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The report contains abstracts on adsorption phenomena, aerosols, alkaloids, analytical, electro- and biochemistry, coal gasification, combustion and explosives, environmental pollution, food technology, free radicals, ion exchange, organometallic and organophosphorus compounds, pesticides, industrial toxicology, petroleum processing technology, radiation chemistry, and related fields.
USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

CHEMISTRY

No. 49

This serial publication contains abstracts of articles from USSR and Eastern Europe scientific and technical journals on the specific subjects reflected in the table of contents.

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Adsorption

USSR

ZOLOTAREV, P. P. and ULIN, V. I., Institute of Physical Chemistry of the Academy of Sciences USSR, Moscow

APPROXIMATE SOLUTION OF THE PROBLEM OF INTERNAL DIFFUSION IN A BIPOROUS ADSORBENT FOR STRONGLY CONVEX ADSORPTION ISOTHERMS

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA IN Russian No 5, May 76 signed to press 6 Feb 76 p 1190

[Abstract] The authors examine internal diffusion in adsorbents with biporous structure for the case of adsorption isotherms that reach saturation rapidly enough to be approximated by a right angle. These are typical of adsorption of gas and vapor by zeolite and activated charcoal. Such a rectangular isotherm \((a = 0, c = 0; a = a_0, c > 0)\) leads to a finite zone of adsorption perturbation in the granule at finite time \(t\). The boundary of this zone \(Z(t)\) moves as a function of time. The law in found for the change in width of the adsorption wave front \(a(x)\) with time. The law of motion of the wave front is related to the moments of the kinetic curve of the adsorbent granule by the expression

\[
1/2
\]

USSR

ZOLOTAREV, P. P. and ULIN, V. I., IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA No 5, May 76 p 1190

\[
M_1 = M_{x1} + \frac{1}{b} \int_0^b t_*(x) \, dx
\]

where \(M_{x1}\) is the first moment of the kinetic function of the microporous formations (for diffusion kinetics \(M_{x1} = r_0^2/15D_a\), \(r_0\) is the size of the microporous formations; \(D_a\) is the coefficient of diffusion in these formations; \(b\) is the size of a granule; \(t_*(x)\) is the inverse function of \(Z(t)\). This formula can be used to find the coefficients of internal diffusion \(D_i\) and \(D_a\). Reference 1 Russian.
Analytical Chemistry

USSR

UDC 614.72-074:546.264-31:543.422.4

DMITRIYEV, M. T., doctor of chemical sciences, and KIRPRIN, V. I., candidate of technical sciences, Institute of General and Communal Hygiene imeni A. N. Sysin, Academy of Medical Sciences, Moscow

INFRARED-PHOTOMETRIC AUTOMATIC DETERMINATION OF CARBON DIOXIDE IN THE AIR

Moscow GIGIYENA I SANITARIYA in Russian No 7, Jul 76 signed to press
17 Dec 75 pp 84-88

[Abstract] A diagram and operating principle are presented for an automatic station for sanitary-hygienic determination of carbon dioxide gas in the air based on an IR analyzer. The device is designed to sample the air in a number of rooms or areas automatically in sequence. Recordings of the concentration of carbon dioxide in various rooms in an apartment over a 24-hour period are presented as an example of the operation of this device. Peaks clearly show the arrival of the occupant of the apartment, periods of activity, sleep, and departure of the occupant. Figures 2; Table 1; References 6 (Russian).

1/1

USSR

UDC 615.47:614.71-074

URBANSKII, V. M., Shuma Sanitary-Epidemiological Station

AN INSTALLATION FOR TAKING AIR SAMPLES UNDER FIELD CONDITIONS

Moscow GIGIYENA I SANITARIYA in Russian No 7, Jul 76 signed to press
23 Jun 75 pp 95-96

[Abstract] A simple method has been developed for sampling air under field conditions. An air sample is drawn through the absorber of filter cartridge using the vacuum generated by the intake system of a car, truck or motorcycle, utilizing a system of hoses and connectors as illustrated in a figure which accompanies the article. Figure 1.

1/1
LIPKIND, G. M., MAKSUMOV, I. S., and POPOV, YE. M., Institute of Bioorganic Chemistry imeni M. M. Shemyakin, Academy of Sciences USSR, Moscow

THEORETICAL CONFORMATIONAL ANALYSIS OF NONVALENT COMPLEXES OF α-CHYMOTRYPSIN WITH N-ACETYL-L-TRYPTOPHAN METHYLAMIDE AND N-ACETYL-L-ALANYL-L-ALANYL-L-TRIPTOPHANYL-L-ALANINE

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 2, No 7, Jul 76 signed to press 30 Dec 75 pp 966-977

[Abstract] Theoretical analysis is used to study the conformational aspects of the interaction of α-chymotrypsin with N-acetyl-L-tryptophan methylamide and N-acetyl-L-alanyl-L-alanyl-L-triptophanyl-L-alanine. It is shown that the productive bonding of the substrate is achieved only in the lowest energy conformation of the complex. A study is made of the dependence of the position of the side chain of the Ser195 group on orientation of the cleaved group. It is noted that the formation of a Michaelis complex with α-chymotrypsin occurs in a way such that only the substrate preferential as to conformational energy in the active center is productive, with one of the low energy forms of the free substrate. Figures 5; Tables 4;
References 33: 7 Russian, 26 Western.
1/1
Environmental Pollution

UDC 628.33 + 628.543

KOGANOVSKIY, O. M., doctor of chemical sciences, LEVCHENKO, T. M., candidate of chemical sciences, and GORA, L. M.

POSSIBILITIES FOR UTILIZING PURIFIED SEWAGE WATERS IN CLOSED WATER SUPPLY SYSTEMS IN BUSINESS PLANTS

Kiev VISNYK AKADEMII NAUK UKRAYINS'KOYI RSR (Herald of the Academy of Sciences, Ukrainian SSR) in Ukrainian No 8, Aug 76 pp 86-90

[Abstract] Introduction of closed water supply circuits is advocated for industrial purposes. The technological schematics for such a system consists of: 1) adsorption of residual organic compounds over activated charcoal, 2) regeneration of the spent charcoal, supplement with fresh material and recycling, 3) lowering concentration of salt by means of ion exchange systems, and 4) regeneration of the resins and recycling. The system is beginning to be economically feasible and should be introduced into practice during the next Five Year Plan. One table, no figures or references.

1/1

UDC 613.632.4:661.731]-074

SHAPOSHNIKOV, YU. K., and KONDAKOVA, L. V., candidates of chemical sciences, and KIRILLOVA, N. N., and LEBEDEV, M. A., Scientific Research Institute for Sanitary and Industrial Purification of Gases (Dzerzhinsk Branch)

STUDY OF THE COMPOSITION OF GAS EXHAUST FROM THE PRODUCTION OF NUTRIENT ACETIC ACID

Moscow GIGIYENA I SANITARIYA in Russian No 7, Jul 76 signed to press 29 Apr 75 pp 110-111

[Abstract] The processes involved in purification of acetic acid in the production of the edible product liberate volatile substances of unknown qualitative and quantitative composition into the air of the working areas. Samples were taken to determine the content of the air in the working areas by chromatographic methods. The results of the analysis indicate that the air requires purification due to the high concentrations of certain substances. Substances found included acetic acid, propionic acid, sulfur dioxide and aldehydes and ketones. Figures 2; Table 1.

1/1

PROBLEMS OF LABOR HYGIENE IN THE PRODUCTION OF ENAMELED WIRE WITH POLYESTER INSULATION

Moscow GIGIYENA I SANITARIYA in Russian No 7, Jul 76 signed to press
30 Jun 75 pp 106-107

[Abstract] Medical examination of 120 persons working at vertical wire enameling machines utilizing polyester insulation revealed a large number of complaints of pains in the upper and lower extremities, changes in menstrual cycles, itching, dryness, periodic reddening of the skin, edema and painful areas in the skin, dryness of the nasopharynx, pain in the right mediastinum and epigastral area. Objective examination confirmed these complaints. Results of the studies indicate the need to improve health conditions, primarily by replacing obsolete equipment, increasing the effectiveness of catalytic combustion of the products of destruction of varnishes, development of closed type varnish baths with centralized varnish feed. Construction and sanitary-medical measures are also recommended.

1/1

DUSHUTIN, K. K., and SOPACH, E. D.

ROLE OF THE REACTION OF DIMETHYLAmine WITH NITROGEN TETROXIDE AND OZONE IN AIR POLLUTION

Moscow GIGIYENA I SANITARIYA in Russian No 7, Jul 76 signed to press
24 Jun 75 pp 14-18

[Abstract] A study is made of the interaction of DMA with nitrogen tetroxide and ozone in binary mixtures at concentrations of 10^{-7} mol/l (10 mg/m^3) in the air and the degree of influence of these reactions on the sanitary condition of the atmosphere is determined. All studies were performed under laboratory conditions at normal air pressure and 20+1 C in a cylindrical chamber 0.5 m in diameter with a total volume of 120 l. It is found that under these conditions with an initial concentration of 10 mg/m^3, DMA in a gas phase reaction with nitrogen tetroxide forms N-nitrosodimethylamine, aerosols of N-dimehtylnitramine and DMA nitrate. Under the conditions, ozone breaks down DMA to formaldehyde. The reaction of DMA with nitrogen tetroxide and ozone at 10 mg/m occurs with a half conversion time of less than 10 minutes at 20+1 C. This is significantly faster than the photochemical oxidation of hydrocarbons in the air. The reaction of DMA with nitrogen tetroxide has negative hygienic results, since it produces the active carcinogen NDMA and finely dispersed aerosols reducing the visibility. Figures 2; Tables 3; References 20: 16 Russian, 4 Western.

1/1
SCIENTIFIC AND TECHNICAL PROGRESS AND IMPROVEMENT OF THE SANITARY CONDITION OF BODIES OF WATER NEAR OIL REFINERIES AND PETROCHEMICAL ENTERPRISES

Moscow GIGIYENA I SANITARIYA in Russian No 7, Jul 76 signed to press 4 Aug 75 pp 7-10

[Abstract] Combined investigations concerning the hygienic effectiveness of measures for the protection of bodies of water undertaken at enterprises in the oil and petrochemical industry demonstrate that the degree of water pollution by oil refinery and petrochemical plant waste waters has been greatly reduced. Figures are quoted indicating the factors by which the number of improved low-leakage pumps and other improved varieties of equipment has increased in the oil industry in Bashkiria over the past few years. This has resulted in a decrease in losses of 31%, with a total increase in production volume of 11.8%. Waste water treatment plants have also been installed, reducing the level of pollution of Bashneftekhimzavod (Bashkir Petrochemical Plant) by 69.9%, including elimination of approximately 99% of the phenols. More work remains to be done in this area, however. Tables 2.

1/1

THE ROLE OF SYNTHETIC CLEANSERS IN PREVENTING INDUSTRIAL DERMATITIS

Moscow KHIMICHESKAYA PROMYSHLENOST' in Russian No 8, Aug 76 pp 631-632

[Russian abstract provided by the source]

[Text] An examination is made of the part played by synthetic cleansers class DNS-AK (disodium sulfosuccinate and alkylolamides of aliphatic acids) in preventing industrial dermatitis. It is found that the detergent does not cause changes in the epidermal barrier, skin irritation or para-allergic reactions. The intensity of the action of synthetic detergents on the skin depends on the alkalinity of soap. The most effective synthetic detergents, including those containing complexing compounds, are recommended for extensive use in metalworking, machine building, asbestos cement, construction and other branches of industry.
NEMENKO, A. A., and YUSHCHENKO, V. A.

