SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1203
AUTHOR GARIF'JANOV, N.S., KOZYREV, B.M.
TITLE The Relaxation Times T_1 and T_2 in Anthracite.
PERIODICAL Žurn. eksp. i teor. fis, 30, 1160-1160 (1956)
Publ. 6 / 1956 reviewed 8 / 1956

When measuring the paramagnetic resonance in anthracite due to electrons for the first time, the authors found $\Delta H = 0,7$ Oe for the half width of the corresponding absorption line. Thus, it is considerably less than in other kinds of mineral coal. A.A. MANENKOV found $\Delta H = 0,3$ Oe in his dissertation Apparently half width differs in different sorts of anthracite. The last measuring results obtained by the authors from samples of anthracite taken from the KUZNECK basin at frequencies of 12,25 and 22 kc were $\Delta H = 0,5$ Oe.
For the determination of the spin lattice relaxation T_1 the degree of saturation was measured for various amplitudes of the oscillating magnetic field at the two aforementioned frequencies. The method was checked with αα-diphenyl-β-picrylhydrazol, on which occasion $T_1 = 6,6.10^{-8}$ sec was obtained. Here the parameter T_2 of the half width was assumed to be $6,0.10^{-8}$ sec, corresponding to the half width ΔH 0,5 Oe of the line found with the monocrystal of the free radical mentioned. The amount T_1 agrees well with the results obtained by

Žurn.eksp.i teor.fis, 30, 1160-1160 (1956) CARD 2 / 2 PA - 1203

N.BLOEMBERGEN and S.WANG, Phys.Rev. 93, 72, 1954 as well as by M.M.R.GABILLARD abd J.A.MARTIN, C.R. 238, 2307 (1954). In the case of the samples of KUZNECK anthrazite T_1 was 12.10^{-8} at $T_2 = 11,4.10^{-8}$ sec.

The theory of paramagnetic resonance in systems with great exchange interaction demands $T_1 \sim T_2$, and therefore the result found here confirms the existence of a strong exchange in anthracite.

In conclusion it must be pointed out that, at the temperature of liquid air, the relaxation time of anthracite becomes somewhat longer because in that case saturation occurs at smaller amplitudes of the oscillating field. This corresponds to the notion that, in anthracite, the "open valences" between the carbon atoms prove to be the carriers of paramagnetism.

INSTITUTION: Physical-Technical Institute of the KAZAN branch of the Academy of Science in the USSR.

KOZYREV, Boris Mikhaylovich (Physico-Tech Inst, Kazakh Affiliate, AS, USSR) awarded sci degree of Doc Physico-Math Sci for the 16 Dec 57 defense of dissertation: "Experimental research in the field of paramagnetic resonance" at the Council, Physics Inst imeni Lebedev, AS, USSR; Prot No 15, 7 Jun 58.

(BMVO, 11-58,27)

KOZYREV, B.M.

.24(7) p.3 PHASE I BOOK EXPLOITATION SOV/1365

L'vov. Universytet

Materialy X Vsesoyuznogo soveshchaniya po spektroskopii. t. 1: Molekulyarnaya spektroskopiya (Papers of the 10th All-Union Conference on Spectroscopy. Vol. 1: Molecular Spectroscopy) [L'vov] Izd-vo L'vovskogo univ-ta, 1957. 499 p. 4,000 copies printed. (Series: Its: Fizychnyy zbirnyk, vyp. 3/8/)

Additional Sponsoring Agency: Akademiya nauk SSSR. Komissiya po spektroskopii. Ed.: Gazer, S.L.; Tech. Ed.: Saranyuk, T.V.; Editorial Board: Landsberg, G.S., Academician (Resp. Ed., Deceased), Neporent, B.S., Doctor of Physical and Mathematical Sciences, Fabelinskiy, I.L., Doctor of Physical and Mathematical Sciences, Fabrikant, V.A., Doctor of Physical and Mathematical Sciences, Kornitskiy, V.G., Candidate of Technical Sciences, Rayskiy, S.M., Candidate of Physical and Mathematical Sciences, Klimovskiy, L.K., Candidate of Physical and Mathematical Sciences, Miliyanchuk, V.S., Candidate of Physical and Mathematical Sciences, and Glauberman, A. Ye., Candidate of Physical and Mathematical Sciences.

Card 1/30

PURPOSE: This collection of articles is intended for scientists working in the field of spectroscopy and for engineers and laboratory analysts who use spectroscopic methods in their work.

COVERAGE: This collection of articles is concerned with theoretical, experimental, and technical problems in molecular spectroscopy. The application of molecular spectroscopy to various fields of theoretical research is described in articles covering chemical structure, kinetics, catalysis, theory of the chemical bonding, properties of crystals, effect of radiation on substance, etc. Good coverage is also given to the use of spectroscopy in organic and inorganic technology including the study of petrochemicals, polymers, glass, phosphate, boron compounds, etc. Each article is followed by references. The text includes tables and figures.

TABLE OF CONTENTS:

КОЗЫРЕВ Б.М.

543

AUTHORS: Garif'yanov, N.S., Kozyrev, B.M. and Krivovyaz, I.M.
(Institute of Chemistry of the Ac.Sc. of the Uzbek SSR).

TITLE: Free radicals during coking of the Angrensk coals.
(Svobodnyye radikaly pri spekanii Angrenskikh ugley).

PERIODICAL: "Khimiya i Tekhnologiya Topliva i Masel" (Chemistry and Technology of Fuels and Lubricants), 1957, No.2, pp. 29-32 (U.S.S.R.)

ABSTRACT: The nature of binding forces appearing during coking of coal was investigated on an example of agglomeration of the Angrensk brown coal ground to 1-0 mm. The coal does not cake on heating, while briquettes made from this coal (pressed at 2000 kg/sq.cm), heated to 900--1000°C produced coke similar in properties to one produced from a coking coal. Caking of a coking coal is often explained by its ability to pass into the plastic state on heating, but brown coals do not pass through this stage. The other explanation offered is an interaction of free radicals in the final stage of the coking process. It was expected by one of the authors that the interaction of free radicals during thermal treatment of non-caking coal fines and briquettes made from these fines should be different. Thus, paramagnetic resonance of thermally treated powdered Angrensk coal should be present as the coal particles do not react with each other, while in a

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Free radicals during coking of the Angrensk coals. (Cont.)

similarly treated briquette it should disappear. To confirm this supposition measurements of paramagnetic resonance of the initial coal and that heated to 350, 550, 700, 750 and 900°C as well as similarly treated briquettes were carried out. Experimental results are given in Tables 2 and 3. Details of the experimental procedure are given. On heating powdered coal an increase in the paramagnetic resonance was observed, it attained maximum at 550°. On further heating it decreased and became unobservable after treatment at 950°. Samples which after an appropriate treatment were kept for four days in air, showed a much higher paramagnetic effect, the intensity of which was increasing with the temperature to which samples were heated (the width of the peak of the sample heated to 950°C was twice larger than that of the starting coal). Quite different results were obtained for briquetted coal. The paramagnetic effect disappeared after heating to 700 to 750°C and was not restored after four days. It is concluded that in powdered coal there were no suitable conditions under which an interaction of free radicals could take place, as individual particles were not brought closer either by pressing or by the presence

Free radicals during coking of Angrensk coals. (Cont.)

of plastic layer. In briquettes on the other hand, free radicals interacted during heating and this is confirmed by the disappearance of the paramagnetic effect. There are three tables and 9 references, 8 of which are Russian.

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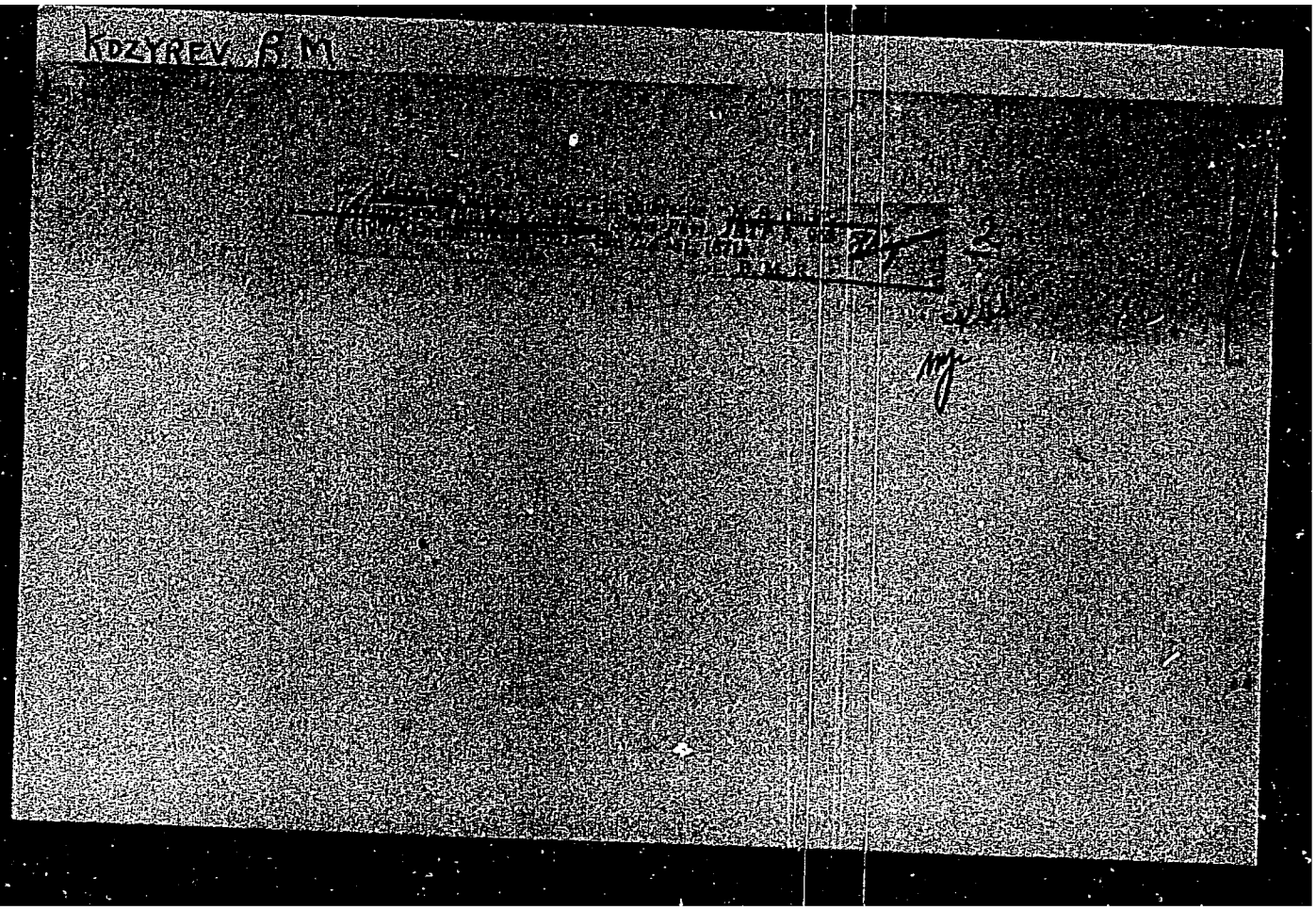

KOZYREV, B.M.

