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USSR

UDC 547.26'118

MINGALYEVA, K. S., RAZUMOVA, N. A., PETROV, A. A., YEVTIKHOV, Zh. L., and BAGROV, F. V., Leningrad Technological Institute imeni Lensovet

"Dipole Moments of Derivatives of Trivalent Phosphorus Which Contain a Dioxaphospholane Ring"

Leningrad, Zhurnal Obshchey Khimii, Vol 41, No 11, Nov 1971, pp 2,431-2,434

Abstract: In trivalent phosphorus compounds, hybridization of the phosphorus atom varies readily in response to change in the type of substituent, and thanks to this the phosphorus may exhibit bifilarity. However, there is very little published information on variation in the dipole moments of compounds containing trivalent phosphorus. The present study, based on the dipole moment method, is intended to show the mutual effect of atoms in compounds containing dioxaophospholane rings. Data of electrographic research on molecules of 2-chloro-1,3,2-dioxaphospholane and triethyl phosphite were used to compute dipole moments. The group moment of the dioxaphospholane cycle was estimated from M. J. Aroney's data. Moments of the phosphorus-halogen bonds were determined from the dipole moments of the corresponding phosphorus trihalides. Laboratory measurements were made using dilute solutions in benzene at 20± 0.05°. All experimental and calculated data are included in the paper. It is concluded that increase in the electron-acceptor capacity of the substituents is accompanied by an increase in the dipole moment.

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UNCLASSIFIED

TITLE--ARBUZOV REARRANGEMENT OF GLYCOLPHOSPHOROUS ACID DERIVATIVES -U-

PROCESSING DATE--04DEC70

AUTHOR-(03)-RAZUMOVA, N.A., YEVTIKHOV, ZH.L., PETROV, A.A.

COUNTRY OF INFO--USSR

SOURCE--ZH. OBSHCH. KHIM. 1970, 40(4), 933-4

DATE PUBLISHED--------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--ORGANIC PHOSPHORUS COMPOUND, GLYCOL, FLUORIDE, MOLECULAR STRUCTURE, HETEROCYCLIC OXYGEN COMPOUND, IR SPECTRUM, NMR SPECTRUM, ELECTRON ACCEPTOR

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3006/1514

STEP NO--UR/0079/70/040/004/0933/0934

CIRC ACCESSION NO--AP0135175

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CIRC ACCESSION NO--AP0135175 UNCLASSIFIED PROCESSING DATE--04DEC70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. ETBR DOES NOT REACT EVEN UNDER DRASTIC CONDITIONS WITH BROMIDES, CHLORIDES, OR ISOTHIOCYANATES OF CYCLIC PHOSPHITES OF GLYCOLS AND THESE DERIVS WITH ELECTRON ACCEPTOR GROUPS DISPLALY INHIBITION OF THE SN2 ATTACK OF THE PHOSPHITE ON THE C ATOM OF RX. IN FLUORIDES OF SUCH ESTERS, HOWEVER, THE CONJUGATION OF UNSHARED ELECTRON OF F WITH 3D ORBITALS OF P PROVIDE A STRONGLY NEG. CHARGE ON P, MAKING POSSIBLE THE ARBUZOV TYPE REACTION WITH ETBR. I WITH R EQUALS H OR ME HEATED WITH ETBR 40-50 HR AT 140-50DEGREES GAVE BRCH SUB2 CHROP(O)ETF: R EQUALS H, 83PERCENT, B SUB3 97DEGREES, N PRIME20 SUBD 1.4240, D PRIME20 1.4839; R EQUALS ME, 87PERCENT, B SUB1 90DEGREES, 1.4381, 1.4334, CONFIRMED BY IR AND NMR SPECTRA. THUS THE DONOR ACCEPTOR RELATIONSHIP IN THE ARBUZOV REACTION AND IN THE CONDENSATION WITH DIENES IS MUTUALLY CONTRADICTORY. WHILE IN THE ARBUZOV REACTION P ACTS AS A DONOR OF ELECTRONS RELATIVE TO RX, IN THE CONDENSATION OF P COMPDS. WITH DIENES IT SERVES AS AN ELECTRON ACCEPTOR.

FACILITY: LENINGRAD. TEKHNOL. INST. IM. LENSOVETA, LENINGRAD, USSR.

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1/2 017 UNCLASSIFIED PROCESSING DATE--13NOV70

TITLE--1,3,DIPOLAR ADDITION TO UNSATURATED COMPOUNDS. XXIII. REACTIONS OF ALPHA,BETA,UNSATURATED PHOSPHINES WITH DIPHENYLNITRILIMINES -U-

AUTHOR-(03)-KOLOKOLTSEVA, I.G., CHISTOKLETOV, V.N., PETROV, A.A.

COUNTRY OF INFO--USSR

SOURCE--ZH. BOSHCH. KHIM. 1970, 40(3), 574-8

DATE PUBLISHED-------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--IMINE, HETEROCYCLIC NITROGEN COMPOUND, ORGANIC PHOSPHORUS COMPOUND, ORGANIC AZOLE COMPOUND, BENZENE DERIVATIVE, ORGANIC SYNTHESIS, CHEMICAL REACTION MECHANISM

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3002/1366

STEP NO--UR/0079/70/040/003/0574/0578

CIRC ACCESSION NO--AP0128767

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CIRC ACCESSION NO--AP0128767 UNCLASSIFIED PROCESSING DATE--13NOV70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. REFLUXING AN EQUIMOLAR MIXT. OF PH SUB2 PCH:CH SUB2, 1,5,DIPHENYLTETRAZOLE, AND ET SUB3 N.HCL IN MESITYLENE 3 HR GAVE 66PERCENT I, M. 235-7DEGREES. PH SUB2 PC TRIPLE BOND CH AND PHNHN:CCLPH WITH ET SUB3 N-C SUB6 H SUB6 GAVE AFTER 1 DAY AT ROOM TEMP. AND 1-2 HR ON A STEAM BATH, 98PERCENT II (R EQUALS H), M. 244-5DEGREES: SIMILARLY WERE PREPD. II (R EQUALS ME), M. 243-5DEGREES, AND II (R EQUALS PH) M. 150-2DEGREES. II, R EQUALS H AND 3PERCENT AQ. KOH GAVE 73PERCENT PH SUB2 P(O)CH:CHNPHN:CHPH (III) M. 214-15DEGREES. SIMILARLY TO I WAS PREPD. 50PERCENT PH SUB2 P(O)(CH SUB2) SUB2 NPHN:CHPH, M. 184-5DEGREES, WHEN PH SUB2 PCH:CH SUB2 AND DIPHENYLNITRILIMINE WERE ALLOWED TO REACT IN THE PRESENCE OF CONTROLLED AMT. OF H SUB2 O. III WAS HYDROGENATED OVER RANEY NI IN ETOH TO 68.9PERCENT PH SUB2 P(O)(CH SUB2) SUB2 NHPH (IV), M. 132-4DEGREES. REFLUXING PH SUB2 P(O)CH:CH SUB2 WITH PHNH SUB2 AND PHNH SUB2 .2HCL 5 HR GAVE 50PERCENT IV, M. 132-4DEGREES. REACTION OF PH SUB2 PCH:CH SUB2 WITH PHCCL:NNHPH AND ET SUB3 N AT 20DEGREES 3 HR GAVE 60PERCENT I; WITH 2 MOLES PH SUB2 PCH:CH SUB2 THIS ROSE TO 83PERCENT, WHILE WITH 2 MOLES ET SUB3 N IT ROSE TO 78PERCENT, DECREASE OF PROPORTION OF ET SUB3 N OR ITS ELIMINATION CAUSED A SHARP DECLINE OF THE YIELD. THIS SUPPORTS THE REACTION MECHANISM IN WHICH THE PRIMARY PRODUCT IS V. FACILITY: LENINGRAD. TEKHNOL. INST. IM. LENSOVETA, LENINGRAD, USSR.

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USSR

UDC: 547.341

RAZUMOVA, N.A., YEVTIKHOV, ZH.L., and PETROV, A.A., Leningrad Technological Institute imeni Lensovet, Leningrad, Ministry of Higher and S condary Specialized Education RSFSR

"Arbuzov Rearrangement of Glycolphosphorous Acid Derivatives"

Leningrad, Zhurnal Obshchey Khimii, Vol 40, No 4, Apr 70, pp 933-934

Abstract: For purposes of comparing the mechanism of the condensation reactions of various trivalent phosphorus derivatives with 1,3-diene hydrocarbons with the mechanism of the classical Arbuzov rearrangement, the authors studied the reactions of a series of glycolphosphorous acid derivatives (ethylene- and propyleneglycolphosphorous acid fluorides) with ethyl bromide. The reaction products are the acid fluoride of β-bromoethyl ester of ethylphosphinic acid and the acid fluoride of β-bromoisopropyl ester of ethylphosphinic acid. The structure of the resultant compounds was confirmed by IR and N(P)MR spectra. The results indicate that the donor-acceptor interrelationships in the classical Arbuzov reaction and in the condensation

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RAZUMOVA, N. A., et al., Zhurnal Obshchey Khimii, Vol 40, No 4, Apr 70, pp 933-934

reaction with dienes with one and the same phosphorus components are mutually contradictory: in the Arbuzov rearrangement phosphorus has the function of electron donor with respect to the alkyl halide, while in the condensation reaction it is an electron acceptor.

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MASHLYAKOVSKIY, L.N., IONIN, B.I., OKHRIMENKO, I.S., and PETROV, A.A., Leningrad Technological Institute imeni Lensovet, Leningrad, Ministry of Higher and Secondary Specialized Education RSFSR

UDC: 547.341

"Phosphine Oxides Containing 1,3-Diené Grouping at Phosphorus Atom"

Leningrad, Zhurnal Obshchey Khimii, Vol 40, No 4, Apr 70, pp 804-808

Abstract: A previous article by the authors reported the synthesis of individual 1,3-dienephosphine oxides by the interaction of unsaturated phosphonyl dichlorides with Grignard reagents. The present article gives more detailed information on the synthesis and structure of these compounds. The interaction of 1,3-dienephosphonic and chlorobutenephosphonic acid dichlorides with Grignard reagents with subsequent dehydrochlorination by alcoholic alkali gives previously undescribed tertiary phosphine oxides containing a 1,3-diene grouping at the phosphorus atom. The structure of the resultant phosphine oxides is confirmed by the results of catalytic hydrogenation.

The formation of compounds with the cis and trans configura-

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MASHLYAKOVSKIY, L. N., et al., Zhurnal Obshchey Khimii, Vol 40, No 4, Apr 70, pp 804-808

tion with respect to the double bond in the $\alpha,\beta$-position to phosphorus is explained on the basis of the idea of the bimolecular mechanism of trans-elimination and the influence of steric interactions of substituents at the $\beta$-carbon atom with the phosphorus-containing grouping.

