

USSR

WFO: -8.14

ARAYS, Ye. A., SIBIRYANOV, G. V., SHUTENKO, A. V.

"Interpretation System for Solving Large Problems"

V sb. Vopr. programmir. i avtomatiz. proyektir. (Problems of Design Programming and Automation--collection of works), Tomsk, Tomsk University, 1971, pp 37-43 (from RZh-Kibernetika, No 1, Jan 72, Abstract No IV1010)

Translation: The authors describe the "Reader" interpretation system specialized for solution of large problems on the BESM-4 computer. The component parts of the Reader system are: a) a library of standard operators; b) a table of characteristics; c) the working board; d) the Reader interpretation program. The characteristic of each operator appearing in the library of standard operators is comprised of: the octal number of the operator, the instruction for use of the operator, and its description. The table of characteristics contains information on each operator in the library of standard operators. The working board is a section of the core store in which the standard operators are located. It is noted that the given system does not eliminate possibilities for simultaneous use of the conventional IS-2 interpreting system.

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UDC: 8.74

ARAYS, Ye. A., SHUTENKOV, A. V.

"Solution of Problems of Linear Algebra in the Auto-Analitik System"

V sb. Vopr. programmir. i avtomatiz. proyektir. (Problems of Design Programming and Automation--collection of works), Tomsk, Tomsk University, 1971, pp 191-196 (from RZh-Kibernetika, No 1, Jan 72, Abstract No IV1053)

Translation: An algorithm is described for solution of the following matrix problems of linear algebra in symbolic form in the Auto-Analitik system: 1) a matrix is given whose elements may be both numbers and analytical expressions. It is necessary to determine the rank and determinant of the matrix; 2) the matrix of coefficients of some system of linear equations is given. It is necessary to solve this system; 3) the initial matrix gives a system of  $m \times n$ -dimensional vectors. It is required to isolate an independent subsystem of vectors from the given system; 4) it is required to write out with respect to the predetermined number  $k > 0 (k < m, k < n)$  a system of equations whose satisfaction results in vanishing of all determinants of order  $k$  in the initial matrix; 5) it is

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ARAYS, Ye. A., SHUTENKOV, A. V., Vopr. programmir. i avtomatiz. proyektir., Tomsk, Tomsk University, 1971, pp 191-196

required to find a matrix which is the inverse of the initial matrix. The principal cycle of transformations for solving the problems enumerated above is reduction of the matrix to triangular form. A modified method (the equivalent matrix method) is used as the reduction procedure. It is noted that the program which realizes the described algorithm can be used with matrices of order (70 x 70). The program for formulating the given problems is made up in the form of an operator in the Auto-Analitik system (BESM-6) under the general title PAL (Programs of Algebra, Linear).  
V. Mikheyev.

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USSR

UDC: 6.71

ABAYS, Ye. A., DMITRIYEV, V. M.

"Program for Modeling and Analysis of Radio Electronic Circuits (MARS-1)"

V sb. Vopr. programmir. i avtomatiz. proyektir. (Problems of Design Programming and Automation--collection of works), Tomsk, Tomsk University, 1971, pp 65-79 (from Elektronika, No 1, Jan 72, Abstract No 1V1065)

Translation: The authors describe principles and algorithms for analyzing the characteristics of AC and DC circuits, including algorithms for calculating sensitivity and finding the frequency responses of the circuits, and statistical analysis of electronic circuits. A. Doroshenko.

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UDC: 8.74

ARAYS, Ye. A., DMITRIYEV, V. M.

"Program for Modeling and Analysis of Radio Electronic Circuits (MARS-1)"

V sb. Voпр. programir. i avtomatiz. proektir. (Problems of Design Programming and Automation--collection of works), Tomsk, Tomsk University, 1971, pp 44-64 (from RZh-Kibernetika, No 1, Jan 72, Abstract No IV1066)

Translation: A program is described for modeling and analysis of electronic radio circuits by means of a computer designed to aid the planner with the analytical part of his work. The basic purpose of the program is to predict the behavior of an electronic circuit modification selected by the designer on the basis of its mathematical model. The program provides for: 1) analyzing electronic circuits in the constant and steady-state mode; 2) analyzing transient processes in the circuit; 3) carrying out various statistical studies (evaluating the effect of scatter in parameters and aging of elements, analyzing circuit reliability, analyzing the sensitivity of the circuit to variations in its internal parameters). In addition to circuits with DC signals, the program can be used for analyzing circuits whose supply source is a trapezoidal pulse, a sinusoidal

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ARAYS, Ye. A., DMITRIYEV, V. M., Vopr. programir. i avtomat. proyektir.  
Tomsk, Tomsk University, 1971, pp 44-64

signal, a linearly modulated sinusoidal signal, a damped exponential signal, or a signal whose shape is given in tabular form. The MARS-1 program is designed for operation with linear DC models and with linear AC steady-state models, including pulse circuits. The MARS-1 algorithms are based on methods of circuit analysis: the method of loop currents, the method of junction potentials, the sectional method and a combination method. The MARS-1 program is formulated on the basis of the "Reader" interpretation system for solution of large problems. Bibliography of ten titles. V. Mikheyev.

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ARBATSKAYA, Yu. D.

INSTRUCTION ON EXPERT MEDICAL EVALUATION OF DISABILITY AT MEDICAL INSTITUTES AND INSTITUTES FOR THE ADVANCED TRAINING OF PHYSICIANS

Article by Yu.D. Arbat'skaya, O.L. Babonova, Yu.G. Gromova, Chair of Expert Medical Disability Certification (headed by doctor Yu.D. Arbat'skaya), Central Institute for the Advanced Training of Physicians (vice-chancellor V.B. Kovtunin); Moscow, Sovetskoye Zdravoohraneniye, No. 10, 1971, submitted 28 April 1971, pp 45-51

So: SPAS 54514  
12 MAY 71  
ADDC: 614-030, 456; 1378, 661+614, 754; 655, 386, 3, 0

It is of great national importance to improve the quality of medical evaluation of disability under present conditions. The success of work pertaining to prevention of disease and disability, of rational spending of social insurance funds, and of preserving skilled personnel in industry relies on proper expert evaluation of temporary and lasting disability. However, practice has shown that physicians often make many errors in making expert evaluation of disability. For example, in 1967, 10.2 percent of the patients were referred to MEK [Medical Commission for Determination of Disability] without justification, and in some oblates and republics the percentage reached 30.

The achievements of Soviet public health care are closely linked with comprehensive and proper training of students at medical institutes. For this reason, one of the forms of advanced training of physicians at our institute are seminars for the professors and instructors of medical institutes, which have been held as a part of the curriculum since 1955. We know that qualified training of instructors is very important. There are a number of works dealing with organization, methods of conducting, and effectiveness of such seminars (A.D. Kovrigina; M.V. Korov'ev and L.A. Savel'yeva; V.S. Poyanov and N.B. Shul'pin; V.B. Antonovitch; V.S. Butrov; M.Ye. Sokhranova; A.F. Speranskiy and A.N. Sheina; N.B. Krashov et al.; R.Ye. Peterson et al., 1970, and others).

A very special place belongs to seminars and symposiums for instructors at higher medical institutions and institutes for the advanced training of physicians (A.D. Kovrigina, 1969) at our institute. The WHO pays much attention to the training of instructors who teach future medical, so that this was discussed extensively in 1969, in Geneva, at a meeting of WHO representatives (V.N. Butrov, 1970).

ARBACHYOUSKENE, N.A.

mathematics

STUDY OF STOCHASTIC APPROXIMATION ALGORITHM BY THE MONTE CARLO METHOD USED TO ESTIMATE THE WEIGHT FUNCTION

N. A. Arbachyouskene (Kazans)

The estimation of the weight function of a linear dynamic system by the method of stochastic approximation is analyzed for the case when the number of results of observations is finite. Estimates of the vector of weight coefficients B are calculated using the formula:

$$B_{i+1}(t) = B_i(t) + \gamma(t) [z(t) - F_i(t) R_{i+1}(t)] F_i(t) \quad (1)$$

where  $B_i(t)$  is an estimate of the vector weight coefficient B ( $B_0, B_1, \dots, B_i$ );  $F_i(t)$  is the input signal;  $F_{i+1}(t) = (F_i(t), F_i(t) - 1) \dots F_i(t) - 1$  is the vector of the input signal;  $z(t)$  is the output signal observed with noise, i.e.,  $z(t) = x(t) + n(t)$ ;  $n(t)$  is the noise at the output of the object;  $\gamma(t)$  is a series of positive numbers, satisfying the condition  $\sum_{i=0}^{\infty} \gamma(t) = \infty$ ,  $\sum_{i=0}^{\infty} \gamma^2(t) < \infty$ .

$L$  is the iteration number,  $L$  is the number of components of vector B and F. A sufficiently precise estimate of vector  $B_{L+1}$  by the method of stochastic approximation, particularly with a high noise level, can be produced only after a tremendous number of iterations ( $10^4 - 10^5$ ). The determination of this great number of points of realizations of input and output signals requires a great deal of time. Therefore, the possibility is studied of using a repeated listing algorithm, the theoretical basis of which was provided by B. N. Litvakov.

The accuracy of restoration of a parameter in a limited number of iterations depends on the statistical characteristics of the input signal  $F(t)$ , noise level  $n(t)$  and the selection of a tuning step length  $\gamma(t)$ . Only parameter  $\gamma(t)$  can be changed freely.

Investigation by the Monte Carlo method allowed certain specifics of the algorithm with repeated listing to be established. The influence of the following factors on the accuracy of estimation was determined: a) input signal; b) correlation function; c) noise at the output of the object; d) number of re-



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UDC: 51

SYROV, Yu. P., CHURKVEIDZE, Sh. S., ARBATSKIY, G. M., TRUFANOV, V. V.

"On Optimizing Intersectoral and Interregional Communications in Planning the Development of a United National Economic System"

Sb. tr. In-t mat. Sib. otd. AN SSSR (Collected Works. Institute of Mathematics, Siberian Department, Academy of Sciences of the USSR), 1971, vyp. 2(19), pp 138-168 (from RZh-Kibernetika, No 4, Apr 72, Abstract No 4V501)

[no abstract]

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USSR

UDC 621.319.4.002.5

PSHENICHNYY, I. S., NIKITIN, V. A., YAKUSHEV, S. G., BUDKIN, I. A.,  
ALEKSEYEV, V. L., ARBUZOV, A. D.

"A Device for Applying Silver Paste to Ceramic Disc Capacitor Blanks"

Moscow, Otkrytiya, izobreteniya, promyshlennyye obraztsy, tovarnyye znaki,  
1970, No 33, Soviet Patent No 285112, class 21, filed 8 May 69, published  
29 Oct 70, p 58

Translation: This Author's Certificate introduces a device for applying silver paste to ceramic disc capacitor blanks. The unit contains a rotating disc for transporting the blanks. Around the periphery of the disc are multiple-place cartridges with rockets for the blanks. The device also contains a mechanism for applying the paste to the blanks which is fitted with punches. Also included in the device are a drying chamber and a drive mechanism. As a distinguishing feature of the patent, the precision and productivity of the device are improved by placing hollow split sleeves with spring-loaded lugs in the cartridge pockets. Rods fit into these hollow sleeves and open them, and the punches are located on both sides of the cartridges.

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USSR

UDC 542.91:547.1'118

ARBUZOV, A. Ye. (deceased), VALITOVA, F. G., GAZETDINOVA, N. G.,  
and PETROVA, L. P., Institute of Organic and Physical Chemistry  
imeni A. Ye. Arbuzov, Academy of Sciences USSR, Kazan'

"Alpha-Phenyl-beta-diethyl(diphenyl)phosphonohydrazines"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 7,  
Jul 73, pp 1646-1648

Abstract: Upon the reaction in dry benzene of the chlorides of diethyl and diphenyl phosphate with unsymmetric sodium phenylhydrazine, alpha-phenyl-beta-diethylphosphonohydrazine (I) and alpha-phenyl-beta-diphenylphosphonohydrazine (II), respectively, were obtained instead of the expected alpha-phenyl-alpha-diethyl (diphenyl) phosphonohydrazines. The reaction of I and II with phthalic acid dichloride in dry benzene in the presence of  $\text{Et}_3\text{N}$  led to the formation of 2-phenyl-3-diethylphosphono- and 2-phenyl-3-diphenylphosphono-1,4-phthalazinedione, respectively.

