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5(2, 3)

SOV/153-2-2-4/31

AUTHOR: Berezin, B. D.

TITLE: Investigation of the Metallic Phthalocyanines in Solutions (Izucheniye ftalotsianinov metallov v rastvorakh). II. Acidic-alkaline Interaction of the Phthalocyanines of Some Metals in Sulphuric-acid Solutions (II. Kislotno-osnovnoye vzaimodeystviye ftalotsianinov nekotorykh metallov v sernokislykh rastvorakh)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1959, Vol 2, Nr 2, pp 165-172 (USSR)

ABSTRACT: Under the presupposition that the dissolution of stable phthalocyanines in a concentrated H_2SO_4 is accompanied by the reaction:

$$(MPc)_{solid} + H_2SO_4 \rightleftarrows MPcH^+ + HSO_4^- \qquad (II)$$

(an intensely green acid phthalocyanine form $MPcH^+$ accumulating in the solution), the author looked for quantitative characteristics of the dissolution process (II) of the phthalocyanines Cu^{2+}, Co^{2+}, Ni^{2+}, Zn^{2+}, and of the nonmetallic phthalocyanine, i.e. of those objects which have the biggest technical importance. These characteristics have a practical value as

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A Study of Metal Phthalocyanines in Solutions. SOV/153-2-1-2/25
I. Stability of Phthalocyanines of Some Metals From the Middle of the IV. Period

magnitude of 10^{-6} (approximately). Further, the author proved that in preparing pigment dyes from phthalocyanine with Cu^{2+}, Ni^{2+}, and Co^{2+} by treatment with H_2SO_4 solutions of up to 7-8 mols/l neither losses occur due to dissolution nor a deterioration of the tinge due to the accumulation of free phthalocyanine or of its decomposition products. The subject was recommended by K. B. Yatsimirskiy. There are 2 tables and 26 references, 8 of which are Soviet.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut; Kafedra analiticheskoy khimii (Ivanovo Institute of Chemical Technology, Chair of Analytical Chemistry)

SUBMITTED: January 9, 1958

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enter an exchange reaction in such solutions, which is accompanied by the formation of a free phthalocyanine (H_2Pc; Pc denotes the phthalocyanine radical). It has remained unknown up till now how far the reaction proceeds according to the equation (I) in the case of the Co-, Ni-, Cu-, and Zn-compounds. In the first part of his article the author tried to determine the relation - $\frac{[M^{2+}]}{[H_3O^+]^2} = K$. It should remain constant even if the bottom phase consists of MPc and H_2Pc. For this purpose the author studied the solubility of CoPc, NiPc, CuPc, and ZnPc by the quantitative method, while that of FePc was ascertained semi-quantitatively. Tables 1 and 2 show the solubility of copper- and cobalt phthalocyanine. The author found approximate values of the equilibrium constant of the reaction of dissolution (see equation) for copper- and cobalt phthalocyanine. At 20-70° they have the order of

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5(2,3)

AUTHOR: Berezin, B. D.

SOV/153-2-1-2/25

TITLE: A Study of Metal Phthalocyanines in Solutions (Izucheniye ftalotsianinov metallov v rastvorakh). I. Stability of Phthalocyanines of Some Metals From th Middle of the IV. Period (I. Ustoychivost' ftalotsianinov nekotorykh metallov serediny chetvertogo perioda)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1959, Vol 2, Nr 1, pp 10-14 (USSR)

ABSTRACT: After a survey of publications (Refs 2-18) the author states that the thermodynamic properties of metal phthalocyanines (MPc) apparently have not yet been investigated. Particularly interesting are the determination of the thermodynamic stability mentioned in the subtitle and a study of the kind of the chemical bond in connection with special properties of phthalocyanine as an addendum. Special attention should also be devoted to the close similarity between phthalocyanine and biologically important porphyrine derivatives which play a significant role in the vital action of plant and animal organisms (Refs 22,23). Those phthalocyanines were studied in sulphuric acid solutions. The majority of metal phthalocyanines

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Indicators of Mercurimetry. III. β-Nitroso-α-naphthol SOV/153-58-6-5/22

tables and 14 references, 11 of which are Soviet.

ASSOCIATION: Kafedra analiticheskoy khimii; Ivanovskiy khimiko-tekhnologicheskiy institut (Chair of Analytical Chemistry; Ivanovo Chemo-technological Institute)

SUBMITTED: September 10, 1957

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of ß-nitroso-α-naphthol. Table 1 shows its solubility in borate buffer solutions at 25°. From their results, the authors draw the following conclusions: The qualitative characteristics of the substances mentioned in the subtitle and of the indication product formed by the former with mercury-(II) ions are very close to the corresponding values of diphenyl-carbazonium (Ref 14). Consequently, the two indicators can be regarded as equivalent in this respect. Diphenyl-carbazonium does, however, yield a more vividly colored product with Hg-ions (II), and is therefore more sensitive. The latter reaction appears instantaneously, whereas the reaction product of ß-nitroso-naphthol tends to form oversaturated solutions with the Hg-(II) ions. Thus diphenyl-carbazonium is to be more highly recommended. In the course of work, the acid dissociation constant of ß-nitroso-α-naphthol $(2.15 \pm 0.13) \cdot 10^{-8}$ was established. From the data on the solubility of mercury-ß-nitroso-α-naphtholate in different solvents, the equilibrium constant of the indication reaction of the Hg-(II) ions with ß-nitroso-α-naphthol was obtained (Table 4), and the solubility product $(9.7 \pm 1.2) \cdot 10^{-27}$ as well as the instability constant of mercury-ß-nitroso-α-naphtholate $(1.2 \pm 0.2) \cdot 10^{-20}$ were determined. There are 4

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5(2,3)

AUTHORS: Yatsimirskiy, K. B., Berezin, B. D.

TITLE: Indicators of Mercurimetry (Indikatory merkurimetrii). III. ß-Nitroso-α-naphthol (III. ß-nitrozo-α-naftol)

SOV/153-58-6-5/22

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1958, Nr 6, pp 28-33 (USSR)

ABSTRACT: Among the indicators proposed in the most recent papers (Refs 1-6) and mentioned in the title, the substance mentioned in the subtitle and its monobromine derivative, bromonitrosol (Ref 4), have proved most useful for various applications (Refs 4,7-9) in practical work. However, a number of difficulties still prevent their further introduction into the practical field. There are no systematic quantitative investigations into this matter, and the necessity of appropriate investigations is therefore most obvious. As bromonitrosol is structurally fairly similar to ß-nitroso-α-naphthol, the latter was investigated. The experimental part contains discussions of: (1) Acid properties of ß-nitroso-α-naphthol, (2) the solubility of ß-nitroso-α-mercury-naphtholate in acid solutions (Tables 3,4). Table 2 presents the computed and experimentally obtained values of the dissociation constant

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Indicators of the Mercurometry. Communication II: Diphenyl Carbazone

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completely bound by diphenyl carbazone at a pH of 5 approximately. The composition at pH 2 and 5 corresponds to the ratio of diphenyl carbazone: Hg^{2+} = 2:1. The dissociation constants of diphenyl carbazone after the first step at 25° and at ionic strengths of 0,1 and near zero amounts to $(3.4 \pm 0.3).10^{-8}$ and $(1.1 \pm 0.1).10^{-8}$. There are 2 figures, 5 tables, and 18 references, 9 of which are Soviet.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut (Ivanovo Chemo-Technological Institute) Kafedra analiticheskoy khimii (Chair of Analytic Chemistry)

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Indicators of the Mercurometry. Communication II: Diphenyl Carbazone

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optimum concentrations of the indicator, the possible dilutions of halide solutions and the optimum accuracy of the methods under various conditions. Perchloric acid and mercury perchlorate were used in the experiments. Table 1 presents the solubility of diphenyl carbazone in borate buffer solutions determined at 25°. In an alkaline medium it can be transformed into diphenyl carbodiazone (Ref 2). K_s of diphenyl carbazone was measured by the spectrophotometer (Table 2). The data obtained from the two methods mentioned above were checked (Table 3). The spectrophotometric method of the isomolar series was applied, because the preparative determination of the indication product of mercury ions (II) with diphenyl carbazone is, for various reasons, very difficult. The results are given in table 4. The solubility product of mercury diphenyl carbazonate was determined according to Gorbachev's method, the latter having been modified to a certain extent. The solubility product amounts to (Ref 17)$(6.7 \pm 0.7) \cdot 10^{-26}$. First a calibration curve was plotted. Hg^{2+} is practically

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5(2)

AUTHORS: Yatsimirskiy, K. B., Berezin, B. D. SOV/153-58-4-6/22

TITLE: Indicators of the Mercurometry (Indikatory merkurimetrii) Communication II: Diphenyl Carbazone (Soobshcheniye II. Difenilkarbazon)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1958, Nr 4, pp 35 - 42 (USSR)

ABSTRACT: Although diphenyl carbazide, according to corresponding publications (Ref 11), is less suitable as indicator for the determination of the chlorides of thallium (Ref 4), silver in the presence of copper (Ref 5), methyl thiouracil (Ref 6), and others, diphenyl carbazone, which is a better mercurometric indicator, has been still insufficiently investigated. Blue-violet compounds are formed by it with Hg^{2+}, the composition of which, however, is unknown. Scientists also disagree as to the optimum pH-value in the determination of halides. It would be necessary to know the solubility product of mercury diphenyl carbazonate and the acid dissociation constant of diphenyl carbazone in order to find the

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Conference Discussion on the Methods of Investigating the Complex Formation in Solutions

SOV/153-58-3-30/30

stability of the 'pyridinates' is changed in dependence on the solvent. Ya. I. Tur'yan in his lecture "The Influence of the Solvent Upon the Composition and Stability of Complex Ions" discussed the polarographic investigation method of the chloride and thiocyanate complexes of lead in aqueous ethanol solutions at different content of the non-aqueous solvent and at a constant ionic strength. A step-wise character of the complex formation was found as well as the instability constants of the complexes. The influence of the dielectric constant of the solution on the stability of the investigated complexes was proved. In the lecture by V. D. Vasil'yev on the "Investigation of Aquo Complexes in Mixed Solvents" the main attention was devoted to the necessity of the qualitative recording of the solvation effects in the complex formation. The applicability of the polarographic method in the determination of the composition and stability of the aquo complexes in mixed solvents was proved and experimental material on the thermodynamics of the dissociation of the cadmium-aquo complexes in aqueous ethanol solutions was mentioned. V. N. Tolmachev, V. I. Kuznetsov

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and I. V. Tananayev stressed in their lectures the necessity of a more complete and general investigation of the solvation processes. A. K. Babko and A. M. Golub pointed out the great importance of the investigations of the complex formation equilibria in non-aqueous solutions, and made several critical comments on the lecture by Ya. I. Tur'yan. The following scientists took part in this discussion: L. P. Adamovich, O. I. Khotsyanovskiy, A. P. Moskvin and A. G. Mustakhev. At the final meeting of the conference A. A. Grinberg, Corresponding Member, AS USSR, said in his speech that such a conference was very urgent. A detailed discussion of the determination methods of the composition of the complexes, as well as of the method used in the study of the quantitative characteristics of the stepwise complex formation was extremely useful for all who attended this conference.