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Acc. Nr: AP0045501 Abstracting Service: CHEMICAL ABST. 4-70 Ref. Code: UR0051

84536b Charge transfer bands in complexes of rare-earth ions with aromatic acids. Ermolaev, V. L.; Kazanskaya, N. A.; ~~Petrov, A. A.~~; Kheruze, Yu. L. (USSR). *Opt. Spektrosk.* 1970, 28(1), 208-10 (Russ). The electronic absorption and luminescence spectra of the complexes of rare-earth metal ions ($Sm^{3+}$, $Eu^{3+}$, $Tb^{3+}$, $Dy^{3+}$, and $Yb^{3+}$) with benzoic, salicylic (I), 2,4-dihydroxybenzoic (II), 2-methoxybenzoic, phthalic, anthranilic (III), dimethylanthranilic, and other aromatic acids were measured in MeOH contg. MeONa at 293°K. The uv spectra of the complexes of Eu with I-III and of Sm with II contained addnl. long-wavelength bands which were not present in analogous Tb complexes. The long-wavelength bands were characterized as charge-transfer bands. Also the formation of a new short-wavelength band in the uv spectra of the complexes was obsd.; however, these bands were not interpreted. Upon excitation in the ligand absorption-band region, the complexes of Sm, Eu, Tb, and Dy with aromatic acids gave an intense luminescence due to an intramol. energy transfer from the triplet energy level of the complex to the resonance level of the respective ion. No luminescence was obsd. with complexes of Eu and Sm. C. Parkanyi

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Acc. Nr: AP0049503 Abstracting Service: CHEMICAL ABST. 5/78 Ref. Code: UR 0078

100843g Unsaturated organogermanium compounds. VI. Reaction of alkyllithium compounds with 1,3-diyne organogermanes. Kaptyug, O. I.; Stadnichuk, M. D.; Petrov, A. A. (Leningrad. Tekhnol. Inst. im. Lensoveta, Leningrad, USSR). *Zh. Obshch. Khim.* 1970, 40(1), 118-24 (Russ). RLi add to double bonds that are remote from Ge in organogermanium compds. of the 1,3-diyne class considerably less readily than they do for similar Si compds. The main reaction is substitutive metalation at Me or $CH_2$ groups connected to the triple bond. The relative reactivity of 1,3-diynes of this nature can be disposed in descending order: Si, Ge, C. A mixt. of $EtMgBr$ and 1,3-pentadiyne treated with ice-salt cooling with $Me_3GeBr$ and refluxed 8 hr gave 36% 1-trimethylgermanyl-1,3-pentadiyne (I), $b_{1.5}$ 42-2.5°, $d^{20}$ 1.0869, $n^{18}_D$ 1.5072; similarly were prepd. 86% 1-trimethylgermanyl-1,3-hexadiyne (II), $b_{1.5}$ 48.5-9.5°, 1.0590, 1.5058; 56% 1-trimethylgermanyl-1,3-heptadiyne (III), $b_2$ 58.5°, 1.0355, 1.5042; and the previously reported $Et_3Ge$

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analogs of these. Adding 4.4 g 1,4-hexadiyne to EtMgBr from 2 g Mg, keeping the mixt. 8 hr, then refluxing 2 hr gave only 3 g Ge-contg. product, $b_2$ 71–3°, $d^{20}$ 1.1007, $n_D^{20}$ 1.4810, $C_{12}H_{14}Ge$. BuLi from 3.5 g Li and 30.5 g BuBr in $Et_2O$ under N at −80° treated with I (5.8 g) and held 40 min gave 55% product, $b_{0.1-1}$ 30–50°, $C_8H_{12}Ge$. Similarly, II and BuLi gave 1-trimethylgermanyl-4-ethyl-3-octen-1-yne, $b_3$ 79–81°, 0.9886, 1.4840, which heated with MeOH-KOH, then hydrogenated, gave 4-ethyloctane. II and iso-BuLi gave a mixt. of at least 4 products, $b_{0.1}$ 41–8°; a similar mixt. formed with $Me_3CLi$, $b_1$ 56–64°. III and BuLi gave 69% isomerizates, $b_{1.5}$ 60–92°, and 27% adducts, $b_{0.07}$ 73–4°, $C_{14}H_{26}Ge$. 1-Triethylgermanyl-1,3-hexadiyne and BuLi gave 69% isomerizates, $b_2$ 91–9°, and some 1-triethylgermanyl-4-ethyl-3-octen-1-yne, $b_1$ 107–8°, 0.9763, 1.4885.

G. M. Kosolapoff

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Acc. Nr: AP0053451 Abstracting Service: CHEMICAL ABST. Ref. Code: 4R0366

110710a Reaction of the diethylamide of chlorosulfonic acid with butylmagnesium bromide. Maslii, L. K.; Petrov, A. A. (USSR). *Zh. Org. Khim.* 1970, 6(2), 396 (Russ). An attempt to prep. alkylsulfamides by reacting $Et_2NSO_2Cl$ with BuMgBr gave only $SO_2$, $Et_2NH$, and BuCl. The reaction at −40° evidently proceeds with the formation of $[Et_2N(SO_2Cl)MgBu]^+Br^-$, which during the work up with 5% HCl soln. decomps. CPJR

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USSR

UDC 547.558.1

MINGALEVA, K. S., CHISTOKLETOV, V. N., KOSOVTSEV, V. V., and PETROV, A. A.,
Leningrad Technological Institute imeni Lensovet

"Dipole Moments and the Structure of Alkenylphosphines and of the Derivatives of Phosphonous Acid"

Leningrad, Zhurnal Obshchey Khimii, Vol 41 (103), No 4, Apr 71, pp 862-865

Abstract: Dipole moments were used in a study analyzing the distribution of electron density in alkenylphosphines and in derivatives of alkenylphosphonous acids. Replacing an ethoxy group in triethyl phosphite by a vinyl group led to a slight drop of the dipole moment, as did the replacement of α or β hydrogen atoms in $(C_2H_5O)_2PCH{:}CH_2$ by methyl groups. Replacement of a $(C_2H_5)_2P$ group by $[(CH_3)_2N]_2P$ has practically no effect on the dipole moment. In general the electron state of the phosphorus atom in above compounds depends on the substituents. As the p character of the unshared pair of electrons of the phosphorus atom increases, its acceptor capacity is decreased.

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USSR

UDC 537.563:547.241

BOGOLYUBOV, G. M., GRISHIN, N. N., and PETROV, A. A., Leningrad Technological Institute imeni Lensovet

"Organic Derivatives of Group V-VII Elements. XVIII. Conjugation Energy of the P-P Bond. Mass Spectra of Phosphine Sulfides"

Leningrad, Zhurnal Obshchey Khimii, Vol 41 (103), No 4, Apr 71, pp 811-815

Abstract: The conjugation energy of the P-P bond in tetraethyldiphosphine was found to be of the order of 25 kcal/mole. Phosphorus atoms in this molecule have unshared pairs of electrons. Studying the electron spectra, dipole moments and the dissociation energy of the E-E type of compounds, where E= an element of the V, or VI group possessing and unshared pair of electrons, it was found that the conjugation between elements led to an increased resistance of the E-E bond to electron attack. Yet at the same time these compounds are highly susceptible to the action of nucleophilic agents. This phenomenon has been explained by an anti-ion participation in their chemical reactions.

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UDC: 621.391.1:519.2:621.372.54

SARKISYAN, A. A. and PETROV, A. A.

"Using the Model of a Receptive Field for Improving Signal Detection Efficiency (Author's Abstract)"

Elektron. tekhnika. Nauchno-tekhn. sb. Mikroelektronika (Electronic Engineering, Scientific-Technical Collection, Microelectronics) 1970, No. 2(23), pp 131-132 (from RZh-Radiotekhnika, No. 3, March 71, Abstract No. 3A42)

Translation: A method of signal storage widely used in engineering is considered. The storage procedure described in this paper is based on the modeling of some function processes of the receptive field in the retina of the eye. Author's abstract

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USSR

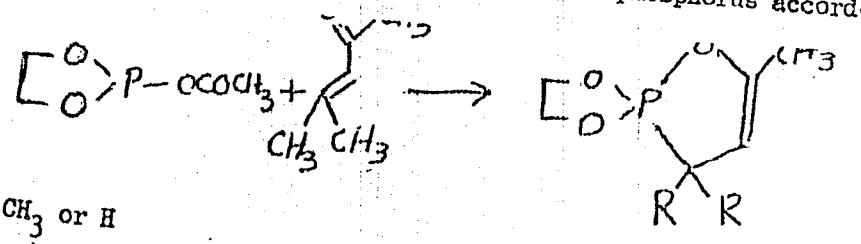
UDC 547.341

VOZNESENSKAYA, A. Kh., RAZUMOVA, N. A., and PETROV, A. A., Leningrad Technological Institute imeni Lensovet

"Condensation of Acetyl Ethylene Phosphite with Alpha, Beta-Unsaturated Ketones"

Leningrad, Zhurnal Obshchey Khimii, Vol 41, No 1, Jan 71, p 234

Abstract: The condensation of acetyl ethylene phosphite with methyl vinyl ketone or mesityl oxide yields compounds with pentacovalent phosphorus according to the scheme



where R = $CH_3$ or H

The composition and structure of the resultant substances was confirmed by analysis and IR and NMR spectra.

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KONOTOPOVA, S. P., CHISTOKLETOV, V. N., and PETROV, A. A., Leningrad Technological Institute imeni Lensovet

UDC 547.341

"Reactions of Aminophosphines With 1,3-Bipolar Systems"

Leningrad, Zhurnal Obshchey Khimii, Vol 41, No 1, Jan 71, p 235

Abstract: Tertiary phosphines react with nitrileimines to give phosphoranes. The authors found that the reaction of nitrileimines with aminophosphines proceeds analogously, apparently through the intermediate formation of betaines.

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UDC 547.345+543.422.4

KOLOKOL'TSEVA, I. G., CHISTOKLETOV, V. N., and PETROV, A. A., Leningrad Technological Institute imeni Lensovet

"1,3-Bipolar Addition to Unsaturated Compounds: XXV. Dipolarophilic Activity of Organophosphorus and Organosilicon Unsaturated Compounds With 1,3-Bipolar Systems"

Leningrad, Zhurnal Obshchey Khimii, Vol XL, No 12, Dec 70, pp 2618-2622

Abstract: Since any conjugation will increase dipolarophilic activity of multiple bonds in the reactions with 1,3-dipolar systems; it was attempted here to establish the effect of organosilicon and organophosphorus substituents on dipolarophilic activity of multible bonds, using the method of competing reactions.

It was shown that in the case of diphenylnitrilimine, the rate of addition increases with increasing electrophilicity of the double bond of the compounds investigated. The N-oxide of benzonitrile, the variation in dipolarphilic activity in the dipolariphiles studied is inadequate for their activity in reactions with diphenylnitrilimine.

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USSR

UDC 547.241

KOSOVTSEV, V. V., CHISTOKLETOV, V. N., and PETROV, A. A., Lengr. Techno. Inst.

"1,3-Bipolar Addition to Unsaturated Compounds. XXVI. Reaction of Vinyldiphenylphosphine With C-Carbethoxy-N-Arylnitrilimines"

Leningrad, Zhurnal Obshchey Khimii, Vol XL, No 12, Dec 70, pp 2570-2573

Abstract: The reactions of vinyldiphenylphosphine with five different C-carbethoxy-N-arylnitrilimines were studied; the results showed that they proceeded similarly to the same reactions of diphenylnitrilimine, with formation of cyclic phosphonium salts.

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UDC 547.341

RAZUMOVA, N. A., ZUBTSOVA, L. I., and PETROV, A. A.

"Phosphorus-Containing Heterocyclics: Condensation of Phosphites and Dihalo-phosphites of the Aliphatic Series With 1,3-Dienes"

Leningrad, Zhurnal Obshchey Khimii, Vol XL, No 12, Dec 70, pp 2563-2565

Abstract: The esters of catechol and glycolphosphorous acids condense with dienes to form phospholine oxide derivatives; and with replacement of the alkoxy group by the stronger electron-withdrawing acetyl group there is an acceleration of the condensation. The authors tested whether this pattern would hold good for derivatives of trivalent phosphorous which do not contain a ring in their structure, and reached these conclusions:

With increase in the electron-acceptor capability of trivalent phosphorus, the rate of condensation with 1,3-dienes of acyclic phosphites, just as in the case of the cyclic esters, increases;

As regards the condensation rate, the 1,3-dienes can be arranged in the following descending order: isoprene, butadiene, piperylene; and chloroprene.

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RAZUMOVA, N. A., Zhurnal Obshchey Khimii, Vol XL, No 12, Dec 70, pp 2563-2565

With bulky substituents, in the presence of trivalent phosphorus, steric hindrance predominates over the electron effect.

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USSR

UDC 51:330.115

IVANILOV, Yu. P., MOYISEYEV, N. N., PETROV, A. A.

"Some Mathematical Problems of Programmed Control of an Economic System"

Kibernetiku -- na Zluzhbu Kommunizmu. T. 6 [Cybernetics in the Service of Communism, Vol 6 -- Collection of Works], Moscow, Energiya Press, 1971, pp 9-22, (Translated from Referativnyy Zhurnal, Kibernetika, No 10, 1971, Abstract No 10 V702 by D. Epshteyn).

