L 54749-65

ACCESSION NR: AT5015396 $\mathcal{D}$

uranium from 0.025 M solutions of uranyl fluoride by the ion exchangers under considera-
tion requires the presence of free HF in amounts no less than 0.1 M in the original solution.
From the standpoint of eluting capacity, the solutions studied can be arranged as follows:
1 N HNO_3 > 0.9 N NH_4NO_3 + 0.1 N HNO_3 > 1 N NH_4NO_3. Uranium is eluted from EDE-IOP
better than from AN-2F, and with smaller volumes of the eluent. Orig. art. has: 5 figures.

ASSOCIATION: None

SUBMITTED: 13May63   ENCL: 00   SUB CODE: IC

NO REF SOV: 005   OTHER: 002

Card 2/2

L 18403-63   EWT(d)/BDS   Pg-4/Pk-4/Pl-4/Po-4/Pq-4   AFFTC/ASD/APGC/
IJP(C)   BC
ACCESSION NR: AP3003736   S/0103/63/024/007/0891/0899   74

AUTHOR: Stikhin, V. N. (Sverdlovsk)

TITLE: Feedback control systems with opposite interests

SOURCE: Avtomatika i telemekhanika, v. 24, no. 7, 1963, 891-899

TOPIC TAGS: feedback control system, feedback

ABSTRACT: A method of finding optimum solution is formulated for memory-equipped automatic-control systems. The method is based on a statistical principle of loss minimax. For a no noise-interference case, two systems whose interests are opposite are described mathematically. Optimization problem is formulated for both cases, with a fixed and with an indefinite number of switching operations. Conditions of existence of optimum solution are determined for recurrence of the normal-form game with a finite number of the opponent strategies. Orig. art. has: 1 figure and 60 formulas.

Card 1/2

STREITY, A.M.

Application of the principle of minimum losses in problems involving automatic control systems. Izv. vys. Ucheb. zav. ... (MIRA 13:8)

ACC NR: AT6022688   SOURCE CODE: UR/0000/66/000/000/0201/0209

AUTHOR: Kokovikhin, V. A.; Stikhin, V. N.; Zhivoglyadov, V. P.

3 2

ORG: none

B+1

TITLE: On the theory of dual control

SOURCE: Moscow. Institut avtomatiki i telemekhaniki. Samoobuchayushchiyesya avtomaticheskiye sistemy (Self-instructing automatic systems). Moscow, Izd-vo Nauka, 1966, 201-209

TOPIC TAGS: automatic control theory, second order differential equation, differential equation solution, approximation method

ABSTRACT: Various pursuit problems are considered in the article. Methods for the solution of these problems, based on notions of dual-control theory, are proposed, and some experimental information is given. Bayesian strategy in the Fel'dman and Bellman formulation is studied, and the relation of the theory of approximation to the Bayesian principle is analyzed. In their computations, the authors have made a wide use of the optimality principle and the techniques of dynamic programming. A numerical example involving a second-order differential equation is solved, and there is a brief discussion of the work by V. P. Zhivoglyadov.

Card 1/2

ACC NR: AT6022608

Orig. art. has: 13 formulas.

SUB CODE: 09,12/ SUBM DATE: 02Mar66/ ORIG REF: 003/ OTH REF: 003

Card   2/2

STIKHINA, S.

Club of submarine sportsmen. Voen.znan. 37 no.5:28 My '61.
(MIRA 14:4)

(Diving, Submarine)

CHERDAK, M.G.; STIKHOVNIN, A.M.; MAIROVSKIY, B.I.; GAROV, F.G.

Conferences of managerial personnel of the main departments of
the Ministry. Stroi. i dor. mashin-str. 2 no.5:36-38 My '57.
                    (Road machinery)   (MLRA 10:6)

KHOMYAKOV, K.G.; STIKHOVNIN, A.M.; NEMIROVSKIY, E.I.; GUROV, P.G.

Branch conferences of production activists of the Main Admin-
istrations of the Ministry. Stroi.i dor.mashinostr. no.9:37-38
S '56.   (MLRA 9:11)
        (Machinery industry--Congresses)

STIKSA, E.; FANTOVA, B.; ZVOLSKA, E.

Effect of emotions on intensity of pain in labor. Cesk. gyn. 18 no.3: 217-222 June 1953.   (CLML 25:1)

1. Of the First Obstetric Clinic (Head--Prof. K. Klaus, M.D.) of Charles University, Prague.

BUDINSKY, Josef, MUDr.; STIKSA, Emanuel; SRP, Bedrich, MUDr.

Improvement of obstetric analgesia with phenothiazine preparations.
Cesk. gyn. 22[37] no.1/2:24-28 Jan 58.

1. I, por. klinika Karlovy university, prednosta prof. Dr. K. Klaus.
J. B., Praha 2, Apolinarska 18.
        (LABOR, anesth. & analgesia
                phenothiazine prep. (Cz))
        (PHENOTHIAZINE, rel. cpds.
                in anesth. in labor 'Cz))

STIKSA, Emanuel, MUDr.; SRP, Bedrich, MUDr.; BUDINSKY, Josef, MUDr.

Clinical experiences with oral chlorpromazine in labor. Cesk. gyn. 22[37] no.1/2:118-121 Jan 58.

1. I. por. klinika KU v Praze, prednosta prof. Dr K. Klaus. E. S., Praha 2, Apolinarska 18.
      (LABOR, anesth. & analgesia
         adjunct chlorpromazine, oral admin. (Cz))
      (CHLORPROMAZINE, anesth. & analgesia
         adjunct chlorpromazine in labor, oral admin. (Cz))

SKRIVAN, Jiri; BUDINSKY, Josef; STIKSA, Emanuel

Effect of neuroleptic drugs on uterine activity in labor. Cas.
lek.cesk.99 no.44:1389-1392 28 O '60.

1. I. porodnicko-gynekologicka klinika, prednosta prof. dr.
K. Klaus, doktor lekarskych ved.
(CHLORPROMAZINE pharmacol)
(PROMETHAZINE pharmacol)
(ERGOT ALKALOIDS pharmacol)
(LABOR)
(UTERUS pharmacol)

SNAJD, V., prof.; ANTOS, J.; LUKAS, V.; BOUDA, J.; BARDOS, A.; MANKA, J.; HAJEK, A.; PACIN, Z.; SKACEL, K.; STIKSA, E.; SIKL, O.; SKODA, V.

Clinical aspects of carcinoma of the endometrium. Cesk. gynek. 27 no.3:173-177 Ap '62.

1. I gyn. klin. fak. vseob. lek. KU v Praze, prednosta prof. MUDr. K. Klaus.

(UTERUS NEOPLASMS)

BUDINSKY, J., CSc.; STIKSA, E.; SKRIVAN, J.; FABIANOVA, J.; SRP, B., CSc.

Neuroplegic obstetrical analgesia. Cesk. gyn. 27[41] no.5:
387-394 Je '62.

1. I. gyn.-por. klin. KU v Praze, prednosta prof. dr. K. Klaus, DrSc.
(ANESTHESIA OBTETRICAL)   (HIBERNATION ARTIFICIAL)

STIKSA, E.; BUDINSKY, CSc.

A technic for medical management of labor with the use of neuroplagic
analgesic mixture. Cesk. gyn. 27[41] no.5:395-396 Je '62.

1. I. gyn.-por. klin. fak. vseob. lek. KU v Praze, prednosta prof.
dr. K. Klaus, Dr.Sc.
          (ANESTHESIA OBSTETRICAL)   (HIBERNATION ARTIFICIAL)

SNAID,V.; STIKSA, E.

   Surgery of the ovary. Cesk. gynek. 29 no.5:335-337 Je'64

   1. I. gyn.-por. klin. fak. vseob. lek. KU [Karlovy university]
   v Praze; prednosta: prof. dr. K.Klaus, DrSc.

SNAID, V.; ZAVADIL, M.; STIKSA, E.

The ovary in menopause. Cesk. gynek. 29 no.5:341-345 Je'64

1. I. gyn.-por. klin. fakulty vseobecneho lek. KU [Karlovy
university] v Praze; prednosta: prof. dr. K.Klaus, DrSc.

KVAPIL, J.; STIKSA, E.; SNAID.V.

Experiences with anesthesia in gynecological surgery and comments on current problems. Cesk. gynek. 29 no.5:387-390 Je'64.

1. I. gyn.-por. klin. fak. vseob. lek. KU [Karlovy university] v Praze; prednosta: prof. dr. K.Klaus, DrSc.

STIKSA, Emanuel

Basic clinical and experimental data on the electrical conduc-
tivity of squamous epithelium of the cervix uteri. Acta Univ.
Carol. [med.] (Praha) 10 no.2:139-164   '64

1. I. gynekologicko-porodnicka klinika fakulty vseobecneho lekar-
stvi University Karlovy v Praze(prednosta: prof. MUDr. K.Klaus,
DrSc.)

STIKSA, J., MUDr.; STEPAN, J., JUDr.

New directives on medicolegal examination. Cesk. zdravot. 5 no.1: 53-56 Jan 57.

(MEDICINE, LEGAL, legisl.
    on expert testimony in Czechoslovakia (Cz))

BALOGH, J.,MUDr.; UTTL, K., MUDr.; STIKSA, J. MUDr.

Specialization for medical experts in Czechoslovakia. Cesk. zdravot.
5 no.8:448-450 Aug 57.

1. Vyzkummy ustav organisace zdravotnictvi--odbor posudkove cinnosti.
        (EXPERT TESTIMONY, educ.
            specialization in Czech. (Cz))
        (SPECIALISM
            expert med. testimony specialization in Czech. (Cz))

TIKSA, Jiri, MUDr.

Problems of medical characteristics of occupations. Cesk. zdravot.
5 no.9:490-492 Sept 57.

1. Vyzkumny ustav organisace zdravotnictvi odbor posudkova cinnosti.
        (OCCUPATIONAL DISEASES, diag.
                expert med. testimony (Cz))
   (EXPERT TESTIMONY, in var dis.
                occup. dis. (Cz))

STIKSA, J.; DVORAK, B.; PALEC, R.; SOUKUP, V.

Evaluation of working ability. Cesk. zdravot. 6 no.9:540-547 Sept 58.
(DISABILITY EVALUATION (Cz))

STIKSA, J.