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plex compounds was stressed. In the lecture delivered by I. A. Shek on "The Investigation of the Complex Formation by the Method of the Dielectric Permeability and the Polarization" the principles of the methods mentioned were presented. This method was employed for investigating the compounds of the type of the "affiliation" products. The lecture delivered by I. A. Shek and Ye. Ye. Kriss "Employing the Method of the Dielectric Constant for Investigating Complex Compounds of the Type of Crystal Solvates in Solutions" dealt with the investigation of the solvates of lanthanum and cerium chlorides with ketones, as well as with the study of the compounds formed in heterogeneous systems with tributyl phosphate and nitric acid. V. F. Toropova gave in her lecture "The Polarographic Method of Investigating the Complex Formation in Solutions" a survey of the applications of the polarographic method in the study of the complex compounds, and illustrated several fine characteristic features of this method. In the lecture delivered by T. N. Sumarokova "The Cryoscopic Method of Investigating the Complex Formation Reactions" a survey of the possibilities of the cryoscopic method was given, and its applicability in the study of several complex compounds of stannic chloride with organic substances was proved. A. M. Golub described the results of his investigations of thiocyanate complexes of several metals. A vivid discussion took place on the lectures held. Ya. A. Fialkov and Yu. Ya. Fialkov considered the cryoscopic method of investigating complex compounds to be of considerable value. K. B. Yatsimirskiy pointed out that the publication of the surveys on individual methods of investigating the complex formation reactions would be desired; this concerns especially the polarographic method. The cryoscopic method should be brought to a level that makes the calculation of the equilibrium constants of the processes to be investigated possible. The problem of the method of evaluating the experimental results becomes more and more important. Many scientists use the instability constants without taking into account the way in which they had been obtained. The calculation methods employed by A. M. Golub are one step back, as compared to these employed at present. In his lecture N. P. Komar' pointed out the extremely great importance of the mathematical evaluation of the results obtained, as well as of the plotting of curves. A. K. Babko suggested selecting one or two systems that are experimentally well investigated, and to evaluate the results obtained according to different methods so that it is possible to check and evaluate them. Ya. I. Tur'yan took part in the discussion. Ya. A. Fialkov discussed in his lecture "The Effect of the Solvent on the Complex Formation Process as Well as on the State of Equilibrium in the Solutions of Complex Compounds" the influence exerted by the solvents upon the molecular state, upon the solvation of the system components, upon the stabilization of the complexes formed in the system, upon the step-wise dissociation of the complexes and upon a number of other processes. The influence exercised by the dielectric constant upon the complex formation process was discussed. It was concluded that a direct relation does not exist, and that the chemical nature of the solvent must be taken into account. A. V. Ablov and L. V. Nazarova held a lecture on "The Spectroscopic Investigation of Nickel Cobalt 'Pyridinates' in Various Solvents". The instability constants of the complexes were determined and it was proved that the

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of Some Thorium Complex Compounds" results obtained from the experimental investigation of the distribution of thorium compounds in the systems: acetylacetone - benzene - water, and 2-oxy-1,4,-naphthoquinone - chloroform - water were given. From these data the instability constants of the thorium complexes with acetyl-acetone and 2-oxy-1,4-naphthoquinone were calculated. I. V. Tananayev, G. S. Savchenko and Ye. V. Genkharov held a lecture on the application of the solubility method in the determination of the stability of complex compounds in solutions. In this lecture also other methods of investigating complex formation processes in the solution were discussed (pH measurement, measurement of the optical density, as well as of the heat of mixing). B. D. Beresin held a lecture on the "Application of the Solubility Method in Studying the Phthalocyanine Complexes of Metals". He used the determined quantitative characteristics of the reaction of the transition of the phthalocyanides of cobalt, nickel, copper and zinc, as well as of the free phthalocyanine into the sulfuric acid solution for the theoretical [illegible], [illegible] as an experimental proof of the existence of

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π-bonds in the complexes investigated. These characteristics also served him as a proof of new electronic formulae of phthalocyanine and its complex derivatives. In the lecture delivered by I. L. Krupatkin on "The Method of the Two Solvents as a Method of Investigating the Formation and Properties of Organic Complexes" it was proved that this method makes it possible to determine the number of complexes formed in the system, their composition and relative stability. V. I. Kuznetsov, A. K. Babko, N. P. Komar', I. S. Mustafin and Ye. I. Tur'yan took part in this discussion. In the lecture delivered by A. A. Grinberg and S. P. Kiseleva on the complex palladium compounds (II) with a coordination number above four it was proved that in the case of a large chlorine and bromine ion excess complexes with the coordination number 5 are formed. The instability constants of these complexes were estimated. L. P. Adamovich mentioned a new manipulation in the spectrophotometric investigation of the complex compounds that can be used in systems with the formation (or predomination) of one single complex. This method makes it possible to determine the composition and instability constant

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of the complex. In the lecture delivered by K. B. Yatsimirskiy and V. B. Korableva the application of the theory of crystalline fields for the determination of the composition and structure of the chloride complexes of cobalt, nickel and copper according to the absorption spectra of these complexes was discussed. It was proved that in a hydrochloric acid concentration above 5 mole/liter in the solution there exists an equilibrium between the tetrahedric and octahedric form of the cobalt chloro complexes. Yu. P. Nazarenko proved in his lecture "The Application of Radioactive Isotopes in the Investigation of the Solvation Equilibrium in Solutions of Complex Compounds" the possibility of using data on the isotope exchange to clarify the structure of the complex and mechanism of the hydration processes. V. Klimov mentioned in his lecture the use of radioactive isotopes in the study of tin and antimony complexes in non-aqueous solutions. A. V. Ablov, V. N. Tolmachev, V. I. Kuznetsov and A. M. Golub took part in the discussion of the lectures. The usefulness of employing the theory of the crystallize fields in explaining the results obtained from the absorption spectra of the com-

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investigation as developed by the Scandinavian school is of high value. He also pointed to the necessity of studying the kinetics of the polymerization process and a quantitative determination of the strength of the polymers. A. K. Babko pointed out that the study of the polymer structure was necessary. N. P. Komar' mentioned in his lecture that the rather widely spread polymerization type according to the scheme "nucleus + chain members" is not obtained in all cases. The following scientists took part in the discussion: V. N. Tolmachev, A. V. Ablov, I. S. Mustafin, I. V. Tananayev and K. B. Yatsimirskiy. A. K. Babko then discussed in his lecture "Methods of Determining the Dissociation Constant of the Complex Groups in Solutions" the main principles of determining the instability constants. N. P. Komar' discussed in his lecture "Calculation Methods of the Instability Constants of the Complex Compounds According to Experimental Data" the possibilities of using the known calculation methods of the instability constants for various cases of the complex formation in solution. If several mononuclear complexes are formed the displacement method by Abegg and Bodlender (completed by A. K. Babko) cannot be recommended for the calculation of the instability constant. The lecturer discussed the dissolution methods of the polynomials proposed by B'yerrum, Leden, Rossoti, Sketchard, Edsolloy and other authors. The constants calculated in this way are not very accurate. It was proved that the method of successive approximations can lead to wrong conclusions as to the chemical processes taking place in the system investigated. The most probable value of the physical constants can be obtained by the method of the least squares. B. V. Pritsyn, Ye. N. Tekster and L. I. Vinogradova described the determination methods of the instability constants of the oxalate complexes of niobium, uranium and iron which are based on the investigation of the equilibrium displacement of the complex formation by silver ions. N. K. Bol'shakova, I. V. Tananayev and G. S. Savchenko held a lecture on "The Role of the Time Factor in the Investigation of the Complex Formation". In the discussion on the lectures A. A. Grinberg mentioned that due to the slow adjustment of the equilibria the methods discussed of determining the instability constants (palladium and cobalt complexes) can often not be employed. A. V. Ablov pointed out the necessity of devising direct methods of proving the existence of intermediate forms in a step-wise complex formation. K. B. Yatsimirskiy mentioned that the instability constants of slowly dissociating complexes can be calculated from thermochemical data. L. P. Adamovich, A. M. Golub among others took part in the discussion on the lectures. A. K. Babko requested inclusion in the next conference on the chemistry of complex compounds a lecture in which various calculation methods of the instability constants should be discussed by the example of actual cases. This should clarify to which divergencies of the values of the constants different methods of evaluating the experimental data can lead. N. P. Komar' stressed that in the determination of the instability constants all chemical equilibria should be taken into account that render complex the complex formation process in the solution, especially the hydrolysis processes of the central ion and the addendum. In the lecture delivered by V. M. Peshkova and A. P. Zozulya "Application of the Distribution Method to the Investigation of the Stability Constants

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BEREZIN, B.D.

BEREZIN, B.D.

5(4)

AUTHORS: Vasil'yev, V. P., Korableva, V. D., Yatsimirskiy, K. B. SOV/153-58-3-30/30

TITLE: Conference Discussion on the Methods of Investigating the Complex Formation in Solutions (Soveshchaniye-diskussiya po metodam izucheniya kompleksoobrazovaniya v rastvorakh)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1958, Nr 3, pp 173 - 174 (USSR)

ABSTRACT: From February 18 to 21, 1958 a conference discussion took place at the town of Ivanovo; it dealt with the subjects mentioned in the title. It was called on a decision of the VIIth All-Union Conference on the Chemistry of Complex Formations. More than 200 persons attended the conference, among them 103 delegates from various towns of the USSR. At the conference methods of determining the composition of the complexes in solutions were discussed, as well as the methods of calculating the instability constants according to experimental data and problems concerning the influence of the solvent upon the processes of complex formation. [illegible]. In the lecture by A. K. Babko and M. M. Tananayko, "Physical and Chemical Analysis of the Systems With 3 Colored Complexes in the Solution", the results of a systematic investigation in copper-quinoline-salicylate, as well as in copper-pyridine-salicylate systems by means of the optical method were dealt with. In the lecture by Ya. A. Fialkov the idea of a further investigation of the complex formation processes in solutions was developed. Besides the determination of the composition and stability of the complexes also the physical and chemical properties, the chemical nature and the structure of the complex compounds must be investigated . . . . .

