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USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

CHEMISTRY

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## USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

## CHEMISTRY

No. 56

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## Adsorption Phenomena

USSR

UDC 541.183.08

### A DERIVATOGRAPHIC DEVICE FOR INVESTIGATING ADSORPTION

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 51, No 2, Feb 77 pp 516-519 manuscript received 13 Dec 74

OPRISHKO, A. A., SVETYASH, YU. G., BORISOVA, L. V., KHNDRAT'YEVA, G. A., FRID, M. N. and CHAPANOV, I. D., Groznenskiy Petroleum Scientific Research Institute, All-Union Scientific Research and Planning Institute "Promavtomatika"

[Abstract] A prototype device for studying in detail the principles of the adsorption process was constructed using a derivatograph, evaporative sample introduction, hermetic sorption apparatus and a momentless system for gas flow. Measuring error does not exceed 0.05%. Adsorbant mass change and rate of mean change, temperature and thermal effects are automatically recorded on light sensitive paper. All observations are by difference between sample and reference adsorbant. The device was used to obtain statistical and kinetic parameters of the adsorption of n-parafins on synthetic zeolite. The results reflect the kinetic, reversible nature of the process. Figures 4; References: 2 Russian.

USSR

UDC 539.188+541.124/128+541.183.2

### THE CRITICAL ENERGY OF ADHESION AND COEFFICIENT OF ADHESION IN MULTIPHONON ADSORPTION THEORY

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 51, No 2, Feb 77 pp 336-340 manuscript received 3 Dec 74

SHAYMAN, K. V., Moscow State University imeni M. V. Lomonsov

[Abstract] In order to compare results of the author's earlier work on adsorption with classical mechanics, the mean critical energy of adhesion is derived in terms of the phonon frequency and probability of reflection. Good agreement between calculated results and Leonas' classical mechanics treatment were obtained. Comparison with McCarrol and Ehrlich's calculation of the dependence of critical energy of adhesion in thermal sublimation on the ratio of adsorption and extralattice oscillator constants demonstrated some qualitative agreement with a decrease in mean energy due to the use of potentials with more rigid repulsion. The coefficient of adhesion derived agrees adequately with experimental results. The results indicate the importance of the multiphonon theory in understanding and describing the elementary act of adsorption. Figures 2; tables 1, references 11: 5 Russian, 6 Western.

MEASURING THE PENETRATION OF AEROSOLS THROUGH HIGH-EFFICIENCY FILTERS

Moscow KOLLOIDNYY ZHURNAL in Russian Vol 39, No 2, Mar-Apr 77 pp 288-294  
manuscript received 18 Mar 76

KIRSH, A. A. and ZHULANOV, YU. V., The L. Ya. Karpov Scientific Research  
Institute for Physics and Chemistry, Moscow

[Abstract] Measurements were made of the penetration of aerosols with radii of  $\sim 0.03-0.25\mu\text{m}$  through ultrafine fiber filters, using steams of high boiling point liquids and photoelectric counters to measure the particles. The effectiveness of filters was determined by comparing resistance and effectiveness of the tested filters with the standards for those parameters for a homogeneous filter. The heterogeneity of the filter structures proved to decrease the coefficient of retention of particles. To check the theoretical values obtained several commonly used foreign filters and one domestic filter of fiberglass were actually tested. Only an American filter had a bonding substance in addition to the filaments. Results of the experiments and the theoretical values were comparable when allowance was made for structural irregularities. Cracks and other defects in the filters tested could be measured only by comparison of measured and calculated efficiencies, which was not part of the experiment. Figures 4, tables 1, formulas 13, references 20: 11 Russian, 9 English.

USSR

UDC 631.84:633.11

THE ROLE OF VEGETATIVE ORGANS IN THE ACCUMULATION OF WHEAT-GRAIN  
SUBSTANCES UNDER VARIOUS CONDITIONS OF NITROGEN NUTRITION

Moscow AGROKHIMIYA in Russian No 3, Mar 77 pp 9-13 manuscript received  
17 May 76

KOLESNIK, T. N. and PAVLOV, A. N., Institute of Plant Physiology, AS USSR:  
All-Union Scientific Research Institute of Fertilizers and Soil Science,  
Moscow

[Abstract] In vegetation experiments conducted with the aim of studying the accumulation of dry matter (nitrogenous and nitrogen-free matter) in individual organs of the wheat plant in the process of their development, and ascertaining the amount of reutilization of these substances for grain forming under various conditions of nitrogen nutrition, it is shown that among plants obtaining nitrogen to complete maturity, 90-98% of the dry substance of the grain is created as a result of direct photosynthesis of the assimilating organs in the grain-forming period. When nitrogen is excluded from the nutritive medium at the end of plant blossoming, the efflux of dry matter from the vegetative organs into the grain increases, and 49-78% of the dry grain matter accumulates due to direct photosynthesis. Figures 2; tables 1; references 8: 6 Russian, 2 Western.

USSR

UDC 631.811:633.11:(517.3)

THE EFFECT OF MINERAL FERTILIZERS AND MANURE ON THE NUTRITIVE REGIME OF  
THE SOIL, THE YIELD, THE QUALITY OF THE PERMANENT SPRING WHEAT GROWN UNDER  
THE CONDITIONS OF THE MONGOLIAN PEOPLE'S REPUBLIC

Moscow AGROKHIMIYA in Russian No 3, Mar 77 pp 50-56 manuscript received  
12 Apr 76

LISOVAL, A. P. and TSERMAA, D., Ukrainian Agricultural Academy, Kiev, and  
Scientific Research Institute of Plant Growing and Agriculture of the  
Mongolian People's Republic, Dzunkhara

[Abstract] Research has been conducted by the authors at the Scientific Research Institute of Plant Growth and Agriculture of the Mongolian People's Republic in Dzunkhara, on the influence of organic and mineral fertilizers upon soil fertility with the Orkhon permanent spring wheat. It was ascertained that on the chestnut medium-loamy soil of Mongolia, the greatest increments in the grain yield of the Orkhon spring wheat were

obtained with the application of  $N_4OP_4O$ , the albumin content increased by 1.9%, the gluten content increased by 4.4%. It was found that potassium fertilizer improved the bread-baking properties of the wheat flour. Tables 6; references: 2 Russian.

USSR

UDC 631.82:631.153.3:631.445.4

THE EFFECTIVENESS OF SOME TYPES OF MINERAL FERTILIZERS IN GRAIN-BEET CROP ROTATION ON PODZOLIZED CHERNOZEM

Moscow AGROKHIMIYA in Russian No 3, Mar 77 pp 30-35 manuscript received 7 Apr 76

VOYTENKO, S. I. and IVANOVA, V. I., Khmel'nitskaya Agricultural Experimental Station

[Abstract] In an experiment initiated at the Khmel'nitskaya agricultural experimental station in 1961, research was conducted on a 10-field grain-beet crop-rotation schedule. The first round of crop rotation was completed in all the experimental fields in 1975. It was ascertained that the application of various types and ratios of mineral fertilizers for grain-beet crop-rotation cultivation, with the basic fertilizer against a background of manure, has determined a different effectiveness of identical doses of the components. Nitrogen characterized the first minimum, potassium characterized the second, and phosphorus--the third. The effect of N, P, and K upon the quality of the principal output and their amortization by the harvest increments has been manifested in the same sequence. Tables 5; references: 8 Russian.

USSR

UDC 631.83:631.841:631.445.2:631.445.4

THE EFFECT OF POTASSIUM UPON THE UTILIZATION OF AMMONIA NITROGEN IN A VEGETATION EXPERIMENT ON PEAT-PODZOLIC SOIL AND ON CHERNOZEM

Moscow AGROKHIMIYA in Russian No 3, Mar 77 pp 22-29 manuscript received 24 May 76

MOGILEVKINA, I. A. and LEBEDEVA, M. Yu., Soil Institute imeni V. V. Dokuchayev, Moscow

[Abstract] In an earlier publication it was shown that the joint application of potassium and ammoniacal fertilizers in a vegetation experiment on a mixture of sand with vermiculite led to blockage of the ammoniacal

nitrogen by the potassium and a decrease in utilization of the nitrogen fertilizer, with the result that a decrease of the oat harvest by a factor of almost 3 was observed. The present article sets forth the results of an analogous experiment conducted on peat-podzolic soil and on chernozem. The simultaneous and successive application of ammoniacal and potassium fertilizers (K before and after N) upon peat-podzolic soil and chernozem and their mixture with vermiculite had an equivalent effect upon the harvest obtained in a vegetation experiment: not a single one of the tested methods of application of the fertilizers was accompanied by a blocking effect. Tables 3; references 4: 3 Russian, 1 Western.

USSR

UDC 631.862:633.15

THE EFFECT OF NONBEDDING MANURE UPON THE YIELD OF CORN AND UPON THE CONTENT OF NITROGEN COMPOUNDS IN IT

Moscow AGROKHIMIYA in Russian No 3, Mar 77 pp 72-78 manuscript received 22 Apr 76

MAMENCHIKOV, I. P., SEMENOV, P. Ya., and PLATONOVA, L. G., All-Union Scientific Research Institute of Fertilizers and Soil Science, Moscow

[Abstract] A field experiment has been conducted at the Central Experimental Station of the All-Union Scientific Research Institute of Fertilizers and Soil Science (Moskovskaya oblast, Domodedovskiy district) since 1972 with the aim of studying the effect of increasing doses of nonbedding manure upon the corn yield and the output quality. It has been ascertained that the application of more than 300 kg/hectare of total nitrogen with nonbedding manure underneath corn for silage does not provide for reliable yield increments in comparison to smaller doses. The content of crude protein, in the composition of which the portion of nonalbuminous nitrogen rises, increases in the plants due to high doses of nonbedding manure. Under the influence of superhigh doses of nonbedding manure, the quantity of nitrates in corn prior to harvesting for silage may reach 0.3% of the dry substance. An elevated accumulation of nitrates is noted in corn stalks. Tables 6; references 27: 13 Russian, 14 Western.

USSR

UDC 631.82:633.15

NUTRITION CONDITIONS AND PRODUCTIVITY OF CORN WITH THE APPLICATION OF FERTILIZERS ON THE ORDINARY CHERNOZEM OF THE SOUTHEAST PORTION OF THE UKRAINIAN STEPPE

Moscow AGROKHIMIYA in Russian No 3, Mar 77 pp 66-71 manuscript received 14 Apr 76

STULIN, A. F. and KIZYAKOV, V. Ye., Rozovskaya experimental station of the All-Union Scientific Research Institute for Corn, Zaporozhskaya Oblast

[Abstract] In field experiments conducted in 1973-75 at the Rozovskaya experimental station of the All-Union Scientific Research Institute for Corn, the influence of the doses and ratios of mineral fertilizers upon the dynamics of the nutritive substances was studied for corn in ordinary chernozem. It was found that the content of nutritive elements in the soil and in the corn plants rose under the influence of mineral fertilizers. Of the fertilizer pair combinations it is most expedient of all to apply N30P30; the greatest increment (6.2 centner/hectare) of grain was obtained with the application of N90P30K30. The removal of nutritive substances was determined by the size of the corn yield and by differences in the chemical composition of the plants. Figures 1; tables 4.