SUBJECT: USSR/Physics of Magnetic Phenomena 48-6-10/23

AUTHOR: Kozyrev, B.M.

TITLE: Electronic Paramagnetic Resonance in Electrolytic Solutions (Elektronnyy paramagnitnyy rezonans v rastvorakh elektrolitov)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1957, Vol. 21, # 6, pp 828-832 (USSR)

ABSTRACT: The dependence of the width of paramagnetic resonance lines on the temperature in electrolytic solutions was investigated. Most measurements were carried out at a frequency of the oscillating magnetic field equal to 1.27×10^7 cycles in water solutions of Mn^{2+}, Cr^{3+}, Cu^{2+} and VO^{2+} by applying the Zavoyskiy method of network current with magnetic field modulation.

Among the solutions studied, the aqueous solutions of Mn^{2+}-salts show the narrowest lines. A number of experiments discovered that Mn^{2+}-solutions produce 6 peaks of hyperfine structure at high frequencies, and at low frequencies a single peak with a g-factor approximating unity.

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TITLE: Electronic Paramagnetic Resonance in Electrolytic Solutions (Elektronnyy paramagnitnyy rezonans v rastvorakh elektrolitov)

48-6-10/23

The temperature-dependence of the line width for $MnCl_2$ aqueous solutions of various concentrations is represented by the curves in Fig. 1 in the article. It can be seen that all the curves have minima corresponding to the same temperature of $\sim 80^{\circ}$ C.

The temperature-dependence of the line width for some other solutions is represented by Fig. 2, which shows that the slope of the lines decreases with a decrease of concentration.

The temperature-dependence of the line width for the monomolecular aqueous solution of $Cu(NO_3)_2$, represented by Fig. 3, shows that the line width increases proportionally to the square of the temperature.

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The article contains 3 figures and 1 table.

There are 10 references, 5 of which are Russian.

Physics Tech Inst., Kazan' Br., AS USSR

KOZYREV, B.M.

53-3-4/6

AUTHORS: Al'tshuler, S.A., Kozyrev, B.M.

TITLE: The Paramagnetic Resonance of Electrons (Elektronnyy paramagnitnyy rezonans)

PERIODICAL: Uspekhi Fiz. Nauk , 1957, Vol. 63, Nr 3, pp. 533 - 573 (USSR)

ABSTRACT: The follwoing survey is arranged as follows: 1.) Introduction: Paramagnetic resonance and the history of its discovery, paramagnetic resonance as part of the theory of magnetism, paramagnetic resonance and spectroscopy, experimental methods. 2.) The spectra of ion crystals: The hydrated salts of the elements of the iron group, the superfine structure of the spectra of paramagnetic resonance, the salts of rare earths, covalent binding; the 3d-, 4d-, 5d-transition groups, the actinides, the experimental results concerning the spectra of ion crystals, the salts of the ions of the iron group (3d), the compounds of the elements of the palladium group (4d), and the platinum group (5d), the compounds of the group of rare earths (4f), the compound of the ions of the actinide group.
3.) The shape of the lines of paramagnetic resonance in ion crystals: Spin-spin interaction, spin-lattice interaction.
4.) Electrolyte solutions. 5.) The free radicals.

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The Paramagnetic Resonance of Electrons 53-3-4/6

Summary: Paramagnetic resonance can, under suitable conditions, be observed in all substances that contain uncoupled electrons. The present survey deals only with such types of these substances as have been most frequently studied both theoretically and experimentally, viz. the ion crystals, electrolyte solutions, and free radicals. The present survey shows the following: The discovery and the investigation of paramagnetic resonance not only augmented the theory of magnetism considerably, but also furnished a new and very valuable method for the solution of the most various problems of the physics of solids, of the theory of liquids, the physics of the atomic nucleus, chemistry, and biology. It may well be that this development will be utilized for technical purposes in the near future. There are 7 figures and 140 references, 44 of which are Slavic.

AVAILABLE: Library of Congress

Card 2/2

AUTHOR: GARIF'YANOV, N.S., ZARIPOV, M.M., KOZYREV, B.M.

TITLE: On the Value of the Spin of the Fe^{57} Nucleus. (O znachenii spina yadra Fe^{57} - Russian).

20-6-15/59

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 6, pp 1243-1243 (U.S.S.R.)

ABSTRACT: The authors of the paper under review conducted measurements of the paramagnetic resonance in a congealed vitreous solution of borax, this solution contained iron. The cylindrical samples were obtained by melting together 5 mg of $FeCl_3.6H_2O$ and 4 g of borax. Sample # I contained an iron which had been enriched with the isotope Fe^{57} up to a concentration of 71.91%, whereas the analogous sample # II contained the common mixture of isotopes that had not been enriched. The measurements were conducted at 77° K at the frequencies of 115, 240 and 430 megacycles, and they were carried out with the aid of the method of the grid current, with the constant magnetic field H being modulated. The amount of the effective g-factor, the asymmetrical shape of the curves $\chi''(H)$, and the widening of these curves at frequency multiplication (all these phenomena can be observed in sample # II) permit to draw the following conclusion: The ion Fe^{+++} is under conditions that are analogous to the conditions in the derivatives of haemoglobin. It is probable that also in the case considered in the paper under review the lowest Kramers doublet ($M_S = \pm 1/2$) is in a considerable distance from the other sublevels. In such a case, taking into account the low frequencies employed in this investigation, one has to expect that the maximum of the absorption corresponds to the effective g-factors ~4, as a matter of fact, this was also observed in the experiments car-

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On the Value of the Spin of the Fe^{57} Nucleus. 20-6-15/59

ried out with the sample # II. For the enriched sample # I, the curves χ'' (H) are at all three frequencies much wider than the corresponding curves for the sample # II. In sample #I, there can be observed next to the main maximum of absorption a poorly resolved additional maximum which is located at lower field intensities than the main maximum. The maximum of the sample # II lies between these two maxima.
These results can be explained by a nuclear spin I = 1/2 of the isotope Fe^{57}. The constant of the hyperfine structure amounts to approximately 10 gauss and is slightly anisotropic. This value by several times larger than the values obtained in earlier investigations. Such increase of the constant of the hyperfine structure is possible because the large initial splitting must be caused by an admixture of excited states, particularly of the state $3d^3 4s$.
(No reproductions).

ASSOCIATION Physical-Technological Institute, Kazan Branch, Academy of Science of the USSR, and State University Kazan.
PRESENTED BY ARTSIMOVICH L.A., Member of the Academy
SUBMITTED 13.2.1957
AVAILABLE Library of Congress
Card 2/2

AUTHORS: Garif'yanov, N. S., Kozyrev, B. M. 20-118-4-31/61

TITLE: The Influence of Oxygen on the Paramagnetic Resonance Absorption in αα-Diphenyl-β-Picrylhydracyl (O vliyanii kisloroda na paramagnitnoye rezonansnoye pogloshcheniye v αα-difenil-β-pikrilgidrazile)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 118, Nr 4, pp. 738-739 (USSR)

ABSTRACT: The authors developed by a method described by them already earlier (reference 1) a strong influence of oxygen on the paramagnetic resonance absorption in αα-diphenyl-β-picrylhydrazyl, which here was used as freshly pulverized, fine crystalline powder. When the air pressure above the test piece is reduced the intensity of the absorption line increases, its half-width, however, decreases. At an increase of the pressure to the original value the original absorption line is reproduced. The influence of oxygen on the intensity, width, and shape of the line shows up especially clearly in case of cooling down of the sample. The dependence of the half-width ΔH of the absorbed lines

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on the temperature in the samples which are subjected to an air pressure of 9.10^{-4} and 760 torr is illustrated in a diagram. Further the photographs of several lines are added here. In case of absent oxygen only a very weak decrease of ΔH on occasion of a heating of the sample from 77 to 395°K is observed. In case of a sample which is in contact with air the curve ΔH is higher, whereon in the temperature interval from ~300 to ~250°K a sharp increase of the line width is observed. The experiments with the same sample are well reproducible. The various samples gave somewhat different results at an air pressure of 760 torr. An especially strong change of the absorption line is observed, when the finely pulverized sample is in direct contact with the liquid oxygen. But on occasion of contact with liquid nitrogen the dependence $\Delta H(T)$ remains about the same as in case of the evacuated specimen. The here discussed experiments show that the change of the half-width is caused completely by the oxygen molecules which are absorbed on the surface of the αα-diphenyl-β-picrylhydracyl. A widening of the line also was observed in an NO_2-atmosphere. In

The Influence of Oxygen on the Paramagnetic Resonance Absorption in αα-Diphenyl-β-Picrylhydracyl 20-11-4-31/61

αα-diphenyl-β-picrylhydrazyl the absorbed paramagnetic gases considerably shorten the period T_2, which determines the line width. The most important factor thereby is the strong change of the line width near 275°K, probably bedause of a change of the character of the motion of the O_2-molecules on the surface of the αα-diphenyl-β-picryl-hydrazyl. At temperatures above 275°K the adsorbed oxygen has a high free motion on the surface of the sample, where as at temperatures below ~275°K the motion of the adsorbed molecules freezes. The adsorption of oxygen on the surface of αα-diphenyl-β-picrylhydracyl is the first stage of the oxydation of this free radical, but the oxydation itself takes place slowly.
There are 2 figures, and 9 references, 1 of which is Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Kazanskogo filiala Akademii nauk SSSR (Kazan' Branch, AS USSR, Physical-Technical Institute)

Card 3/4

AVVAKUMOV, V.I.; GARIF'YANOV, N.S.; KOZYREV, B.M.; TISHKOV, P.G.

Paramagnetic resonance and relaxation in solutions of salts of the iron group. Zhur.eksp.i teor.fiz. 37 no.6:1564-1569 D '59.
(MIRA 14:10)

1. Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR.
(Paramagnetic resonance and relaxation) (Iron salts)

5 (3, 4)

AUTHORS: Arbuzov, A. Ye., Academician, SOV/20-126-4-23/62
Valitova, F. G., Garif'yanov, N. S., Kozyrev, B. M.

TITLE: Paramagnetic Resonance of α,α-Diphenyl-β-picryl-hydrazyl Obtained From Different Solvents (O paramagnitnom rezonanse α,α-difenil-β-pikrilgidrazila, poluchennogo iz razlichnykh rastvoriteley)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 4, pp 774-776 (USSR)

ABSTRACT: The data given by various authors on the width of the line of the paramagnetic resonance of the compound (DPhPH) mentioned in the title, vary considerably: from ~1 to ~6 Oersted. In order to explain this fact, the first author suggested to deal with the subject mentioned in the title. DPhPH was produced according to the method described in reference 3 which differs from the Goldschmidt method (Ref 4). The solvents used were: benzene, toluene, xylene (isomeric mixture), pyridene, bromoform, carbon tetrachloride, chloroform and carbon disulfide. For the method of measuring the resonance see reference 5. The values of the width of the lines of the paramagnetic absorption $(\Delta H)_{1/2}$ mentioned in the title, show

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that the nature of the solvent has a considerable influence on the width of the line. Naturally this leads to the conclusion that the molecules of the solvent form part of the crystalline lattice of the DPhPH (Refs 6-9). In no case however, there is a guarantee that the experimenter dealt with chemically pure compounds. The data of table 1 show that the solvents used here, are divided into two groups, according to their influence on the width of the line: a. compounds of the cyclic type, b. compounds containing no cycles. In DPhPH specimens of the group a. a narrowing of the absorption line takes place, in consequence of cooling and of an increase of their frequency. Group b. in such cases shows a widening of this line. On the whole it may be said that the specimens of group a. despite of their broader lines, are more magnetically isotropic than the specimens of group b. All this has to be considered as something more or less provisional. The observed dependences can only be explained after further investigation. Furthermore both DPhPH groups show a different influence of the atmospheric oxygen on the breadth of line. On the whole widening of the line by means of O_2 is reversible.