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I. I. Alekseyeva and K. B. Yatsimirskiy in their lecture "Investigation of the Polymerization of Iso-Poly Acids in Solutions" mentioned experimental results of the investigation of the polymerization in solutions of molybdic acid. The authors proved that especially the molybdic acid within a certain range of the pH values and the concentrations exists as a number of compounds that can be expressed by an overall formula $MoO_4(HMoO_4)^{n-2}$. In the lecture by N. V. Aksel'rud and V. B. Spivakovskiy investigation results on basic salts taking into account the complex formation in solutions by means of the potentiometric method were mentioned for systems with zinc, cadmium and indium. In the evaluation of their results the authors employed the method of the table difference. The calculation of the consecutive constants was carried out according to the interpolation formula by Newton. M. A. Chepelevtskiy held a lecture on "pH Measurement Method of the Solutions in Combination With the System Analysis of the Solubility Diagram of the System Cu^{2+}-HCl - H_2O in Investigating Complex Copper Compounds in Saturated Solutions". It was found that the substance at the bottom of the liquid is more basic than the solution; furthermore, the increased acidity of the solution from the viewpoint of the formation of hydroxy-chloro complexes in the solution was explained. V. I. Kuznetsov opened the discussion with his lecture; he pointed out the necessity of utilizing the concepts worked out in the investigations of the polymerization in organic chemistry in the chemistry of polynuclear complexes. A. A. Grinberg thinks that the new approach of the hydrolysis

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The Indicators of Mercurimetry. Communication I. Sodium Nitroprusside SOV/153-58-2-8/30

of table 4 permit the conclusion that the equation (5) can be used for a sufficiently accurate calculation of the mentioned corrections if the titration is carried out fairly slowly and under constant stirring (by hand). These possibilities make sodium nitroprusside one of the best indicators of mercurimetry. There are 1 figure, 4 tables, and 13 references, 4 of which are Soviet.

ASSOCIATION: Ivanovskiy khimiko-tekhnologicheskiy institut (Ivanovo Chemical Technological Institute) Kafedra analiticheskoy khimii (Chair of Analytical Chemistry)

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$$\Delta V_{ml} = 2.64 \cdot 10^{-5} \cdot \frac{V_{end}}{C^{o}_{Hg^{2+}}} \cdot \sqrt{\frac{[HgCl_2]}{[Npr^{2-}]}} \quad (5)$$

where ΔV_{ml} denotes the correction (in ml) of the titration liquid mercury nitrate of a concentration $C^{o}_{Hg^{2+}}$; it is always detracted from the final volume of the mercury nitrate solution used for the titration; V_{end} denotes the final volume of the solution after the titration; $[HgCl_2]$ and $[Npr^{2-}]$ denote the concentrations of mercuric chloride or nitroprusside, respectively in the solution after the titration. To prove that the equation (5) fully reflects the nature of the correction in the mercurimetric determination of the chloric with the nitroprusside indicator under normal titration conditions table 4 gives a comparison of the corrections calculated according to (5) with those experimentally found. The experimental data

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indicators as well as the most important quantitative characteristics of the latter are not known. The present paper deals first of all with the investigation of the solubility of $Hg[Fe(CN)_5NO]$. In the experimental part first the solubility of this indicator is studied in water. Table 1 gives the results. Furthermore its solubility is investigated by the precipitation method (Table 2). From the data of table 1 the authors attempted to calculate the solubility product $+'k^{s}_{HgNpr}$ of mercury nitroprusside from the following relation: $K^{s}_{HgNpr} = [Hg^{2+}][Npr^{2-}]$ (1). From the observation of the process of stepwise complex formation (IV) the expression of the correction for the stepwise complex formation is determined. After this correction is introduced, and after the simplification and insertion of known quantities, the following equation is obtained:

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5(2)

AUTHORS: Yatsimirskiy, K. B., Berezin, B. D. SOV/153-58-2-8/30

TITLE: The Indicators of Mercurimetry (Indikatory merkurimetrii) Communication I. Sodium Nitroprusside (Soobshcheniye I. Nitroprussid natriya)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1958, Nr 2, pp 43 - 50 (USSR)

ABSTRACT: The method of mercurimetric analysis is used at present in the determination of various substances on a large scale. It is based on the capability of the ions of bivalent mercury of forming stable complex compounds with several anions and molecules according to the reaction

$Hg^{2+} + nA^{z-} \rightleftarrows HgA_n^{2-nz}$ (I). This method increasingly replaces the argentometric method, as it has a number of advantages over the latter. The mercurimetric method is, however, hardly known in quantitative respect. The limits of its applicability with various

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BUSHUYEV, M.N., inzh., red.; BEREZIN, B.A., inzh., red.; MERNIK, M.Kh., inzh., red.; SUTOKSKIY, N.B., inzh., red.; EDEL', Yu.U., kand. tekhn. nauk., red.; GOFMAN, Ye.K., red. izd-va; POL'SKAYA, R.G., tekhn. red.

[Technical development at the Leningrad Stalin Metal Works] Razvitie tekhniki na Leningradskom metallicheskom zavode imeni Stalina. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1957. 313 p. (MIRA 11:9)

(Turbines) (Leningrad--Metal industries)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

BEREZIN, B. A., Gorshkov, S. V.,

"The Plant as a Forge of Cadres," Technological Developments at the Leningrad Metal Works imeni Stalin, Moscow, Mashgiz, 1957. p. 292.

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

BEREZIN, B., inzh.

Evaluating the economic efficiency of the specialization of motor-vehicle repair enterprises. Avt.transp. 42 no.1:32 Ja '64. (MIRA 17:2)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

BEREZIN, B., kand.tekhn.nauk

Typewriting school; lesson No.3. Nauka i zhizn' 29 no.5:106-107 My '62. (MIRA 15:11)

(Typewriting)

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APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

EYDUK, Yu. P.; SEDMAL, Yu. N.; BEREZIN, A. Ya.

2

"Concerning the structure of alumosilicophosphate glasses."

report submitted for 4th All-Union Conf on Structure of Glass, Leningrad, 16-21 Mar 64.

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L 38196-66 EWT(1) GD

ACC NR: AT6022323 SOURCE CODE: UR/0000/66/000/000/0003/0009

AUTHOR: Berezin, A. S.; Kudryashova, T. S.; Patrikeyev, L. N.; Popov, V. D.

ORG: none

TITLE: Investigation of parametrons designed with new types of nonlinear capacitors

SOURCE: Vsesoyuznaya nauchnaya sessiya, posvyashchennaya Dnyu radio. 22d, 1966 Sektsiya mikroelektroniki. Doklady. Moscow, 1966, 3-9

TOPIC TAGS: parametron, nonlinear capacitor, varactor diode

ABSTRACT: Parametrons designed with varactors and with reverse-gradient capacitors (Soviet-made test specimens) were investigated. Findings: (1) Oscillation rise or fall time does not exceed 10 periods of fundamental frequency (or 20 periods of pumping frequency); (2) The parametron can be excited with $Q_{min} = 2.2$; (3) The parametron can operate at zero bias voltage; (4) The reverse-gradient-capacitor parametron can operate in wide frequency band. The load characteristic of an experimental parametron is shown. Orig. art. has: 6 figures and 8 formulas. [03]

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BEREZIN, Anatoliy Sergeyevich; LEBEDEV, A.N., otv. red.; IGNAT'YEV, I.P., red. izd-va; PARNIKOV, Ye.S., tekhn. red.

[Contribution of innovators of an economic council to the seven-year plan]Ratsionalizatory sovnarkhoza - v fond semiletki. IAkutsk, IAkutskoe knizhnoe izd-vo, 1959. 30 p. (MIRA 16:2)

1. Nachal'nik otdela glavnogo mekhanika i energetika, sekretar' pervichnoy partiynoy organizatsii sovnarkhoza (for Lebedev).
(Yakutia--Technological innovations)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

BEREZIN, A.O., inzhener.

Automatic signalization and calculation of the operating time of machine units. Torf.prom. 31 no.7:26-27 '54. (MLRA 7:11)

1. Lengostorf.
(Automatic control)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

BEREZIN, A.M.; VAYSBURD, P.M.

Two circuits for connecting fluorescent lamps. Energ. i elektrotekh. prom. no.3:14-16 Jl-S '62. (MIRA 18:11)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

BEREZIN, A.M., inzh.; VAYSBURD, P.M., inzh.

Condenser braking of small three-phase electric motors. Energ. i elektrotekh. prom. no.4:53-54 O-D '64.

(MIRA 18:3)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

BEREZIN, A.M.; VAYSBURD, P.M.

Increasing the stability of an electronic timer. Prib. i tekh. eksp. 8 no.2:105-106 Mr-Ap '63. (MIRA 16:4)

1. Kiyevskoye opytno-konstruktorskoye byuro.
(Electronic apparatus and appliances)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

BEREZIN, A.M., otv. red.; KUDRITSKIY, D.M., red.izd-va;
KONDRAT'YEVA, M.N., tekhn. red.

[Methods of aerial photo interpretation in forest inventories]
Metody deshifrirovaniia lesov po aerosnimkam. Moskva, Izd-vo
AN SSSR, 1963. 138 p. (MIRA 16:12)

1. Akademiya nauk SSSR. Laboratoriya aerometodov.
(Photographic interpretation)
(Forest and forestry--Valuation)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

BEREZIN, A.M.; KHARIN, N.G.

Identification of forests on aerial photographs of L'vov Province and Ciscarpathia. Trudy Lab. aeromet. 10:123-133 '60. (MIRA 14:1)

(Ukraine—Aeronautics in forestry)
(Photographic interpretation)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

BEREZIN, Aleksey Maksimovich; KHARIN, Nikolay Gavrilovich; BELOV, S.V., red.; MEL'NIKOVA, M.S., red.izd-va; PARAKHINA, N.L., tekhn. red.