Current possibilities in the medical reatment of chronic bron-
chitis. Cas. lek. csek. 103 no.30:823-830   27 Jul'64

1. Vyzkumny ustav experimentalni terapie a interni katedra
UDL, Prahe-Krc; reditel: prof. dr. O. Smahel, DrSc.
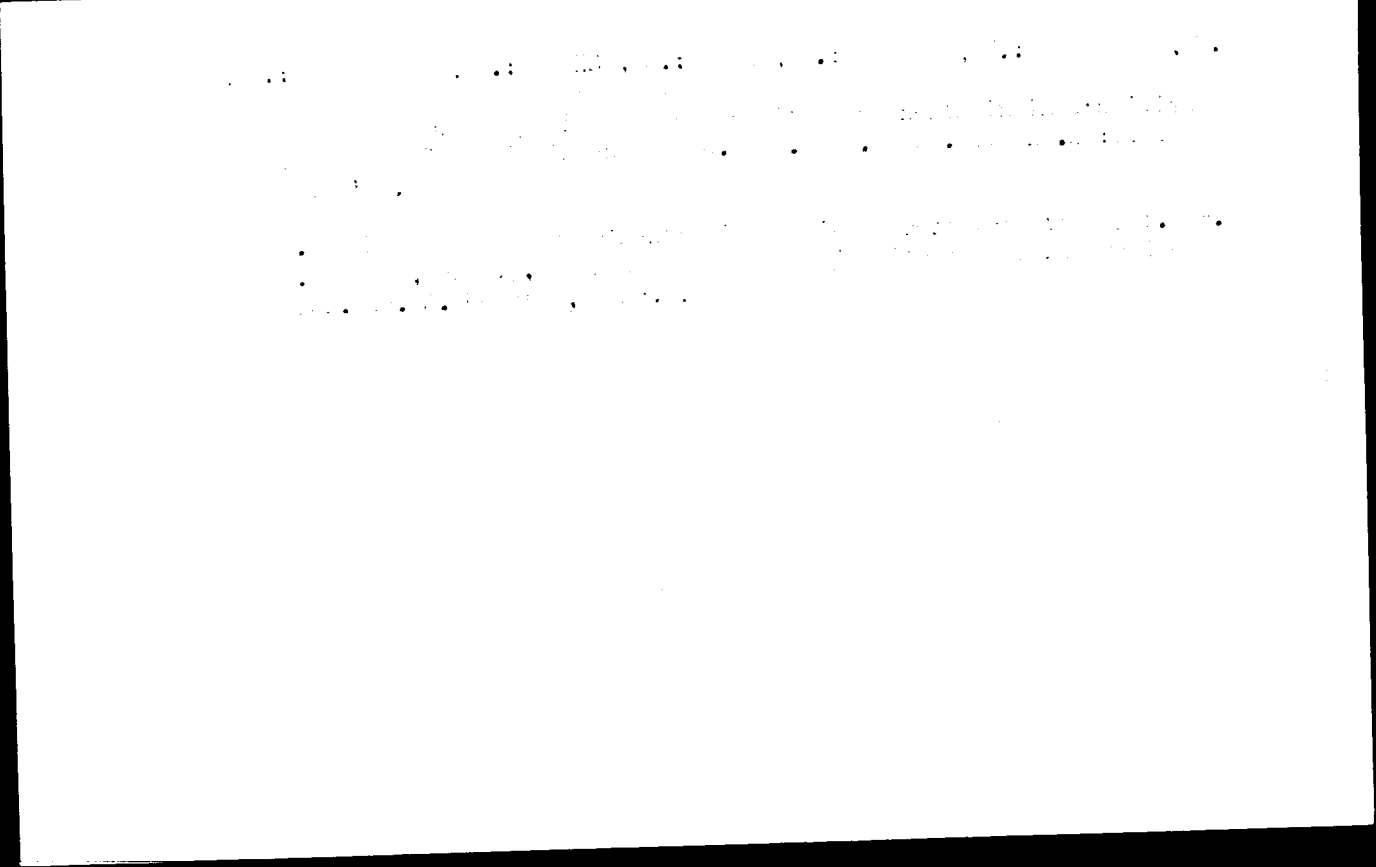
DAUM, S.; NIKODYMOVA, L.; STIKSA, J.; VOKAC, Z.; VAVROVA, V.; HLOUSKOVA, Z.
Technical assistance: MACHANOVA, A.; i LACHA, B.; URBANOVA, A.

Diffusing capacity of the lungs and its components in interstitial pulmonary fibroses during adolescence. Rev. Czech. med. 11 no.3: 180-189 '65.

1. Institute of Postgraduate Medical Training. Chair of Internal Medicine, Prague (Director: Prof. O. Smahel, M.D., D.Sc.), Research Institute of Experimental Therapy (Director: Prof. O. Smahel, M.D., D.Sc.), and Research Institute of Child Development, Prague (Director: Prof. J. Houstek, M.D., D.Sc.).

TLUSTY, L.; HLOUSKOVA, Z.; KOHN,R.; DAUM,S.; STIKSA, J.

The diffusion capacity of the lungs and its share in children
and juveniles after interstitial pneumonias. Cesk. pediat.
20 no.3:392-395 Mr '65

1. I. interne Klinik in Hradec Kralove; Kinderklinik Po Petrinem,
Prag; Katheder der Kinderheilkunde, Institut für ärtzliche Fort-
bildung, Prag; und Institut der experimentellen Therapie, Prag.

HOUSTEK,J.; BAUM, S.; HLOUSTOVA,Z.; NIECDENOVA, L.; STIKSA,J.; VAVROVA, V.; VOKAG,Z.

Functional changes in diffuse pulmonary fibrosis. Cesk. pediat.
20 no.3:366-371 Mr '65

1. Second Children's Clinic; Research Institute of Child Development, and Research Institute of Experimental Therapy, Prague.

DAUM, S.; NIKODYMOVA, L.; STIKSA, J.; VOKAC, Z.; VAVROVA, V.; HLOUSKOVA, Z.;
    Technicka spoluprace: MACHANOVA, A.; PLACHA, B.; URBANOVA, A.

Diffusion capacity of the lungs and its components in interstitial
pulmonary fibrosis in adolescents. Cas. lek. Cesk. 104 no.49/50:
1366-1371   10 D '65.

1. Vyzkumny ustav experimentalni terapie v Praze (reditel prof.
dr. O. Smahel, DrSc.) a Ustav vyzkumu vyvoje ditete v Praze
(reditel prof. dr. J. Houstek, DrSc.).

Methods

CZECHOSLOVAKIA   UDC   616.152.264.01 - 074

STIKSA, J.; DAUM, S.; PLACHA, B.; Research Institute for Experim-
ental Therapy, and Chair for Internal Diseases, Institute for
Postgraduate Medical Training (Vyzkumny Ustav Experimentalni Te-
rapie a Interni Katedra Ustavu pro Doskolovani Lekaru), Prague,
Director (Reditel) Dr O. STAREL.

"Examination in Hypercapnia."

Abstract /Authors' English summary modified_7: Values of partial
pressure of CO_2 in arterial blood calculated on the basis of the
manometric method were compared to those obtained by calculation
on the basis of the titration method, and to those obtained by
interpolation using the method of Astrup and Siggaard-Andersen.
The manometric method and the interpolation method agree with each
other much better than with the titration method. Advantages of
using the Astrup and Siggaard- Andersen method are described. 2
Figures, 12 Western references. (Manuscript recived Dec 65).

1/1

MUSIL, Jan; STIKSA, Jiri

Transaminases in medicine. Cas. lek. cesk. 101 no.34:161-172 24 Ag
'62.

1. Oddeleni pro klin. biochemii lekarske fakulty hygienicke KU v Praze
10, prednosta MUDr. RNDr. J. Opplt Interni katedra UDL v Praze, prednosta
doc. dr. O. Smahel, DrSc.
(AMINOTRAMINASES)

KOLIHOVA,E.; STIKSOVA,G.; JIRA,M.

Importance of pelvic arteriography in the diagnosis of bladder
tumors. Cesk. rentgen. 18 no.4:229-235 Jl'64

1. Radiologicka klinika (prednosta: prof. dr. V.Svab, DrSc.)
a I. chirurgicka klinika (prednosta: prof. dr. J.Pavrovsky)
fakulty vseobecneho lekarstvi KU [Karlovy university] v
Praze.

VISHNEVSKIY, N.A., prof.; ABDULLAYEVA, V.M.; IVANOVA, Ye.A.; STIKSOVA, V.N.

Some changes in the crystalline lens in health subjects. Vest.oft.
72 no.5:43-49 S-O '59.   (MIRA 13:3)
          (CRYSTALLINE LENS, physiol.)

VISHNEVSKIY, N.A.; ABDULLAYEVA, V.M.; IVANOVA, Ye.A.; KOTOVA, Ye.S.;
KROTOVA, S.I.; STIKSOVA, V.N.

Critical evaluation of the significance of "initial signs" of
radiation cataract. Med. rad. 5 no.11:77-81 N '60. (MIRA 13:12)
      (RADIATION SICKNESS)   (CATARACT)

VISHNEVSKIY, N. A., prof.; ABDULLAYEVA, V. M.; IVANOVA, Ye. A.; KOTOVA, E. S.; STIKSOVA, V. N. (Moskva)

Initial symptoms and classification of cataract. Vest. oft. no.5: 65-68 '61. (MIRA 14:12)

(CATARACT)

The Short- and Long-Term Order in Ferromagnetic Bodies. I. S. Stolhan (Zhur. Eksper. i Teoret. Fiziki (J. Exper. Theoret. Physics), 1939, 9, 432 437; Chem. Zentr., 1940, 111, (II), 3309).—[In Russian.] S. discusses the thermo-dynamic characteristics of ferromagnetic bodies. The usual methods of cal-culation, which do not take into consideration the short-term order, give incorrect results at temperatures above the critical. S. carried out calcula-tions taking into account the short-term order, which are therefore also valid at temperatures in excess of the critical. Formulæ derived in calculations embracing the long-term order confirm the former ones.

METALLURGICAL LITERATURE CLASSIFICATION

STIL'BANS, L. S.

