

ABDULLAYEV, G., Geroy Sotsialisticheskogo Truda; GRUSHKIN, A., red.;
ABBASOV, T., tekhrad.

[Fulfilling the seven-year plan in two years; practices of the
Karl Marx Collective Farm in Kalinin District of Tashkent
Province] Semiletku - v dva goda; opyt kolkhoza im. Karla
Marksa Kalininskogo raiona Tashkentskoi oblasti. Tashkent.
Gos.izd-vo Uzbekskoi SSR, 1960. 39 p. (MIRA 14:2)

1. Predsedatel' kolkhoza im. Karla Marksa Kalininskogo rayona
Tashkentskoy oblasti (for Abdullayev).
(Tashkent Province--Collective farms)

USSR / Cultivated Plants. Fruit Trees. Small Fruit M
Plants. Nut Trees. Tea.

Abs Jour : Ref Zhur - Biologiya, No 6, 1959, No. 25062

Author : Abdullayev, G. A.
Inst : Scientific-Research Institute of Tea and
Subtropical Cultures

Title : Growth and Fruit-Bearing Biology and
Morphology of the Lemon Tree's Different
Varieties in Young Age

Orig Pub : Byul. Vestn. n.-1. in-ta chaya i subtrop.
kul'tur, 1957, No 3, 131-151

Abstract : Investigatory data of 5 varieties and 2
specimens of the lemon tree were submitted,
as a result of which the characteristics
of these varieties are somewhat completed.

Card 1/1

~~ABDULLAYEV, G. A.~~ Master Biol Sci (diss) -- "The biology and morphology of the growth and fruit yield of various types of lemons when young". Tbilisi, 1958, published by the Georgian Agric Inst. 16 pp (Georgian Order of Labor Red Banner Agric Inst), 100 copies (KL, No 8, 1959, 135)

41512-65

2007(1)/2007(1)/2007(1)

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ACCESSION NR. AP401890

ACCESSION NR: AP5015453

"APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R000100120001-6

APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R000100120001-6"

ABDULLAYEV, G. Y. ³

IA 242 T14

USSR/Electricity - Literature

Dec 52

"New Books on Electricity, Electrical Engineering,
and Electric Power Engineering, Published in 1952"

"Elektrichestvo" No 12, p 89

Lists 17 titles published in 1952, including the
following: "Electronic Semiconductors and Their
Applications" (Elektronnyye poluprovodniki i ikh
primeneniye"), 56 pp, by G. M. Abdullayev; and
"Synchronization of Induction Motors by the DAG
System" ("Sinkhronizatsiya asinkhronnykh dvigate-
ley po skheme DAG"), 84 pp, a short manual by
I. B. Uvarov and L. N. Afanas'yev.

242T34

6
ABDULLAYEV, G. Y.

USSR/Physics - Semiconductors, Potential Surge Mar/Apr 52

"Investigating the Temperature Dependence of a Potential Jump (Surge) at the Electrode in Cuprous Oxide," G.M. Abdullayev, Inst of Phys and Math, Acad Sci Azerbaydzhan SSR

"Iz Ak Nauk, Ser Fiz" Vol XVI, No 2, pp 225, 226

Exptl research of high-tension polarization in hole semiconductors, cuprous oxide and selenium, at temp of liquid air was performed by V.I. Lyashenko, G.A. Gedorurus and Z.P. Felvashnikova ("Iz Ak Nauk, Ser

Fiz" 5, 641, 1938; 5, 4-5 1941); they found a potential surge at the anode. Author studied this phenomenon at room temp in various elec fields. He found an increasing surge with de-creasing temp. Indebted to Kh. I. Amirhanov.

220797

ABDULLAYEV, G.M.

Name: ABDULLAYEV, Gəzən Məmməd Əgir-ogly

Dissertation: Investigation of physical processes occurring in selenium rectifiers

Degree: Doc Phys-Mat Sci

Affiliation: Inst of Physics and Mathematics, Acad Sci
Azerbaijan SSR

Defense Date, Place: 9 May 54, Council of Leningrad Phys-Tech Inst
Acad Sci USSR

Certification Date: 23 Mar 57

Source: BMVO 14/57

ABDULLAYEV, G.; ZEYNALOV, A.; MAMEDOV, K.

Effect of X rays on perforated and electron transition. Izv. AN
Azerb. SSR no.11:61-67 N'54 (MLRA 8:11)
(Semiconductors)

ABDULLAYEV, G.; ALIYEV, M.

Determination of $\frac{e}{kT}$ from volt-ohm characteristics of selenium
rectifiers. Izv. AN Azerb. SSR no. 5:3-10 May '55. (MLRA 9:5)
(Electric current rectifiers)(Electric conductivity)

ABDULLAYEV, G. B.

112-6-11843

Translation from: Referativnyy zhurnal, Elektrotehnika, 1957, Nr6, p.9 (USSR)

AUTHOR: Abdullayev, G. B. Akhundov, G.

TITLE: Investigation of Conductivity and Thermo-e.m.f. of Some Semiconductors
(Issledovaniye elektroprovodnosti i termo-e.d.s. nekotorykh poluprovodnikov)

PERIODICAL: Izvestiya AN Az. SSR, 1955, Nr12, pp.3-16

ABSTRACT: Determined were the el. conductivity and thermo-emf of the electron synthetic semiconductors SnSe and Bi₂S₃, which were of interest because thin layers of these compounds are formed in selenium rectifiers, and PbS and MoS₂ (possibility of using these natural minerals for transistors were explored). The measured values of electric conductivity in 10⁻³ ohm⁻¹ cm⁻¹ units are:
SnSe - from 5.128 at 20° to 166 at 300°
Bi₂S₃ - from 0.2 to 77
PbS - from 107.6 to 1755 at 290°
MoS₂ - from 0.1151 to 6.289
Activation energy values are computed. Curves of thermo-emf plotted against temperature for the above semiconductors are given. Bibliography: 4 titles.

Card 1/1

N.A.B.

A. Abdulayev, G. B.

TRANSLATION FROM: Referativnyy zhurnal, Elektrotekhnika,
1957, Nr 2, p. 247 (USSR)

112-2-4273

AUTHOR: Abdulayev, G. B.

TITLE: The Redistribution of Impurities During the Forming of Selenium Rectifiers (O pereraspredelenii primesey pri formovke selenovykh vypryamiteley)

PERIODICAL: Izv. AN Azerb. SSR, 1956, Nr 2, pp. 3-9

ABSTRACT: The opinion is expressed that the increase in forward resistance during forming under high voltage is caused by a decrease in the concentration of haloid impurities in the pn junction which takes place under the effect of a strong electric field. It is also maintained that the subsequent recombination is due to reverse diffusion and to more even distribution of the impurities. High-voltage selenium elements have been produced in which the basic selenium mass contained haloid impurities. There was no impurity in the junction layer between the selenium and the electronic semi-conductor. Selenium was crystalized with the haloid impurities and maintained at a temperature of 214° for 16 hours after which a sulfide or cadmium selenide layer

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The Redistribution of Impurities During the Forming of (Cont.) 112-2-4273

and an upper layer of a lead-cadmium alloy were applied. Before forming the elements had good parameters. After the usual forming they acquired high-voltage characteristics and the forward resistance decreased or remained unchanged. The forward resistance increased after forming at 100 to 110 volts. If a layer of pure selenium is applied between the layer of selenium with impurities and the sulfide or cadmium selenide layer, the forward resistance drops by 15 per cent after an hour forming. This is due to the more even distribution of the impurities in the selenium during the forming and can be verified by calculating the resistance of the selenium. Constant forward resistance after forming can be explained by the fact that increased forward resistance due to increased thickness of the electron semiconductor layer is balanced out by its subsequent decrease as a result of more even distribution of the impurity concentration. Seven bibliographic entries.