[Instruction manual for the use and interpretation of aerial photographs of forests in different spectral regions] Metodicheskoe posobie po ispol'zovaniiu spektrozonal'nykh aerosnimkov dlia deshifrirovaniia lesov. Moskva, Goslesbumizdat, 1960. 68 p. (MIRA 15:6)

(Forest surveys)

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Akademiya nauk SSSR. Laboratoriya aerometodov

Trudy, tom 9 (Transactions of the Laboratory of Aerial Methods, USSR Academy of Sciences, vol. 9) Moscow, AN SSSR, 1960. 357 p. Errata slip inserted. 1,700 copies printed.

Resp. Ed.: V.V. Sharkov, Candidate of Geography; Ed. of Publishing House: D.M. Kodritskiy; Tech. Ed.: M.Ye. Zendel'.

PURPOSE: This volume is intended for geographers, geologists, geodesists, and photogrammetrists.

COVERAGE: This collection of 23 articles contains studies of the earth's surface, structure, and geological formations by means of aerial photography. The authors discuss the principles, methods and techniques used in aerial surveying to determine such factors as the petrographic composition of the soil through the measurement of the spectral brightness of surfaces, the geological structure of underwater areas through recorded photographic images, the geological composition and geomorphological structure of underlying layers through the analysis of surface plant coverings, the trends and characteristics of recent tectonic movements through the study of surface features traced photographically

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BEREZIN, A.M.

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

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BELOV, S.V.; BEREZIN, A.M.

Importance of natural and technical conditions and type of film for aerophotographic study of forests. Trudy Lab. aeromet. 6:146-175 '58. (MIRA 12:1)
(Forests and forestry) (Photographic interpretation)

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BEREZIN, A.M.

3(4) PHASE I BOOK EXPLOITATION SOV/1835

Akademiya nauk SSSR. Laboratoriya aerometodov

Trudy, t. 6 (Transactions of the Laboratory of Aerial Methods, USSR Academy of Sciences, Vol 6) Moscow, Izd-vo AN SSSR, 1958. 280 p. Errata slip inserted. 1,500 copies printed.

Resp. Ed.: V.P. Miroshnichenko, Candidate of Geological and Mineralogical Sciences; Ed. of publishing House: D.M. Kudritskiy; Tech. Ed.: E.Yu. Bleykh.

PURPOSE: This volume is intended for geologists, photo interpreters, or other personnel engaged in the study of landscape formations, especially from the standpoint of aerial photography.

COVERAGE: This collection of studies and brief articles treats problems in aerial photography and photo interpretation in relation to geological phenomena. The geographical area of study, with minor exceptions, is the Caspian plains and western shore. Most of the studies are well illustrated with aerial photographs. Aside from the numerous articles on geological phenomena of the Caspian basin, the following are also covered: portions of the Russian platform, the Muyunkumy sands of Central Kazakhstan, photo interpretation of clayey flats, desert vegetation and tree cover, the effective lens speed of photographic objectives, photogrammetric determination of profiles on hydro technical models, and others. No personalities are mentioned. References follow each main article.

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SOV/35-59-11-9572

The Comparative Usefullness of the Various Scales in Aerophoto Surveys and the Types of Aerial-Films for Deciphering Aerial Photographs of Forests

scale of 1:3,000 and 1:5,000, and spectrum zonal ones, on a scale of 1:5,000. Aerial-visual examination preceded the field deciphering. Simultaneously, observations were carried out on the phenological conditions of the plantation. It is established that the conducting of the aerial photo survey on a scale larger than 1:3,000 - 1:5,000 is inexpedient, inspite of the increased accuracy of deciphering, because of a worsened discernment of borders of taxation districts, and the considerable cost increase of the aerial photo survey work. For the purposes of forest amelioration of the 1 - 3 categories, aerial photo surveys should be carried out on a scale of 1:10,000, in the spring on orthochromatic aerial films, in the summer on spectrum-zonal or infra-chromatic ones, in the autumn on colored or panchromatic aerial films. Aerial photo surveys on a scale of 1:5,000 are recommended only for forests that are the most valuable in exploitation respect. Bibl. 5 titles.

A.I. Vinogradov

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SOV/35-59-11-9572

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Translation from: Referativnyy zhurnal, Astronomiya i Geodeziya, 1959, Nr 11, p 133 (USSR)

AUTHOR: Berezin, A.M.

TITLE: The Comparative Usefullness of the Various Scales in Aerophoto Surveys and the Types of Aerial-Films for Deciphering Aerial Photographs of Forests

PERIODICAL: Uch. zap. Lesn. gruppy. Labor. agrometodov AS USSR, Leningrad, 1957, pp 47 - 58

ABSTRACT: Experimental work was carried out by the expedition of the aerial methods laboratory, AS USSR, in two districts: the Baykal (Irkutsk oblast') with valuable mature and overmature plantations of Siberian cedar, Siberian larch, pine, birch, aspen, and in the Lisinsk (Leningrad oblast') with mixed mature and overmature plantations of pines, firs, birches and aspens; 1-5 sorts of quality. The survey of the Baykal district was carried out simultaneously by two AFA with F = 200 mm, of the Lisinsk - by AFA with F = 152 mm in different atmospheric-optic conditions. Orthochromatic, panchromatic, and infrachromatic aerial photographs were obtained on a scale of 1:3,000 - 1:25,000; colored three layer ones on a

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BEREZIN, A.M.

Determining the number of trees and the measurement of standing timber by means of black and white, and colored aerial photographs. Trudy Lab.aeromet. 5:216-221 '56. (MIRA 10:1)
(Aeronautics in forestry)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

BEREZIN, A.M.

Interpreting colored aerial photographs of taiga forests. Geog. sbor. no.7:128-139 '55. (MLRA 9:1)
(Photography, Aerial) (Aeronautics in forestry)

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

BEREZIN, A.M.

BEREZIN, A.M.: "The comparative convenience of various scales and types of aerial film for the decipherment of forest aerial photographs". Leningrad, 1955. Min Higher Education USSR. Leningrad Order of Lenin Forestry Engineering Academy imeni S.M. Kirov. (Dissertations for the Degree of Candidate of Agricultural Sciences).

SO: Knizhnaya letopis' No 44, 29 October 1955. Moscow.

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

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4

Oscillations within these ranges occurred at pressures of 5×10^{-3} and lower, the averaged electron temperatures being 88, 65, and 66 ev at 5×10^{-3}, 4×10^{-3}, and 3×10^{-3} mm Hg, respectively. The electron temperatures at higher pressures (1×10^{-2} mm Hg), where no oscillations occurred, were 2 to 3.5 times lower. Measurements of the radiation intensity were conducted to determine the character of its relation to the current pulse. The shape of the luminosity curve suggested that it is a result of high-frequency plasma oscillations and, to a greater degree, of the collisionless heating of plasma electrons. The ion-temperature measurements were based on profiles of the spectral lines of ions and atoms. A table summarizes the results from ion-temperature measurements for oxygen, helium, hydrogen, and air and hydrogen. At higher pressures, high-frequency oscillations did not occur, while ion temperatures were about half the values given in the table. The temperature rise apparently is caused by both collisions and the effect of a constant electric field. A profile widening observed in the case of hydrogen atoms is attributed to the high-frequency Stark effect. The authors thank Ya. B. Faynberg for a continued interest in the work and for valuable discussions and V. Ye. Ivanov, L. I. Bolotin, and V. G. Padalka for interest in the work and discussion of results. Orig. art. has: 4 figures and 2 tables. [FP]

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ACC NR: AP6018736

SOURCE CODE: UR/0057/66/036/006/1087/1093

AUTHOR: Lifshits, Ye. V.; Berezin, A. K.; Lyapkalo, Yu. M.

ORG: none

64
60
B

TITLE: Spectroscopic investigation of the interaction of plasma with charged particle beams

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 6, 1966, 1087-1093

TOPIC TAGS: plasma, plasma oscillation, plasma high frequency oscillation, plasma electron temperature, plasma ion temperature, electron beam, charged particle beam

ABSTRACT: A spectroscopic study was made of processes taking place in the interaction of beams with plasma in order to establish quantitatively the main parameters of the process and their interdependencies. Electron temperature, ion temperature, and high-frequency field strength were determined experimentally. In the electron-temperature measurements, a 12-amp, 20-kev electron beam was passed through a discharge tube at pressures from 8×10^{-4} to 10^{-2} mm Hg. Pulse duration was 4.5 μsec, frequency 50 pulses per sec, and beam diameter 20 mm. Plasma density with passage of the beam reached 6×10^{11} per cm^3. The process took place in a constant magnetic field of 0.12 emu. The discharge tube was filled successively with argon, helium, hydrogen, and air. High-frequency oscillations generated by passing an electron beam through a plasma were measured within the 600—2000 and 2400—7500 Mc ranges.

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reached a value of $6 \cdot 10^{11}$ cm^{-3}. The plasma and beam were located in a constant magnetic field with an intensity of 1200 oersteds. The shock tube was filled successively with argon, helium, hydrogen, air and mixtures of gases. A detailed description is given of the experimental procedure and analytical formulas used in measuring the electron and ion temperatures. Orig. art. has: 9 figures, 4 tables, 8 formulas.

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L 23568-66 EPF(n)-2/EWT(1)/ETC(f)/EWG(m) IJP(c) AT/GS

ACC NR: AT6008861 SOURCE CODE: UR/0000/65/000/000/0207/0221

AUTHOR: Lifshits, Ye. V.; Berezin, A. K.; Bolotin, L. I.; Lyapkalo, Yu. M.