USSR/Physics - Semiconductors, Hall Effect Jan 52

"Adiabatic and Isothermal Hall Effects in Semi-
conductors," L. S. Stil'bans

"Zhur Tekh Fiz" Vol XXII, No 1, pp 77-79

Analysis of the finally derived expression shows
that the difference between the adiabatic and iso-
thermal Hall effects can, in only the most unfa-
vorable cases, reach several percent, whereas ac-
cording to Gans' theory (Ann der Phy 20, p 293,
1906) this difference could be as large as desired.
Submitted 15 May 51.

206T103

PHILIPP, L. L., MAKHMUDOVA, Yu. I. and LYAKHOVA, Yo. O.

"Thermal Conductivity, Electrical Conductivity, and Thermoelectromotive Force of the System Sb-Zn, and also the Influence on Them of Insignificant Admixtures of Other Metals," ZhTF, 22, No. 1, pp 129-142, 1952.

1 Jun 52

STILBANS, L. S.

USSR/Physics - Semiconductors

"Temperature Dependence of Mobility of Electricity Carriers in Semiconductors,"
Ye. D. Devyatkova, Yu. P. Maslakovets, L. S. Stilbans, T. S. Stavitskaya

"Dok Ak Nauk SSSR" Vol 84, No 4, pp 681-682

The relation $u = AT^{-3/2}$ was tested on silicon, germanium and intermetallic compd
SbZn and on a number of corps considered to be intermediate between atomic and
ionic in a temp range 20-500°. Plotted results indicated a relation $u = AT^{-3}$.
Indebted to A.F.Ioffe. Received 1 Apr 52

232T99

(PA 56 no.668: 5467 '53)

FD-2819

USSR/Physics - Semiconductors

Card 1/1   Pub. 153-2/30

Author   : Vlasova, R. M. and Stilbans, L. S.

Title   : Study of Thermoelectric Properties of Bismuth Telluride

Periodical : Zhur. Tekh. Fiz, 25, 569-576, 1955

Abstract   : Ratio of thermoemf, conductivity, concentration and mobility of current carriers of the alloy Bi_2Te_3 to temperature and to excess of one component versus stoichiometric compound is studied. Results are illustrated in graphs and tables. Gratitude for cooperation is expressed to S. N. Nikolayev anf F. I. Vasenin. Five foreign and one USSR references.

Institution :

Submitted   : July 16, 1955

IOFFE, A.F.; STIL'BANS, L.S.; IORDANISHVILI, Ye.K.; STAVITSKAYA, T.S.;
FROLOV, A.A., redaktor izdatel'stva; PEVZNER, R.S., tekhnicheskiy
redaktor

[Thermoelectric refrigeration] Termoelektricheskoe okhlazhdenie.
Moskva, Izd-vo Akademii nauk SSSR, 1956. 107 p.   (MIRA 9:11)
    (Refrigeration and refrigerating machinery)
    (Semiconductors)

STILBANS, L. S.

Increase in the effectiveness of semiconductor thermo-couples. A. F. Ioffe, S. V. Airapetlants, A. V. Ioffe, N. V. Kolomoets, and L. S. Stil'bans. Soviet Phys. "Doklady" 1, 132(1950)(English translation).--See C.A. 51, 841a.

B. M. R.

St,ll 'bans, L S .

K-1

USSR/Processes and Equipment for Chemical Industries.
Processes and Apparatus for Chemical Technology

Abs Jour   : Referat Zhur - Khimiya, No 9, 1957, 33252

Author   : Ioffe, A., Stil'bans, L., Iordanishvili, Ye.,
              Fedorovich, A.

Inst   :
Title   : Thermoelectric Cooling in Refrigeration Engineering

Orig Pub   : Kholodil'naya tekhnika, 1956, No 3, 5-16

Abstract   : A brief consideration of the physical phenomena upon which
              the thermoelectric cooling is based, and a presentation
              of the fundamental propositions of the theory of A.I.
              Ioffe. A formula is given for determination of the refri-
              geration coefficient ε , from which it follows that ε
              does not depend on geometrical dimensions and shape of
              the thermoelements but is determined by the physical cha-
              racteristics of semiconductor materials (thermal and elec-
              tric conductivity, thermo e.m.f. of thermoelement branches)

Card 1/2

STIl'bAns, L.S

Abstract : A.F. Ioffe's theory of thermoelectric cooling is explained. The
           conditions under which the highest cooling coefficient and the
           maximum temperature drop is obtained are discussed. Experimental
           data are given for $PbTe$, and the theoretical deductions are con-
           firmed. The author lists practical applications of thermoelectric
           cooling, developed by the Institute of Semiconductors of the Academy
           of Sciences, USSR, jointly with the commercial organizations, such
           as a domestic refrigerator, hygrometer, etc.

Card   : 1/1

STIL'BANS, L.S.

Abstract   : Semiconductor thermocouples developed at the Institute of
             Semiconductors of the Academy of Sciences, USSR made it
             possible to obtain temperature drops of 60 -- 70° and in-
             dividual cases up to 80°. Experiments are carried out
             deep cooling with the aid of a three-stage setup (first
             stage -- compressor refrigerating machine, two others --
             thermocouple coolers). The temperature drop obtained
             reached 102°. By way of a thermal load, a chamber with
             a volume of one liter was used. In experiments on ther-
             mostatic control, use was made of the reversibility of the
             Peltier effect: the thermopile worked both as a

Card 1/2

Stil'bans, L.S.

G-3

Category : USSR/Electricity - Semoconductors

Abs Jour : Ref Zhur - Fizika, No 2, 1957, No 4228

Author   : Iordanishvili, Ye.K., Stil'bans, L.S.
Title   : Miniature Thermocouple Refrigerators

Orig Pub : Zh. tekhn. fiziki, 1956, 26, No 5, 945-957

Abstract : The principles of the theory and design of thermocouple refrigerators
           are considered. Equations are derived for the cooling coefficient
           and for the maximum temperature drop of refrigerators made up of bars
           of n and p-semiconductors. For deep cooling it is proposed to use a
           multi-stage thermocouple battery, in which the cold junctions of the
           first battery cool the hot junctions of the second, etc. With this,
           the temperature drop between the first and third stages reaches 60 --
           70°. Results are reported of experiments on combined cooling, in which
           an ordinary refrigerating machine is used in the first stage, making it
           possible to bring the total temperature drop to 102°. Results of the
           use of thermocouple batteries as thermal stabilizers of small volumes
           are described.

Card   : 1/1

IOFFE, A., akademik; STIL'BANS, L.; IORDANISHVILI, Ye.; FEDOROVICH, A.

Thermoelectric cooling in the refrigerating industry. Khol.tekh.33
no.3:5-16 Jl-S '56. (MIRA 9:10)
(Thermoelectricity) (Refrigeration and refrigerating machinery)

STIL'BANS, L.S.

USSR/ Laboratory Equipment. Apparatuses, Their
        Theory, Construction and Application.   I

Abs Jour: Referat. Zhur.-Khimiya, No. 8, 1957, 27361.

Author : A.F. Ioffe, S.V. Ayropetyants, A.V. Ioffe,
           N.V. Kolomoyets, L.S. Stil'bans.

Inst.   Academy of Sciences of USSR.

Title   : Efficiency Increase of Semiconductor Thermo-
           couples.

Orig Pub: Dokl. AN SSSR, 1956, 106, No. 6, 981.

Abstract: With a view to increase the ratio of the mobility
           of electricity carriers to the heat conductivity
           of the lattice, it is proposed to introduce ther-
           mocouples of substances possessing approximately
           the same lattice constant into the first named
           crystalline lattice.

Card 1/1

Dokl.Akad.Nauk, <u>111</u>, fasc.5, 1011-1013 (1956) CARD 2 / 2   PA - 1859

m = 0,63 m$_o$. The curve for r = 0 is equal to the experimental curve if
m = 0,29 m$_o$. Here m and m$_o$ denote the effective mass and the mass of the free
electron respectively. When computing the theoretical curves for the depend-
ence of mobility on the number of carriers, scattering by admixture ions was
not taken into account, and consideration of this scattering will probably
increase the slope of these curves for r = 0 and r = 1. This and some other
important reasons speak for r = 0 and against r = 1. Thus, there remains the
last step, i.e. to bring the relation r = 0 into line with the temperature
dependence of the mobility u ~ $T^{-5/2}$ within the range of high temperatures,
and u ~ $T^{-3/2}$ within that of low temperatures. The authors believe that this
is possible only by one way, i.e. by the assumption that the free length of
path of the electrons is limited within the range of low temperatures by col-
lisions with the participation of only one phonon. The probability of these
collisions increases in proportion to temperature and therefore it holds that
l ~ T^{-1} and u ~ $T^{-3/2}$. However, at higher temperatures collisions with seve-
ral phonons begin to play an important part. On this occasion at first colli-
sions with the participation of two phonons, and later, with a further in-
crease, collisions with three phonons etc. take effect.

INSTITUTION: Institute for Semiconductors of the Academy of Science in the
             USSR.

Stil'bans, Lazar' Solomonovich, Candidate of Physical and Mathemati-
cal Sciences

Poluprovodnikovyye termoelektrokholodil'niki (Semiconductor Thermo-
electric Refrigerators) Leningrad, Leningr. dom nauchno-tekhn.
propagandy, 1957. 98 p. (Series: Poluprovodniki, vyp. 12) 15,000
copies printed.

Tech. Ed.: Freger, D.P.; Editorial Board of Series: Ioffe, A.F.
Academician (chief ed.); Sominskiy, M.S., Candidate of Physical
and Mathematical Sciences (deputy chief ed.), Maslakovets, Yu.P.,
Doctor of Physical and Mathematical Sciences, Smolenskiy, G.A.,
Doctor of Physical and Mathematical Sciences, Shalyt, S.S., Doctor
of Physical and Mathematical Sciences, Regel', A.R., Candidate of
Physical and Mathematical Sciences, Subashiyev, V.K., Candidate

Card 1/5

Semiconductor Thermo...

Card 3/5

STIL'BANS, L. S.

258

PHASE I BOOK EXPLOITATION

Akademiya nauk SSSR. Institut poluprovodnikov

Poluprovodniki v nauke i tekhnike (Semiconductors in Science and Technology) v. 1. Moscow, Izd-vo AN SSSR, 1957. 470 p. 23,000 copies printed.

Resp. Ed.: Ioffe, A.F.; Tech. Ed.: Arons, R.A.