Translation: A program method of control of the national economy is defined. The program refers to a set of s operations which must be performed to achieve the desired goal. A program of development of production supporting the entire set of programs of development of an economic system is particularly noted. An s-digit number $z = k_1, k_2, \ldots, k_s$ is used to describe the state of the program, where $k_i$ defines the degree of fulfillment of the ith operation in a scale selected such that all $k_i \leq m$ and $z = mm\ldots m$ means that the program has been fulfilled. A system of equations is concluded describing the fulfillment of a certain program for a simple multibranch dynamic production model. Control u(t) refers to an s digit number containing the intensity of fulfillment of the ith operation at moment t in the ith digit. A dead end control refers to a control under which it is impossible to increase the intensity of fulfillment of any

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USSR

UDC 51:330.115

IVANILOV, Yu. P., MOYISEYEV, N. N., PETROV, A. A., Kibernetiku -- na Zluzhbu Kommunizmu. T. 6, Moscow, Energiya Press, 1971, pp 9-22.

operation due to resource limitations. It is proven that the dead end control include the control providing for fulfillment of the program in the minimum time. A search algorithm is constructed leading to the construction of this optimal control with a maximum excess of resources at the end. An arbitrary example of calculation of a program for a linear, single-product model is presented.

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JPRS 59008
6-73

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XI-3. OBTAINING THE MATERIALS OF $A^3B^5$-$A^2B^6$ SOLID SOLUTIONS CLOSE TO CHARACTERISTIC

[Article by Ye. V. Kalashnikova, V. I. Korzhov, V. N. Morozov, A. A. Petrov, N. A. Semikolenova, L. A. Skorobogatova, V. K. Fingerova, V. A. Khabarova, Z. N. Knabarov, Irkutsk; Novosibirsk, III Simpozium po Protsessam Rosta i Sintezu Poluprovodnikovykh Kristallov i Plenok, Russian, 12-17 June 1972, p 148]

A study was made of the conditions of the conditions of directional crystallization of semiconductor solid solutions of InAs-CdTe and InSb-CdTe. The distribution of the composition of the solid solutions along the ingot corresponds to a diagram of state of pseudobinary systems.

It was discovered that all the crystals grown from the stoichometric melt have limiting and constant concentration of the conduction electron ($N \sim 1 \cdot 10^{19} cm^{-3}$ for InAs-CdTe and $N \sim 5 \cdot 10^{18} cm^{-3}$ for InSb-CdTe) which is caused by the peculiarities of the crystallization processes of solid solutions of the $A^3B^5$-$A^2B^6$ type. The segregation coefficients of the $A^2$ and $B^6$ elements for crystallization of the solid solutions are found in the same ratios as pure $A^3B^5$ compounds.

Studies were made of the possibility of obtaining materials with different concentration of the current carriers by varying the degree of stoichiometry of the investigated compounds. Studies were made of the optical and the galvano-magnetic properties of the characteristic solid solutions on the materials obtained.



PETROV, A.A.

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USSR

UDC 51:330.115

IVANILOV, Yu. P., PETROV, A. A.

"Some Methods of Solution of the Problem of Optimal Planning for Dynamic Production Models"

Kibernetiku -- na Zluzhbu Kommunizmu. T. 6 [Cybernetics in the Service of Communism, Vol 6 -- Collection of Works], Moscow, Energiya Press, 1971, pp 51-64, (Translated from Referativnyy Zhurnal, Kibernetika, No 10, 1971, Abstract No 10 V705 by D. Epshteyn).

Translation: The discrete maximum principle is presented for dynamic models with phase limitations and without them. Two algorithms for search for the optimal control with phase limitations are presented, reducing the problem to determination of the optimal control for a certain loaded functional without phase limitations. An ALGOL program is presented.

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USSR

UDC 51:330.115

IVANILOV, Yu. P., PETROV, A. A.

"Calculation of the Optimal Plan of Development of Production Using a Dynamic π Model"

Kibernetiku -- na Zluzhbu Kommunizmu. T. 6 [Cybernetics in the Service of Communism, Vol 6 -- Collection of Works], Moscow, Energiya Press, 1971, pp 65-82, (Translated from Referativnyy Zhurnal, Kibernetika, No 10, 1971, Abstract No 10 V719 by D. Epshteyn).

Translation: A linear dynamic production model is studied, considering the differentiation of lags in construction and startup of facilities by branches. The controls used are vectors of the total output and planned increases in capacities of enterprises. Calculations using this model were performed for six branches. Linear change in coefficients of expanses with time are suggested. The goal function expresses the mean deviation for consumer goods from a certain fixed level (with a fixed structure) at the end of the plan period. The algorithm is based on the maximum principle. Results of calculations are presented. It is noted that one significant feature of the optimal plan is the creation of reserves and temporary under utilization of capacity.

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USSR UDC 535.34+535.37

YERMOLAYEV, V. L., KAZANSKAYA, N. A., PETROV, A. A., KHERUZE, Yu. I.

"Charge-Transfer Bands in Complexes of Rare-Earth Ions With Aromatic Acids"

Leningrad, Optika i Spektroskopiya, Vol 28, No 1, Jan 70, pp 208-210

Abstract: The authors studied the electron absorption spectra and luminescence of solutions of complexes of rare-earth ions with aromatic acids (benzoic acid, o-hydroxybenzoic acid, 2,4-dihydroxybenzoic acid, o-methoxybenzoic acid, phthalic acid, anthranilic acid, dimethylanthranilic acid) in methanol at 293° K. The absorption spectra of complexes of europium with salicylic, $\beta$-resorcylic, and anthranilic acids and samarium with $\beta$-resorcylic acid revealed additional long-wave bands which were absent in the same complexes of terbium. The dependence of the position of the new long-wave absorption bands on the reduction potentials of triply charged ions of the rare-earth elements, their width, and intensity indicate that these bands are due to electron charge-transfer transitions from organic ligands to rare-earth ions. The appearance of the charge-transfer bands is accompanied by disappearance of the luminescence of the complexes.

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YERMOLAYEV, V. L., et al., Optika i Spektroskopiya, Vol 28, No 1, Jan 70, pp 208-210

The authors thank A. V. Moshinskaya for preparing the rare-earth nitrates and salicylates.

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UDC: 51:330.115

IVANILOV, Yu. P., PETROV, A. A.

"Dynamic Model of Expansion and Rearrangement of Production ($\pi$-Model)"

V sb. Kibernetiku -- na sluzhbu kommunizmu (Cybernetics to the Service of Communism--collection of works), T. 6, Moscow, "Energiya", 1971, pp 23-50 (from RZh-Kibernetika, No 11, Nov 71, Abstract No 11V751)

Translation: A dynamic model of expansion and rearrangement of production is constructed which accounts for the possibilities of a change in the structure of production due to accretion, conversion of the capacities of one sector for turning out other goods, the possibilities of conserving and deconserving capacities with regard to time lags, noncoincidence of the production cycle in sectors, etc. D. Epshteyn.

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USSR

UDC 621.396.626

PETROV, A.D. (Member, Scientific-Technical Society Of Radio Engineering, Electronics, And Communication imeni A.S. Popov)

"On The Average Interference Immunity Of Space-Diversity Reception During The Effect Of Interference From Extraneous Radio Stations"

Radiotekhnika, Vol 27, No 3, Mar 1972, pp 68-74

Abstract: An evaluation is made of the average interference immunity of space-diversity reception, taking account of the distribution of the average powers of such interference according to the logarithmic--normal law, for which the dependence is determined of the probability of distortions, on the ratio of the average power of the signal to the most probable (median) value of the average powers of the interference of the extraneous radio stations. The advantages of space-diversity reception as compared with individual reception for the case considered are determined, and the dependence of the advantages on the parameters of the distribution of the average powers of the extraneous radio stations is analyzed. The case is also considered where the average power of the signal is random and is distributed according to the logarithmic--normal law. 3 fig. 1 tab. 3 ref. Received 3 Nov 69.



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USSR

UDC 536.22+536.252

VOINOV, O. V., GOLOVIN, A. M., PETROV, A. G., Moscow

"Transfer of Energy from an Evaporating Drop into the Vapor Medium"

Zhurnal Prikladnoy Mekhaniki i Tekhnicheskoy Fiziki, No 1, 1972, pp 74-78.

Abstract: The distribution of temperature around an evaporating drop in a vapor medium is studied. The transfer of energy occurs by molecular heat conductivity, convection and radiation. The mean free path length of radiation is significantly greater than the characteristic distance over which the temperature changes. The times of relaxation of temperature to its stable value and characteristic distances over which temperature distribution changes are determined.

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USSR

UDC 532.529.6

VOYNOV, O. V., PETROV, A. G., Moscow

"Motion of a Sphere of Variable Volume in an Ideal Fluid Near a Flat Surface"

Mekhanika Zhidkosti i Gaza, No 5, 1971, pp 94-103.

Abstract: The problem is studied of the motion of a spherical cavity in a liquid. The radius of the sphere changes under the influence of constant pressure at infinity. The problem of the collapsing of a bubble moving in an unlimited fluid and the collapsing of a bubble near a plane are solved in the precise statement. The presence of initial forward velocity or proximity of a solid surface in contrast to collapsing of a sphere at rest in an unlimited fluid lead to the appearance of a limiting radius, at which the bursting process stops. A sphere initially at rest near a plane always contacts the plane as a result of collapsing. With various initial distances from the plane, the radius and velocity with which the sphere reaches the plane are calculated. A possible mechanism of action of a cavitation bubble on a solid surface is discussed.

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VOINOV, O. V. and PETROV, A. G., Moscow

UDC 532.529

"The Movement of a Small Sphere in a Nonuniform Flow of Incompressible Fluid"

Novosibirsk, Zhurnal Prikladnoy Mekhaniki i Tekhnicheskoy Fiziki, No 5, Sep/Oct 73, pp 57-61

Abstract: For the general case of a small sphere moving in an arbitrary potential flow of ideal fluid, integral equations of movement and a partial solution are obtained. It is shown that the force acting on a small sphere in plane flow is central if, and only if, the derivative of the complex potential is of the form $dW/dz - cd^{\lambda}$, where c is an arbitrary complex number and $\lambda$ is a real number. Movement within a vortex source whose complex potential is c $\log_e z$ is an example.

In calculations for fluids in uniform flow around a cylinder it is shown that particles denser than the fluid can come in contact with the cylinder from a sufficiently close initial point, but lighter spheres cannot. These calculations can be extended to other solids of evaluation. A case of practical interest involves determining the minimum distance at which particles can avoid being sucked into a drain. It can be shown that the number of particles entering the drain per unit time as a function of particle density in the fluid is independent of the velocity of uniform flow.



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UDC 621.357.5.035:621.70.027(088.8)

PETROV, A. I., and RAZUMIKHIN, G. M.

"Device for Protection Against Short Circuiting During the Electrochemical Treatment of Metals"

Author's Certificate No 347144, filed 4 Dec 70, published 21 Aug 72 (from Referativnyy Zhurnal -- Khimiya, No 8(II), 1973, Abstract No 8L289P)

Translation: A device is patented for protection against short circuiting during the electrochemical milling of metals using a circuit for the control of the power supply by silicon resistors. It is improved in that in order to increase the reliability and the simplicity of the instrument it operates as a pick up for spark formation, the input of which is connected to the electrochemical gap and the output to a switch conducting the signal to the multivibrator, switching off and on the corresponding silicon resistors in the power supply.

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USSR

UDC: 621.315.592

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ANDREYEV, V. M., BORODULIN, V. I., KONYAYEV, V. P., PAK, G. T., PETROV, A. I., PORTNOY, Ye. L., SHVEYKIN, V. I., Physicotechnical Institute imeni A. F. Ioffe, Academy of Sciences of the USSR, Leningrad

"Spatial Distribution of Heterolaser Emission"

Leningrad, Fizika i Tekhnika Poluprovodnikov, Vol 6, No 9, Sep 72, pp 1739-1748

Abstract: The paper presents the results of experimental and theoretical studies of the luminous field of emission from a heterolaser in the short range and long range zones for various thicknesses of the active region and outside dimensions of the cavity. The distribution of the luminous field on the mirror face of the cavity crosswise of the active region which was observed in the experiments can be satisfactorily described within the framework of a flat triaxial waveguide model. The angular distribution of heterolaser emission in the plane perpendicular to the heterojunction plane can be treated with a fair degree of accuracy as diffraction of a waveguide wave on the open end of a flat metal waveguide filled with a dielectric. The pattern of the long-range field is symmetric relative to the normal to

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ANDREYEV, V. M., et al., Fizika i Tekhnika Poluprovodnikov, Vol 6, No 9, Sep 72, pp 1739-1748

the mirror. The directions to the principal maxima are determined by the angle of refraction of the partial waveguide plane waves. Modes of increasingly higher orders are stimulated in the active region as its width is increased. The pattern of the short-range field (order of the mode) does not depend on either the cavity length or the pumping. In heterolasers with wide active regions, three-dimensional modes of total internal reflection are stimulated which impair the quantum efficiency and increase the divergence of emission. These modes can be suppressed by increasing the ratio $L/l$, TM modes being suppressed faster.