USSR

UDC 632.51:633.11

THE EFFECT OF OFFSET WEEDS IN SPRING-WHEAT SOWINGS UPON THE REMOVAL OF NITROGEN, PHOSPHORUS, AND POTASSIUM

Moscow AGROKHIMIYA in Russian No 3, Mar 77 pp 57-59 manuscript received 15 Apr 76

SHASHKOV, V. P., KOLMAKOV, P. P., VOLKOV, Ye. D., and TRIFONOVA, L. F., All-Union Scientific Research Institute of Grain Management, Shortandy, Tselinogradskaya Oblast

[Abstract] The greatest removal of nitrogen with the above-ground mass is noted for *Cirsium arvense* Scop., then for *Lactuca tatarica* C.A. Mey, *Convolvulus arvensis* L., and *Sonchus arvensis* L. The greatest removal of phosphorus and potassium has been noted for *Lactuca tatarica* C.A., somewhat less for *Cirsium arvense* Scop. and *Sonchus arvensis* L., and least of all for *Convolvulus arvensis* L. In the tillering phase of spring wheat the content of nitrate nitrogen in the soil decreased perceptibly during its infestation by *Cirsium arvense* Scop., *Sonchus arvensis* L., and *Convolvulus arvensis* L. Tables 2; references: 5 Russian.

## Alkaloids

USSR

UDC 547.944/945

### ALKALOIDS OF DELPHINIUM DICTYOCARPUM

Tashkent KHIMIYA PRIRODNYKH SOYEDINENIY in Russian No 1, 1977 pp 128-129  
manuscript received 19 Oct 76

SALIMOV, B. T., YUNUSOV, M. S., and UYNUSOV, S. Yu., Order of the Labor  
Red Banner Institute of the Chemistry of Vegetable Substances, Acad. Sci.  
Uzbek SSR, Tashkent

[Abstract] A new base has been isolated during the continuation of  
research on the sum of alkaloids of the above-ground portion of *Delphinium*  
*dictyocarpum* DC. Infrared-, nuclear magnetic resonance-, and mass-spectrum  
data permit this base (I) to be classed among diterpene alkaloids with a  
lycoctonine skeleton. Saponification of (I) yielded an amino alcohol (II)  
shown to be identical with the amino alcohol of delectrine. Test data show  
that the new base (I) is an N-acetyl delectrine. Separation of the alka-  
loid sums of the roots of *Delphinium dictyocarpum* resulted in the isola-  
tion of methyl lycaconitine, anthranolillicoctonine, and a base (III) shown  
to be identical with dimethylene eldelidine. This is the first time that  
dimethylene eldelidine has been derived from plants. References 6:  
5 Russian, 1 Western.

USSR

UDC 547.943

### GORCHAKOIN--A NEW ALKALOID FROM CORYDALIS GOTYSCHAKOVII

Tashkent KHIMIYA PRIRODNYKH SOYEDINENIY in Russian No 1, 1977 pp 127-128  
manuscript received 12 Oct 76

IGRASHEV, T., ISRAILOV, I. A., ABDULLAYEV, N. D., YUNUSOV, M. S., and  
YUNUSOV, S. Yu., Order of the Labor Red Banner Institute of the Chemistry  
of Vegetable Substances, Acad. Sci Uzbek SSR, Tashkent

[Abstract] Continuing the separation of the alkaloid sums of *Corydalis*  
*gortschakovi*, the authors have isolated a new base which they have named  
gorchakoin. The structure for Gorchakoin is proposed on the basis of the  
available data. Note is taken of the fact that such a structure has been  
obtained earlier as an intermediate product during syntheses of the  
alkaloid petaline. References 4: 2 Russian, 2 Western.

USSR

UDC 547.94

ALKALOIDS OF HYOSCYAMUS NIGER AND DATURA STRAMONIUM

Tashkent KHIMIYA PRIRODNYKH SOYEDINENIY in Russian No 1, 1977 pp 126-127  
manuscript received 21 Sep 76

SHAROVA, Ye. G., ARIPOVA, Yu. S., and ABDILALIMOV, O. A., Order of the  
Labor Red Banner Institute of the Chemistry of Vegetable Substances,  
Acad. Sci Uzbek SSR, Tashkent

[Abstract] Hyoscyamine, hyoscyne, and skimmyanine have been derived from  
*Hyoscyamis niger*. Apohyoscyne, apoatropine, tropine,  $\alpha$ - and  $\beta$ -bella-  
donnine have also been detected in this plant. Hyoscyne, hyoscyamine,  
skimmyanine, apoatropine, 2,6-dioxytropine, tropane, and  $\alpha$ -belladonnine  
have been derived from *Datura stramonium*. The principal alkaloids in all  
the obtained sums were hyoscyamine and hyoscyne. References: 2 Russian.

USSR

UDC 547.944/945

ALKALOIDS OF BERBERIS. A NEW ALKALOID-OBLONGAMIN

Tashkent KHIMIYA PRIRODNYKH SOYEDINENIY in Russian No 1, 1977 pp 80-83  
manuscript received 13 Oct 76

KARIMOV, A., TELEZHENETSKAYA, M. V., LUFTULLIN, K. L., and YUNUSOV, S. YU.,  
Order of the Labor Red Banner Institute of the Chemistry of Vegetable Sub-  
stances, Acad Sci Uzbek SSR, Tashkent; Andizhan State Medical Institute  
imeni M. I. Kalinin

[Abstract] In a study of the alkaloid composition of young shoots of  
*Berberis integerrima* and *B. oblonga*, berbamin, oxyacanthin, magnoflorin,  
berberin, and palmatin were isolated. Oblongamin, a new bisbenzyliso-  
quinoline monoquaternary alkaloid was extracted from the roots of *B.*  
*oblonga*. On the basis of chemical conversions and spectral data, it is  
proposed that oblongamin is the first monoquaternary base of the oxyacan-  
thin type. References 9: 4 Russian, 5 Western.

SELECTION OF CONDITIONS FOR THE EXTRACTION AND SEPARATION OF ALKALOIDS  
FROM Tangut Scopolia

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 11, No 2,  
Feb 77 pp 113-118

ASTAKHOVA, T. V. and MININA, S. A., Leningrad Chemical-Pharmaceutical  
Institute

[Abstract] Linear regression line equations were established in order to correlate various combinations of experimental parameters during the title operation. The first set of values were defined as follows:  $Y$ % of theoretical yield of the alkaloid;  $X_1$ , length of digestion of the raw material, hours;  $X_2$ , rate of squeezing, bed volumes per hour;  $X_3$ , degree of disintegration;  $X_4$ , load density, g/cm;  $X_5$ , ratio of raw material to extract g/ml. The derived equation had the form  $y = 78.49 + 0.91X_1 + 2.61X_2 + 1.46X_3 + 0.62X_5 = 12.11X_5$ . The second set of values were defined as follows:  $X_1$ , parts of silica gel per 3 parts of aluminum oxide;  $X_2$ , volume of methanol per 20 ml of chloroform, ml;  $X_3$ , concentration of the effluent solution;  $X_4$ , length of travel of the eluent (TN: length of chromatographic column), cm;  $X_5$ , degree of activation of the alumina. The resulting equation had the form:  $Y = 16.00 - 5.90 X_1 - 6.12X_2 - 0.25X_3 + 1.50X_4 - 1.00 X_5$ . Experimental procedures are given. References 17: 2 Western, 15 Russian.

Analytical Chemistry

USSR

UDC 615.916.074(049.3)

BOOK REVIEW: "DETERMINATION OF INDUSTRIAL INORGANIC TOXIC AGENTS IN THE ORGANISM"

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian Vol 40, No 1, Jan/Feb 77  
p 122 Leningrad "Meditsina" 1975

GADASKINA, I. D., GADASKINA, N. D., and FILOV, V. A. Reviewer:  
ZAUGOL'NIKOV, S. D.

[Abstract] The book consists of two distinct parts. In the first, the authors concentrate on the aspects of the entry of toxic agents into the organism, their movement in it, metabolism, distribution and excretion. A literature review covering physical-chemical methods of analysis is also in this part. The second portion is devoted primarily to chemical methods of analysis of toxic agents found in biological media. Considerable attention is given to diagnostic potential of each test.

USSR

UDC 613.632.4:547.514-074

DETERMINATION OF CYCLOPENTADIENE IN THE AIR OF WORK ROOMS

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 3,  
Mar 77 pp 54-55 manuscript received 29 Jun 76

BARANOVA, V. G. and LOGINOVA, N. K., Yaroslavl' Institute of Monomers for  
Synthetic Rubber

[Abstract] A new method of determination of cyclopentadiene in air has been reported based on a color reaction with 1,4-dinitrobenzene in DMFA in presence of a base. For analytical purposes the air is passed through two traps containing 4 ml DMFA, the solvent is transferred into a test tube, 1,4-dinitrobenzene and the base are added and the reading is taken at  $\lambda$  620 m $\mu$ . The concentration is determined from a graph prepared on the basis of known concentrations. Table 1, references 5: 4 Russian, 1 Western.

USSR

UDC 613.632.4+614.72]:547.867.4]-074

DETERMINATION OF MORPHOLINE IN AIR

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 3,  
Mar 77 pp 55-56 manuscript received 27 Apr 76

BURENKO, T. S., ZHURAVLEV, YE. G., MIKLASEVICH, T. A., Leningrad Institute  
of Petrochemical Processes

[Abstract] A colorimetric method has been developed for determination of morpholine in air, based on its reaction with methyl orange. The method is safe, rapid and more sensitive than the existing ones. The air sampling is done through two traps filled with aqueous solution of methyl orange. This is a rapid and effective method. Table 1, references: 4 Russian.

USSR

UDC 613.63-074:[632.954:543.47

POLAROGRAPHIC METHOD FOR DETERMINATION OF RAMROD (PROPACHLOR) IN AIR

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 3,  
Mar 77 pp 56-57 manuscript received 26 Apr 76

KOYEN, YE. S., Bulgaria, Sophia Center of Hygiene

[Abstract] A polarographic method has been developed for rapid determination of microconcentrations of ramrod on the background of 0.01 N solution of tetraethylammonium iodide. This method is specific, even in presence of chlorides and other halides. Its sensitivity is 0.2 mg/ml and the relative measurement error is 1-5%. Table 1, figure 1, and references: 2 Russian.