PURPOSE: The collection of articles "Semiconductors in Science and Technology" is intended for a wide circle of engineers and technicians.

COVERAGE: The first volume of the collection presents the principles of semiconductor theory concerning electric conductivity, thermo- and galvanomagnetic properties, contact phenomena, diffusion and thermoelectric properties. A description of semiconductor devices and their fields of application is given. References are given after each article.

Card 1/19

258

Semiconductors in Science and Technology
difficult problem of semiconductor technique is the creation of
heat-resisting semiconductor materials with given electric and
thermal properties to be used in economically profitable thermal
generators. The author considers the scientific, technical and
economic importance of the semiconductor problem to be equal to
that of the problem of utilization of nuclear energy. He presents
some general ideas on the electric conductivity of solids and on the
concentration and mobility of current carriers (p. 10) on the charge
sign of current carriers in semiconductors;   on the intrinsic
and impurity conductivity of semiconductors (p. 36);   on the relation
of semiconductor conductance to temperature (p. 49);   on semiconductor
photoconductivity (p. 61); on the influence of a strong electric
field on semiconductor conductance (p. 68); on the influence of
various corpuscular radiations on semiconductor conductance (p. 74);
on the influence of deformation (p. 78); and on conductance of
liquid, amorphous and polycrystalline bodies (p. 80). A table is
given of the numerical values of basic physical parameters which

Card 3/19

258

Semiconductors in Science and Technology
diffusion coefficient is close to the value of the complementary
thermal conductivity (p. 88). Crystal lattice thermal conductivity
is also analyzed. There are 3 diagrams and 3 references (2 Soviet
and 1 a translation).

Ch. III. Stil'bans, L.S.   Electron Statistics in Semiconductors 95
This article explains the Fermi statistics and the Fermi-Dirac
distribution function. There are 8 diagrams and 5 Soviet references.

Ch. IV. Stil'bans, L.S.   Thermoelectric Phenomena   113
The article explains the nature of the Peltier and Thomson
effects. Between 1930 and 1956 Ioffe, A.F. developed a qualitative
and then a quantitative theory of thermoelectromotive force and of
thermo-emf semiconductor generators (p. 115). The TGK-3 type of
thermoelectric generator based on Ioffe's ideas and designed under
his supervision is produced in the USSR as a power source for the
collective radio stations of the "Urozhay" type in regions where
there is no electric power supply (p. 115). Other models of
higher capacity are under development. In 1950, Ioffe, A.F.

Card 5/19

Semiconductors in Science and Technology   258

developed a theory of thermoelectric cooling with semiconductor
thermoelements. The Semiconductor Institute, Academy of Sciences,
USSR, has already developed a domestic refrigerator and other
devices based on this principle (p. 115). The author derives
formulae for the Peltier factor and for the thermoelectromotive
force using two different approaches: (1) either to obtain the
Peltier factor from kinetic considerations and then to find the
thermo-emf from the Thomson formula,or conversely, (2) to find a
formula for α (the thermo-emf factor) and then to obtain the
Peltier factor from the Thomson relation. He investigates two
components of the thermo-emf, namely the contact and volumetric,
and then studies the third component, the carrying along of
electrons by phonons. According to the author, this phenomenon
was first investigated in metals by Burevich, L.E. in 1945 and
later (1951) in semiconductors by Pikus, G..Ye., who derived a
formula for this source of thermo-emf (p. 122-123). Further
investigations of this phenomenon by non-Soviet researchers
are also mentioned. A method of measuring the thermoelectric
properties of semiconductors and the apparatus used for this
purpose are described in detail (p. 126). A comparison of experimental
and theoretical results   obtained for semiconductors and semi-
metals is made (p. 129) and data obtained by Gokhberg, B.M. and
Sominskiy, M.S. are presented (p. 131). It was found that

Card 6/19

Semiconductors in Science and Technology   258

agreement of results is obtained only for temperatures above -30° C, and only for certain groups of materials. There are 11 diagrams and 3 references (2 Soviet and 1 translation).

Ch. V. Stil'bans, L.S. Galvanomagnetic Phenomena   133

The author discusses galvanomagnetic phenomena occurring in conductors of the first type (i.e., in materials in which the current is carried by electrons and not by ions) when there is a simultaneous action of the electric and magnetic fields. He takes into consideration the case of perpendicularity of these fields when galvomagnetic phenomena attain their maximum. Descriptions are given of the Hall effect (p. 137) and the Ettingshausen effect (p. 141); of conductance changes in a magnetic field (p. 142); of thermomagnetic phenomena (p. 144); of methods used in measuring semiconductor conductance and the Hall effect (p. 145). There are 8 diagrams and 3 references (2 Soviet and 1 translation).

Ch. VI. Pikus, G. Ye. Contact Phenomena   148

The author presents the theory of contact phenomena in

Card 7/19

Źurn.techn.fis.27, fasc.1, 30-34 (1957)   CARD 2 / 2   PA - 1993

amperage. Here $\sigma_s(H)$ and $\sigma_s(0)$ denote quantities which are inversely propor-
tional to the resistance of deliquescence (conductivities of probes) at the
magnetic field strength H and in the case of a lacking field respectively.
In the case of low amperages dependence is linear and if concentration is di-
minished a considerable saturation occurs. From similar measurements carried
out at sufficiently high temperatures on a sample with homogeneously worked
surfaces the velocities of surface recombination were computed and are shown
in a table.
The modification of the resistance in a magnetic field was determined on a
sample with different recombination velocities on the lateral surfaces from
the voltage drop between the probe and the current electrode. A diagram
shows the modification of conductivity in dependence of the amount and the
direction of the magnetic field at a temperature of 320° K. In the case in-
vestigated here the modification $\Delta \sigma(+ H)$ of conductivity consists of two
parts: $\Delta \sigma(\pm H) = \Delta \sigma_q(H) \pm \Delta \sigma_{lin}(\bar{H})$. Here $\Delta \sigma_q(H)$ denotes the ordinary
term which is necessary for the improvement of the trajectories of the current
carriers, and $\Delta \sigma_{lin}(H)$ denotes the linear term which occurs because of the
modification of the concentration of the carriers. This linear part passes
through the origin of coordinates and is proportional to the magnetic field
strength in a wide domain.
INSTITUTION:

STIL'BANS, L.S.

'8642.   AN INVESTIGATION OF THE THERMOELECTRIC
PROPERTIES OF LEAD TELLURIDE AND LEAD SELENIDE
N.V. Kolomoets, L.S. Stavitskaya and L.S. Stil'bans
Zh. tekh. Fiz., Vol 27, No. 1 , 1957   (in Russ.)
    Measurements were made of the temperature variation

composition variation of the carriers
section (S. 3 x altering conditions
are given graphically   S never exceeded 3 x 10
of S with velocity of charge carriers was a coupling
form s = A (λ = de Broglie wavelength)
Rayleigh scattering of light   A.P. Brown

MT

SUBJECT	USSR / PHYSICS
AUTHOR	STIL'BANS, L.S.
TITLE	On the Commutation of Semiconductor Termoelements.
PERIODICAL	Zurn.techn.fis. 27,fasc.1, 212-213 (1957)
	Issued: 2 / 1957

According to theory (A.F.IOFFE, Poluprovodnikovye termoelementy (= semicon-
ductor thermoelements), published by the Academy of Science of the USSR,
Moscow-Leningrad (1956)) it applies for the degree of efficiency of semicon-
ductor thermoelements used in thermogenerators and coolers that

$$z = \left[(\alpha_1 - \alpha_2)/(\sqrt{\mathcal{H}_1 \varrho_1} + \sqrt{\mathcal{H}_2 \varrho_2}) \right]^2.$$

Here α_1 and α_2, ϱ_1 and ϱ_2, $\mathcal{H}_1$ and $\mathcal{H}_2$
denote the coefficients of the thermoelectromotoric force, the specific re-
sistance, and the heat conductivity respectively of the branches of the
thermoelement. In the most simple case, i.e. that both branches have the same
parameters, the above expression takes the more simple form of $z = \alpha^2/\mathcal{H}\varrho$.
However, these two formulae apply only to the ideal case that the resistance
of the soldered joints of the thermoelement is equal to zero. Otherwise, the
relation $z' = \alpha^2/\mathcal{H}(\varrho + r_0/l)$ holds for the degree of efficiency of the thermo-
element. Here ϱ denotes the resistance of a contact with the surface 1 cm^2,
and 1 - the length of the branches of the thermoelement. The removal of
transition resistances is one of the most important problems in connection with
the development of the thermoelements. The following condition must thus be
satisfied: $r_0 < 10^{-5}$ ohm.cm for $z' \sim z$.

57-9-33/40

AUTHOR: Ayrapetyants, S.V., Yefimova, B.A., Stavitskaya, T.S.,
Stil'bans, L.S., Sysoyeva, L.M.

TITLE: On the Mobility of Electrons and Holes in Solid Solutions Ob-
tained on the Basis of PbTe and Bi_2Te_3
(O podvizhnosti elektronov i dyrok v tverdykh rastvorakh, polu-
chennykh na osnove telluridov svintsa i vismuta)

ABSTRACT: On the strength of the facts mentioned here it may be said that
in all investigated cases the electrons move along the sublattice
of the cathions and the holes move along the anion sublattice.
Expressed in terms of quantum mechanics this means that the mo-
dulated amplitude of the wave function of electrons moving in
the conduction zone attains its maximum values near nodes occu-
pied by positive ions, while its lowest are attained near the
negatively charged nodes. For holes in a nearly completely fill-
ed zone the opposite is the case. Therefore electron mobility
is considerably reduced by the distortions of the "positive sub-
lattice", and hole mobility is considerably reduced by those
of the "negative sublattice". Furthermore, the conclusion is
drawn that, if it is intended to reduce the heat conductivity

Card 1/2

57-9-33/40

On the Mobility of Electrons and Holes in Solid Solutions Obtained on the
Basis of PbTe and Bi_2Te_3

of a compound destined to be used as material for the positive
thermoelement branch without thereby reducing the mobility of
holes, it is necessary partly to replace the cathions in the
lattice. On the other hand, the anions must be replaced in the
material used for the negative branch. There are 4 figures and
8 Slavic references.