ORG: none

73
B+1

TITLE: Spectroscopic investigation of the interaction between beams of charged particles and a plasma

SOURCE: AN UkrSSR. Magnitnye lovushki (Magnetic traps). Kiev, Naukova dumka, 1965, 207-221

TOPIC TAGS: electron temperature, ion temperature, plasma physics, charged particle, electron beam, spectroscopy

ABSTRACT: The authors consider the possibilities for spectroscopic analysis of the fundamental processes which take place during interaction of charged particles with a plasma and determine the basic parameters and relationships which are characteristic for this interaction. The electron temperature, ion temperature and rf field strength are determined. The measurements were made for instantaneous and time-averaged values. An electron beam (with a current of 12 a and an energy of 20 kv) was passed through a discharge tube in which the pressure was varied from $8 \cdot 10^{-4}$ to 10^{-2} mm Hg. The current pulse duration was 4.5 μsec with a prf of 50 cps. The beam was 20 mm in diameter. The density of the plasma formed during passage of the beam through the shock tube

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tions. The agreement is shown to be good. Under the conditions of the experiment some 18% of the beam energy was lost to the plasma through the excited oscillations in the plasma as well as through the heating of the plasma. At most, 60% of the lost energy was found in the plasma oscillations. Orig. art. has: 10 figures, 4 formulas.

SUB CODE: 20/ SUBM DATE: 11Nov65/ ORIG REF: 009/ OTH REF: 001

Card 2/2 gd

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

L 06313-67 EWT(1) IJP(c) AT/GD

ACC NR: AT6020431 (N) SOURCE CODE: UR/0000/65/000/000/0007/0023

AUTHOR: Berezin, A. K.; Faynberg, Ya. B.; Bolotin, I. I.; Berezina, G. P.

ORG: none

50

B+1

TITLE: High frequency oscillations excited during electron beam interaction with plasma

SOURCE: AN UkrSSR. Vzaimodeystviye puchkov zaryazhennykh chastits s plazmoy (Interaction of charged particle beams with plasma). Kiev, Naukova dumka, 1965, 7-23

TOPIC TAGS: HF oscillator, plasma heating, electron beam, cyclotron frequency

ABSTRACT: The generation of oscillations in a plasma and the electron beam traversing the plasma and the study of the resulting waves are described. The experiments were conducted with the plasma frequency smaller than that of the electron cyclotron frequency. A beam current of 8.5 and 5 A and a magnetic field in the range of 720-1320 oe (parallel to current) were used. The frequencies generated in the experiment were determined by magnetic probes and wavemeters. All three spatial components were determined. The frequency spectrum of 400 to 3200 cps was measured. These measurements show that the intensity of the generated waves in the beam depend on the ambient pressure. At higher pressure values, a characteristic plateau was found. The wave intensity was also found to increase in the beam direction, and to decrease as the magnetic field decreased. These results are discussed and compared with the theoretical predic-

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L 4242-66

ACCESSION NR: AT5007973

3

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR (Physicotechnical Institute, AN UkrSSR) 44,55

SUBMITTED: 26May64 ENCL: 00 SUB CODE: NP

NO REF SOV: 005 OTHER: 001

BVK

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I. Shevchenko at this institute for the case of beams of not very large density, a nonlinear theory has been created which permits one to trace the process of interaction of an initially nonmodulated beam and mono-energetic beam with a plasma from the initial stage to saturation. As is shown, a large part of the beam's energy of ordered motion (75% of its initial energy) is lost by the beam as a result of collective interactions with the plasma. Thus the energy expended upon excitation of oscillations amounts to 30%; upon increasing the thermal energy of the plasma, to 30%; and upon increasing the thermal energy of beam, to 15%. The experimental investigations of this interaction were carried out by I. F. Kharchenko and A. K. Berezin and their respective co-workers. Their results are in agreement with the theory of M. F. Gorbatenko. The mentioned institute has also carried out further theoretical and experimental investigations on the problems of electromagnetic wave propagation in plasma waveguides excited by high-frequency wall sources. The experimental studies, by O. G. Zagorodnov, et al., showed that the results agree well with theory under conditions of insignificant nonlinear effects. Current experiments are concerned with highly-ionized plasmas with density 10^{11} to 10^{12}. Orig. art. has: 4 figures, 1 table.

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crease in the high-frequency energy losses. It is also important to concentrate the electromagnetic energy in the radial direction only in the regions where the accelerated particles are moving. Thus for a given field strength the electromagnetic energy flux decreases markedly. If the fluxes of accelerated particles are large, the waveguide properties necessary for acceleration can be ensured by the particles of the beam which are not entrapped in the acceleration process, through which particles the entrapped particles move. The beam itself which is injected into the accelerator operates under these conditions of an accelerating system. To clarify the possibilities of particle acceleration by means of electromagnetic waves excited by charged particle beams, and also to investigate the influence of beam instabilities upon the acceleration process, the Physicotechnical Institute, Academy of Sciences Ukrainian SSR conducted theoretical and experimental investigations on the interaction of charged particle beams with a plasma. These investigations were intended to lead to, not the design and construction of a definite accelerator model, but the physical processes occurring during the interaction under consideration, and in this way to a determination of the possibilities of plasma methods of acceleration which are being developed at this institute. The theory developed up to the present time of the interaction between beams and plasma has been essentially a linear theory. As a result of the work of V. D. Shapiro and V.

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paratively small plasma densities around 10^9 to 10^{13} cm^{-3}). Under these conditions the high-frequency energy losses during wave propagation, which are due to the collisions of plasma particles, are small. The density of electrons in metals (about 10^{23}) is many orders greater than is necessary for ensuring waveguide properties in the microwave range. This leads to great losses of high-frequency power during wave propagation in metallic conductors. For plasma densities around 10^9 to 10^{13} cm^{-3}, the energy losses during particle transist through the plasma, which are proportional to plasma density, are insignificant, from 10^{-5} to 10^{-6} ev/cm. This means that plasma waveguides are "transparent" for accelerated particles. According to the conditions of acceleration the particles are divided into individual bunches. Thus the loss of particles moving in the plasma can increase greatly because of the occurrence of coherent deceleration representing the inverse of the effect of coherent acceleration, which was established by V. I. Veksler (Symposium CERN 1, 80 (1956)). However, even for accelerated particle fluxes of the order of tens of amperes, these losses are all insignificant. Because waveguide properties are determined by the plasma, the metal surfaces can be remote from regions with large field strengths or eliminated altogether, which permits a significant increase in the permissible voltages of the accelerating fields and a substantial de-

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L 4242-66 EWT(1)/EWP(m)/ETC/EPF(n)-2/EWG(m)/EPA(w)-2/EWA(m)-2 IJP(c)

ACCESSION NR: AT5007973 G5/AT/JXT S/0000/64/000/000/1023/1029

AUTHOR: Berezin, A. K.; Berezina, G. P.; Bolotin, L. I.; Gorbatenko, M. F.; Yegorov, A. M.; Zagorodnov, O. G.; Kornilov, B. A.; Kurilko, V. I.; Lutsenko, Ye. I.; Laypkalo, Yu. M.; Pedenko, N. S.; Kharchenko, I. F.; Shapiro, V. D.; Shevchenko, V. I.; Faynberg, Ya. B.

TITLE: Acceleration of charged particles with the aid of longitudinal waves in plasma and plasma waveguides

SOURCE: International Conference on High Energy Accelerators. Dubna, 1963. Trudy. Moscow, Atomizdat, 1964, 1023-1029

TOPIC TAGS: high energy accelerator, electron beam, plasma accelerator, plasma waveguide

ABSTRACT: Plasma waveguides and noncompensated electron and ion beams can be utilized as accelerating systems in linear accelerators (Faynberg, Ya. B., Symposium CERN 1, 84 1956); *Atomnaya energiya* 6, 431 (1959)). In such systems, slow electromagnetic waves $v_\phi \leq c$ are propatated, which are necessary for particle acceleration. The waveguide properties of restrained plasma and noncompensated beams are displayed in the case of waves in the meter and centimeter range even for com-

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BEREZIN, A.K.; BEREZINA, G.P.; BOLOTIN, L.I.; FAYNBERG, Ya.B.

Interaction between pulsed heavy-current beams and a plasma in a magnetic field. Atom.energ. 14 no.3:249-256 Mr '63. (MIRA 16:2)

(Electron beams) (Plasma (Ionized gases)) (Magnetic fields)

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longitudinal "sagging" of the potential occurs. At the same time the secondary electrons return to the axis of the tube. On account of the "sagging" of the potential these electrons are accelerated in the direction of the analyzer and also in the direction of the anode. The energy of the slow electrons is determined by the amount of longitudinal sagging. The energy is proportional to the current strength and the velocity of the electron beam. The longitudinal sagging is perhaps largest at the instant when the current density attains its maximum value, and probably at this same instant the accelerated electrons have their maximum energy. With increasing contraction of secondary electrons at the axis there occurs a new density distribution. The beam of the secondary electrons begins to broaden, and the sagging decreases. The density and the sagging change more rapidly with increasing pressure. K. D. Sinel'nikov and Ya. B. Faynberg are thanked for discussions and advice. There are 9 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR Khar'kov (Physico-technical Institute AS UkrSSR, Khar'kov)

SUBMITTED: June 17, 1961

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APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

9.3130
24.6716
24.2120

37267
S/057/62/032/005/014/022
B104/B102

AUTHORS: Berezin, A. K., Stupak, V. G., Bolotin, L. I., and Berezina, G. P.