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USSR

UDC 621.375.82

BORODULIN, V. I., MALYAVKINA, G. M., PAK, G. T., PETROV, A. I., CHERNOUSOV, N. P., SHVEYKIN, V. I., YASHUMOV, I. V.

"Some Properties of Degradation of Heterolasers"

V sb. Kvant. elektronika (Quantum Electronics--collection of works), No 3, Moscow, Soviet Radio, 1972, pp 108-110 (from RZh-Fizika, No 12, Dec 72, Abstract No 12D977)

Translation: An experimental study was made of the catastrophic and slow degradation of heterolasers. It was demonstrated that catastrophic degradation occurs for average light energy flux densities $(2-4)\cdot 10^6$ watts/cm$^2$ and local densities of $10^7$ watts/cm$^2$. Depending on the light energy flux density the service life of the heterolasers can vary from several minutes to 100 hours and more; catastrophic degradation in this case is the limiting case of slow degradation under the effect of radiation. Heterolasers with a radiation power in the pulse of $\geq 10$ watts, a frequency of 6 kilohertz, and a pulse duration of 100 nanoseconds are capable of operating more than 100 hours without a significant reduction in power.

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USSR

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UDC 621.315.592

ALFEROV, ZH. I., ANDRIYEV, V. M., BELOUSOVA, T. YA., NORODULIN, V. I., GORBYLEV, V. A., PAK, G. T., PETROV, A. I., PORTNOY, YE. L., CHERNOUSOV, N. P., SHVEYKIN, V. I., YASHCHUMOV, I. V.

"Effective Injection Heterolasers Operating in the Wavelength Band of 7,400-9,000 Å"

Leningrad, Fizika i Tekhnika Poluprovodnikov, Vol 6, No 3, 1972, pp 568-569

Abstract: Results are presented from a study of the characteristics of effective heterolasers radiating in the wavelength band of 7,400-9,000 Å at room temperature. The n-$Al_xGa_{1-x}As$-p-$Al_yGa_{1-y}As$-$p^+$-$Al_xGa_{1-x}As$ heterojunctions were obtained by epitaxial growth from GaAs-AlAs solutions. All the investigated diodes had a Fabry-Perot resonator. The threshold current density, the external differential quantum efficiency and the radiation power per pulse at 300°K are tabulated for various models of the lasers. Graphs are presented showing the mean values of the threshold current density and the external differential quantum efficiency as functions of the emission quantum energy and the temperature dependence of the external differential quantum efficiency. The threshold current density increases exponentially with an increase in temperature according to the known law [V. I. Leskovich, et al., FTP, No 1, 1440, 1967]. Up to

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USSR

ALFEROV, ZH. I., et al., Fizika i Tekhnika Poluprovodnikov, Vol 6, No 3, 1972, pp 568-569

a temperature of 250° K, the external differential quantum efficiency does not vary, in practice, but then it decreases with temperature. The data demonstrate the possibility of obtaining generation in the continuous mode at 300°K up to 7,700 Å.

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USSR

UDC 621.373.826

PAK, G. T., PETROV, A. I., FAYNBOYM, YE. G., CHERNOUSOV, N. P., SHVEYKIN, V. I., YASHUMOV, I. V.

"Internal Parameters of Injection Lasers at 300° K"

V sb. Kvant. elektronika (Quantum Electronics-- collection of works), Moscow, No 5, 1971, pp 99-101 (from RZh-Radiotekhnika, No 1, 1972, Abstract No 1D350)

Translation: The results of experimental studies of the basic parameters of the active zone of injection lasers based on diffusion and epitaxial p-n-transitions and heterotransitions in the GaAs-AlAs system are described. It is demonstrated that heterolasers with two-sided limitation have better characteristics: the specific amplification coefficient is $10^{-2}$ cm/amp, the inversion current density is 2.1 kiloamps/cm$^2$, and the losses are 26 cm$^{-1}$. There is 1 illustration and a 6-entry bibliography.

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USSR

UDC 621.378.35

GORBYLEV, V.A., PAK, G.T., PETROV, A.I., CHERNOUSOV, N.P., SHVEYKIN, V.I., YASHUMOV, I.V.

"Dependence Of Threshold Of Generation Of Injection Lasers On The Duration Of The Pulses Of The Pumping Current"

Kvantovaya elektronika, Moscow, No 5, May 71, pp 97-99

Abstract: The dependence is experimentally studied of the threshold of generation of injection lasers with diffused and heterogenous junctions in the system GaAs--AlAs on the duration of the pulses of the pumping current in the interval 2--100 nsec. The magnitudes are determined of the effective lifetime of the injected electrons for three types of laser diodes: with diffused p-n junction (~1 nsec), with one heterojunction (~2.5 nsec) and with two heterojunctions (3--6 nsec). The nanosecond pulses of the pumping current in the 2--100 nsec range with a building up front less than 1 nsec were shaped with the aid of a TGI1-8/1 thyratron and dispersed delay lines. The pulse repetition frequency was regulated from 100 Hz to 10 kHz. Received by editors, 22 May 71; after revision, 6 May 71. 2 fig. 1 tab. 6 ref.

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USSR

UDC 669.1:539.375

PETROV, A. I., BETEKHTIN, V. I.

"Time Regularities of Rupture and Creep of Metals in Extension Under Hydrostatic Pressure"

Sverdlovsk, Fizika Metallov i Metallovedeniye, Vol 34, No 1, Jul 72, pp 39-47.

Abstract: Study of the rupture of solids has shown that the time of loading influences the strength of all bodies at various temperatures and is a result of the irreversible, thermal-fluctuation process of rupture (breakage of interatomic bonds). This article presents a study of the time dependence of strength and creep under high hydrostatic pressure. It is shown that the primary regularities of rupture and creep of metals in extension are the same at pressures up to 15,000 atm as at atmospheric pressure. The increase in durability, tensile rupture stress and the decrease in creep rate observed under pressure are explained by the increased value of the energy barrier which must be overcome for the thermal fluctuation process of rupture of the interatomic bonds.

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USSR

UDC 669.14.018.25:621.762

DOROFEYEV, Yu. G., PETROV, A. K., TSIPUNOV, A. G., USTIMENKO, V. I. MARINENKO, L. G., BATENEVA, M. K., and ORLOV, Yu. G., Novocherkassk Polytechnic Institute, Ukrainian Scientific Research Institute of Special Steel

"Structure and Properties of R18 Cermet Steel"

Kiev, Poroshkovaya Metallurgiya, No 2 (122), Feb 73, pp 56-60

Abstract: Results are presented of investigations of the production of R18 high-speed cermet steel from pulverized powders by the method of dynamic hot-pressing. Steel productions using plasticizers and production in thin-sheet metal containers are investigated. The established optimum conditions for dynamic hot-pressing of R18 steel are as follows: heating temperature 1250-1280°C, reduced pressing work 25-30 kgm/cm$^3$, aging time 10 min. The produced steel was practically without pores, it had a homogeneous microgranular structure corresponding to the structure of hardened steel, and it was without carbide liquation. Cutters of R18 cermet steel had a resistance twice as high as that of standard R18 steel. Three figures, seven bibliographic references.

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UDC 621.762.224:669.14.018.253

PETROV, A. K., LEVITIN, V. V., MIROSHNICHENKO, I. S., AKIMENKO, V. B., ANDREYEVA, A. YA., BATENEVA, M. K., GOLOVKO, V. A., LABUNOVICH, O. A., ORLOV, YU. G., and ORMAN, R. Z., Ukrainian Scientific Research Institute of Special Steels, Alloys and Ferroalloys, Dnepropetrovsk State University

"Study of Atomized Powders of High-Speed Steel and Blanks Made of Them"

Poroshkovaya Metallurgiya, No 3, Mar 71, pp 9-14

Abstract: This work was performed in order to study the structure of powders of high-speed steel produced by atomizing of liquid steel with a stream of pure argon applied to a stream of metal through a slit diaphram at a pressure of 6-8 atm. For comparison, one melt was atomized using compressed air at 14-16 atm under industrial conditions. The structure and phase composition of the initial powder, powder after heat treatment, and blanks made from the powder were studied. Blanks produced by

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PETROV, A. K., et al., Poroshkovaya Metallurgiya, No 3, Mar 71, pp 9-14

hydrostatic pressing with subsequent sintering had a fine-grain structure with evenly distributed carbides. The structure corresponded to a hardness of 65 HRC after tempering at 560° and 61 HRC after tempering at 620°. This indicates the possibility of producing blanks from atomized powders of high speed steel.

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Steels

USSR

UDC 620.192.45:669.141.247

LITVINOVA, T. I., RAYCHENKO, T. F., PETROV, A. K., and PIROZHKOVA, V. P., UkrNIIspetsstal' [Ukrainian Scientific Research Institute of Special Steels, Alloys and Ferroalloys]

"Mechanism of Magnesian Spinel Formation in Steels"

Moscow, Stal', No 7, Jul 71, pp 650-653

Abstract: The authors made a detailed petrographic study of cobbings from the working layer of industrial electric-furnace hearths in melts of steels ShKh15, 45G17YuZ, Kh18N10T, 25KhGSA, and 30KhGSNA and studied the phase composition of melting slags and nonmetallic inclusions forming in these steels. In addition, these same brands of steel were obtained under laboratory conditions in a 50-kg induction furnace with a magnesite rammed lining, and iron, manganese, chromium, aluminum, and other metals were smelted in magnesite crucibles with a one-hour holding time. All laboratory melt products (metals, slags, fettling), as well as products of the interaction of the smelted metals with periclase were studied by the petrographic method. Solid solutions and complex chemical compounds were studied by the X-ray analysis method.

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USSR

LITVINOVA, T. I., et al., Stal', No 7, Jul 71, pp 650-653

It was found that the source of magnesian spinel inclusion formation in the steels is the magnesite furnace lining, which undergoes mechanical erosion and is exposed to the chemical action of the main steel components during melting. Results of the petrographic study of the working zone of the furnace hearth, melting slags, and nonmetallic inclusions indicate that the fine-crystalline variety of magnesian spinel inclusions (up to 5 microns) is formed directly in the liquid phase (metal and slag) and that this process develops most intensively during teeming of the steel as a result of reoxidation of the metal (as per the findings of YU. A. SHUL'TE). The presence of periclase relics in the macrocrystalline variety of spinel inclusions (20-40 microns) suggests that the inclusions get into the metal with the slag emulsion. On the basis of the described conditions of formation, magnesian spinel inclusions cannot be grouped as either exogenous or endogenous, but are the product of their interaction with each other.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

USSR

UDC 621.762.224:669.14.018.253

PETROV, A. K., LEVITIN, V. V., MIROSHNICHENKO, I. S., AKIMENKO, V. B., ANDREYEVA, A. YA., BATENEVA, M. K., GOLOVKO, V. A., LABUNOVICH, O. A., ORLOV, YU. G., and ORMAN, R. Z., Ukrainian Scientific Research Institute of Special Steels, Alloys and Ferroalloys, Dnepropetrovsk State University

"Study of Atomized Powders of High-Speed Steel and Blanks Made of Them"

Poroshkovaya Metallurgiya, No 3, Mar 71, pp 9-14

Abstract: This work was performed in order to study the structure of powders of high-speed steel produced by atomizing of liquid steel with a stream of pure argon applied to a stream of metal through a slit diaphram at a pressure of 6-8 atm. For comparison, one melt was atomized using compressed air at 14-16 atm under industrial conditions. The structure and phase composition of the initial powder, powder after heat treatment, and blanks made from the powder were studied. Blanks produced by

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

USSR

~~PETROV, A. K.,~~ et al., Poroshkovaya Metallurgiya, No 3, Mar 71, ~~pp 9-14~~

hydrostatic pressing with subsequent sintering had a fine-grain structure with evenly distributed carbides. The structure corresponded to a hardness of 65 HRC after tempering at 560° and 61 HRC after tempering at 620°. This indicates the possibility of producing blanks from atomized powders of high speed steel.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

1/2 035 UNCLASSIFIED PROCESSING DATE--11SEP70

TITLE--IR SPECTROSCOPIC STUDY OF THE DECARBOXYLATION OF PENTAFLUOROBENZOIC ACID -U-

AUTHOR--PETROV, A.K., BALAKINA, G.G.