## Biochemistry

USSR

UDC 577.156.074

### A SYNTHETIC MACROMOLECULAR MODEL FOR HYDROLASES EXHIBITING PROTEOLYTIC ACTIVITY

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 3, No 1, Jan 77 pp 133-134  
manuscript received 15 Jun, resubmitted 1 Sep 76

LATOV, V. K., FASTOVSKAYA, M. I., SLOBODYANIKOVA, L. S., TSYRYAPKIN, V. A.,  
and BELIKOV, V. M., Institute of Metal Organic Compounds, Academy of  
Sciences USSR

[Abstract] A macromolecular catalyst was synthesized which possessed proteolytic activity. It was obtained by the reaction of styrene and maleic anhydride copolymer with mixtures of: histidine, serine and phenylalanine in DMFA followed by precipitation with 1 N HCl. The products are soluble in a series of organic solvents. The caseinolytic activity is at an optimum at pH 8.0-8.2. These catalysts exhibit also acylase activity. Table-1, figures 2, references 9: 4 Russian, 5 Western.

USSR

UDC 577.156

### PHYSICAL-CHEMICAL PROPERTIES OF TRYPSINE BOUND COVALENTLY TO WATER SOLUBLE POLYCARBOXYLIC ACIDS

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 3, No 1, Jan 77 pp 127-132  
manuscript received 12 Apr 76, resubmitted 16 Jun 76

IVANOVA, G. P., MIRGORODSKAYA, O. A., PANARIN, YE. F., and MOSKVICHEV, B. V.,  
All Union Scientific Technological Research Institute of Antibiotics and Enzymes for Medicinal Purposes, Leningrad

[Abstract] A comparison was made of the inactivation of native trypsin with that of trypsin immobilized on a copolymer of vinyl pyrrolidone and crotonic acid, using water soluble carbodiimide. It has been shown that chemical modification of the enzyme results in decreased rate of autolytic denaturation. Thermodenaturation of modified trypsin occurs at a faster rate than that of the native trypsin, because it is not complicated by autolysis. Modified enzyme shows a shift of the pH optimum towards the base. This may be due to an apparent change in the pK of trypsin's imidazole group which participates in the deacylation process. It has been shown that modification of trypsin results in a reduced affinity for its own inhibitor as well as for the blood serum inhibitors. Figures 6; references 13: 6 Russian, 7 Western.

USSR

UDC 615.31.072:612"52"

UTILIZATION OF CERTAIN BIOCHEMICAL METHODS OF SCREENING CHEMICAL COMPOUNDS  
TAKING DAILY RHYTHMS INTO ACCOUNT

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian No 3, 1977 pp 7-9  
manuscript received 5 Jul 76

BESPALOV, A. M., ANTONYAN, S. G., DOMRACHEV, N. V., and SHIFRINA, S. V.,  
The Scientific Research Institute for Biological Testing of Chemical Com-  
pounds, Moscow Oblast'

[Abstract] Tests were made using male rats of the Vistar line weighing 120-140 g that had been maintained in vivaria for a month prior to the tests in June and July 1974. They were fed a semisynthetic ration that was nutritionally balanced. The enzyme used was monoaminoxidase from rat livers, obtained by a differential centrifuge, and then suspended in dis-tilled water or a phosphate buffering solution with pH 7.4. A colorimeter method was used to determine monoaminoxidase activity according to the growth of optical density during oxidational deaminization. The substrata used was parnitrophenylethylamine--HCl of local manufacture. ATP activity was also measured on the basis of increases of inorganic phosphate in a 30-minute period at 37°C. Results indicated that the maximum MAO activity came at 20 hours, and then declined somewhat by 24 hours. Minimal MAO activity came at the morning hour of 4 AM. RNA and DNA content in the liver was highest at 4 hours, while the minimum concentrations of phos-phorus from those acids was at 20 hours. ATP activity was highest at 8 hours, then declined. Tables one, references 15: 8 Russian, 7 English.

USSR

UDC 541.128.13+577.15.02

STUDY OF THE KINETICS OF ACTION OF IMMOBILIZED HYDROGENASE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 233, No 4, Apr 76  
signed to press 20 Dec 76 pp 631-634

SAFONOV, M. S., VARFOLOMEYEV, S. D., SUD'INA, G. F., and BEREZIN, I. V.,  
corresponding member, Academy of Sciences USSR; Moscow State University  
imeni L. V. Lomonosov

[Abstract] Catalytic chemistry based on the use of enzymes which are immobilized on matrices of various kinds is an area which is being inten-sively developed at the present time. The reaction kinetics are described by solution of a system of differential equations of diffusion from various sites. Multistage chemical processes are of great practical value in enzymatic catalysis; an example of this is the action of polyenzyme systems present on biological membranes which produce a chain of sequential

conversions of initial compounds. Here, the initial substances and, also, the intermediate compounds have definite diffusion mobility; the mechanism of reaction involves two sequential stages, expressed by a mathematical equation. The present work analyzes the heterogenous kinetics of two sequential reactions where the first stage proceeds rapidly, practically instantaneously, while the second is described by the equation of Michaelis-Menten. A mathematical model of the effect of an immobilized enzyme in a system of two sequential reactions is presented: the enzyme, the hydrogenase of phototropic bacteria *Thiocapsa roseopersicina*, was immobilized in polyacrylamide gel (Ngo, et al., 1975), in a membrane form, 1.8 to 10 mm thick; study was made of its release of molecular hydrogen from the reduced form of methylviologen, using sodium dithionite as the primary electron donor. Rate of formation of hydrogen was measured chromatographically (Toay, Ch.D., et al., 1976). After the reaction course in the diffused non-stationary regime, it goes over into a stationary state characterized by a constant rate process. The kinetic parameters  $V'_{max}$  and  $K'_M$  are determined (by

equation) from the relation of the stationary rate of reaction for the thin membranes of immobilized hydrogenase to concentration of methylviologen with a saturated concentration of sodium dithionite. Presented by the authors are the mathematical formulas for the reaction stages, and for calculating  $V'_{max}$  and  $K'_M$ , and, also, a graphic representation of the profiles of concentrations of substrates in a stationary state in a system of two sequential reactions with a rapid first stage. Figure 1; Table 1; References 10: 6 Russian, 4 Western.

Environmental Pollution

USSR

UDC 628.356.39.001.24

SOME PROBLEMS OF THE THEORY AND CALCULATION OF ROTATING BIOLOGICAL DISK FILTERS

Moscow VODOSNABZHENIYE I SANITARNAYA TEKHNIKA in Russian No 2, 1977 pp 4-6

DMITRIYEVSKIY, N. G., Odessa Engineering-Construction Institute

[Abstract] Data on the laboratory and pilot plant scale experiments have been reported on rotating biological disk filters, the methodology for their calculation and optimal dimensions of individual elements. These filters represent simple but promising equipment for biological purification of sewage waters. The principal role in purification of sewage waters is played by the upper layers of the biological membrane which are the youngest and the most active ones. Tables 3, Figure 1, References 8: 8 Russian.

USSR

PROTECTION OF THE ENVIRONMENT AND SANITATION TECHNOLOGY

Moscow VODOSNABZHENIYE I SANITARNAYA TEKHNIKA in Russian No 2, 1977 pp 2-3

LIVCHAK, I. F.

[Abstract] The paper is an editorial recount of the problems of air and water contamination. The problems outside the USSR are recited followed by a statement that because of the use of natural gas for heating purposes and slow development of the automobile industry, the USSR does not face such problems. Yet, it is stressed that the sanitation engineers could play an important role in maintaining the quality of air and water. The point of providing central heating facilities for large cities is stressed, since individual heating, especially when based on high sulfur content fuel, adds tremendously to the contamination of the environment. The final problem brought up is the disposal of solid waste. Concentrated effort in this area is highly recommended. No tables or figures, references: 4 Russian.

USSR

UTILIZATION OF THE SPREADING METHOD FOR INDUSTRIAL WASTES INTO THE  
ATMOSPHERE

Moscow VODOSNABZHENIYE I SANITARNAYA TEKHNIKA in Russian No 2, 1977 p 20

DONCHENKO, E. G. and KUN, M. YU.

[Abstract] A discussion type note arguing against the conclusions of N. D. Voronov who was against spreading method for industrial waste control. Basically the wastes are removed by means of filters. Sometimes, however, this is impractical and then the emission into the upper atmosphere by means of long smoke stacks appears to be the solution. Currently considerable theoretical work has been carried out on this problem; it needs more experimental proof. Some recommendations have been already developed on this. No tables or figures, references: 6 Russian.

USSR

UDC [628.543.3:668.812.5]:532.71

PURIFICATION OF SEWAGE WATERS FROM ANILINE DYE INDUSTRIAL CONTAMINANTS BY  
MEANS OF SEMIPERMEABLE MEMBRANES

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 2, 1977 pp 110-111

RYABCHUK, S. V., TSYRLIN, YE. I., EL'BERT, A. A., KATALEVSKIY, YE. YE.,  
MISEYUK, A. V., and DUBYAGA, V. P.

[Abstract] Data are reported on the output and selectivity of acetatecellulose, reverse osmosis and ultrafiltration polyamide membranes in filtering the monopotassium salt of the anthraquinone-2,7-disulfoacid and of the filtrate containing the active red 10-3 dye. It has been shown that all of the membranes are highly selective in respect to the dye; the anthraquinone salts have been retained by the reverse osmosis membranes only. Tables 4, references 5: 3 Russian, 2 Western.

USSR

UDC 628.543:532.71

USE OF REVERSE OSMOSIS IN PURIFICATION OF SEWAGE WATERS FROM SURFACE  
ACTIVE MATERIALS

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 2, 1977 pp 106-110

DYTNERSKIY, YU. I., and MORGUNOVA, YE. P.

[Abstract] Distribution of the solutions of surface active agents (SAA) and of the salt solutions with SAA additives has been investigated by reverse osmosis. The experiments were performed with solutions of technical PAA of various classes most widely used in the economy: the nonionogenic ones (xylitol O-10, OP-10, syntanol DS-2); anion active agents (Necal BKh, sulfonal NP-1) and the cation active ones (Alkamone OS-2). Acetatecellulose and polyacrylonitrile membranes were used for separation. It has been shown that retention of PAA depends to a large degree on the structure of the solution. Some PAA's influence retention of salts, so it is very effective to add microquantities of PAA to increase salt retention. Specific recommendations have been made for the selection of membranes assuring optimal separation of the solutions containing PAA. Figures 6, table 1, references 11: 5 Russian, 6 Western.

USSR

UDC 613.63+615.9](049.3)

CRITERIA OF NOXIOUSNESS IN HYGIENE AND TOXICOLOGY IN ASSESSING THE DANGER  
OF CHEMICAL SUBSTANCES

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 3,  
Mar 77 pp 59-60

SANOTSKIY, I. V., and ULANOVA, I. P., Moscow "Meditsina" 1975; Reviewer:  
TIUNOV, L. A., Leningrad

[Abstract] The first five chapters of the book cover general theoretical concepts. The second part of the book concentrates on toxicology and dangerous aspects of individual compounds. The problem of threshold activity of environmental agents is considered in detail, concentrating on mutagenic and blastomogenic toxic agents as well as on ionizing radiation. The authors made an attempt to formulate principles of differentiation between adaptation and compensation. When physiologically normal levels were considered, the question of biorhythms was discussed. The authors stress the complexity of the problem: only consideration of all interacting effects may lead to successful solution of the problems: humans are exposed to toxic substances in air, water and food.