Card 2/2

E. N. U.

SOV/112-57-6-13105

Translation from: Referativnyy zhurnal. Elektrotehnika, 1957, Nr 6, p 207 (USSR)

AUTHOR: Abdullayev, G. B.

TITLE: Determining the Components of an Equivalent Electric Circuit for a Semiconductor Rectifier (Ob opredelenii sostavlyayushchikh ekvivalentnoy elektricheskoy skhemy poluprovodnikovykh vypryamiteley)

PERIODICAL: Izv. AN AzSSR, 1956, Nr 3, pp 3-10

ABSTRACT: An equivalent electric circuit of a selenium valve is considered; the circuit comprises resistance R and capacitance C of the barrier layer and the selenium resistance r connected in series with the above two components. The values of R , C , and r can be determined by the substitution method on a conventional AF bridge; however, the method gives ambiguous results. To determine the values graphically, by means of impedance circle diagrams, is cumbersome and inaccurate. A different method of measuring R , C , and r is described which is based on the fact that at low audio frequencies $R \gg r$, while at high frequencies the main part is played by r , as R is shunted by the

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SOV/112-57-6-13105

Determining the Components of an Equivalent Electric Circuit for a Semi-

capacitance C . The experimental outfit -- a modified Wien bridge for 50-100,000 cps -- is briefly described. The values of R and C at 300 cps and of r at 100 kc were determined by the substitution method. The error in determining r was less than 10%. The values of R and r determined by the above method agree well with those determined from the circle diagram. The results are reported of determining the thickness of electric-semiconductor artificial layer on the selenium valve by means of measuring its capacitance by the above method, and also by a weighting method and an optical method. Simultaneously with the spraying of the electron semiconductor, the layer thickness on an adjacent control glass plate was determined optically by means of an interferometer microscope. Results of measurements by all three of the above methods agree satisfactorily. Bibliography: 7 items.

E.N.U.

Card 2/2

USSR/Electricity - Semiconductors

G-3

Abs Jour : Ref Zhur - Fizika, No 5, 1957, 12197

the formation of CdS. CdS was also formed upon contact between a plate of cadmium with the sulphur-coated surface of a selenium element and subsequent electric forming. Upon investigation of shop selenium elements under an upper electrode, consisting of tin and cadmium, formation of CdSe and CdS was observed. It is concluded, that in selenium rectifiers, the rectification takes place on the boundary between the CdSe and Se.

Card 2/2

SOV/112-58-2-2959

Translation from: Referativnyy zhurnal, Elektrotehnika, 1958, Nr 2, p 182 (USSR)

AUTHOR: Abdullayev, G. B., and Alliyev, M. G.

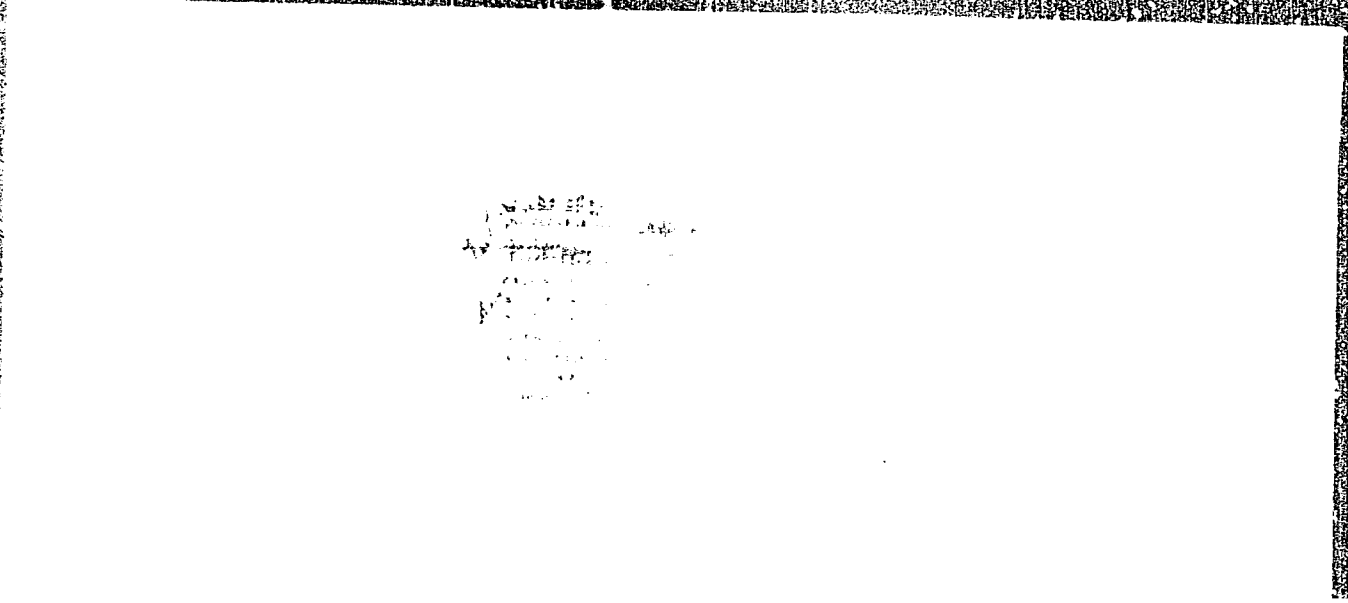
TITLE: On the Forming of Sulfur-Coated Selenium Rectifiers
(O protsesse formovki osernennykh selenovykh vypryamiteley)

PERIODICAL: Tr. In-ta fiz. i matem. AS AzerbSSR, 1956, Vol 8, pp 5-12

ABSTRACT: The effect of sulfur purity on the forming and characteristics of selenium rectifiers has been clarified; a selenium surface has been treated with sulfur vapor prior to being coated with the counter-electrode. Rectifiers treated with purified sulfur vapor have shown a smaller reverse current during the forming and also smaller forward and reverse resistances. An increase in the reverse current with a lowering of the ambient temperature has been observed at higher voltages and lower temperatures than those of rectifiers treated with non-purified sulfur vapor. Voltage-current and temperature characteristics are given.

S.M.A.

Card 1/1



ABDULLAYEV, G.B.; AKHUNDOV, G.A.; ALIYEV, M.G.

Mechanism of intensive field effects in p-n junctions. Dokl. AN
Azerb. SSR 12 no.11:787-791 '56. (MLRA 10:3)

1. Institut fiziki i matematiki AN Azerbaydzhanskoy SSR.
(Semiconductors)

9(4)

SOV/112-59-1-1602

Translation from: Referativnyy zhurnal. Elektrotehnika, 1959, Nr 1, p 226 (USSR)

AUTHOR: Abdullayev, G. B.