P

COUNTRY OF INFO--USSR

SOURCE--IAVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR, NO 2, SERIYA KHIMICHESKIKH NAUK 1970, NR 1, PP 160-163

DATE PUBLISHED--------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--DECARBOXYLATION, FLUORINATED ORGANIC COMPOUND, BENZOIC ACID, REACTION KINETICS, ACTIVATION ENERGY, IR SPECTRUM

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1987/1765 STEP NO--UR/0289/70/000/000/0160/0163

CIRC ACCESSION NO--AP0100345

UNCLASSIFIED

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

2/2 035 UNCLASSIFIED PROCESSING DATE--11SEP70

CIRC ACCESSION NO--AP0100345

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE KINETICS OF THE DECARBOXYLATION OF PENTAFLUOROBENZOIC ACID HAS BEEN STUDIED AT TEMPERATURES ABOVE 200DEGREESC. THE ACTIVATION ENERGY IS 25 KCAL-MOLE. THE DECARBOXYLATION WAS PERFORMED IN THERMOSTATED GAS CELL WITH GLASS WALLS; IN THE COURSE OF THE REACTION, IR SPECTRA WERE MEASURED AT TIME INTERVALS. THE REACTION IS HETEROGENEOUS. IT IS OF ZERO ORDER AND PROCEEDS ON SURFACE OF GLASS. IN THE PRESENCE OF POTASSIUM FLUORIDE, THE DECARBOXYLATION PROCEEDS VIA DECOMPOSITION OF PENTAFLUOROBENZOATE ANION.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

S/019/61/000/003/089/101
A154/A027

AUTHORS: Tarantov, Ye.A., and Petrov, A.M.

TITLE: A High-Speed Motion-Picture Camera

PERIODICAL: Byulleten' izobreteniy, 1961, No. 3, p. 70

TEXT: Class 57a, 61. No. 135756 (638877/26 of September 16, 1959). A high-speed motion-picture camera, containing an objective on whose axis is located a rotary system of mirrors for scanning the image on the film, distinguished by the fact that, in order to increase the probability of recording of the scanning process when taking single pictures, the mirror system of the camera consists of a single double-sided rotating mirror, the distance between whose reflecting surface and rotary axis is small.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

JPRS 59208

6-73

6

X-7. DISTRIBUTION OF ADMIXTURES IN THE EPITAXIAL LAYERS OF GALLIUM PHOSPHIDE ALLOYED WITH SULFUR AND NITROGEN

[Article by D. G. Zabelina, A. M. Petrov, A. N. Pikhtin, D. A. Yas'kov, V. P. Krepkaya, N. M. Artamonova, Leningrad; Novosibirsk, III Simpozium po Protsessam Rosta i Sinteza Poluprovodnikovykh Kristallov i Plenok, Russian, 12-17 June 1972, p 135]

The properties of monocrystalline layers of gallium phosphide alloyed with nitrogen were investigated. The layers were grown by the method of liquid-phase epitaxy in an open system on GaP substrates alloyed with sulfur obtained by the Czochralski method. Alloying with nitrogen was realized by adding gallium nitride from 0.05 to 1 percent by weight to the GaP-Ga melt. The sulfur got into the melt as a result of solution of the substrate.

By using the measurements of the capacitance of the surface barrier at the GaP-Au contact, a study was made of the concentration distribution of the donors with respect to depth of the epitaxial layer. On the films obtained, a study was made of the optical absorption near the edge of the basic band. On the basis of an analysis of the absorption spectra, the nitrogen concentration in the films was determined as a function of the amount of GaN in the GaP-Ga melt. Results are presented from a study of the electroluminescence of the p-n junctions obtained by the diffusion of zinc in the grown layers. The radiation spectra at room temperature contained two bands with 2.24 electron volt and 2.2 electron volt peaks.

The quantum yield of green radiation is $4 \cdot 10^{-3}$%. The brightness of the diodes at a current density of 10 milliamps/mm$^2$ was 30 nits; at 100 milliamps/mm$^2$ it was 1,100 nits.



PETROV, A.M.

APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

USSR

UDC: 621.396.6-181.5

PETROV, A. N.

"Microelectronic Circuits in the SHF Range and Trends in Their Development"

V sb. Vopr. elektron. tekhniki (Problems of Electronic Technology--collection of works), Saratov, 1970, pp 93-99 (from RZh-Radiotekhnika, No 6, Jun 70, Abstract No 6V176)

Translation: The author discusses various aspects of microminiaturization in radio electronics. It is shown that the use of thick films holds prospects for development. Examples are given of developments in the area of integrated SHF circuitry in the United States. Two illustrations, bibliography of 20 titles. N. S.

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APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

USSR

UDC 531

VINOGRADOV, V. A., IVIN, S. M., PETROV, A. S.

"Dynamic Balancing of Rotors Without a Compensation System"

Tr. Ufim. Aviats. In-ta. [Works of Ufim Aviation Institute], 1972, No 38, pp 34-40 (Translated from Referativnyy Zhurnal, Aviatsionnye i Raketnye Dvigateli, No 12, 1972, Abstract No 12.34.117).

Translation: A method is presented for dynamic balancing of rotors without a compensation system. The method utilizes the results of theoretical conclusions, theoretical and experimental studies of the dependences of the phase shift angles of oscillations of supports of a machine tool on the magnitude and location of imbalance. A method is presented for graphic determination of the imbalance in each plane from the signals of sensors in the moving supports. 5 Figures; 2 Biblio. Refs.

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APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

1/2 021 UNCLASSIFIED PROCESSING DATE--16OCT70

TITLE--REACTIVE MODULATION TYPE AMPLIFIER BASED ON A PARAMETRICALLY EXCITED OSCILLATOR CIRCUIT -U-

AUTHOR-(02)-IVANOV, A.N., PETROV, A.S.

COUNTRY OF INFO--USSR

SOURCE--RADIOTEKHNIKA, VOL. 25, MAR. 1970, P. 79-84

DATE PUBLISHED--------70

SUBJECT AREAS--ELECTRONICS AND ELECTRICAL ENGR.

TOPIC TAGS--AMPLITUDE MODULATION, PARAMETRIC OSCILLATOR, ELECTRONIC AMPLIFIER

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1996/1080 STEP NO--UR/0108/70/025/000/0079/0084

CIRC ACCESSION NO--AP0118230

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

2/2 021 UNCLASSIFIED PROCESSING DATE--16OCT70

CIRC ACCESSION NO--AP0118230

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. DESCRIPTION OF A REACTIVE MODULATION TYPE AMPLIFIER (MODERN AMPLIFIER) WHOSE PRINCIPLE OF OPERATION IS BASED ON THE AMPLITUDE MODULATION OF OSCILLATIONS EXCITED PARAMETRICALLY IN THE CIRCUIT AT AN OSCILLATOR FREQUENCY TWICE THE RESONANT FREQUENCY OF THE CIRCUIT. IT IS SHOWN THAT THE MAXIMUM FREQUENCY RESPONSE OF SUCH A AMPLIFIER CAN BE SHIFTED TOWARD HIGHER FREQUENCIES BY CHANGING THE AMPLITUDE OF THE EXCITED OSCILLATIONS. CIRCUIT OPERATION IS ANALYZED BY SOLVING A DIFFERENTIAL EQUATION FOR A CIRCUIT WITH THE NONLINEAR CAPACITY OF A SEMICONDUCTOR DIODE. IT IS SHOWN THAT THE PASSBAND OF THE PROPOSED CIRCUIT IS TWICE AS WIDE AS IN ORDINARILY USED CIRCUITS.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

USSR

P

PETRAKOVSKIY, G. A., PETROV, A. S., TABARIN, V. A.

"Study of an Yttrium Garnet as an Element of a Reactive Modulation Amplifier"

Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, Vol 34, No 6, 1970, pp 1,194-1,196

Abstract: A linear analysis is made of a ferrite-based reactive modulation amplifier by a simultaneous solution of the Maxwell and the Landau-Lifshits equations using the Krylov-Bogolyubov method. An experimental investigation was also made of an experimental model of a reactive modulation video amplifier based on a yttrium garnet. Stable amplification of not less than 30 db was obtained in the band from 1.5 to 4.5 megahertz. Investigation of the noise spectrum of the ferrite confirmed the low-noise factor of the ferrite amplifier.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

29


| | | Page |
|---|---|---|
| Fomchenkov, V. M., Shadrikov, O. A. | Application of the TsTS-19 Piezoceramic for Ultrasonic Scanning of a Laser Beam ..... | 402 |
| Vanetsian, R. A., Lebedeva, L. N., Samylkin, N. I. | Rotation of the Lobes of the Reflection Pattern of Coherent Light on Rotation of the Reflecting Surfaces ..... | 408 |
| Arsen'yan, T. I. | Study of the Statistical Properties of Variations of the Laser Field Intensity on Propagation on a Ground Route ..... | 417 |
| Arsen'yan, T. I., Semenov, A. A. | Analysis of Random Variations of the Laser Field Intensity in the High-Frequency Part of the Spectrum During Propagation in the Troposphere | 420 |
| Gusev, V. G., Vorobeychikov | Study of the Passage of Phase Modulated and Amplitude Modulated Optical Band Signals Through the Atmosphere ..... | 425 |
| Milyutin, Ye. P., Lobkova, L. M., Litvinova, T. P., Chistyakov, A. B. | Experimental Study of Laser Beam Propagation in the Atmosphere ..... | 429 |
| Lobkova, L. M. | Power Fluctuations of Laser Radiation Caused by a Turbulent Atmosphere ..... | 435 |
| Vlasov, G. I., Levin, I. M. | Laser Beam Videoinformation Transmission Range in an Aqueous Medium ..... | 443 |
| Genin, V. N., Kabanov, M. V. | Spatial and Time Characteristics of Atmospheric Noise in the Visible Range of the Spectrum ... | 447 |
| Vaytsel, V. I., Khmelevtsov, S. S. | Holographic Recording Through Random Media ... | 453 |
| Senkevich, B. V., Lysakov, Ye. I., Osipov, Yu. N. | Frequency Stabilization of Laser Emission by the Active Method with the Application of an Auxiliary Heterodyne ..... | 460 |
| Yegorov, Yu. P., Petrov, A. S. | Experimental Measurement of the Natural Radiation Line Width of a Gas Laser with Coupled Types of Oscillations ..... | 464 |
| Sagatov, E. A., Nazarov, A. U. | Correlation Analysis of the Coherence of Laser Emission ..... | 471 |
| Sagatov, E. A., Nazarov, A. U. | Laser Noise During Operation of an Optical Quantum Amplifier ..... | 478 |




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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

# TECHNICAL TRANSLATION

ARM | FSTC-HT-23-2015-72
29 Nov 72

ENGLISH TITLE: PROBLEMS OF LASER BEAM DATA TRANSMISSION PROCEEDINGS OF THE FIRST ALL-UNION CONFERENCE, KIEV, SEPTEMBER 1968

FOREIGN TITLE: PROBLEMY PEREDACHI INFORMATSII LAZERNYM IZLUCHENIYEM

AUTHOR: I. A. DERYUGIN, ET AL.