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USSR

UDC: 632.95

ARBUZOV, A. Ye., VALITOVA, F. G., and BAYGIL'DINA, S. Yu., Institute of Organic and Physical Chemistry im. A. Ye. Arbuzov)

"A Method for Preparing Diphenylthiophosphonhydrazines"

USSR Author's Certificate No 256761, filed 3 May 67, published 13 Apr 70 (from RZh-Khimiya, No 22, 25 Nov 70, Abstract No 22 N651 P by G. V. Kuznetsova)

Translation: These substances with the formula  $R_2P(S)NHNPh_2$  (I) (R=alkosyl, aryloxy group or aryl) are obtained from the reaction of  $R_2P(S)X$  (X=halide) with  $Ph_2NNH_2$  (II) in a medium of polar solvents. A solution of 9.2 g of  $(EtO)_2P(S)Cl$  in 25 ml of MeCN is added to a solution of 18 g of II in 15 ml of MeCN after which the mixture is left to stand for several days. The re-precipitated hydrochloride of II is filtered out and the solution is evaporated to an oil which is treated with ether. The residue of II hydrochloride is separated and after the ether evaporates an oil is obtained which crystallizes at  $-10^\circ$ . The yield of I (R=OEt),  $C_{15}H_{12}N_2O_2PS$ , is 61%, melting point  $69-70^\circ$ . I (R=OPh),  $C_{24}H_{21}O_2PS$ , are prepared in a similar fashion, yield 66%, oil; and

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AREUZOV, A. Ye., et al, USSR Author's Certificate No 256761, filed 3 May 67, published 13 Apr 70 (from RZh-Khimiya, No 22, 25 Nov 70, Abstract No 22 N651 P by G. V. Kuznetsova)

I (R2Ph),  $C_{24}H_{21}N_2PS$ , yield 24%, melting point  $153-4^{\circ}$  (absolute alcohol), along with 65%  $\angle Ph_2(S) \angle_2 O$ ,  $C_{24}H_{20}OP_2S_2$ , melting point  $200-2^{\circ}$  (PhMe). I can be used as physiologically active substances.

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USSR

UDC 547.26'11

VIZEL', A. O., KRUPNOV, V. K., ARBUZOV, B. A., and FADEYEVA, L. M., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Academy of Sciences USSR

"Production of 1-Halophospholenes With a Trivalent Phosphorous Atom and Syntheses Based on These Compounds"

Leningrad, Zhurnal Obshchey Khimii, Vol 43 (105), No 10, Oct 73, pp 2137-2143

Abstract: A simple, one stage synthesis of 1-halophospholenes with a trivalent phosphorus has been described based on the reaction of a conjugated diene hydrocarbon with phosphorus trihalide and white phosphorus, best results being obtained with the reagent ratio of 3:1:2. The products are very reactive compounds which could be used in synthesis of novel phospholene derivatives: ethers, thioethers, and amides with trivalent phosphorus; they also react easily with conjugated dienes via a 1-4 cycloaddition, yielding novel spirophosphonium salts. The cyclic phosphonates obtained undergo easily the Arbuzov and Perkov rearrangement reactions.

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USSR

UDC 542.91:547.1.118

ARBUZOV, B. A., NOVOSEL'SKAYA, A. D., and VINOGRADOVA, V. S., Chemical Institute imeni A. M. Butlerov, Kazan' State University imeni V. I. Ul'yanov-Lenin

"Reaction of Some Vicinal Dihalide Compounds With One Electron Accepting Group Containing Sodium Triethyl Phosphite and Diethyl Phosphite"

Leningrad, Zhurnal Obshchey Khimii, Vol 43 (105), No 12, Dec 73, pp 2604-2608

Abstract: The reaction of methyl esters and nitrates of  $\alpha,\beta$ -dichloro- and  $\alpha,\beta$ -dibromopropionic acids with sodium triethyl phosphite and diethyl phosphite was studied at several temperatures [ $-7^\circ$ , to  $-10^\circ$ ,  $+7^\circ$ ,  $+20^\circ$ ,  $+110^\circ$  and  $+150^\circ$ ] as well as the reaction of  $\alpha,\beta$ -dibromodiethyl ester with triethyl phosphite at room temperature. The intermediate and final products were isolated and identified by means of IR spectral data and comparative analysis of physical properties.

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USSR

UDC 661.718.1+547.38+547.514

ARBUZOV, B. A., Member Academy of Sciences USSR; FUZHENKOVA, A. V., ZIN-KOVSKIY, A. F., and SAVCHENKO, L. Ya., Scientific Research Chemical Institute imeni A. M. Butlerov at Kazan' State University imeni V. I. Ul'yanov-Lenin, Kazan'

"The Interactions of Trimethyl Phosphite and Dimethylphosphorous Acid With Phencyclone"

Moscow, Doklady Akademii Nauk SSSR, Vol 199, No 2, 1971, pp 339-341

Abstract: A thermographic study of the addition of  $(MeO)_3P$  to phencyclone showed that this reaction proceeded at a higher temperature (beginning of the exo-effect at 58-62°, maximum at 85-90°) than the addition of  $(MeO)_3P$  to tetracyclone. The reaction also took place with an Arbuzov rearrangement, but not by a nucleophilic attack on the oxygen of the C=O group, as in the case of tetracyclone, but by a nucleophilic attack on the carbon atom of C=O with a subsequent rearrangement into a bipolar ion I, which then rearranged into a bipolar ion II with final isomerization into the end-product dimethyl ester of 2-methoxy-1,3-diphenyl-4,5(0,0'-biphenylene)-2,4-cyclopentadienylphosphonic acid (III), or by a direct attack on the 5-C atom adjacent to C=O with the formation of II. A proof of  
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ARBUZOV, B. A., et al., Doklady Akademii Nauk SSSR, Vol 199, No 2, 1971, pp 339-341

the formation of II was the conversion of II into 1,3-diphenyl-4,5-(0,0'-biphenylene)-4-cyclopentenone-phosphonic acid (IV) by the action of proton-donor reagents, i.e., acetic acid and MeOH. IV could also be obtained by the hydrolysis of III with 1:1 HCl. The addition of dimethylphosphorous to phencyclone resulted in the formation of IV.

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USSR

UDC 661.718.1' + 547.77

ARBUZOV, B. A., VIZEL', A. O., IVANOVSKAYA, K. M., and GOL'DFARB, E. I.,  
Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Academy  
of Sciences USSR

"Reaction of 2-Oxo-2-chloro-3,3,5-trimethyl-1,2-oxaphospholene-4 With  
Ethylene Glycol"

Leningrad, Zhurnal Obshchey Khimii, Vol 43 (105), No 10, Oct 73, pp 2134-2137

Abstract: The reaction of 2-oxo-2-chloro-3,3,5-trimethyl-1,2-oxaphospholene-4 with ethylene glycol was studied under various conditions: with or without solvent, different ratios of the reagents, with or without triethylamine. In all cases only one acyclic product was obtained: 2-oxo-2-(1,1-dimethyl-3-oxobutyl)-1,3,2-dioxaphospholane, b.p. 140-141°/0.01 mm,  $n_D^{20}$  1.4727,  $d_4^{20}$  1.2221. Formation of a cyclic dioxaphospholane structure requires more vigorous reaction conditions.

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Organophosphorous Compounds

USSR

UDC 661.718.1 + 547.38 + 547.514

ARBUZOV, B. A., FUZHENKOVA, A. V., ZINKOVSKIY, A. F., and KOLOSKOVA, T. N.,  
Scientific Chemical Research Institute imeni A. M. Butlerov at the Kazan'  
State University

"Reaction of Trialkyl Phosphites With Indanocyclone"

Leningrad, Zhurnal Obshchey Khimii, Vol 43 (105), No 10, Oct 73, pp 2129-2133

Abstract: The reaction of trialkyl phosphites with indanocyclone goes along the Arbuzov rearrangement route, forming 1:1 bipolar type addition compounds at the first stage. If the reaction is carried out in presence of acetic acid or acetic anhydride, a series of enols is formed. An intermediate product is a bipolar ion whose presence was shown by thermographic and spectral data. An analogous addition product forms in a reaction of indanocyclone with tris(dimethylamino)-phosphine.

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USSR

UDC 542.91:547.1'118

ARBUZOV, B. A., MUSLINKIN, A. A., VIZEL', A. O., KOVALENKO, V. I., VYRINA, N. N., and KAPUSTINA, N. M., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Academy of Sciences USSR

"Phospholene Glycolacrylates and Some of Their  $\alpha$ -Substituted Analogs"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 8, Aug 73, pp 1828-1833

Abstract: Experimental results are reported on the synthesis of new acrylic derivatives containing organophosphoric heteroring -- phospholeneglycolacrylates and some of their  $\alpha$ -substituted analogs. These products were obtained by reacting 1-chloro-1-oxophospholenes with glycolmonoacrylate and  $\alpha$ -substituted acrylates in inert organic solvents, in presence of triethylamine as an acceptor of HCl. Several synthetic routes have been proposed for the synthesis of phospholeneglycol- $\alpha$ -fluoroacrylates.

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USSR

UDC 542.91:547.1'118

ARBUZOV, B. A., NURETDINOVA, O. N., NIKONOVA, L. Z., GOL'DFARB, E. I.,  
Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov of the  
Academy of Sciences of the USSR

"Reaction of Phosphorous Acid Chlorides With Oxetanes"

Moscow, Izv. AN SSSR: Ser. Khimicheskaya, No 3, Mar 73, pp 627-632

Abstract: A study is made of the reaction of  $PCl_3$  and alkylphosphorous acid dichlorides with 2-methyloxetane and 3,3-dimethyloxetane in other than 1:1 reagent ratios. The equations of 18 reactions are given together with the experimental details of eight reactions and physical constants of 23 synthesized phosphorous acid derivatives.

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USSR

UDC 542.91:547.1'118

ARBUZOV, B. A., DIANOVA, E. N., and VINOGRADOVA, V. S., Chemical Institute  
Imeni A. M. Butlerov, Kazan' State University Imeni V. I. Ul'yanov-Lenin

"Reaction of 2,5-Diphenyl-3,4-diazacyclopentadien-1-one-3,4-dioxide With  
Trialkyl Phosphites"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 6, Jun 73,  
pp 1422-1424

Abstract: Trimethyl- and triethyl phosphite react with 2,5-diphenyl-  
3,4-diazacyclopentadien-1-one-3,4-dioxide yielding 1-alkyl-3,5-diphenyl-  
pyrazolyl-4 dialkyl phosphates.

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USSR

UDC 542.91:547.1'118

ARBUZOV, B. A., NIKONOVA, L. Z., NURETDINOVA, O. N., Institute of Organic and Physical Chemistry imeni A. Ye. Arbutov of the Soviet Academy of Sciences

"Some Properties of Oxaphospholans"

Moscow, Izv. AN SSSR: Ser. Khimicheskaya, No 3, Mar 73, pp 648-650

Abstract: Some reactions of compounds with the oxaphospholan ring were studied. Di-(1-methyl-3-chloropropyl) ester of ethylphosphonous acid at 100-110°C was converted to two phosphorus-containing products which separate fairly readily on distillation.

Pure 2-oxo-2-phenyl-5-methyl-1,2-oxaphospholan (Ib) was synthesized by additional heating of the mixture of (Ib) and (IIb) at 200-220°C for 1.5-2 hours. Compound (Ib) reacts with  $PCl_5$  in  $CHCl_3$  with formation of the corresponding acid chloride. Reacting compounds (Ia) and (Ib) with  $P_2S_5$  in boiling benzene produces the thiooxaphospholan compounds (IIIa) and (IIIb) which upon further heating with  $P_2S_5$  without a solvent at 120-130°C replace the oxygen in the oxaphospholan ring by a sulfur atom. The constants of the synthesized compounds are summarized in a table.

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USSR

UDC 542.91+541.6:547.431.2'118.3

MAKAROVA, N. A., NABIULLIN, V. N., MUKMENOV, E. T., and ARBUZOV, B. A.,  
Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Academy of  
Sciences USSR

"The Behavior of 2-Ethoxy-4-chloromethyl-1,3,2-dioxaphospholane on Heating"

Leningrad, Zhurnal Obshchey Khimii, Vol 43, No 11, Nov 73, pp 2373-2378

Abstract: Re-esterification of triethyl phosphite with 1-chloro-1-deoxy-D,L-glycerol (I) led to the formation of 2-ethoxy-4-chloromethyl-1,3,2-dioxaphospholane (II). Study by the methods of gas-liquid chromatography and  $^{31}\text{P}$  nuclear magnetic resonance showed that the cyclic phosphite II consisted of a mixture of a cis- and a trans-isomer with boiling points that were close to each other. The trans-isomer predominated in the mixture. On heating of II for 6 hrs at  $175-90^\circ$ ,  $\text{EtCl}$  was evolved and a P-containing oligomer formed, apparently as a result of an inter-molecular Arbuzov rearrangement. II was also prepared by reacting I with ethyl dichlorophosphite  $\text{EtOPCl}_2$  in the presence of  $\text{NEt}_3$ .

Similarly, the 2-beta-chloroethoxy and 2-isobutoxy analogs of II (III and IV) were synthesized by the reaction of I with  $\text{ClCH}_2\text{CH}_2\text{OPCl}_2$  and  $i\text{-BuOPCl}_2$ , respectively. The 2-phenoxy analog (V) of II was also prepared. The behavior and properties of compounds III-V, including the predominance of the trans-isomer  
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MAKAROVA, N. A., et al., Zhurnal Obshchey Khimii, Vol 43, No 11, Nov 73,  
pp 2373-2378

in them, were consistent with the assumption of an intermolecular rearrangement.  
The authors thank V. V. Pomazanov, N. P. Anoshina, and E. I. Gol'dfarb for  
carrying out instrument measurements.