USSR

UDC 616-056.3-057-02:[547.538.141+547.391.1

EVALUATION OF LOCALLY IRRITATING ACTIVITY AND ALLERGIC EFFECT OF SOME FINISHING AGENTS USED IN THE TEXTILE INDUSTRY

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 3, Mar 77 pp 50-52 manuscript received 7 Sep 76

RATPAN, M. M., and KORDYSH, E. A., L'vov Institute of Epidemiology and Microbiology

[Abstract] In connection with the fact that textile industry, which employs various chemical agents, is one of the principal sources of professional dermatoses, three agents widely used in this industry were investigated in respect to their sensibilization and obligatory action: emucryl C (a product of emulsion copolymerization of ethylacrylate and styrene) and the lubricants BV and B-73--liquid multicomponent compositions based on mineral oils. The assays were performed on rabbits, guinea pigs and white rats. All of the tested materials appeared as weak local irritants. The lubricant BV and emucryl C are also weak allergens; the lubricant B-73 showed no sensibilizing effect. In this study the tests registering the leucocyte alteration were more sensitive than the skin tests. No tables or figures, references: 4 Russian.

USSR

UDC 613.632:615.285.7

DEVELOPMENT OF HYGIENIC REGULATIONS FOR OPERATIONS IN HOT HOUSES IN WHICH POISONOUS CHEMICALS ARE USED

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 3, Mar 77, pp 49-50 manuscript received 22 Mar 76

ZOTOV, V. M., SVIRIN, YU. N. and PRUSAKOVA, R. M., Orel Institute of Labor Protection and Agriculture

[Abstract] Study of the hot house air concentration of poisonous chemicals showed the following: immediately after spraying, without shaking the plants, the concentration of dimethyldichlorovinyl phosphate (DDVP) exceeded the maximum permissible level by about six times ( $1.2 \text{ mg/m}^3$ ) cineb--by 1.7 fold ( $0.87 \text{ mg/m}^3$ ) and the concentration of benlot was  $0.15 \text{ mg/m}^3$ . After 20 hrs the concentration of DDVP was  $0.01 \text{ mg/m}^3$ , that of the cineb-- $0.12 \text{ mg/m}^3$  and benlot could not be detected at all. After 40 hrs all chemicals were not detectable. Shaking the leaves of the plants increases the air concentration by 10-26%. When a combination of toxic agents is used, their synergistic action must be taken into consideration. Table 1; references: 2 Russian.

USSR

UDC 628.543.5

APPLICATION OF MICROFILTERS FOR THE ADDITIONAL PURIFICATION OF BIOLOGICALLY  
PURIFIED MUNICIPAL WASTE WATERS

Moscow VODOSNABZHENIYE I SANITARNAYA TEKHNIKA in Russian No 3, 1977  
pp 12-16

DRAGINSKIY, V. L. and GREBENEVICH, Ye. V., Scientific Research Institute  
of Municipal Water Supply and Water Purification, Academy of Municipal  
Services imeni K. D. Pamfilov, ZAPORNIKOV, V. P., DAVYDOV, A. Ye., and  
DOGADAYEVA, O. S., Zelenogradskaya Aeration Station, Moscow

[Abstract] Tests of the MFB 1.5 x 2.8 microfilter for additional purification  
of biologically purified municipal waste waters at the Moscow  
Zelenogradskaya aeration station showed that they can be successfully used  
together with filters containing a granular charge. Microfilters have  
substantial technical and economic advantages, consisting in reduction of  
capital investments and operating expenses. References 5: 3 Russian,  
2 Western.

USSR

UDC 628.165.001.6

EXPERIMENTAL DESALINATION EQUIPMENT WITH A GAS-LIQUID HEAT EXCHANGER

Moscow VODOSNABZHENIYE I SANITARNAYA TEKHNIKA in Russian No 3, 1977  
pp 16-17

TAUBMAN, Ye. I., candidate of technical sciences, and GORNEV, V. A.  
engineer, Odessa Technological Institute of the Refrigeration Industry,  
BIL'DER, Z. P., engineer, Odessa Polytechnical Institute, and KALISHEVICH,  
Yu. I., engineer, Institute of Technical Thermophysics, Academy of Sciences  
Ukrainian SSR

[Abstract] An experimental adiabatic evaporation installation for the  
desalination of waste saline waters is described, in which a contact gas-  
liquid heat exchanger is used as the heater of the saline liquid. In such  
installations there is no contact of the saline liquid with the heating  
surface, so that scale formation is eliminated and corrosion of the equip-  
ment is reduced. The results of investigation of the processes of heat  
exchange in the contact heat exchanger are presented. References: 6  
Russian.

USSR

UDC 677.463:628

RENDERING THE ENVIRONMENT OF ENTERPRISES MANUFACTURING ARTIFICIAL FIBERS  
HARMLESS DURING THE TENTH FIVE-YEAR PLAN

Moscow KHIMICHESKIYE VOLOKNA in Russian No 2, 1977 pp 29-32

KIM, V. P., CHICHERIN, Yu. I. and SELIN, A. N.

[Abstract] The increase in the manufacture of artificial fibers has also increased the release of undesirable chemicals. A number of goals are listed, among which are the following: improving the technological processes generating  $CS_2$  and sharply reduce its concentration in the working areas; improving scrubbing equipment to remove the contaminants from effluent gases, increasing scientific studies for preparing the fibers without  $CS_2$  and development of continuous processes. Effluent water is also considered, the goal in this case being to reduce zinc, copper oxides, particulate material and acid. The recent installation of an electro-flocculator reduced the concentrations of the above components by 95%, 95%, 100% and 58% respectively in one factory. Flow diagrams for two systems are shown.

USSR

UDC[665.637.7:665.77].004.3

THE EFFECT OF PACKING MATERIAL ON THE QUALITY OF PARAFFIN USED FOR THE NEEDS OF THE FOOD INDUSTRY

Moscow KHIMIYA I TEKHNLOGIYA TOPLIV I MASEL in Russian No 3, 1977 pp 35-36

BAGDANOV, N. F., SERGEYEVA, M. I. and GLADYSHEV, V. P.

[Abstract] The All-Union State Standard 13577-77 on the packaging of bulk paraffin suitable for the food industry in order to prevent the formation of benzo-alpha-pyrene is discussed. The requirement for packaging paraffin in sacks or polyethylene wrapping is unnecessary and prevents mechanization. Extraction with n-octane and analysis for benzo-alpha-pyrene by UV fluorescence shows that dense three-layer cardboard protects paraffin as well as porous calico. Comparison of the surface and center of export grade paraffin stored in cardboard containers demonstrates an increase in fluorescence background for all samples, but the pyrene is absent. Two year storage of P-1 grade paraffin in cardboard cartons with and without polyethylene wrapping gave no change in composition, properties, external appearance or background fluorescence and no benzo-alpha-pyrene was formed.

USSR

UDC 62-622

## HYDROGEN AS AN AUTOMOBILE FUEL (SURVEY)

Kiev KHIMICHESKAYA TEKHNOLOGIYA in Russian No 2, 1977 pp 3-10 manuscript received Mar 75

GAMBURG, D. YU. and SEMENOV, V. P., The State Institute for Automobile Industries

[Abstract] Since automobile emissions cause an increasingly serious problem, research for new types of fuel has become ever more essential. One promising direction seems to be use of hydrogen in liquid and gaseous states. Investigations of such uses of hydrogen date from the 19th century, but the problem of detonation has remained crucial. Some of the advantages of hydrogen are more thorough burning, hence less emissions, smooth operation of engines that are similar to current internal combustion engines, and abundance. A critical problem to be solved is storage in the vehicle, and a compact form of hydrogen is being sought to solve that problem. Certain metal hydrides seem to offer the solution. Some of the properties of these hydrides, including boron, magnesium, vanadium, niobium and alloys of those metals, are described. Energy density during the storage and use of hydrides is discussed, and model solutions and applications are summarized. Factors limiting progress toward practical use are mentioned, including prices and reserves of hydrocarbon fuels, technology for actual use, and distribution. Tables 3, References 24: 6 Russian, 18 English.

USSR

UDC 531.7.082.2/32

## THE GENERALIZED DEPENDENCE OF JET FUELS SURFACE TENSION ON TEMPERATURE

Moscow KHIMIYA I TEKHNOLOGIYA TOPLIV I MASEL in Russian No 3, 1977 pp 53-55

SOLOV'YEV, A. N. and BLAGOVISTNAYA, V. I., KIIGA

[Abstract] Since it is not possible to accurately calculate surface tension of commercial fuels, the relationship between surface tension and density for four fuels was studied. Volyak's formula permitted interpolation with about 3% accuracy from 233 to 523°K. The error using the formula of Dubokin, Malincheva and Kuznetsova was 2.5-3.5%, but could be reduced to 1% by improving the constants in the formula. All the points for the dependence of change in tension with temperature on change in density lie on one curve from 223 to 573°K, as do points for several individual hydrocarbons. An equation for the surface tension in terms of the density at room temperature is derived. Figures 1; tables 1; references 8: 7 Russian, 1 Western.

USSR

UDC 665.521.3:665.2:66.094.382

THE INFLUENCE OF PHENOL-TYPE ANTIOXIDIZING ADDITIVES ON THE WORKING PROPERTIES OF HYDRO-REFINED JET FUELS

Moscow KHIMIYA I TEKHOLOGIYA TOPLIV I MASEL in Russian No 4, 1977  
pp 24-27

LYKOV, O. P., VISHNYAKOVA, T. P., KRYLOV, I. F., SEREGIN, YE. P.,  
PROKUDIN, V. N., GKOVORODIN, G. B. and ZALISHCHEVSKIY, G. D.

[Abstract] Three fuels, each containing 0.001% ionol, were examined with respect to their resistance to oxidation on the addition of various concentrations of phenol-type antioxidants. The original properties of the fuels are given. Parameters such as the following were measured on samples containing different concentrations of the additives: precipitate, potential resins, actual resins, critical weight, antiabrasion properties, electrical conductivity, and anticorrosion properties with respect to steel and bronze. The analyses indicate that the addition of phenol-type antioxidants in concentrations of 0.003-0.01 mass % exerts practically no effect on the working properties of the fuels but strongly reduces oxidations. References: 2 Western, 4 Russian.

