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USSR Report

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27 May 1982

USSR REPORT

CHEMISTRY

No. 86

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ANALYTICAL CHEMISTRY

UDC 546.185 +549.35 + 66.093 + 631.841

SULFATOPHOSPHATE STUDIES, PART 10: THERMAL CONVERSIONS OF MIXTURES OF HYDROSULFATES AND DIHYDROPHOSPHATES OF POTASSIUM AND AMMONIUM

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA KHIMICHESKAYA in Russian No 1, Jan-Feb 82 (manuscript received 30 Sep 81) pp 7-12

KAIPOVA, Z. K., LITVINENKO, V. I. and BEKTUROV, A. B., Institute of Chemical Sciences, KaSSR Academy of Sciences, Alma-Ata

[Abstract] After obtaining the initial salts by isothermic evaporation and polythermic crystallization, various proportions of potassium and ammonium hydrosulfates-dihydrophosphates were studied during thermal conversions in air and ammonia atmospheres. The intensity of thermal effects increased with increased ammonium salts. Chemical analyses of the compounds obtained at 250-750° C showed that the K_2O and P_2O_5 content increased and the SO_3 , NH_3 and water content fell with increasing temperature, independent of the initial proportions of reagents in the mixture. In the presence potassium hydrosulfate-dihydrophosphate, ammonium hydrosulfate-dihydrophosphate (and products of its condensation and dehydration) are decomposed at a lower temperature than the pure salt alone. With heating to 250-300° C, dehydration and condensation bring formation of ammonium and potassium pyrosulfates and acid pyrophosphates. Figures 3; references 10 (Russian). [160-12131]

UDC 546.185 + 661.635 + 66.094.4

CONVERSIONS IN HEATING SULFATE AND MONOALUMINUM ORTHOPHOSPHATE IN MIXTURES WITH PHOSPHORIC ACID AND PHOSPHORIC ANHYDRIDE

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA KHIMICHESKAYA in Russian No 1, Jan-Feb 82 (manuscript received 21 Jun 81) pp 12-17

KALMYKOV, S. I., SHEVCHENKO, N. P. and NIKOLAYEVA, N. M., Institute of Chemical Sciences, KaSSR Academy of Sciences, Alma-Ata

[Abstract] Reactions in a temperature range of 25-800° C were studied of $Al(H_2PO_4)_3 \rightleftharpoons H_3PO_4 \rightleftharpoons H_2O$ and $Al_2(SO_4)_3 \rightleftharpoons H_3PO_4 \rightleftharpoons H_2O$, and of $Al(H_2PO_4)_3 \rightleftharpoons P_2O_5$

and $\text{Al}_2(\text{SO}_4)_3 \rightarrow \text{P}_2\text{O}_5$ at 1200°C , using differential thermal analysis to study the conversions involving phosphoric acid. The liquid and solid phases formed showed no interaction between phosphoric acid and the monophosphate, but aluminum sulfate reacted with the phosphoric acid at 230, 280 and 770°C . Monophosphate dehydration brought condensed phosphates and identical thermo-effects. The sulfate reacted with phosphoric anhydride initially to form a metaphosphate. Figures 3; references 16: 14 Russian, 2 Western.
[160-12131]

UDC 547.993.1.02:595.461

TOXIC COMPONENTS OF VENOM FROM CAUCASUS SUBSPECIES OF SCORPION BUTHUS EUPEUS

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 8, No 2, Feb 82
(manuscript received 18 Sep 81) pp 155-164

GRISHIN, Ye. V., VOLKOVA, T. M. and SOLDATOVA, L. N., Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow

[Abstract] Toxic components of the venom from the scorpion *Buthus eupeus* (Caucasian subspecies) were isolated and characterized. Amino acid sequence was determined for the insectotoxin I_5 isolated from this venom. The venom was obtained from scorpions living in the wild and in a scorpionarium; the composition of material from both sources was identical. Lyophilized venom could be stored at -10°C for a long time without loss of biological activity. Three neurotoxins towards mammals were isolated from the study material and one insectotoxin. Their homogeneity was shown by means of disc electrophoresis in 15% polyacrylamide gel and by analysis of N-terminal amino acids. All of these toxins were homologous with respective toxic polypeptides isolated from Central Asian subspecies of the scorpion. The insectotoxin I_5 was obtained in highest yield; total amino acid sequence for this toxin was determined. It consisted of 35 amino acids with 4 intramolecular disulfide bonds. Serine, valine, isoleucine, tyrosine, histidine and tryptophan were completely absent in this molecule. I_5 contains an amidated C-terminal arginine radical. Figures 7; references 17: 7 Russian, 10 Western (1 by a Russian author).
[158-7813]