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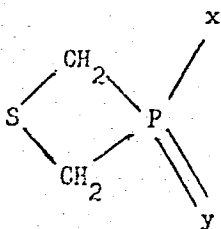
UDC 541.63:547.1'118

ARBUZOV, B. A., ARSHINOVA, R. P., VERESHCHAGIN, A. M., and VUL'FSON, S. G.,  
Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzova, Academy of  
Sciences, USSR, Chemical Institute imeni A. M. Butlerov, Kazakstan State  
University imeni V. I. Ul'yanova-Lenina

"Steric Configurations Containing Phosphorus Heterocyclics. 3. Gauche Confor-  
mation of the Alkoxy Group in 3-Alkoxy-1-thia-3-phosphethanes"

Moscow, Seriya Khimicheskaya, 9, 1973, pp 1964-1967

Abstract: A four-membered ring containing two heteroatoms -- one of S and one  
of P -- of the type below for the given sets of x and y was examined:



- (I) x = OMe, y = O
- (II) x = OPh, y = O
- (III) x = OMe, y = S
- (IV) x = OPh, y = S
- (V) x = OC<sub>6</sub>H<sub>4</sub>-p-NO<sub>2</sub>, y = S

1/2

USSR

ARBUZOV, B. A., et al., Seriya Khimicheskaya, 9, 1973, pp 1964-1967

The molecules can have either a bent or a flat configuration. The dipole moments and Kerr constants were determined for all five compounds and shown both as graphs and in tables. On the basis of these graphs it was shown that these compounds occur in the bent configuration and have angles of less than 140 to 165°. The phosphoryl or thiophosphoryl group occupies a pseudoequatorial position while the methoxy and phenoxy groups have a gauche orientation.

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USSR

UDC 542.91:547.772.2:547.1'118

ARBUZOV, B. A., SOROKINA, T. D., FUZHENKOVA, A. V., VINOGRADOVA, V. S.

"Interaction of 1,2-diphenyl-4-benzalpyrazolidine-3,5-dione with Trimethylphosphite and Tri(dimethylamino)phosphine"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 11, 1973, pp 2577-2580

Abstract: A study was made of the effect of trimethylphosphite and tri(dimethylamino)phosphine on 1,2-diphenyl-4-benzalpyrazolidine-3,5-dione (I). The study was made using thermography and infrared spectroscopy.

Trimethylphosphite interacts with 1,2-diphenyl-4-benzalpyrazolidine-3,5-dione via the bipolar ion stage with the formation of the methyl ether of the enol form of the dimethyl ester of 1,2-diphenylpyrazolidine-3-5-dione-4-benzylphosphonic acid. On interaction of tri(dimethylamino)phosphine with 1,2-diphenyl-4-benzalpyrazolidine-3,5-dione, a stable adduct (1:1) was obtained having the structure of the bipolar ion with the P-C bond.

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USSR

UDC 542.91:547.572:547.1'118

ARBUZOV, B. A., ZOROASTROVA, B. M., TUDRIY, G. A., FUZHENKOVA, A. V.

"Interaction of Dibenzal Acetone with Trimethyl Phosphite and Dimethyl Phosphorus Acid"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 11, 1973, pp 2581-2585

Abstract: A study was made of the interaction of dibenzal acetone with tri-alkyl phosphites. Trimethyl phosphite reacts with dibenzal acetone with the formation of 2,2-trimethoxy-3phenyl-5-5-( $\beta$ -phenyl)vinyl-1,2-oxaphospholene-4(II). When (II) is washed with water, the phosphorane ring breaks at the P-O bond with the formation of two keto phosphonates, probably S-cis- and S-transconformers. Phosphorane (II) reacts with dibenzal acetone by the diene synthesis reaction. A thermogram is presented for a mixture of dibenzal acetone with  $(\text{CH}_3\text{O})_3\text{P}$  and the reaction of dibenzal acetone with  $(\text{CH}_3\text{O})_3\text{P}$  in the presence of  $\text{CH}_3\text{COOH}$ .

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USSR

UDC 541.67:547.879

ARBUZOV, B. A., Academician, ARSHINOVA, R. F., GURARIY, L. I., MUKMENEV, E. T., Scientific Research Institute of Chemistry imeni A. M. Butlerov Affiliated with Kazan State University imeni V. I. Ul'yanov-Lenin; Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Academy of Sciences of the USSR, Kazan

"Dipole Moments and Kerr Constants of 1,3,2-Dioxaphospholans"

Moscow, Doklady Akademii Nauk SSSR, Vol 204, No 6, 21 Jun 72, pp 1349-1351

Abstract: The paper is a continuation of research on the stereostructure of heterorings. The authors study conformations of a series of 1,3,2-dioxaphospholans with the tricoordinate phosphorus atom. Four compounds of this type were synthesized by reacting ethylene-1,2-propylene, 2-3butylene and 2,3-dimethyl-2, 3-butylene glycols with phosphorus trichloride and alkyl dichlorophosphites. The dipole moments and Kerr constants were measured in an atmosphere of dry argon. The results show that the usual conformation of the 1,3,2-dioxaphospholan ring is distorted by the spatial interaction of methyl groups which takes place in the case of meso-2-chloro-4,5-dimethyl 1,3,2-dioxaphospholan. This explains the contradictory data in the literature with respect to PMR and gas electronography determinations of the stereostructure of these rings. The authors thank A. N. Vereshchlagin and A. G. Vul'fson for assistance with the work. 1/1

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USSR

UDC 542.91.547.1'118

ARBUZOV, B. A., ZOROASTROVA, V. M., TUDRIY, G. A., GUZHENKOVA, A. V.,  
Chemical Institute imeni A. M. Butlarov of Kazan State University imeni  
V. I. Ul'yanov-Lenin

"Interaction of 2-6-dibenzylidene-cyclohexanone with trialkylphosphite and  
dialkylphosphorous Acids"

Moscow, Izvestiya Akademii Nauk SSR -- Seriya Khimicheskaya, No 11, 1972,  
pp 2545-2549

Abstract: The interaction of trimethyl and triethylphosphite with 2,6-  
-dibenzylidenecyclohexanone was found to lead to the formation of cyclic  
phosphorane (Ia), (Ib). The structure of the phosphoranes was checked  
by the nuclear magnetic resonance and infrared spectral data. The properties  
of these spectra are discussed. The interaction of 2,6-dialkylphosphites  
forms dialkyl esters of 2-(6-benzylidenecyclohexanone)benzylphosphonic acid  
and also cyclic esters depending on the temperature. The experimental pro-  
cedures and results are given for the interaction of 2,6-benzylidenecyclo-  
hexanone with trialkylphosphites, the saponification of the phosphoranes, the  
interactions of phosphorane (Ia) with acetic anhydride, the interaction of  
2,6-benzylidenecyclohexanone with trialkylphosphites in the presence of  
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USSR

AREUZOV, B. A., et al., Izvestiya Akademii Nauk SSR - Seriya Khimicheskaya, No 11, 1972, pp 2545-2549

$(\text{CH}_3\text{CO})_2\text{O}$ , the interaction of phosphorane (Ia) with  $\text{CH}_3\text{COOH}$ , the interaction of 2,6-dibenzylidenecyclohexanone with trialkylphosphites in the presence of  $\text{CH}_3\text{COOH}$ , the interaction of 2,6-dibenzylidenecyclohexanone with  $(\text{CH}_3\text{O})_2\text{POH}$ , 2,6-dibenzylidenecyclohexanone with  $(\text{C}_5\text{H}_2\text{O})_2\text{POH}$ , 2,6-dibenzylidenecyclohexanone with  $\text{P}(\text{OCH}_3)_3$  in the presence of methanol, and thermographic analysis of the enol derivative of phosphorane (Ib).

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Organophosphorous Compounds

USSR

UDC 542.91+661.718.1

ARBUZOV, B. A., SOROKINA, R. D., and VINOGRADOVA, V. S., Chemical Institute  
imeni A. M. Butlerov, Kazan' State University imeni V. I. Ul'yanov-Lenin  
Kazan'

"The Reactions of 5-Benzalbarbituric Acid with Trimethyl Phosphite and  
Tris(dimethylamino)phosphine"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 3, Mar 71,  
pp 573-577

Abstract: At minus 14° trimethyl phosphite (I) added to 5-benzalbarbituric acid (II) with the formation of a 1:1 addition product (m.p. 80-5°) that had a bipolar structure. This product isomerized to the methyl ester of the enol form of the dimethyl ester of barbituryl-5-benzylphosphonic acid (III; m.p. 220-2°). The latter compound formed directly when the reaction was carried out at room temperature. On treatment of III with HCl, the dimethyl ester of barbituryl-5-benzylphosphonic acid (IV; m.p. 244°) was obtained. Dimethyl phosphite reacted with II to form a product which on recrystallization from dioxan yielded the dioxanate of the enol form of the dimethyl ester of barbituryl-5-benzylphosphonic acid (m.p. 154-5°). Treatment of the dioxanate with HCl resulted in the formation of a product that proved to be 1/2

USSR

ARBUZOB, B. A., et al., Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 3, Mar 71, pp 573-577

identical with IV. In the presence of glacial acetic acid, I and II reacted with the formation of IV, which was isolated in the form of the enol dioxanate. The reaction of tri(dimethylamino)phosphine with II yielded a 1:1 addition product (m.p. 150-2<sup>o</sup>) which had the structure of a bipolar ion with a P-C bond. The product was stable in the form of a bipolar ion in the crystalline state.

2/2

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USSR

UDC 661.718.1:547.642

APREIZOV, R. A., MAREYEV, YU. M., VINOGRADOVA, V. S., and SAMITOV, YU. YU.,  
Chemical Institute imeni A. M. Butlerov, Kazan' State University imeni  
V. I. Ul'yanov-Lenin

"Spirophosphoranes Based on Acrolein and Methyl Esters of Ethylene-glycol-  
and Butyleneglycol-1,3-phosphorous Acid"

Moscow, Doklady Akademii Nauk SSSR, Vol 205, No 4, Aug 72, pp 843-846

Abstract: The reaction of acrolein with cyclic phosphites was studied. Addition of acrolein to the methyl ester of ethyleneglycolphosphorous acid in absolute ether yielded 1,6,9-trioxa-[(5-methoxy)-5-phosphaspiro-(4,4)]-2-nonene, b.p. 55-56°/10<sup>-3</sup>mm, n<sub>D</sub><sup>20</sup> 1.4820, d<sub>4</sub><sup>20</sup> 1.3016. When butyleneglycolphosphorous acid methyl ester was used, the product was 1,6,10-trioxa-9-methyl-[(5-methoxy)-5-phosphaspiro-(4,5)]-2-decene, b.p. 61-62°/10<sup>-3</sup> mm, n<sub>D</sub><sup>20</sup> 1.4780, d<sub>4</sub><sup>20</sup> 1.2041. Addition of methyl vinyl ketone to the methyl ester of butyleneglycolphosphorous acid yielded, after a somewhat slower reaction, 1,6,10-trioxa-2,9-dimethyl-[(5-methoxy)-5-phosphaspiro-(4,5)]-2-decene, b.p. 73-74°/10<sup>-3</sup> mm, n<sub>D</sub><sup>20</sup> 1.4745, d<sub>4</sub><sup>20</sup> 1.1707. The reactions were carried out with exclusion of moisture, under continuous stirring, keeping the temperature below +25°C. The products were found to hydrolyze easily in air but were stable enough to be distilled under high vacuum.

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USSR

UDC: 547.26'118:547.775

ABRIZOV, B. A., DIANOVA, E. N., VINOGRADOVA, V. S., Chemical Institute imeni  
A. M. Butlerov Affiliated With Kazan' State University imeni V. I.  
Ul'yanov-Lenin

"The Structure of Products of the Reaction of 1-Phenyl-3-Methyl-4-Isopropylidene-  
pyrazolone-5 With Dimethylphosphorous Acid"

Leningrad, Zhurnal Obshchey Khimii, Vol 42(104), No 6, Jun 72, pp 1212-1217

Abstract: The structure of dimethyl (1-phenyl-2,3-dimethylpyrazolone-5-yl-4)  
isopropyl phosphonate and dimethyl (1-phenyl-3-methyl-5-methoxypyrazolone-4)  
isopropyl phosphonate was identified by the addition of dimethylphosphorous  
acid to 1-phenyl-3-methyl-4-isopropylidene-pyrazolone-5 followed by alkylation.  
Tautomerism of the adduct of dimethylphosphorous acid with 1-phenyl-3-methyl-  
4-isopropylidene-pyrazolone is proved. The authors thank Yu. Yu. Samitov and  
E. I. Gol'dfarb for taking the nmr spectra.

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USSR

UDC 542.91:547.1'118

ARBUZOV, B. A., KRUPNOV, V. K., and VIZEL', A. O., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Academy of Sciences USSR

"Preparation of Acyl Bromides of Trivalent and Pentavalent Phosphorus Acids"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 5, May 72, pp 1193-1194

Abstract: It is shown that acyl bromides of phosphoric acids can be synthesized by replacing chlorine with bromine in the corresponding acyl chlorides in the presence of phosphorus tribromide.  $PBr_3$  can be used to obtain a wide range of acyl bromides of pentavalent and trivalent phosphorus acids. Optimum reaction temperature 170-190°.