ASSOCIATION: Institute for Semiconductors, Leningrad
               (Institut poluprovodnikov, Leningrad)

SUBMITTED: June 24, 1957

AVAILABLE: Library of Congress

Card 2/2

AUTHORS.   Gershteyn, E. Z., Stavitskaya, T. S., Stil'bans, L. S.   57-11-8/33

TITLE.   Investigation of Thermoelectric Properties of Lead Telluride
(Issledovaniye termoelektricheskikh svoystv telluristogo svintsa).

PERIODICAL.   Zhurnal Tekhn.Fiz., 1957, Vol. 27, Nr 11, pp. 2472-2483 (USSR).

ABSTRACT.   Referring to the previous work of the authors in T, 1957, Nr 1,
the investigation of the thermoelectric properties of the lead
telluride was extended to a somewhat greater carrier concentration
region of from 5.10^{17} to 2.10^{20}. The influence of the dispersion pro-
cess and of the degeration on the thermo-electromotive force and the
mobility are investigated at the sample in a wide admixture-concen-
tration interval. In the case of types which approach a stoichiometric
structure the correlation between the temperature dependence of the
forbidden zone width and the carrier mobility is investigated. By
introduction of compensating admixtures the influences on the kinetic
degeneration coefficients and on the variation of the dispersion pro-
cess are separated. The investigation of the temperature dependence
in degenerated and not degenerated types facilitates to determine
separately the dependence of the length of free path of the electrons
on the temperature and the energy.

Card 1/2   Inst. for Semiconductors, AS USSR

STIL'BANS, L.S.

PHASE I BOOK EXPLOITATION   SOV/1503
Akademiya nauk SSSR. Institut poluprovodnikov/

Poluprovodniki v nauke i tekhnike, t. 2. (Semiconductors in Science and Technology, Vol 2) Moscow, Izd-vo AN SSSR, 1958. 658 p. 17,000 copies printed.

Resp. Ed.: A.F. Ioffe; Tech. Ed.: R.S. Pevzner.

PURPOSE: This collection of articles is intended for scientists, engineers and technicians.

COVERAGE: The collection, published by the Semiconductor Institute, Academy of Sciences, USSR, under the supervision of Academician A.F. Ioffe, contains Parts II and III of a two-volume work on semiconductors. Part II completes the material on semiconductor devices begun in Volume I, and Part III describes various semiconductor materials. Lack of space did not permit inclusion of such subjects as crystal counters, thermoelectric generators, atomic batteries, luminophores, semiconductor catalysts, materials for complex cathodes and various other applications of semiconductors. Ioffe points out that the article by the American scientists V. Johnson and K. Lark-Horovitz on semiconductors at low temperatures deals with a subject hardly covered in the Soviet literature. Similarly, the article by the Swiss scientists G. Busch and U. Winkler fills a gap in the Soviet literature on methods of investigating semiconductor characteristics. These subjects will be dealt with exclusively in a proposed third volume. References appear separately after each article.

TABLE OF CONTENTS:

The authors explain the theory of the thermoelectric effect (also called the Peltier effect). In the USSR thermoelectric refrigeration (is based on the application of semiconductors was developed theoretically and in practice chiefly by and under A.F. Ioffe and by scientists and engineers of LFTI (Leningradskiy fiziko-tekhnicheskiy institut AN SSSR), later the Semiconductor Institute, AN SSSR. The authors devote three chapters to materials suitable for thermoelectric elements. They describe new developments in the theory of thermoelectricity and explain methods of calculation and the design of semiconductor refrigerators. They review various types of refrigerators developed as prototypes by LFTI, including miniature thermostatic units (used mostly for piezoelectric crystal stabilization), and semiconductor refrigerators developed recently for scientific research purposes and for atomic and nuclear research. They illustrate their application to experimental physiology with complex of improved types of these refrigerators ("formed" and a microscope stage with thermoelectric heating and cooling). There are 35 references, of which 34 are Soviet and 1 English.

Card 1/9

STILBANS, L.

"The Scattering Mechanism of Carriers on Phonons and on Lattice Defects,"

paper submitted Intl. Conf. of Semiconductors, Rochester, N. Y., 18-22 August
1958

Inst. of Semiconductors, Leningrad.

Abst: B-3,107,843, 2 July 58

57-2-12/32

AUTHOR: Stil'bans, L. S.

TITLE: On the Selection of the Cross-Section Relations in the Branches of Semiconductor Thermocouple Elements (O vybore sootnosheniya secheniy vetvey poluprovodnikovykh termoelementov).

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 28, pp. 262-263 (USSR).

ABSTRACT: In materials which are at present used for the positive and negative branch the specific resistance usually differs by the 1,5 - 2-fold amount and the specific thermal conductivity by the 1,2-fold amount, whereas $m_o \simeq 1,5$.

$$m_o = \sqrt{\frac{\varrho_1}{\chi_1} \frac{\chi_2}{\varrho_2}}$$

$\varrho_1, \varrho_2, \chi_1, \chi_2$ denote the specific resistances and the specific thermal conductivities of the thermocouple branches respectively. From considerations of the construction, however, it is more advantageous to keep the cross-sections of the branches equal. In this connection the problem arises whether the above-mentioned formula for m_o represents a critical value. Simple calculations given here show that small deviations

Card 1/2

On the Selection of the Cross-Section Relations in the   57-2-12/32
Branches of Semiconductor Thermocouple Elements.

of m from m_o (within the domain of $50^o/o$) are quite admissible. It is
shown that it is decisively admissible for the case discussed here to lay
out equally the cross-sections of the thermocouple-element branches.
There is one Slavic reference.

ASSOCIATION: Institute of Semiconductors AS USSR, Leningrad (Institut poluprovodnikov
AN SSSR, Leningrad).

SUBMITTED: October 21, 1957.

AVAILABLE: Library of Congress.

1. Thermocouples-Mathematical analysis

Card 2/2

57-28-3-7/33

AUTHORS: Stavitskaya, T. S.,   Stil'bans, L. S.

TITLE: On the Influence of Degeneration on the Efficiency of Semi-
             conductor Thermocouples (O vliyanii vyrozhdeniya na effektiv-
             nost' poluprovodnikovykh termoelementov)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 28, Nr 3, pp.484-488
             (USSR)

ABSTRACT: It was determined here to which extent   taking into account
             of the degeneration influences the conclusions of theory
             with regard to the conditions for an optimum of the efficien-
             cy of thermocouples. The theoretical relations were compared
             with the experimental results. At first the theoretical con-
             ditions (correlations) are given, that is to say, the formu-
             lae for the carrier-concentration n, for the coefficient
             of the thermoelectromotive force, for the electric conducti-
             vity σ and the constant A in the Wiedemann-Franz-law as
             functions of the reduced value of the chemical potential

Card 1/4 $\mu^* = \dfrac{\mu}{kT}$. It is shown that in the case of r = 0 (r denotes

57-28-3-7/33

On the Influence of Degeneration on the Efficiency of Semiconductor Thermo-couples

the exponent in dependence of the free length of path of the electron on the energy)   taking into account of the de-generation only introduces insignificant corrections into the conditions for the optimum of $\alpha^2\sigma$. In the case r = 1 and r = 2, however, such   taking into account funda-mentally changes the picture. In the case of r = 1 $\alpha^2\sigma$ has no extremum and with the increase in n asymptotically tends toward a constant value. In the case of r = 2 $\alpha^2\sigma$ in-creases illimitably . This is also to be seen from formulae (4b) and(5b) for the case of a high degeneration at $\mu^* \gg 0$. The theoretical relations given in chapter 1 were experimen-tally checked, in a number of samples of electron-lead--tellurite with a carrier-concentration of from 5.10^{17} to 2.10^{20} cm^{-3}. It is shown that on the one hand the experi-mental results qualitatively agree with those of theory, but that on the other hand essential divergences also exist. 1) With a rise of temperature $\alpha^2\sigma$ decreases more rapidly than it would have to according to theory, 2) the maximum $\alpha^2\sigma$ values of the curves, corresponding to the different carrier-concentrations, are not equal as this should be, according to theory, but decrease with an increase of carrier

Card 2/4

57-28-3-7/33

On the Influence of Degeneration on the Efficiency of Semiconductor Thermo-couples

-concentration. Both deviations from theory are due to the fact that in the range of high temperatures $1_0(T)(1$ - free length of path of the electron) is proportional to the square of the temperature and not to the first power as was assumed earlier. It is concluded that in electron--dispersions of the heat vibrations of an atom lattic the conclusions of the theory with regard to the dependence of $\alpha^2\sigma$ on the carrier-concentration and the temperature gene-rally agree with the experimental results . The observed di-vergences are due to the fact that the present electron--theory of solids does not sufficiently exactly render the dependence of the carrier-mobility on its concentration and on temperature. At present no possibility exists to compare the theoretical rules governing the case r = 1 with experi-ment, as no substance was hitherto found in which the de-pendence of the free length of path of the electrons on their energy is expressed by this law. There are 8 figures, and 2 Soviet references.

Card 3/4

Inst. Semiconductors, AS USSR

57-28-3-8/33

AUTHORS: Stil'bans, L. S. , Fedorovich, N. A.

TITLE: On the Performance of Cooling Thermoelectric Cells on Non-
                steady Conditions (O rabote okhlazhdayushchikh termoelementov
                v nestatsionarnom rezhime)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 28, Nr 3, pp.489-492
                (USSR)

ABSTRACT: The performance of a cooling thermoelectric cell on nonsteady
                conditions was theoretically and experimentally investigated
                here. The equation for the temperature of the cold soldered
                junctions (4) is derived. The analysis of this formula (4)
                shows that the inertia of the thermoelectric cell is a func-
                tion of the square of its linear dimensions, i.e. that the
                cooling velocity is inversely proportional to the square of
                its length. The cooling velocity increases with the current
                rise. The investigations were made in specially produced
                samples as well as in thermoelectric cells of usual construc-
Card 1/2   tion. It is shown that the inertia also depends on the opera-

57-28-3-8/33

On the Performance of Cooling Thermoelectric Cells on Nonsteady Conditions

tion amperage and can many times be reduced by the use of a pulsating current with an amplitude which surpasses the value of the optimum current under steady conditions. In the case of a pulsed operation the thermoelectric cell may for a short time guarantee a cooling which considerably surpasses the maximum cooling under steady conditions. M. N. Vinogradov helped with the measurements and the production of the thermoelectric cells. There are 4 figures and 2 Soviet references.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad
(Leningrad Institute for Semiconductors, AS USSR)

SUBMITTED: October 1, 1957

1. Refrigeration systems—Equipment   2. Refrigeration systems
—Performance   3. Electric currents—Temperature factors

TITLE: Thermoelectric cells

Card 2/2

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67383

SOV/181-1-9-1/31

AUTHORS: Yefimova, B. A., Stavitskaya, T. S., Stil'bans, L. S.,
            Sysoyeva, L. M.