USSR

UDC 547.7/8:62-634.2:542.943

INFLUENCE OF HETEROORGANIC COMPOUNDS ON THE TENDENCY TOWARDS OXIDATION OF HYDROGENATED JET FUELS AND THE EFFECTIVENESS OF ANTIOXIDANTS

Moscow KHIMIYA I TEKHOLOGIYA TOPLIV I MASEL in Russian No 4, 1977  
pp 16-19

ENGLIN, B. A., SLITIKOVA, V. M., RADCHENKO, Ye. D., BABENKO, N. V. and  
KIR'YANOVA, A. A.

[Abstract] A study was made of the effects of heating and different processing on the following properties of three different fuels: optical density: acidity, mg KOH/100 ml; and the peroxide number,  $10^4$  mg  $O_2$ /ml. The samples were a "hydro-purified" fuel RT, a fuel T-8V obtained from the hydrocracking of vacuum gasolines, and a fuel T-6 obtained by the deep hydrogenation of the light gasolines from catalytic cracking. The fuels were analyzed in the original state, in the original state with the addition of 0.003% ionol, after the resins had been removed, and after the resins had been removed with the addition of 0.003% ionol. Heating involved 5, 8, and 12 cycles at 120°C. Evidence of oxidation increased with increasing number of cycles. Evidence of oxidation decreased slightly

with the addition of ionol, more significantly when the resins were removed and most when both ionol was added and the resins removed. A sulfur-containing fuel was also heated in a similar manner but showed minor changes compared with the other three fuels. References: 6 Russian.

Organometallic Compounds

USSR

UDC 547.242

PMR SPECTRA OF ARSONIUM AND ALKYLTHIOARSONIUM SALTS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 621-623 manuscript received 2 Jul 75

ZYKOVA, T. V., CHERNOKAL'SKIY, B. D., SALAKHUT'DINOV, R. A., and RYABCHENKO, I. B., Kazan' Chemical-Technological Institute Imeni S. M. Kirov

[Abstract] Distribution of electronic density in alkylarylarsonium salts containing methyl or ethyl radicals at the arsenic atom were studied. By comparing chemical shifts of methyl and ethyl protons it has been shown that the positive charge on the arsenic atom increases with the change from triethyl substituted salts to triphenylarsines. Analogous substituents located at the arsenic or sulfur atoms in the alkylthioarsonium salts have been shown to have identical shifts. The spectra of triphenyl(ethylthio)- and triethyl(ethylthio)arsonium tetrafluoroborates and bromides were identical. Tables 2, references 9: 7 Russian, 2 Western.

USSR

UDC 547.242

REACTION PRODUCTS OF TERTIARY ARSINE OXIDES AND HYDROGEN HALIDE ACIDS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 624-625 manuscript received 1 Jul 75

ABALONIN, B. YE., GATILOV, YU. F. and IZMAYLOVA, Z. M., Kazan' Pedagogical Institute

[Abstract] It has been shown to be possible to isolate tertiary arsine dihalides from the reaction of tertiary arsine oxides with hydrogen halide acids. The conditions for this isolation included excess acid and relatively high resistance of the dihalides to hydrolysis. Table 1, References 7: 4 Russian, 3 Western.

## SYNTHESIS OF ALKYLTHIOARSONIUM SALTS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 625-627 manuscript received 21 Jul 75

ABALONIN, B. YE., GATILOV, YU. F., VASILENKO, G. I., ZYKOVA, T. V., and ZHIKHAREVA, N. A., Kazan' Pedagogical Institute, Kazan' Chemical-Technological Institute

[Abstract] A series of ethylthioarsonium tetrafluoroborates has been synthesized by a published method based on the reaction of tertiary arsine sulfides with triethyloxonium tetrafluoroborate in methylene chloride. Physical properties and analytical data have been tabulated. Table 1, figure 1, references 19: 15 Russian, 4 Western.

Organophosphorus Compounds

USSR

UDC 547.634

REACTION OF TRIETHYLPHOSPHITE WITH CROTON ALDEHYDE DIETHYLHYDRAZONE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 571-572 manuscript received 10 Jul 75

OSIPOVA, M. P. and KUKHTIN, V. A.

[Abstract] When heated to 120° for 8 hrs, triethylphosphite reacts with croton aldehyde diethylhydrazone forming diethyl(4-N,N-triethylhydrazo-3-butenyl-2)phosphonate, b.p. 102-103/1 mm,  $d_4^{20}$  0.9675,  $n_D^{20}$  1.4459. No tables or figures, references 4: 3 Russian, 1 Western.

USSR

UDC 547.241

STUDIES IN THE SERIES OF PHOSPHINOUS AND PHOSPHINIC ACID DERIVATIVES. 98. PHOSPHORYLATED  $\beta$ -NITROALCOHOLS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 567-570 manuscript received 4 Jul 75

RAZUMOV, A. I., LIORBER, B. G., KHAMMATOVA, Z. M., SOKOLOV, M. P., ZYKOVA, T. V., and ALPAROVA, M. V., Kazan' Chemical-Technological Institute Imeni S. M. Kirov

[Abstract] Phosphorylated  $\beta$ -nitroalcohols have been synthesized by the reaction of phosphorylated aldehydes with nitroethane. The study of the nature of hydrogen bonding of these compounds by IR and PMR spectroscopy showed that in the condensed phase they exist in the associated state. When diluted with non-polar solvents and at elevated temperatures they break down and convert to monomeric molecules in which the hydrogen atom of the hydroxyl group participates in the intramolecular H-bonding with the phosphoryl oxygen atom. Tables 3, figure 1, references 11: 10 Russian, 1 Western.

USSR

UDC 547.241

STRUCTURE AND REACTIVITY OF PHOSPHORYLATED CARBONYL COMPOUNDS. 12.  
2,4-DIPHOSPHORYLATED-2-BUTENALS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 563-566 manuscript received 4 Jul 75

RAZUMOV, A. I., SOKOLOV, M. P., LIORBER, B. G., ZYKOVA, T. V., and ZHIKHAREVA, N. A., Kazan' Chemical-Technological Institute imeni S. M. Kirov

[Abstract] Crotonic type phosphorylated acetaldehydes were condensed yielding 2,4-diphosphorylated-2-butenals. Tautomeric equilibrium of these compounds was studied, showing that in the condensed state they exist principally in the enol forms, stabilized by intermolecular association. When diluted with solvents, they convert to the aldol forms which differ by the position of their double bonds. Tables 3, figure 1, references: 2 Russian.

USSR

UDC 547.244.233

REACTION OF ISOTHIOCYANATES WITH P<sup>III</sup> ACID AMIDES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 559-562 manuscript received 22 Jul 75

BATYYEVA, E. S., OFITSEROV, YE. N., and PUDOVNIK, A. N., Institute of Organic and Physical Chemistry Imeni A. Ye. Arbuzov, Kazan' Branch of the Academy of Sciences USSR

[Abstract] The reaction of P<sup>III</sup> acid amides with arylisothiocyanates and acylisothiocyanates occurs at the phosphorus atom, leading to the formation of bipolar ions with a P-C bond. No embedded products are observed under such reaction conditions. As it was shown earlier, the "embedded" products are formed in these reactions because of the presence of amine hydrochloride in the reaction mixture, which protonates the amidophosphite. The betaines obtained react further with proton containing reagents forming thioureas or quasiphosphonium salts, depending on the nature of proton containing reagent. No tables or figures, references 9: 6 Russian, 3 Western.

USSR

UDC 547.245+547.241

REACTION OF BIS(TRIMETHYLSILYL)HYPOPHOSPHITE WITH UNSATURATED COMPOUNDS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 555-559 manuscript received 21 Jul 75

PUDOVIK, A. N., ROMANOV, G. V., and NAZMUTDINOV, R. YA., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan' Branch of the Academy of Sciences USSR

[Abstract] It was shown that the reaction of bis(trimethylsilyl)hypophosphite with acrylonitrile takes place with the formation of trimethylsilyl- $\beta$ -trimethylsilyl- $\beta$ -cyanoethylphosphonite (I) and bis(trimethylsilyl)- $\beta$ -cyanoethylphosphonite (II). The relationship among the products depends on the reaction temperature. It has been established that I--a derivative of tetracoordinated phosphorus atom with a P(O)H group--isomerizes at temperatures above 100° into II--a derivative of tricoordinated phosphorus atom. Figures 2, references: 7 Russian.

USSR

UDC 547.244.233

REACTION OF AMIDOPHOSPHITES WITH CARBOXYLIC ACID CHLORIDES IN THE PRESENCE OF AMINE HYDROCHLORIDE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 550-555 manuscript received 16 Jul 75

BATYYEVA, E. S., AL'FONSOV, V. A., NESTERENKO, V. D., and PUDOVIK, A. N., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov Kazan' Branch of the Academy of Sciences USSR

[Abstract] The reaction of amidophosphites with carboxylic acid chlorides in the presence of amine hydrochlorides has been investigated. It was shown that formation of chlorophosphite and carboxylic acid amide under these conditions occurs not by the attack of nitrogen atom on the carbon atom of the carbonyl group, but is the result of an equilibrium shift in the direction of the protonated form of the amidophosphite in the presence of the amine hydrochloride and other acid admixtures. Acid chloride reacts faster with the amine, forming by the protonation of nitrogen atom, than with amidophosphite. Figures 3, references 6: 4 Russian, 2 Western.

USSR

UDC 547.26'118

REACTION OF THE CHLOROMETHYLATED COPOLYMER OF STYRENE AND DIVINYLBENZENE WITH PHOSPHOROUS AND PHOSPHORIC ACID AMIDES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 572-575 manuscript received 14 Jul 75

BUTOVA, G. L., GUBNITSKAYA, YE. S., and FESHCHENKO, N. G., Institute of Organic Chemistry, Academy of Sciences Ukrainian SSR

[Abstract] When reacted with phosphorous acid amides, chloromethylated copolymer of styrene and divinylbenzene (I) yields respective quasi-phosphonium salts which are resistant to acids and bases. Reaction of I with dialkylphosphonic acid ethylenamides yields N-phosphoneaminoethyl derivatives of I, which upon saponification with concentrated HCl yield dialkylphosphoric acid and the hydrochloride of  $\beta$ -chloroethylvinylbenzylamine and divinylbenzene. Reactions of the copolymer with N- $\beta$ -cyano- and N- $\beta$ -phenylethylethylenimines yield aminoethyl derivatives of the chloromethylated copolymer of styrene and divinylbenzene. Table 1, references 5: 3 Russian, 2 Western.

USSR

UDC 547.794:543.422

SOME PROPERTIES OF DIAZAPHOSPHOLS AND DIAZAPHOSPHOLINES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 576-579 manuscript received 16 Jul 75

BOBKOVA, R. G., IGNATOVA, N. P., SHVETSOV-SHILOVSKIY, N. I., MEL'NIKOV, N.N. NEGREBETSKIY, V. V., BOGEL'FER, L. YA., DYMOVA, S. F., and VASIL'YEV, A.F.