DERMATOLOGICAL CHARACTERISTICS OF NONIONIC SURFACTANTS

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 8, Aug 76 p 630

[Russian abstract provided by the source]

[Text] An examination is made of the results of an experimental study of the effect of nonionic surfactants on the skin. It is found that an increase in threshold concentrations of hydroxyethylated alcohols and alkylphenols is directly related to an increase in the number of moles of ethylene. It is shown that hydroxyethylated alkylphenols with a number of moles of ethylene oxide of less than 10 induce sensitization. Hydroxyethylated alcohols show no sensitizing action. The data given in the paper are of importance in forecasting the future development of nonionic surfactant production. Table 1.

OGANESOV, S. G., REZNIKOV, I. G., and VAVILOV, A. M.

SKIN ACTION OF SYNTHETIC DNS-AU CLEANSING AGENT

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 8, Aug 76 pp 628-629

[Russian abstract provided by the source]

[Text] The authors examine data of an experimental clinical study of the way the skin is affected by a synthetic cosmetic detergent based on disodium salt of monoesters of sulfosuccinic acid and alkylolamides of undecylenic acid [DNS-AU]. It is found that the threshold concentration of skin-irritating action is 29.7% of the active agent in aqueous solution, and the subthreshold concentration is 21.3%. In the subthreshold concentration, the preparation induces only nonspecific changes in the reactive state of experimental animals. The results of a clinical study of 15 patients with dry seborrhea of the scalp showed that DNS-AU detergent has a symptomatic effect. References 7: 3 Russian, 4 Western.
DERMATOLOGICAL EVALUATION OF THE QUALITY OF SYNTHETIC SKIN-CLEANSERS

Moscow KHIMICHESKAYA PROMYSHLENOST' in Russian No 8, Aug 76 pp 627-628

[Abstract] The paper gives the results of a dermatological study of synthetic skin cleansers based on surfactants most frequently used for these toilet goods. The analysis covered ten shampoos based on alkyl sulfates, ten based on disodium sulfosuccinates (DDS) and ten based on alkyl sulfates combined with DSS. The threshold concentrations of surfactants leading to irritation with skin application were determined. Clinical tests were done on 216 subjects in good health and 412 patients suffering from dermatitis. The results show that detergents based on DSS can be used both by healthy people and by those suffering from psoriasis, eczema, neurodermitis and seborrhea.

1/1
USSR


of gamma radiolysis of TS involve accumulation of an intermediate product that leads to a transformation switching the chain of the more active radical to the less active radical. Figures 6; Table 1; References 15: 9 Russian, 6 Western.

USSR

UDC 628.543.566.085
628.543.15;661.185.1
628.543.49.085


COMPARISON OF RADIATIVE AND BIOCHEMICAL DESTRUCTION OF SURFACTANTS

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 8, Aug 76 pp 620-621

[Abstract] Experiments were done on radiation purification of tannery wastes containing various surfactants, dyes, compensators, wetting agents and several other organic and inorganic pollutants. Cobalt-60 was used as the gamma source, and the treatment was combined with aeration. It was found that the products of radiolysis of biologically unoxidizable surfactants are oxidizable, as confirmed by the reduction in C.O.D. and B.O.D. The ratio of biochemical to chemical oxygen demand is a criterion of radiation purification. It is found that the end products of biochemical and radiation oxidation of surfactants are similar, but biochemical oxidation is sensitive to the structure of alkyaryl sulfonates, while radiation treatment oxidizes all surfactants regardless of structure. Table 1; References 8: 6 Russian, 2 Western.

1/1
FOAM-RADIATION REMOVAL OF SYNTHETIC SURFACTANTS FROM WASTE WATER

Moscow KHIRICHESKAYA PROMYSHLNOST' in Russian No 8, Aug 76 pp 618-620

[Text] The paper describes a method of removing surfactants from waste water by combining foam fractionation with radiation treatment of the foam for surfactant degradation in one or two devices. A material balance equation is derived for the foam-radiation equipment, and results of foam treatment with accelerated electrons are given, partly confirming this equation. The proposed method can be used to treat wastes with a high surfactant concentration that cannot be treated by the method of foam fractionation. Figures 2; Table 1; References 2: 1 Russian, 1 Western.

BIOCHEMICAL REMOVAL OF SURFACTANTS FROM WASTE WATERS

Moscow KHIRICHESKAYA PROMYSHLNOST' in Russian No 8, Aug 76 pp 616-617

[Abstract] An investigation was made of biochemical purification of waste water containing sulfonol chloride from the Sumgait Chemical Combine. This compound is present in most Soviet synthetic washing detergents. Treatment was done by agitation aeration tanks with the addition of biogenic elements in the form of nitrogen (15-20 mg/l) and phosphorus salts (5 mg/l) for 16 hours. The C.O.D. was reduced from 100 to 36.7 mg O2/l, and the B.O.D. was reduced to 63.2 to 12.5 mg/l. Degree of surfactant removal was 77%. In tests on biochemical oxidation of wastes containing various surfactants combined with sewage, degradation of surfactants was 87% effective for an initial concentration of about 30 mg/l, and the degree of purification was 99% with respect to B.O.D., and 95% with respect to C.O.D. The results show that this type of industrial waste should be combined with sewage before treatment to improve effectiveness. References 5 Russian.
BLAST DIAMONDS AND SOME OF THEIR PROPERTIES

Kiev VISNYK AKADEMII NAUK UKRAYINS'KOI RSR [Herald of the Academy of Sciences, Ukrainian SSR] in Ukrainian No 8, Aug 76 pp 40-43

[Abstract] Experimental results showed it to be possible to obtain diamonds with high physical-mechanical and utilization properties by converting graphite to diamond under blast energy. These diamonds may be used along with ACH diamonds in preparation of instruments, pastes, suspensions, corundums, special ceramics and other ultrahard materials. Figures 2; Table 1; References 9: 8 Russian, 1 Western.

HYGIENIC PROPERTIES OF PVC PIPES STABILIZED WITH LEAD COMPOUNDS

Moscow PLASTICHESKIYE MASSY in Russian No 7, Jul 76 p 71

[Abstract] Pipes made from rigid PVC with lead sulfate, tribasic, and lead stearate, dibasic, used as stabilizers were tested for migration of lead into the water flowing through the pipes. It is found that pipes are suitable for use in water supply systems if the lead-containing stabilizer concentration is 2.5 wt.% and two wash cycles are used (6 hours of running water followed by 18 hours standing water in each cycle). The pipes should not release more than 0.05 mg of lead per liter of water. References 4: 3 Russian, 1 Western.
TREATMENT OF WASTE WATERS OF STYRENE COPOLYMER SYNTHESIS

Moscow PLASTICHESKIYE MASSY in Russian No 7, Jul 76 signed to press
15 Jan 76 p 60

[Abstract] The article describes a method developed at the Orekhovo-Zuyevo "Karbolit" Production Association for pretreating waste water from styrene copolymer production before biological purification. The concentrated waste water is collected and heated to 90-95° with agitation, and then pumped into a settling tank. Sulfuric acid treatment coagulates the particles of copolymer and emulsifier, which are then separated from the clarified water. Solid particles larger than 1 mm are held back by a metal screen as the clarified water is pumped out of the settling tank. The treated water is then diluted about eight to one with municipal waste water before biological purification. The system has proved to be effective in five years of operation.

1/1
Ion Exchange

USSR

MALOVIK, V. V., IL'INSKIY, A. A., LEYKIN, YU. A., SMIRNOV, A. V., and
SEMENIY, V. YA., Institute of Organic Chemistry, Academy of Sciences UkrSSR

SF-5 PHOSPHONIC ACID CATION-EXCHANGE RESIN PRODUCTION TECHNIQUE

Kiev KHIMICHESKAYA TEKHOLOGIYA in Russian No 4(88), Jul/Aug 76 signed to
press Jun 74 pp 21-23

[Abstract] The process of synthesizing SF-5 phosphonic acid cation exchanger
involves the following stages: phosphorylation of a styrene-divinylbenzene
copolymer with phosphorus trichloride in the presence of AlCl₃; hydrolysis
of the resultant polystyrene phosphonic acid chloride; oxidation of the
polystyrene phosphonic acid; conditioning of the resin. In the phosphoryla-
tion stage the phosphorus trichloride is poured over the porous copolymer,
and the mixture is stirred for an hour, after which anhydrous aluminum
trichloride is added and the reaction mixture is heated to 70-75°C and held
at this temperature for 6 hours with continuous agitation. After removal
of hydrogen chloride and the unreacted PCl₃, 5% hydrochloric acid is added
to the reactor and the mixture is cooled to -10°C. Copolymer is added and
the temperature is held at 7-10°C. After loading is completed, the
mixture is heated to the boiling point of the liquid and held for an hour.

USSR

MALOVIK, V. V., IL'INSKIY, A. A., LEYKIN, YU. A., SMIRNOV, A. V., and
SEMENIY, V. YA., KHIMICHESKAYA TEKHOLOGIYA No 4(88), Jul/Aug 76 pp 21-23

Hydrogen chloride is removed continuously. The mixture is then cooled to
30°C. The resultant granules are adjusted to pH 3. The polymer is
oxidized in 28-30% nitric acid for 6 hours with agitation at 60-65°C.
The nitrogen oxides are continuously removed during the reaction. After
completion of the reaction, the mixture is cooled to 30°C and washed with
condensate until the pH reaches 5-6. The ion exchanger is conditioned for
standardizing by washing with aqueous solutions of acid and alkali in a
sorption column. The duration of the complete production cycle is two
days. References 6: 4 Russian, 2 Romanian.
Miscellaneous

USSR

UDC 547.463+542.953.7+547.486

ODINOKOV, V. N., GALEYEVA, R. I., and TOLSTIKOV, G. A., Institute of Chemistry, Bashkir Affiliate of the Academy of Sciences USSR

THE DIECKMANN REACTION FOR POLYCARBOXYLIC ACID ESTERS

Leningrad ZHURNAL ORGANICHESKOY KHIMII in Russian Vol 12, No 7, Jul 76 signed to press 4 Sep 75 pp 1442-1449

[Russian abstract provided by the source]

[Text] The dieckmann reaction for tetramethyl esters of diastereoisomeric 1,2,3,4-pentanetetracarboxylic acids is accompanied by isomerization with respect to asymmetric atoms, resulting in the formation of a mixture of diastereoisomeric trimethyl-4-oxo-5-methylcyclo-pentane, 1,2,3-tricarboxylates from different diastereoisomeric tetraesters, the principal component of the mixture being the trans, trans, trans-isomer. The cyclopentane-keto-triester was converted by the Michael reaction to the trimethyl-3a-hydroxy-5-oxo-3-methylperhydroindan-1,2,7a-tricarboxylate. Subsequent dehydration yields the trimethyl-5-oxo-3-methyl-5,6,7,7a-tetrahydroindan-1,2,7a-tricarboxylate. Acid hydrolysis of the resultant substituted oxocyclopentane and hydroxysterindan is accompanied by decarboxylation near the keto and hydroxy groups respectively. Tables 2; References 11: 7 Russian, 1 Polish, 3 Western.