A PRIORI CALCULATION OF SPATIAL STRUCTURE OF INSECTOTOXIN I₁ OBTAINED FROM VENOM OF SCORPION BUTHUS EUPEUS

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 8, No 1, Jan 82
(manuscript received 29 Jun 81) pp 61-71

POPOV, Ye. M., SHVYRKOV, V. N. and SPASOV, V. Z., Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow

[Abstract] Insectotoxin I₁ represents one component of the scorpion venom and consists of 36 aminoacids (including 8 cysteine radicals). There are no experimental data on the spatial structure of I₁ or its homologues, nor on the location of four disulfide bonds. The attempt to perform the conformational analysis of its structure was performed with incomplete information about the covalent structure of this molecule. In addition, this study was aimed at obtaining confirmation of the physical model and the calculation scheme for an a priori prediction of spatial organization of natural peptides and proteins. The first step in this procedure was to analyze conformational permutations of relatively short fragments containing all eight radicals of cysteine: Met¹-Thr⁸, Cys¹⁶-Lys²¹ and Cys²⁶-Cys³³. From this basis, more complex molecule fragments were analyzed, Met¹-Cys²⁰ and Ala¹⁸-Cys³¹ and finally the entire sequence. On the basis of this massive evaluation of conformational possibilities, the conformational parameters of the principal and side chains were proposed and the system of four disulfide bonds was identified. Figures 2; references 14: 7 Russian, 7 Western (1 by Russian author).
[152-7813]

MICROCHROMATOGRAPHIC STUDY OF ASSOCIATION OF PHOSPHOLIPASE A₂ FROM VENOM OF CENTRAL ASIAN COBRA NAJA NAJA OXIANA IN PRESENCE OF SUBSTRATES IN MONOMERIC AND MICELLAR FORMS

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 8, No 1, Jan 82
(manuscript received 29 Jun 81) pp 96-101

MAL'TSEV, V. G., ZIMINA, T. M., BELEN'KIY, B. G. and KURENBIN, O. I., Institute of High Molecular Compounds, USSR Academy of Sciences, Leningrad; and PAVLOVA, N. P., D'YAKOV, V. L. and ANTONOV, V. K., Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow

[Abstract] In an earlier study it was shown that phospholipase A₂ from the venom of Central Asian cobra exists in solution in form of an equilibrium of a monomer and dimer mixture. Further, it was shown that Ca²⁺ ions did not affect this equilibrium but lowered the association and dissociation rate. This led to an assumption that the active form of phospholipase A₂

may be a dimer. Based on this assumption, the substrate should have a distinct effect on the association rate and on the monomer-dimer equilibrium. In an attempt to check this hypothesis, a study was carried out of the monomer-dimer equilibrium of E-2 and E-3 isoenzymes of phospholipase A₂ in presence of Ca²⁺ (promotor) and Ba²⁺ (inhibitor) ions and of the effect of micellar and water soluble forms of dihexanoylleucine (the substrate) by the method of frontal gel chromatography and by equilibrium sedimentation. It was shown that the dimerization was retarded somewhat by Ba²⁺ ions but remained unaffected by the water soluble form of the substrate. The micellar substrate led to complete dimerization of E-2 and E-3. The formation of a complex between the enzyme dimer and micellar substrate was promoted by Ca²⁺ ions and retarded by Ba²⁺ ions. It was concluded that the effect of Ca²⁺ and Ba²⁺ ions occurs at the stage of the interaction between the dimer and the micellar substrate and not during the association stage. Figures 3; references 9: 4 Russian, 5 Western.
[152-7813]