[Abstract] Reaction of 2-acetyl-5-methyl-1,2,3-diazaphosphol and 2-acetyl-5-methyl-3-methoxy-1,2,3-diazaphospholine with phenylhydrazine leads to the formation of 5-methyldiazaphosphol. Bromination of 2-phenyl-1,2,3-diazaphosphol yields 4-bromo-5-methyl-2-phenyl-1,2,3-diazaphosphol. No tables or figures, references 3: 2 Russian, 1 Western.

USSR

UDC 542.91:547.1'118

DERIVATIVES OF PHENOPHOSPHAZINE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 579-583 manuscript received 28 Apr 75

PETROV, K. A., CHAUZOV, V. A., and MAL'KEVICH, N. YU.

[Abstract] 10-Keto-5,10-dihydrophenophosphazine (I) reacts with carbonyl compounds to yield 10-hydroxyalkyl derivatives; with benzalaniline and N,N,N',N'-tetraethylmethylenediamine the products are 10-aminoalkyl derivatives. I reacts easily with diethylamine and ethanol in presence of carbon tetrachloride to yield corresponding derivatives of phenophosphazinic acid. Table 1, references 10: 4 Russian, 6 Western.

USSR

UDC 547.26.118.07

CHEMICAL REACTIONS OF PHOSPHORUS ACID HYDRAZIDES. I. REACTION OF PHOSPHORUS ACID HYDRAZIDES WITH METHANESULFOCHLORIDE, ETHYL ESTER OF CHLOROCARBONIC ACID AND WITH CARBONYL COMPOUNDS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 583-587 manuscript received 12 May 75

OVRUTSKIY, V. M. and PROTSENKO, L. D., Kiev Scientific Research Institute of Pharmacology and Toxicology, Public Health Ministry of the Ukrainian SSR

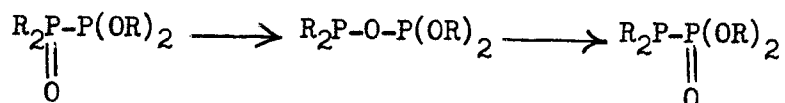
[Abstract] Reaction of the phosphorus acid hydrazides containing a chloroethylamine group with methane-sulfochloride, ethyl ester of chloro-carbonic acid as well as with various carbonyl compounds leads to the formation of  $\beta$ -methylsulfohydrazide,  $\beta$ -ethoxycarbonylhydrazide and alkylidene (aralkylidene)-hydrazides of the aryl esters of N,N-di(2-chloroethyl) amidophosphoric acid respectively. Tables 3, references 4: 2 Russian, 2 Western.

## ISOMERIZATION OF THE MONOTHIOOXIDES OF ALKYLALKOXYDIPHOSPHINES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 721-722 manuscript received 5 Jul 76

FOSS, V. L., VEYTS, YU. A., KUKHMISTEROV, P. L., and LUTSENKO, I. F.,  
Moscow State University imeni M. V. Lomonosov

[Abstract] The following rearrangement was studied with thioanalogues:



The isomerization is irreversible in both cases, but the reaction routes differ. Some of the intermediate products of the thioanalogues appear to be less stable, so that final composition is different. References: 4 Russian.

## PROTONIZATION OF TRIS(TRIMETHYLSILYLMETHYL)PHOSPHINE OXIDE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 p 721 manuscript received 5 Jul 76

SKVORTSOV, N. K., IONIN, B. I., and REYKHSFEL'D, V. D.

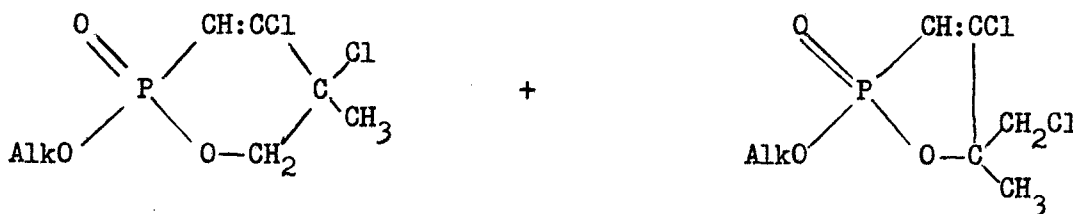
[Abstract] Even though tris(trimethylsilylmethyl)phosphine oxide could have been expected to act as a good indicator for the construction of the acid function of phosphoryl compounds, study of its protonization by NMR showed it to be less basic than expected from theoretical calculations. In general branching of the phosphine oxides showed decreased basicity probably because of solvation effects. References 4: 2 Russian, 2 Western.

CYCLOHALOGENATION OF 2-CHLORO-3-METHYL-1,3-BUTADIENOPHOSPHONIC ACID  
DIALKYL ESTERS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 p 720  
manuscript received 21 Jun 76

SHEKHADE, A. M., IGNAT'YEV, V. M., ZAKHAROV, V. I., IONIN, B. I., and  
PETROV, A. A., Leningrad Technological Institute imeni Lensovet

[Abstract] Chlorination of the dialkyl esters of 2-chloro-3-methyl-1,3-butadienophosphonic acids leads to the formation of cyclohalogenated derivatives: a mixture of six and five membered phosphorus containing rings:



No figures, tables or references.

THERMAL REARRANGEMENT OF  $\alpha$ -HYDROXY- $\alpha$ -CYANOALKYLPHOSPHINES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 p 719  
manuscript received 19 Mar 76

PUDOVIK, A. N., ROMANOV, G. V., and POZHIDAYEV, V. M., Institute of  
Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan' Branch of the  
Academy of Sciences USSR

[Abstract]  $\alpha$ -Hydroxyalkylphosphines formed by the reaction of secondary phosphines with the nitriles of  $\alpha$ -ketocarboxylic acids isomerize to the tertiary phosphine oxides when heated to 150°. No catalyst is required for this conversion. References: 4 Western.

USSR

UDC 547.26'118.3-325

REARRANGEMENT OF  $\alpha$ -HYDROXYALKYLPHOSPHONITES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77  
pp 718-719 manuscript received 19 Mar 76

PUDOVIK, A. N., ROMANOV, G. V., and NAZMUTDINOV, R. YA., Institute of Organic and Physical Chemistry Imeni A. Ye. Arbuzov, Kazan' Branch of the Academy of Sciences USSR

[Abstract]  $\alpha$ -Hydroxyalkylphosphonites containing an electron-accepting nitrile group at the  $\alpha$ -position in respect to the phosphorus atom isomerize easily to respective phosphites. Evidently as a result of the nucleophilic attack of the dialkylhypophosphite phosphorus atom on the carbon atom of the carbonyl group,--a bipolar ion with a P-C bond is formed which is then stabilized by proton transfer to the oxygen or isomerized into another ion with a P-O-C bond. The  $\alpha$ -hydroxyalkylphosphonites are evidently in equilibrium with the bipolar ion and eventually can convert to the thermodynamically more stable phosphites. References 6: 5 Russian, 1 Western.

USSR

UDC 547.241 + 547.565.2

SYNTHESIS OF ALKYL(ARYL)- $\beta$ -CHLOROETHYL-2,5-DIMETHOXYPHENYLPHOSPHINE OXIDES

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 717-718 manuscript received 28 Jun 76

OSIPOVA, M. P., STEPANOVA, A. G., and KUKHTIN, V. A., Chuvash State University imeni I. N. Ul'yanov

[Abstract] Several alkyl(aryl)- $\beta$ -chloroethyl-2,5-dimethoxyphenylphosphine oxides have been synthesized by the magnesium organic synthetic method for the purpose of obtaining photographic materials. References: 1 Russian.

USSR

UDC 547.241

UNUSUAL BEHAVIOR OF PHOSPHORUS CONTAINING DIAZOALKANES IN RESPECT TO HYDROGEN CHLORIDE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 716-717 manuscript received 28 Jun 76

GAREYEV, R. D., LOGINOVA, G. M., and PUDOVIK, A. N., Kazan' State University imeni V. I. Ul'yanov-Lenin

[Abstract] An unusual product has been observed in the reaction of the methyl ester of phenyl- $\alpha$ -diazopropylphosphinic acid with HCl. In addition to the erythro- and threo- isomers of the methyl ester of phenyl- $\alpha$ -chloropropylphosphinic acid, both cis and trans isomers of the methyl ester of phenylpropen-1-phosphinic acids were found. Analogous behavior was noted with the esters of phenyl- $\alpha$ -diazoethylphosphinic acid. No tables, figures or references.

USSR

UDC 547.26:118:543.4

REACTION OF SOME DITHIOPHOSPHATES WITH PALLADIUM SALTS

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 659-662 manuscript received 28 Jul 75

BUSEV, A. I., MAKAROVA, S. V., BEL'SKAYA, G. F., All Union Scientific Research Institute of Chemical Plant Protective Agents, Moscow State University imeni Lomonosov

[Abstract] Phtalophos and phozalon, reacting with Pd(II) salts undergo a P-S bond split; palladium adds at the point of break. The following compounds have been isolated and analyzed: bis-S-(N-methylphtalimide) palladium disulfide and bis-S-(N-methyl-6-chlorobenzoxazolinone)palladium disulfide. Dimethyl- and diethylthiophosphoric acids have been identified polarographically and by analysis of the precipitate formed with Hg(II) nitrate. Acid residue of palladium salt is not one of the compounds formed. Figure 1, references 17: 7 Russian, 10 Western.

USSR

UDC 547.78

PHOSPHORYLATION OF SODIUM-2-BENZTHIAZOLMERCAPTIDE WITH PHOSPHORUS  
CHLOROXYDE

Leningrad ZHURNAL OBSHCHEY KHIMII in Russian Vol 47, No 3, Mar 77 pp 722-  
723 manuscript received 9 Jul 76

RATNIKOVA, T. V., SHESHINA, G. M., and GINAK, A. I., Leningrad Technologi-  
cal Institute imeni Lensovet

[Abstract] Phosphorylation of sodium 2-benzthiazolmercaptide with a 2-fold  
excess of phosphorus chloroxide in highly polar solvents and under an  
atmosphere of dry nitrogen leads to the formation of N-(benzthiazoline-  
thione-2) dichlorophosphonate, m.p. 160-162°. References 3: 2 Russian,  
1 Western.

USSR

UDC 547.461:546/547.07

OBTAINING TRIALCOXY-ALKYL(ARYL)DIALCOXY- AND DIARYLALCOXYPHOSPHASOCARBACYLS

Kiev KHIMICHESKAYA TEKHNLOGIYA in Russian No 2, 1977 pp 59-60

TSUTSURIN, V. V., KUCHEROVA, M. N., RUDAUSKIY, V. P., ZAGNIBEDA, D. M.,  
and NOVIKOV, I. N.