SOURCE: KIEV ORDER OF LENIN STATE UNIVERSITY IMENI T.G. SCHEVCHENKO

Translated for FSTC by ACSI

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36


| | | Page |
|---|---|---|
| Kuliyev, T. A., Mustel', Ye. R., Parygin, V. N. | Electron-Beam Light Modulator ..... | 234 |
| Mustel', Ye. R., Parygin, V. N., Solomatin, V. S., Baglikov, V. B. | Internal Modulation of a Gas Laser ..... | 239 |
| Pankratov, V. M., Petrova, T. V., Ponomareva, I. P., Fomichev, N. N. | Visible and Infrared LightModulator Based on a Lithium Metaniobate Crystal with 0° Orientation | 248 |
| Pankratov, V. M., Petrova, T. V., Ponomareva, I. P., Fomichev, N. N. | Wide Band Light Modulator Based on a Lithium Metaniobate Crystal with 90° Orientation ..... | 253 |
| Magdich, L. N. | Phase Relations of the Synchronous Mode of Laser Emission with Modulated Dielectric Constant of the Resonator ..... | 258 |
| Deryugin, I. A., Solomko, A. A. | Nonlinear Distortions in Microwave Modulators of Laser Emission ..... | 262 |
| Kovlova, M. M., Nikolayev, I. V. | Utilization of Gallium Arsenide Crystals for Modulation of Radiation with a Wavelength of $\lambda$ = 10.6 microns ..... | 268 |
| Tron'ko, V. D. | Some Types of Faraday Modulators and Their Nonlinear Distortions ..... | 273 |
| Tron'ko, V. D. | Method of Simultaneous Determination of the Frequency Characteristics of the Photoreceiver and Faraday Modulator ..... | 278 |
| Mishchenko, B. P., Oboznenko, Yu. L. | Application of a Refraction Acoustic Cell for Synchronization of the Pulse Laser Emission .... | 280 |
| Samorodov, Yu. D., Belozerov, Ye. G. | Wideband Light Detector ..... | 283 |
| Petrov, A. S., Soldatkin, N. P. | Sensitivity and Inertia of a Photodiode Light Receiver with Parametric Amplifier ..... | 293 |
| Petrov, A. S., Tyul'kov, G. I. | High-Frequency and Low Inertia Photoresistor Light Detector with Superhigh-Frequency Bias ... | 299 |


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# TECHNICAL TRANSLATION

16

FTD | FSTC-HT-23-2015-72

29 Nov 72

ENGLISH TITLE: PROBLEMS OF LASER BEAM DATA TRANSMISSION PROCEEDINGS OF THE FIRST ALL-UNION CONFERENCE, KIEV, SEPTEMBER 1968

FOREIGN TITLE: PROBLEMY PEREDACHI INFORMATSII LAZERNYM IZLUCHENIYEM

AUTHOR: I. A. DERYUGIN, ET AL.

SOURCE: KIEV ORDER OF LENIN STATE UNIVERSITY IMENI T.G. SCHEVCHENKO

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

USSR

UDC 621.791:669.295:621.78.062.3

KUPREYEV, V. P., Engineer, and POLYAKOV, D. A., Candidate of Technical Sciences, PETROV, A. V., Doctor of Technical Sciences, and VORONTSOV, V. V. Engineer

"Change of Protective Medium Composition During Welding of Titaneium in Controlled Atmosphere Chambers"

Moscow, Svarochnoye Proizvodstvo, No 7, Jul 73, pp 24-26

Abstract: Investigation of controlled atmosphere welding of titanium was carried out in an USKS-2 unit with an operating chamber volume of 800 liters, equipped with a vacuum system which provided an operating pressure inside the chamber of 5-6 x $10^{-5}$ mm Hg for 130-140 minutes. During the welding process the concentration of water vapors was measured along with the concentrations of hydrogen, nitrogen, and oxygen. It was established that hydrogen content is increased as a result of the titanium reacting with the water vapors while the oxygen and nitrogen content was decreased. For a constant argon humidity in the chamber the quantity of hydrogen entering into the gas phase was proportional to the time of arc burning and its effective thermal capacity. An increase of water vapor in the argon by factors of 10 and 100 leads to a respective increase of factors of 2 and 4 of the amount of hydrogen entering

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

USSR

KUPREYEV, V. P., et al., Svarochnoye Proizvodstvo, No 7, Jul 73, pp 24-26

into the gas phase, other conditions being equal. 1 figure, 4 tables, 7 bibliographic references.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

USSR

PETROV, A. V., PETROV, V. Ya., SHKATOV, T. N.

"Determination of Probability of Losses of Information in a Buffer Memory Unit"

Moscow, Raboty po Tekhicheskoy Kib rnetike, No 4, 71, pp 24-29

Abstract: A method is suggested for determination of the probability of losses of information in buffer memory, allowing accurate estimation of losses in the system resulting from limited memory volume and limited waiting time. The formulas produced are rather simple and can be used for direct calculation if the probability characteristics of message arrival are known.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

USSR

UDC: 631.551:633.416

PETROV, A. V., All-Union Scientific Research Institute of Fodder

"Pinching Seed Plants of Fodder Beet With MG-T"

Moscow, Khimiya v Sel'skom Khozyaystve, no 11, Nov 70, pp 52-54

Abstract: Described are experiments conducted in 1965, 1966 and 1967 involving chemical pinching of seed plants of fodder beet using MG-T (a water-soluble form of the hydrazide of maleic acid) in concentrations of 0.01, 0.05 and 0.5%. The spraying was done during the mass blooming of the seed plants. For better wetting of the leaves, OP-10, a surface-active substance was added. Observations have shown that pinching fodder beet seed plants with MG-T promotes an increase in the crop of seeds by 1.2-3.0 centners per hectare and improves their sowing qualities. Substitution of chemical pinching for a manual one produced savings of 43 rubles per hectare or 20 man-days. Pinching the seed plants of fodder beet is effective in years with ample precipitations during the blooming period. In arid weather, when the admission of water and nutrients is disturbed, pinching may decrease the share of large seed balls.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

AA0040677 P Petrov, A.V.

UR 0482

Soviet Inventions Illustrated, Section I Chemical, Derwent, 1-70

241581 SHEET STEEL WELDING MACHINE with continuous weld deformation where to improve the weld quality of thin gauge sheet steel, a drum type welding machine was equipped with a semi-cylindrical trough 9 of a small diameter with a slot for the welding electrode 4. During welding, the steel sheets pass round the trough 9: the material expands under the heat and the edges of the sheets are bent downwards which ensures good contact of the welded seam with the backing support.

8.8.66 as 1095074/25-27. A.V.PETROV et alia(8.9.69) Bul 14/18.6.69. Class 21h. Int.Cl.B 23k.

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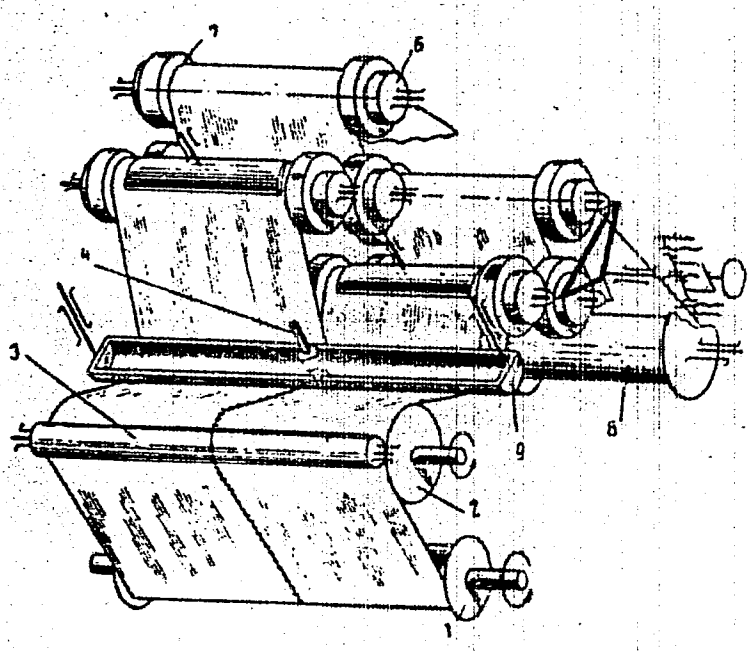
"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

AA0040677

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

AA0040677

AUTHORS: Petrov, A. V.; Slavin, G. A.; Leonov, V. D.; Kuleshov, M. P.; Zhukov, V. F.; Shorokhov, V. I.; and Mitrofanov, B. D.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

USSR

UDC 531.1

PETROV, A. V., Moscow

"Processing of Measurements in Problems of the Stellar Orientation of Space Craft"

Moscow, Mekhanika tverdogo tela, No. 2, Mar/Apr 72, pp 40-43

Abstract: The problem of the stellar orientation of space craft is considered using the Rodrig-Hamilton parameters and a modification of the least squares method, thus making it possible to reduce the computational procedure in solving the problem to a determination of the eigenvector of a symmetric matrix. Formulas are given for calculating the correlation matrix of the errors in determining the Rodrig-Hamilton parameters. It is shown that the use of the Rodrig-Hamilton parameters and an algorithm for determining orientation given in the article makes it possible to reduce the computational procedure to a determination of the maximum of the quadratic form in a unit sphere. The weighting coefficients in the maximized function can be selected so that processing in accordance with the algorithm proposed and processing by the least squares method give results that are close to one another. The error in determining the



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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

USSR

PETROV, A. V., Mekhanika tverdogo tela, No. 2, Mar/Apr 72, pp 40-43

orientation caused by errors of measurement can be estimated with formulas for calculating the correlation matrix of the errors in the Rodrig-Hamilton parameters.

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APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8"

"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

Acc. Nr: A70048616 Abstracting Service: INTERNAT. AEROSPACE ABST. Ref. Code: 5-70 UR0020

P

A70-24268 # Sample modeling of the sun's gravitational field (O vyborochnom modelirovanii polia tiagoteniia solntsa). A. Z. Petrov (Kazanskii Gosudarstvennyi Universitet, Kazan, USSR). *Akademiia Nauk SSSR, Doklady*, vol. 190, Jan. 11, 1970, p. 305-308. 9 refs. In Russian.

Study of the problem of modeling planet orbits and light beams touching the sun in the solar gravitational field. It is shown that Einstein's theory of the solar gravitational field allows approximate sample modeling in a flat space, when the planet orbits and light beams passing around the solar disk are modeled by nongeodesic curves determined by Lorentz type equations of motion in electrodynamics, and the field 'strengths' for this model (like the electromagnetic field tensor) satisfy Maxwell type equations. A.B.K.

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REEL/FRAME
19800343

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

1/2 031 UNCLASSIFIED PROCESSING DATE--02OCT70

TITLE--SPACE MARATHON -U-

AUTHOR-(03)-PARIN, V., PETROV, B., YELISEYEV, A.

COUNTRY OF INFO--USSR

SOURCE--KNIZHNOYE OBOZRENIYE, JULY 3, 1970, NR 27

DATE PUBLISHED--03JUL70

SUBJECT AREAS--BEHAVIORAL AND SOCIAL SCIENCES, SPACE TECHNOLOGY

TOPIC TAGS--MANNED SPACECRAFT, S AND T PUBLICATION/(U)SOYUZ 9 MANNED SPACECRAFT

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1991/1172 STEP NO--UR/0567/70/000/027/0000/0000

CIRC ACCESSION NO--AN0110825

UNCLASSIFIED

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UNCLASSIFIED PROCESSING DATE--02OCT70

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CIRC ACCESSION NO--AN0110825

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE SPACE EXPLOITS OF THE SOVIET SOYUZ 9 WILL BE TOLD IN THE "KOSMICHESKIY MARAFON" (SPACE MARATHON), A COLLECTION OF ARTICLES AND PRESS RELEASES WHICH WILL BE PUBLISHED BY THE "IZVESTIYA" PUBLISHING HOUSE.



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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

UNCLASSIFIED PROCESSING DATE--09OCT70

1/2 046

TITLE--COMMENTS BY ACADEMICIAN PETROV -U-

AUTHOR--PETROV, B.