TITLE: Investigation of Physical Phenomena in Electron-Hole Junctions

PERIODICAL: Tr. i-y nauchn. sessii Soveta po koordinatsii AN AzerbSSR. Baku, AS AzerbSSR. 1957, pp 39-47

ABSTRACT: The nature, mechanism, forming, and de-forming of the barrier layer in Se-rectifiers were investigated. Experiments were conducted on both industrial and laboratory Se-rectifiers. The Se-rectifier functioning is due to its electron-hole junction. This junction is formed by the top electrode and is perfected by the forming process. The highest rectification factor can be obtained from Se-rectifiers with a top electrode from Cd or CdS. It was found that CdSe and CdS layers formed at the Se-boundary are electron-type semiconductors. Hence, in contact with Se, which is a hole-type semiconductor, type p-n junctions are formed. An electron-diffraction study showed that CdSe

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SOV/112-59-I-1602

Investigation of Physical Phenomena in Electron-Hole Junctions

and CdS layers are hexagonal modifications. The optimum thickness of the electron semiconductor, which corresponds to the maximum rectification factor, is 5×10^{-5} cm. Rectifiers with a rectification factor of about 10^6 at 1 v were constructed artificially. Such rectifiers have, at 18 v -- the working voltage of conventional Se-elements -- a resistance 150 times that of commercial rectifiers. Studying the structure of the barrier layer yielded knowledge of physical phenomena occurring in the layer. Static volt-ohm characteristics were explained, and empirical formulae for conductance-field relations obtained. The inversion point of the temperature coefficient of the backward resistance of Se-rectifiers can be varied by the thickness of the electron layer of the semiconductor. Influence of the halogen content of Se upon the forward resistance of rectifiers was found. The experiments showed that de-forming and internal short-circuiting of Se-rectifiers are due to an intrinsic EMF arising as a result of oxidation of CdSe and CdS layers in air

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SOV/112-59-1-1602

Investigation of Physical Phenomena in Electron-Hole Junctions

followed by galvanic phenomena prompted by humidity. This results in dendritic formations and leads to short-circuiting. It is recommended that Se-elements be protected from air humidity to prevent de-forming and short-circuiting.

B.G. Zh.

Card 3/3

"APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R000100120001-6

APPROVED FOR RELEASE: 04/03/2001

CIA-RDP86-00513R000100120001-6"

KULIYEV, A.A.; ABDULLAYEV, G.B.

Studying the diffusion of some metals in seleniu, with the aid of radioactive isotopes. Dokl. AN Azerb. SSR 13 no.7:727-731 '57. (MLRA 10:7)

1. Institut fiziki i matematiki.
(Selenium) (Diffusion) (Metals)

~~ABDULLAYEV, G.B.~~
BASHSHALIYEV, A.A.; ABDULLAYEV, G.B.

Effect of temperature on the heat conductivity of selenium containing admixtures of bromine. Dokl. AN Azerb. SSR 13 no.8:831-836 '57.

(MLRA 10:9)

1. Institut fiziki i matematiki Azerbaydshanskoy SSR.
(Heat--Conduction) (Selenium) (Bromine)

1145-1148
AKHUNDOV, G.A.; ABDULLAYEV, G.B.

Studying the diffusion of thallium, tin, and indium in selenium.
Dokl. AN Azerb. SSR 13 no.11:1145-1148 '57. (MIRA 10:12)

1. Institut fiziki i matematiki AN AzerSSR.
(Selenium) (Diffusion) (Metals)

Abdullayev, G.B., Bashshaliyev, A.A., 57-9-8/40
AUTHORS
TITLE The Influence of Bromine Admixtures on the Heat Conductivity of Selenium.
(Vliyaniye primesey bromina na teploprovodnost' selena.-Russian)
PERIODICAL Zhurnal Tekhn.Fiz., 1957, Vol 27, Nr 9, pp 1971 - 1975 (U.S.S.R.)
ABSTRACT First, the experimental plant and the order in which measurements were carried out are described, after which the results obtained by investigations are dealt with. It is shown that pure amorphous selenium possesses the highest degree of conductivity, which amounts to $3,08 \cdot 10^{-3}$ cal/degree.cm sec. If the bromine content is increased up to 0,065%, it is reduced down to the minimum ($1,37 \cdot 10^{-3}$ cal/degree.c .cm.sec. A further increase of the concentration of the bromine leads to an increase of heat conductivity, which approaches the original value without, however, attaining it ($2,424 \cdot 10^{-3}$ cal/degree cm. sec.) The same governing rules were found to prevail in crystalline selenium with different bromine concentration. It is shown that the modification of heat conductivity in dependence of the bromine content is determined also in crystallization mainly by the conditions of dispersion for the phonons. The admixtures introduced into selenium diminish the free length of path of the phonons and thus also reduce the share of phonons in heat conductivity. Up to a content of 0,065% bromine in selenium reduced the concentration of the additional centers for the dispersion of phonons and reduces the heat conductivity of selenium. The increase of heat conductivity in the case of a bromine content of more than 0,065% is explained by the

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The Influence of Bromine Admixtures on the Heat Con- 57-9-8/40
ductivity of Selenium.

fact, that in the case of great bromine concentrations, the admix-
ture density causes the formation of non-active bromine molecules.
On this occasion the number of dispersion centers is reduced, which
leads to an increase of heat conductivity. The fact that the amount
of heat conductivity is always less than in the case of pure se-
lenium proves that the neutral bromine molecules which are formed
produce additional dispersion centers of the phonons.
There are 3 figures and 10 Slavic references.

ASSOCIATION Physical Institute AN Azerbaidzhan SSR
(Institut fiziki AN AzSSR, Baku)
SUBMITTED September 10, 1956
AVAILABLE Library of Congress.
Card 2/2

ABDULLAYEV, G.B.

AUTHOR: . ABDULLAYEV, G.B., ALIYEV, M.I.

20-5-21/60

TITLE: The Thermal Conductivity of Selenium as Affected by Iodine. (Vliyanie yoda na teploprovodnost' selena, Russian)
PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol 114, Nr 5, pp 995-996 (U.S.S.R.)

ABSTRACT: At first the results of some previous papers are given. The influence exercised by various admixtures on the thermal conductivity of selenium has not yet been investigated. As an admixture of iodine increases the electric conductivity of selenium a hundred- and thousand-fold, also an influence exercised on the thermal conductivity of the selenium is to be expected. For the investigation of this influence the authors produced admixtures of selenium with 0,069; 0,103; 0,243; 0,534; 0,777; 0,923; 1,257; 1,385 %. From these admixtures cylindrical samples with a diameter of 20 mm and a height of from 5 to 9 mm were produced. The results of the measurements of thermal conductivity are shown in form of a diagram. Crystallization of the samples took place at 214°. In a second diagram the dependence of the thermal conductivity of the crystalline selenium on the amount of the iodine admixture is shown. The dependence of the thermal conductivity of the amorphous as well as of crystalline selenium on the amount of the iodine admixtures is of the same character. The atomic chains are not ordered in amorphous selenium. On the

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20-5-21/60

The Thermal Conductivity of Selenium as Affected by Selenium Admixtures.

occasion of its crystallization ordered microcrystalline domains are formed, which diminishes the concentration of the defects which are scattering centers. Therefore the free length of path of the phonons and the degree of anharmonic oscillations increases. Consequently, the thermal conductivity increases with crystallization. The heat capacity of the crystalline selenium is lower than that of amorphous selenium. The heat capacity of the amorphous and crystalline samples, investigated in the domain of concentration of the admixtures does not depend upon the amount of iodine. The heat capacity for the amorphous samples amounts in the average to 0,118 cal/g Δ and for the crystalline samples to 0,0701 cal/g Δ. The admixture of iodine increases the concentration of the admixture centers of the phonons and produces points of thermal resistance. With an increase of the admixture atoms the number of points where destruction takes place and of scattering centers increases, which causes a decrease of the thermal conductivity of the selenium, and a minimum is attained. With a further increase of the admixture atoms the iodine atoms begin to accumulate at the places where destructions

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The Thermal Conductivity of Selenium as Affected by Selenium
Admixtures.

and distortions took place, and recombination of iodine atoms
into molecules begin. This weakens the scattering of the phonons
and diminishes the degree to which oscillations are anharmonic
and therefore increases the thermal conductivity of selenium.
(With 2 illustrations).