UDC: 543.275

ESTIMATE OF POLLUTION OF ATMOSPHERIC AEROSOLS BY TRACE ELEMENTS FROM INDUSTRY

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 3, Mar 82 pp 18-23

ZHIGALOVSKAYA, T. N. and KOLOSKOV, I. A., Institute of Applied Geophysics

[Abstract] Attempts were made to produce objective estimates of the pollution of the atmosphere, and of precipitation, by refining the accuracy of determination of "background" concentration and determination of high priority pollution substances. The background concentration of trace elements was considered to be their weight concentration which did not exceed the mean values of concentrations of the same elements in uncontaminated soil in the same region. For snow samples, the background concentrations of trace elements were those related to the mass of dry residue of a filter after filtration of thaw water or evaporation of the filtrate. The background concentration of trace elements in atmospheric aerosols or in precipitation are those concentrations equal to the mean values in uncontaminated soil from the same region. This allows determination of industrial origin pollution above the background concentration resulting from local soil dust. References 8: 5 Russian, 3 Western.
[177-6508]

METHOD OF SAMPLING SOIL TO TEST FOR HEAVY METAL AND PESTICIDE POLLUTION
OF THE ENVIRONMENT

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 3, Mar 82 pp 36-38

VIRCHENKO, Ye. P., VERTINSKAYA, G. K., candidate of physical and
mathematical sciences, and MAKHON'KO, E. P., Institute of Experimental
Meteorology

[Abstract] A method is suggested for subdividing test areas according to
type of relief and for periodically sampling soils at distances ranging
from 0.5 to 30 km from potential pollution sources to assure adequate
sampling of the soil. The present frequency and numbers of samples are
adequate to assure accuracy equivalent to the potential accuracy of the
analysis methods, but terrain relief features must be considered to assure
that the potential accuracy is actually achieved. References 2 (Russian).
[177-6508]

UDC 547.458.07:576.851.49

SYNTHESIS OF ANALOGUES OF SALMONELLA O-ANTIGENIC POLYSACCHARIDE REPEATING UNIT FRAGMENTS RHAMNOPYRANOSYL-(α 1 $\rightarrow$ 3)-GLUCOSE AND MANNOPYRANOSYL-(α 1 $\rightarrow$ 4)-RHAMNOPYRANOSYL-(α 1 $\rightarrow$ 3)-GLUCOSE

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 8, No 1, Jan 82
(manuscript received 8 Jul 81) pp 114-119

TORGOV, V. I., KUDASHOVA, O. V., SHIBAYEV, V. N. and KOCHETKOV, N. K.,
Institute of Organic Chemistry imeni N. D. Zelinskiy, USSR Academy of
Sciences, Moscow

[Abstract] The goal of the present study was to synthesize analogues of di- and tri-saccharide fragments of the repeating unit of O-specific polysaccharides of Salmonella in which the O-galactose radical was replaced by D-glucose: disaccharide Rha α 1 $\rightarrow$ 3Glc and trisaccharide Man α 1 $\rightarrow$ 4Rha α 1 $\rightarrow$ 3Glc. Reaction of 1,2-O-(R and S)-ethylidene- α -D-glucopyranose (I) with methylisopropenyl ether in acetone gave 1,2-O-(R and S)-ethylidene-4,6-O-isopropylidene- α -D-glucopyranose (II). When I was reacted with benzaldehyde diacetal in dioxane, the product was 1,2-O-(R and S)-ethylidene-4,6-O-benzylidene- α -D-glucopyranose (III). Reaction of II and III with 2,3,4-tri-O-acetyl- α -L-rhamnopyranosyl bromide gave 1,2-O-(R and S)-ethylidene-4,6-O-[isopropylidene- and benzylidene-]-3-O-(2,3,4-tri-O-acetyl- α -L-rhamnopyranosyl- α -D-glucopyranose, respectively. Finally, in the reaction of 2,3-di-O-acetyl-4-O-(2,3,4,6-tetra-O-acetyl- α -D-mannopyranosyl)- α -L-rhamnopyranosyl bromide with III by the Helferich reaction, the product was a trisaccharide, 1,2-O-(R and S)-ethylidene-4,6-O-benzylidene-3-O-[2,3,di-O-acetyl-4-O-(2,3,4,6-tetra-O-acetyl- α -D-mannopyranosyl)- α -L-rhamnopyranosyl]- α -D-glucopyranose. The structures of individual products were supported by ^{13}C NMR spectroscopy. References 12; 5 Russian, 7 Western (2 by Russian authors).
[152-7813]

CATALYSIS

UDC 547.315.2:547.518

PROPYLENE DIMERIZATION IN PRESENCE OF NICKEL-CONTAINING COMPLEX CATALYSTS FIXED ON PHOSPHORYLATED POLYSTYRENE

Leningrad ZHURNAL ORGANICHESKOY KHIMII in Russian Vol 18, No 2, Feb 82
(manuscript received 2 Mar 81) pp 265-269