Paramagnetic Resonance of α,α-Diphenyl-β-picryl-hydrazyl Obtained From Different Solvents

SOV/20-126-4-23/62

Finally experiments of the authors are described in which one solvent (chloroform) was replaced by another (benzene). The crystals developed by chloroform, showed wider lines after they had been recrystallized with benzene. With a reverse sequence of the solvents used, the crystals maintained the line of a benzene specimen. Thus it seems that the affinity of benzene and DPhPH is stronger than that of chloroform. If DPhPH is used as a standard for defining the number of paramagnetic centres in different substances, it has to be done very carefully. Only a DPhPH preparation from a certain solvent may be used. In the case of a DPhPH synthesis from other solvents, the exact details of the experiment have to be given, or the experimenter will get various results. There are 1 table and 13 references, 3 of which are Soviet.

Physico-Tech Inst. Kazan Br. AS USSR
Chem Inst.

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5(4) SOV/20-127-5-31/58

AUTHORS: Kozyrev, B. M., Rivkind, A. I.

TITLE: Paramagnetic Resonance in Solutions of Complex Copper Salts

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 5, pp 1044-1046 (USSR)

ABSTRACT: Microwave spectra were recorded of solutions of acetyl acetonate-, nitrate-, ethanolamine-, and diethanolamine complex salts of Cu(II) with the frequencies of $\nu_1 = 9392$ and $\nu_2 = 1569$ megacycles (Fig 1). In transition from frequency ν_1 to frequency ν_2, the hyperfine structure of the spectrum varies in accordance with the relaxation theory by H. M. McConnell (Ref 2). Table 1 gives the g-factors for the hyperfine structure of the investigated spectra. The deviation of data from the values found by B. R. McGarvey (Ref 1) for acetyl acetonate is explained by the fact that McGarvey produced his solutions from solid, waterfree acetyl acetonate, whereas the authors proceeded from the nitrate $Cu(NO_3)_2 \cdot 3H_2O$, and their solutions therefore contained remains of crystal water. The dipole in-

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fluence of the H_2O-molecule could be proved; it corresponded to theoretical expectations. Further, the influence exercised by the correlation time τ_c (Ref 2) upon the shape of the spectrum was investigated. By the addition of diamagnetic ions (LiCl) additional electrical "friction" was produced, and a noticeable increase of spectrum asymmetry was attained. What has not been explained is the phenomenon that the aqueous solution of the ethanolamine complex in a concentration of 1.2 mol/l at a frequency of ν_1 shows one single line, the width of which is by 30-40% narrower than the full width of the hyperfine structure spectra of diluted solutions. The authors thank K. A. Valiyev for expressing his opinion on the work performed. There are 1 figure, 1 table, and 4 references, 1 of which is Soviet.

ASSOCIATION: Kazanskiy filial Akademii nauk SSSR (Kazan' Branch of the Academy of Sciences, USSR)

PRESENTED: April 8, 1959 by A. Ye. Arbuzov, Academician

SUBMITTED: April 4, 1959

KOZYREV, B. M., GARIF'YANOV, N. S., TIMEROV, R. Kh., and USACHEVA, N. F. (Kazan)

"Paramagnetic resonance in the Solutions of Vanadyl Salts."

report submitted for the 10th AMPERE Colloquium, Leipzig, DDR, Sept. 1961.

KOZYREV, B. M.

PHASE I BOOK EXPLOITATION SOV/5774

Al'tshuler, Semen Aleksandrovich, and Boris Mikhaylovich Kozyrev

Elektronnyy paramagnitnyy rezonans (Electron Paramagnetic Resonance) Moscow, Fizmatgiz, 1961. 368 p. 10,000 copies printed.

Ed.: B. L. Livshits; Tech. Ed.: K. F. Brudno.

PURPOSE: This book is intended for senior students, aspirants, and scientific personnel in the fields of physics, radio engineering, chemistry, and biology.

COVERAGE: According to the annotation the book is the initial attempt to present a complete review of investigations in the field of electron paramagnetic resonance [EPR]. It is based on the literature published prior to 1959. The phenomenon of EPR is said to have been discovered in 1944 by the Soviet physicist Ye. K. Zavoyskiy. The authors stress its importance and value as a method of physical investigation in solid-state physics,

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magnetism, and semiconductor and nuclear physics, and state that a new type of amplifier with extremely low set-noise level has been designed on the basis of EPR. It is widely applied in modern chemistry, and the study of EPR in biological materials has begun. Ch. I was written jointly; Chs. II, IV, and VII and Secs. 5 and 7 of Ch. V by B. M. Kozyrev; and Chs. III, VI, and VIII and Secs. 1 to 4, 6, 8, 9, and 10 of Ch. V. by S. A. Al'tshuler. The authors thank Ye. K. Zavoyskiy, R. Sh. Nigmatullin, V. B. Shteynshleyger, N. S. Koloskova for their help. References accompany each chapter. There are 1230 references, mostly Western.

TABLE OF CONTENTS:

GARIF'YANOV, N.S.; KOZYREV, B.M.; TIMEROV, R.Kh.; USACHEV, N.F.

Electron paramagnetic resonance in concentrated aqueous solutions of VO^{2-}. Zhur.eksp.i teor.fiz. 41 no.4:1076-1078 O '61. (MIRA 14:10)

1. Fiziko-tekhnicheskiy institut Kazanskogo filiala Akademii nauk SSSR.

(Paramagnetic resonance and relaxation) (Vanadium oxides)

32947
S/030/62/000/001/008/011
B105/B101

24.6800

AUTHORS: Dmitrachenko, V. M., Kitaygorodskiy, A. I., Kozyrev, B. M.

TITLE: Wide-range spectrometer for nuclear quadrupole resonance

PERIODICAL: Akademiya nauk SSSR. Vestnik, no. 1, 1962, 74 - 76

TEXT: Nuclear quadrupole resonance indicates slightest changes in a molecular electron cloud. The search for the unknown signal must be conducted in a wide frequency interval. For this purpose, a spectrometer for frequency ranges from 1 to 600 - 800 Mc/sec, which was designed jointly by physicists and radio engineers, had to be built. At the suggestion of the Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR (Institute of Elemental Organic Compounds of the Academy of Sciences USSR) and the Fiziko-tekhnicheskiy institut Kazanskogo filiala Akademii nauk SSSR (Physicotechnical Institute of the Kazan' Branch of the Academy of Sciences USSR), work was started in 1960 for the purpose of developing a wide-range quadrupole radiospectrometer. The instrument was built under the direction of B. N. Pavlov and D. Ya. Shtern. V. I. Robas, I. A. Safin, K. G. Semin, and E. I. Fedin were consulted. Samples of the

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S/030/62/000/001/008/011
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Wide-range spectrometer for...

ЯКС-1 (YaKS-1) spectrometer were built, which permits investigations in the range from 1 to 600 Mc/sec. In the supraregenerator for 90 - 400 Mc/sec and in the detector, the sample can be kept at constant temperature between -196 and +120°C. A lot of YaKS-1 spectrometers is to be built in 1962. There are 4 figures.

4

Card 2/2

KOZYREV, B.M.; RIVKIND, A.I.

Nature of widening of superfine components in electron paramagnetic resonance spectra of paramagnetic solutions. Zhur.strukt.khim. 3 no.1:95 Ja-F '62. (MIRA 15:3)

1. Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR.
(Paramagnetic resonance and relaxation)
(Electrolyte solutions--Spectra)

S/056/62/042/005/001/050
B125/B108

AUTHORS: Garif'yanov, N. S., Kozyrev, B. M., Timerov, R. Kh., Usacheva, N. F.

TITLE: Electron paramagnetic resonance in dilute vanadyl chloride solutions

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 5, 1962, 1145 - 1148

TEXT: The authors used a РЭ-1301 (RE-1301) type radio-spectrometer operating on a frequency of 9320 Mcps to study the dependence of the hyperfine line width δH of the electron paramagnetic resonance spectrum of dilute $VOCl_2$ solutions on temperature and viscosity of the medium. It was found that less electrical conductivity produced more symmetrical resonance lines. The following results are valid for symmetrical peaks and $VOCl_2$ aqueous solutions of 0.02 mole/l. The dependence of the width of the peaks (see reference) on the nuclear spin projection m_I is given by $\delta H = a_1 + a_2 m_I + a_3 m_I^2$. The coefficients a_1, a_2, a_3 determine the width

Card 1/3

Electron paramagnetic resonance in...

of each peak of the hyperfine structure and are related to the anisotropic parameters Δg and b of the VO^{2+} ion spin Hamiltonian. The dependence of δH on m_I becomes less sharp when temperature is increased.and consequently viscosity is reduced. When $\omega_o^2\tau_c^2 \leqslant 1$, the ratio a_2/a_3 is independent of temperature and viscosity. τ_c is the characteristic time of the correlation function of the Brownian motion. a_1 depends on temperature to a lesser extent than a_2 and a_3. This indicates that the relaxation mechanism (differing from the McConnel-mechanism) is predominant in a_1 and consequently also in that part of the half-width of the hyperfine structure components which is independent of the nuclear spin orientation. The most probable mechanism is that suggested by S. A. Al'tshuler and K. A. Valiyev (ZhETF, 35, 947, 1958). A double hyperfine structure is observed in some liquid solutions of $VOCl_2$, if $(\Delta g\beta H/\hbar)\tau_c \gg 1$ and $b\tau_c \gg 1$. There are 2 figures and 1 table. The most important English-language reference is: R. N. Rogers, G. E. Pake, J. Chem. Phys., 33, 1107, 1960.

Card 2/3

Electron paramagnetic resonance in... S/056/62/042/005/001/050
B125/B108

ASSOCIATION: Kazanskiy filial Akademii nauk SSSR (Kazan' Branch of the Academy of Sciences USSR)

SUBMITTED: November 9, 1961

Card 3/3

FEDOTOV, V.N.; GARIF'YANOV, N.S.; KOZYREV, B.M.