[Abstract] Phosphoryl products of carbonic acids have excellent properties  
as herbicides, fungicides, defoliants and bacteriocides, and the present  
study summarizes methods for obtaining variants of these compounds using  
alcoholates and spirits in the presence of triethylamine. Each variation  
is described, to produce aloxydichlorphosphasocarbacyls, dialcoxychlor-  
phosphasocarbacyls, trialcoxyphosphasocarbacyls, alkyl(aryl)alcoxychlor-  
phosphasocarbacyls, alkyl(aryl)dialcoxyphosphasocarbacyls, and diarylal-  
coxyphosphasocarbacyls. References: 5 Russian.

SYNTHESIS OF PHOSPHATES AND THIOPHOSPHATES BASED ON 1,4-BIS( $\beta$ -HYDROXY-ALKYL)PIPERAZINES

Frunze IZVESTIYA AKADEMII NAUK KIRGIZSKOY SSR, in Russian No 6, 1976 pp 61-64 manuscript received 28 Jun 75

BEYSHEKEYEV, ZH., DZHUNDUBAYEV, K. D., RYSKULOV, T., TOKTOBEKOVA, T., and ISYKHZHANOVA, A., Institute of Organic Chemistry, Academy of Sciences Kirgiz SSR

[Abstract] In an attempt to get new physiologically active compounds, a series of phosphates and thiophosphates was synthesized by reacting dialkyl(aryl)phosphoric and thiophosphoric acid chlorides with 1,4-bis( $\beta$ -hydroxyethyl)- and 1,4-bis( $\beta$ -hydroxypropyl)piperazines. The reaction was performed in benzene at room temperature, followed by heating to 70-80° for 8-10 hrs. The structures of these products were proven by IR data, independent syntheses, elemental analyses and conversions to the picrates. Table 1, references 10: 1 Russian, 9 Western.

USSR

UDC 577.152:577.15.02

## EFFECT OF THE CATIONIC CHARGE OF A LEAVING GROUP IN THE REACTION OF ORGANOPHOSPHORUS INHIBITORS WITH ACETYLCHOLINESTERASE

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 3, No 2, Feb 77 pp 268-272 manuscript received 29 Jun 76

YARV, YA. L., AAVIKSAAR, A. A., GODOVIKOV, N. N., and LOBANOV, D. I., Tartusk State University, EstSSR, Institute of Cybernetics, Academy of Sciences EstSSR, Tallin, Institute of Metalorganic Compounds, Academy of Sciences USSR, Moscow

[Abstract] The rate constants of the inhibition of acetylcholinesterase by organophosphorus compounds  $[(C_2H_5O)_2P(O)S(CH_2)_nS^+(CH_3)C_2H_5]CH_2SO_4^-$  ( $n = 1$  to  $6$ ) have been determined at  $25^\circ C$  and pH 7.5. Using the equation  $lgK_{II}^X = lgK_{II}^O + \rho^* \sigma_X^* + \varphi \pi_X + Q_X$  the contribution of the positive charge of the leaving group to the inhibitory activity of these compounds has been calculated. Inhibitor with  $n = 1$  shows a 0 effect of the charge. All the other compounds had  $\rho^*$  of 3.6, being independent of "n". An assumption has been expressed that the main role of acetylcholinesterase anionic site is to compensate cationic substituents' "antihydrophobicity", which is the result of energetically unfavorable transfer of a charged group from water to enzyme active site of hydrophobic region. Table 1, references 23: 11 Russian, 12 W. stern.

USSR

UDC 615.214.22.015.4:[616-003.96-02:616.45-001.1/.3

## EFFECT OF SOME PSYCHOPHARMACOLOGIC AGENTS ON THE ADAPTATION UNDER CONDITIONS OF STRESS

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian Vol 40, No 1, Jan/Feb 77 pp 9-12 manuscript received 20 Feb 76

STANISHEVSKAYA, A. V. and MEZENTSEVA, L. N., Laboratory of Psychopharmacology, Institute of Psychiatry imeni Prof. V. P. Serbskiy, Public Health Ministry USSR, Moscow

[Abstract] Central noradrenergic mechanisms participate in formation of pathologic states resulting from stress and accompanied by development of ulcerative lesions of the gastric mucosa. Appearance of somatic damage is related to the drop in the level of noradrenaline in mesencephalon and hypothalamus. Pretreatment with phenamine (5 and 10 mg/kg) intensifies the pathologic action of the stressing agent. No effect was noted with administration of the inderol (0.5 mg/kg) or pyroxan (20 mg/kg)-- $\beta$ - and  $\alpha$ -

adrenoblocking agents respectively. Administration of L-DOPA (50 mg/kg) shows no effect on the frequency of the appearance of ulcerative lesions due to the stress. The protective effect of L-DOPA appears during the blocking of  $\alpha$ -adreno-receptors with pyroxan but it disappears with the additional blocking action of inderol ( $\beta$ -receptors). Administration of the tranquilizer seduxen (5 mg/kg) alone or in combination with L-DOPA (50 mg/kg) improves the adaptation of the organism in stress states and results in appearance of fewer ulcerative lesions. Tables 2, references 7: 4 Russian, 3 Western.

USSR

UDC 615.31:547.1.015.4(047)

#### THE BIOLOGICAL ACTIVITY OF SUBSTANCES CONTAINING ADAMANTANE

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian No 3, 1977 pp 19-27  
manuscript received 14 Jun 76

KOVALEV, I. YE., The Scientific Research Institute for Biological Testing of Chemical Compounds, Moscow Oblast

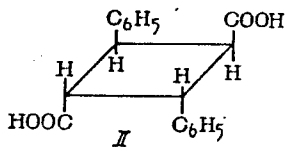
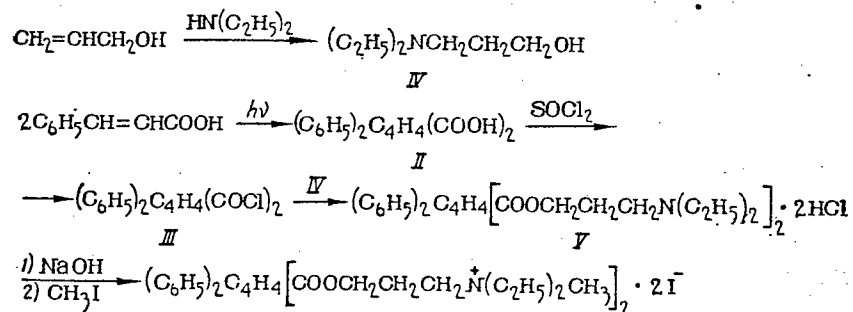
[Abstract] The history of the discovery of adamantane and early theories regarding its isomerization and formation of compounds is presented. Specific reactions are described concerning the biological activity of 1-adamantanes with hydrochloride and similar compounds, pharmacological and toxic properties of adamantane hydrochloride, usefulness in treating Parkinson's disease, the biological activities of other byproducts of adamantane, the effects of modification with the adamantane radical on certain pharmacological preparations, thereby producing medications for hypoglycemia, certain tumors, immunizations, antibacterial and fungistatic substances, and numerous other treatments. Unfortunately most of the research so far has been on a purely empirical basis, and there are practically no data on the biochemical or physicochemical mechanisms involved in adamantane interaction with the cells. This makes it extremely difficult to explain the effects of any preparation, or to give a direction to research with adamantane. Figures 12, references 71: 26 Russian, 45 Western.

## CYCLOBUTONES--NEW NATIVE CURARE FORM COMPOUND

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 11, No 2, Feb 77  
pp 145-150

KHARKEVICH, D. A., SKOLDINOV, A. P., ARENDARUK, A. P., KAHAKOVA, T. P.,  
YEZOROV, N. V., ASTASHINA, I. A., GUREVICH, G. I., SHAMR'YAN, M. I.,  
and MAYSKIY, V. V., Institute of Pharmacology of the Academy of Medical  
Sciences Moscow; First Moscow Institute of Medicine im. I. M. Sechenova

[Abstract] The title compound was synthesized according to the following  
scheme.



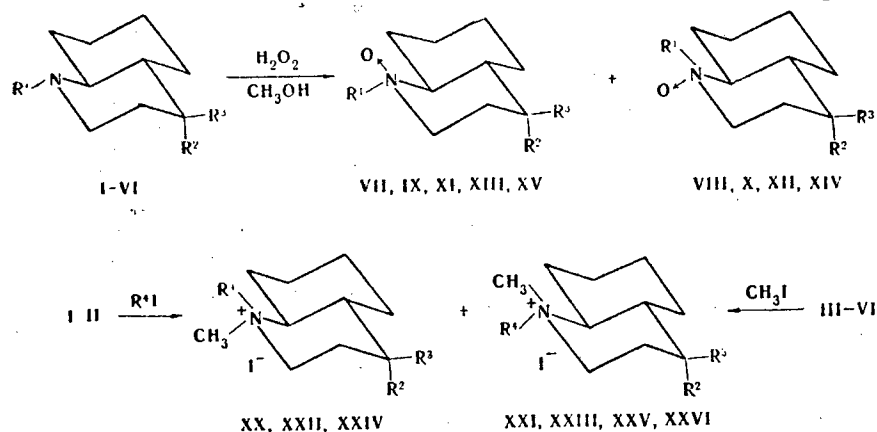
This compound may have important application in anesthesiology. In contrast to currently available drugs which exert a depolarizing effect, these compounds do not influence the distribution of calcium ions and, therefore, neither disrupt the cardiac activity nor cause muscular pain. Other clinical investigations are described. References: 9 Russian.

## STEREOCHEMISTRY OF THE OXIDATION AND ALKYLATION REACTIONS OF trans-1-alkyl-4-ethynyldecahydroquinolols-4

Riga KHIMIYA GETEROTSIKLIЧЕСКИХ SOEDINENIY in Russian No 2, Feb 77  
pp 221-224

AKHREM, A. A., UKHOVA, L. I., MARCHENKO, N. F., KUKSO, G. P. and  
GORUL'KO, V. M., Institute of Bioorganic Chemistry, Academy of Sciences,  
Belorussian SSR

[Abstract] The title study was carried out as outlined in the reaction  
path below.



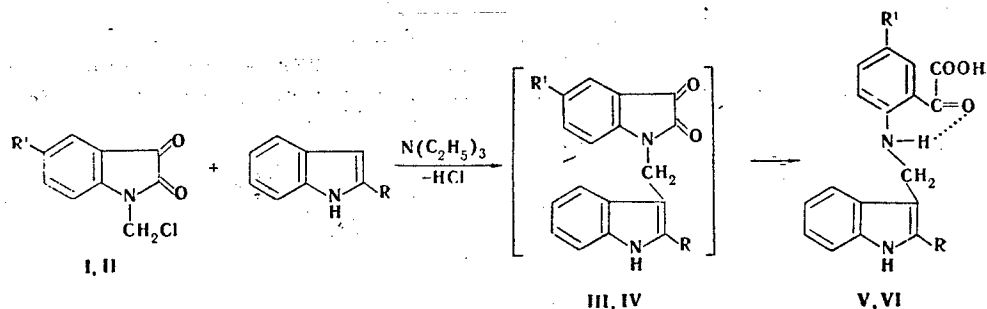
NMR spectra were used to determine the orientations of the  $C\equiv CH$  and  $N-CH_3$  substituents. It was concluded that the larger the volume of the alkyl group on the reactant compound, the greater the stereospecificity that occurs during the reaction. Experimental procedures are given as well as elemental analysis and physical properties of the compounds. References 12: 8 Western, 4 Russian.