ALIYEV, V. S., KHANMETOV, A. A., MAMEDOV, R. Kh., KERIMOV, R. K. and
AKHMEDOV, V. M., Institute of Petrochemical Processes, AzSSR Academy of
Sciences

[Abstract] The complex catalysts fixed on polystyrene were obtained by mixing benzene solutions or suspensions of nickel compounds with polystyrene containing phosphine groups. Without an activator these complexes exhibited no catalytic activity. They are activated by $(C_2H_5)_2AlCl$ or $(iso-C_4H_9)_2AlCl$ and retain their activity for a long time. The spent catalyst can be reactivated by addition of a fresh portion of aluminumorganic compound. The most effective catalyst is obtained from organic salts and π -complexes of nickel on phosphorylated polystyrene, reaching an activity of 1300-1700 g of the dimer per g of nickel per hour. Aluminum trialkyls are inactive as cocatalysts and in presence of $EtAlCl_2$ or $iso-BuAlCl_2$ higher oligomers of propylene are formed. The optimal reaction temperature is in the range of 20-60°C. In aromatic hydrocarbons the reaction is very fast. In alkanes it is much slower, but the catalyst retains its activity for up to 1000 hrs. In the pressure range of 1-10 atm, the dimerization rate is directly proportional to the pressure. Figure 1; references 10: 8 Russian (2 by Western authors), 2 Western.
[161-7813]

CHEMICAL INDUSTRY

DEVELOPMENT OF PLASTIC PRODUCTION REVIEWED

Moscow EKONOMICHESKAYA GAZETA in Russian No 51, Dec 81 p 15

[Text] "Solution of the complex problems associated with creating highly productive production processes, making sensible use of minerals, protecting the environment and satisfying the individual's needs more fully are directly associated with further development of polymer chemistry," noted Leonid Il'ich Brezhnev in the seventh volume of his works, "Leninskim kursom" [Following Lenin's Course].

Production of high quality polymers with prescribed technical characteristics, to include reinforced and filled plastics as well as tubing made from plastic, is being expanded in the 11th Five-Year Plan in compliance with decisions of the 26th CPSU Congress. A complex of measures is being implemented to achieve fuller satisfaction of the national economy's demand for chemical additives to be used in polymers, synthetic fibers, filaments and dyes, packaging materials and special ultrathin polymer films.

Beginning in 1965 the country's production of plastics and synthetic resins increased by an average of 1.5 times every 5 years. In 15 years it increased from 800,000 tons to 3.6 million tons. Application of these progressive materials in the Ninth and 10th Five-Year plans made it possible to free more than 9 million tons of ferrous and nonferrous metals and about 900,000 tons of natural fibers for other purposes. Production of plastics and synthetic resins will increase by about 1.7 times in the 11th Five-Year Plan.

On the Forward Edge of Technical Progress

More than half of the country's plastics and synthetic resins are produced by enterprises of the Ministry of Chemical Industry. These products are also produced by the USSR Ministry of Petroleum Refining and Petrochemical Industry, the Ministry of Mineral Fertilizer Production and a number of other ministries.

The procedures for producing the entire contemporary assortment of plastics and synthetic resins have now been developed by the sector's scientific research organizations in collaboration with academy and educational institutes. Polycarbonate, polyacetals, polybutylene terephthalate, polyphenylene oxide, new brands of polyamides and composites based on various forms of polymers are intended for construction purposes. The range of heat resistant and lightened plastics has broadened.

One ton of these materials replaces 6-12 tons of lightened steel, 6-10 tons of non-ferrous metals and a ton and a half or two of aluminum. Moreover two to three times less power is required to produce and process plastic than an equivalent quantity of metals. The use of 2 tons of thermoplasts is equivalent in the national economy to saving the labor of one worker (due to the minimal amount of labor required to process them into articles).

Substitution of glass by polyethylene film in hothouse construction produces a savings of 162,000 rubles of capital investments per hectare. When we use this film to cover silage, even the surface layers keep, and the yield of ready-to-eat feed increases by 3-4 percent while nutrient losses decrease from 20-50 to 2-6 percent, depending on the storage method.