Electron paramagnetic resonance in Nb^{4+}. Dokl.AN SSSR 145 no.6:1318-1320 Ag '62. (MIRA 15:8)

1. Kazanskiy filial AN SSSR. Predstavleno akademikom B.A. Arbuzovym.
(Niobium chloride) (Magnetic resonance and relaxation)

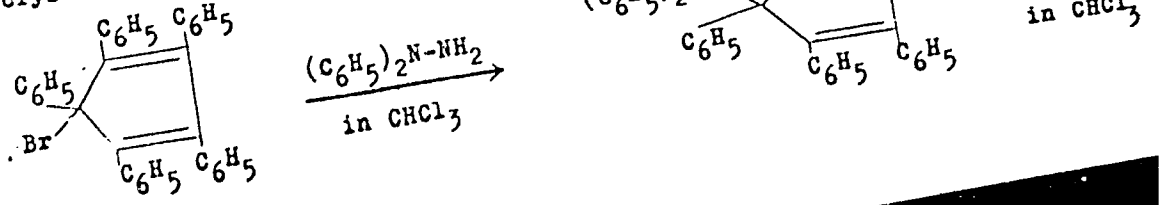
S/020/62/147/001/015/022
B106/B101

AUTHORS: Arbuzov, A. Ye., Academician, Valitova, F. G., Il'yasov, A. V., Kozyrev, B. M., Yablokov, Yu. V.

TITLE: Study of the free radical α,α-diphenyl-β-pentaphenyl-cyclopentadienyl hydrazyl by the e.p.r. method

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 1, 1962, 99-102

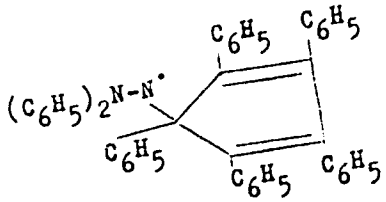
TEXT: The e.p.r. spectrum of the free radical α,α-diphenyl-β-pentaphenyl-cyclopentadienyl hydrazyl (I) was studied both in solution and in its crystalline state. The synthesis of I was:



Card 1/4

S/020/62/147/001/015/022
B106/B101

Study of the free radical ...



(I). Data for the radical: yield 70-80%; small bright-orange crystals with a melting point >180°C (decomposition); soluble in benzene, chloroform, alcohol, acetonitrile, glacial acetic acid and dioxane. In dilute solutions (< 10^{-3} moles/l), the spectra show a hyperfine structure, the analysis of which proves that the unpaired electron in I remains mainly on the nitrogen atoms. A comparison of the e.p.r. spectrum of I with the spectrum of the α,α-diphenyl-β-picryl hydrazyl radical (DPPH) showed that the additional hyperfine structure is due solely to the protons of the α-phenyl groups. It may be explained by the interaction of the unpaired electron with the 2,4,6-protons of one of the two α-phenyl groups. The value obtained for the constant a of hyperfine coupling was 1.7 oersteds, and for ΔH_n 1.1 oersteds. The relative

Card 2/4

Study of the free radical ... S/020/62/147/001/015/022
B106/B101

ASSOCIATION: Fiziko-tekhnicheskiy institut Kazanskogo filiala Akademii nauk SSSR (Physicotechnical Institute of the Kazan' Branch of the Academy of Sciences USSR); Khimicheskiy institut im. A. Ye. Arbuzova Akademii nauk SSSR (Chemical Institute imeni A. Ye. Arbuzov of the Academy of Sciences USSR)

SUBMITTED: August 8, 1962

Card 4/4

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000826010014-9

S/020/62/147/002/012/021
B106/B101

AUTHORS: Garif'yanov, N. S., Kozyrev, B. M., Semenova, Ye. I.

TITLE: Electron paramagnetic resonance in compounds of bivalent silver

PERIODICAL: Akademiya nauk SSSR.. Doklady, v. 147, no. 2, 1962, 365-367

TEXT: The e. p. r. spectra of some compounds of bivalent silver were studied in order to confirm experimentally the strong covalent bond between silver and the ligands which has been postulated by K. D. Bowers (Proc. Phys. Soc. A, 66, 666 (1953)) for $[Ag(Py)_4]S_2O_8$, and to ascertain the strong exchange interactions between the 4d-electrons, which are expected in analogy to Cu^{II} compounds. Results: Fine crystalline $Ag(C_5H_5N)_4S_2O_8$ (A) showed at 450 Mcps and 77°K a peak with $g = 2.15$, $\delta H = 26$ oerst. This, and also the independence of the coefficient of paramagnetic susceptibility of H_o indicate an exchange interaction between the 4d electrons. At 9320 Mcps, 77 and 295°K a line with $g_\parallel = 2.17 \pm 0.01$, $g_\perp = 2.08 \pm 0.01$ was

Card 1/2

recorded. Aqueous solutions of A gave at 77°K a curve with $g_{\parallel} = 2.16 \pm 0.01$, $g_{\perp} = 2.06 \pm 0.01$, and with 11 superposed peaks of the hyperfine structure. This spectrum is explained by the covalent bond of the Ag (II) ion with the pyridine molecules containing a nitrogen atom with I = 1. Solid solutions of A with the isomorphic cadmium compound did not make it possible to resolve the hyperfine structure, but undercooled solutions of $Ag(NO_3)_2 \cdot xH_2O$ in HNO_3, and $Ag(ClO_4)_2$ in $HClO_4$ showed at 77°K, 9320 Mcps an anisotropic well resolved doublet with $g_{\parallel} = 2.337$, $g_{\perp} = 2.071$, contrasting with the data by J. A. McMillan, B. Smaller (Chem. Phys. 35, 1698 (1961)). There is 1 figure.

ASSOCIATION: Fiziko-tekhnicheskiy institut Kazanskogo filiala Akademii nauk SSSR (Physicotechnical Institute of the Kazan' Branch of the Academy of Sciences USSR)

PRESENTED: June 25, 1962, by A. Ye. Arbuzov, Academician

SUBMITTED: June 21, 1962

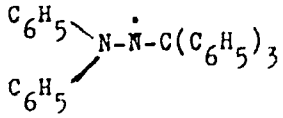
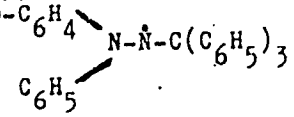
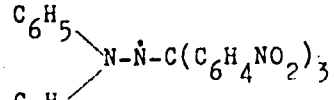
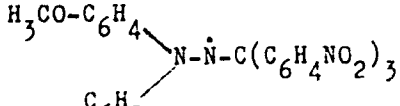
S/020/62/147/003/022/027
B101/B186

AUTHORS: Ikrina, M. A., Il'yasov, A. V., Kozyrev, B. M., Matevosyan, R. O., Ryzhmanov, Yu. M., Yablokov, Yu. V.

TITLE: Hyperfine structure of the e.p.r. spectra of α,α-diphenyl-β-triphenyl methyl hydrazyl and its derivatives

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 3, 1962, 618-621

TEXT: The authors studied the hyperfine structure of the epr spectra of

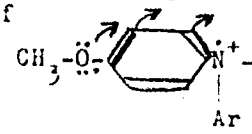

(I),

(II),

(III), and

(IV).

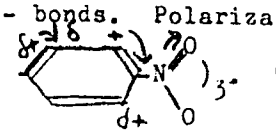
As these radicals were unstable in air, the reaction mixture of hydrazines

(~ 0.001 moles/l) dissolved in benzene or chloroform, was evacuated at 77°K, and the e.p.r. spectrum was recorded in vacuo at 9350 Mcps. Each spectrum contains seven completely resolved components of hyperfine structure. Each component was restructurized owing to an effect caused by protons at the periphery. This additional structure, however, is not discussed, as the data are insufficient for identifying these protons. The experimental data were analyzed by constructing a theoretical nine-component spectrum, for which the values for A_1, A_2, and ΔH were so chosen as to make the position and shape of the lines consistent with the experimental spectrum. A computer was used to calculate the data for A_1/A_2, $A_1 + A_2$(oe), $A_1(\pm 0.20$ oe) and $A_2(\pm 0.20$ oe) : for I 0.472, 17.70, 5.68, 12.02; for II 0.502, 17.80, 5.95, 11.85; for III 0.582, 18.20, 6.70, 11.50, and for IV 0.604, 18.35, 6.91, and 11.42, respectively. As compared with the results for diphenyl picryl hydrazyl obtained by M. M. Chen, K. V. Sane et al. (J. Phys. Chem. 65, 713 (1961)), the shift of the unpaired electron in α,α-diphenyl-β-triphenyl methyl hydrazyl and its derivatives is mainly restricted to the two N atoms and α-phenyl groups. This explains the low stability of these radicals. The presence of the acceptor phenyl groups of triphenyl methyl

Hyperfine structure of ...

increases the electron density of the unpaired electron on the N_α atom. Substitution of one methoxy group for one p-H atom of the α-phenyl group makes the existence of



more probable than in a non-substituted radical. Substitution of NO_2 for one p-H in the phenyl group of triphenyl methyl causes polarization of the electron clouds of the -C-C<, $-\ddot{N}_\beta$-C-, and $-\ddot{N}_\alpha-\ddot{N}_\beta$- bonds. Polarization decreases in the following sequence: $-\ddot{N}_\alpha \rightarrow \ddot{N}_\beta \rightarrow C \rightarrow$  This explains that the density of the unpaired electron on the N_α atom revealed by the high A_1/A_2 values, is higher than in nonsubstituted radicals. There are 1 figure and 2 tables. The most important English-language references are: R. M. Deal, W. S. Koski, J. Chem. Phys., 31, 1158 (1959); N. W. Lord, S. M. Blinder, J. Chem. Phys., 34, 1693 (1961); Y. Deguchi, J. Chem. Phys., 32, 1584 (1960).

Card 3/4

Hyperfine structure of ...

S/020/62/147/003/022/027
B101/B186

ASSOCIATION: Fiziko-tekhnicheskiy institut Kazanskogo filiala Akademii nauk SSSR (Physicotechnical Institute of the Kazan' Branch of Academy of Sciences USSR); Ural'skiy politekhnicheskiy institut im. S. M. Kirova (Ural Polytechnic Institute imeni S. M. Kirov)

PRESENTED: June 29, 1962, by B. A. Arbuzov, Academician

SUBMITTED: June 22, 1962

Card 4/4

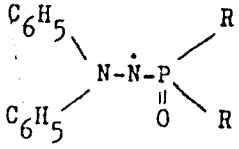
S/020/62/147/004/017/027
B107/B186

AUTHORS: Arbuzov, A. Ye., Academician, Valitova, F. G., Il'yasov, A. V., Kozyrev, B. M., Yablokov, Yu. V.

TITLE: Electron paramagnetic resonance in solutions of some free radicals of the phosphono-hydrazyl series

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 4, 1962, 839-842

TEXT: The resonance spectra of the following radicals were studied:



, where R = OC_2H_5 (I), OC_6H_5 (II), C_6H_5 (III). 1.10^{-3} molar solutions in acetonitrile and chloroform were studied. A P3 -1301 (RE-1301) radiofrequency spectrometer with a 9330 Mc frequency of the magnetic field was used. In all cases, a hyperfine structure of five equidistant lines was caused by interaction of the unpaired electron with the two N^{14} atoms. The spectrum is described by the spin Hamiltonian:

Electron paramagnetic resonance ...