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USSR

UDC 541.6:547.1'118

ABBUZOV, B. A., SO OKINA, T. D., VINOGRADOVA, V. S., and SERGEYEVA, G. N.,  
Chemical Institute Imeni A. M. Butlerov, Kazan State University Imeni V. I.  
Ul'yanov-Lenin

"Structures of the Reaction Products of Some  $\alpha, \beta$ -Unsaturated  
Carbonyl Compounds With Trimethylphosphite and Tri(dimethylamino)-Phosphine"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 4, Apr 72,  
pp 865-871

Abstract: Trimethylphosphite reacts with 1,3-diphenyl-5-benzalbarbituric acid at  $-14^{\circ}$  yielding a 1:1 addition product with bipolar structure which isomerizes easily to a methyl ester of the enol form of  $\alpha$ -(1,3-diphenylbarbituryl-5)-benzylphosphonic acid dimethyl ester (I). The latter forms when the reaction is carried out at room temperature. Hydrolysis of (I) yields an enol form of a dimethylester of  $\alpha$ -(1,3-diphenylbarbituryl-5)-benzylphosphonic acid. Reaction of tri(dimethylamino)phosphine with 1,3-diphenyl-5-benzalbarbituric acid yields a 1:1 crystalline addition product with a bipolar ionic structure. Dipole moment values and UV spectral parameters of a series of bipolar ions obtained from tri(dimethylamino)phosphine are reported.

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USSR

UDC 542.91:547.1'116

ARBUZOV, B. A., ZORCASTROVA, V. H., HEMLESOVA, I. D., RUDNINA, M. A., YEGOROVA, N. V., and Lukin, G. S., Chemistry Institute imeni A. M. Butlerov of Kazan' State University imeni V. I. Ul'yanov-Lenin and Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov of the Academy of Sciences USSR

"Derivatives of Phosphorus Acids and  $\alpha$ -Chloroallyl Alcohol. 2. Synthesis of Mixed  $\alpha$ -Chloroallyl Esters of Phosphoric Acid and Some of their Biological Properties"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 5, May 72, pp 1155-1159

Abstract: A previous article by the authors described some phosphorous, phosphoric, thiophosphoric and phosphinic acid esters containing an  $\alpha$ -chloroallyl radical. A study of biological properties of the synthesized compounds showed that they have a selective fungicidal and antimicrobial effect. Low toxicity and significant activity towards the dermatophytes *Trichophyton gypseum* and *Epidermophyton Kaufmann-Wolf* were noticeable in mixed phosphoric acid esters containing one  $\alpha$ -chloroallyl radical. Preliminary data showed that the fungicidal activity of the mixed esters increases with lengthening of the hydrocarbon radicals at the phosphorus atom, while toxicity declines.

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ARBUZOV, B. A., et al., Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya,  
No 5, May 72, pp 1155-1159

The present article gives a more detailed study of the biological effect of  
this type of compound. The alkyl radical in the series of compounds

$(RO)_2P(O) - OCH_2 - \overset{Cl}{\underset{|}{C}} - CH_2$  was lengthened from  $C_1$  to  $C_6$ . An improvement in

the synthesis, viz. conducting the reaction between dialkylphosphoric acid  
chlorides and  $\alpha$ -chloroallyl alcohol in an absolute benzene (instead of  
ether, as before) and at room temperature, increased the yields considerably.  
The results indicate that the selectivity of the action of the compounds on  
the dermatophytes is sharply increased by lengthening the alkyl radical from  
 $C_1$  to  $C_6$ . Further lengthening of the radical reduces the antifungal activity  
of the compounds. The top selectivity index is found in di-n-amy- $\alpha$ -chloro-  
allyl phosphate.

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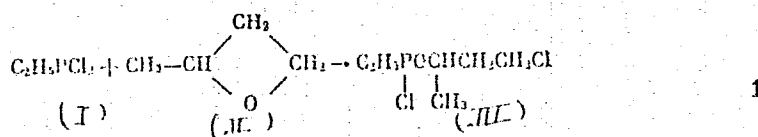
UDC 542.91.547.1\*118

NURETDINOVA, O. N., NIKONOVA, L. Z., and ARBUZOV, B. A., Institute for Organic and Physical Chemistry imeni A. Ye. Arbuзов, Academy of Sciences USSR

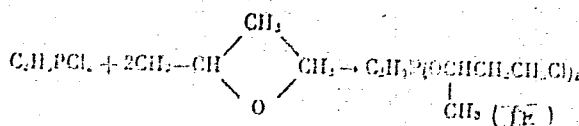
"Reaction Between Ethyldichlorophosphine and 2-Methyloxetane"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 3, 1972, pp 548-550

Abstract: Reaction 1 was observed when equimolar concentrations



of (I) and (II) were used. A 30-40% yield was recovered. When 2 moles of (II) and 1 mole of (I) were used, compound (IV) was obtained.

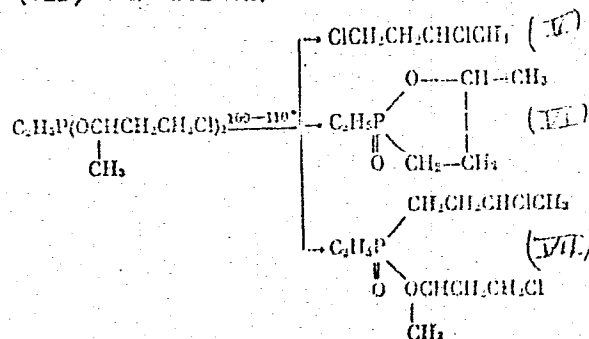


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USSR:

NURETDIKOVA, O. N., et al., Izvestiya Akademi Nauk SSSR, Seriya Khimicheskaya, No 3, 1972, pp 548-550

Upon heating compound (IV) at 100-110°C for 20-30 min and then distilling, compounds (V), (VI), and (VII) were formed.



Compound (VI) may have been an impurity. Reacting (VI) with  $\text{PCl}_5$  produced a 50% yield of (VIII). Using  $\text{C}_6\text{H}_5\text{PCl}_2$  instead of  $\text{C}_2\text{H}_5\text{PCl}_2$ , a series of reactions

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NURETDINOVA, O. N., et al., Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 3, 1972, pp 548-550

was carried out yielding the  $C_6H_5P$  analogs of compounds (III), (V), (VI), and (VII).

3/3





USSR

GAZIZOV, T. Kh., et al., Investiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 6, Jun 71, pp 1259-1266

Formation of an analogous cyclic anhydride is observed in the interaction of trichloroethylene with methacrylic acid, as well as in the presence of acetic acid.

The authors thank E. I. GOL'DMARE for taking the EMR spectra.

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USSR

UDC 661.710.1 + 547.36 + 547.517

FUZHENKOVA, A. V., ZHIGONCHIK, A. P. and ~~AFENKOVA, M. A.~~ (Institutes of the USSR Academy of Sciences); Scientific-Research Chemical Institute named A. M. Butlerov, at the Kazan State University named V. I. Ul'yanov-Lenin

"Interaction of Dimethylphosphoric Acid with Tetracyclons"

Moscow, Doklady Akademi Nauk SSSR, Vol 201, No 3, 71, pp 632-635

Abstract: The interaction between dimethylphosphoric acid and tetracyclons was studied under conditions of careful temperature control. As verified by infrared and chemical analysis, two of the end-products were the dimethyl esters of 2,3,4,5-tetraoxaphosphorinane-2-one-phosphoric acid and 1,2,3,4-tetraoxaphosphorinane-2-one-phosphoric acid. With use of the catalyses triethylamine or sodium methoxide, at room temperature, the dimethyl ester of 1-oxo-2,3,4,5-tetraoxaphosphorinane-2,4-dienyl-2-phosphoric acid was formed, following which, in the course of 2-3 days, the dimethyl-2,3,4,5-tetraoxaphosphorinane-2-one-phosphoric acid appeared, from which 2,3-dihydroxytetracyclon was finally extracted.

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FUZHENKOVA, A. V., et al., Doklady Akademii Nauk SSSR, Vol. 201, No. 3, 71, pp 632-635.

The presence of a compound of structure



formed with the first two compounds mentioned was suspected, but this could not be verified even chromatographically.

Physico-chemical data for all verified products of the fraction are given.



USSR

UDC 541.67:547.879

ABRIZOV, B. A., ARSHINOVA, R. P., and ZOROASTROVA, V. M., Scientific-Research Institute imeni A. M. Butlerov, under the Kazan' State University imeni V. I. Ul'yanov-Lenin

"Steric Structure of Certain 2-Oxa-Derivatives of 1,3,2-Dioxaphosphorinanes"

Moscow, Doklady Akademii Nauk SSSR, Vol 199, No 5, 11 Aug 71, pp 1061-1062

Abstract: The steric structure of 6-member heterocycles with a phosphorus ring atom is a current object of intensive research, with use of roentgenography and other techniques. However, the dipole-moment method and the Kerr effect have so far not been used systematically in the case of the 2-X-oxa-1,3,2-dioxaphosphoryls, despite the promising prospects of this approach.

The authors measured the dipole moments and Kerr constants of these particular compounds, and studied derivatives of trimethylglycol in the process, measurements being taken in dilute  $CCl_4$ . Assuming the existence of these compounds in ring form to be definitely established, they calculated moments and Kerr molar constants with allowance for two possible ring forms -- axial and equatorial. Butyleneglycol derivatives were also studied.

Values for probable variation in the proportions of these two forms were

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ARBUZOV, B. A., et al., Doklady Akademii Nauk SSSR, Vol 199, No 5, 11 Aug 71, pp 1061-1062

arrived at on the basis of the experimental data obtained, and also theoretical figures. One general conclusion reached is that for 2-oxa-derivatives of the 1,3,2-dioxaphosphorinanes, phosphorus atom substitutes in the ring are "available" in this ascending order:  $H < Cl < CH_3 < CPh_3$ . Some measurement data and structural formulas are included in the paper.

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USSR

UDC 547.76'241.542.952.1

~~ARBUZOV, B. A.,~~ VIZEL', A. O., GINIYATULLIN, R. S., and SHCHUKINA, L. I.,  
Institute of Organic and Physical Chemistry imeni A. ye. Arbuzov, Academy of  
Sciences USSR, Kazan'

"Isomerization of 1-Oxo-chlorophosphenes in Presence of Phosphorus Trichloride"

Riga, Khimiya Geterotsiklicheskikh Soyedineniy, No 12, Dec 71, pp 1616-1619

**Abstract:** The effect of phosphorus trichloride on 1-oxo-1-chlorophosphenes was studied. Heating the phospholenes to 130-160° in presence of PCl<sub>3</sub> leads to a migration of the double bond; phospholenes-3 are converted to derivatives of phospholenes-2 at a high conversion yield. The reverse process is difficult. Further experiments have shown that dry hydrogen chloride is incapable of causing similar double bond migration. No migration was observed also in case of 3-methyl- and 4-methylphospholenes. Anotherwords, during the synthesis of phospholene derivatives, isomerization may occur due to the presence of PCl<sub>3</sub>, leading to a mixture of products.

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USSR

UDC 547.1'118'112

ARBUZOV, B. A., VIZEL', A. O., VERESHCHAGIN, A. N., RAYEVESKIY, O. A., and ZVEREVA, M. A., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Academy of Sciences USSR

"1-Halogen-1-thioxophosphenes"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 11, Nov 71, pp 2489-2493

**Abstract:** For the purpose of synthesizing isomeric 1-halogen-1-thioxophosphenes and studying some of their properties, the authors isolated three pairs of isomers containing chlorine and bromine at the phosphorus atom. The chlorides were obtained by the interaction of the corresponding isomers of 1-chloro-1-oxophosphenes with  $P_2S_5$ , bromides by the interaction of the diene adduct of phosphorus tribromide with  $H_2S$ . A mixture of isomers with a preponderance of 3-phosphenes was formed in this case. All the products were considered pure when further distillations failed to change physicochemical characteristics and their IR spectra contained no signs of isomeric products. IR and Raman spectra were taken of the oxygen- and sulfur-containing derivatives of 2-phosphenes and 3-phosphenes and their dipole moments determined.

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USSR

UDC 542.91:661.718.1

ARBUZOV, B. A., POLEZHAYEVA, N. A., and VINOGRADOVA, V. S.; Chemical Institute imeni A. M. Butlerova, and Kazan State University imeni V. I. Ul'yanov-Lenin

"Structure of the Reaction Products of Trimethyl Phosphite with Acetyl- and Benzoyl-p-quinone"

Moscow, Doklady Akademii Nauk SSSR, Vol 201, No 1, Nov-Dec 1971, pp 91-94

Abstract: The reaction of some p-quinones with trialkyl phosphites and phosphines was studied. Benzoyl-p-quinone reacts with trimethyl phosphite in dry nitrogen to form dimethyl-p-methoxy-o-benzoyl phenylphosphate (I);  $P^{31}$  nmr showed the presence of an unstable bipolar ion (II), the latter rearranged to (I). The results indicate the formation of (II) as an intermediate in the presence of 1 mole of acetic acid; the only product is dimethyl p-hydroxy-o-benzoyl-phenyl phosphate (III). The reaction of acetyl p-quinone with trimethyl phosphite at low temperatures produces a phosphorane which in methylene chloride rapidly isomerizes into an enol ether. Physical data, structural formulas, compositions and infrared spectra for these and several other compounds are given.