1/1
Nitrogen Compounds

PERSHIN, A. D., LAPSHIN, N. M., BUCHACHANKO, A. L., Institute of Chemical Physics, Academy of Sciences USSR, Moscow, Gor'kiy State University imeni N. I. Lobachevskiy

CHEMICAL POLARIZATION OFNUCLEI. REPORT 3. INTERACTION OF QUATERNARY AMMONIUM SALTS OF HYDROPEROXIDES WITH CARBON TETRACHLORIDE

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA in Russian No 5, May 76 signed to press 28 May 75 pp 1001-1005

[Abstract] Chemical polarization of $^{13}$C nuclei is used to study the mechanism of interaction of quaternary ammonium salts of hydroperoxides with CCl₄. The principal reaction products are chlorides of tetraalkylammonium and tert-butyl alcohol. The composition of the final products shows that the reaction is made up of a series of ionic reactions:

\[ R_4\ddot{N}\ddot{O}OC(CH_3)₃ ⇌ R_4\ddot{N} + (CH_3)_3CO\ddot{O} \]  
\[ (CH_3)_3CO\ddot{O} + CCl₄ → CCl₄ + (CH_3)_3COCl \]  
\[ R_4\ddot{N} + CCl₄ → R_4\ddot{N}Cl + Cl₂ \]


USSR

PERSHIN, A. D., LAPSHIN, N. M., BUCHACHANKO, A. L., IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA No 5, May 76 pp 1001-1005

A comparison of the composition of the products of these reactions with the observed chemically-induced polarization of carbon nuclei shows that the molecules with polarized nuclei are produced chiefly by conversions of the two intermediate products (CH₃)₃COCl and Cl₂. The reaction of dichlorocarbene with carbon tetrachloride is

\[ CCl₃ + CCl₄ → [CCl₄][CCl₃] → CCl₃ \]

The unstable tert-butylperoxyhypochloride formed in reaction (2) may decompose in three ways:
PERSHIN, A. D., LAPSHIN, N. M., BUCHACHANKO, A. L., IZVESTIYA AKADEMI
NAUK SSR, SERIYA KHIMICHESKAYA No 5, May 76 pp 1001-1005

\[
(CH_3)_3COOCl \rightarrow (CH_3)_3COO + Cl^+ (CH_3)_3COOH + HCl (or RC1) \quad (5)
\]

\[
(CH_3)_3COOCl \rightarrow (CH_3)_3CO + OCl^- \rightarrow (CH_3)_3COH^+ + HCl \quad (6)
\]

\[
(CH_3)_3COOCl \rightarrow (CH_3)_3CO + ClO_2 \rightarrow (CH_3)_3CCl + O_2 \quad (7)
\]

The principal reaction is apparently (6) since it forms tert-butyl alcohol. Another mechanism of dissociation of tetraalkylammonium salts of hydroperoxide is

\[
(CH_3)_4\tilde{N}\tilde{O}OC(CH_3)_3 \rightleftharpoons (CH_3)_3\tilde{N} \tilde{O} + CH_2 + (CH_3)_3COOH \quad (8)
\]

\[
(CH_3)_4\tilde{N} \tilde{O} + CH_2 \rightarrow (CH_3)_3N + CH_2 \quad (9)
\]

This is a secondary mechanism since the yield of hydroperoxide and tertiary amine is low. However it does lead to formation of carbene CH2, which then reacts with carbon tetrachloride. Figure 1; Tables 2; References 9: 7 Russian, 2 Western.

3/3
FESHIN, V. P., GILLER, S. A. (deceased), AVOTA, L. YA., and VORONKOV, M. G.,
Irkutsk Institute of Organic Chemistry, Siberian Department of the Academy
of Sciences USSR, Irkutsk, Institute of Organic Synthesis, Academy of
Sciences Lithuanian SSR, Riga

NMR SPECTRA OF Cl\textsuperscript{35} CHLORINE-SUBSTITUTED DERIVATIVES OF PYRIDAZONE-6

Riga KHIMIYA GETEROTSIKLICHESKIKH SOYEDINENIY in Russian No 3, Mar 76
signed to press 21 May 75 pp 392-395

[Russian abstract provided by the source]

[Text] NMR spectra of Cl\textsuperscript{35} chloropyridazines-6 are used as a basis for
studying the influence that substituents in the pyridazone ring (including
the carbonyl oxygen atom) have on the chlorine atoms in positions 3, 4
or 5. The NMR frequencies of 1-phenyl-4,5-dichloropyridazine-6 are
compared with the reactivity of the chlorine atoms in this compound in
reactions of nucleophilic substitution. References 11: 8 Russian, 3
Western.

1/1

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KUCHKOVA, K. I., STYNGACH, YE. P., RIVILIS, F. SH., FROLOVA, N. M., and
SEMENOV, A. A., Institute of Chemistry, Academy of Sciences MoldSSR,
Kishinev

THE CARBOLINES. VIII. α-CARBOLINE COMPOUNDS FROM OXIMES OF β-(INDOLYL-3)-
KETONES

Riga KHIMIYA GETEROTSIKLICHESKIKH SOYEDINENIY in Russian No 3, Mar 76
signed to press 14 May 75 pp 386-391

[Abstract] Using previously developed methods the authors synthesize new
substituted β-carbolines XIV-XVI that are potential physiologically active
compounds. Ethylidene and isobutylidene acetones were reacted with indole
under the action of perchloric acid, forming indole ketones I and III which
were converted to oximes II and IV (for synthesis of α-substituted oxime VI,
tert-butyl α-propylacetoacetate was methylated with gramine methylsulfate).
Oximes II, IV and VI were converted to 3,4-dihydro-β-carbolines by contact
with phosphorus pentachloride for one minute in warm nitrobenzene. The
resultant hydrochlorides X-XIII were dehydrogenated by heating in glycol
with palladium black. When oxime II is reacted with PCl\textsubscript{5}, an additional
compound identified as 1H-1,4-dimethyl-2-chloro-α-carboline (XVII) is
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formed in addition to carboline X. The product of reduction dechlorination of XVII is compound XVIII. Regrouping in oximes VIII and IX under the action of PCl₅ in nitrobenzene forms anhydronium bases XIX and XXI, which can be readily converted to XX and XXII. Phosphorus pentachloride acts on VII to give α-isocarboline XXIV. The first stage of the process leading to formation of α-carboline bases is apparently Beckman regrouping of oximes with migration of radical R³. It can be assumed that cation XXVII formed by Beckman regrouping is chlorinated to the intermediate compound XIX, which is cyclized in a Hoffman-Löfler type reaction, splits off HCl and is oxidized by nitrobenzene. The paramagnetic resonance signal of compound II indicates a mixture of two isomers, identified as the syn (XXX) and anti (XXXI) geometrical isomers. Tables 2; References 10: 4 Russian, 6 Western.

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KUCHKOVA, K. I., STYNGACH, YE. P., RIVILIS, F. SH., FROLOVA, N. M., and SEMENOV, A. A., KHIMIYA GETEROTSIKLICHESKIX SOYEDINENII No 3, Mar 76 pp 386–391
Organometallic Compounds

CHADAYEVA, N. A., MAMAKOV, K. A., ISKHAKOVA, D. A., ANOSHINA, N. P.,
A. YE. Arbuzov Institute of Organic and Physical Chemistry

SYNTHESIS AND CERTAIN PROPERTIES OF $\gamma$-CHLOROPROPYL ESTERS OF THIOACIDS OF
THREE-COORDINATION ARSENIC

Leningrad ZHURNAL OBShCHEY KHIMII in Russian Vol 46, No 4, Apr 76 pp 817–820
manuscript received 4 Nov 74

[Abstract] Continuing their studies on the synthesis and investigation of
the properties of thioacid esters of three-coordination arsenic, the authors
interacted alkyl esters of three-coordination arsenic acids with $\gamma$-chloro-
propylmercaptan to produce $\gamma$-chloropropyl esters of the corresponding arsenic
thioacids, earlier unknown. It is established that the $\gamma$-chloropropyl esters
of alkylphenylthioarsenous acid undergo disproportionation upon heating.
Figures 2; Table 1; References 5 (Russian).
Organophosphorous Compounds


INDUCTION INFLUENCE OF LEAVING GROUP IN THE REACTION OF ORGANOPHOSPHORUS INHIBITORS WITH ACETYLCOLINESTERASE

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 2, No 7, Jul 76 signed to press 12 Nov 75 pp 978-985

[Abstract] The biomolecular constants of the rate of inhibition of acetylcholinesterase (EC 3.1.1.7) by organophosphorus inhibitors (C₂H₅O)₂-P(O)SX are determined, where X = -CₖH₂ₖ₊₁(n=4-8), -(CH₂)ₘSC₂H₅(m=1-6), and the biomolecular constants of their alkaline hydrolysis are defined. It is shown that the inhibiting capacity of compounds as a function of the structure of their leaving group is described by the equation \( \log k^{0}_{II} = \log k^{0}_{XII} + \rho^* \varphi^* + \phi^{\pi}_{X} \), considering the induction influence and hydrophobicity of the substituent X. The values of the constant are defined: \( \rho^* = 4.0, \varphi = 0.58, \log k^{0}_{XII} = -1.2 \). The reaction constant \( \rho^* \) for the 1/2

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reaction of phosphorylation of the active center of an enzyme is 1.8 times \( \rho^* \) for the reaction of alkaline hydrolysis. Possible difference in the structure of the transition states of these reactions are discussed. Figures 3; Tables 2; References 49.
INTERACTION OF α-OXYALKYLPHOSPHONATES WITH ACETOACETIC ESTER AND DIKETENE

[USSR]

PUDOVIK, A. N., ZIMEN, M. G., SOBANOV, A. A., and ZABIROV, N. G., Kazan' State University imeni V. I. Ul'yanov-Lenin

INTERACTION OF α-OXYALKYLPHOSPHONATES WITH ACETOACETIC ESTER AND DIKETENE

Leningrad ZHURNAL OBŠŠCHEY KHIIMII in Russian Vol 46, No 4, Apr 76 signed to press 28 Oct 74 pp 770-773

[Abstract] Continuing their study of the esters of α-oxyalkylphosphonic acid and the synthesis of unsaturated organophosphorus compounds on their basis, the authors studied the interaction of diethyl esters of α-oxymethyl-, ethyl- and allylphosphonic acids with acetoacetic ester and the diethyl esters of α-oxoethyl-, allyl- and β-carboethoxyisopropylphosphonic acids with diketene. It is found that when the diethyl esters of α-oxymethyl-, ethyl-, allyl- and β-carboethoxyisopropylphosphonic acids are reacted with acetoacetic ester and diketene in the presence of alkaline catalysts, acetyl acetates of the esters of α-oxyalkylphosphonic acid are formed, which are capable of keto-enol tautomerism. Table 1; References 8 (Russian).