TITLE: The passage of intense pulsed electron beams through dielectric tubes. II

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 5, 1962, 600-605

TEXT: The energy spectrum of 35 kev electrons in quartz and glass tubes of diameter 9 mm and length 60 mm was oscillographed with the help of an electrostatic analyzer (angle of aperture 2°). A group of slow and another of fast electrons (35 kev) were observed. A study was made of the behavior of these groups in their dependence on the beam energy, the current strength, the pressure of the residual gas, and other factors. The following conclusion is drawn from these observations: When the pressure in the tube is above a critical pressure, ions and slow secondary electrons are generated by the electron beam in the tube. The ions are trapped near the axis and the electrons travel to the wall. At a certain instant reneutralization starts. The electron beam contracts and a radial and

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ACCESSION NR: AT4036049 ENCLOSURE: 02

Legend to Enclosure 01:

1 - electron gun chamber, 2 - cathode heating, 3 -cathode post, 4 - cathode, 5 - solenoid for focusing longitudinal magnetic field, 6 - tube for producing pressure drop, 7 - plasma chamber, 8 - bellows,9 - mechanical leak valve, 10 - 'retarding field' analyzer, 11 - second analyzer grid, 12 - third analyzer grid, 13 - Faraday cup, 14 - entrance flange for measurement of the beam current, 15 - vacuum window for pumping out the plasma chamber, 16 - nine cells, 17 - line supply, 18 - to oscilloscope, 19 - water, 20 - pump, 21 - filament transformer, МКФ - microfarad, КОМ - kilohm, ОМ - ohm,

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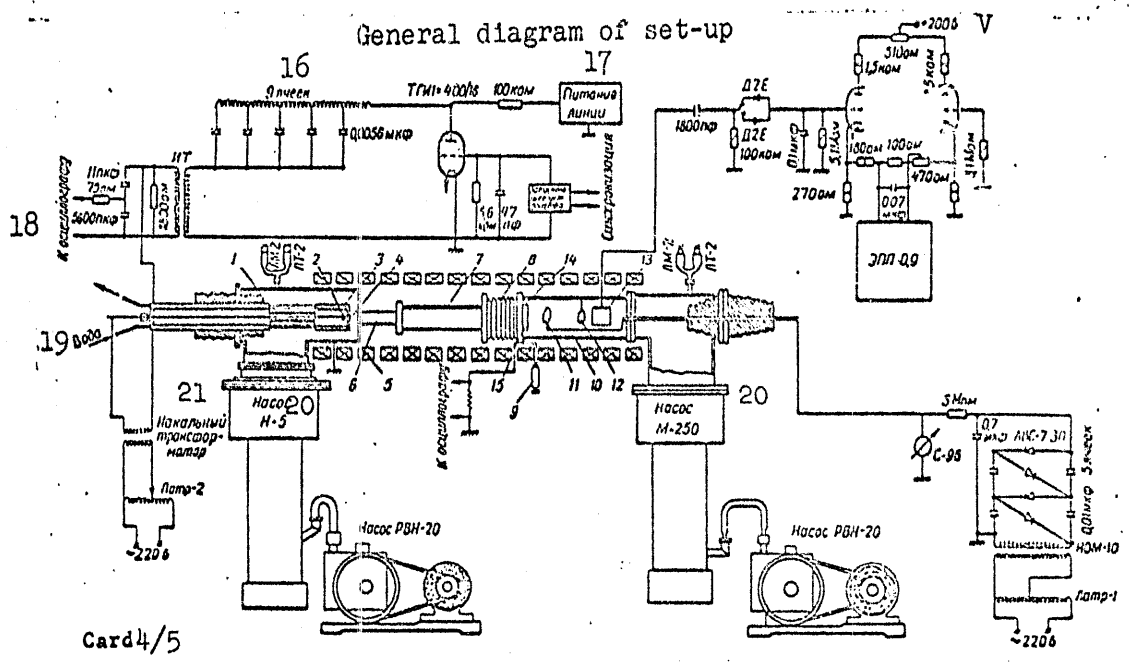
ACCESSION NR: AT4036049

ENCLOSURE: 01

General diagram of set-up



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ACCESSION NR: AT4036049

phase velocities which are smaller than the velocity of light in vacuum, and have intensities which reach 50--60 kV/m at the end of the interaction region. A small group of the electrons (1--4% of the total current) experiences an increase in energy up to 50%. If the electron beam is initially modulated, its frequency experiences a Doppler shift at the end of the interaction. Orig. art. has: 7 figures and 5 formulas.

ASSOCIATION: None

SUBMITTED: 00	DATE ACQ: 21May64	ENCL: 02
SUB CODE: ME	NR REF SOV: 016	OTHER: 005

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ACCESSION NR: AT4036049

under which oscillations are excited, the frequency spectrum, the amplification coefficients, the character of instability, and comparison of the experimental data with the theory. The electron beam had an approximate energy 15 keV and a current 5--8.5 A. It was injected in a quartz and glass plasma chamber, ionizing the air in it, producing a plasma, and interacting with the latter. After passing through the plasma the beam was electrostatically analyzed. The procedures used to measure the various parameters are described. The experiments have shown that the beam loses an appreciable part of its initial energy (~18%). This energy is consumed in excitation of oscillations and heating the plasma. Some 50--60% of the energy loss goes to excitation of longitudinal space-charge density waves and transverse electromagnetic oscillations; this agrees qualitatively with the theory. It follows from the measurements that the amplification coefficients and the maximum resonant frequency are also in satisfactory agreement with the calculated data. The longitudinal space charge density waves excited in the plasma and in the beam have

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ACCESSION NR: AT4036049 S/2781/63/000/003/0125/0138

AUTHORS: Berezin, A. K.; Berezina, G. P.; Bolotin, L. I.; Lyapkalo, Yu. M.; Faynberg, Ya. B.

TITLE: Interaction of pulsed high-current electron beams with a plasma in a magnetic field

SOURCE: Konferentsiya po fizike plazmy* i problemam upravlyayemogo termoyadernogo sinteza. 3d, Kharkov, 1962. Fizika plazmy* i problemy* upravlyayemogo termoyadernogo sinteza (Plasma physics and problems of controlled thermonuclear synthesis); doklady* konferentsii, no. 3. Kiev, Izd-vo AN UkrSSR, 1963, 125-138

TOPIC TAGS: plasma research, plasma magnetic field interaction, plasma wave absorption, plasma wave reflection, electron beam, microwave plasma, plasma electromagnetic property

ABSTRACT: The investigation reported was aimed at determining the energy losses of a beam passing through a plasma, the conditions

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The passage of intense pulsed... S/057/62/032/005/013/022
B104/B102

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR Khar'kov (Physicotechnical Institute AS UkrSSR, Khar'kov)

SUBMITTED: June 17, 1961

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electrons travel towards the wall and the ions collect about the axis of the tube. With progressive formation of ions the electron beam is focused and after time $t \sim \tau$ the current attains a maximum value at the exit of the tube. As the electron beam contracts towards the axis of the tube so does the region of ion formation. When the intensity of the beam becomes sufficiently large, the number of electrons produced exceeds that lost by diffusion towards the wall, recombination, etc. Then reneutralization starts, and the radial electric field changes signs. The electrons travel towards the axis of the tube and the space charge inside it becomes differently distributed. An excess of negative space charge is formed at the center and the current through the tube begins to decrease. At a pressure of $3.6 \cdot 10^{-4}$ mm Hg the current strength of a pulse decreases by about 20 % during the duration of the pulse; at a pressure of $8 \cdot 10^{-4}$ mm Hg the decrease is 80 %. The current pulse passing through a dielectric tube is 4-5 times larger than that through a copper one. With the help of the focusing properties of a dielectric tube described here electron beams may be "canalized" over large distances. There are 7 figures.

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24.2120
93130

S/057/62/032/005/013/022
B104/B102

AUTHORS: Berezin, A. K., Stupak, V. G., Bolotin, L. I., and Berezina, G.P.

TITLE: The passage of intense pulsed electron beams through dielectric pipes. I

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 5, 1962, 593-599

TEXT: The cathode of the electron gun was a tungsten spiral 16 mm in diameter. The pressure in the vacuum chamber was $3 \cdot 10^{-6}$ mm Hg. It was possible to produce 50 kev electron pulses with a current density of up to 1 a/cm^2, duration of the pulses reaching 4.6 μsec. The dielectric tube (quartz, glass) had an inner diameter of 8-10 mm and the pressure inside it could be varied between $2 \cdot 10^{-4}$ and $5 \cdot 10^{-2}$ mm Hg. The electron density of a pulse was measured by an shf method while the size and the shape of the electron pulses were oscillographed. An intense electron pulse broadens on account of the space charge. At the same time the electron pulse ionizes the residual gas creating positive ions and secondary electrons. The

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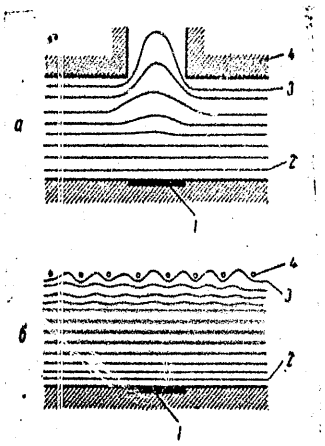
High power electron gun for ... S/120/62/000/002/031/047
E140/E163

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR
(Physicotechnical Institute, AS Ukr.SSR)

SUBMITTED: July 26, 1961

Fig.1



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APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

S/120/62/000/002/031/047
E140/E163

AUTHORS: Berezin, A.K., Stupak, V.G., Berezina, G.P., Bolotin, L.I., Lyapkalo, Yu.M., Solopikhin, D.P., and Bondarenko, V.P.

TITLE: High power electron gun for operation under difficult vacuum conditions

PERIODICAL: Pribory i tekhnika eksperimenta, no.2, 1962, 136-138.

TEXT: An electron gun is described giving 20 A at 25 kV in a vacuum of 5×10^{-5} mm Hg. The cathode is a cylindrical tablet of lanthanum hexaboride, vacuum-sintered, and located in the homogeneous region of the focussing magnetic field. A grid-form anode is used, resulting in a smaller defocusing field than the more usual pierced disc (Fig.1). The transparency of such an anode is also satisfactory. The anode mesh is of tungsten wire 60 μ diameter with a pitch of 1.5 mm. In plasma interaction experiments the gun was used for several months under continuous evacuation without replacement of any of its parts. There are 4 figures.