I/1

USSR

UDC 547.514.47+547.462.3

FUZHENKOVA, A. V., ZINKOVSKIY, A. F., and ARBUZOV, B. A., Scientific Research Institute of Chemistry imeni A. M. Butlerov affiliated with Kazan' State University imeni V. I. Ul'yanov-Lenin

"Thermographic Study of the Reaction Between Trialkyl Phosphites and Tetracyclone"

Leningrad, Zhurnal Obshchey Khimii, Vol 42(104), No 3, Mar 72, pp 491-495

Abstract: The reaction of trialkyl phosphites with tetracyclone was studied by using thermography. Thermographic interactions of trimethyl, triethyl and tripropyl phosphites with tetracyclone showed only an exo-effect on the thermograms regardless of the heating rate up to 130°C. The reaction goes to completion at room temperature within 1-2 days. The interaction of trimethyl phosphite with tetracyclone was studied in detail. The final products isolated from the reaction mixture were 0,0'-dimethyl 5-methyl-2,3,4,5-tetra-phenylcyclopenta-1,3-dienyl phosphate and crystalline 0,0'-dimethyl-3-methyl-2,3,4,5-tetra-phenylcyclopenta-1,4-dienylphosphate. Reaction of trimethyl phosphite with tetracyclone in the presence of acetic anhydride yielded 0,0'-dimethyl-2,3,4,5-tetra-phenylcyclopenta-1,4-dienyl phosphate instead of the expected acetyl derivative, and reaction of diethyl acetyl phosphite

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USSR

FUZHENKOVA, A. V., et al., Zhurnal Obshchey Khimii, Vol 42(104), No 3, Mar 72, pp 491-495

with tetracyclone produced 0,0'-diethyl 2,3,4,5-tetraphenylcyclopenta-1,4-dienylphosphate instead of 0,0'-diethyl s-3,4,5-tetraphenyl-3-acetylcyclopenta-1,4-dienyl phosphate and 0,0'-diethyl 2,3,4,5-tetraphenyl-5-acetylcyclopenta-1,3-dienyl phosphate. Attempts to study the reaction of tetracyclone with ethyl diacetyl phosphite were unsuccessful. Thermography of mixtures of tetracyclone with trimethyl, triethyl and diethyl acetyl phosphites reveals another exo-effect at higher temperatures as a result of thermal conversion of phosphorus-containing products synthesized by passage through the first exo-effect. A Kurnakov PK-52 pyrometer with chromel-alumel thermocouple in sealed Stepanov vessels was used for the thermographic analysis. Calcined magnesium oxide was the standard. The exo-effect accompanying the reaction of trialkyl phosphites with tetracyclone is attributed to a two-step reaction involving an Arbuzov rearrangement and nucleophilic attack of the phosphorus atom either on the oxygen atom of the carbonyl group to form a bipolar form of the phosphate type, or on the carbon with phosphonate-phosphate rearrangement of the resultant bipolar ion.

2/2

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USSR

UDC 542.91:547.1'118

VIZEL', A. O., KRUPNIV, V. K., and ARBUZOV, B. A., Institute of Organic and Physical Chemistry imeni A. Ye. Arbusov, USSR Academy of Sciences

"1-Chlorophosholines with Trivalent Phosphorus"

Moscow, Izvestiya Akad. Nauk SSSR, Seriya Khimicheskaya, No 1, Jan 72, p 181

Abstract: The P-chlorides of phospholene with trivalent phosphorus are quite reactive substances which offer new possibilities in the chemistry of organophorus, five-membered heterocycles.

The authors were able to secure an effective transformation of 1-thioxo-1-chlorophospholene into a series of three 1-chloropholenes. Analytical for these are given.

1/1

- 47 -



USSR

UDC 542.91:547.1'118

NURETDINOVA, O. N., NIKONOVA, L. Z., and ARBUZOV, B. A., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, USSR Academy of Sciences

"Reaction of Diethylchlorophosphine with 2-Methyloxetane"

Moscow, Izvestiya Akad. Nauk SSSR, Seriya Khimicheskaya, No 1, Jan 72, pp 197-198

Abstract: It is concluded from an experimental study of the reaction of diethylchlorophosphine with 2-methyloxetane that isomerization of the  $\alpha$ -methyl- $\gamma$ -chloropropyl ester of diethylphosphonous acid takes place via the formation of a cyclic intermediate product.

1/1

SSR

UDC 542.91+541.69:661.718.1

ARBUZOV, B. A., NURETDINOVA, O. N., NEKLESOVA, I. D., IRAIDOVA, I. S.,  
KUDRINA, M. A., and YEGOROVA, N. V., Institute of Organic and Physical  
Chemistry imeni A. Ye. Arbuzov, Academy of Sciences USSR

"Synthesis and Biological Activity of Some Thioglycidyl and Thiethanyl  
Esters of Pentavalent Phosphorus Acids"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 10, Oct 71,  
pp 2213-2217

Abstract: A series of thioglycidyl and thiethanyl esters of pentavalent phosphorus acid was synthesized and their biological properties were investigated. The thioglycidyl esters of dialkoxythio- and dialkoxydithiophosphoric acid exhibit no contact or systemic insecticidal activity, but they are active against pathogenic fungi. Toxicity of these compounds decreases considerably when  $C_2H_5O$ -groups are replaced with  $CH_3O$ -, when the alkoxy radical is enlarged to  $C_4$ , and when the  $-P(=O)-S-C$  group is replaced by  $-P(=O)-C$ - group. In contrast to the thioglycidyl, thioethanyl esters show distinct contact and systemic insecticidal properties coupled with higher toxicity towards the warm-blooded animals. The activity of 0,0-diethylthiophosphoric ester being much less pronounced than that of 0,0-diethylthiophosphoric ester. Substitution of  $-N(CH_3)_2$  for  $C_2H_5O$ - lowers the  
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USSR

ARBUZOV, B. A., et al., Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya,  
No 10, Oct 71, pp 2213-2217

toxicity towards white mice, and the insecticidal and antifungal activity.  
When  $-N(CH_3)_2$  is substituted by  $-N(C_2H_5)_2$ , a further reduction in toxicity  
takes place, the insecticidal activity disappearing altogether.

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USSR

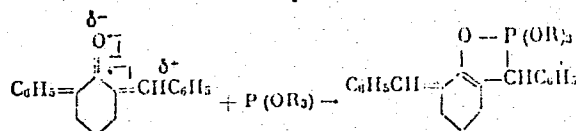
UDC 661.718.1

ARBUZOV, B. A., Academician, ZOROASTROVA, V. M., TUDRIN, G. A., and FUZHENKOVA, A. V., Chemical Institute imeni A. M. Butlerov, Kazan' State University imeni V. I. Ul'yanov-Lenin

"Reaction of 2,6-Dibenzylidenecyclohexanone With Trialkyl Phosphites"

Moscow, Doklady Akademii Nauk SSSR, Vol 200, No 4, 1971, pp 847-849

Abstract: Trialkyl phosphites react with 2,6-dibenzylidenecyclohexanone during heating in a sealed ampoule ( $100^{\circ}$ , 4-10 hours) to give 1:1 adducts of phosphorane structure (Ia) and (Ib):



Ia ( $R=CH_3$ ), Ib ( $R=C_2H_5$ ). The structure of the resultant phosphoranes was confirmed by IR and NMR spectra and study of their chemical properties. Phosphorane (Ia) is hydrolyzed in benzene with an equimolar quantity of water to give the dimethyl ester of 2-(6-benzylidenecyclohexanone)-benzylphos-  
1/2

USSR

ARBUZOV, B. A., Doklady Akademii Nauk SSSR, Vol 200, No 4, 1971, pp 847-849

phonic acid. Phosphorane (Ib) is readily saponified in an ether solution with atmospheric moisture.

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USSR

UDC 542.91.661.718.1

ARBUZOV, B. A., RAKOV, A. P., and VIZEL', A. O., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Academy of Sciences USSR, and Chuvash State University imeni I. N. Ul'yanov

"Phospholenols and Other Phospholene Derivatives"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 9, Sep 71, pp 1999-2002

Abstract: The article describes a method for the one-stage synthesis of 2-phospholen-4-ol derivatives by the reaction of 3-phospholene derivatives with peracetic acid in the presence of alkali metal salts. The hydroxy group of the phospholenes is highly reactive, which makes it possible to obtain other phospholene derivatives. Acylation with Acetic anhydride and oxidation with chromic acid gave the unsaturated heterocyclic ketone 2-phospholen-4-one, which was then converted to its 2,4-dinitrophenylhydrazone.

1/1

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USSR

UDC 542.91:661.718.1

ARBUZOV, B. A., KRUPNOV, V. K., and VIZEL', A. O., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Academy of Sciences USSR

"Reaction of Acyl Derivatives of Phosphorous Acid with Dienes"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 6, Jun 71, pp 1327-1329

Abstract: Cyclic anhydrides -- derivatives of salicylphosphorous acid -- react with conjugated diene hydrocarbons and form phospholene derivatives which contain no residue of salicylic acid.

1/1

USSR

UDC: 541.67+547.87

ARBUZOV, B. A., and ARSHINOVA, R. P., Scientific Research Institute Imeni A. M. Butlerov at the Kazan' State University Imeni V. I. Ul'yanov-Lenin

"Dipole Moments, Kerr Constants and Conformations of Some 1,3-Dioxaphosphorinanes"

Moscow, Doklady Akademii Nauk SSSR, Vol 195, No 4, Dec 70, pp 835-836

Abstract: Two groups of compounds were studied: one included 2-chloro-1,3-dioxaphosphorinane-2 (1a), 5,5-dimethyl-2-chloro-1,3-dioxaphosphorinane-2 (1b), and 4-methyl-2-chloro-1,3-dioxaphosphorinane-2 (1c); the other group included 2-methyl-2-thiono-1,3-dioxaphosphorinane-2 (2a), 2,4-dimethyl-2-thiono-1,3-dioxaphosphorinane-2 (2b), 2-chloro-2-thiono-1,3-dioxaphosphorinane-2 (2c), and 2-chloro-2-thiono-4-methyl-1,3-dioxaphosphorinane-2 (2d). The results obtained on dipole moment (D) and molar Kerr constants (mK) are tabulated.

Compound	1a	1b	1c	2a	2b	2c	2d
D	3.47	3.60	3.66	3.90	5.37	5.30	5.55
mK	164	121	215	436	1175	1356	1195

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USSR

ARBUZOV, B. A., and ARSHINOVA, R. P., Doklady Akademii Nauk SSSR, Vol 195,  
No 4, Dec 70, pp 835-836

On the basis of above data it has been concluded that the structures of the  
1 group have the P-C1 bond in equatorial orientation, while the compounds in  
the second group tended to have the P-C1 or P-CH<sub>3</sub> bonds axially oriented.

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USSR

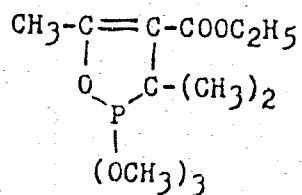
UDC: 661.718.1+547.241+541.6

ARBUZOV, B. A., DIANOVA, E. N., VINOGRADOVA, V. S., and PETROVA, M. V., Chemical Institute Imeni A. M. Butlerov at the Kazan' State University Imeni V. I. Ul'yanov-Lenin

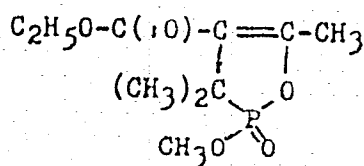
"Reaction of Trimethylphosphite With Isopropylideneacetoacetate"

Moscow, Doklady Akademii Nauk SSSR, Vol 195, No 5, Dec 70, pp 1094-1096

Abstract: Trimethylphosphite reacts with isopropylidene acetoacetate at room temperature to yield the cyclic phosphorane A, b.p. 85-87° at 2·10<sup>-4</sup> mm Hg, n<sub>D</sub><sup>20</sup> = 1.4721, d<sub>0</sub><sup>20</sup> = 1.1132.



"A"



"C"

1/2

USSR

ARBUZOV, B. A., et al, Doklady Akademii Nauk SSSR, Vol 195, No 5, Dec 70, pp 1094-1096

At room temperature with a water excess A hydrolyzes to yield dimethyl-2-acetyl-2-carbethoxyethylphosphinic acid (B),  $n_D^{20} = 1.4620$ ,  $d_4^{20} = 1.1722$ .  
When acetic anhydride was reacted with A at  $70-80^\circ$  for 7 hrs, the product was an enol acetate of B, b.p.  $107-108^\circ/2 \cdot 10^{-4}$  mm,  $n_D^{20} = 1.4630$ ,  $d_4^{20} = 1.1578$ .  
When an attempt was made to distill B, the cyclic product C was obtained, b.p.  $133^\circ/2 \cdot 10^{-4}$  mm,  $n_D^{20} = 1.4738$ .