P

COUNTRY OF INFO--USSR

SOURCE--FBIS DAILY REPORT, SOVIET UNION, 15 JUNE 1970, VOL III, NR 115, P D 6-D 7

DATE PUBLISHED--15JUN70

SUBJECT AREAS--SPACE TECHNOLOGY

TOPIC TAGS--MANNED SPACECRAFT, AEROSPACE PERSONNEL, SPACE STATION, MANNED ORBITAL LABORATORY, UNMANNED ORBITAL LABORATORY, AUTOMATIC FLIGHT CONTROL/(U)SOYUZ 9 MANNED SPACECRAFT

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1990/1614 STEP NO--US/0000/70/003/115/0006/0007

CIRC ACCESSION NO--AP0109625

UNCLASSIFIED

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

2/2 046 UNCLASSIFIED PROCESSING DATE--09OCT70

CIRC ACCESSION NO--AP0109625

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. MOSCOW JUNE 13 TASS ACADEMICIAN BORIS PETROV SAID THAT THE FLIGHT OF THE SOVIET SPACESHIP "SOYUZ 9" IS ANOTHER STAGE IN THE VAST PROGRAMME OF EXPLORATION AND CONQUERING OF OUTER SPACE THAT IS BEING IMPLEMENTED BY THE SOVIET UNION. THE FLIGHT THAT STARTED ON JUNE 1 IS AN IMPORTANT STEP IN PREPARATION FOR NEW MORE COMPLEX FLIGHTS OF SPACESHIPS, IN THE CREATION OF ORBITAL STATIONS THAT WILL MAKE LONG FLIGHTS. THE SOVIET COSMONAUTICS HAS BEEN DEVELOPING ALONG THESE LINES OVER A NUMBER OF YEARS. THE FIRST GROUP FLIGHTS OF THE SPACESHIPS "VOSTOK," THE FIRST SPACE WALK BY ALEXEI LEONOV, THE AUTOMATIC LINK UP "COSMOS" SPACECRAFT AND LATER, THE LINK UPS OF SPACESHIPS "SOYUZ" ARE THE STEPS LEADING TO THE CONSTRUCTION OF ORBITAL STATIONS. THE FIRST EXPERIMENTAL ORBITAL STATION MANNED BY FOUR SOVIET COSMONAUTS THAT WAS SET UP IN JANUARY OF 1969 AND THE GROUP FLIGHT OF SEVEN COSMONAUTS ON THE SPACESHIPS "SOYUZ 6", "SOYUZ 7" AND "SOYUZ 8" MADE IT POSSIBLE TO SOLVE MANY IMPORTANT TASKS OF THE PERFECTION OF SPACE EQUIPMENT, ACADEMICIAN PETROV SAID IN THE INTERVIEW WITH TASS. IN FUTURE, ORBITAL STATIONS WILL BE PUT INTO AN ORBIT PART BY PART BY SEPARATE BOOSTERS AND WILL BE LATER ASSEMBLED IN AN ORBIT THROUGH LINK UP AND OTHER METHODS OF ASSEMBLING. MANY OPERATIONS AND SYSTEMS NECESSARY FOR THIS WERE TESTED AND PERFECTED DURING THE EXPERIMENTS THAT WERE MENTIONED, BORIS PETROV SAID. MAN'S PARTICIPATION IN EXTRATERRESTRIAL RESEARCH HAS VAST PROSPECTS AND THEY WILL GREATLY INCREASE WITH THE CREATION OF LARGE ORBITAL STATIONS.

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USSR UDC 669.187.2

TYURIN, YE. I., and ZHEMCHUZHNYY, M. V., Candidate of Technical Sciences, FEDAN, A. T., Engineer, and PETROV, B. A., Candidates of Technical Sciences, Krasnyy Oktyabr' Plant

"Improvement of Stainless Steel Production Technology"

Moscow, Stal', No 10, Oct 73, pp 895-898

Abstract: Research was conducted by the Krasnyy Oktyabr' Plant jointly with the Volgograd Scientific Research Institute of Machine Building Technology and the Moscow Institute of Steel and Alloys on improving the engineering properties of a number of stainless steels by adding raro-earth metals and microalloying with boron (0.0015-0.0050%). Studies were also performed on the principles of oxidation of impurities in steels baths of varying composition during deep decarburizing using oxygen, and on the features of reducing chromium and iron from the oxides of the high-chromium slag. As a result of this study, an entire series of stainless steels of the austenitic and austenitic--ferritic class was put into mass production, the technology of smelting many stainless steels by a one-slag process was developed and mastered, and the technology of smelting stainless steels with a carbon content less than 0.03%

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USSR

TYURIN, YE. I., et al., Stal', No 10, Oct 73, pp 895-898

is being successfully introduced by the method of remelting tailings with oxygen oxidation. The following persons from the Volgograd and Moscow Institutes have participated in the above mentioned research, which started in 1960: B. S. PETROV, A. F. VISHKAREV, K. I., ANTIPOV, M. N., KUL'KOVA, M. P., SIDEL'KOVSKIY (DECEASED), B. V. IVANOV, YU. V. KRYAKOVSKIY, and N. A. PIROGOV, S. A. BLIZNYUKOV, Candidate of Technical Sciences (Moscow Institute of Steel and Alloys), determined that boron is not a surface-active element on steel Kh23N18 and does not affect the grain boundary state. A. P. OKENKO, Candidate of Technical Sciences, and T. B. SABININA, Engineer, conducted electron microscopy studies of grain-boundary strengthening. Four figures, eight bibliographic references.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

USSR

UDC: 621.316.727

PETROV, B. A.

"A Method of Phase Control"

USSR Author's Certificate No 269282, filed 19 Jul 68, published 14 Aug 70 (from RZh-Avtomatika, telemekhanika i vychislitel'naya teknika, No 12, 1971, Abstract No 12A189P)

Translation: The known methods of phase control use a reference voltage made up of two summed voltages shifted by an angle of $\pi/2$, one of which is the controlling voltage. The proposed method uses, as the second component, the difference voltage between the reference and that voltage which is a function of the controlling and modulated reference voltage, permitting a symmetrical phase characteristic to be obtained and providing a control range from 0 to $\pi$. To stabilize the amplitude of the phase-controlled voltage, use is made of the difference between a constant standard voltage and the rectified first difference voltage mentioned above, as the function of the controlling voltage. The characteristic of the rectified voltage used as the function of the controlling voltage is close to linear. Resume

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Acc. Nr: AP0054067 Ref. Code: UR0531

PRIMARY SOURCE: Khirurgiya, 1970, Nr 4, pp 65-71

# THE TREATMENT OF ACUTE CHOLECYSTITIS

B. A. Petrov, E. I. Gal'perin, N. N. Ivanova

The authors analyze 1173 operations for acute cholecystitis and 100 repeated interventions. During the last years the number of aged and senile patients has risen sharply. Between 1960—1966 the number of operated patients over 60 years of age augmented by 40 per cent. The number of patients with a complicated course of cholecystitis with involvement into the process of the bile ducts, liver and pancreas. In operations at the peak of an attack of acute cholecystitis it is impossible to carry out a meticulous preoperative preparation and during the operation to explore the bile ducts. Such operations are attended by a high mortality and, frequently, by unsatisfactory remote results. Emergency operations should be performed only in manifestations of peritonitis. The majority of patients with acute cholecystitis should be operated 8—10 days after admission after the subsidence of acute manifestations.

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PETROV, B. D.

JPRS 55570
29 Mar 72

UDC: 61(091):[001(091):061.3(100)"1971"

HISTORY OF MEDICINE DISCUSSED AT THE THIRTEENTH INTERNATIONAL CONGRESS ON THE HISTORY OF SCIENCE

[Article by Professor B.D. Petrov, corresponding member of the USSR Academy of Medical Sciences; Moscow, Sovetskoye Zdravookhraneniye, Russian, No 2, 1972, submitted 30 September 1971, pp 80-83]

More than 2,000 scientists from 41 countries participated in the 13th International Congress on the History of Science which convened on 18-24 August 1971, in Moscow. In his opening remarks, B.M. Kedrov, president of the congress, stressed the increasing interest in the history of science. And this is quite understandable, since the history of science itself is more and more facing modern times and its most urgent problems. Hence, the congress adopted the slogan: learn about the past to be guided in the present and anticipate the future.

At all prior congresses much attention had been devoted to the history of medicine. At the 13th congress, there were about 50 papers on this subject from 17 countries, including France, Great Britain, Italy, USA, FRG, the Netherlands, Mexico, Poland, GDR, Bulgaria, Yugoslavia, Romania, Czechoslovakia, Hungary, and the USSR. The following spoke at seven meetings of the section on the history of medicine: P. Guillard and J. Theodorides (France), I. Winter (GDR), G. Lindeboom (Netherlands), G. Bratesku (Romania), M. Grmek (Yugoslavia), V. Ternovskiy, M. Mol'tanovskiy, and P. Zabludovskiy (USSR), Academician Ts. Kristanov and Professor V. Pavlova (Bulgaria), and many other medical historians. The summaries of papers by historians who did not come to the congress were also published: E. Clark (Great Britain), E. Larsen (Norway), C. Leake (USA), M. Madzhmabadi (Iran), T. Watanabe (Japan), A. Georgiyevskiy and N. Ducks (USSR), and others.

A wide spectrum of issues pertaining to different eras, different countries, and people was discussed at the meetings dealing with the history of medicine. About 150 people participated in the discussions.

The paper of Professor V. Pavlova (Bulgaria) about the methodology of history of medicine was heard with great attention. According to her,



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Water Treatment

USSR

UDC 628.34

ZHIVOPISTSEV, V. P., PETROV, B. I., and PONOSOV, I. N.

"Concentration of Radiochemical Research Wastes and Radioactive Decontamination of Waste Water by Using Diantipyrylmethane"

Leningrad, Radiokhimiya, Vol 12, No 4, 1970, pp 631-635

Abstract: The authors investigated diantipyrylmethane extraction of elements into chloroform in an thiocyanate system using elimination of cobalt from the waste solutions of radiochemical research as a specific example. It was shown that diantipyrylmethane is an effective extracting agent for Co-60, and it can be used for extraction and separation of radioactive elemnts and decontamination without a carrier. A method was developed for radioactive decontamination of water solutions accumulated in the process of radiochemical research and containing radioactive cobalt and other elements which are capable of forming fairly stable metal-thiocyanate complex anions (tin, iron, zinc, molybdenum, zirconium).

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USSR

UDC: 550.834

SHEKHTER, Z. Kh., OOKOLOV, G. S., PETROV, B. I., LERNER, B. L., DADERKO, Yu. R., BARYSHNIKOV, G. P., Special Design Office of Seismic Instrument Building

"A Device for Registration of Seismic Information in Digital Form"

Moscow, Otkrytiya, Izobreteniya, Promyshlennyye Obraztsy, Tovarnyye Znaki, No 23, Aug 72, Author's Certificate No 346694, Division G, filed 20 Aug 71, published 28 Jul 72, p 188

Translation: This Author's Certificate introduces a device for registration of seismic information in digital form. The device contains amplifiers in accordance with the number of channels, a multiplexer, an analog code converter, a single-channel digital plotter, and a single-channel playback circuit. As a distinguishing feature of the patent, in order to simplify computer input of recorded seismic information, and to visualize recorded data by means of a single-channel playback device through sequential path-by-path representation of multichannel seismic data in serial digital code on a single track of the magnetic tape, a code converter and an intermediate memory module are added. The code converter

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USSR

SHEKHTER, Z. Kh. et al., USSR Author's Certificate No 346694

has a single input connected to the output of the analog code converter, and several outputs of demultiplexed signals in serial code to equal the number of seismic channels. In the registration mode, each of the converter outputs is connected through a commutator to its own section of the intermediate memory. In the mode of path-by-path transcription of signals from the intermediate memory to a single track of the magnetic tape and to the visible information medium, the sections of the intermediate memory which each have their own corresponding seismic recording path are connected to the main head of the digital plotter and to the input of the single-channel playback circuit through the same commutator used for sequential switching of these signal sections.

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USSR

UDC 621.382.3.029.6

PETROV, B. K., KOCHETKOV, A. I., SYNOROV, V. F.