$\hat{\mathcal{H}} = g\beta H\hat{S} + A_1\hat{S}\hat{I}_{N_1} + A_2\hat{S}\hat{I}_{N_2}$, where β is the Bohr magneton, $g \approx g$ (α,α-diphenyl-β-picryl hydrazyl) = 2.0036, H is the value of the static magnetic field, $S = 1/2$; $I_{N_1} = I_{N_2} = 1$. The constants A_1 and A_2, and the width δH between maximum and minimum of the first derivative of the individual hyperfine structure line were obtained through comparison with theoretically plotted curves, using the given parameters. Calculated data agreed well with those obtained by experiments. $A_1 + A_2$ values found for phosphono-hydrazyls (maximum: 11.4 oe in azetonitrile, minimum: 9.4 in chloroform) were considerably less than the known value of 17.52 oe established for α,α-diphenyl-β-picryl-hydrazyl. A hyperfine structure caused by the P^{31} nucleus was not found. The production of phosphono-hydrazyls followed the reaction $(C_6H_5)_2N\text{-}\underset{H}{N}\text{-}P(C_6H_5)_2$ $\xleftarrow{(C_6H_5)_2PCl}$ $(C_6H_5)_2\text{-}NH_2$ $\xrightarrow{R_2P(O)Cl}$ $(C_6H_5)_2N\text{-}\underset{H}{N}\text{-}\underset{O}{P}R_2$; and oxidation:

Card 2/3

Electron paramagnetic resonance ...

$(C_6H_5)_2N\text{-}\underset{H}{N}\text{-}\underset{O}{PR_2} \xrightarrow{PbO_2} (C_6H_5)_2\text{-}N\text{-}\dot{N}\text{-}\underset{O}{PR_2}\cdot$ Reaction yields (70-75%) and physical properties of phosphono-hydrazyls were tabulated. There are 1 figure and 2 tables.

ASSOCIATION: Khimicheskiy institut im. A. Ye. Arbuzova Akademii nauk SSSR (Chemical Institute imeni A. Ye. Arbuzov of the Academy of Sciences USSR); Fiziko-tekhnicheskiy institut Kazanskogo filiala Akademii nauk SSSR (Physicotechnical Institute of the Kazan' Branch of the Academy of Sciences)

SUBMITTED: September 15, 1962

VISHNEVSKAYA, G.P.; KOZYREV, B.M.; TISHKOV, P.G.

Paramagnetic relaxation in concentrated aqueous solutions of $(VO)^{2+}$. Dokl. AN SSSR 152 no.3:644-646 S '63. (MIRA 16:12)

1. Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR i Kazanskiy khimiko-tekhnologicheskiy institut. Predstavleno akademikom B.A.Arbuzovym.

RYZHMANOV, Yu., M.; YABLOKOV, Yu. V.; KOZYREV, B. M.; MATEVOSYAN, R. O.
STASHKOV, L. I.

Electron maramagnetic resonance of meta-substituted α,α-diphenyl-β-picrylhydrazyl. Dokl. AN SSSR 156 no. 1: 106-109 My '64. (MIRA 17:5)

1. Fizi[illegible]-tekhnicheskiy institut Kazanskogo filiala AN SSSR i Ural'skiy politekhnicheskiy institut im. S. M. Kirova. Predstavleno akademikom A. Ye. Arbuzovym.

GARIF'YANOV, N. S.; KOZYREV, B.M.; FEDOTOV, V. [illegible]

Electron paramagnetic resonance in thiocyanate complexes of Mo (V) and W (V). Dokl. AN SSSR 156 no. 3:641-643 '64.
(MIRA 17:5)

1. Kazanskiy fiziko-tekhnicheskiy institut AN SSSR. Predstavleno akademikom A. Ye.Arbuzovym.

KOZYREV, B.M.; YABLOKOV, Yu.V.; MATEVOSYAN, R.O.; IKRINA, M.A.;
IL'YASOV, A.V.; RYZHMANOV, Yu.M.; STASHKOV, L.I.; SHATKUKOV, L.F.

Electron paramagnetic resonance in substituted diphenylpicrylhydrazyls.
Opt. i spektr. 15 no.5:625-635 N '63. (MIRA 16:12)

LEZHNEV, N.N.; KOZYREV, B.M.; GARIF'YANOV, N.S.; RYZHMANOV, Yu.M.; NOVIKOVA, I.S.

Probable mechan'sm underlying the reaction of carbon black with phenyl-2-naphthylamine and mercaptobenzothiazole (captax). Dokl. AN SSSR 159 no.5:1127-1130 D '64 (MIRA 18:1)

1. Nauchno-issledovatel'skiy institut shinnoy promyshlennosti i Kazanskiy fiziko-tekhnicheskiy institut AN SSSR. Predstavleno akademikom M.M. Dubininym.

RYZHMANOV, Yu.M.; YABLOKOV, Yu.V.; KOZYREV, B.M.; STASHKOV, L.I.; MATEVOSYAN, R.O.

Superfine structure in electron paramagnetic resonance of some derivatives of benzoyl hydrazyl free radicals. Dokl. AN SSSR 162 no.1:116-119 My '65. (MIRA 18:5)

1. Kazanskiy fiziko-tekhnicheskiy institut AN SSSR i Ural'skiy politekhnicheskiy institut im. S.M.Kirova. Submitted September 29, 1964.

GARIF'YANOV, N.S.; KOZYREV, B.M.; FEDOTOV, V.N.

Electron paramagnetic resonance in Mo (V) complexes with diethylphosphorodithioic acid. Teoret. i eksper. khim. 1 no.1:118-122 Ja-F '65. (MIRA 18:7)

1. Kazanskiy fiziko-tekhnicheskiy institut AN SSSR.

FAGIR'YANOV, N.S.; KOZYREV, B.M.

Study of certain organic complexes of tetravalent vanadium by the electron paramagnetic resonance method. Teoret. i eksper. khim. 1 no.4:525-530 '65. (MIRA 18:10)

1. Kazanskiy fiziko-tekhnicheskiy institut AN SSSR.

RYZHMANOV, Yu.M.; YABLOKOV, Yu.V.; KOZYREV, B.M.; MATEVOSYAN, R.O.; STASHKOV, I.I.

Electron paramagnetic resonance in biradicals of the hydrazine series. Dokl. AN SSSR 164 no.5:1073-1076 O '65.

(MIRA 18:10)

1. Kazanskiy fiziko-tekhnicheskiy institut AN SSSR i Ural'skiy politekhnicheskiy institut im. S.M.Kirova. Submitted March 19, 1965.

VISHNEVSKAYA, G.P.; KOZYREV, B.M.

Paramagnetic relaxation in solutions of chromium, titanium, and copper salts. Zhur.strukt.khim. 6 no.5:667-675 S-O '65. (MIRA 18:12)

1. Kazanskiy fiziko-tekhnicheskiy institut AN SSSR. Submitted December 14, 1964.

GARIF'YANOV, N.S.; KOZYREV, B.M.

Electron paramagnetic resonance in solutions of diethyl dithiophosphate of bivalent copper. Zhur.strukt.khim. 6 no.5:773-775 S-O '65. (MIR 18:12)

1. Kazanskiy filial Vsesoyuznogo nauchno-issledovatel'skogo instituta khimicheskikh reaktivov i osobo chistykh khimicheskikh veshchestv. Submitted January 25, 1965.

L 24761-66 EWT(m)/EWP(j)/T RM

ACC NR: AP6015540 SOURCE CODE: UR/0379/65/001/001/0118/0122

AUTHOR: Garif'yanov, N. S.; Kozyrev, B. M.; Fedotov, V. N.

43
B

ORG: Kazan' Physicotechnical Institute, AN SSSR (Kazanskiy fiziko-tekhnicheskiy institut AN SSSR)

TITLE: Electron paramagnetic resonance in complexes of Mo(V) with diethyldithiophosphoric acid

SOURCE: Teoreticheskaya i eksporimental'naya khimiya, v. 1, no. 1, 1965, 118-122

TOPIC TAGS: electron parametric resonance, complex molecule, molybdenum, organic phosphorus compound, solvent extraction

ABSTRACT: The EPR method was used to study complexes of pentavalent molybdenum with diethyldithiophosphoric acid. The experiments were conducted at frequencies of 9320 megacycles and 300 megacycles at room temperature and at 77°K. The complexes were prepared by the action of diethyldithiophosphoric acid on aqueous solutions of oxyfluoride, oxychloride, oxybromide, and oxysulfate of Mo(V), strongly acidified by HF, HCl, HBr, or H_2SO_4. The EPR spectra were investigated in both polar and nonpolar solvents, capable of extracting Mo(V) complexes from the initial solution, namely: carbon tetrachloride, benzene, toluene, diethylester, and ethanol. The EPR spectra of complexes of M(V) dissolved in excess diethyldithiophosphoric acid were also studied. It was concluded that the complex studied has the form of an axially distorted octahedron. The authors thank I. P. Lipatova for her carrying out the infrared spectra measurements in liquid solutions. Orig. art. has: 1 figure and 2 formulas. [JPRS]

SUB CODE: 07, 20 / SUBM DATE: 20Nov64 / ORIG REF: 004

Card 1/1

KOZYREV, B. P., DOCENT PA 15/49T107

USSR/Radio Jul 48
Vacuum Tubes

"Development of Electrovacuum Technique in the USSR," Docent B. P. Kozyrev, Cand Tech Sci, Leningrad Elec Eng Inst imeni Ul'yanov, 3½ pp

"Elektrichestvo" No 7

Describes development of vacuum technology in Russia and its application to radio tubes. Mentions names of scientists concerned. Historical data on Leningrad Electrotech Inst.

[redacted] 15/49T107

KOZYREV, B. P.

USSR/Physics - Photoelectric Cells Jun 51

"Photoelectric Optical Amplifier," B. P. Kozyrev

"Uspekh Fiz Nauk" Vol XLIV, No 2, pp 173-199

Kozyrev summarizes work for which he was awarded Stalin prize (cf. "Pravda" 4 Mar 50). Apparatus, described in detail, is able to register eddy current of the order of 10^{-9} v by means of photocells and series of galvanometers. Five photographs show the various instruments making up the photoelec opt amplifier. Cf. Aiken and Welz, "Electronics," 124, 1947; Clark Jones, JOSA, 39, 344, 1949; Daly, Proc Phys Soc 59, 77, 1947.