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B116/B201

Passage of intense pulsed...

spectrum until the radial field has changed its sign, i.e., not until the electrons start moving from the tube wall toward the beam axis. The results presented in Figs. 1a, 1b, 1c have been obtained under the following conditions: voltage of the beam, 35 kv; beam current, 0.4 a; pressure in the chamber, $3.6 \cdot 10^{-4}$ mm Hg. It is finally pointed out that in the course of experiments described here also the energy spectrum of slow electrons as a function of pressure, intensity, and velocity of the primary electron beam has been has been determined experimentally (no details, however, are given). [Abstracter's note: Essentially complete translation.] There are 2 figures and 3 references: 1 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR Khar'kov (Institute of Physics and Technology, AS UkrSSR, Khar'kov)

SUBMITTED: December 30, 1960

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current I_p was mounted on the quartz tube. The signal reaching the ring was differentiated by an RC circuit and fed to the oscilloscope. One of the oscillograms is shown in Fig. 1b. The negative half-wave on the oscillogram corresponds to the motion of secondary ions toward the wall and to the capture of ions near the electron-beam axis. If "overneutralization" takes place in the beam, the electric field will change its sign, and the ions, due to diffusion and other factors, will start moving toward the wall, while the secondary electrons migrate to the beam axis. The positive half-wave on the oscillogram corresponds to this condition. The energy spectrum of electrons passing through the quartz tube, measured with the electrostatic analyzer, permits distinguishing two separate electron groups, i.e., a group of fast electrons and a group of slow electrons. If, under the same conditions, the electron beam is allowed to pass through a metal tube, the spectrum will, as usual, consist of fast electrons only. Experiments have been conducted to determine the moment at which slow electrons of a given energy appear in the beam. The time was calculated from the beginning of the voltage pulse at the electron gun onward. The moment at which slow electrons appear at the analyzer output as a function of their energy is presented in Fig. 1c. As may be seen from Figs. 1b and 1c, slow electrons do not appear in the energy

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Passage of intense pulsed...

tude of the time required for complete neutralization of the beam), they will return to the electron-beam axis. Both the radial and the longitudinal component of the electric field are modified by this process. This, however, has an effect upon conditions on the passage of the beam through the tube, particularly upon the energy of secondary electrons. An experimental study has now been made of the passage of a pulsed electron beam through a dielectric tube. The experiment has been conducted in the following manner: A square voltage pulse having an amplitude up to 50 kv, a duration of 4.4 μsec (Fig. 1a), and a frequency of 50 pulses/second was applied to the electron gun placed in a vacuum chamber at a pressure of $2 \cdot 10^{-6}$ mm Hg. The gun permitted obtaining an electron beam with an amperage of up to 1 a in the pulse. The electron beam was injected into a quartz tube with an internal diameter of 9 mm and a length of 120 mm. On the other side of the tube, the vacuum chamber was connected with a device, by which the pressure in the chamber was varied from $2 \cdot 10^{-4}$ to 10^{-2} mm Hg. Part of the beam reached the electrostatic analyzer, by which the energy spectrum of the electrons in the beam was determined. A 30-mm wide metal ring, used for measuring the radial

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B116/B201

9,3130

AUTHORS: Berezin, A. K., Stupak, V. G., Bolotin, L. I., Berezina, G.P., Lyapkalo, Yu. M., Sevryukov, Yu. N.

TITLE: Passage of intense pulsed electron beams through dielectric tubes

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 6, 1961, 751 - 753

TEXT: The passage of an electron beam through metal tubes had been studied in theoretical and experimental papers by E. G. Linder and K. J. Herngvist (Ref. 1: Journ. of Appl. Phys., 21, 1088, 1950), by H. F. Ivey (Ref. 2: Advances in Electronics and Electron Physics, 6, 137, 1954), and by M. D. Gabovich (Ref. 3: UFN, 56, 215, 1955). On the passage of a beam through a tube, the residual gas is ionized, and positive ions as well as slow (secondary) electrons appear in the tube. In the case of a metal tube, these secondary electrons reach the wall, and do not participate in the further processes related to the passage of the electron beam through the tube. If the dielectric tube is "overneutralized", the secondary electrons will first reach the wall, and, after a certain time (of the order of magni-

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21404
S/089/61/011/006/001/014
B102/B138

Interaction of strong...

40%. This is in good agreement with experiments. There are 6 figures and 13 references: 10 Soviet and 3 non-Soviet. The four references to English-language publications read as follows: D. Bohm, E. Gross, Phys. Rev., 75, 1851, 1864 (1949); D. Bohm, E. Gross, Phys. Rev., 79, 992 (1950); V. I. Veksler, Proc. Symp. CERN, 1, 80 (1956); M. Biondi, S. Brown, Phys. Rev., 75, 1700 (1949).

SUBMITTED: June 17, 1961

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Interaction of strong...

interaction. The plasma density was measured by a cylindrical cavity excited with a TM_{030} wave from a klystron. The upper limit of measurement was $4 \cdot 10^{10} cm^{-3}$. Its value during the passage of current was determined from the plasma decay law: $n = n_0 \exp(-t/\tau)$, where τ is the mean time for plasma decay and n_0 the density at $t=0$. The straight line $n(t)$ was drawn from three measurements and extrapolated toward $t=0$. Maximum electron density was $7 \cdot 10^{10} cm^{-3}$, while the value $9 \cdot 10^{10} cm^{-3}$ resulted from shf-interferometric measurements. The electron energy spectrum was recorded by means of a beam catcher connected to an oscillograph. These spectra were investigated at the input and output of the plasma tube, and for pressures of $4 \cdot 10^{-3}$ and $3 \cdot 10^{-4}$ mm Hg, for which losses reached 11% and 1% of the initial energy, respectively. Conclusions: Energy losses increase with plasma density and with current, and are proportional to the electron mean free path in the plasma. Calculation of losses due to elastic collisions between electrons and gas molecules yields $\simeq 0.04$ ev, and $\simeq 3$ ev for those due to inelastic collisions. Coherent interaction, however, causes losses of 3.2 kev if self-modulation of the beam is assumed to reach

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21404
S/089/61/011/006/001/014
B102/B138

24.6716

AUTHORS: Berezin, A. K., Faynberg, Ya. B., Berezina, G. P., Bolotin, L. I., Stupak, V. G.

TITLE: Interaction of strong electron beams with plasma

PERIODICAL: Atomnaya energiya, v. 11, no. 6, 1961, 493 - 497

TEXT: The energy losses of a nonmodulated electron beam passing through an air plasma were determined. Beam voltage was 26 kev, amperage 8 a, electron density $(7-9)\cdot 10^{10} cm^{-3}$, and pressure in the discharge tube $3\cdot 10^{-4}-4\cdot 10^{-3}$ mm Hg. The quartz plasma tube, 64 cm in length, was arranged so that the greater part of the plasma was outisde the focusing magnetic field (2000 oe). The electron gun, a LaB_6 disk 10 mm in diameter, was perpendicular to the magnetic field and was with voltage pulses of up to 30 kev, a width of 3.5 μsec, and repetition frequency of 50 cycles. This gun was able to produce current pulses of 9 a at the plasma chamber input, where the focusing field was 1200 oe. In the field-free region amperage decreased with increasing flight path down to 2 - 3 a due to Coulomb

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BEREZIN, A.K.; NEKRASHEVICH, A.M. [Nekrashevych, O.M.]; SILENOK, G.A. [Sylenok, H.O.]; FAYNBERG, Ya.B.; KHIZHNYAK, N.A. [Khyzhniak, M.A.]

Spiral wave guide with an artificially anisotropic dielectric. Part 2. Ukr.fiz.zhur. 4 no.4:460-464 Jl-Ag '59. (MIRA 13:4)

1. Khar'kovskiy gosudarstvennyy universitet im. Gor'kogo.
(Wave guides) (Dielectrics)

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FAYNBERG, Ya.B.; KHIZHNYAK, N.A. [Khyzhniak, M.A.]; Silenok, G.A. [Sylenok, Ho.O.]; BEREZIN, A.K.; NEKRASHEVICH, A.M. [Nekrashevych, O.M.]

Spiral wave guide with an artificially anistropic dielectric. Part 1. Ukr.fiz.zhur. 4 no.4:451 Jl-Ag '59. (MIRA 13:4)

1. Khar'kovskiy gosudarstvennyy universitet im.Gor'kogo.
(Wave guides) (Dielectrics)

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BEREZIN, A.I.

Present status and future development of the Kal'makyr Mine.
Izv. AN Uz. SSR. Ser. tekh. nauk 9 no. 6:36-39 '65
(MIRA 19:1)

1. Submitted February 22, 1965.

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BALOBOLKIN, A.N., kand.tekhn.nauk; PAK, S.V., gornyy inzh.;
BOCHKAREV, V.N., gornyy inzh.; BEREZIN, A.I.

Drilling slim diverted holes in the Kal'makyr Mine.
Gor. zhur. no,6:74 Je '62. (MIRA 15:11)

1. Gornyy otdel AN UkrSSR (for Balobolkin, Pak, Bochkarev). 2. Nachal'nik Kal'makyrskogo rudnika (for Berezin).
(Anmalyk region--Boring)

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BEREZIN, A.I., kand.med.nauk (Kiyev)

Development of the socialist public health system in Poland. Vrach. delo no.10:143-145 O '60. (MIRA 13:11)
(POLAND--PUBLIC HEALTH)

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BEREZIN, A.I., kand.med.nauk; ODARICH, L.P.

Problem of arterial dystonia. Terap.arkh.30 no.9:28-36 S'58 (MIRA 11:10)
(HYPOTENSION, etiology and pathogenesis,
arterial dystonia (Rus))
(HYPOTENSION, etiology and pathogenesis,
arterial dystonia (Rus))

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APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

BEREZIN, A. I.

Berezin, A. I.

"On the Reflex Effects of Insulin (Experimental Investigation)." Kiev Order of Labor Red Banner Medical Inst imeni Academician A. A. Bogomolets. Kiev, 1955. (Dissertation for the Degree of Candidate in Medical Science)

So: Knizhnaya letopis', No. 27, 2 July 1955

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BEREZIN, A.I.

Methodology of perfusion of organs "in situ." Medych. zhur. 23 no.2: 60-63 '53. (MLRA 8:2)

1. Institut eksperimental'noi biologii i patologii im. akad. O.O. Bogomol'tsya.
(MEDICAL INSTRUMENTS AND APPARATUS)

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REREZIN, A.I.

Reflex action of insulin. Vop. fiziol. no.6:83-101 '53. (MLRA 8:1)

1. Institut eksperimental'noy biologii i patologii im. akad. A.A.Bogomol'tsa Ministerstva zdravookhraneniya USSR, laboratoriya eksperimental'noy endokrinologii.
(INSULIN, effects,
reflex mechanism)

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APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

BEREZIN, A.I.

Effect of insulin under narcosis. Medych.zhur. 22 no.6:41-44 '52. (MLRA 6:10)

1. Instytut eksperymental'noyi biologiyi i patologiyi im. akad. O.O.Bohomol'-tsya. (Insulin) (Narcotics)

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SOV/127-59-2-19/21

14(5)

AUTHORS: Berezin, A.I., and Chernenko, M.B., Mining Engineers

TITLE: The Readers' Conference of the Gornyy Zhurnal in Almalyk (Konferentsiya chitateley Gornogo zhurnala v Almalyke)

PERIODICAL: Gornyy zhurnal, 1959, Nr 2, p 77 (USSR)

ABSTRACT: The readers of Gornyy zhurnal working at the lead and zinc combine of Altyn-Topkan (Tashkentskiy sovnarkhoz) met at a conference in November 1958. They are satisfied with the journal but would like to read more about some questions, e.g. about more efficient methods to drift rising workings, and especially about all questions concerning open pits.