ASSOCIATION: Institute for Physics and Mathematics of the Academy of Science
of the U.S.S.R. of Azerbeidzhan. (Institut fiziki i matematiki
Akademii nauk Azerb. S.S.R., Russian)

PRESENTED BY: Member of the Academy A.E.IOFFE

SUBMITTED: 24.11.1956

AVAILABLE: Library of Congress

Card 3/3

Abdullayev, G. B.

AUTHORS: Aliyev, G. M., and Abdullayev, G. B.

20-4-20/51

TITLE: A Note on the Influence of a Chlorine Admixture on the Thermal Conductivity of Selenium (O vliyaniy primesi khloro na teploprovodnost' selena).

PERIODICAL: Doklady AN SSSR, 1957, Vol. 116, Nr 4, pp. 598-600 (USSR).

ABSTRACT: The thermal conductivity of semiconductors and its dependence on the chemical composition and on crystal structure was investigated by A. F. Ioffe and his students (reference 1, 2, 3, 4). In the production of selenium rectifiers admixtures of halogenes, in particular chlorine, are used for the purpose of increasing the current passing through the semiconductor. The experiments showed the following results. During the electric formation and the further continued operation of these rectifiers a redistribution of the admixtures takes place, which modifies the electric and thermal characteristics of the selenium layer and of the system as a whole. In the backward direction the voltage applied to the rectifier is localized almost entirely at the anode at the electron-hole transition because of the formation of a great resistance. This causes a temperature gradient along the semiconductor. The authors determined the coefficient of thermal conductivity by a stationary me-

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A Note on the Influence of a Chlorine Admixture on the Thermal Conductivity of Selenium. 20-4-20/51

thod by means of a cylindrical set up, containing a sensitive semiconductor ring for the removal of lateral heat losses. A diagram illustrates the curves of the modification of heat conductivity of selenium and its dependence on the chlorine content from 20 to 22°C. The different curves are related to vitreous and crystallised selenium. The course taken by these curves is independent of the degree of crystallization, but depends only on the admixtures. The heat conductivity decreases as far as 0,03% at an increase of the chlorine content, then it increases again and remains constant above a value of 0,5%. A similar dependence of the heat conductivity was found by the author in the case of iodine and bromine admixtures. The dependence of heat conductivity on the degree of crystallization is mainly determined by the conditions of the scattering of the phonons with increasing concentration of selenium the concentration of the admixtures is decreased and there with the mean free path of the phonons increases. By this, the frequency of their scattering decreases and the anharmonicity degree of the oscillations and therefore the heat conductivity increases. The authors here evaluate this influence of the modification of the free path and the numerical values, which were found, are given. On crystallisation the free

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A Note on the Influence of a Chlorine Admixture on the Thermal Conductivity of Selenium. 20-1-20/51

path of the phonons shows a greater increase than their velocity. The heat conductivity of crystalline selenium, so to speak, is made up from the heat conductivity of the intercrystalline amorphous interposed layers and from the heat conductivity of the microcrystals.

There are 1 figure and 5 Slavic references.

ASSOCIATION: Institute for Physics and Mathematics AN of the Azerbaijan SSR (Institut fiziki i matematiki Akademii nauk Azerb SSR).

PRESENTED: May 13, 1957, by A. F. Ioffe, Academician.

SUBMITTED: April 13, 1957.

AVAILABLE: Library of Congress.

Card 3/3

ALIYEV, M.; ABDULLAYEV, G.; MIRZOYEV, B.

Conductivity of p - n junction of selenium rectifiers at strong fields
and different temperatures. Izv.AN Azerb.SSR.Ser.Fiz-tekh. i khim. nauk.
no.1:37-47 '58. (MIRA 12:3)
(Selenium) (Electric current rectifiers)

69396

SOV/137-59-4-8423

Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 4, p 155 (USSR)

24-7700
AUTHORS: Aliyev, G.M., Abdullayev, G.B.

TITLE: The Effect of the Admixture of Chlorine on Electric Properties of Selenium ✓

PERIODICAL: Izv. AS AzerbSSR, Ser. Fiz-tekhn. i khim. n., 1958, Nr 4, pp 23 - 30 (Azerb. résumé)

ABSTRACT: The authors investigated changes in electric conductivity σ and thermo-emf α of Se depending on Cl concentration (0.0035 - 0.5%) and temperature. Crystallization of a smelted Se and SeCl_4 mixture was carried out under pressure first at 130°C, then at 200°C (40 minutes each). Cl admixture up to 0.125% raise σ of Se (up to 1,000 times) the maximum is attained at 0.125% and then σ decreases with higher Cl amount. Hole conductivity is preserved. The coefficient α within a range of 25 - 85°C increases with elevated temperature. Electroconductivity in this range of both pure and admixed Se increases with raising temperatures

~~and~~ according to the exponential law. If the Cl amount increases, dissociation work and coefficient α decrease, and concentration and effective mobility of charge carriers increase. It is concluded that admixtures of Cl cause the formation of additional energy levels in Se, which are arranged at the upper boundary of the filled-up zone.

ALIYAROVA, Z.A.; ABDULLAYEV, G.B.

Investigation of the diffusion of some elements in
selenium [in Azerbaijani with summary in Russian]. Izv. AN
Azerb. SSR, Ser. fiz.-tekh. i khim. nauk no.5:7-13 '58.

(Selenium) (Diffusion)

(MIRA 12:1)

BAKIROV, M.Ya.; TALIBI, M.A.; ABDULLAYEV, G.B.

Effect of the electroforming, thermo- and electrochemical processing
on physical processes occurring in selenium photoelectric cells [in
Azerbaijani with summary in Russian]. Izv. AN Azerb. SSR. Ser.fiz.-
tekh. i khim.nauk no.6:43-53 '58. (MIRA 12:2)
(Photoelectric cells) (Selenium) (Electrochemistry)

ABDULLAYEV, G.B.

81505

24.7600
Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 5, p 172 (USSR)
SOV/137-59-5-10665

AUTHORS: Aliyev, G.M., Abdulayev, G.B.

TITLE: On the Effect of Chlorine Admixtures on the Heat Conductivity of Selenium γ 21

PERIODICAL: Tr. In-ta fiz. i matem. AS AzerbSSR, 1958, Vol 9, pp 20 - 26
(Azerb. résumé)

ABSTRACT: The atuhor used the method of the stationary thermal field to investigate the effect of the admixture of 0.0035 - 1% Cl on the heat conductivity of Se. It was found that the heat conductivity minimum was attained with a 0.03% Cl concentration. After the Cl concentration was as high as 0.5%, the heat conductivity approached a constant value but did not, however, attain its initial value. The course of the heat conductivity curve does qualitatively not depend on the Se recrystallization and is explained by the presence in Se mainly of phonon heat conductivity and by changes in the cross section of phonon scattering depending on the Cl concentration. 4

A.L.

Card 1/1

~~ABDULLAYEV, G.B.~~
TALIBI, M.A.; ABDULLAYEV, G.B.

Determining the electromotive force and resistance of selenium
rectifier cells subjected to radiation. Dokl. AN Azerb. SSR 14
no.1:3-7 '58. (MIRA 11:2)

1. Institut fiziki i matematiki AN Azerbaydzhanskoy SSR.
(Selenium cells) (Photoelectricity)

SOV/137-58-9-19704

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 9, p 225 (USSR)

AUTHORS: Akhundov, G.A., Abdullayev, G.B.