187T101

KOZYREV, B.P., doktor tekhn.nauk, doktor

Calculation of an ordinary bolometric circuit for the measure of radiant power. Izv.LETI no.25:16-24 '53. (MLRA 13:2)
(Bolometer)

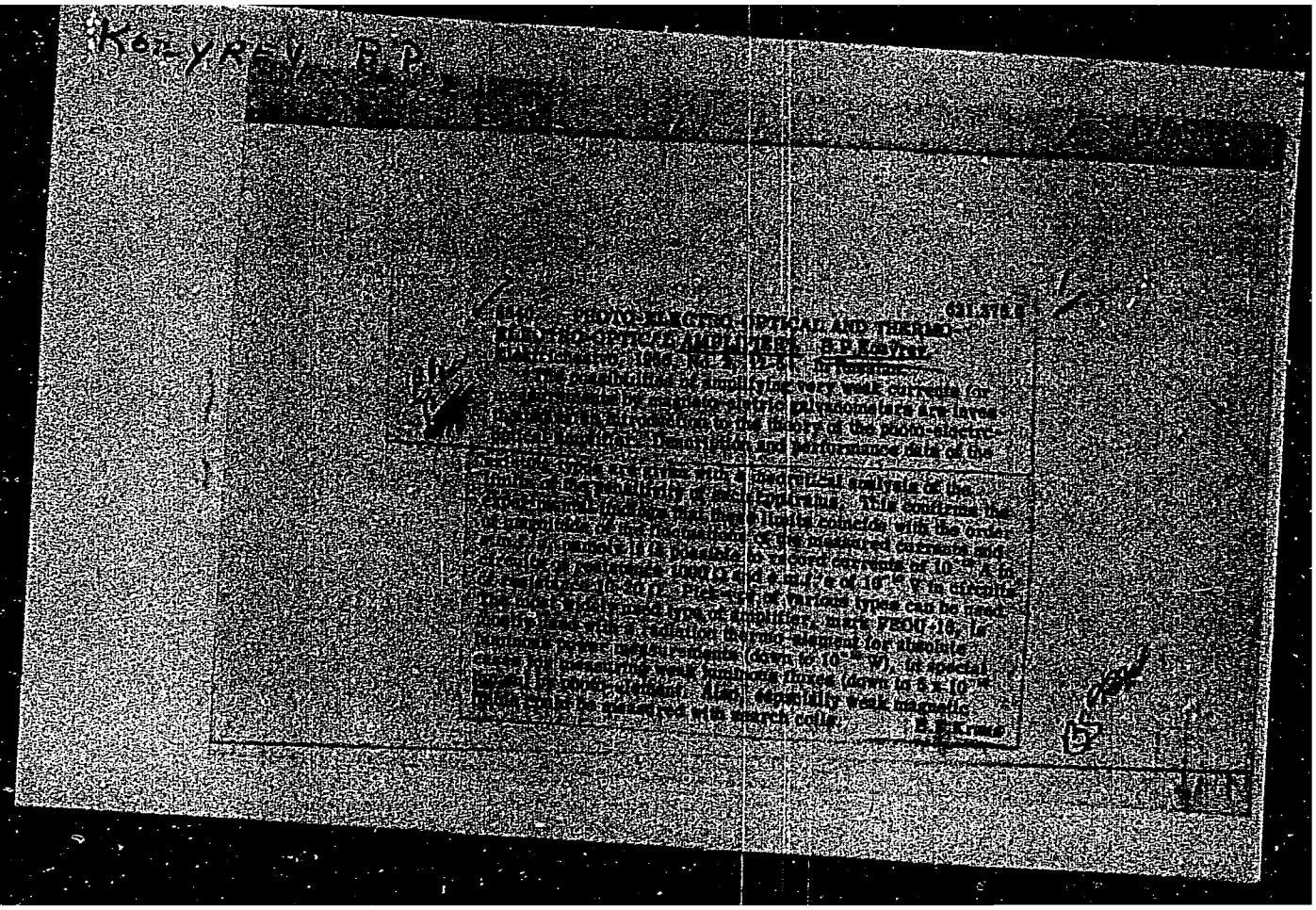
KOZYREV, B.P., doktor tekhn.nauk prof.

Compensated thermal vacuum meter. Izv.LETI no.25:48-72 '53.
(MIRA 13:2)
(Bridge circuits) (Vacuum gauges)

KOZYREV, B. P. "In a report entitled "Photocells and Their Application," Prof B. P. Kozyrev discussed the following recent achievements in photocell technology: photoelectron multipliers (FEU), electron-optic transducers (EOP), photoconductors of indium selenide, the germanium phototransistor, a low-temperature photoconductor of lead telluride, silver sulfide photocells, etc. The information given in Kozyrev's report was amplified by Prof B. T. Kolomiyets in a paper that dealt with the range of applications and characteristics of modern photoconductors. The paper by Kolomiyets outlined anticipated developments in this field of semiconductor applications in the near future.

given at the conference on the Technology of Dielectrics and Semiconductors, Leningrad Electrotech. Inst. im. Ul'yanov, (Lenin) June 1956.

Sum 1239



BOGORODITSKIY, N.P.; NEYMAN, L.R.; YERMOLIN, N.P.; KAPLYANSKIY, A.Ye.; ODINTSOV, G.V.; KOZYREV, B.P.

A.V. Berendeev. Elektrichestvo no.7:94 Jl '56. (MLRA 9:10)

(Berendeev, Aleksei Viktorovich, d.1955)

KOZYREV, B. P.

"Computation and Selection of Parameters of a Single- Junction Vacuum-Type Radiation Thermoelement With Separate Receiving Area," pp 37-64, 16 ref

Abst: The purpose of the article is to specify the conditions for the question of parameters and computation of a single-junction radiation thermoelement, to use the derived formulas in accordance with various methods for utilizing radiation thermoelements in circuits, and to obtain formulas necessary in the design of radiation thermoelements using certain practical important materials such as chromel and copel alloys.

SOURCE: Izvestiya Leningr. Elektrotekhn. In-ta im. V. I. Ul'yanova (Lenina) (News of the Leningrad Electrical Engineering Institute imeni V. I. Ul'yanov (Lenin), No 30, Leningrad, 1956

Sum 1854

KOZYREV, B. P.
and
KHRISANFOVA, L. P.

"Examination of the Absorptive Powers of Certain Atomized Getters," pp 91-98, ill, 2 ref

Abst: Results are given of experiments using three types of getters: (a) barium beryllate with an admixture of titanium; (b) BATO, containing barium and thorium; and (c) BATI, containing barium and titanium. It is noted that, of the getters examined, the greatest absorptive capacity was found in the barium beryllate with an admixture of titanium and the least in the BATO getter.

SOURCE: Izvestiya Leningr. Elektrotekhn. In-ta im. V. I. Ul'yanova (Lenina) (News of the Leningrad Electrical Engineering Institute imeni V. I. Ul'yanov /Lenin/), No 30, Leningrad, 1956

Sum 1854

KOZYREV, B. P.

24(7) PHASE I BOOK EXPLOITATION SOV/1700

L'vov. Universitet

Materialy X Vsesoyuznogo soveshchaniya po spektroskopii, 1956. t. II: Atomnaya spektroskopiya (Materials of the 10th All-Union Conference on Spectroscopy, 1956. Vol 2: Atomic Spectroscopy) [L'vov] Izd-vo L'vovskogo univ., 1958. 568 p. (Series: Its: Fizichеskiy sbornik, vyp. 4(9)) 3,000 copies printed.

Additional Sponsoring Agency: Akademiya nauk SSSR. Komissiya po spektroskopii.

Editorial Board: G.S. Landsberg, Academician, (Resp. Ed.); B.S. Neporent, Doctor of Physical and Mathematical Sciences; I.L. Fabelinskiy, Doctor of Physical and Mathematical Sciences; V.A. Fabrikant, Doctor of Physical and Mathematical Sciences; V.G. Koritskiy, Candidate of Technical Sciences; S.M. Rayskiy, Candidate of Physical and Technical Sciences; L.K. Klimovskaya, Candidate of Physical and Mathematical Sciences; V.S. Milyanchuk (Deceased), Doctor of Physical and Mathematical Sciences; A.Ye. Glauberman, Doctor of Physical and Mathematical Sciences; Ed.: S.L. Gazer; Tech. Ed.: T.V. Saranyuk.

PURPOSE: This book is intended for scientists and researchers in the field of spectroscopy, as well as for technical personnel using spectrum analysis in various industries.

COVERAGE: This volume contains 177 scientific and technical studies of atomic spectrography presented at the 10th All-Union Conference on Spectroscopy in 1956. The studies were carried out by members of scientific and technical institutes and include extensive bibliographies of Soviet and other sources. The studies cover many phases of spectroscopy: spectra of rare earths, electromagnetic radiation, physicochemical methods for controlling uranium production, physics and technology of gas discharge, optics and spectroscopy, abnormal dispersion in metal vapors, spectroscopy and the combustion theory, spectrum analysis of ores and minerals, photographic methods for quantitative spectrum analysis of metals and alloys, spectral determination of the hydrogen content of metals by means of isotopes, tables, and atlases of spectral lines, spark spectrographic analysis, statistical study of variation in the parameters of calibration curves, determination of traces of metals, spectrum analysis in metallurgy, thermochemistry in metallurgy, and principles and practice of spectrochemical analysis.

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Materials of the 10th All-Union Conference (Cont.) SOV/1700

Card 9/31

SOV/81-59-21-74721

Translation from: Referativnyy zhurnal, Khimiya, 1959, Nr 21, p 154 (USSR)

AUTHOR: Kozyrev, B.P.

TITLE: Photoelectrooptical Amplifiers FEOU-17 and FEOU-18 for Recording Extremely Weak Infrared Radiation

PERIODICAL: Fiz. sb. L'vovsk. un-t, 1958, Nr 4(9), pp 125 - 129

ABSTRACT: Models of photoelectrooptical amplifiers with the recording of signals by a pen and a reduced drift of the zero position are described. The electrical circuit of FEOU-17 is similar to that of FEOU-15. In order to reduce the heating of the photoelements and the zero drift connected with it, the illumination lamp in the FEOU-17 apparatus has been removed from the casing and illuminates 4 condensers through an opening in the upper wall of the cover by means of an additional mirror placed in the course of the rays at an angle of 45°. The FEOU-18 amplifier consists of two photoelectrooptical stages, each placed in a separate casing, but the latter are mounted on a single common plate. The condensers of the first stage are illuminated, as in FEOU-15, by a lamp (3.5 v, 0.3 a)

Card 1/2

Leningrad Electro-Tech Inst
im Ulyanov-Lenin

SOV/81-59-21-74721

Photoelectrooptical Amplifiers FEOU-17 and FEOU-18 for Recording Extremely Weak Infrared Radiation

fed from a storage cell. The condensers of the second stage are illuminated by a lamp (5 v, 1 a) fed from the grid through a stabilizer and a step-down transformer. Recordings of the absorption spectrum of vapors of atmospheric water in the region 4 - 7μ on an IKS-11 spectrograph with a FEOU-18 amplifier are presented. The sensitivity limit of FEOU-18 is 10^{-10} v.

V. Lygin

Card 2/2

S/058/62/000/006/097/136
A062/A101

AUTHOR: Kozyrev, B.P.

TITLE: Submillimetric electromagnetic waves

PERIODICAL: Referativnyy zhurnal, Fizika, no. 6, 1962, 1, abstract 6Zh1 ("Sb. tr. XIII Leningr. nauchno-tekhn. konferentsii, posvyashch. dnyu radio". Leningrad 1959, 114 - 132)

TEXT: Survey. Spark generators and mass radiators, thermal sources, an undulator, are briefly described. The possibility of using the Cherenkov effect is indicated. Also methods of monochromatizing a radiation are described. A number of methods is set forth for indicating and measuring the wavelengths of submillimeter band generators and data are provided on the propagation of those waves in the atmosphere.