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USSR

UDC 542.91 + 661.718.1

ARBUZOV, B. A., RIZFOLZHENSKIY, N. I., VIZEL', A. O., IVANOVSKAYA, K. M., MUKHAMEDOV, F. S., and GOL'DFARB, E. I., Institute of Organic and Physical Chemistry imeni A. Ye., Arbuzov, Acad. Sc. USSR

"Synthetic Routes of 1,2-Oxaphospholene Derivatives in the Reaction of  $\beta$ -Ketoalcohols With Acid Chlorides of Trivalent Phosphorus Acids"

Moscow, Izvestiya Akademii Nauk, SSSR, Seriya Khimicheskaya, No 1, Jan 71, pp 117-125

Abstract: In studying the reaction of  $\beta$ -ketoalcohols with acid chlorides of trivalent phosphorus acid, a series of 1,2-oxaphospholene derivatives was obtained. The reaction took place in several definitely marked stages. For example, dropwise addition of phenyldichlorophosphine to cooled diacetone alcohol resulted in an initial exothermic reaction producing a precipitate; the liquid portion becoming yellow, and an odor of mesitylene oxide becoming noticeable. The second half of the process occurred slowly, the precipitate disappeared, the reaction mixture becoming again almost colorless. When the volatile pro-

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USSR

ARBUZOV, E. A., et al., Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 1, Jan 71, pp 117-125

ducts were removed, the reaction mixture crystallized, and finally liquefied again on distillation. A five stage mechanism has been proposed for this reaction: the first stage consisting of an alcoholysis of acyl chloride leading to the formation of an acid which then reacts with more starting material to produce a new acyl chloride, a very reactive compound which adds rapidly to the unsaturated ketone formed in the first stage to yield a ketochloride  $RF(:O)Cl-CR_2CH_2COCH_3$  which isomerizes to 1,2-oxaphospholane. In the final step a molecule of HCl are not conjugated yielding 1,2-oxaphospholene.

2/2

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USSR

UDC 542.91 + 547.241 + 547.589.4

ARBUZOV, B. A., DIANOVA, E. N., and VINOGRADOVA, V. S., Chemical Institute imeni A. M. Butlerov, Kazan' State University imeni V. I. U 'yanov-Lenin

"Reaction of Trimethyl Phosphite With Benzylidenebenzoylactic Ester"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 11, Nov 70, pp 2543-2548

Abstract: Continuing their study of phosphorane-type compounds obtained in reactions of trialkyl phosphites with  $\alpha, \beta$ -unsaturated carbonyl compounds, the authors found that the reaction of trimethyl phosphite with benzylidenebenzoylactic ester gives crystalline 2,2,2-trimethoxy-3,5-diphenyl-4-carbethoxy-1-oxo-2-phosphacyclo-4-pentene (I). The structure of I was proved by IR, NMR and UV spectral data, as well as a study of its chemical properties. I does not react with ethanol on heating to 70° for 7 hours even in the presence of phosphoric acid as catalyst, but is readily hydrolyzed on heating with an equimolar quantity of

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USSR

ARBUZOV, B. A., et al., Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 11, Nov 70, pp 2543-2548

water in ether, resulting in ring opening and the formation of the dimethyl ester of 1-phenyl-2-benzoyl-2-carbomethoxyethylphosphonic acid, whose structure was confirmed by IR spectra. The action of acetic anhydride on I gives enol acetates.

The authors thank A. A. MUSINA for the NMR spectra.

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USSR

UDC; 542.91+661.718.1

ARBUZOV, B. A., ZOROASTROVA, V. M., and TUDRIY, G. A., Scientific Research Institute of Chemistry imeni A. M. Butlerov, Kazan, Kazan' State University imeni V. I. Ul'yanov-Lenin

"Effect of Dialkyl Phosphorous Acids on 9-Chloro-10-anthracenealdehyde, 9-Anthracenealdehyde, and 9-Butylmercapto-10-Anthracenealdehyde"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 1, Jan 70, pp 90-95

Abstract: Three series of dialkyl anthranyl-alpha-hydroxyphosphonates were prepared by heating 9-chloro-10-anthracenealdehyde(I), 9-anthracenealdehyde, or 9-butylmercapto-10-anthracenealdehyde with dialkyl phosphorous acids (RO) 2OPH (R=Me, Et, iso-Pr, iso-Bu) in  $C_6H_6$  in the presence of a catalyst (sodium alcoholate or triethylamine). Yields of the products varied from 60-100% in the presence of a sodium alcoholate. A low yield of diethyl 9-chloroanthranyl-alpha-hydroxy-methylphosphonate was obtained in the presence of  $Et_3N$ . It was shown that I does not react with (Me)<sub>3</sub> 2OPH in the absence of a catalyst, even under extreme conditions (at 200-300° for 15hr.). All the products but one were solids with m.p. in the 30-177° range. An attempt to obtain acids from prepared esters by hydrolysis with diluted  $HCl$  failed.

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USSR

UDC: 542.91+661.718.1

NURETDINOVA, O. N., and ARBUZOV, B. A., Institute of Organic and Physical Chemistry imeni A. Ye. Arbutov, Academy of Sciences USSR

"Reactions of O,O-Diethyl S-(beta-Hydroxy-gamma-chloropropyl) Dithiophosphate and beta-Hydroxy-gamma-chloropropyl Thioacetate with Bases"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 1, Jan 70, pp 145-147

Abstract: Reaction of the adduct of diethyldithiophosphoric acid and epichlorohydrin with  $\text{Et}_3\text{N}$  in toluene or with  $\text{KOH}$  in  $\text{EtOH}$  solution at its b.p. yielded O,O-diethyl S-2,3-thiopropyl thiophosphate (I) instead of the expected epoxy compounds. Diethyl chlorophosphate gave an adduct with thioglycidol and  $\text{Et}_3\text{N}$  in  $\text{Et}_2\text{O}$  at  $0^\circ$ . The adduct combined with S in boiling  $\text{C}_6\text{H}_6$  solution to form O,O-diethyl O-2,3-thiopropyl thiophosphate (II)

B.p.,  $d^{20}$ , and  $n_d^{20}$  of II differ from respective constants of I. Formation of I according to proposed reaction scheme was confirmed by preparation of propylene sulfide from diethyldithiophosphoric acid and propylene oxide. Beta-hydroxy-gamma-chloropropyl thioacetate reacted with  $\text{KOH}$  in  $\text{EtOH}$  at b.p. to yield 44% 3-thiethanyl acetate which gave 0.0% 3-thiethanol, when hydrolysed with  $\text{KOH}$  in  $\text{EtOH}$ . B.p.,  $d^{20}$  and  $n_d^{20}$  of both products were determined.

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USSR

UDC 542.91 + 661.718.1

ARBUZOV, B. A., NIKONOVA, L. Z., NURETDINOVA, O. N., POMAZANOV, V. V., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Academy of Sciences USSR

"Reaction of Oxetanes With Phosphorus Trichloride and Dichloroanhydrides of Alkylphosphorous Acids"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 6, Jun 70, pp 1426-1428

Abstract: The reaction of 3,3-dimethyloxetane with phosphorus trichloride or dichloroanhydride of alkylphosphorous acid yields the following type of compounds:  $RP(Cl)OCH_2C(CH_3)_2CH_2Cl$ , the R, b.p. (°C)/mm Hg,  $d_4^{20}$ , and  $n_D^{20}$  being: Cl, 86.5/10, 1.2867, 1.4926;  $CH_3O$ , 41-41.5/0.12, 1.1949, 1.4710;  $C_2H_5O$ , 102-104/10, 1.1536, 1.4620;  $C_3H_7O$ , 113/12, 1.1253, 1.4620. Under similar reaction conditions 2-methyloxetane yields  $RP(Cl)OCH(CH_3)CH_2CH_2Cl$ , the R, b.p. (°C)/mm Hg,  $d_4^{20}$ , and  $n_D^{20}$  being reported: Cl, 79.5-80/10, 1.3347, 1.4951;  $CH_3O$ , 89-91/10, 1.2316, 1.4712;  $C_2H_5O$ , 96-98/10, 1.1688, 1.4620;  $C_3H_7O$ , 110.5/11, 1.1421, 1.4600.

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USSR

UDC 542.952.1+661.718.1

NURETDINOVA, O. N., AREUZOV, B. A., GUSEVA, F. F., Institute of Organic and Physical Chemistry imeni A. Vs. Arbuzov, Academy of Sciences USSR

"The Effect of Salt Cation and the Solvent on the Isomerization of the Thirane Cycle Into the Thiethane Cycle in the Reaction of Thioepichlorohydrine With O,O-Diethyldithiophosphates of Alkali Metals"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 8, Aug 70, pp 1601-1602

Abstract: Reactions of thioepichlorohydrine with potassium, sodium, and ammonium O,O-diethyldithiophosphates were carried out in propanol, ethanol, and in water by heating the reagents for 2 hours at 60-70°C. It was found that the salt cation shows no effect on that reaction course. Depending on the solvent, however, the above reaction may yield either thioepoxyderivatives -- when ethanol or propanol are used -- or a mixture of isomeric compounds with the thioepoxy and thioethane structures, the later forming predominantly when aqueous alcohol or water are used as solvents.

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1/2 022 UNCLASSIFIED PROCESSING DATE--23OCT70  
TITLE--DIPOLE MOMENT AND CONFORMATION OF  
3,5-DIBENZYLIDENE, TETRAHYDRO, 4H, THIOPYRAN, 4, ONE AND ITS 1,1-DIOXIDE -U-  
AUTHOR--(04)-ARBUZOV, B.A., YULDASHEVA, L.K., ARSHINOVA, R.P., BALABANOVA,  
F.B.  
COUNTRY OF INFO--USSR  
SOURCE--IZV. AKAD. NAUK SSSR, SER. KHIM. 1970, (2), 448-50  
DATE PUBLISHED-----70  
SUBJECT AREAS--CHEMISTRY  
TOPIC TAGS--DIPOLE MOMENT, SULFONE, IR SPECTRUM, BENZENE DERIVATIVE,  
HETEROCYCLIC OXYGEN COMPOUND, KETONE, ORGANIC OXIDE  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAME--1997/0844 STEP NO--UR/0062/70/000/002/0448/0450  
CIRC ACCESSION NO--AP0119748  
UNCLASSIFIED

2/2 022 UNCLASSIFIED PROCESSING DATE--23OCT70  
CIRC ACCESSION NO--AP0119748  
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. CONDENSATION OF  
TETRAHYDRO,4H,THIOPYRAN,4,ONE WITH BZH GAVE THE 3,5,DIBENZYLIDENE  
DERIV., M. 150-1DEGREES, DIPOLE MOMENT 2.5 D. THE DIPOLE MOMENT OF ITS  
SULFONE, M. 198-9DEGREES, WAS 3.55 D. THUS, BOTH ARE IN THE "ENVELOPE"  
CONFORMATION, A CONCLUSION SUPPORTED BY IR SPECTRA. FACILITY:  
KHIM. INST. IM. BUTLEROVA, KAZAN. GOS. UNIV. IM. UL'YANOVA, LENINA,  
KAZAN, USSR.

UNCLASSIFIED

1/2 010 UNCLASSIFIED PROCESSING DATE--23OCT70  
TITLE--REFLECTION EFFECT IN DERIVATIVES OF  
TETRAMETHYLTETRAHYDROTHIOPYRAN, 4, ONE -U-  
AUTHOR-(04)-ARBUZOV, B.A., YULDASHEVA, L.K., ARSHINOVA, R.P., ZOLOVA, D.D.  
COUNTRY OF INFO--USSR *A*  
SOURCE--IZV. AKAD. NAUK SSSR, SER. KHIM. 1970, (3), 526-9  
DATE PUBLISHED-----70  
SUBJECT AREAS--CHEMISTRY  
TOPIC TAGS--ORGANIC SULFUR COMPOUND, HETEROCYCLIC OXYGEN COMPOUND, DIPOLE  
MOMENT, SULFUR OXIDE, SULFONE, MOLECULAR STRUCTURE  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRA--2000/0738 STEP NO--UR/0062/70/000/003/0526/0529  
CIRC ACCESSION NO--AP0124408  
UNCLASSIFIED

2/2 010 UNCLASSIFIED PROCESSING DATE--23OCT70  
CIRC ACCESSION NO--AP0124408  
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE EXPTL. DIPOLE MOMENT VALUE FOR  
2,2,6,6,TETRAMETHYLTETRAHYDRO,4,PYRONE IS 1.49 D, SULFOXIDE 1.58 D,  
SULFONE 2.45 D, TETRAHYDROTHIS,4,PYRONE 1.51 D, AND ITS SULFONE 2.41 D.  
FROM THESE DATA IT WAS CONCLUDED THAT ALL THESE COMPS. HAVE THE  
PREFERRED CHAIN CONFORMATION. INTRODUCTION OF GEM ME GROUPS IN THE 3  
POSITION RELATIVE TO THE CO GROUP CAUSES BUT SLIGHT DEFORMATION OF THE  
RING. FACILITY: KHIM. INST. IM. BUTLEROVA, KAZAN. GOS. UNIV.  
IM. UL'YANOVA LENINA, KAZAN, USSR.