TITLE: On the Diffusion of Cadmium and Tin in the Cd-Sn Alloy (O diffuzii kadmiya i olova v splave Cd-Sn)

PERIODICAL: Dokl. AN Azerbaydzhan SSR, 1958, Vol 14, Nr 2, pp 103-104

ABSTRACT: The determination of the parameters of diffusion of Cd and Sn in the industrial alloy of 32% Cd - 68% Sn (used in Se rectifiers) was carried out with the aid of Cd¹¹⁵ and Sn¹¹³ isotopes by the layer-removal method. Diffusion annealing was conducted under vacuum for 20-50 hours at 50-160°C. The following coefficients of diffusion were found: $cd_{Cd} = 4.43 \cdot 10^{-8} \exp(-4500/RT)$ and $cd_{Sn} = 5.92 \cdot 10^{-7} \exp(6700/RT) \text{ cm}^2 \text{ sec}^{-1}$.

R.O.

1. Cadmium-tin alloys--Analysis
2. Cadmium--Determination
3. Tin--Determination
4. Cadmium isotopes (Radioactive)--Performance
5. Tin isotopes (Radioactive)--Performance

Card 1/1

TALIBI, M.A.; ABDULLAYEV, G.B.

Calculating the efficiency coefficient and quantum yield of barrier-layer photocells produced upon the incidence of penetrating radiations. Dokl. AN Azerb. SSR 14 no.3:201-205 '58. (MIRA 11:4)

1. Institut fiziki i matematiki AN AzerSSR.
(Photoelectric cells) (Gamma rays) (X rays)

TALIBI, M.A.; ABDULLAYEV, G.B.

Applicability of the theory of the barrier-layer photoelectromotive force to selenium cells. Dokl. AN Azerb. SSR 14 no.6:425-428 '58.

(MIRA 11:7)

1. Institut fiziki i matematiki AN AzerSSR.
(Selenium cells)

ALIYEV, M.G.; ABDULLAYEV, G.B.

Selenium rectifier with a zinc cathode. Dokl.AN Azerb.SSR
15 no.8:653-655 '58. (MIRA 13:1)
(Electric current rectifiers)

ABDULLAYEV, G.B.; ALIYEV, G.M.; CHETVERIKOV, N.I.

Influence of Ga and Fe impurities on the thermal conductivity of
germanium. Zhur. tekhn. fiz. 28 no.11:2368-2371 N '58.

(Germanium--Thermal properties)

(MIRA 12:1)

AUTHORS: Akhundov, G. A., Abdullayev, G. B. 20-119-2-20/60

TITLE: Investigation of the Diffusion of Components in Tl_2Se by Means of Marked Atoms (Izucheniye diffuzii komponentov v Tl_2Se metodem mechenykh atomov)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol 119, Nr 2, pp 267 - 267 (USSR)

ABSTRACT: The physical properties of semiconducting compounds strongly depend on small and very small deviations from the stoichiometric ratio, especially on the surface of the semiconductor. In semiconductor apparatus, especially in selenium rectifiers, the semiconductor is constantly in connection with a metal and therefore a chemical compound forms. The density and the physical properties of this compound determine the characteristics of the apparatus. In the thallium rectifiers the thallium is in contact with selenium and obviously a thin layer of Tl_2Se is formed. In connection with the investigation of the physical processes in thallium-selenium rectifiers it was of interest to investigate the diffusion of the single components in a

Card 1/4

20-119-2-20/60

Investigation of the Diffusion of Components in Tl_2Se by Means of Marked
Atoms

Tl_2Se -semiconductor as function of the temperature. The samples were produced by fusing thallium with selenium, the corresponding weight ratios corresponded with an accuracy of $2 \cdot 10^{-4}g$ to the stoichiometric composition. The synthesis took place in a vacuum of $10^{-3}mm$ torr. at a temperature of $450^{\circ}C$ and lasted for 6 hours. From the thus produced Tl_2Se -sample some 12 mm long cylinders of a diameter of about 6mm were produced and they were ground on both sides with emery-paper. On the one front of these cylinders the radioactive isotopes Tl^{204} and Se^{75} were applied electrolytically. The diffusion annealing was carried out in evacuated and sealed ampoules at temperatures of from $150 - 300^{\circ}C$ it lasted for 15 - 20 hours. After annealing the number of impulses from the diffused through substances was radiometrically determined

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20-119-2-20/60

Investigation of the Diffusion of Components in Tl_2Se by Means of Marked Atoms

according to the method of the separation of thin layers. The formula for the calculation of the diffusion coefficient is put down and shortly explained. From the temperature dependences of the diffusion coefficient D for the diffusion of thallium and selenium in Tl_2Se the following equations were found:

$$D_{Tl \rightarrow Tl_2Se} = 1.17 \cdot 10^{-3} e^{-0.61/kT} \text{ cm}^2 \text{ sec}^{-1};$$

$$D_{Se \rightarrow Tl_2Se} = 2.25 \cdot 10^{-5} e^{-0.58/kT} \text{ cm}^2 \text{ sec}^{-1},$$

i.e. for the diffusion of Tl and Se the activation energy ΔE and the constant D_0 are equal respectively to 0.61 eV; $1.16 \cdot 10^{-8} \text{ cm}^2 \text{ sec}^{-1}$ and 0.58 eV; $2.25 \cdot 10^{-5} \text{ cm}^2 \text{ sec}^{-1}$. There are 1 figure and 1 reference,

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20-119-2-20/60

Investigation of the Diffusion of Components in Tl_2Se by Means of Marked
Atoms

1. of which is Soviet.

ASSOCIATION: Institut fiziki i matematiki Akademii nauk AzerbSSR
(Institute for Physics and Mathematics AS Azerbaydzhan
SSR)

PRESENTED: October 24, 1957, by A.F. Ioffe, Member, Academy of
Science, USSR

SUBMITTED: September 6, 1957

Card 4/4

AUTHORS:

Aliyev, G. M., Abdullayev, G. B.

SOV/20-120-1-19/63

TITLE:

The Temperature Dependence of the Thermal Conductivity of Selenium With Small Chlorine Additions (O temperaturnoy zavisimosti teploprovodnosti selena s primes'yu khloro)

PERIODICAL:

Doklady Akademii nauk SSSR, 1958, Vol. 120, Nr 1, pp. 76 - 78 (USSR)

ABSTRACT:

The present paper investigates the temperature dependence of the thermal conductivity of crystalline selenium with different additions of chlorine. The samples of different chlorine content were produced of a mixture of selenium tetrachloride and selenium (purity 99,996%). The amount of the chlorine contained in the selenium was determined argentometrically. The coefficient of thermal conductivity was determined by means of the stationary method with a cylindrical apparatus. A diagram shows the temperature dependence of the coefficient of the thermal conductivity upon different chlorine contents. The coefficient of thermal conductivity decreases with rising temperature. Only in the case of pure samples there is a small deviation from the linearity. Another diagram shows the dependence of the

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The Temperature Dependence of the Thermal Conductivity of Selenium With Small Chlorine Additions *SOV/20-120-1-19/63*

thermal conductivity on the electric conductivity for samples of pure selenium as well as for samples of different chlorine content. In all samples a linear dependence exists between the electric conductivity and the thermal conductivity. With increasing chlorine content the slope of the straight becomes less. The straight expressing the dependence of the thermal conductivity λ on the electric conductivity σ can be expressed by the equation $\lambda = k\sigma + c$ for samples with and without chlorine additions, where k and c denote constants in all samples. (The corresponding numerical values are given). At all temperatures the thermal conductivity in the case of an increasing electric conductivity first decreases and then increases. The total coefficient of thermal conductivity of a body is, as is known, composed of the coefficients of thermal conductivity dependent on phonons and electrons: $\lambda = \lambda_{\text{electron}} + \lambda_{\text{phonon}}$. In the samples with and without chlorine additions $\lambda_{\text{electron}}$ is extremely small which is proved by the lack of any influence of the magnetic field on the thermal conductivity. A raise of temperature increases the scattering of the phonons on phonons

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The Temperature Dependence of the Thermal Conductivity of Selenium With Small Chlorine Additions *Sov/20-120-1-19/63*

and therefore reduces the coefficient of thermal conductivity. The deterioration of the Volt-Ampère characteristics of the selenium rectifiers as a consequence of a temperature rise partly is dependent on the decrease of the coefficient of thermal conductivity of selenium and therefore also on the decrease of the thermal scattering. Selenium with an addition of 0,0035% chlorine has its greatest thermal conductivity at 80° (which corresponds to the operational temperature of the selenium rectifiers). There are 4 figures and 13 references, all of which are Soviet.