M. Golant

[Abstracter's note: Complete translation]

Card 1/1

24(3)
AUTHORS: Kozyrev B.P., and Sozina N.N. SOV/139-59-1-12/34

TITLE: An Investigation of Germanium Photoresistors (Issledovaniye germaniyevykh fotosoprotivleniy)

PERIODICAL: Izvestiya Vysshikh Uchebnykh Zavedeniy, Fizika, 1959, Nr 1, pp 71-76 (USSR) (+ 1 plate)

ABSTRACT: Basic characteristics and parameters of germanium photoresistors have been investigated and the results are now reported. The photoresistors were cut from monocrystals of n- and p-type germanium with different specific resistance. Low and high resistance specimens of n-Ge and p-Ge were available. The dimensions of the specimens were: contact area 12-100 mm^2, thickness 0.23-0.43 mm. To obtain low temperatures a cryostat was constructed and is shown schematically in Fig 1. Measurements were carried out on 15 specimens from three groups of germanium photoresistors. In measuring the current-voltage characteristics, the response to light and the spectral characteristics, the dark current was compensated for by using the Wheatstone bridge shown in Fig 2. Fig 3 shows the dependence on the sensitivity of the photoresistors on temperature for E = 103 lux. The

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An investigation of Germanium Photoresistors

main parameters of the photoresistors are summarized in the table on p 73. The current-voltage characteristics of the various groups of germanium photoresistors were found to be practically linear at 290 °K (up to 320 lux) and were noticeably non-linear at 90 and 77 °K. This non-linearity is ascribed to thermal effects associated with dark currents. Fig 4 shows typical current-voltage characteristics at 290 and 90 °K. The dependence of the photocurrents on the illumination was found to be of the form $\Delta I = AE^X$. The response to light is illustrated in Fig 5 in the case of a high-resistance specimen. The frequency characteristics, i.e. the relative sensitivity as a function of frequency, are plotted in Fig 6, where Curve 1 refers to a temperature of 290 °K and Curve 2 refers to 90 °K. The frequency characteristics were obtained using modulated light. At room temperature germanium photoresistors have the best frequency characteristics. The frequency characteristic is practically flat up to f_{mod} = 6 kc/s at T = 290°K while at f_{mod}=10 kc/s the decrease in the sensitivity is not more than 18%. At low temperatures there is no flat portion. The

An Investigation of Germanium Photoresistors

relative spectral sensitivity is plotted as a function of wavelength in Fig 7 for two temperatures. Curve 1 of this figure refers to T=290°K, and Curve 2 refers to T=90°K. The photoresistors in this part of the experiment were irradiated using a tungsten lamp (25 watt). The first curve has a peak at about 1.4 μ and the second at about 1.6 μ. The temperature characteristics were also determined in the range 77 - 373 °K. In all cases the resistance had a maximum at some temperature T_m. In the case of high-resistance specimens of both types of germanium, this temperature was less than 290 °K. In the case of low-resistance specimens of n-Ge the temperature T_m was close to 340 °K. In the region $T < T_m$ germanium behaves as metal and for $T > T_m$ it behaves as a semiconductor. M.A. Kropotkin and O.A. Kuryakova are

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An Investigation of Germanium Photoresistors

thanked for carrying out the measurements.
There are 7 figures, 1 table and 8 English references.

ASSOCIATION: Leningradskiy Elektrotekhnicheskiy Institut imeni V.I. Ul'yanova (Lenina)
(Leningrad Electrotechnical Institute imeni V.I. Ul'yanov (Lenin)

SUBMITTED: June 11, 1958

24.2600

65719

SOV/139-59-2-18/30

AUTHORS: Sozina, N.N. and Kozyrev, B.P.

TITLE: Some Aspects of Photoconductivity in Cooled Films of PbSe and PbTe

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika, 1959, Nr 2, pp 120-128 (USSR)

ABSTRACT: The materials are prepared by vacuum evaporation from compounds made by fusion under a pressure of 10^{-2} mm Hg (synthesis at atmospheric pressure in sealed vessels gives almost identical results). The layers are most sensitive if they are 0.8 to 1.2 μ thick; no heat-treatment is needed. Aquadag electrodes are used. Fig 2 shows the cell used to cool the samples to 90°K. The field used is less than 500 V/cm; at 10 V the sensitivity of PbSe at 90°K is found to be 0.13 to 0.15 A/watt (for the light from a tungsten lamp run at 2480°K). The sensitivity of PbTe is 0.6 to 0.7 A/wt. A mixture of 17% PbSe and 63% PbTe distils to give a sensitivity of 5.7 A/watt. Temperature has little effect on the photocurrent for PbSe; at 90°K the dark current is 1/5 to 1/40 of the room temperature value, whereas the figures for PbTe are 1/100 to 1/1000; PbTe shows a much higher photo-

Card 1/2

Some Aspects of Photoconductivity in Cooled Films of PbSe and PbTe

sensitivity at 90°K. Gibson's effect (a rise in sensitivity with time of illumination) is reported for PbTe and PbSe. Fig 3 illustrates the effect for PbTe at 90°K with 80 V applied; Fig 4 shows similar data for 3 V at 290 and 90°K (E, the light intensity, in both cases is in lux). Figure 5 shows voltage-current curves; 1 and 1' relate to PbSe, and 2 and 2' to PbTe, and 3 and 3' to 50% PbSe + 50% PbTe; E = 50 lux. Fig 6 shows light response curves (current versus intensity); the caption is clear from the explanation for Fig 5. Fig 7 shows the curve of Fig 6 for PbTe taken with both directions of change to higher intensities. Fig 8 shows spectral response curves (the wavelengths are in μ; the currents are relative). Figure 9 shows a frequency-response curve (f is in c/s). There are 9 figures and 12 references, 2 of which are Soviet, and 10 English.

ASSOCIATION: Leningradskiy elektrotekhnicheskiy institut imeni V.I.Ul'yanova (Lenina) (Leningrad Institute of Electrical Engineering imeni V.I.Ul'yanov (Lenin))

SUBMITTED: June 11, 1958

Card 2/2

KOZYREV, B.P.; KUSAKIN, V.F.

Electron-induced conductivity of thin layers of PbS, Bi_2S_3, and copper-activated CdS. Izv.vys.ucheb.zav.; fiz. no.3:16-22 '59. (MIRA 12:10)

1. Leningradskiy elektrotekhnicheskiy institut imeni V.I. Ul'yanova (Lenina).
(Semiconductors) (Sulfides—Electric properties)

24(4) SOV/51-6-4-22/29

AUTHORS: Kozyrev, B.P. and Vershinin, O. Ye.

TITLE: Determination of the Spectral Coefficients of Diffuse Reflection of Infrared Radiation from Blackened Surfaces (Opredeleniye spektral'nykh koeffitsiyentov diffuznogo otrazheniya infrakrasnoy radiatsii ot zachernennykh poverkhnostey)

PERIODICAL: Optika i Spektroskopiya, 1959, Vol 6, Nr 4, pp 542-549 (USSR)

ABSTRACT: In measurement of the spectral dependence of reflection in the infrared region, when the radiation sources emit small amounts of energy and thermal receivers have low sensitivity, it is necessary to collect, if possible, all the diffusely reflected radiation at the receiver. This can be done by means of a spherical mirror which collects radiation proceeding from a blackened sample A and focuses it at a receiver A' (Fig 1). The two points A and A' are conjugate with respect to the hemisphere centre O. Use of a hemispherical mirror does not ensure automatically that the absolute values of the reflection coefficients will be measured, since radiation losses occur due to: (a) escape of some of the radiation reflected by the sample A through the aperture d (Fig 1) which is used to admit the incident infrared beam;
(b) aberrations of the hemispherical mirror which may cause the light

Card 1/3

Determination of the Spectral Coefficients of Diffuse Reflection of Infrared Radiation from Blackened Surfaces

reflected by A to be focused at points other than A'; (c) screening due to the holder of the receiver. Losses due to these three causes were taken into account in constructing a hemisphere at the Laboratory of Electro-Vacuum Technology of the Leningrad Technical Institute imeni V.I. Ul'yanov (Lenin). This hemisphere had a diameter of 15 cm, and a special thermo-element with a large receiving area was used. The focused image of the sample A was smaller than the receiving area and consequently possible losses due to optical aberrations were avoided. The losses due to the necessary aperture d were or the order of 3%. The screening action of the receiver holder was avoided by using special diaphragms inside the hemisphere. By varying the solid angle α (Fig 3), defined by these diaphragms, the nature of the reflection by the sample could be determined. If on decrease of the angle α the reflection coefficient decreases continuously, then the sample reflects diffusely. If the reflection coefficient remains unaltered by the change of the angle α down to very small values of the latter, the reflection is specular. The infrared beam was produced by an infrared spectrometer IKS-11 (shown as B in Fig 4). It was passed via a system of mirrors to the hemisphere aperture, as shown in Fig 4. Depending on the inclination of a mirror M_1, the beam could be directed either on the sample or directly on to the receiver. The signals generated by the receiver were

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Determination of the Spectral Coefficients of Diffuse Reflection of Infrared Radiation from Blackened Surfaces

amplified photo-electro-optically and were recorded by means of an electronic potentiometer EPP-09. The apparatus was checked by measuring diffuse reflection of magnesium oxide in the visible and near infrared regions. It was found that the reflection coefficients agreed with the calculated values to within ±0.5%. The sensitivity of the apparatus allowed it to record radiation down to 10^{-8}W. On repetition of measurements on the same sample, the scatter of the reflection coefficients did not exceed ±1%. The apparatus was used to measure the reflection coefficients, in the 1-24 μ region, of clean metal foils (Fig 5 curve 1) and of foils covered with kerosene soot (Fig 5 curves 2-6) and with other soots (Fig 2) or with Bi (Fig 7), Zn (Fig 8), Te and Sb (Fig 9) blacks. These blacks were prepared by sublimation in the presence of oxygen. There are 9 figures and 17 references, 6 of which are Soviet, 10 English and 1 German.

SUBMITTED: April 19, 1958

82845
S/112/60/000/009/001/006

9.4160

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1960, No. 9, p. 212, # 4.7737

AUTHOR: Kozyrev, B. P.

TITLE: The Efficiency of the Photoelectric-Optical Amplification Method

PERIODICAL: Izv. Leningr. elektrotekhn. in-ta, 1959, No. 38, pp. 199-218

TEXT: The method of photoelectric-optical amplification is based on a combination of a galvanometer and photocell and in comparison with the electronic method of amplifying dc it is characterized by a considerably higher sensitivity. It is shown that the general sensitivity of photoelectric-optical amplification as a whole is limited by the threshold of fluctuation interferences in the galvanometer. The author gives a table of values of the current amplification factor for various cases of practical realization of photoelectric-optical amplification and proves that it is not necessary to introduce electronic amplification in photoelectric-optical amplification. It is pointed out that photoelectric-optical amplification is particularly efficient in combination with various thermal receivers, possessing a low resistance (radiation thermocouples, bolometers etc.). The author analyzes the prospects of using

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82845

S/112/60/000/009/001/006

The Efficiency of the Photoelectric-Optical Amplification Method

photoelectric-optical amplification in combination with photocells and thermocouples for the measurement of micromovements and also in other fields of application. There are 23 references.

E. B. V.

Translator's note: This is the full translation of the original Russian abstract.

Card 2/2

VERSHININ, O.Ye., kand.tekhn.nauk, KOZYREV, B.P., prof., doktor tekhn.nauk

Investigation of the absorption and reflection of infrared radiation by darkening coatings. Izv. LETI no.38:229-236 '59.
(MIRA 13:8)

(Infrared rays)

KOZYREV B P.

PHASE I BOOK EXPLOITATION SOV/5058

Bogoroditskiy, N. P., and V. V. Pasynkov, eds.

