static Stability of Long-distance
Electric Transmission Lines With Auxiliary Synchronous Condensers   299
   NIIPT has carried out an investigation on comparative stability of long
   distance transmission lines with and without synchronous condensers. The
   investigations were carried out in the Stalingrad GES - Moscow line.
   The authors describe the tests and their results. They mention experi-
   mental work done by A.I. Kazachkov, V.A. Anreyuk, A.P. Zhilin and A.V.
   Burmistrov. I.A. Kosov and Ye.F. Arzamastsev participated in develop-
   ing the stability comparison model. There are 7 diagrams and 7 ref-
   erences, all Soviet.

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Power Transmission by Direct and Alternating (Cont.)   SOV/1386

Tikhodeyev, N.N. and A.N. Tushnov. Flashover Voltages in Wide Air Spaces   313
of A-C Lines
    The intensive Soviet drive for construction of 400-KV and, in the near
future, of 500 - 650 KV transmission lines caused GOST and NIPPT to com-
mission the author to carry out a thorough investigation of known test
results in the USA and new experimental work on this problem. The re-
sults have now been introduced into practice in transmission lines. The
equivalent circuit method for cascade transformers was worked out by
A.K. Gertsik. There are 6 diagrams and 13 references, of which 6 are
English, 5 Soviet and 2 German.

Filippov, A.A. Method of Calculating Corona in Three-phase Transmission   324
Lines With   Bundle Conductors and a Wide Bundle Span
    The author explains the application of bundle conductors to reduce
the effects of corona and describes the method of calculating the charges
and designing the bundle conductors. The results of his findings were
checked experimentally by NII in 1954. There are 2 tables and 4 diagrams.
There are no references.

AVAILABLE: Library of Congress

Card 13/13   JP/fal
                                                          5-1-59

ALEKSANDROV, D.D.; OLENDZSKAYA, N.F.; PTITSYN, S.V.

Investigating the electric strength of high-voltage mercury
rectifiers. Izv.NIIPT no.3:5-19 '58.   (MIRA 12:1)
(Mercury-arc rectifiers)

AUTHORS: Aleksandrov, D. D., Olendzkaya, N. F.,   57-28-4-34/39
             Ptitsyn, S. V.

TITLE: The Electric Strength of a High-Voltage Valve (Elektriches=
             kaya prochnost' vysokovol'tnogo ventilya)

ABSTRACT: The electric strength of a standard valve in a static state
             without load current in dependence on the pressure of mer=
             cury-vapor, hydrogen, helium and air in the valve as well
             as on the interelectrode-distance was investigated here.
             It is shown that the electric strength of a high-voltage
             valve is determined by the rules governing the high-vacuum-
             breakdown. This law is observed in the case of an inter=
             electrode-distance equal to 15 cm up to pressures of the
             order of magnitude $4-5 \cdot 10^{-3}$ mm torr in the case of air and
             mercury-vapors, $7-8 \cdot 10^{-3}$ mm torr in the case of hydrogen
             and $12-18 \cdot 10^{-3}$ mm torr in the case of helium. The transi=
Card 1/2   tion from the domain of the high-vacuum breakdown into that

The Electric Strength of a High-Voltage Valve   57-28-4-34/39

which follows Paschen's law takes place over a certain
intermediate domain where the breakdown voltage decrease
with a rise of pressure and with a reduction of the inter-
electrode-distance. Under the conditions existing here the
magnitude of the breakdown-voltage is influenced by the shape
of the applied voltage. A pulsating voltage with a frequency
of 5o cycles increases the value of its breakdown in the do-
main of the vacuum-breakdown, in comparison to the direct
voltage, by almost 5o%.
There are lo figures and 13 references, 6 of which are
Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy institut postoyannogo toka, Lenin-
grad (Leningrad, Scientific Research Institute for Direct
Current)

SUBMITTED: June 11, 1957

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SOV/109-4-8-9/35

AUTHORS: Ptitsyn, S.V., Aleksandrov, D.D. and Olendzkaya, N.F.

TITLE: Influence of the Intermediate Electrodes on the Ignition
             Voltage of a Self-sustaining Discharge in a High-voltage
             Mercury Rectifier

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 8,
             pp 1278 - 1283 (USSR)

ABSTRACT: Investigation of the influence of the intermediate
             electrodes on the ignition of gas discharges (mercury
             discharge, in particular) was carried out by means of
             the rectifier shown in Figure 1. The anode input of this
             tube is surrounded (see the figure) by the concentric
             cylinders of a capacitive voltage divider, the inter-
             cylinder insulators being made of steatite.. The
             intermediate transverse electrodes or so-called "inserts",
             in the form of discs provided with ring slots and
             circular holes in the middle, were attached to the end
             of the concentric cylinders. All the components of the
             rectifier, except the insulators, were made of high-
             quality steel, the principal insulator being of porcelain.

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Influence of the Intermediate Electrodes on the Ignition Voltage of a Self-sustaining Discharge in a High-voltage Mercury Rectifier

Full details of this tube can be found in the authors' earlier work (Ref 1). The Paschen curves for mercury vapour and various gases were taken at a voltage of 300 kV. The measurements were first carried out while the tube contained four transverse electrodes or inserts. The inserts were then taken out and the sharp ends of the capacity-divider cylinders were provided with ring flanges. The results of the measurements are shown in Figures 2 and 3, where the ignition voltage U_s is plotted as a function of $P_o d$ where P_o is the gas pressure referred to 0 °C and d is the distance between the grid and the anode (this was equal to 15 cm). Figure 2 shows the curves for the case of mercury vapour, while those of Figure 3 are for the rectifier filled with air. Curves 1 of Figures 2 and 3 were taken for a discharge gap without the intermediate electrodes, while Curves 2 were measured in the presence of the inserts. It is seen that in the latter case, the curves are shifted to the right,

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