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Spectroscopic investigation of the ... S/057/63/033/003/005/021
B104/B180

the chamber, giving no information on symmetrical pulsations. There are 2 figures and 1 table.

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

SUBMITTED: March 19, 1962

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APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

APPROVED FOR RELEASE: 06/23/11: CIA-RDP86-00513R000204800018-6

S/057/63/033/003/005/021
B104/B180

AUTHORS: Berezin, [illegible] B., Zeydel', A. N., and Malyshev, G. M.

TITLE: Spectroscopic investigation of the collective motion of NIV ions in the "Alfa" apparatus

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 33, no. 3, 1963, 291-295

TEXT: The collective motion of ions in a plasma was studied in detail via its contribution to the broadening of the NIV lines (λ = 3479 Å). The apparatus consisted of a ДФС-8 (DFS-8) diffraction spectrograph with inverse dispersion 6 Å/mm, a spectral line separator, two photomultipliers and a double-trace oscillograph. The intensities of the two halves of the line were measured at different times. From a series of oscillograms it is concluded that the collective motion of NIV ions makes no very great contribution to line broadening, i.e., not more than 20%. The frequency of the observed motion is about 100 kc with an amplitude of a few centimeters at this frequency and an oriented motion velocity of about 10^6 cm/sec. The method only takes account of the contribution of collective motions which are a symmetrical with respect to the axis of

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BEREZIN, A B

Reports presented at the 5th Intl. Conference on Ionization Phenomena in Gases. Munich, 28 August - 1 September 1961.

a. G A Bazilevskaya, A M Andrienov, V F Demichev and V I Vasilyev

"Investigation of a Pulse Discharge in a Hollow Cylindrical Gas Sheath"

b. B G Brezhnev Ya S Maksimov

"Energy Measurements of Fast Electrons Formed During a Powerful Pulse Discharge" Chamber

c. A B Berezin, A N Zaydel, and G M Malyshev

"On a Method of Spectralisopopic Investigation of the Hydrogen Discharge Chamber Walls Interactions"

d. V F Kitayeva N N Sobolev

"On the Hydrogen Lines Broadening Under the Carbon Arc and Detonation Wave Conditions"

e. S G Alikhanov R A [illegible], A V [illegible], G G Podlesnyy, G L [illegible]

" An Investigation of Plasma Diffusion in the Magnetic Field"

f. V G Komelkov, Yu V Skvortsov V N Tereshchenko S S Tsarevitinov

"Dynamical Current Cord"

g. N N Sobolev

"A Spectroscopically Studied State of Gases Following the Detonation Wave"

h. R N Ilin, Ye S Solovyev N V [illegible]

"Molecular Hydrogen Ionization by Gas Hydrogen Atoms"

i. I P [illegible], G N [illegible]

"Ionization of Gases Induced by Multi-charged Ions"

j. P M [illegible], L N [illegible]

"The Source for Molecular Hydrogen Ions Formation at the Ogra Device"

k. A L Bezbatchenko V V [illegible] N P Malakhov N N [illegible]

"Injection of an Ionic Beam into the Ogra Magnetic Trap"

l. V Ye Yurasova

"On Directed Emission of Particles from a Copper Single Crystal Sputtered by Bombardment with Ions"

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Legend to Fig.9: Щ slit, Л lens, П dividing prism, ФЭУ photomultiplier.

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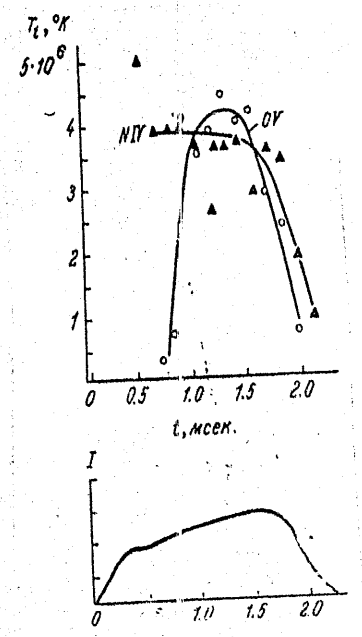
B019/B056



Fig, Card 4/5 Рис. 3. Зависимость ширины линий NIV 3479 и OV 2781 Å от времени.

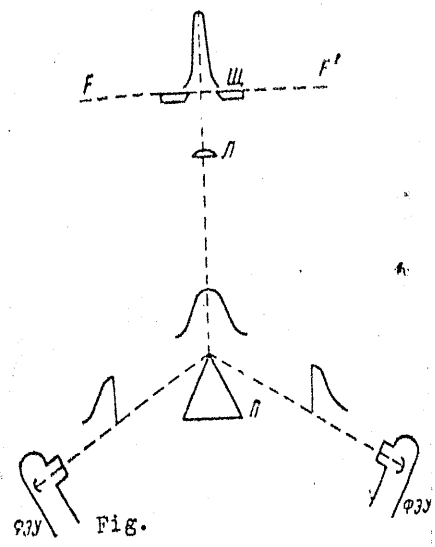


Fig. Рис. 9. Схема делителя.

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87460

Spectral Examinations With "Al'fa" Research Installation. III. Time Characteristics of Plasma Radiation

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ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR (Institute of Physics and Technology of the AS USSR). Nauchno-issledovatel'skiy institut elektrofizicheskoy apparatury (Scientific Research Institute of Electrophysical Apparatus)

SUBMITTED: July 15, 1960

Card 3/5

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Spectral Examinations With "Al'fa" Research Installation. III. Time Characteristics of Plasma Radiation

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B019/B056

of time. In the description of the photoelectric method, measurement of spectral line intensity with the aid of a photomultiplier and an oscilloscope is first discussed. By means of a two-beam oscilloscope, the intensity of the spectral line and the discharge amperage were recorded. From the Doppler shift, the authors were able to prove an ordered motion of ions at sufficiently high speeds, and with the aid of a divider shown in Fig.9 for the spectral lines, a shift of spectral lines could be determined with high accuracy. "Al'fa" did not show any difference in the course of intensity of the two halves of the line. Intensity oscillations of the lines having a frequency of 10^5 cps are explained by a Doppler shift and by an ordered motion of the NIV ions along the direction of observation. Laboratory Assistant V. V. Semenov took part in the work. The authors thank B. P. Konstantinov for his interest. There are 10 figures and 5 references: 1 Soviet, 2 Hungarian, 1 British, and 1 Swedish.

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87460

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B019/B056

24.2120

AUTHORS: Zaydel', A. N., Malyshev, G. M., Berezin, A. B., and Razdobarin, G. T.

TITLE: Spectral Examinations With "Al'fa" Research Installation. III. Time Characteristics of Plasma Radiation

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol. 30, No. 12, pp. 1437 - 1446

TEXT: Two methods are described for recording the time characteristic of plasma: a photographic method with mechanical spectrum scanning, and a photoelectric method. The mechanical scanning of the photographic method was carried out by means of a slitted disk rotating in front of the slit of the spectrograph. The width of the disk slit varied from 0.5 to 2 mm; the speed at which the disk slit moved past the slit of the spectrograph was 5 m/sec. In the studies carried out on this spectrograph it was found that the width of lines changed during the radiation of the plasma. The widths of the NIV and OV lines and the discharge current are both graphically represented in Fig.3 as functions

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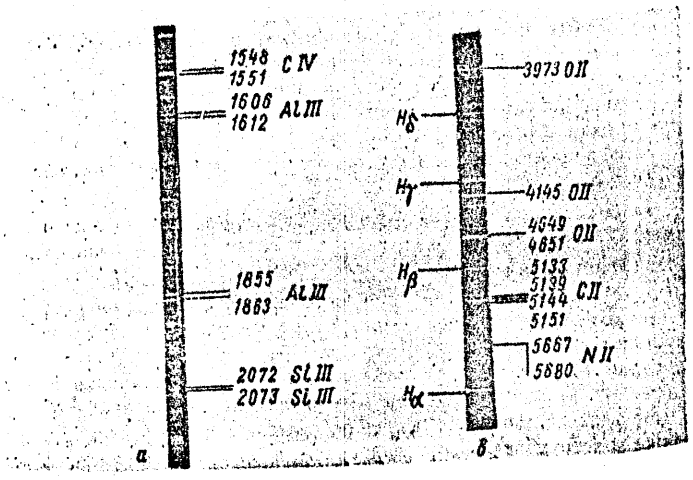

Legend to Fig.1:
The spectrum a was recorded at U = 16 kv, H_z = 180 oe, b at U = 10 kv and H_z = 180 oe and c at U = 5 kv and H_z = 180 oe.

Fig.1

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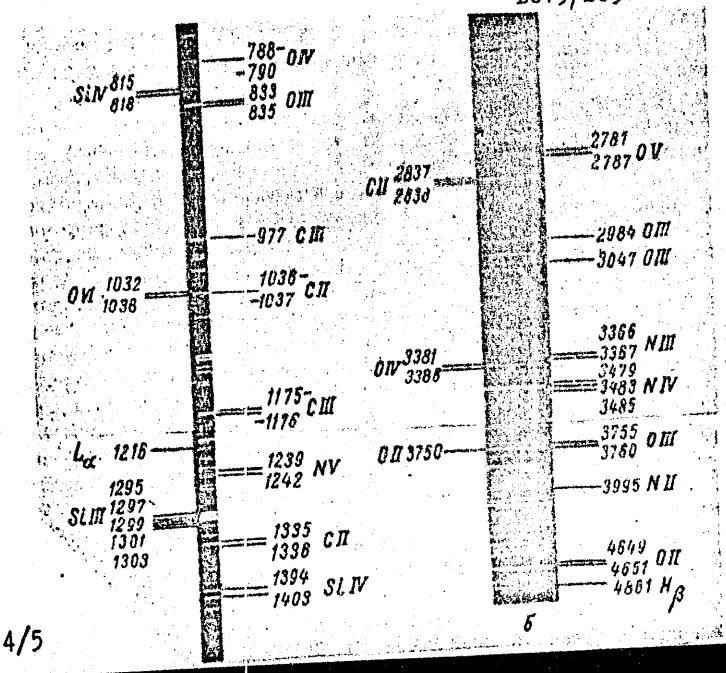

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