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THE INTERACTION OF CHLOROPHOSPHITES AND DIALKYLPHOSPHITES WITH AMINO- SILANES AND AMINOSILAZANES

[USSR]

PUDOVIK, M. A., MEDVEDEVA, M. D., and PUDOVIK, A. N., A. YE. Arbuzov Institute of Organic and Physical Chemistry

THE INTERACTION OF CHLOROPHOSPHITES AND DIALKYLPHOSPHITES WITH AMINO- SILANES AND AMINOSILAZANES

Leningrad ZHURNAL OBŠŠCHEY KHIIMII in Russian Vol 46, No 4, Apr 76 signed to press 17 Dec 74 pp 773-776

[Abstract] In order to determine the possibility of producing compounds containing the system PIII N-Si, we studied the interaction of certain dialkyldichlorophosphites with monoalkyl- and monoarylaminosilanes. It was found that these reactions, both with and without bases present, occur by breaking of the Si-N bond and lead to alkyl (aryl) amides of dialkylphosphoric acids. Thus, the interaction of diethylchlorophosphite with trimethylsilyl-tert-butyamine in the presence of triethylamine leads to the production of the tert-butyldimethylsilane of diethylphosphorous acid. Dialkylphosphorous acid chlorides react with monoalkyl and monoarylaminosilanes to form alkyl (aryl) amides of dialkylphosphorous acids. Cyclic and normal chlorophosphites with heptamethyldisilazane form N-silylated derivatives of trivalent phosphorus and diposphorylated methylamine. The interaction of acid phosphites with aminosilanes and silazanes results in the production of silylphosphites. References 5: 2 Russian, 3 Western.

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ALKOXYDIODOPHOSPHINES AND AROXYDIODOPHOSPHINES. II.

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 46, No 4, Apr 76 signed to press 2 Jul 74 pp 777-783

[Abstract] Alkoxydiiodophosphines were produced by the authors to interacting alkoxydichlorophosphines with lithium iodide in an inert solvent. They are significantly less stable than aroxydiiodophosphines produced by a similar method, beginning to decompose at -20 - -15 C, but can be stored for long periods unchanged at -60 - -50 C. When they disproportionate at 20 C, they are converted to trialkylphosphites and phosphorus trifluoride. These two products interact, producing alkyliodides, phosphorus diiodide and a polymer of unknown structure. Diaroxy and dialkoxydiiodophosphines are stable only in solution at low temperatures. They also disproportionate. Alkoxydiiodophosphines interact with iodine to liberate alkyliodides and form phosphorus oxyiodide. Table 1; References 6: 4 Russian, 2 Western.

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OXIDES OF TERTIARY PHOSPHINES CONTAINING THE α-EPoxyCycLe

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 46, NO 4, Apr 76 signed to press 11 Jul 74 pp 783-785

[Abstract] Type (IV) oxyrins were synthesized by cyclizing the corresponding bromohydrins with caustic potash in an aprotic polar solvent. The bromohydrins were produced by attachment of hypobromous acid to the corresponding olefin. Catalytic quantities of trifluoroacetic acid in an indifferent solvent causes regrouping of tertiary phosphine oxides containing the α-epoxycycle to aldehydes, and their hydration leads to the corresponding diols. References 7: 1 Russian, 6 Western.

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VYSOTSKIY, V. I., CHUPRAKOVA, K. G., and TILICHENKO, M. N., Far Eastern State University, Vladivostok

REACTIONS OF 1,5-DIKETONES. XVIII. INTERACTION OF 1,5-DIKETONES WITH PHOSPHORUS TRICHLORIDE

Leningrad ZHURNAL OБSHCHEЙ KHIMII in Russian Vol 46, No 4, Apr 76 signed to press 30 Sep 74 pp 785-789

[Abstract] The reaction of 1,5-diketones with phosphorus trichloride is studied in acetic acid at 60-65 C. Under these conditions, 2-oxytetrahydropyran-6-phosphonic acid lactones are formed with high yield. The acid chloride of 2-oxy-1,4-diphenylperhydrochromenyl-8a-phosphonic acid lactone is synthesized, hydrolyzed to lactone and converted from the lactone to its methyl ester. Table 1; References 13: 9 Russian, 4 Western.

MURAV'YEV, I. V., and FEDOROVICH, I. S., L'vov State University imen I. Franko

ARYLATION OF DI- AND TRITHIOPHOSPHORIC ACID ESTER HALIDES

Leningrad ZHURNAL OБSHCHEЙ KHIMII in Russian Vol 46, No 4, Apr 76 signed to press 12 Nov 75 pp 789-791

[Abstract] The authors found that alkyl dichlorodithiophosphonates and dialkylmonochlorotriphosphates are arylated by benzene and toluene in the presence of anhydrous ammonium chloride. The reaction occurs with boiling of the reaction mixture with an excess of benzene for 2.5-5 hr. The diphenylphosphonic and phenyltrithiophosphonic acid esters produced are liquids which are easily soluble in most organic solvents. When methylidithiodichlorophosphate, dimethyltrithiomonochlorophosphate and isopropyldithiodichlorophosphate are interacted with benzene in the presence of anhydrous ammonium chloride, the reaction occurs by splitting of the P-S-C bond. Table 1; References 5: 3 Russian, 2 Western.
KINETICS OF CATALYTIC INTERACTION OF DIETHYLPHOSPHITE WITH ISOCYANATES IN THE PRESENCE OF STANNOUS OCTOATE

Leningrad ZHURNAL OHSHEH KIMII in Russian Vol 46, No 4, Apr 76 signed to press 18 Nov 74 pp 791-795

[Abstract] A study is made of the peculiarities of the kinetics of the interaction of diethylphosphorous acid with phenyl-, o-, m- and p-chlorophenylisocyanates. Stannous octoate and 2-methylbicyclo[2,2,2]diazao-1,4-octane were used as catalysts. The relative influence of the substituents on the reactivity of the chlorophenylene isocyanates was established. The temperature dependence of the reaction rate of diethylphosphate with phenylisocyanate was determined and the effective activation energy of the reaction calculated. Figures 3; Tables 2; References 6 (Russian).

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CERTAIN REACTIONS OF α-CHLOROTHIENYLDICHLOROPHOSPHINE

Leningrad ZHURNAL OHSHEH KIMII in Russian Vol 46, No 4, Apr 76 signed to press 19 Nov 74 pp 795-800

[Abstract] This work is a continuation of earlier works studying organophosphorus derivatives of α-chlorothiophene with the three-coordination atom of phosphorus -- esters and chlorophosphines. The acid ethyl ester of α-chlorothiénylphosphonous acid reacts exothermically with aldehydes and ketones to form α-chlorothiényl-α'-alkylphosphinic acid esters. A method is developed for production of pure α-chlorothiényl-2-chloroformyl-ethylphosphinic acid chloride by reaction of α-chlorothiényldichlorophosphine with acrylic acid with subsequent sequential treatment of the reaction products with acetic anhydride and phosphorus pentachloride. Figure 1; Table 1; References 4: 3 Russian, 1 Western.

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AMOSOVA, S. V., TARASOVA, O. A., KHIL'KO, M. YA., and TROFIMOV, B. A.,
Irkutsk Institute of Organic Chemistry, Siberian Department of the Academy
of Sciences USSR

INTERACTION OF ESTERS OF CERTAIN THIOPHOSPHORIC ACIDS WITH ACETYLENE

Leningrad ZHURNAL OБSHCHEЙ KХIMII in Russian Vol 46, No 4, Apr 76 signed to
press 20 Nov 74 pp 803-808

[Abstract] A discussion is presented of the results of the use of the
reaction of certain thiione compounds with acetylene, leading to divinyl
sulfide and its substituents to certain thiophosphoric compounds. The
P = S fragment of thiophosphoric acid esters in aqueous DMSO, in the
presence of alkali, reacts with acetylene to form divinyl sulfide. When
triethylthionophosphate, triethyltrithiophosphate and triethyltrithio-
phosphate are interacted with acetylene in an alkaline medium, the P-O
and P-S bonds are split, forming the corresponding alkylvinyl esters and
sulfides. Tables 3; References 11: 8 Russian, 3 Western.

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ZDOROVA, S. N., NOVIKOVA, Z. S., and LUTSENKO, I. F., Moscow State University

PRODUCTION AND CERTAIN PROPERTIES OF α-METALLIZED ESTERS OF PHOSPHORUS (III)
SUBSTITUTED ACETIC ACIDS

Leningrad ZHURNAL OБSHCHEЙ KХIMII in Russian Vol 46, No 6, Jun 76 signed to
press 16 Apr 75 pp 1218-1222

[Abstract] The authors studied metallized esters of phosphorus (III)
substituted acetic acids, as well as certain properties of the enolates
produced. The metallizing reagent used was sodium bis(trimethylsilyl)-
amide, widely used for the production of sodium enolates in a number of
carbonyl compounds. The reaction was conducted in a solution of ether or
DME. It is shown that the esters of phosphorus (III) substituted acetic
acid are easily metallized by sodium bis(trimethylsilyl)amide at the
methylen group. The direction of the interaction of sodium enolates of
phosphorus-substituted alkylacetates is determined by the electrophilicity
of the reagent; the reaction may occur at the phosphorus, carbon or oxygen
atom of the mesomer system. Tables 2; References 11: 4 Russian, 7 Western.

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FRIDLAND, S. V., DMITRIYeva, N. V., VIGALOK, I. V., and SALAKHUTDINOV, R. A., S. M. Kirov Chemical-Technological Institute, Kazan'

PHOSPHORYLATION OF OLEFINS WITH PHOSPHORUS TRIBROMIDE IN THE PRESENCE OF PERCHLORYLFLUORIDE

Leningrad ZHURNAL OBŠCHIEY KHIMII in Russian Vol 46, No 6, Jun 76 signed to press 8 Jul 74 pp 1228-1231

[Abstract] It is shown that the interaction of phosphorus tribromide with olefins in the presence of perchlorylfluoride leads to the synthesis of 1-bromoalkane-2-phosphonic acid bromofluorides and dibromides. The phosphorylation of olefins with trivalent phosphorus halides occurs at the phosphorus-halogen bond. The product of the reaction of 3-ethoxy-1-chloropropane-2-phosphonic acid chlorofluoride and dichloride with sodium ethylate is the diethyl ester of 3-ethoxy-1-protein-2-phosphonic acid. Based on analysis of the structure of the diester produced, it is concluded that the phosphoryl group is attached to the second carbon of the olefin atom. Figure 1; References 7: 6 Russian, 1 Western.

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THE INTERACTION OF PHOSPHORUS TRIBROMIDE WITH OLEFINS UNDER THE INFLUENCE OF OXYGEN

Leningrad ZHURNAL OBŠCHIEY KHIMII in Russian Vol 46, No 6, Jun 76 signed to press 23 Sep 74 pp 1232-1234

[Abstract] Earlier works have reported that when phosphorus tribromide interacts with olefins with bubbling of oxygen, dibromophosphonates are formed. The authors' previous data confirmed only the formation of a phosphorus-carbon bond, and the product was assigned the structure of a phosphonite. To confirm these initial data, more detailed studies were undertaken on the example of cyclohexene, 1-hexene and 1-octene. The reactions were performed by preliminary mixing of the olefin and phosphorus tribromide with subsequent bubbling through of oxygen. It is found that the interaction of olefins with phosphorus tribromide with oxygen initiation leads to the synthesis of 1-bromoalkane-2-phosphonous acid dibromides. References 8: 4 Russian, 4 Western.

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PETROV, K. A., CHAUZOV, V. A., BOGDANOV, N. N., and PASTUKHOVA, I. V.