## REACTION OF 1-CHLOROMETHYLIZATION WITH INDOL

Riga KHIMIYA GETEROSIKLICHESKIKH SOEDINENIY in Russian No 2, Feb 77  
pp 217-220

ZHUNGIYETU, G. I., SINYAVSKAYA, L. P. and FILIPENKO, T. Ya., Institute  
of Chemistry, Acad. Sci. Moldavian SSR

[Abstract] The title reaction, carried out in the presence of triethyl-  
amine, results in colorless crystals of o-(N-skatylamino) benzoylcarboxylic  
acid as shown below



I, IV, VI R' = H; II R' = CH<sub>3</sub>; III, V R = R' = H; IV, VI R = CH<sub>3</sub>

Various other products may be formed by the initial redistribution of the  
1-chloromethylizatin and subsequent loss of CH<sub>2</sub>Cl, Cl, CO, or HCN. NMR,  
IR and mass spectra were used to confirm product identification. Pro-  
cedures for the synthesis, yields, elemental analyses and physical proper-  
ties of the considered compounds are given. References: 3 English.

## Polymers and Polymerization

USSR

UDC 678.742:678.029.65

### METHODS FOR INCREASING THE FIRE-RESISTANCE OF POLYOLEFINS

Moscow PLASTICHESKIYE MASSY in Russian No 3, 1977 pp 57-60 manuscript received 24 Jun 76

RUMYANTSEV, V. D., GVOZDYUKEVICH, I. F., VASILENKO, YE. A., OMEL'CHUK, L.S. and KONOVAL, I. V.

[Abstract] Patents developed in recent years for methods to improve polyolefin fire resistance are reviewed. Chlorine containing antipyrenes include aliphatic, aromatic and cycloaliphatic compounds such as chlorinated paraffin and can be used with antimony trioxide and dechloranes. Bromine containing antipyrenes are more effective than chlorine containing with aromatic compounds most active. Mixtures of chlorine and bromine containing substances or those containing them on the same molecule enhance protection. Antimony trioxide is primarily used as an effective synergist for halogenated compounds. Potassium antimony tartrate and sodium pyroantimonate are suggested for reducing pigmentation, but reduce effect. Phosphorus containing organic antipyrenes can also be synergistically used with halogen and antimony containing compounds, as can phosphonium bromide derivatives. Aromatic halogenated boron and arsenic derivatives, nitrogen containing compounds such as melams and halogenated nitrogen containing compounds have been used. However all these antipyrenes have defects in effectiveness or compatibility. Aluminum hydroxide is a widely used nontoxic and inexpensive flame retardant, as are fluoborates or metals of groups I and II and ammonia. Powdered red phosphorus is effective with malamine, polyacrylonitrile or halogenated compounds. Additives which increase cross-linking effectiveness protect halogenated antipyrenes from decomposition during cross-linking. References 113: 7 Russian, 106 Western.

USSR

UDC 678:664-40501:53

### THE PROPERTIES OF A NEW TYPE OF FLAME-RETARDANT POLYURETHANE FOAM

Moscow PLASTICHESKIYE MASSY in Russian No 3, 1977 p 39 manuscript received 21 Jun 76

GUBENKO, A. B., TURETSKIY, L. V., BOROVIKOVA, N. B., GRINEVICH, S. M., MAROVA, L. YE. and RUMYANTSEVA, I. A.

[Abstract] A new type of polyurethane foam, 316H, formulated with reaction additives, does not propagate flames or burn and has a flammability

coefficient of 0.92. Density, stability to stress, modulus of elasticity and shear, thermal conductivity and capacity, vapor permeability and water absorption of the new foam are listed. Resistance to frost and cyclic changes in temperature were studied. Tables 1; references 4: 3 Russian, 1 Western.

USSR

UDC 615.849.1.015.25(049.3)

## CHEMISTRY AND PHARMACOLOGY OF THE PROPHYLACTIC AGENTS AGAINST RADIATION DAMAGE

Moscow FARMAKOLOGIYA I TOKSIKOLOGIYA in Russian Vol 40, No 1, Jan/Feb 77  
p 123

SUVOROV, N. N., and SHASHKOV, V. S. Moscow; Reviewers: CHEKMAN, I. S.  
and MIL'KO, V. I.

[Abstract] This is practically the first monograph devoted to the problem of the chemistry and pharmacology of radioprotectors. The first chapter is devoted to aminothiols and other sulfur containing compounds, covering the synthesis, physical-chemical and pharmacological properties, biosynthesis, metabolism and mechanism of action--a pattern repeated throughout the book. The later chapters are devoted to mediators of vegetative nervous system, indolalkylamines, histamine and acetylcholine respectively. The book is for chemists, pharmacologists and radiologists.

USSR

UDC 550.42

## REGULARITIES IN URANIUM, IONIUM, RADIUM AND THORIUM DISTRIBUTION IN THE BASINS OF THE BLACK AND AZOV SEAS

Moscow GEOKHIMIYA in Russian No 2, Feb 77 pp 230-236 manuscript received  
25 Mar 76

[Abstract] The uranium concentration of deposits in the Black and Azov seas is five to seven times or more that in ocean deposits, due to  $H_2S$  reduction of  $U^{+6}$  carbonate complexes to  $U^{+4}$  precipitates. The  $^{234}U/^{238}U$  ratio is greater than one due to superior leaching of the daughter isotope from river rocks. In the black Sea the Thorium-232 concentration ranges from  $1.4$  to  $3.9 \times 10^{-9}$  g/l, while in the Azov Sea it ranges from  $4$  to  $219 \times 10^{-9}$  g/l. In both the nuclide content is highest in coastal areas and estuaries. Ionium (Thorium 230) follows a similar pattern, with concentrations ranging from  $2.5$  to  $4.2 \times 10^{-13}$  g/l. The less pronounced concentration gradient for Ionium is caused by differences in colloidal particle concentration and form, in which Ionium is usually adsorbed on larger particles. The concentration of radium in the Black Sea appears identical in deep and shallow water and equal to  $1 \times 10^{-13}$  g/l, which is close to that of the oceans. The radium concentration in the Azov Sea is  $1.4 \times 10^{-13}$  g/l. Tables 1; references 31: 22 Russian, 8 Western.

USSR

UDC 541.183

INVESTIGATION OF THE RADIATION STABILITY OF THE ANION EXCHANGER VP-1AP

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 51, No 3, 1977 pp 554-556 manuscript received 16 Oct 74

KHASANOVA, V. M., KISELEVA, YE. D., and CHMUTOV, K. V., Institute of Physical Chemistry, Academy of Sciences USSR, Moscow

[Abstract] The effect of  $^{60}\text{Co}$  ionizing gamma-radiation on the macroporosity of the anion exchanger VP-1AP--a methylated copolymer of 2,5-vinylpyridine and divinylbenzene, of a class of sorbents known to have high radiation stability--was investigated. It is shown that the capacity for  $\text{Cl}^-$  and swelling ability were reduced during the irradiation of VP-1AP in water and 0.7N  $\text{HNO}_3$  at a dose of  $4 \times 10^8 - 1 \times 10^9$  rads. The results indicate that VP-1AP is destroyed in the main as a result of radiative oxidation by the radiolytic products of that medium. References: 4 Russian.

USSR

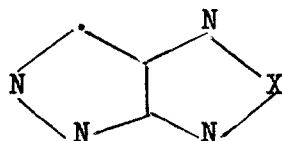
UDC 615.849.2.015.25

RADIATION-PROTECTION EFFECTS AND TOXICITY OF HETEROCYCLIC RING COMPOUNDS CONTAINING NITROGEN AND SULFUR

Moscow KHIMIKO-FARMATSEVTICHESKIY ZHURNAL in Russian Vol 11, No 2, Feb 77 pp 82-89

KRUTOVSKIKH, G. N., RUSANOV, A. M., GORNAYEVA, G.F., VARTANYAN, L. P., KOLESOVA, M. B., MURAVICH-ALEKSANDR, KH. L., SMIRNOVA, N. V. and CHERKAZOVA, S. S., Central Scientific Research Institute of Roentgenology and Radiology, Leningrad

[Abstract] Twenty-six compounds of the type



where X represents S or N and containing double bonds and substituents at various locations were prepared, using both published and newly developed syntheses. The latter are described in the article; the product was confirmed using NMR. These drugs were administered to white mice in three different doses of 25-1000 mg/kg body weight. The mice were then exposed to a dose of 700 R at a rate of 98-110 R/min. Tabulated results show the life expectancy and  $\text{LD}_{50}$  for each set of experimental conditions. References: 12 Western, 4 Russian.

## URANIUM AND THORIUM IN THE MAGMATIC ROCKS OF THE SIBERIAN PLATFORM

Moscow GEOKHIMIYA in Russian No 2, Feb 77 pp 217-229 manuscript received 6 Feb 75

MASAYTIS, V. L. and SMYSLOV, A. A., All-Union Scientific Research Geological Institute, Leningrad

[Abstract] The uranium and thorium contents of various types and ages of rocks from the magmatic formations of the Siberian platform were studied. Uranium was measured via luminescence in 1000 samples and thorium radiochemically or colorimetrically in 200 samples. The average chemical and geological compositions of diabase, dolerite and basalt from various geological epochs are discussed. The most widely distributed and weakly differentiated magmatic trapp formations were characterized by uniform and low uranium and thorium contents, which were lower in younger rocks. The generally lowered level of radioactivity in basalt and dolerite with age found is probably connected with the decreased quantity of alkali metals, particularly potassium, in volcanic products. In the process of proto- and hystero-crystallization of basic magma a regular, small increase in uranium and thorium content is observed, which is directly proportional to the content of alkali and  $\text{SiO}_2$ . Trachybasalt contained two to three times more uranium and thorium than dolerite and trapp basalt of corresponding  $\text{SiO}_2$  concentration, with maximal activity found in certain ultrabasic alkaline formations. The increased thorium to uranium ratio seen in trachite and trachiliparite is due to  $\text{U}^{+6}$  loss during volcanic glass crystallization. The data show that radiogeochemical zone formation is connected with the development of elevated alkalinity complexes and metasomatoses. The most favorable epochs for the formation of highly radioactive rocks are the midpaleozoic and late paleozoic to early mesozoic periods. Figures 5; tables 5; references 25: 24 Russian, 1 Western.

CSO: 1841

- END -