TITLE: On the Scattering Mechanism of Carriers in Some Solid
            Solutions on the Basis of Lead- and Bismuth Tellurides

PERIODICAL: Fizika tverdogo tela, 1959, Vol 1, Nr 9, pp 1325 - 1332
            (USSR)

ABSTRACT: The present paper supplies a store of experimental material
            concerning the relation between mobility of electrons and
            holes on the one hand, and the composition of various lead-
            tellurium and bismuth-tellurium alloys on the other. The first
            part of the paper deals with the dependence of the free-path
            time of electrons and holes on the position of the impurity
            atoms in the lattice. Following suggestions by A. V. Ioffe
            and A. F. Ioffe, the scattering of neutral impurities was
            investigated with the aim of increasing the efficiency of
            thermocouples. The results obtained by several previous
            investigations on this subject are briefly discussed and next,
            the mobility-to-composition curves of the systems $Bi_2Te_3-Sb_2Te_3$,

Card 1/4

67383

On the Scattering Mechanism of Carriers in Some Solid   SOV/181-1-9-1/31
Solutions on the Basis of Lead- and Bismuth Tellurides

Bi_2Te_3-Bi_2S_3, and PbTe-PbSe (Figs 1-3) are dealt with. The
abscissa is given by the concentration (in atom%) of the
second component, while the ordinate is given by the mobility
of holes (Curve 1) and electrons (Curve 2). In the first case,
the hole mobility rises with concentration, whereas the elec-
tron mobility drops; in the second case, the hole mobility
drops, while the electron mobility remains about constant.
In the third case, finally, the two mobility curves have a
flat minimum at about 50% PbSe. This is indicative of the
fact that electrons move toward the cation sublattice, and
the holes toward the anion sublattice. The relation between
mobility and composition in the systems Bi_2Te_3-Bi_2Se_3 (Fig 4)

and PbTe-SnTe (Fig 5) is more complicated. In the first case
both curves have a minimum, in the second case the hole
mobility has a minimum with low SnTe-concentration and there-
upon rises steeply, while the electron mobility drops monoton-
ously. The electron mobility in bismuth telluride is about
four times less than in bismuth selenide, and the hole mobil-

Card 2/4

On the Scattering Mechanism of Carriers in Some Solid   SOV/181-1-9-1/31
Solutions on the Basis of Lead- and Bismuth Tellurides

67383

ity in Bi_2Te_3 is by the 1.5 fold less than in Bi_2Se_3. Condit-
ions in PbTe-SnTe (Fig 5) are even more complicated. The hole
mobility rises after a minimum, while the electron mobility
drops after a maximum. In a similar manner, the second part
of the paper investigates the dependence of the free-path time
on the carrier energy. A number of diagrams are shown and dis-
cussed. Thus, figure 7 shows the temperature dependence of
mobility for pure PbTe and for PbTe + 5% PbSe with equal
carrier concentration ($n = 4.10^{19}$); figure 8 shows the temper-
ature dependence of $\nu_{n.i.}$ (the collision frequency
$\nu = \nu_{th} + \nu_i + \nu_{n.i.}$; ν_n denoting the frequencies of collisions
with thermal vibrations, ions and neutral impurities).Figure 9
shows the temperature dependence of mobility u in pure PbTe and
PbTe + 5% PbSe, figure 10 $\nu_{n.i.}/T = f(\lg \varepsilon)$, figure 11 u(n),
figure 12 τ as a function of ε ($\tau \sim \varepsilon^{-0.8}$). Figures 13-19 show
the results of similar investigations for the systems
PbTe-SnTe and $Bi_2Te_3-Bi_2Se_3$. In all these cases, the free-path

Card 3/4

On the Scattering Mechanism of Carriers in Some Solid   67383
Solutions on the Basis of Lead- and Bismuth Tellurides   SOV/181-1-9-1/31

time is by way of approximation inversely proportional to
temperature, which is in contradiction with the theory. It is
explained by the fact that triple collisions (electron -
impurity atom - phonon) may occur in a lattice containing
impurities. Theoretical investigations were conducted by
T. A. Kontarova. There are 19 figures and 4 Soviet references.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of
                Semiconductors of the AS USSR, Leningrad)

SUBMITTED: May 19, 1959

Card 4/4

AUTHORS: Ilkhovich, M. F.; Colhan, O. A.; Iglseen, T. A.; Kuts, ...

TITLE: Investigation of the Scattering Mechanism of Carriers in Some Semiconductors

ABSTRACT: The above investigations were conducted on lead telluride, and also at the following: 1) with electron addition and thermal vibrations of the crystal lattice, the dependence of the time required for the traveling of the free path of the electron is determined. 2) In the scattering energy of electrons should be determined. 3) In the scattering on the ionized impurity atom one finds the dependence of a on the concentration of the impurities and also on the energy of the electron. A qualitative picture of the quantitative relations should then be determined on the basis of these phenomena should then be determined. The investigations were mainly conducted on poly-crystalline samples produced by powder metallurgy. The dependence of a on the energy of the electron and also on the intensity of the thermal vibrations is still unclear; these ...

Card 1/4

dependences, however, can be separated from one another by appropriate investigations. Among other things, the following holds for lead telluride: $a \sim T^{-5/2}$ holds throughout the temperature range investigated for the mobility of a sample with the concentration of $3.1 \cdot 10^{17}$. In the case of concentrations of $2.4 \cdot 10^{18}$ and $1.5 \cdot 10^{19}$, $a \sim T^{-5/2}$ holds in the range of high temperatures, and in the case of low temperature...

Card 2/4

concentration of the carriers are in satisfactory agreement with the theory. Also in the case of n-type Bi_2Te_3 and Bi_2Se_3 the dependence of the thermoelectromotive force on the concentration of the carriers is in good agreement with the theory. This also holds for the temperature dependence of mobility in Bi_2Te_3, with low thermoelectromotive forces and with low temperature. The temperature-dependence of mobility ...

Card 3/4

review agree with Kройnov's theory (Ref 5). For Bi_2Te_3,
$$\frac{1}{u(a)} = \frac{1}{u_0(a)} + S_i \mu_0 a^{1/2}$$
holds. Here u_0 denotes the theoretical dependence of u on a for $a = 1/2$, where n denotes the number of electrons (and ions) and S_i is the transversal cross section of the ion. A similar relation also holds for the dependence of the motion on temperature. There are 19 figures and 6 references, 4 of which are Soviet.

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AUTHORS: Vinogradova, M. N., Golikova, O. A., Mitrenin, B. P.,
             Stil'bans, L. S.

TITLE: The Mechanism of Carrier Scattering in p-Type Germanium

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 7, pp. 1428-1430

TEXT: It has been shown many times already that the temperature
dependence of the hole mobility of germanium in the range 100 - 300°K
corresponds to the law $u \sim T^{-2.3}$, and this contradicts the theory of
carrier scattering on accustic vibrations. It was proposed to take into
account also the optical vibrations to overcome this difficulty. If this
is done, the mobility falls rapidly for $T < \theta$, θ being the Debye
temperature. To check this hypothesis, u-measurements for $T > \theta$ can be
made. To be able to determine u directly from conductivity and Hall
constant R, the range of impurity conductivity on the side of high
temperatures must be increased. This increase takes place in more

Card 1/3

The Mechanism of Carrier Scattering in
p-Type Germanium

82533
S/181/60/002/007/008/042
B006/B070

strongly doped samples. The authors used gallium-doped germanium with a

hole concentration of $2.8 \cdot 10^{15}$ to 8.10^{16}. R was measured at 17,000 oe,

where $R\sigma = \dfrac{u_l p_l + u_h p_h}{p_l + p_h} = \bar{u}$. The index l refers to light and h to heavy

holes. If it is assumed that the temperature dependence of the mobility
of holes of both kinds is the same, $\bar{u} = f(t)$ gives a correct
description of the temperature dependence of the mobility of heavy
holes. Fig. 1 shows u(T) on a logarithmic scale for five samples of
germanium with different hole concentrations (curves 2-6). Curve 1 gives
the straight line corresponding to the $T^{-2.3}$ law. When the carrier
concentration is increased, the slope of the curve approaches that of
the straight line. Further investigations showed that the carriers of
all samples are in a non-degenerate state at all temperatures. Lower
values of the mobility in samples with high hole concentrations should,
therefore, be explained as being due to the effect of a scattering from
negatively charged acceptor ions whose number N is equal to the number of
holes p. If it is assumed that the total number of collisions per second

Card 2/3

825 33

The Mechanism of Carrier Scattering in   S/181/60/002/007/008/042
p-Type Germanium   B006/B070

$\nu = 1/\tau$. (τ - relaxation time, $u = \frac{e}{m}\tau$) is the sum of collisions with

thermal vibrations (ν_{th}) and ions (ν_i), a comparison of two samples with

different hole concentrations may give ν_i, mobilities u_{th} and u_i, where

ν_i = aN (a=sv. s being the mean ionic cross section, and v the mean hole

velocity) and $\frac{1}{u_i} = \frac{m}{e}$ aN. Figs. 2 and 3 show the results of the

calculations. Fig. 2 shows $\frac{1}{u} = f(lgT)$ for five samples, Fig. 3 shows

$\Lambda (\frac{1}{u})$ for different pairs of samples. If formula (1): $1/u_{th} = 1/u - 1/u_i$

holds for the mobilities, the $T^{-2.3}$ law is obeyed for all samples.
Summarizingly, it may be said that between 100 - 450°K ν_i is independent
of temperature (up to an accuracy of 10%), which diverges completely
from the old theory. The mean free path of the carriers (l = τv) is,
therefore, proportional to v and not to v^4, as was assumed earlier.
Taking into account the scattering of holes by thermal lattice vibrations,

the $T^{-2.3}$ law is well obeyed in the range of temperatures considered.