NITROALKYL ORGANOPHOSPHORUS COMPOUNDS. I. NITROMETHYLPHOSPHONATES

Leningrad ZHURNAL OSHCHEY KHIMII in Russian Vol 46, No 6, Jun 76 signed to press 15 Mar 74 pp 1242-1246

[Abstract] Methods are developed for synthesis of dialkylmethylphosphonates by nitration of ethoxyvinylphosphonates. References 21: 19 Russian, 2 Western.

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PETROV, K. A., CHAUZOV, V. A., PASTUKHOVA, I. V., and BOGDANOV, N. N.

NITROALKYL ORGANOPHOSPHORUS COMPOUNDS. II. SYNTHESIS AND PROPERTIES OF α-NITROISOALKYLPHOSPHONATES

Leningrad ZHURNAL OSHCHEY KHIMII in Russian Vol 46, No 6, Jun 76 signed to press 4 Jun 74 pp 1246-1250

[Abstract] This work is dedicated to the search for method of synthesis of α-nitroalkylphosphonates, based on the use of more available initial compounds and studies of their chemical properties. A method is developed for synthesis of α-nitroisoalkylphosphonates by oxidation of aminophosphonates with potassium permanganate. α-nitroisopropyl- and α-nitro-sec-butylphosphonic acid dichlorides are produced; esterification of α-nitropropylphosphonic acid produces the dipropyl ester of α-nitroisopropylphosphonic acid. Hydrolysis of chlorides and esters of α-nitroisopropyl- and α-nitro-sec-butylphosphonic acids produce α-nitroisopropyl- and α-nitro-sec-butylphosphonic acids, separated as aniline salts. Table 1; References 7: 4 Russian, 3 Western.

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PETROV, K. A., CHAUZOV, V. A., BOGDANOV, N. N., and PASTUKHOVA, I. V.

NITROALKYL ORGANOPHOSPHORUS COMPOUNDS. III. SYNTHESIS OF α-NITROETHYL AND -PROPYLPHOSPHONATES

Leningrad ZHURNAL OBSHCHEY KIMII in Russian Vol 46, No 6, Jun 76 signed to press 14 Oct 74 pp 1250-1256

[Abstract] It is found that when α-alkyl-β-alkoxyvinylphosphonates interact with acetyl nitrate in acetic anhydride, attachment products are formed: dialkyl esters of α-alkyl-α-nitro-β-acetoxy-β-alkoxyethylphosphonic acids. It is shown that when they are treated with bases (KOH, RONa) and acids, the C-C bond is split, forming dialkyl esters of α-nitroalkylphosphonic acids. Figures 2; Table 1; References 7 (Russian).

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PETROV, K. A., CHAUZOV, V. A., and YEROKHINA, T. S.

REGROUPING OF CHLOROMETHYLDIBENZYLPHOSPHINE OXIDE UNDER THE INFLUENCE OF SODIUM METHYLATE

Leningrad ZHURNAL OBSHCHEY KIMII in Russian Vol 46, No 6, Jun 76 signed to press 14 Oct 74 pp 1256-1259

[Abstract] Data are presented on a new regrouping in the phosphine oxide series -- isomerization of chloromethyldibenzylphosphine oxide under the influence of sodium methylate, including migration of a benzyl group to the carbon atom of the chloromethyl group. It is shown that when chloromethyldibenzylphosphine oxide and sodium methylate interact, intramolecular displacement of the benzyl group from the phosphorus atom to the carbon atom of the chloromethyl group occurs, forming methylbenzyl-2-phenylethylphosphinate. The proposed structure of the product of regrouping is confirmed by hydrology, spectroscopic data and reverse synthesis. Figures 2; References 3: 1 Russian, 2 Western.

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[Abstract] Data are presented produced in a study of the chlorination of N-dichlorophosphino-N-alkylamidodialkylphosphates. IR spectroscopy and the method of isotope labeling (O¹⁸) establish the mechanism of phosphoran-phosphate regrouping occurring upon chlorination of 0,0-diethyl-N-dichlorophosphino-N-methylamidophosphate. It is shown that this chlorination leads to 0-ethyl-N-dichlorophosphatyl-N-methylchlorophosphate, the new P = 0 bond of which is formed at the oxygen of the phosphoryl group of the initial phosphate. Figure 1; References 7: 4 Russian, 3 Western.

[Abstract] Results are presented from a study of the reactions of tetraethylpyrophosphite with the methyl ester and nitrile of pyruvic acid. It is shown that the reaction occurs in methylene chloride at a low temperature in an atmosphere of argon forming substituted phosphates. References 3 (Russian).
PETROV, K. A., CHAUZOV, V. A., and PASTUKHOVA, I. V.

A SIMPLE METHOD OF SYNTHESIS OF O-(DIALKOXYPHOSPHINYL METHYL) PHENYLSULFONATES

Leningrad ZHURNAL O'BISHCHEY KHIMII in Russian Vol 46, No 6, Jun 76 signed to press 30 Jun 75 p 1413

[Abstract] A two-stage method of preparation of O-(dialkoxyphosphinyl-methyl)phenylsulfonates is suggested, based on a modification of the earlier method of their formation from higher dialkyl phosphates. Oxy-methylphosphonates are synthesized by interacting phosphites with an aqueous solution of formaldehyde in the presence of NET3 catalyst without a solvent or in dioxane for one day; the product is extracted with ether, the extract is dried and the ether is distilled away. This produces oxy-methylphosphonates, which are acylated by the action of PhSO2Cl and NET3 while boiling for two hours in benzene; the benzene solution is washed with water, hydrochloric acid, NaHCO3 and twice more with water, dried, and the benzene is distilled away. References 2 (Russian).

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YEFANOV, V. A., DOGADINA, A. V., IONIN, B. I., and PETROV, A. A., Leningrad Technological Institute imeni Lensoviet

OXIDATIVE CHLOROPHOSPHORYLATION OF ALLYL HALIDES

Leningrad ZHURNAL O'BISHCHEY KHIMII in Russian Vol 46, No 6, Jun 76 signed to press 1 Dec 75 pp 1416-1417

[Abstract] The oxidative chlorophosphorylation of allyl chloride leads to preferential formation of 1,3-dichloropropane-2-phosphonic acid dichloride. The interaction of phosphorus trichloride and oxygen with 2-chloro-3-pentene and subsequent dehydrochlorination leads to the formation of 2-chloro-2-pentene-4-phosphonic acid dichloride. The reaction of phosphorus trichloride and oxygen with butadiene hydrochlorides and isoprene forms complex mixtures of compounds containing P=C and P-O-C bonds. When 2,4-dichloro-2-butene is interacted, the main direction of the reaction is breaking of the C=C bond, forming 1,2-dichloroethylphosphonic acid and acetyl chloride. The interaction of the intermediate radical formed with the phosphorus trichloride is obviously hindered, leading to the formation of the phosphates and breaking of the carbon-carbon bond. References 3: 2 Russian, 1 Western.
DEVITAYEVA, R. S., SEMENOVAYA, L. S., and BARDEBAANOYVA, G. V., Department of Plastics Technology, Kazan' Institute of Chemical Technology imeni S. M. Kirov

ON SYNTHESIS OF POLYETHYLENE THIOPHOSPHORIC ACID AND ITS DERIVATIVES

Ivanovo IZVESTIYA VUZov, KHIMIYA I KHIMICHESKAYA TEKHNOLIIYA in Russian Vol 19, No 7, 1976 signed to press 4 Mar 75 pp 1091-1092

[Abstract] Polyethylene is chemically modified by introducing sulfur that is bound directly to the phosphorus-containing groups of the polymer. The initial polymer was low-density polyethylene (0.91-0.93 g/cc), which was phosphorylated by conventional methods in the presence of aluminum trichloride. Heating the resultant polyethylene phosphinous acid dichlorides with sulfur yielded polyethylene thiophosphonic acid dichlorides, which were converted by water hydrolysis to the corresponding acid. Infrared spectroscopy showed that most of the P=S groups are retained in the polymer. The optimum temperature range for phosphorylation is 65-70°C. The amount of sulfur varied from 1 to 0.25 mole per link of the polyethylene. It was found that with an increase in the initial amount of sulfur, the content in the polymer reaches 9.5%. The amount of phosphorus in the modified 1/2

DEVITAYEVA, R. S., SEMENOVAYA, L. S., and BARDEBAANOYVA, G. V., IZVESTIYA VUZov, KHIMIYA I KHIMICHESKAYA TEKHNOLIIYA Vol 19, No 7, 1976 pp 1091-1092

polymers is 1.76-4.05%, which agrees with data on Friedel-Crafts phosphorylation. The finished product is a white rubbery mass with characteristic odor that dissolves in decahydronaphthalene, and swells in toluene, benzene, acetone and carbon tetrachloride. The softening temperature is 140-220°C depending on phosphorus content. References 6: 5 Russian, 1 Western.
Kozlov, N. S., KLEYN, A. G., and GALISHEVSKIY, YU. A., Department of Chemistry, Perm' State Pedagogical Institute

ON THE ROLE OF PHENYL POLYPHOSPHATE IN ALKYLA TION OF PHENOLS

Ivanovo IZVESTIYA VUZOV, KHIMIYA I KIMICHESKAYA TEKHNOLIOGIYA in Russian Vol 19, No 7, 1976 signed to press 19 Sep 76 pp 1029-1031

[Russian abstract provided by the source]

[Text] Phenyl polyphosphate is synthesized by reacting phenol with polyphosphoric acid, and comparative alkylation is done on phenol with cyclohexene in the presence of polyphosphoric acid and phenyl polyphosphate. It is shown that the phosphate is a relatively mild catalyst for the reaction as compared with the free acid, promoting alkylation at the oxygen atom. The use of phenyl polyphosphate as an alkylation catalyst increases the ratio of o- and p-cyclohexylphenols to 2.5 (as against 1.7 for polyphosphoric acid). The catalytic activity of phenyl orthophosphates formed with splitting of the polyphosphoric chain is extremely low. It is established that the phenol bound into the ester with polyphosphoric acid does not enter into the alkylation reaction under the investigated conditions. References 4: 3 Russian, 1 Western.

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Rudavskiy, V. P., ZAGNIBEDA, D. M., and NIZHNIKOVA, YE. YE.

TRICHLORO, ALKYL(ARYL)DICHLORO AND DIARYLCHLOROPHOSPHAZO HYDROCARBONS

Kiev KHIMICHESKAYA TEKHNOLIOGIYA in Russian No 4(88), Jul/Aug 76 pp 23-24

[Abstract] In view of the pronounced biological activity of phosphoric acid derivatives and phosphorylated derivatives of carboxylic acids, the authors have synthesized some trichloro, alkyl(aryl) dichloro and diarylchlorophosphazo hydrocarbons. Phosphorus pentachloride, phosphorus trichloride or red phosphorus and chlorine are reacted with trichlorophosphazocarbacyls or amides of carboxylic acids of the aliphatic group to synthesize trichlorophosphazo hydrocarbons, with alkyl(aryl) dichlorophosphazocarbacyls to synthesize alkyl(aryl) dichlorophosphazo hydrocarbons, and with diarylchlorophosphazo carbacyls to synthesize diarylchlorophosphazo hydrocarbons. The trichlorophosphazo compounds have general formula RClCl2N=PCl3 where R is CH3F, CF3, CF3CFCl, CH3CHCl, CH3CCl2 and CH3CHBr; alkyl(aryl) dichlorophosphazo RClCl2N=PR'Cl2 with R and R' paired as follows: CH3CCl2 with CCl3; CH2ClCHCl with C6H5; CH2ClCCl2 with CCl3 and with C6H5; diarylchlorophosphazo RClCl2N=PAR2Cl where R is Ar=C6H5, CCl3, CH3CHCl, CH2ClCHCl, CH3CCl2 and CH2ClCCl2. References 6 Russian.