UNCLASSIFIED

1/2 017 UNCLASSIFIED PROCESSING DATE--23OCT70  
TITLE--REACTION OF BENZOYL AND TRICHLOROACETYL ISOCYANATES WITH SCHIFF  
BASES -U-  
AUTHOR--(02)-ARBUZOV, B.A., MANNANOV, M.KH. *A*  
COUNTRY OF INFO--USSR  
SOURCE--IZV. AKAD. NAUK SSSR, SER. KHIM. 1970, (3), 617-21  
DATE PUBLISHED-----70  
SUBJECT AREAS--CHEMISTRY  
TOPIC TAGS--BENZENE DERIVATIVE, ORGANIC ISOCYANATE, SCHIFF BASE, KETONE,  
ORGANIC SYNTHESIS, AMINE DERIVATIVE, CHLORINATED ORGANIC COMPOUND,  
FLUORINATED ORGANIC COMPOUND, UREA  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAE--2000/0734 STEP NO--UR/0062/70/000/003/0617/0621  
CIRC ACCESSION NO--AP0124404  
UNCLASSIFIED



2/2 017

UNCLASSIFIED

PROCESSING DATE--23OCT70

CIRC ACCESSION NO--AP0124404

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. BZNCO AND BENZALBENZYLAMINE (I) IN ET SUB2 O REACTED UNDER CO SUB2 TO FROM IN 2 DAYS 90PERCENT 2,6-PHENYL, 3, BENZYL, 3, 4, DIHYDRO, 2H, 2, OXA, 3, 5, DIAZIN, 4, ONE, M. 124DEGREES. THIS AND DIOXANE WITH A TRACE OF CONCO. HCL HEATED 15 MIN GAVE 80PERCENT N, BENZOYL, N PRIME, BENZYLUREA, M. 168DEGREES, ALSO PREPO. FROM BZNCO AND PHCH SUB2 NH SUB2 IN ET SUB2 O. BZNCO AND P, DIMETHYLAMINOBENZALBENZYLAMINE IN ET SUB2 O SIMILARLY GAVE 80PERCENT 2, (P, DIMETHYLAMINOPHENYL), 3, BENZYL, 6, PHENYL, 3, 4, DIHYDRO, 2H, 1, OXA, 3, 5, DIAZINE, 4, ONE, M. 116-18DEGREES. P, CHLOROBENZALBENZYLAMINE GAVE SIMILARLY 85PERCENT 2, (P, CHLOROPHENYL), 3, BENZYL, 6, PHENYL, 3, 4, DIHYDRO, 2H, 1, OXA, 3, 5, DIAZIN, 4, ONE, M. 107-8DEGREES; SIMILARLY WERE PREPO. 75PERCENT 2, (P, BROMOPHENYL) ANALOG, M. 110-11DEGREES; AND P, ANISYL ANALOG, M. 105-7DEGREES. REACTION OF CCL SUB3 CONCO WITH I GAVE 80PERCENT 2, PHENYL, 3, BENZYL, 6, TRICHLOROMETHYL, 3, 4, DIHYDRO, 2H, 1, OXA, 3, 5, DIAZIN, 4, ONE, M. 151-3DEGREES, WHICH HEATED IN ME SUB2 CO-HCL 10 MIN GAVE N, TRICHLOROACETYL, N PRIME, BENZYLUREA, M. 106DEGREES, ALSO PREPO. FROM CCL SUB3 CONCO AND PHCH SUB2 NH SUB2. FACILITY: KAZAN. GOS. UNIV. IM. UL'YANOVA LENINAL, KAZAN, USSR.

REF ACCEIVED

1/2 014 UNCLASSIFIED PROCESSING DATE--23OCT70  
TITLE--ISOMERIZATION OF 3,4,EPOXYPHOSPHOLANES -U-  
AUTHOR-(03)-ARBUZOV, B.A., RAKOV, A.P., VIZEL, A.O.  
COUNTRY OF INFO--USSR *A*  
SOURCE--IZV. AKAD. NAUK SSSR, SER. KHIM. 1970, (1), 85-90  
DATE PUBLISHED-----70  
  
SUBJECT AREAS--CHEMISTRY  
TOPIC TAGS--ISOMERIZATION, ORGANIC PHOSPHORUS COMPOUND, HYDROXYL RADICAL,  
EPOXY COMPOUND, HYDRAZONE  
  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAE--1984/1589 STEP NO--UR/0062770/000700170035/0099  
CIRC ACCESSION NO--AP0100206  
UNCLASSIFIED

2/2 014

UNCLASSIFIED

PROCESSING DATE--23OCT70

CIRC ACCESSION NO--AP0100206

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. 3,4,EPOXYPHOSPHOLANES ARE ISOMERIZED IN BASIC MEDIA TO 2,PHOSPHOLEN,4,OLS. THE UNSYM. MEMBERS FORM THE ISOMER WITH PREDOMINANT TERTIARY HO GROUPING. TREATING 3,ETHOXY,3,OXO,6,3,OXAPHOSPHABICYCLO(3.1.0)HEXANE WITH ETONA-ETOH 12 HR, THEN REFLUXING 25 HR, GAVE ON ACIDIFICATION WITH HCL 74PERCENT 1,ETHOXY,1,OXO,2,PHOSPHOLEN,4,OL (I) (R EQUALS ETO, R PRIME1 EQUALS R PRIME2 EQUALS H), B SUB0.03 141-30DEGREES, N PRIME20 SUB0 1.4950, D PRIME20 1.2294.

1,METHYL,3,ETHOXY,3,OXO,6,3,OXAPHOSPHABICYCLO(3.1.0)HEXANE SIMILARLY GAVE 53.3PERCENT I, ETO, H, ME, B SUB0.045 116-17DEGREES, 1.4860, 1.1672, AND 4.4PERCENT I, ETO, ME, H, B SUB0.035 139-40DEGREES, 1.4960, 1.1799. 1,5,DIMETHYL,3,ETHOXY,3,OXO,6,3,OXAPHOSPHABICYCLO(3.1.0)HEXANE HEATED WITH ACON-ACONA 15 HR GAVE 35PERCENT I, ETO, ME, ME, B SUB0.03 138-9DEGREES, 1.4908, 1.1501, WHILE

1,5,DIMETHYL,3,PHENYL,3,OXO,6,3,OXAPHOSPHABICYCLO (3.1.0)HEXANE HEATED WITH ETOH-ET SUB3 N GAVE 50PERCENT I, PH, ME, ME, M. 198.5-9.5DEGREES. I, ETO, ME, H, OXIDIZED WITH K SUB2 CR SUB2 O SUB7-H SUB2 SO SUB4 TO A CRUDE CARBONYL COMPD. WHOSE 2,4,DINITROPHENYLHYDRAZONE, M. 184-50DEGREES, WAS IDENTIFIED AS II.

UNCLASSIFIED

Acc. Nr:

AP0100272

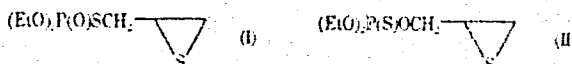
Abstracting Service:

CHEMICAL ABST.

Ref. Code:

UR 0062

111178v Interaction of O,O-diethyl S-(β-hydroxy-γ-chloro-propyl) dithiophosphate and β-hydroxy-γ-chloropropyl thioacetate with bases. Nuretdinova, O. N.; Arbutov, B. A. (Inst. Org. Fiz. Khim. im. Arbutova, Moscow, USSR). *Izv. Akad. Nauk SSSR, Ser. Khim.* 1970, (1), 145-7 (Russ). Heating 38.5 g adduct of (EtO)<sub>2</sub>PS<sub>2</sub>H and epichlorohydrin with 15 g Et<sub>3</sub>N in MePh 40 min gave Et<sub>3</sub>N.HCl and I, b<sub>10</sub> 117-19°, d<sub>4</sub><sup>20</sup> 1.2213, n<sub>D</sub><sup>20</sup> 1.5160. Reaction of 6.5 g (EtO)<sub>2</sub>PCl at -15° in Et<sub>2</sub>O with 3.8 g thioglycidol and Et<sub>3</sub>N gave the crude phosphite, d<sub>4</sub><sup>20</sup> 1.1150, n<sub>D</sub><sup>20</sup>



1.4700, which with S in C<sub>6</sub>H<sub>6</sub> gave II b<sub>10</sub> 101-3, 1.4891, 1.4960, also formed when KOH was used as the base in this reaction, run in EtOH soln. Treating AsSCH<sub>2</sub>CH(OH)CH<sub>2</sub>Cl with KOH in EtOH gave 44% 3-thietanyl acetate, b<sub>10</sub> 71-2°, 1.1718, 1.4935, which with alc. KOH gave 3-thietanol, b<sub>10</sub> 80-1°, 1.2140, 1.5110. Propylene oxide added with cooling to (EtO)<sub>2</sub>PS<sub>2</sub>H and the mixt. heated briefly to 80-90° gave propylene sulfide, b. 73°. Reaction schemes are proposed. G. M. Kosolapoff

REEL/FRAME

19841668

1/2 026 UNCLASSIFIED PROCESSING DATE--13NOV70  
TITLE--SYNTHESIS AND STUDY OF THE ANISOTROPY OF POLARIZABILITY AND DIPOLE  
MOMENTS OF SOME COMPOUNDS OF THE ENDOXYCYCLOHEXANE SERIES -U-  
AUTHOR-(04)-VERESHCHAGIN, A.N., GROZINA, L.A., KHAMATULLINA, I.M.,  
ARBUZOV, B.A.  
COUNTRY OF INFO--USSR  
SOURCE--IZV. AKAD. NAUK SSSR, SER. KHIM. 1970, (4), 792-7  
DATE PUBLISHED-----70  
SUBJECT AREAS--CHEMISTRY  
TOPIC TAGS--ANISOTROPY, DIPOLE MOMENT, ORGANIC SYNTHESIS, CYCLOHEXANE,  
FURAN, OXIDATION, PHTHALIC ACID, EPOXY COMPOUND, DIELECTRIC PROPERTY,  
NITRILE  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAME--3006/1003 STEP NO--UR/0062/70/000/004/0792/0797  
CIRC ACCESSION NO--AP0134715  
UNCLASSIFIED

2/2 026

UNCLASSIFIED

PROCESSING DATE--13NOV70

CIRC ACCESSION NO--AP0134715

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. CONVENTIONALLY PREPD. DIELS ALDER ADDUCTS OF FURAN WERE OXIDIZED WITH HCO SUB2 H,H SUB2 O TO TRANS,1,2,DICYANO,4,5,EPOXY,3,6,ENDOXYCYCLOHEXANE, M. 124-6DEGREES, AND THE CIS ISOMER, M. 123-4DEGREES, WHOSE DIPOLE MOMENTS, FROM DIELEC. DATA, WERE, RESP., 2.92 AND 5.62 D. THE FOLLOWING DIPOLE MOMENTS AND KERR CONSTS. (M PRIMEKX1012), RESP., WERE REPORTED: 3,6 ENDOXO,DELTA PRIME4,TETRAHYDROPHTHALIC ANHYDRIDE, 5.53, NEGATIVE 99.6; TRANS,1,2,DICYANO,3,6,ENDOXY,4,CYCLOHEXENE, 3.18, 65.8; CIS ISOMER, 5.55, 468.7; TRANS,1,3,DICYANO,4,5,EPOXY,3,6,ENDOXYCYCLOHEXANE, 2.92, NEGATIVE 31.8; CIS ISOMER, 5.62, 404.2; AND 4,5,EPOXY,3,6,ENDOXYHEXA,HYDROPHTHALIC ACID, 4.03 NEGATIVE. OXIDN. OF DIELS ALDER ADDUCTS OF FURAN WITH DINITRILES YIELDS EXO EPOXY DERIVS. FACILITY: KAZAN. GOS. UNIV. IM. UL'YANOVA-LENINA, KAZAN, USSR.

UNCLASSIFIED

USSR

UDC: 542.91 - 547.781

*A*  
AREUZOV, B.A., ZOBOVA, N.H., and BALABANOVA, F.B., Kazan' State University imeni V.I. Ul'yanov-Lenin, Kazan, Ministry of Higher and Secondary Specialized Education RSFSR

"Synthesis of 3-Benzoyl- and 3-Trichloroacetyl-2-imidazolidinones"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 2, Feb 70, pp 447-448

Abstract: Ethylenimine reacts energetically with benzoyl isocyanate and trichloroacetyl isocyanate at 0° in the absence of a catalyst to give the corresponding 3-benzoyl- and 3-trichloroacetyl-2-imidazolidinones. The composition and structure of the resultant adducts were confirmed by data from elementary analysis and IR spectra and by chemical transformations.

1/1

USSR

UDC 542.91:547.1.118

AREUZOV, B. A., BELKIN, YU. V., and POLEZHAYEVA, N. A., Chemical Institute  
Imeni A. M. Butlerov, Kazan' State University Imeni V. I. Ul'yanov-Lenin

"Reaction of Benzylidenephnylsulfonylacetophenone With Trimethyl Phosphite  
and tris(Dimethylamino)phosphine"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 5, May 73,  
pp 1107-1112

Abstract: Benzylidenephnylsulfonylacetophenone (I) reacts with trimethyl phosphite ( $80^{\circ}$ ,  $C_6H_6$ ), yielding 2,2,2-trimethoxy-3,5-diphenyl-4-phenylsulfonyl-1,2-oxaphospholene-4 (II). At high temperatures ( $160^{\circ}$ ) two processes take place concurrently: isomerization of the phosphorane (II) with formation of the dimethyl ester of 1,3-diphenyl-2-phenyl-sulfonyl-3-methoxypropene-2-phosphonic acid, and decomposition of the phosphorane (II) to yield the starting materials, accompanied by breaking of the P-C bond. Reaction of the phosphorane (II) with proton donor reagents leads to an opening of the phosphorane ring at the P-O bond, yielding the dimethyl ester of 1-phenyl-2-benzoyl-2-phenyl-sulfonylethanephosphonic acid. (I) reacts with tris(dimethylamino)-phosphine yielding a 1:1 addition product with a P-C bond and a bipolar structure.