"Calculating the Stationary Temperature Fields in Overlay Superhigh Frequency Transistors"

Moscow, Radiotekhnika i elektronika, Vol 17, No 10, 1972, pp 2176-2181

Abstract: The stationary temperature distribution in the semiconductor crystal of transistors with band emitters was first calculated in the two-dimensional approximation [W. R. Wilcox, IEEE Trans. Electron Devices, ED-10, 5, 308, 1963], and later a simple formula was obtained [V. F. Synorov, et al., Radiotekhnika i elektronika, Vol 16, No 6, 1090, 1971] for the thermal resistance of the crystal in supernigh frequency overlay transistors. In the two-dimensional approximation the heat fluxes from the edge emitters in the direction of the Oy axis were neglected, and the emitter bands were considered infinitely long. Now the equation of thermal conductivity has been solved to obtain the stationary temperature distribution $R_T$ and the formula for the thermal resistance of the semiconductor crystal of a superhigh frequency overlay transistor for the more general case of a three-dimensional heat flux. A numerical example of calculating the thermal resistance of a crystal for a standard powerful superhigh frequency silicon transistor is presented to compare the two-dimensional and three-dimensional theories. In real instruments the temperature drop within the emitter area is highly significant (≈50%).

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USSR

PETROV, B.M.

UDC 621.371

"Diffraction Of Electromagnetic Waves At Reflectors With Parameters Periodic In Time"

Kiyev, Izv. VUZ:Radioelektronika, Vol XVI, No 2, Feb 1973, pp 52-59

Abstract: The paper studies a field which is diffracted at reflectors, the surface impedance of which is modulated in time according to periodic laws with frequencies considerably smaller than the frequency of the incident field. The method of integral equations is used. Expressions are obtained which determine the time harmonics of the surface currents and the scattering fields for an impedance cylinder. The results are presented of calculations of the spectral characteristics of a scattering field in the long-distance zone for a one-position radar system for the case when the width of the impedance band at the cylinder equals 0.1 $\lambda$. An experimental check of the calculated relations was made for Type TE waves with $\lambda$ = 10 cm. 5 fig. 11 ref. Received by editors, 9 April 1971; after revision, 7 October 1971.

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Mining, Petroleum, Geological

USSR

UDC 551.242.51:551.82(470.32)

PETROV, B. M., Territorial Geologic Administration of the Central Regions, Ministry of Geology, RSFSR

"Lower Proterozoic Structure of the Kursk Magnetic Anomaly Territory and Some Features of its Evolution"

Moscow, Geotektonika, No 1, Jan-Feb 73, pp 42-54

Abstract: Available data is said to indicate that the seam downwarp of the Kursk magnetic anomaly is a paleoavlakogen, rather than formed by a geosynclinal process, as other authors maintain. In fact this avlakogen is more typical than that of the west Aldansky shield. The paleoavlakogen is considered to have been laid due to the development of regularly constructed fault dislocation systems in the raised portions of the protoplatform already possessing a certain degree of consolidation. Branching of the downwarp is often found at the ends, analogous to the branching of the graben system at the ends of the real avlakogen of the Neogaea. The paleoavlakogen is said to have been laid in two phases, north-east and south-west, confirmed by structural tectonic analysis. The raised protoplatform has a mosaic depression crest character of approximately ovla forms with dimensions about 100 km. These depressions are complicated by

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PETROV, B. M., Geotektonika, No 1, Jan-Feb 73, pp 42-54

oval and bean-shaped depressions of the second order with dimensions about 10 km. Second order depressions may have gneiss-edged domes. These characteristics seem connected to the remobilization and granitization of the foundation of the protoplatform.

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Radar

USSR

UDC: 538.574.4

PETROV, B. M.

"Spectral Characteristics of the Fringing Field of a Uniformly Advancing and Rotating Impedance Cylinder"

Moscow, Radiotekhnika i Elektronika, Vol 17, No 9, Sep 72, pp 1799-1806

Abstract: The author solves the following problem of scattering of electromagnetic waves by a moving rotating cylinder with nonuniform surface impedance. An infinite circular cylinder moves at a given velocity in a direction normal to its own axis while simultaneously rotating about its axis at a given constant velocity in an inertial coordinate system introduced into free space. A plane monochromatic electromagnetic wave of a given frequency is incident on the moving cylinder. Impedance boundary conditions are satisfied on the surface of the cylinder in the coordinate system in which it is at rest. The problem is to find the fringing field of the cylinder which satisfies Maxwell's equations, the boundary conditions on the cylinder, and the condition of radiation in the inertial coordinate system. It is found that the fringing field in the long-range zone has a harmonic spectrum, and

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PETROV, B. M., Radiotekhnika i Elektronika, Vol 17, No 9, Sep 72, pp 1799-1806

that the difference between frequencies of adjacent harmonics is determined by the rotational velocity of the cylinder, the velocity of translational motion, and the angle between the direction of advancing motion and the direction to the point of observation of the fringing field. The amplitudes of the harmonics depend on the nonuniformity of the surface impedance of the cylinder, and the fringing field spectrum broadens with an increase in nonuniformity. The width of the spectrum may even surpass that which is accounted for at present in radio ranging of rotating objects. The fringing patterns of the harmonic components depend on the surface impedance, rotational velocity and radius of the cylinder.

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USSR

PETROV, B. M.

UDC: 538.56

"Scattering of Electromagnetic Waves by a Rotating Metal Cylinder"

Kiev, Izvestiya VUZov, Radioelektronika, Vol 15, No 1, Jan 72, pp 13-21

Abstract: The author formulates and solves the problem of finding the field scattered by an infinite cylinder of fixed radius uniformly rotating and moving at a constant velocity in a direction normal to the axis when a plane monochromatic electromagnetic wave is incident on the surface of the cylinder. It is shown that the scattering field is a complex function of time in the general case, and may be considered monochromatic in the long-range zone. The monochromaticity of the field is experimentally verified. Four figures, bibliography of five titles.



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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

USSR UDC: 538.574.4

PETROV, B. M.

"Electromagnetic Wave Dispersion by a Moving and Rotating Cylinder"

Moscow, Radiotekhnika i elektronika, No 11, 1970, pp 2220-2228

Abstract: This study is conducted with regard to radar used to observe moving and simultaneously rotating bodies. To clarify the characteristics of the dispersion field of a monochromatic electromagnetic wave, the author considers the problem of an incident plane wave on an infinitely long cylinder rotating around its own axis. In his analysis he postulates two coordinate systems, one fixed in space, the other moving with the cylinder at the same velocity as the latter. These systems are connected by the Lorentz transformation. While these two systems are Cartesian, the author introduces still another coordinate system, a cylindrical one, in which the body rotates and in which it remains at rest. Under the assumption that the cylinder moves through a distance small in comparison with the distance to the point of observation during the observation period, the author derives expressions for the dispersion field in the far zone. He also describes experiments he performed to verify his conclusions, one of which is that the far-zone dispersion field has a discrete infinite frequency spectrum. 1/1



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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

USSR UDC: 629.78

PETROV, B. N., GANIN, I. A., MITROSHIN, E. I., OLEYNICHENKO, L. G., UKOLOV, I. S., USSR

"Selecting Parameters for a System to Control Descent of a Spacecraft in the Case of Random Variations of Atmospheric Density"

Moscow, Trudy IV Mezhdunarodnogo simpoziuma IFAK po avtomaticheskomu upravleniyu v prostranstve, Dubrovnik, Jugoslavia, Sep 1971, Vol 2, pp 5-11

Abstract: The authors examine a method of constructing a control system for safe descent of a space vehicle in the earth's atmosphere. The approach to solution of the problem of descent control is based on analysis of systems with variable structure: i. e., systems in which the control law is a linear combination of coordinates with stepwise variable coefficients depending on the state of the system. The main coordinates of the system are independent of external perturbations, including variations of atmospheric density and deviations of the aerodynamic characteristics of the descent craft.

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USSR UDC 629.76/.78.015:533.6

PETROV, B. N., VLASOV, A. G., MITROSHIN, E. I., UKOLOV, I. S.

"Stochastic Optimal Control System Under Entry Into the Atmosphere With Second Cosmic Velocity"

V sb. Upravlenive v kosmose. T. 1 (Control in Space. Vol 1 -- Collection of Works), Moscow, "Nauka", 1972, pp 32-40 (from RZh-Mekhanika, No 3, Mar 73, Abstract No 3B345)

Translation: The problem of the optimal control of the perturbed motion of a descending space ship is discussed in the stochastic approximation. 6 ref. Authors' abstract.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

USSR

PETROV, B. N., PETROV, V. V., ULANOV, G. M., AGEYEV, V. M., ZAPOROZHETS, A. V., USKOV, A. S., KOCHURIEVSKIY, I. D.

"Origin of the Information Theory of Control"

Tr. IV Vses. Soveshch. po Avtomat. upr., 1968. Teoriya Avtomat. upr. [Works of Fourth All-Union Conference on Automatic Control, 1968. The Theory of Automatic Control], Moscow, Nauka Press, 1972, pp 145-154, Discussion 256-262 (Translated from Referativnyy Zhurnal, Kibernetika, No 3, Moscow, 1973, Abstract No 3 V277 by the authors).

Translation: This work studies the information characteristics of control processes of general form. The conclusion of information characteristics is based on thresholds of differentiability of states of an object of control at a given level of organization, introduced by the authors. The information conditions of basic modes of control and regulation are studied, including stabilization of the states of a control object, reproduction of required states and information conditions of invariance (absolute and with accuracy to ε). General equations are produced for the balance of enthalpy, corresponding to the basic modes of control. A general analogy is discovered between problems in statistical physics and information processes in control. Examples are presented of the design of control systems by the methods suggested. 12 Biblio. Refs.

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"APPROVED FOR RELEASE: 09/17/2001 CIA-RDP86-00513R002202410020-8

USSR UDC 629.7.05.001.2(082)

Petrov, B. N., Butkovskiy, V. Yu., Kretova, I. N., Zemlyakov, S. D.

PRINTSIPY POSTROYENIYA I PROYEKTIROVANIYA SAMONASTRAIVAYUSHCHIKHSYA SISTEM UPRAVLENIYA (Principles of Building and Planning Adaptive Control Systems) Moscow, "Mashinostroyeniye" 1972, 260 pp, illus, biblio, 5,300 copies printed

The book presents a brief analysis of the principles of building, the fundamentals of planning, methods of synthesizing and computing model-reference ("nontracking") adaptive control systems, which are most widely used in flight control of aircraft.

The book is intended for use by engineers and scientific workers engaged in the planning of automatic control systems, and can also be of use to students in the advanced courses at the VUZ level.

No mention is made of any particular ACS for any specific aircraft or missile system. The various types of adaptive systems are illustrated by block diagram only.

The first 99 items in the 124-item bibliography are Russian-language sources, the remaining 25 items are English-language sources.

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PRINTSIPY POSTROYENIYA I PROYEKTIROVANIYA SAMONASTRAIVAYUSHCHIKHSYA SISTEM UPRAVLENIYA (Principles of Building and Planning Adaptive Control Systems), Petrov, Rutkovskiy, Kruteva and Zemlyakov, Moscow, 1972, 260 pp

Contents


| | | |
|---|---|---|
| Foreword | | page 5 |
| Introduction | | 7 |
| Chapter I. | The Basic Circuit and Information In Model-Reference (Nontracking) Adaptive Control Systems | 16 |
| Chapter II. | Adaptive Systems With Information On Frequency Characteristics | 63 |
| Chapter III. | Model-Reference Adaptive Control Systems | 103 |
| Chapter IV. | Nontracking Adaptive Control Systems With Time-Characteristic Monitoring | 188 |
| Chapter V. | The Adaptive Properties of Certain Adaptive Systems | 225 |
| Bibliography | | 251 |


2/2



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ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THEORETICAL ANALYSIS OF SPACECRAFT REENTRY TRAJECTORY CONTROL WITH THE AID OF ACCELERATORS MOUNTED ON A GYROSTABILIZED PLATFORM AS FLIGHT INFORMATION SOURCES. REENTRY TRAJECTORIES WITH LATERAL VELOCITIES BEING ONLY SMALL FRACTIONS OF LINEAR VELOCITIES ARE CONSIDERED. EQUATIONS ARE DERIVED TO DESCRIBE A STOCHASTIC OPTIMAL REENTRY CONTROL SYSTEM. ALSO ESTIMATED IS THE ACCURACY AND COMPLETENESS OF REENTRY TRAJECTORY DATA OBTAINED WITH THE AID OF A KALMAN FILTER. A COMPUTER ALGORITHM IS DEVELOPED FOR SPACECRAFT REENTRY TRAJECTORY OPTIMIZATION.

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