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INTERACTION OF DIALKYL PHOSPHOROUS ACIDS WITH 2-METHYLINDANDIONE-1,3

[Abstract] 2-Methylindandione-1,3 reacts with dialkyl phosphorous acids in the presence of triethylamine at ~20°C to form 2-methyl-3-hydroxyindanon-1-yl-3-dialkyl phosphonates. These compounds isomerize to the corresponding phosphates when the reaction mixture is allowed to stand. 2-Methyl-3-hydroxyindanon-1-yl-3-dialkyl phosphonates are converted by the action of thionyl chloride to 2-methylinden-2-on-1-yl-3-dialkyl phosphonates. At 160°C complex interaction takes place between 2-methylindandione-1,3 and diethyl phosphorous acid with an excess of triethylamine, forming 2-methylinden-2-on-1-yl-3-diethyl phosphate and a series of products that do not contain phosphorus. Unsaturated dialkyl phosphates are also synthesized from 2-bromo-2-methylindandione-1,3 and trialkyl phosphites.

2-Methylinden-2-one-1 reacts with diethyl phosphorous acid in the presence of triethylamine to form 2-methyl-1-hydroxyinden-2-yl-1-diethyl phosphonate. Tables 3; References 7: 4 Russian, 3 Western.
CHERKASOV, R. A., OVCHINNIKOV, V. V., and PUDOVIK, A. N., Kazan' State University imeni V. I. Ul'yanov-Lenin

REACTIVITY OF CYCLIC DITHIOPHOSPHORUS ACIDS IN REACTIONS WITH UNSATURATED ORGANOPHOSPHORUS COMPOUNDS

Leningrad ZHURNAL OБSHCHEY KHIMII in Russian Vol 46(108), No 5, May 76
generated to press 28 Aug 74 pp 957-963

[Abstract] The authors study the addition of cyclic acids to unsaturated systems such that the cyclic fragment has minimum influence on reaction rate. The cyclic dithiophosphorus acids were reacted with vinyl derivatives of pentavalent phosphorus. Diphenyl, phenylethyl and diethylvinyl phosphine oxides and α-carbethoxystyryldiethyl phosphonate were reacted with equimolecular amounts of alkylene dithiophosphoric acids in para-xylene or chlorobenzene for 2-3 hours without catalysts at 60-90°C. The adducts are viscous liquids that do not distill in deep vacuum, or crystals. It was found that alkylene dithiophosphates are more active in addition of dithiophosphorus acids to unsaturated organophosphorus compounds than are their acyclic analogs. It is shown that the nucleophilic activity of cyclic dithiophosphates is less pronounced than in open dithiophosphates.

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USSR

CHERKASOV, R. A., OVCHINNIKOV, V. V., and PUDOVIK, A. N., ZHURNAL OБSHCHEY KHIMII Vol 46(108), No 5, May 76 pp 957-963

Kinetic and spectral studies and analysis of the influence of solvents on reaction rates in addition of cyclic dithiophosphorus acids to unsaturated organophosphorus compounds confirm the conclusions drawn from previous research on the mechanism of these interactions. Tables 4; References 16: 14 Russian, 2 Western.

2/2
ON THE MECHANISM OF REACTION OF DITHIOPHOSPHORUS ACIDS WITH ACRYLONITRILE

Leningrad ZHURNAL OBShCHEY KHIMII in Russian Vol 46(108), No 5, May 76 signed to press 28 Aug 74 pp 963-966

[Abstract] The ease with which dithiophosphorus acids are added to unsaturated electrophilic systems without catalysis is due to pronounced electrophilic and nucleophilic functions. It has been suggested that dithiophosphorus acids react with acrylonitrile by a mechanism of interaction with a cyclic transitional state where both functions of the acid participate. In this paper the authors study the mechanism of this reaction and explain the relative role of the acidic and nucleophilic properties of dithiophosphates in the cyanoethylation reaction

\[ \text{ABP(S)SH} + \text{CH}_2=\text{CHCN} \rightarrow \text{ABP(S)SCH}_2\text{CH}_2\text{CN}. \]

It is shown that the influence of solvents on the rate of reaction of dithiophosphorus acids with acrylonitrile agrees with the cyclic nature 1/2

of the transitional state. It is found that cyclic and acyclic dithio acids belong to different reaction series in the cyanoethylation reaction, which is due to the conformational peculiarities of dithio acids. Figure 1; Tables 2; References 11: 7 Russian, 4 Western.
ON THE INTERACTION OF CHLORIDES OF TRIVALENT PHOSPHORUS ACIDS WITH CYCLIC KETONES

NURTDINOV, S. KH., ISMAGILOVA, N. M., ZYKOVA, T. V., SABIROVA, K. G., and TSIVUNIN, V. S., Kazan' Institute of Chemical Technology imeni S. M. Kirov

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 46(108), No 5, May 76 signed to press 8 Jul 74 pp 1007-1011

[Abstract] Ethyl dichlorophosphine and phenyl dichlorophosphine are reacted with cyclohexanone and cyclopentanone. The primary chlorophosphines react with cyclopentanone in equimolar proportions to give alkyl(aryl)cyclopenten-1-ylphosphinic acid chlorides. When treated with water, alcohols and phosphorus pentasulfide, the resultant chlorides form the respective derivatives.

\[
\begin{align*}
\text{HPCL}_2 + O \to & \overset{\text{HCl}}{\text{R}} \overset{\text{Cl}}{\text{P}} \overset{\text{O}}{\text{O}} \overset{\text{R}}{\text{H}} \\
\text{H}_2\text{O} & \overset{\text{R}}{\text{P}} \overset{\text{O}}{\text{O}} \overset{\text{R}}{\text{O}} \\
\text{R}^{\prime}\text{OH} & \overset{\text{R}}{\text{P}} \overset{\text{O}}{\text{O}} \overset{\text{R}}{\text{O}} \\
\text{P}_2\text{S}_5 & \overset{\text{R}}{\text{P}} \overset{\text{O}}{\text{O}} \\
\end{align*}
\]

Interaction of ethyl dichlorophosphine with cyclohexanone in equimolar proportions gives ethylcyclohexen-1-ylphosphinic acid chloride, but with a low yield. Treating the reaction mixture with water gives alkyl (or aryl)-α-hydroxycycloalkylphosphonic acids, while phosphorus pentachloride treatment followed by vacuum distillation gives alkyl-, arylcycloalken-1-ylphosphinic acid chlorides. Reaction of phenyl dichlorophosphine with cyclohexanone gives phenyl-α-hydroxycyclohexylphosphinic acid chloride. Treatment with water gives the acid.
If phenyldichlorophosphine is reacted with an equimolar mixture of cyclohexanone and acetic acid, phenylcyclohexen-1-ylphosphinic acid is formed. A table is given summarizing the constants of the synthesized products. Figure 1; Tables 2; References 5 Russian.

3/3
The monoesters are solid white crystals with fairly high melting point. They dissolve easily in alcohol and 1,4-dioxane. Figures 2; Tables 2; References 5 Russian.
NIKONOROVA, L. K., GRECHKIN, N. P., and NURETDINOV, I. A., ZHURNAL OBSCHEY KHIMII Vol 46(108), No 5, May 76 pp 1015-1018

chlorophosphate is reacted with an alkylamine in the presence of a base in the ratio 2:1:2, the corresponding N-alkylamide of bis-dialky1 phosphorous acid is formed.

\[ 2(RO)_{5}PCl + H_{2}NR + 2B \rightarrow (RO)_{5}PN(R)P(OR)_{2} + 2B \cdot HCl \]

The same products are produced by reacting dialkyl chlorophosphites with N-alkylamides of dialkyl phosphorous acids in the presence of a base.

\[ (RO)_{5}PNHR + (RO)_{5}PCI + B \rightarrow (RO)_{5}PN(R)P(OR)_{2} + B \cdot HCl \]

These products are colorless fairly low-boiling liquids that dissolve readily in organic solvents. Figures 1; Tables 2; References 8: 3 Russian, 1 Polish, 4 Western.

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KURSHAKOVA, N. A., and RAZUMOVA, N. A., Leningrad Technological Institute imeni Lensovet

PHOSPHORUS-CONTAINING HETEROCYCLICS. SYNTHESIS AND INVESTIGATION OF THE PROPERTIES OF 1,1-PYROCATECHOL-1-METHYL-3-PHOSPHOLINES

Leningrad ZHURNAL OBSCHEY KHIMII in Russian Vol 46(108), No 5, May 76 signed to press 14 Nov 74 pp 1027-1031

[Abstract] Pyrocatechol esters of methylphosphonous acid are condensed with 1,3-butadiene, isoprene and piperylene.

As a result, compounds with a pentacovalent phosphorus atom are synthesized: 1,1-pyrocatechol-1-methyl-3-phospholine (I), 1,1-pyrocatechol-1,3-dimethyl-3-phospholine (II), 1,1-pyrocatechol-1,2-dimethyl-3-phospholine (III). The 1/3
authors studied hydrolysis, alcoholysis and acetolysis of compounds I-III. These reactions give compounds IV-VIII:

![Chemical structures](image)

Hydrolysis of the phospholines with an excess of water in the presence of hydrochloric acid yielded 1-methyl-3-phospholine-1-oxide (IX) and pyrocatechol. IR and NMR spectroscopic analysis of IX shows that the compound with pentacovalent phosphorus atom is converted to one with a tetracoordinated phosphorus atom. Tables 2; References 7: 6 Russian, 1 Western.
BODNARCHUK, N. D., and MOMOT, V. V., Institute of Organic Chemistry, Academy of Sciences UkrSSR

TRIPHENYLPHOSPHAZOPERHALOTHANES

Leningrad ZHURNAL OBCHCHEY KHIIMII in Russian Vol 46(108), No 5, May 76 signed to press 10 Feb 75 pp 1031-1034

[Abstract] In trichlorophosphazo-α,α-dichloroalkanes (I) the chlorine atoms attached to the α-carbon atom in the alkyl radical are more active than the chlorine atoms attached to the phosphorus atom. We should expect that when phenyl radicals replace the chlorine atoms attached to the phosphorus, the mobility of the chlorine atoms attached to the α-carbon would be further enhanced. The research described in this paper concerns attempts to synthesize the first representatives of triorganophosphazoperhalothananes -- triphenylphosphazoperhalothananes (II). These compounds were produced by the action of chlorine or bromine on benzene solutions of 1-triphenylphosphazo-1-trichloro(trifluoro)-methyl-2,2-dicarboalkoxyethylenes (III).