New brands of effective ion-exchange materials, polyelectrolytes, binders, adhesives and embedding composites exhibiting remarkable properties are also being introduced today into the national economy. All of these materials are finding broad use, and they are imparting new qualities primarily to consumer goods as well as the products of aviation, motor vehicle, ship building, electronics and electrical engineering industry.

The production of many new types of plastics is being organized in the 11th Five-Year Plan. Moreover the time it takes for these products to reach consumers will be reduced owing to active reconstruction and reequipment of chemical enterprises. Facilities to produce new materials, installed in place of obsolete production operations, are to be erected and put into operation on an accelerated schedule. The existing reserves for intensifying production processes and utilizing more effective catalytic systems, reagents and additives must be placed into action.

In this case the polycarbonate output capacities will be increased by 1.7 times, polyamide capacities will triple, and production of unsaturated polyesters will increase by 1.5 times. In comparison with 1980, by the end of the five-year plan production will increase by 2.2 times for polyolefins, 2.3 times for polystyrene and 1.6 times for polyvinyl chloride.

Extensive research was started in the present five-year plan to create highly heat resistant and low-combustibility composites, highly selective microfilters and semipermeable membranes, wear resistant polymers based on a metal-polymer matrix, light-sensitive and cross-linking composites exhibiting heightened adhesion, and polymer-polymer composites exhibiting a complex of unique properties. Completion of these projects will significantly raise the technical level of plastics industry.

It should be noted that until recently, not enough attention was being devoted in the sector to development of so-called low-tonnage chemistry, which produces various catalysts, plasticizers, static control agents and other additives which improve article quality and which are irreplaceable in a number of cases in terms of production of new polymers. The need for raising the production volume of low-tonnage chemistry was noted in decisions of the 26th CPSU Congress. Modern facilities producing several forms of highly effective catalysts have now been created at all new large polyethylene and polypropylene production operations. There are plans for organizing production of the necessary forms of additives at enterprises belonging to various ministries, with the intention of subsequently halting importation of these products.

Resource Economization

Plastics industry is a major consumer of crude hydrocarbons and of electric and thermal energy. The reserves for economizing on these resources in the sector are sizeable. But the great potentials for creating, for example, energy recycling production processes are not being utilized adequately yet. Large amounts of heat produced by chemical reactions are not being utilized: Instead, this heat is being dissipated in the atmosphere or lost together with liquid wastes.

Assimilating production of new polymers in the 11th Five-Year Plan, the sector's enterprises must turn special attention to introducing highly effective wasteless production processes ensuring integrated and economical use of raw materials, fuel and power. The example of the best labor collectives persuasively shows that initiative and a creative approach to organizing the economization campaign can produce substantial results.

The "Polimir" Production Association in Novopolotsk has accumulated good experience in using secondary power resources in production. This association is successively implementing an entire complex of organizational and technical measures. As a result practically full utilization of mobile secondary fuel resources and a significant proportion of the heat of chemical reactions and high-temperature smoke gases has been achieved. In the 10th Five-Year Plan the collective of "Polimir" saved 25 million kilowatt hours of electric power, 160,000 gigacalories of heat and 5,000 tons of standard fuel. Today, more than 40 percent of the association's total production is based on the use of secondary power resources and heat from chemical reactions. The experience of the "Polimir" Association was approved by the CPSU Central Committee.

The problem of utilizing the plastic itself is also becoming more important. The USSR Gosnab has been given the job of organizing a system for collecting, preparing and processing polymer articles. It was with this purpose that it created the main scientific research organization to deal with the entire range of problems associated with utilization of plastics--"Mashpriborplastik" (Khar'kov). This secondary raw material represents a major reserve for increasing plastic production and economizing on the petroleum products that serve as the raw material from which the plastic is acquired.

Today 52 percent of the norms followed in plastics industry are scientifically grounded. Their proportion will constantly grow. Their improvement represents a dependable source of economizing on material resources. By capitalizing on this factor, plastic enterprises of just the Ministry of Chemical Industry are to save raw materials, heat and electric power worth 1.6 million rubles in 1982.

Calculations show that were the newly constructed enterprises in Tomsk, Omsk, Shevchenko, Budennovsk and a number of other cities to reach their planned output capacities ahead of schedule, the total savings could be increased to 6.5 million rubles. As we know, the norms for consumption of material resources are set more leniently in the period when new output capacities are being assimilated. Reducing the time to raise their production to normal promises a significant impact.