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USSR

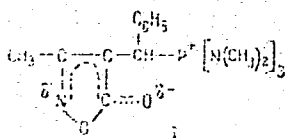
UDC 547.241

AREJZOV, B. A., DIANOVA, E. M., and VINOGRADOVA, V. S., Chemical Institute imeni A. M. Butlerov and Kazan State University imeni V. I. Ul'yanov-Lenin

"Reaction of 3-Methyl-4-benzylidenisoxazolinone-5 and 1,3-diphenyl-4-benzylidene-pyrazolone-5 With Tri(dimethylamino)phosphine"

Leningrad, Zhurnal Obschey Khimii, Vol 42(104), Vyp 4, 1972, pp 750-753

Abstract: The title reactions result in the formation of 1:1 bipolar adducts. The adduct (I) of the 3-methyl compound is soluble only in polar



solvents; however, the adduct of the diphenyl compound is soluble in a wider range of solvents. Trace amounts of the product formed by the condensation of two pyrazalone rings were detected. Physical properties, NMR data, IR spectra, and experimental procedures are given.

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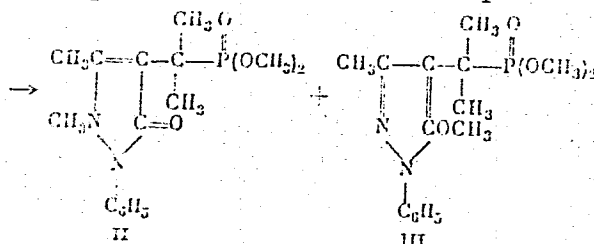
UDC 547.775.547.26'113

ARBUZOV, B. A., DIANOVA, E. N., VINOGRADOV, V. S., and PETROVA, M. V., Chemical Institute imeni A. M. Butlerov and Kazan State University imeni V. I. Ul'yanov-Lenin

"Reaction of Trimethyl Phosphite With 1-Phenyl-3-methyl-4-isopropylidene-pyrazolone-5"

Leningrad, Zhurnal Obshchey Khimii, Vol 42(104), Vyp 4, 1972, pp 746-749

Abstract: The title reaction does not occur at room temperature; however, if the reactants are allowed to react for 6 hours at 130°C in an atmosphere of dry nitrogen, two products are formed: compound (II), if the entering methyl group bonds to the 2-nitrogen and compound (III), if the methyl group bonds to the keto oxygen. The two products are difficult to separate.



1/2

USSR

UDC 661.718.1+547.38+547.514

FUZHENKOVA, A. V., ZINKOVSKIY, A. F., SAVCHENKO, L. YA., and ARBUZOV, B. A.,  
Chemical Scientific-Research Institute imeni A. M. Butlerov affiliated with the  
Kazan State University imeni V. I. Ul'yanov-Lenin

"Reaction of Fencyclone With Trialkyl Phosphite in the Presence of Acetic  
Anhydride"

Leningrad, Zhurnal Obshchey Khimii, Vol 42(104), Vyp 4, 1972, pp 754-756

Abstract: The title reaction may go via two pathways ( $R = CH_3$  and  $C_2H_5$ ):

USSR

UDC 542.91:547.1'118

AREUZOV, B. A., KRUPNOV, V. K., and VIZEL', A. O., Institute of Organic and Physical Chemistry Imeni A. Ye. Arbuzov, Acad. Sc. USSR

"A new Method for Synthesis of 1-Halo-1-thioxophospholenes"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 5, May 73, pp 1176-1177

Abstract: A one stage synthetic method for 1-halo-1-thioxophospholene is described. Best results were obtained by using a 3:3:1 ratio of the diene:  $PX_3:P_2S_5$ . As a rule mixtures of phospholenes-2 and phospholenes-3 were obtained. Only in the reaction of 2,3-dimethylbutadiene-1,3 with  $PBr_3$  and  $P_2S_5$  a single product was obtained -- 1-bromo-1-thioxo-3,4-dimethylphospholene-3.

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USSR

UDC 542.91:547.1'118

AREUZOV, B. A., POLEZHAYEVA, N. A., and VINOGRADOVA, V. S., Chemical Institute  
Imeni A. M. Butlerov, Kazan' State University Imeni V. I. Ul'yanov-Lenin

"Structure of the Products Obtained in the Reaction of Trimethyl Phosphite  
With N-Acetyltrichloroacetalimine"

Moscow, Izvestiya Akademii Nauk SSSR, Seriya Khimicheskaya, No 5, May 73,  
pp 1112-1116

Abstract: Several products are obtained from the reaction of N-acetyltrichloroacetalimine [ATD] with trimethyl phosphite, depending on the reaction conditions. When the reaction is carried out at  $-13^{\circ}$ , two crystalline products are obtained: dimethyl ester of  $\alpha$ -(N-acetyl)-amino- $\beta$ ,  $\beta$ -trichloroethylphosphonic acid (I), m. p.  $150.5-151^{\circ}$ , and the dimethyl ester of  $\alpha$ -(N-acetyl) amino- $\beta$ ,  $\beta$ -dichlorovinylphosphonic acid (II), m.p.  $98-99^{\circ}$ . The same reaction carried out without cooling is exothermic, the temperature of the reaction mixture rising to  $40-45^{\circ}$ , and it yields the phosphonate (I) plus an addition product of 1 mole of trimethyl phosphite to 2 moles ATD. The melting point of this addition product is  $153.5-154^{\circ}$ . With cooling to  $-40^{\circ}$  the reaction products are (I), (II), and an inseparable mixture of several liquid products.

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1/2 022 UNCLASSIFIED PROCESSING DATE--16OCT70  
TITLE--AUTOMATIC SLIDEBACK INSTRUMENT -U-

AUTHOR--(04)-ARBUZOV, I.A., KUZNETSOV, A.S., RAVKIN, A.I., TIL, A.V.

COUNTRY OF INFO--USSR

SOURCE--U.S.S.R. 245906

REFERENCE--OTKRYTIYA, IZOBRET., PROM. OBRAZTSY, TOVARNYE ZNAKI NO 20  
DATE PUBLISHED--19NOV69

SUBJECT AREAS--ELECTRONICS AND ELECTRICAL ENGR., METHODS AND EQUIPMENT

TOPIC TAGS--AMPLITUDE RANGE INDICATOR, PHASE MEASUREMENT, TRANSDUCER,  
ELECTRIC MEASURING INSTRUMENT, PATENT

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAE--1994/0956

STEP NO--UR/0482/69/000/000/0000/0000

CIRC ACCESSION NO--AA0114989

UNCLASSIFIED

2/2 022

UNCLASSIFIED

PROCESSING DATE--16OCT70

CIRC ACCESSION NO--AA0114989

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. AUTOMATIC SLIDEBACK INSTRUMENT TO MEASURE AMPLITUDE AND PHASE OF AN AC VOLTAGE HAS IN BOTH CHANNELS, MECHANICALLY COUPLED WITH THE SERVO MOTORS, TWO TRANSDUCERS TO CONVERT AN ANGLE OF TURN OF THE MOTOR SHAFT INTO A VOLTAGE. ONE OF THESE TRANSDUCERS IS LINKED THROUGH A SCALER TO A SIGNAL AMPLIFIER TO PROCESS THE COMPENSATING VOLTAGE AND THE OTHER, WHICH IS FED FROM A SEPARATE SOURCE, PROCESSES THE VOLTAGE WHICH IS APPLIED TO A VECTOR PLOTTER AS A COMPONENT OF THE VECTOR. THE PLOTTER FEEDS BOTH THE AMPLITUDE PROCESSOR AND THE PHASE PROCESSOR, EACH WITH ITS OWN SCALE. HANDLES ARE PROVIDED FOR A MANUAL ADJUSTMENT OF THE VECTOR COMPONENTS.

UNCLASSIFIED

USSR

UDC 661.55

ARBUZOV, M. P., KHAYENKO, B. V., and KACHKOVSKAYA, E. T., Institute of the Problems of Material Science, Academy of Sciences UkrSSR

"Investigation of the Real Structure of Titanium Mononitride in the Region of Its Homogeneity"

Kiev, Poroshkovaya Metallurgiya, No 6(126), Jun 73, pp 69-74

**Abstract:** The boundaries of the homogeneity region of titanium mononitride, the concentration dependence of its lattice periods, and its density in the annealed and tempered (from 1400°C) states are specified for equilibrium samples. After annealing and tempering, titanium mononitride possesses throughout the whole homogeneity region a NaCl-type structure with statistical disposition of titanium atoms in the metallic sublattice and of nitrogen atoms in the metalloid sublattice. The actual disposition of the atoms in sublattices is explained by a comparison of values of reflection factors and theoretically calculated values. The degree of filling each of the sublattices with titanium and nitrogen atoms, depending on the nitrogen content of titanium mononitride, is determined. Two figures, two tables, six formulas, twelve bibliographic references.

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USSR

UDC 669.25:539.261

AREUZOV, M. P., PAVLYUKOV, A. A., and OPANASENKO, O. S., Institute of Problems of Material Science, Academy of Sciences UkrSSR

"Initial Stages of Aging of Co-Al Alloys"

Moscow, Fizika Metallov i Metallovedeniye, Vol 30, No 5, 1970, pp 1105-1107

Abstract: In order to study possible changes in the structure of the Co-Al (14.6 wt.%) alloy in the earlier stages of aging, the authors studied the structure and coercive force of the alloy using thin (0.3-0.5 mm) Single crystal specimens, annealed in a cooled 10% aqueous solution of NaOH. X-ray studies were performed using monochromatic  $\text{NiK}_\alpha$  radiation. The experimental data

agree well with calculated results from an earlier work. Based on the data and that of earlier works, the authors suggest the following plan for the aging process of the alloy. In the initial stages of decomposition, chaotically placed, three-dimensionally modulated complexes are formed in the supersaturated  $\beta'$  solid solution. As the aging temperature increases, the size of the complexes increases, leading at 450° to formation of the  $\alpha'$  phase, having a

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USSR

ARBUZOV, M. P., et al, Fizika Metallov i Metallovedeniye, Vol 30, No 5, 1970, pp 1105-1107

hexagonal close-packed lattice. As the  $\alpha'$  phase contacts the impoverished matrix, "monoclinic" distortions arise in the matrix as a result of elastic shift of the atomic  $\{110\}$  planes in the  $\langle 110 \rangle$  directions. At higher aging temperatures ( $700^\circ$ ), packing errors appear in the  $\alpha'$ -phase crystals. After aging at  $750^\circ$ , the structure of the alloy consists of two phases --  $\beta'$  and  $\alpha$ . Since packing errors in the  $\alpha'$  phase arise before appearance of the  $\alpha$  phase in the structure of the alloy, it is possible that they act as seeds for the cubic crystals of the  $\alpha$  phase.

2/2

1/2 024 UNCLASSIFIED PROCESSING DATE--23OCT70  
TITLE--RECRYSTALLIZATION PROCESSES IN NI SUB3 AL-NI SUB3 NB ALLOYS -U-  
AUTHOR-(02)-ARBUZOV, M.P., CHUPRINA, V.G. *A*  
COUNTRY OF INFO--USSR  
SOURCE--UKR. FIZ. ZH. (RUSS. ED.) 1970, 15(2), 228-30  
DATE PUBLISHED-----70  
SUBJECT AREAS--MATERIALS  
TOPIC TAGS--NICKEL ALLOY, NIOBIUM ALLOY, ALUMINUM ALLOY, METAL  
RECRYSTALLIZATION, INTERMETALLIC COMPOUND, METAL DIFFUSION  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAME--1996/1943 STEP NO--UR/0185/70/015/002/0228/0230  
CIRC ACCESSION NO--AP0118905  
UNCLASSIFIED

2/2 024 UNCLASSIFIED PROCESSING DATE--23JCT70  
CIRC ACCESSION NO--4P0113905  
ABSTRACT/EXTRACT--(U) GP-G- ABSTRACT. THE RECRYSTN. OF THE GAMMA PRIME  
PHASE WAS STUDIED IN NI SUB3 AL-NI SUB3 NB ALLOYS BY THE X-RAY POWDER  
METHOD. A CONVENTIONAL TEMP. OF RECRYSTN. WAS DETD., I.E. THE ANNEALING  
TEMP. OF DEFORMED POWDER AT WHICH AN UNDISTORTED GRAIN GROWS FOR AN HR  
UP TO THE DIMENSIONS OF 10 PRIME NEGATIVE 4 -10 PRIME NEGATIVE 3 CM. AN  
INCREASE IN THE NI SUB3 NB CONCN. INCREASES THE RECRYSTN. TEMP. OF THE  
GAMMA PRIME PHASE. THIS IS PROBABLY DUE TO THE DECELERATING EFFECT OF  
NB ON THE DIFFUSION MOBILITY OF ATOMS IN THE NI SUB3 AL ALLOY.  
FACILITY: INST. PROBL. MATERIALOVED., KIEV. USSR.

UNCLASSIFIED