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Phosphazo compounds containing the dichloromethyl group in the α-position also chlorinate with the formation of triphenylphosphazoperchloroethane (IIa). The compounds are yellow or orange crystals that are soluble in polar organic solvents and insoluble in hexane, benzene, ether or carbon tetrachloride. They are rapidly hydrolyzed by moist air. They react readily with water, para-chloroaniline and benzenesulfamide.
A study of the infrared spectra and measurement of the electric conductivity of compound IIa showed that in addition to the covalent structure, phosphazahexachloroethane IIa also exists in the ionic form.

$$\begin{align*}
\text{RC(O)N=P(C}_6\text{H}_5)_3 &\rightleftharpoons \text{R} = \text{CCl}_3 \quad \text{Cl} \quad \text{IIIa}, \\
\text{R} = \text{CF}_3 \quad \text{CF}_3 \quad \text{IIIb}, \\
\text{R} = \text{B} = \text{NH}_2 &\rightleftharpoons \text{RC(=NR')N=P(C}_6\text{H}_5)_3
\end{align*}$$

Figures 1; Table 1; References 5 Russian.

3/3
POBEDIMSKIY, D. G., KURBATOV, V. A., GOL'DFARB, E. P., and BUCHACHENKO, A. L.,
IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA No 5, May 76 pp 1006-1011

The first path leads to the ozonide, while the second path creates radicals with disproportionation and dissociation of biradical (I). The resultant ozonide may also react by two paths:

\[
\begin{align*}
\text{O} & \quad \rightarrow \quad \text{P} \quad + \quad \text{O}_2 \\
\text{OR} & \\
\text{O} & \quad \rightarrow \quad \text{P} \quad + \quad \text{P} \quad \text{OO'} \\
\text{OR} & 
\end{align*}
\]

(3) (4)

The first path is monomolecular dissociation that takes place without the formation of radicals, while the second path involves interaction of the ozonide with a phosphite molecule forming a biradical that then attaches to a phosphite with formation of phosphates.

2/3

Reactions (1) and (3)-(5) are the principal mechanism of the interaction, and (2) is secondary. Figures 3; Table 1; References 14: 11 Russian, 3 Western.

3/3

SYNTHESIS AND COMPLEXING PROPERTIES OF NITROGEN-METHYLATED ETHYLENEDIAMINE N,N'-DIMETHYL AND ETHYLENEDIAMINE N,N'-DIETHYL PHOSPHONIC ACIDS

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA in Russian No 5, May 76 signed to press 23 May 75 pp 1018-1023

[Abstract] The authors synthesize and investigate N,N-dimethyl-ethylenediamine N,N'-dimethyl phosphonic, ethylenediamine N,N'-diethyl phosphonic and N,N' dimethylethylenediamine N,N'-diethyl phosphonic acids, and also the methiodide of the latter acid. N,N'-dimethylethylenediamine N,N'-dimethyl phosphonic acid is synthesized by condensation of N,N'-dimethylethylenediamine with diethyl phosphite and paraformaldehyde followed by saponification of the resultant ester, and also by condensing the diamine with formaldehyde and phosphorous acid.

\[
\begin{align*}
\text{CH}_2\text{NCH}_2\text{CH}_2\text{NH}-\text{CH}_2\text{CH}_2\text{O}+\text{H}_3\text{PO}_3 & \rightarrow \text{PCH}_2\text{NCH}_2\text{CH}_2\text{NCH}_2\text{P(OH)}_2 \\
\text{CH}_2\text{O}+(\text{C}_6\text{H}_5\text{O})_2\text{PO} & \rightarrow \text{CH}_3 \quad \text{CH}_3 \quad \text{O} \\
(\text{C}_6\text{H}_5\text{O})_2\text{PCH}_2\text{NCH}_2\text{CH}_2\text{NCH}_2\text{P(OCH}_3)_2 & \rightarrow \text{H}_2\text{O} \\
\text{CH}_3 \quad \text{CH}_3 \quad \text{O}
\end{align*}
\]

Complexing agents with the ethylene bridge between the nitrogen and phosphorus atoms are synthesized by reacting diethylvinyl phosphonate with ethylenediamine followed by saponification of the ester and methylation of the ethylenediamine N,N'-diethyl phosphonic acid with formaldehyde and formic acid.

\[
\begin{align*}
\text{CH}_2&=\text{CHP(OCH}_3)_2 \quad \text{L}_2\text{NH}_2\text{CH}_2\text{NH}_2 \quad 2\text{HCl} \rightarrow (\text{HO})_2\text{PCH}_2\text{NCH}_2\text{HCH}_2\text{H} \\
\text{CH}_2\text{O/HCOOH} & \rightarrow (\text{HO})_2\text{PC}_6\text{H}_5\text{N}-\text{CH}_2\text{CH}_2-\text{NCH}_2\text{P(OH)}_2 \\
\text{CH}_3 & \quad \text{CH}_3 \quad \text{O}
\end{align*}
\]
Alkylation of N,N'-dimethylethylenediamine N,N'-dimethyl phosphonic acid with an excess of CH₃I gives the monomethiodide.

\[
[(\text{HO})_n \text{PCH}_2\text{CH}_2\text{NCH}_2\text{CH}_2\text{NCH}_2\text{CH}_3 \text{P(OH)}_n]^- \\
\overset{\text{O}}{\text{O}} \quad \overset{\text{CH}_3}{\text{CH}_3} \quad \overset{\text{CH}_3}{\text{CH}_3} \quad \overset{\text{O}}{\text{O}}
\]

The acid and complexing properties of the compounds are studied by pH-potentiometric titration. Tables are given summarizing the constants of acid dissociation of the compounds and constants of stability of complexes with nickel, copper, dysprosium and uranyl. Figures 4; Tables 2; References 12: 6 Russian, 6 Western.
The complexing and acid properties of the compound are studied by potentiometric and high-frequency titration and by spectrophotometry. Tables are given summarizing acid dissociation constants and constants of stability of complexes with calcium, nickel, copper, uranyl, dysprosium and iron. Figures 3; Tables 2; References 14: 7 Russian, 7 Western.
Analogous reaction of 0,0-diethyl-N,N-diethylamide phosphite with lactone (II) gives diethylacroyl phosphate, diethyl phosphorous acid, diethylamide of acrylic acid and O-ethyl-N,N-diethylamide-\(\beta\)-carboethoxyethyl phosphonate, which are products formed when an amido phosphite interacts with acrylic acid. The results can be used to explain the mechanism of reactions of amido phosphites with \(\beta\)-lactone. References 4: 3 Russian, 1 Western.
Pharmacology and Toxicology

USSR UDC 614.72:615.285.7:547.241]-074

UBAYDULLAYEV, R., and KAMIL'DZAHANOV, A. KH., Uzbek Scientific Research Institute for Sanitation, Hygiene and Occupational Diseases, Tashkent

THE TOXICOLOGY OF LOW CONCENTRATION OF PHOZALON IN THE ATMOSPHERE

Moscow GIGIYENA I SANITARIYA in Russian No 7, Jul 76 signed to press
17 Jun 75 pp 10-14

[Abstract] A study is made of the reflex and resorptive effect of low concentrations of the French organophosphorus preparation phoazon, used as a contact insecticide to control fruit and citrus fruit, cotton, grape and other pests. The odor detection threshold and reflex action on the electric activity of the human brain were determined, studying concentrations ranging from 0.185 to 0.037 mg/m³. The odor detection threshold was found to be at 0.049 mg/m³, while 0.037 mg/m³ was undetectable. The maximum effective concentration of phoazon on cerebral electric activity was 0.021 mg/m³, while 0.012 mg/m³ was ineffective. It is recommended that the maximum one-time and mean daily permissible concentration of phoazon in the air of populated areas be at the same level, 0.01 mg/m³. Table 1; References 6 (Russian).

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USSR UDC 613.32:678.744


PERMISSIBLE CONTENT OF THE FLOCCULANT POLYOXYETHYLENE IN WATER RESERVOIRS

Moscow GIGIYENA I SANITARIYA in Russian No 7, Jul 76 signed to press
1 Dec 75 pp 23-25

[Abstract] The flocculant polyoxyethylene is a high molecular linear polymer of ethylene oxide. With a molecular weight of over 1 million, it is a crystalline substance with a water solubility of about 20 g/l. The present study was performed with POE with molecular weights of 2 to 5 million, produced by catalytic polymerization of ethylene oxide in gasoline at 25 C: it is a white powder with a very weak odor. It gives no characteristic odor or taste to fresh water, a mild, nonspecific aromatic odor to chlorinated water. In connection with its surfactant properties, POE was studied for foam formation in water. The threshold concentration for foam formation was found to be 0.125 (for mw 2 million), 0.1 (for mw 3 million) and 0.02 (for mw 5 million) mg/l. The cumulative properties of the flocculant in subacute doses were studied on the basis of the functional indicators of

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the body of small experimental animals. It was found that POE with molecular weights of 2 to 5 million causes no acute intoxication, is noncumulative and with chronic administration per os has no specific effect on the body. In a chronic experiment, a dose of 100 mg/kg does cause damage to the parenchyma of the liver and the nephronic tubules. The limiting factor for establishment of the MPC of POE in water is its organoleptic (foam formation) property. Table 1; References 2: 1 Russian, 1 Western.
EFFECT OF THE HERBICIDE 2,4,5-T BUTYL ETHER APPLIED AT DIFFERENT TIMES OF GESTATION OF THE EMBRYOGENESIS OF ALBINO RATS

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYE ZABOLEVANIYA [Labor Hygiene and Occupation Diseases] in Russian No 8, Aug 76 signed to press 29 Oct 75 pp 15-19

[Abstract] Administration of 0.1 mg/kg dose of 2,4,5-T butyl ether by gavage results in an embroyotoxic effect over the entire gestation period (from the first to the 20th day). The embryos are most sensitive to development of anomalies when the agent is introduced during the 7-8, 9-10, 11-12 or 13-14 days of gestation. It is suggested that experimental studies of embroyotropic and teratogenic effects of various chemicals should be concerned not only with the entire, overall period of pregnancy, but also with separate, individual sub-periods of several days duration. References 16: 11 Russian, 5 Western.

1/1
OCCUPATIONAL PATHOLOGY OF WORKERS ENGAGED IN DRILLING OIL WELLS

Moscow GIGIYENNA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA [Labor Hygiene and Occupational Diseases] in Russian No 8, Aug 76 signed to press 31 Oct 75 pp 22-24

[Abstract] Occupational pathology of arms was observed among workers engaged in sinking oil wells, manifested by several clinical forms: vegetative polyneuritis, brachial epicondylitis and osteochondrosis of the cervical spine. About half of all problems concerned complex forms of brachial diseases due to the stress on brachial and shoulder girdle muscles, continued uniform movements of brachial joints and cervical spine, local vibration and general cooling of that area of the body. No figures, tables or references.

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THERAPEUTIC-PROPHYLACTIC ACTION OF SUCCIMER IN EXPERIMENTAL SUBACUTE POISONING WITH LEAD ACETATE

Moscow GIGIYENNA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA [Labor Hygiene and Occupational Diseases] in Russian No 8, Aug 76 signed to press 7 Jul 75 pp 24-28

[Abstract] Succimer--meso-dimercaptosuccinic acid--helps in removing from the organism the freely circulating metal as well as that already deposited in tissues and bones. In animal experiments doses of 5 mg/kg were used, administered subcutaneously for three weeks, daily. Depending on the application, succimer prevents the emergence and development of disorders in porphyrin and protein metabolism, or contributes to their normalization. With PO or parenteral administration succimer is effective to the same extent. Prophylactic action of succimer is highest when applied twice at the day of poisoning. Figures 2; Tables 3; References 13: 9 Russian, 4 Western.