PRESENTED:

November 1, 1957, by A.F. Ioffe, Member, Academy of Sciences, USSR

SUBMITTED:

October 11, 1957

1. Selenium--Conductivity
2. Conductors--Temperature factors
3. Selenium--Heat transfer
4. Heat--Conductivity
5. Chlorine --Properties
6. Dry disk rectifiers--Analysis

Card 3/3

24.7700

28016

S/081/61/000/015/005/139
B101/B110

AUTHORS: Abdullayev, G. B., Aliyev, M. I., Bashshaliyev, A. A.,
Aliyev, G.M.

TITLE: Effect of halide impurities on the physical properties of selenium

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 15, 1961, 29-30, abstract 156196 (Sb. "Vopr. metallurgii i fiz. poluprovodnikov", M. AN SSSR, 1959, 80-88)

TEXT: The authors studied the effect of halide impurities on the crystallization rate, electrical, thermal, and optical properties of Se. X-ray analysis showed that at annealing temperatures from 60 - 80°C iodine impurities accelerate Se crystallization. In the presence of I and Br, Se begins to crystallize at 60°C, while pure Se begins to crystallize only at 80°C. Halide impurities increase the electrical conductivity of Se by several hundred times. The dependence of the hole mobility on the

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S/081/61/000/015/005/139
B101/B110

Effect of halide impurities on the ...

impurity concentrations shows a maximum. With rising temperature the hole mobility in pure Se and in Se with iodine impurities increases, while their concentration decreases. This phenomenon is explained by structural peculiarities of Se which is a polymer, and by the effect of the inter-crystalline amorphous layers acting as potential barriers. On transition from the amorphous to the crystalline modification, thermal conductivity of Se increases from $3.13 \cdot 10^{-3}$ to $7.01 \cdot 10^{-3}$ cal/cm·sec·deg (25°C). In this case specific heat decreases. At 640 m μ the forbidden-band width of the amorphous Se is 1.94 ev, that of crystalline Se (at 680 m μ) is 1.83 ev. [Abstracter's note: Complete translation.]

LH

Card 2/2

24.7700

38377

S/058/62/000/005/119/119

A061/A101

AUTHORS: Talibi, M. A., Abdullayev, G. B.

TITLE: Investigating the effect of gamma rays, X-rays, and neutrons on the electrical properties of the rectifier systems CdS-Se and CdSe-Se (Theses)

PERIODICAL: Referativnyy zhurnal, Fizika, no. 5, 1962, 31, abstract 5-3-62ts. (V sb. "Fotoelektr. i optich. yavleniya v poluprovodnikakh", Kiyev, AN USSR, 1959, 401) J

TEXT: The action of light, gamma and X-rays, as well as of neutrons was examined in a study of the electrical properties of the semiconducting rectifier systems CdS-Se, CdSe-Se and their constituents. The characteristics of rectifier elements and photodiode operation were examined, the values of the rectifier element emf and the internal element resistances were determined graphically. Photoelectric and dark components of the electrical conductivity of CdSe polycrystals were found to change linearly with an increase of the voltage applied to the specimen, independently of the nature of operating radiations.
[Abstracter's note: Complete translation] L. B.

Card 1/1

ABDULLAYEV, G.B.; BAKIROV, M.Ya.; TALIBI, M.A.

Effect of the area and material used in the upper electrode on
the photoelectric properties of selenium photoelectric cells [in
Azerbaijani with summary in Russian]. Izv. AN Azerb. SSR. Ser. fiz.-
tekhn. i khim. nauk no.1:7-10 '59. (MIRA 12:6)
(Photoelectric cells)

KAZHAYEVA, R.I.; ABDULLAYEV, G.B.; KULIYEV, A.A.

Vaporisation of selenium in a vacuum [in Azerbaijani with summary
in Russian]. Izv. AN Azerb. SSR. Ser. fiz.-mat. i tekhn. nauk. no.3:
39-44 '59 (Selenium) (MIRA 13:3)

TALIBI, M.A.; ABDULLAYEV, G.B.

Studying the effect of gamma radiation on the semiconductor
systems CdS - Se and CdSe - Se. Izv.AN Azerb.SSR.Ser.fiz.-
mat.i tekhn.pauk no.4:23-34 '59. (MIRA 13:2)
(Gamma rays) (Semiconductors)

BAKIROV, M.Ya.; ABDULLAYEV, G.B.; NASIROV, Ya.N.; TALIBI, M.A.

Studying the effect of certain factors on the characteristics
of selenium photocells. Izv. AN Azerb. SSR. Ser. fiz.-mat. i tekhn.
nauk no.5:65-74 '59. (MIRA 13:3)
(Selenium cells)

BAKIROV, M.Ya.; ABDULLAYEV, G.B.; NASIROV, Ya.N.; TALIBI, M.A.

Effect of the degree of crystallization of selenium on the
characteristics of photoelectric cells. Izv. AN Azerb. SSR Ser.
fiz.-mat. i tekhn. nauk no.5:93-99 '59. (MIRA 13:3)
(Selenium cells)

KULIYEV, A.A.; ABDULLAYEV, G.B.

Investigation of the diffusion of Zn and Se in Bi_2Se_3 , BiSe, and CdSb. Fiz. tver. tela 1 no.4:603-605 '59. (MIRA 12:6)

1. Institut fiziki i matematiki AN Azerbaydzhanskoy SSR.
(Diffusion) (Semiconductors)

24.7600

24-(8)

67319

AUTHORS: Aliyev, M. I., Abdullayev, G. B.

SOV, '181-1-8-24/32

TITLE: On the Influence of Halogen Impurities Upon Heat Conductivity²¹
and Diffusion²¹ in Selenium²¹

PERIODICAL: Fizika tverdogo tela, 1959, Vol 1, Nr 8, pp 1296 - 1298 (USSR)

ABSTRACT: The discovery of a correlation between various physical properties is of great interest for solid-state physics. According to A. V. Ioffe and A. F. Ioffe crystal lattice heat conductivity decreases with increasing atomic weight of the atomic crystals, mean atomic weight, and atomic weight ratio of the ion crystal components. V. P. Zhuze and T. A. Kontorova pointed out a correlation connecting microstrength and heat conductivity of the lattice. E. Fermi (Ref 4) and Ya. I. Frenkel (Ref 5) investigated thermal expansion and conductivity of a crystal lattice as connected with thermal vibration anharmonicity and found a correlation. The thermal expansion coefficient is related with the anharmonicity coefficient by the formula $\delta = k\beta/r\alpha^2$.
Notation: k - Boltzmann constant, r - equilibrium distance between the particles, α - coefficient of quasielastic force, β - anharmonicity coefficient. Thermal resistance is proportional.