Card 3/4   Inst Semiconductors AS USSR

84067
S/181/60/002/009/008/036
B004/B056

9.4300 (1035, 1138, 1143)

AUTHORS: Stavitskaya, T. S., Stil'bans, L. S.

TITLE: The Scattering of Electrons on Impurity Ions in Lead
               Telluride

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 9, pp. 2082-2084

TEXT: The present paper aimed at solving the problem as to whether in
PbTe the relaxation time τ_i of the carriers is independent of their energy.
Fig. 1 represents the measured mobility u of the carriers as a function of
their concentration, and the theoretical curve for the case in which scat-
tering on impurity ions occurs. Fig. 2 shows mobility as a function of
temperature for PbTe samples with electron concentrations of
$1.5 \cdot 10^{19}$, $5 \cdot 10^{19}$, and $1.6 \cdot 10^{20}$ cm^{-3}. On the assumption that the total
number of collisions ($\nu = 1/\tau$) results from the addition of collisions
with impurity ions ($\nu_i = 1/\nu_i$) plus the collisions on thermal lattice
vibrations ($\nu_t = 1/\nu_t$), ν_i was calculated from Fig. 1, u(T) was corrected,

Card 1/2

The Scattering of Electrons on Impurity Ions   84067
in Lead Telluride   S/181/60/002/009/008/036
                                                B004/B056

and the temperature dependence $u_o(T)$ in scattering on thermal vibrations
was obtained. The results obtained by this calculation are represented
in Figs. 3, 4. It follows from Fig. 3 that the number of collisions on
ions is proportional to the number of ions: $1/u_i$ = an. The coefficient a
depends neither on the concentration nor on the energy of the carriers.
As the relaxation time of the carriers in the case of scattering on im-
purity ions is thus (like in bismuth telluride) independent of their
energy, $1/u_o(T)$ = $1/u(T)$ - an (1) is written down, and from the data of
Fig. 2 conversion according to equation (1) is carried out. The curves
represented in Fig. 4 no longer show the break to be seen in Fig. 2. Thus,
the latter had been caused by the scattering of the carriers on impurity
ions. There are 4 figures and 3 references: 2 Soviet and 1 British.

ASSOCIATION: Institut poluprovodnikov AN SSSR, Leningrad
                (Institute of Semiconductors of the AS USSR, Leningrad)

SUBMITTED: March 5, 1960

Card 2/2

REGEL', A. R. ; STIL'BANS, L. S.

Abram Fedorovich Ioffe. Fiz. tver. tela 2 no.11:2671-2676 N '60.
(MIRA 13:12)

1. Institut poluprovodnikov AN SSSR, Leningrad.
(Ioffe, Abram Fedorovich, 1880-)

86438

S/:81/60/002/011/025/042
B006/B056

26.16 ;

AUTHORS: Ioffe, A. F., Moyzhes, B. Ya., and ~~Stil'bans, L. S.~~

TITLE: Thermocouples as Power Sources

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 11, pp. 2834-2857

TEXT: The present very voluminous paper deals with a principally theoreti-
cal investigation of the possibilities of using thermoelectric phenomena
for generating energy. In principle, there are four possibilities to do so,
which base upon the use of four devices: 1) Thermoelectric generators;
2) Cooling plants (refrigeration pumps; 3) Heating plants (heat pumps);
and 4) Thermostats and air-conditioning apparatus. All these devices are
characterized economically by Z, which has the dimension degree^{-1}, and
is a function of the material parameters of the components of the thermo-

couple: $Z = (\alpha_1 + \alpha_2)^2 / (\sqrt{\varkappa_1 \varrho_1} + \sqrt{\varkappa_2 \varrho_2})^2$, where α is the thermo-emf,

ϱ the resistivity, and $\varkappa$ the thermal conductivity of the two components.
Further, these devices are characterized by the efficiency

Card 1/4

86438

Thermocouples as Power Sources   S/181/60/002/011/025/042
                                              B006/B056

$$\eta = \frac{T_2 - T_1}{T_2} \cdot \frac{\sqrt{1 + \vartheta} - 1}{\sqrt{1 + \vartheta} + T_1/T_2}$$ (generators) and the cooling coefficient $\mathcal{E}$ of

thermoelectric cooling plants: $\mathcal{E} = \frac{T_1}{T_2 - T_1} \cdot \frac{\sqrt{1 + \vartheta} - T_2/T_1}{\sqrt{1 + \vartheta} + 1} \cdot \vartheta = ZT_m$,

$T_m = (T_1 + T_2)/2$. The materials available today have a ϑ of $\simeq 1$ within the temperature range between room temperature and $1200°K$. Thus, it is possible, in principle, to produce thermoelectric generators with an efficiency of about 15%, as well as cooling devices with a maximum cooling of $80°$ (i.e., at a temperature difference of $40°$, $\mathcal{E} \simeq 50\%$). Further, the material properties determining Z are discussed, and the necessity of looking for materials having minimum thermal conductivity of the lattice with maximal mobility, and of increasing $u/\varkappa_{lattice}$ is stressed. Of such materials, the optimum carrier concentration is given as $n_o = \frac{2(2\pi mkT)^{3/2} \cdot e^r}{h^3}$. Further, problems relating to the usefulness and efficiency of materials with

Card 2/4

86438

Thermocouples as Power Sources   S/181/60/002/011/025/042
                                               B006/B056

complicated band structures, and later problems of carrier concentration
are discussed. In the following sections, the authors discuss the carrier
mobility and their affection by scattering from defects and thermal lat-
tice vibrations; in detail, the scattering by thermal vibrations, impurity
ions, and impurities introduced by substitution into chemical compounds
(above all, tellurides and selenides), are discussed. In the following
sections, the authors discuss problems of heat conduction, the dependence
of Z on the degree of carrier degeneracy and on temperature, and describe
the operation of thermocouples under nonsteady conditions. Further,
possibilities are discussed of increasing the efficiency of thermocouples
(thermal conductivity, mobility, and thermo-emf). Liquid and gaseous
semiconductors are discussed, and the optimum determination of the geo-
metrical dimensions and the correspondence of the individual parts of the
branches of thermocouples. In the last part of the paper, thermocouples
with thermionic emission are discussed (vacuum thermocouple without and
with compensation of the electronic space charge; plasma thermocouple;
and combination of solid and vacuum thermocouples). The paper gives a sur-
vey of the present stage of the theory of thermocouples, and discusses
possibilities of improving it. The material discussed has been taken mainly

Card 3/4

86438

Thermocouples as Power Sources   S/181/60/002/011/025/042
                                                  B006/B056

from published papers. I. A. Smirnov, A. I. Ansel'm, A. R. Regel', and
A. A. Averkiyev are mentioned. There are 3 figures and 31 references:
19 Soviet, 5 German, 5 US, 1 Canadian, and 1 British.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad
                (Institute of Semiconductors of the AS USSR, Leningrad)

SUBMITTED: July 11, 1960

Card 4/4

STIL'BANS, L. ...

Doc Phys-Math Sci - (diss) "Investigation into and several appli-
cations of semiconductor thermoelements." Moscow, 1961. 28 pp;
(Academy of Sciences USSR, Physics Inst imeni P. N. Lebedev);
200 copies; free; list of author's works on pp 26-28 (40 entries);
(KL, 5-61 sup, 171)

29695
S/181/61/003/010/022/036
B104/B108

24,7700 (1164,1385,1559)

AUTHORS: Golikova, O. A., Moyzhes, B. Ya., and Stil'bans, L. S.

TITLE: Hole mobility in germanium as a function of concentration and temperature

PERIODICAL: Fizika tverdogo tela, v. 3, no. 10, 1961, 3105 - 3114

TEXT: The hole mobility in p-type germanium with an acceptor concentration of $4.9 \cdot 10^{13} - 4 \cdot 10^{20}$ cm^{-3} was investigated in the temperature range of from 77 to 450°K. The carrier concentration was determined by measuring the Hall effect in magnetic fields of $50 - 38,000$ oe in the above range of temperatures. Specimens were produced by zone melting during which the germanium was alloyed with gallium. Mobilities of different specimens as functions of temperature are given in Figs. 1 and 2. The carrier concentrations of the different specimens ranged from $4.9 \cdot 10^{13}$ to $6.4 \cdot 10^{16}$ cm^{-3} at 77°K (Fig. 1), and from $1.2 \cdot 10^{17}$ to $4.2 \cdot 10^{20}$ cm^{-3} at 300°K (Fig. 2). The measurement results were checked with specimens

Card 1/5

29695

S/181/61/003/010/022/036
B104/B108

Hole mobility in germanium...

having concentrations of $10^{15} - 10^{16}$ cm^{-3}, produced at the Institut
metallurgii AN SSSR (Institute of Metallurgy, AS USSR) by Chokhral'skiy's
method. Results are given in Fig. 3. In a detailed discussion of the
results the authors show that in the range of carrier concentrations from
10^{15} to $3 \cdot 10^{19}$ cm^{-3} the experimental data on the carrier mobility in
p-type germanium in the temperature range from 77 to 450°K can be ex-
plained qualitatively and quantitatively by theories of carrier scattering
from ionized impurities. The mobility is one-hundredth of that of pure
materials. The ratio u_{theor}/u_{exp} (u = mobility) is equal to unity up to
concentrations of 10^{17} cm^{-3}, has a maximum of nearly 2 at 10^{18} cm^{-3},
decreases to 1.6 and, at a concentration of $5 \cdot 10^{19}$ cm^{-3} starts rising
again. The authors thank M. I. Vinogradov for help, and V. S. Zemskov
(Institute of Metallurgy, AS USSR) for supplying the control specimens.
There are 6 figures and 17 references: 3 Soviet and 14 non-Soviet. The
four most recent references to English-language publications read as
follows: E. G. S. Page. Phys. Chem. Sol., 16, 207, 1960; T. P. McLean,
E. G. S. Page. Phys. Chem. Sol.; 16, 220, 1960; F. A. Trumbore,
A. A. Tartaglia. J. Appl. Phys., 29, 511, 1958; A. C. Beer,

Card 2/5 3

29695
S/181/61/003/010/022/036
B104/B108

Hole mobility in germanium...

R. K. Willardson. Phys. Rev., <u>110</u>, 1286, 1958.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of
Semiconductors AS USSR, Leningrad)

SUBMITTED: May 27, 1961

Fig. 1. Hall mobility as a function of temperature. Legend: The figures
by the curves indicate the number of specimen. On top-specimens with
lower carrier concentration.