Spravochnik po elektrotekhnicheskim materialam. V dvukh tomakh. t. 2; Magnitnyye, provodnikovyye, poluprovodnikovyye i drugiye materialy (Handbook on Electrical Engineering Materials. In two volumes. Vol. 2; Magnetic, Conducting, Semiconducting, and Other Materials) Moscow, Gosenergoizdat, 1960. 511 p. Errata slip inserted. 30,000 copies printed.

Eds. of Handbook: K. A. Andrianov, N. P. Bogoroditskiy, Yu. V. Koritskiy, V. V. Pasynkov, and B. M. Tareyev; Eds. (This vol.): N. P. Bogoroditskiy and V. V. Pasynkov; Tech. Ed.: Ye. M. Soboleva.

PURPOSE: This handbook is intended for technical personnel of electrical and radio engineering establishments, power stations and substations, electric repair shops, laboratories, and scientific research institutes.

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Handbook on Electrical Engineering (Cont.) SOV/5058

COVERAGE: This volume of the handbook contains basic information on magnetic materials, metallic conductors, electrical carbon, and important electrolytes used in modern engineering. It describes characteristics of semiconductor, ferroelectric, and piezoelectric materials. It does not include insulating materials, which were covered in Volume I. The authors thank the scientists associated with the Department of Dielectrics and Semiconductors of the Leningradskiy elektrotekhnicheskiy institute imeni V. I. Ul'yanova (Lenina) [Leningrad Electrotechnical Institute imeni V. I. Ul'yanov (Lenin)], especially Ya. I. Panov, Candidate of Technical Sciences, R. K. Manakov and R. P. Voylochnikov, assistants, and G. I. Panteleyev and O. M. Kornev for their assistance. References accompany each part.

Card 2/19

27925 S/123/61/000/017/016/024
A004/A101

9,6150 (1482)

AUTHOR: Kozyrev, B. P.

TITLE: Vacuum radiation thermoelements

PERIODICAL: Referativnyy zhurnal, Mashinostroyeniye, no. 17, 1961, 12-13, abstract 17E87 ("Izv. Leningr. elektrotekhn. in-ta", 1960, no. 44, 3-21)

TEXT: The author reports on the many years of research work carried out at the Leningradskiy elektrotekhnicheskiy institut (Leningrad Electrotechnical Institute) (LETI) in the field of radiation thermoelements, as a result of which radiation thermoelements with separated receiving area have been developed. Chromel and copel (constantan) were used as material for the thermocouples. The following radiation thermoelements have been developed: for the investigation of the solar corona during eclipses; with micro-reception area for investigations of temperature distribution over the moon surface; with concave mirror placed inside the cylinder to study the radiation from different atmospheric zones. Ultraviolet radiation was investigated with radiation thermoelements when solving problems of dosimetry, and also when studying the atmospheric transmission,

Card 1/3

Vacuum radiation thermoelements

measuring extremely weak radiations, recording the power of submillimeter waves, etc. The developed radiation thermoelements are being used most extensively in spectrometry, mainly in the infrared field. The IKS-11, IKS-12 and IKS-6 devices are equipped with radiation thermoelements. The author states the basic considerations in the selection of the dimensions of the receiving area when designing the most sensitive radiation thermoelements. When sensitive radiation thermoelements with a large receiving area are designed, this area is broken down into several small ones with soldered-on thermocouples connected in series, which form the so-called thermopile. If radiation emanates from a relatively small solid angle, it is expedient to place inside the cylinder a small concave mirror in the focus of which the receiving area is located, unshaded from the side of the mirror, while a compensating radiation element, not optically connected with the mirror, is mounted on the other side of the mirror. In this case it is possible to obtain a sensitivity in the range of 1.5-5 v per 1 w with receiving areas of 3-8 cm^2, although for such areas the specific sensitivity of the radiation thermoelement is generally measured in hundredth parts of v/w. The utilization of the mirror inside the cylinder is only permissible for mirrors of up to 40 mm in diameter. The arrangement of the mirror on the outside of the cylinder increases the focussing accuracy and, if large diameter mirrors are used,

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27925

Vacuum radiation thermoelements

S/123/61/000/019/014/[illegible]
A004/A101

the summary sensitivity of the device. The author presents a table of comparative investigations of thermoelectric systems with concave mirrors and a table of the main parameters of radiation thermoelements developed by LETI. Another table shows the results of comparison of radiation thermoelements developed by LETI and by a number of foreign firms, stating in details their advantages and defects. At present, research work is being carried out at the LETI to develop radiation thermoelements, taking into account the slow sensitivity fall off with increasing losses due to the heat flowoff to the holders in comparison with the losses due to reradiation. These radiation thermoelements require the use of galvanometers and ФЭОУ (FEOU) [Abstracter's note: not defined] with strictly determined resistance magnitudes. There are 28 references.

G. Fidlider

[Abstracter's note: Complete translation]

Card 3/3

S/058/61/000/006/050/063
A001/A101

26.2253

AUTHOR: Kozyrev, B.P.

TITLE: Fundamentals of calculation and designing of radiation thermoelements

PERIODICAL: Referativnyy zhurnal, Fizika, no. 6, 1961, 355, abstract 6Zh247 ("Izv. Leningr. elektrotekhn in-ta", 1960, no. 44, 22 - 39)

TEXT: This is a continuation of a previous work (RZhFiz, 1957, no. 8, 21522); the author develops a method of calculating radiation thermoelements. Cases of deviations from the optimum designing relations are considered in the present work. The author presents calculation formulae and tables of the rated values of radiation thermoelement parameters for various design relations.

/B

O. Talenskiy

[Abstracter's note: Complete translation]

Card 1/1

39278

S/263/62/000/003/010/015
I004/I204

AUTHOR: Kozyrev, B. P.

TITLE: A low temperature compensated radiation thermoelement

PERIODICAL: Referativnyy zhurnal, otdel'nyy vypusk. Izmeritel'naya tekhnika, no. 3, 1962, 40, abstract 32.3.250. "Izv. Leningr. elektrotekhn. in-ta", no. 44, 1960, 40-58

TEXT: Previously published works concerning the use of low temperature radiation thermoelements (RT) are briefly reviewed. Employing a calculation method of RT proposed by the author, it is found that cooling RT from room temperature to the temperature of liquid nitrogen causes a 54-fold increase in the specific thermo-electromotive force, i.e., the thermo emf in volts per each watt of the incident radiation (v/w), and a 14-time increase in the specific galvanometer deflection. Basic design data for a compensated RT operating at 90°K with chromel-copel thermoelectrodes and a notal reception surface are given in table form. The table contains: resistance, sensitivity, inertial properties and the length of both chromel and copel wires for different sizes of the reception area, calculated using formulas derived by the author. A table containing the measured values of the thermal emf and specific resistances of several materials at low temperatures is also given. The table contains data both from the literature and those obtained by the author. It follows from the table that the chromel-copel thermocouple may be successfully replaced by a couple consisting of 65% Sb, 35% Cd and

Card 1/2

89% Bi, 11% Sb. Design data are given for the low temperature RT and cryostats presently under development at LETI. The latter are filled with liquid nitrogen. Results of measurements at low temperature RT's of different sizes, and a comparative table of theoretical and experimental data are included. Low temperature RT's are employed in connection with a photoelectrooptical amplifier with a sensitivity of $1 \cdot 10^{-9}$ v which corresponds to 1.4×10^{-5} °C for chromel-copel thermoelements. Consequently, the thermal operating conditions should assure stability of the order of 10^{-4} to 10^{-5} °C. Therefore in the last modifications of RT the volume of the cooling liquid has been increased. New designs make possible the measurement of radiation energy starting from 2×10^{-9} w. One of the new designs is contained in a metallic vessel while the other is in a glass vessel. Schematic drawings of these designs are given together with basic dimensions. There are 3 figures and 22 references.

[Abstracter's note. Complete translation.]

29757
S/194/61/000/006/032/077
D201/D302

9,4160

AUTHOR: Kozyrev, B.P.

TITLE: A new type of highly sensitive thallium bromide and iodide photo-resistor (KRS-5)

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 6, 1961, 23-24, abstract 6 G182 (Izv. Leningr. elektro-tekhn. in-ta, 1960, no. 44, 59-76)

TEXT: When cooled by liquid oxygen or nitrogen the wafers of KRS-5 exhibit strong photo-conductivity. The results of the first familiarization with the properties of new photo resistances made of KRS-5 are given. These photo-resistances have a photo-conductivity in the region 0.4 - 0.6 microns. The integral sensitivity is within the limits 14.5 - 30 amp/lum. at illumination of 18-5 lux. The spectral sensitivity at λ = 0.5 micron is about 1000 amp/watt. The time constant of samples 0.92 mm thick is 1.5 sec. The dark light current is practically nil. With illumination of 5 lux, f

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A new type of highly sensitive...

is equal to 18 - 34 k ohm.cm and sharply falls with increasing illumination. At high intensities ρ = 1000 ohm.cm. The results are given of measuring the photo current as a function of the KRS-5 wafer thickness and the interelectrode distance; volt-ampere and light characteristics of the photo-resistor, its absolute spectral response etc. Comparison is also made of KRS-5 characteristics with those of photo-resistors of type ФС-А1 (FS-A1), ФС-К1 (FS-K1) and ФС-К2 (FS-K2). In the region of X-ray radiations the photo-resistors KRS-5 have shown the same order of sensitivity as FS-K1. 15 references. [Abstracter's note: Complete translation]

Card 2/2

30405

S/058/61/000/009/019/050
A001/A101

24.3410

AUTHORS: Kropotkin, M.A., Kozyrev, B.P.

TITLE: Device for determining coefficients of diffuse reflection in the long wavelength infrared range of spectrum

PERIODICAL: Referativnyy zhurnal. Fizika, no. 9, 1961, 145, abstract 9G142 ("Izv. Leningr. elektrotekhn. in-ta", 1960, no. 44, 87 - 99)

TEXT: The device consists of "globar", monochromator, mirror semi-sphere, and compensated vacuum thermocell. It is used for measuring coefficients of diffuse reflection of solid, loose and liquid specimens. The singling out of spectrum sections in the monochromator is brought about by the method of residual rays with the aid of crystals of SiO_2, LiF, CaF_2, NaF, NaCl, KCl, KBr, KRS-5, whose reflection peaks correspond to 21; 26; 32; 36; 52; 62; 83 and 180 μ respectively. A mechanism is provided for increasing monochromaticity, which permits changes in reflection number of crystalline plates from 1 to 7. The mirror semi-sphere can be focused on the surface of the thermocell. Assemblies of the device are arranged in a hood with ~0.1 mm Hg vacuum. Measurements can be made with a galvanometer or a ФЭОУ-15 (FEOU-15) amplifier. It is calculated

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30405

Device for determining coefficients ... S/058/61/000/009/019/050
A001/A101

that the radiative flux incident onto the receiver surface changes from $.5 \times 10^{-5}$w for LiF to 10^{-7}w for KRS-5. The spectral reflection coefficients of MgO obtained during the testing of the device agree well with literature data. There are 11 references.

G. Gorodinskiy

[Abstracter's note: Complete translation]

Card 2/2