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On the Influence of Halogen Impurities Upon Heat
Conductivity and Diffusion in Selenium

67319

SOV/181-1-8-24/32

to the square thermal expansion, viz. $1/\alpha \sim r^3 \sqrt{\alpha(M_1 + M_2)} T_0^2$ holds, M_1 and M_2 denoting the masses of which the lattice consists. Grueneisen found the interesting relation $Q/RT = A/\delta T$, where Q denotes the activation heat during diffusion, R - the universal gas constant, and A a constant introduced in a previous paper. A comparison between the two last-mentioned equations indicates a correlation connecting such phenomena as diffusion rate and crystal lattice heat conductivity, i.e., higher diffusion energy during autodiffusion increases the heat conductivity coefficient. Thus, in diamond-type crystals (diamond, Si, Ge) the strength of the lattice interatomic binding decreases when proceeding from diamond to germanium which entails a drop in melting temperature. The relation $Q = 3b^2 RT_{\text{melt}}$ holds where the coefficient b depends on the atomic radius of the diffusing element. On the other hand, lattice heat conductivity depends on the character of the linkage forces in this crystal lattice, which determine the degree of anharmonicity of the thermal vibrations. A comparison of the three last-mentioned equations

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67319

On the Influence of Halogen Impurities Upon Heat
Conductivity and Diffusion in Selenium

SOV/181-1-8-24/32

shows the following: The higher the melting temperature, the better must be heat conductivity. In sulfur, selenium, and tellurium crystals, melting point and also heat conductivity rise when proceeding from sulfur to tellurium. In addition, selenium autodiffusion activation energy similarly depends on the quantity of halogen impurities. The presumptive reasons for these correlations are pointed out. Similar studies will be made also with other impurities. There are 1 figure and 9 references, 8 of which are Soviet.

ASSOCIATION: Institut fiziki i matematiki AN Azerb.SSR (Institute of Physics and Mathematics of the AS of the Azerbaydzhanskaya SSR).
Azerb. gosudarstvennyy universitet im. S. M. Kirova
(Azerbaydzhan State University imeni S. M. Kirov) ✓

SUBMITTED: April 18, 1959

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~~24(6)~~ 24.7700

66270

AUTHORS:

Abdullayev, G. B., Aliyev, M. G., Geller, I. Kh.

SOV/181-1-11-5/27

TITLE:

The Influence of Impurities on the Strong Field Effect in Selenium Rectifiers

PERIODICAL:

Fizika tverdogo tela, 1959, Vol 1, Nr 11, pp 1670 - 1675 (USSR)

ABSTRACT:

A 50 μ thick selenium layer was deposited by vacuum evaporation on bismuth-coated aluminum base. The first selenium crystallization occurred at 110°C in the course of 2 hours. Subsequently the samples were kept at 217°C for 15 minutes. The selenium layer was coated with a thin, chemically pure sulfur layer. The working surface of all samples was 12.5 cm². Various series of samples were prepared, first of 99.996% pure selenium. Next 0.016, 0.032, 0.065 and 0.13 percent by weight of bromine were added to these selenium samples. The statistical voltage versus current characteristic was measured in the conventional measuring arrangement. Figures 1, 2 and 3 graphically present the results in the temperature range -183° to +40°C for the relations $lgR:\sqrt{U}$ and $lgR:U^2$. The results show that the bromine contents considerably influence the field strength where lgR begins to be linearly dependent on \sqrt{U} and U^2 .

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The Influence of Impurities on the Strong Field Effect
in Selenium Rectifiers

66270

SOV/181-1-11-5/27

With dropping temperature the effect of the strong electric field increases. This leads to the fact that at a certain voltage the sign of the temperature coefficient of the backward resistance becomes negative while it had been positive before. This is clearly illustrated in figures 3, 5 and 6. In samples with smaller additions the inversion occurs only at higher voltages and the point of inversion shifts toward lower temperatures. These experimental data are compared with the results of the studies by A. V. Ioffe and A. F. Ioffe and with the theoretical considerations of Gubanov. There are 6 figures and 16 references, 14 of which are Soviet.

ASSOCIATION: Institut fiziki i matematiki AN AzSSR (Institute of Physics and Mathematics of the AS AzSSR)

SUBMITTED: February 16, 1959

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68263

SOV/81-59-10-34022

24.7600

Translation from: Referativnyy zhurnal. Khimiya, 1959, Nr 10, p 28 (USSR)

AUTHORS: Aliyev, G.M., Abdullayev, G.B.

TITLE: On the Effect of the Admixture of Chlorine on the Heat Conductivity of Selenium 1^

PERIODICAL: Tr. In-ta fiz. matem. AS AzerbSSR, 1959, Vol 9, pp 20-26 (Azerbaijdzhanian summary)

ABSTRACT: The heat conductivity λ of amorphous and crystalline Se and the effect of a Cl admixture on it has been studied. The increase of λ at the transition from amorphous to crystalline Se is connected with the reduction of the quantity of defects in the lattice which are centers of scattering of phonons. The admixture of Cl to a certain percentage increases the efficient cross section of phonon scattering, which leads to the reduction of λ ; at a further increase of the Cl concentration due to recombination of the admixtures and the formation of neutral molecules, λ increases again. The ratio $\lambda_{cr}/\lambda_{am}$ for admixture-free samples is equal to 2, in the case of samples with Cl it is, independently from the Cl content, equal to 3. It is assumed that in the crystallization of Se the admixtures are displaced

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SOV/81-59-10-34022

On the Effect of the Admixture of Chlorine on the Heat Conductivity of Selenium
and are concentrated in the intercrystalline interlayer and affect their heat conductivity.

V. Ostroborodova



Card 2/2

KULIYEV, A.A.; ABDULLAYEV, G.B.

Diffusion of some elements in ZnSb and CdSb. Dokl.AN Azerb.SSR 15 no.1:
9-11 '59. (MIRA 12:3)
(Cadmium antimonide) (Zinc antimonide) (Diffusion)

ALIYEV, B.D.; ABDULLAYEV, G.B.

Effect of a bismuth admixture on the self-diffusion of selenium.
Dokl. AN Azerb. SSR 15 no.10:897-899 '59.

(MIRA 13:3)

1. Institut fiziki AN AzerSSR.
(Bismuth) (Selenium)

ABDULLAYEV, G.B.; AKHUNDOV, G.A.; ALIYEVA, M.Kh.

Rectifying property of PbS. Dokl. AN Azerb. SSR 15 no. 11: 999-1003
'59. (MIRA 13:4)

1. Institut fiziki AN AzerSSR.
(Lead sulfide--Electric properties)

S/194/61/000/006/035/077
D201/D302

AUTHORS:

Abdullayev, G.B., Nani, R.Kh. and Nasirov, M.a.N.

TITLE:

Investigating the thermal and electric properties of indigenous cobaltite

PERIODICAL:

Referativnyy zhurnal. Avtomatika i radioelektronika, no. 6, 1961, 2, abstract 6 D8 (Izv. AN AzerbSSR, Ser. fiz.-matem. i tekhn. n, 1960, no. 3, 55-58) (Azerbaydzhan summary)

TEXT: Temperature dependence was investigated of electric conductance σ , thermal conductivity K and of thermal emf α of indigenous cobaltite, σ was measured in the temperature range 20-650°C, at room temperature σ has the value $12.8 \times 10^{-2} \text{ ohm}^{-1} \text{ cm}^{-1}$. With an increase of temperature to 530°C, σ increases 5 times and decreases with further temperature increase. At room temperature α is 33.0 microvolt per degree. The maximum value of α equal to 90 microvolt per degree corresponds to a tempera-

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Investigating the thermal...