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HYGIENIC EVALUATION OF THE ATMOSPHERIC ENVIRONMENT AND HEALTH STATUS OF WORKERS DOING REPAIRS INSIDE BOILERS AT THE ESTONIAN REGIONAL ELECTRIC POWER STATION

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA [Labor Hygiene and Occupational Diseases] in Russian No 8, Aug 76 signed to press 5 Sep 75 pp 29-31

[Abstract] The modern technology of boiler repairs leads to contamination of air within the work area with dust of the combusted fuel and aerosols which develop during welding and fitting operations. The principal contributor is the combustible shale ash dust. Medical examinations identified a group of workers with suspected dust-induced bronchitis of occupational etiology, this diagnosis being confirmed by an in-depth examination of clinical and occupational diseases by the Ministry of Health of the Estonian SSR. To rectify this situation a recommendation has been made to automate the interior processes to the maximum extent and to make it mandatory to use individual protective masks. Table 1; Reference 1.

SOME CHANGES IN THE INTERNAL ORGANS OF WORKERS EXPOSED TO THE EFFECT OF METHYL METHACRYLATE

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA [Labor Hygiene and Occupational Diseases] in Russian No 8, Aug 76 signed to press 30 Sep 75 pp 31-35

[Abstract] Study of the health conditions of 225 workers exposed to the effects of methyl methacrylate showed that in addition to pathology of nervous system, changes in the internal organs were taking place directly related to the longevity of service. These changes included tendency toward anemia and leucopenia, absolute lymphopenia and monocytosis, changes in liver function capacity resulting from disturbed functions of proteidogenous, fat-lipid and carbohydrate metabolism, and in more severe cases even toxic lesions of the liver, pathology of the cardiovascular system, etc. Tables 3; References 17: 14 Russian, 3 Western.
SHABALINA, L. P., and SPIRIDONOVA, V. S., First Moscow Medical Institute imeni I. M. Sechenov

TOXICITY OF THALLIUM FORMICMALONATE

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA [Labor Hygiene and Occupational Diseases] in Russian No 8, Aug 76 signed to press 26 Sep 75 pp 35-37

[Abstract] Thallium has been shown to be capable under production conditions of entering the bodies of the workers, the dermal route being the principal entry. The LD₅₀ of TFM is 18.8 (15.5-22.1) mg/kg for the gavage administration, and 57.7 (48.2-67.2) mg/kg in case of the percutaneous administration. Large doses of TFM create a picture similar to that of shock with concurrent collapse of the vascular system. The toxic effect is further manifested by changes in hepatocyte nuclei and depletion of testes. Smaller doses cause dystrophic changes in the liver and kidneys. TFM produces a marked irritating effect on the skin and mucosae. Recommendations have been made concerning nutritional composition of the workers exposed to thallium as a means of prophylaxis. No tables or figures; References 3: all Western.

1/1

SUL'ZHENKO, A. I., Medical Institute, Smolensk

A METHOD FOR DETERMINING SKIN INJURY CAUSED BY GLASS FIBER AND GLASS PLASTICS DUST

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA [Labor Hygiene and Occupational Diseases] in Russian No 8, Aug 76 signed to press 3 Dec 75 p 55

[Abstract] An epicutaneous test with 0.1% solution of adrenaline hydrochloride has been proposed for determination of the injurious action of fiberglass and glass plastic dust on the skin of workers in light of current technological problems and individual protection deficiencies. The method is objective and simple. It is suitable for routine dermatological examinations. Table 1; References 4: 3 Russian, 1 Western.

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LOOGNA, N. A., and SHAMARDIN, B. M. Tallin

REPUBLICAN SCIENTIFIC-APPLIED CONFERENCE ON THE PROBLEMS OF INDUSTRIAL HYGIENE AND OCCUPATIONAL PATHOLOGY (TALLIN, DECEMBER, 1975)

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA [Labor Hygiene and Occupational Diseases] in Russian No 8, Aug 76 pp 58-59

[Abstract] Achievements and the future of studies in the area of industrial hygiene were discussed by I. I. AKKERBERG who noted the need for continuous study of working conditions due to the ever changing technological processes. The problems of improvements in measuring instrumentation were covered by A. K. AUNAP and V. KH. TIKHANE. KH. A. KAKHN discussed developments in clinical toxicology in Estonian SSR, while N. A. LOOGNA concentrated on the investigation of the occupational factors of low intensity but combined injury caused by a number of factors. A number of papers covered the diseases connected with the mechanization of agriculture, mostly concerned with noise injuries. The problem of occupational oncology was covered by two papers: V. A. Kyung discussed industrial dust as a cause of lung cancer, and B. A. BOGOVSKIY reported on current data on the etiology and prophylaxis of occupational tumors. No tables, figures or references.

DORODNOVA, N. S., Medical Institute, Saratov

INCIDENCE OF GYNECOLOGICAL DISEASES AND SPECIFIC FUNCTIONS OF THE FEMALE ORGANISM UNDER CONDITIONS OF CHEMICAL PRODUCTION OF "NITRON"

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA [Labor Hygiene and Occupational Diseases] in Russian No 8, Aug 76 signed to press 4 Sep 75 pp 45-46

[Abstract] No special effect was noted on the performance or functions of the workers at the "Nitron" production plant during the test period. Gynecological diseases according to the screening data did not exceed the level of the control group and did not depend on the type of job. No effects were noted on the reproductive function. No tables or figures, References 3: all Russian.

TOXICITY OF SILICONORGANIC ALCOHOLS, MERCAPTANS AND SOME OF THEIR DERIVATIVES

Moscow DOKLADY AKADEMI I NAUK SSSR in Russian Vol 229, No 4, Aug 76 signed to press 3 Mar 76 pp 1011-1013

[Abstract] Toxicity of silicon organic alcohols and mercaptans with the formula Si-C-XH was studied. All (trialkylsilyl)-alkanols and ethers of (trialkoxysilyl)alkanols as well as trialkylsilylalkanethiols vinyl-(trialkylsilylalkyl)-sulfides, ethyl-(triethylsilylmethyl)-sulfone bis-(triethylsilyl ethyl)-thiosulfonate and the potassium salt of triethylsilylalkanesulfonic acids are rather weakly toxic, their LD50 being in the range of 1-3 g/kg. Substitution of an alkyl group connected to silicon by a methoxyl group increases their toxicity considerably. The effect on animals is manifested in their respiratory system. Tables 2; References 12: 9 Russian, 3 Western.

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POLYMERS AND POLYMERIZATION

USSR

KAZAKOV, M. V., SHAROVARNIKOV, A. F., GORKUNENKO, V. M., KARPOV, V. I.,
ODINETS, M. V., and LYAGLEVA, L. K.

FIRE-EXTINGUISHING FOAM-SURFACTANTS

Moscow KHMICHESKAYA PROMYSHLENNOST' in Russian No 8, Aug 76 pp 613-616

[Abstract] Data are given on the fire-extinguishing action of foams based on various surfactants. It is shown that the effectiveness of these foams is a complicated function of a number of their physical and chemical parameters. The coefficient of foaming capacity is recommended as a measure of effectiveness:

\[ F = \frac{A_u K_m}{100} \]

where \( A_u \) is the coefficient of utilization of air, and \( K_m \) is the maximum foam multiplicity factor. The coefficient of utilization of air is given by

\[ A_u = \frac{V_f}{V_a} \]

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USSR

KAZAKOV, M. V., SHAROVARNIKOV, A. F., GORKUNENKO, V. M., KARPOV, V. I.,
ODINETS, M. V., and LYAGLEVA, L. K., KHMICHESKAYA PROMYSHLENNOST' No 8,
Aug 76 pp 613-616

where \( V_f \) is the volume of foam produced per minute, and \( V_a \) is the amount of air used to induce foaming per minute. A table is given showing the values of \( F, A_u \) and \( K_m \) for PO-3A, PO-1, PO-1D and PO-10 surfactant-foams. It has been found that the best materials for storage vessels are stainless steel and polyethylene. Research is being done to find additives that will retard corrosion of storage vessels. The best surfactant-foams for long-term storage are sulfonates PO-1 and PO-1D. PO-3A sulfate is poorest with respect to withstanding protracted storage. The foaming agents should be stored at temperatures between 5 and 20°C. Figures 4; Table 1; References 9: 7 Russian, 2 Western.

2/2

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A METHOD OF EVALUATING THE ABILITY OF FLAMEPROOF TEXTILES TO RETAIN THEIR SHAPE

Moscow KHIMICHESKIYE VOLOKNA in Russian No 4, 1976 signed to press 18 Jul 75 pp 33-34

[Abstract] A method is described for evaluating the change in geometric dimensions of flameproof textiles as a function of the duration of exposure to an open flame. A standard-size fabric specimen is clamped at one end, while the other end passes through a dial indicator and is loaded by a weight. The source of open flame is placed underneath the sample. A table is given showing test results for Nitron, Caprolan, Dacron, Phenylone, PVC, Nomex and modified Phenylone. It was found that chemical heat treatment of Phenylone with halide compounds gives a material that is completely incombustible and has excellent shape retention. PVC fabric performed worst: although it doesn't burn, it is rapidly destroyed by melting. Figure 1; Table 1; References 7: 2 Russian, 5 Western.

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PRODUCTION OF SELF-EXTINGUISHING FROTHING POLYSTYRENE

Moscow PLASTICHESKIYE MASSY in Russian No 7, Jul 76 p 69

[Abstract] An examination is made of the influence that compounds containing phosphorus and halides have on the styrene polymerization process, and the effectiveness of these compounds on reducing combustibility of foam polystyrene. Fire retardants added in amounts of 1-3% during polymerization make the plastic incombustible and do not reduce molecular weight or rate of polymerization. Bromophos-2, tris-2,3-dibromopropyl phosphate and pentabromophenylallyl ether are recommended as fire retardants for synthesis of frothing polystyrene with good physical and mechanical properties and satisfactory moldability. Table 1.
Water Treatment

ANAN'YEV, N. I., DEMIN, N. A., and APOLOSOVA, L. R., Department of General Hygiene, Tselinograd Medical Institute

EFFECTIVENESS OF PREPURIFICATION OF WASTE WATERS IN AN ACCUMULATING POND

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[Abstract] For eight years, the waste waters of Tselinograd have been sent to a settling pond after mechanical purification (screening, sand traps, radial settling tanks). Each day, the pond receives an average of 65,700 m³ of waste water, both domestic and industrial. Chemical analyses of the water in the pond indicate that the quantity of suspended matter in the settling tanks is reduced by 5.4-90.8%. In the settling pond, the waste water is almost completely liberated of suspended matter. The quantity of pollutants, based on the BOD₅ after mechanical purification is reduced by 25-57%, while the purification in the settling pond reaches its maximum in September, November and December -- 91.4-93.5%. After mechanical purification and passage through the settling pond, the coli titer is 0.1-1.0, the enterococcus titer is 0.1-10.0, and no helminth eggs are found at all. Table 1; References 4 (Russian).

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