Fig. 2. Hall mobility as a function of temperature. Legend: see Fig. 1.

Fig. 3. Hall mobility as a function of carrier concentration at room
temperature. Legend: (1) specimen examined in the present paper;
(2) specimens supplied by the Institute of Metallurgy, AS USSR; (3) data
taken from the paper of F. A. Trumbore et al.; (4) data taken from the
paper of W. C. Dunlap, Phys. Rev., <u>79</u>, 286, 1950.

Card 3/5

29696
S/181/61/003/010/023/036
B125/B102

24.7600 $(1043, 1137, 1164)$

AUTHORS: Golikova, O. A., and Stil'bans, L. S.

TITLE: Investigation of the dependence of the Hall coefficient on the magnetic field and the temperature in p-type germanium

PERIODICAL: Fizika tverdogo tela, v. 3, no. 10, 1961, 3115-3122

TEXT: The authors study the function R(H) (R - Hall coefficient) for carrier concentrations of $n \sim 10^{13}$ to 10^{16} cm^{-3} at magnetic field strengths of 50 to 38,000 oe, and at temperatures of 77-290°K. The experimental results are compared with theory (A. C. Beer, R. K. Williardson. Phys. Rev., 110, No. 6, 1286, 1953). The experimental results obtained for samples with $n \sim 10^{13}$ to 10^{14} are in semiquantitative agreement with theory. Agreement is found at mobilities lower than the theoretical values. According to G. Dresselhaus, A. F. Kip, and C. Kittel (Phys. Rev., 98, no. 2, 398, 1955) (Determination of the relaxation times τ_1 and τ_h of light and heavy holes, respectively, from the width of the

Card 1/3

Investigation of the dependence of...

resonance curve at $4^{\circ}K$), the following relation is valid: $\tau_1/\tau_h \simeq 1.4$ and not $\tau_1/\tau_h = 1$. The results concerning galvanomagnetic effects were in conformity with theory at $b = m_h/m_1 = 8$ (m_h and m_1 are the effective masses of heavy and light holes, respectively). $\nu = n_1/n_h = 0.02$ was put instead of $\nu = 0.04$. (n_1 and n_h are the concentrations of light and heavy holes, respectively). According to G. Ye. Pikus (ZhETF, XXVII, no. 7, 1957), taking account of the angular dependence may lead to a difference between τ_1 and τ_h; hence, the value $b = 8$ used for the calculations appears to be doubtful. The values of b obtained for various scattering mechanisms (consideration of a possible influence of optical vibrations and of hole-hole scattering) should be taken into account in a more exact theory. M. N. Vinogradov is thanked for aid in measurements, S. S. Shalyt for arranging measurements of the Hall effect in strong magnetic fields, I. I. Farbsteyn for advice, as well as G. L. Bir, B. Ya. Moyzhes, and G. Ye. Pikus for discussions. There are 6 figures, 2 tables, and 12 references: 4 Soviet and 8 non-Soviet. The three most recent

Card 2/3

Investigation of the dependence of...

29696
S/181/61/003/010/023/036
B125/B102

references to English-language publications read as follows:
R. K. Willardson, T. C. Harman, A. C. Beer, Phys. Rev., 96, 1512, 1954;
H. Brooks. Advances in Electronics, 7, 156, 1955; F. J. Morin, Phys.
Rev., 93, no. 1, 62, 1954.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of
Semiconductors AS USSR, Leningrad)

SUBMITTED: May 27, 1961

Card 3/3

33353
S/181/62/004/001/024/052
B108/B104

9.4174 (1043,1482,1114)

AUTHORS: Yefimova, B. A., Kel'man, Ye. V., and Stil'bans, L. S.

TITLE: Mechanism of scattering from impurity ions in Bi_2Te_3

PERIODICAL: Fizika tverdogo tela, v. 4, no. 1, 1962, 152 - 156

TEXT: The temperature dependences of the electron and hole mobilities of polycrystalline Bi_2Te_3 (n- and p-type) were measured at 80 - 600°K. The different carrier concentrations at which the measurements were made were attained by adding Pb (p-type) and/or CuBr (n-type). In evaluating the mobility data it was assumed that the mobility related to scattering from impurity ions is independent of temperature and of the mean carrier energy. Moreover, it was assumed that $1/u_{exp} = 1/u_{therm} + 1/u_{ion}$, where u_{therm} is the mobility with scattering from thermal lattice vibrations, u_{ion} is the mobility with scattering from impurities. The effect of scattering from impurities on the thermo-emf is less than 10 - 12%. It was therefore possible to calculate the levels of the chemical potential from the thermo-

Card 1/4

Mechanism of scattering from...

33353
S/181/62/004/001/024/052
B 08/B104

emf The electron and hole mobilities in the case of scattering from the thermal lattice vibrations are proportional to $T^{-1.78}$ and $T^{-2.12}$ respectively. Experiments as well as calculations were proof of the correctness of the law $l \sim \sqrt{\varepsilon}$ (1 - carrier free path) (M. N. Vinogradova et al., FTT. 1, 9, 1453, 1959). This law accounts for screening of the charge of the impurity ions owing to high dielectric constant and high carrier concentration The experimental and calculated cross sections S of scattering from impurity ions agree well with each other ($S_{exp} \sim 2 \cdot 10^{-15}$ cm^2, $S_{th} \sim 3 \cdot 10^{-15}$ cm^2), corresponding to an "ion radius" of about 3 Å. There are 4 figures, 1 table, and 7 references: 2 Soviet and 5 non-Soviet. The four most recent references to English-language publications read as follows: H. Brooks. C Herring. Phys. Rev., 83, 879, 1951; K Hashimoto. Mem. Fac Science, Kynsyn University, ser. B, 2. 5. 165. 1958; I G. Austin Proc Phys Soc.. 72. 545. 1956; N Sclar Phys Rev., 104. 1545, 1956.

ASSOCIATION: Institut poluprovodnikov AN SSSR Leningrad (Institute of Semiconductors AS USSR, Leningrad)

Card 2/3

BOGUSLAVSKIY, L.I.; STIL'BANS, L.S.

Conductance of films of a polymeric complex of tetracyanoethylene
with metals. Dokl. AN SSSR 147 no.5:1114-1117 D '62.

(MIRA 16:2)

1. Institut elektrokhimii AN SSSR i Institut polyprovodnikov
AN SSSR. Predstavleno akademikom A.N. Frumkinym.

(Organometallic compounds—Electric properties)

(Ethylene compounds)

STIL'BANS, L.S., doktor fiz.-mat. nauk; ROZENSHTEYN, L.D., kand.
        fiz.-mat. nauk; AYRAPETYANTS, A.V., kand. fiz.-mat. nauk;
        KARGIN, V.A., akademik; KRENTSEL', B.A., doktor khim.
        nauk; TOPCHIYEV, A.V., akademik [deceased]; DAVYDOV, B.E.,
        kandid.khim. nauk; GEVSEN, L.V., red.; MIYESSEROV, K.G.,
        red.; GOLUB', S.P., tekhn. red.

        [Organic semiconductors] Organicheskie poluprovodniki. Mo-
        skva, Izd-vo AN SSSR, 1963. 317 p.   (MIRA 16:12)

        1. Akademiya nauk SSSR. Institut neftekhimicheskogo sinteza.
                (Semiconductors)

L 10378-65   EWT(1)/EPA(s)-2/EWG(k)/EWT(m)/EPF(c)/EWP(j)/T   Pc-4/Pr-4/Pt-10/
Pz-6   IJP(c)/ASD(a)-5/AFWL/AFETR/ESD(c)/ESD(dp)/ESD(t)/RAEM(t)   AT/RM

ACCESSION NR: AP4047206   S/0190/64/006/010/1802/1805

AUTHOR: Boguslavskiy, L. I.; Stil'bans, L. S.

TITLE: Study of the conductivity of polymer films at high frequencies

SOURCE: Vy*sokomolekulyarny*ye soyedineniya, v. 6, no. 10, 1964,
1802-1805

TOPIC TAGS: organic semiconductor, semiconducting polymer, polytetra-
cyanoethylene, poly(silver tetracyanoethylene), frequency, electrical
property

ABSTRACT: A study has been made of electrical conduction in the
polymeric complex of tetracyanoethylene with silver, and in metal-free
polytetracyanoethylene.   Thin film (6.4 x 10^{-5} and 5 x 10^{-6} cm, re-
spectively) specimens were prepared at 300 and 500C by a technique
described in the original article.   Measurements of a-c conductivity
were performed at frequencies in the range 0.5—200 mcps. Measure-
ments of the temperature dependence of resistivity were conducted with
d-c current at 20—300C.   It was found that the resistivity and ac-
tivation energy for conduction of the complex decrease with rising

Card 1/2

L 10378-65

ACCESSION NR: AP4047206

frequency. Resistance vs frequency curves, which show a frequency-independent section, were analyzed, and activation energies for conduction determined for d-c and high-frequency a-c currents were compared. It was concluded that d-c measurements alone cannot give a complete picture of the conduction mechanism. Apparently this mechanism is the sum total of the contributions of two mechanisms: 1) carrier transfer from one continuous-conjugation region to another and 2) conduction within the confines of these regions proper, which is characterized for the complex and the metal-free material by an activation energy close to zero. Therefore, in the study of conduction processes in organic polymers, barriers between macromolecules must be taken into account. Orig. art. has: 2 figures, and 1 formula.

ASSOCIATION: Institut elektrokhimii AN SSSR (Institute of Electrochemistry, AN SSSR)

SUBMITTED: 04Dec63   ATD PRESS: 3116   ENCL: 00

SUB CODE: OC, EM   NO REF SOV: 003   OTHER: 003

Card 2/2

STILIJANOV, Dimitrij, inz. CSn.

Meeting of Commission 19 affiliated with the International
Council for Building Research , Studies, and Documentation in
Stockholm, March 1963. Poz stavby 12 no.2:96-98 '64

Stilinovic, S.   -   Results of comparative tests with propagation of false indigo
                    (Amorpha fruticosa L.) by seed or layers. p.176

SO: Monthly List of East European Accessions List (EEAL) LC, Vol 4, No. 11
      November 1955, Uncl.