S/194/61/000/006/035/077
D201/D302

ture of 480°C. With temperature increasing from room temperature to 100°C the K of cobaltite increases. 5 references. [Abstracter's note: Complete translation]



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ABDULLAYEV, G.B.

82543

24.7700

S/181/60/002/007/020/042
B006/B070

AUTHORS: Akhundov, G. A., Abdullayev, G. B., Guseynov, G. D.

TITLE: Some Properties of Single Crystals of Thallium Selenide²¹

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 7, pp. 1518-1521

TEXT: In the introduction, the authors discuss results already available in publications on the investigation of thallium selenide semiconductors. In the present work, the method of preparation of single crystals of TlSe is discussed, and the results of investigation of the electrical properties of such crystals are given. For the preparation of single crystals, 99.989% pure thallium and 99.994% pure selenium were used (total weight: 90 gm). TlSe was obtained in evacuated (10^{-4} torr) quartz ampoules at 500°C in six hours. An X-ray analysis showed that the TlSe had crystallized in tetragonal form with the parameters $a = 8.02$ and $c = 7.00$ Å. The single crystals were obtained by zonal fusing. Fig. 2 shows the photograph of such a crystal in the form of a bar 15 cm long and 1.5 cm in diameter. Fig. 1 shows a Laue diagram obtained after seven

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Some Properties of Single Crystals of
Thallium Selenide

S/181/60/002/017/020/042
B006/B070

zonal fusions with a horizontal zone shift of 10 mm/hour. Identical crystals were obtained by a zone shift of 6 mm/hour. For horizontal as well as for vertical zone shift the (001) plane was the plane of growth. The electrical conductivity and the Hall effect were investigated for a TlSe parallelepipedon of 3 . 4 . 15 mm³. Fig. 3 shows the measured temperature dependence of the electrical conductivity σ for four samples, whose resistivities at 20°C were 1, 3.2, 3.5, and 49 ohm.cm. It is found that the σ of low-resistivity samples first falls with lowering of temperature, then goes through a maximum, and again increases. The larger the resistivity, the lower is the temperature of transition from metallic to the semiconductor state. The minima of the low-resistivity samples lie at 195, 165, and 120°C (curves 1, 2, 3). The pure sample 4 has no minimum. The activation energy of this sample was determined to be 0.56 ev. Fig. 4 shows the temperature dependence of the electrical conductivity, the carrier concentration, and the carrier mobility of sample 3. It appears that the decrease of σ with increase in temperature up to the temperature of transition may be explained as being due to a decrease of the carrier mobility. In this range, the carrier concentration remains nearly

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Some Properties of Single Crystals of
Thallium Selenide

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S/181/60/002/007/020/042
B006/B070

constant. Above the transition temperature, σ increases because of the growth of the hole concentration. For the whole range of temperatures, the conductivity is of p-type. The thermo-emf was determined to be $\sim 400 \mu\text{V}/^\circ\text{C}$. There are 4 figures and 5 references: 3 Soviet, 1 US, and 1 German.

ASSOCIATION: Institut fiziki AN AzSSR Baku (Institute of Physics of
the AS Azerbaydzhanskaya SSR, Baku) 4

SUBMITTED: February 2, 1960 (after revision)

Card 3/3

11070

9/058/62/000/008/079/134
A061/A101

440101

AUTHORS: Elijev, G. M., Abdullaev, G. B.

TITLE: The effect of gallium and iron impurities on the thermal conductivity, electrical conductivity, and thermo-emf of germanium

PERIODICAL: Referativnyy zhurnal, Fizika, no. 8, 1962, 29, abstract 8E213 ("Tr. in-ta fiz. AN AzerbSSR", 1960, v. 10, 5 - 12, Azerb.; summary in Russian) ✓

TEXT: Ge single crystal specimens containing $4.1 \cdot 10^{16}$, $8.8 \cdot 10^{16}$, and $7.4 \cdot 10^{17} \text{ cm}^{-3}$ Ga impurities, and $2.2 \cdot 10^{16}$, $7.5 \cdot 10^{16}$, and $1.1 \cdot 10^{17} \text{ cm}^{-3}$ Fe impurities have been investigated. It is shown that the thermal conductivity of Ge drops with an increase of impurity concentration, and that this effect is stronger with Ga than with Fe impurities. At temperature increase the thermal conductivity of Ge drops with both Ga and Fe impurities. It is also shown that the thermal conductivity of Ge changes in a transverse 9,500-oe magnetic field by no more than 1 - 2.5% in the 20 - 300°C range. Measurements of electrical conductivity and thermo-emf up to 600°C have shown that the temperature dependence of electrical conductivity is exponential in all specimens. The thermo-emf of n-type specimens in the 20 - 600°C range always remains negative. In p-type specimens, the positive thermo-emf changes its sign with temperature increase (at 125 - 150°C).

ABDULLAYEV, G.B., SHAKHTAKHTINSKIY, M.G., KULIYEV, A.A.

Studying the elasticity of saturated vapors of the system Se -
Te. Dokl. AN Azerb. SSR 16 no. 3:219-222 '60. (MIRA 13:7)

1. Institut fiziki AN AzerSSR.
(Selenium) (Tellurium)

ABDULLAYEV, G.B., BAKIROV, M.Ya., GELLER, I.Kh., NASIROV, Ya.I.

Effect of bromine on the characteristics of selenium photocells.
Dokl. AN Azerb. SSR 16 no.4:323-326 '60. (MIRA 13:7)

1. Institutu fiziki AN Azerbaydzhanskoy SSR.
(Bromine) (Photoelectric cells)

BAKHYSHOV, A.Ye.; ABDULLAYEV, G.B.

Photoelectric properties of semiconductor systems Tl₂Se - Se and
InSe - Se in X rays. Dokl. AN Azerb. SSR 16 no. 5:437-441 '60.
(MIRA13:3)

1. Institut fiziki AN AzerSSR.
(Semiconductors)

(Selenium compounds)

ABDULLAYEV, G.B.; BAKIROV, M.Ya.; GASIMOV, R.B.; NASIROV, Ya.N.

Investigating the formation of a p-n junction in selenium
photocells. Part 1: Effect of the material of the top electrode.
Izv. AN Azerb. SSR. Ser.fiz.-mat. i tekhn. nauk no.4:66-72 '60.
(MIRA 14:3)

(Photoelectric cells) (Selenium)

9.4160
26.1512

³¹⁸³⁴
S/194/61/000/010/054/082
D256/D301

AUTHORS: Abdullayev, G.B., Bakirov, M.Ya., Gasymov, R.B. and Nasirov, Ya.N.

TITLE: Selenium photo-cells with layers of CdO, CdS, CdSe and CdTe

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 10, 1961, 28-29, abstract 10 G196 (Izv. AN AzerbSSR. Ser. fiz.-matem. i tekhn. n. 1960, no. 6, 77-83)

TEXT: Results are presented of investigations of n-type selenium photo-cells with layers of CdO, CdS, CdSe and CdTe of high sensitivity in the visible region of the spectrum. The photo-effect in these cells occurs due to p-n transitions at the borders Se-CdO, Se-CdS, Se-CdSe and Se-CdTe. In preparing the photo-cells the material of the top electrode was of no significant importance and did not require special forming. The photo-current of the mentioned

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