However, the Ministry of Chemical Industry created many disproportions between enterprises producing the raw materials and the processing enterprises when it brought new plastics enterprises into being. It is for this reason that the capacities of the Shevchenko, Prikumsk and Omsk plants are not being fully utilized. There is a serious lesson to be learned from this by the administration of the Ministry of Chemical Industry. What it must do first of all is increase its attention to expert analysis of the plans, and verify their technical and economic grounds more carefully.

Following the Example of the Best

Next year, just enterprises of the Ministry of Chemical Industry--the main supplier of polymers--must increase production of plastics and synthetic resins by about 200,000 tons. Plans have been made to start up and assimilate new output capacities in the Mogilev "Khimvolokno" Association, the Moscow "Plastik" Scientific-Production Association, the Kazan' "Orgsintez" Association and the Tomsk and Zima chemical plants.

It will be important for enterprises producing plastics and synthetic resins not to simply reach their planned targets but also make up the amount they fell behind in 1981. The results of the last 11 months indicate that the production of some forms of polymers has fallen behind, to include important ones such as polyethylene, polypropylene, polystyrene and polychlorovinyl resin. Business managers often seek excuses in "objective causes," particularly a shortage of raw materials. But an analysis would show that in January-November, consumption of raw materials exceeded the norms by almost 2 million rubles at the Omsk Plastics Plant, by over 900,000 rubles at the Prikumsk Chemical Plant and by 445,000 rubles at the Vladimir Chemical Plant.

Concurrently the production targets for January-November were significantly exceeded in relation to caprolactam, cellulose acetate, and phenolformaldehyde, carbamide and alkyd resins.

The "Polimir" Association in Novopolotsk and the Gur'yev Chemical Plant are working rhythmically, and with high effectiveness. As an example at the beginning of the 11th Five-Year Plan the Gur'yev plant consumed less raw materials per ton of product than specified by the approved norms--23 kilograms of ethylene and 40 kilograms of propylene. To obtain a ton of ethylene, this plant uses 3.3 rather than 3.6 tons of crude hydrocarbons in its pyrolysis operation. In January-November the enterprise saved material resources worth 150,000 rubles.

Polotsk chemists are consistently reducing relative consumption of crude hydrocarbons and other materials. The "Polimir" Association saves 10 kilograms of ethylene, 22 kilograms of propylene and 7 kilograms of nitrilacrylic acid for every ton of products it manufactures. In 11 months it has managed to save 11 million kilowatt-hours of electric power, 42,000 gigacalories of thermal energy and about a thousand tons of comparison fuel.

The chemists of Polotsk and Gur'yev have adopted sizeable pledges to save on resources in 1982. Dissemination of the experience of these collectives may serve as a reliable means of raising the lagging enterprises to the level of the best.

LITHUANIAN CHEMICAL INDUSTRY DEVELOPS

Vilnius SOVETSKAYA LITVA in Russian 3 Mar 82 p 2

[Interview with Lithuanian SSR Gosplan Deputy Chairman A. Iovarauskas: "Lithuania's Big Chemistry"]

[Text] Owing to the untiring concern of the party and government for developing productive capacities in Soviet Lithuania, new industrial sectors have been created and are now undergoing development. One of them is the chemical sector. Today the republic possesses major centers of chemical industry--Jonava and Kedaynyay, and modern enterprises are now operating in Vilnius and Kaunas. Founded in the republic's capital, the All-Union Scientific Research Institute of Applied Enzymology is now working on the problem of creating new enzyme preparations and introducing them into different sectors of the national economy. A correspondent of SOVETSKAYA LITVA met with Lithuanian SSR Gosplan Deputy Chairman A. Iovarauskas and asked him to reply to a number of questions pertaining to development of chemical industry in Soviet Lithuania.

[Question] The readers would like to know what the chemical sector of Lithuanian industry was like at the time Soviet rule was established.

[Answer] The answer to that is short: It was simply nonexistent. After all, two little paint and varnish plants, the "Inkaras" Shareholders' Society producing rubber footwear and primitive workshops producing domestic chemical articles and cosmetics do not make up a sector.

[Question] When did creation of big chemistry in the republic begin, and what made it necessary?

[Answer] Chemical industry was born and began to develop in Soviet Lithuania following the May (1958) Plenum of the CPSU Central Committee, which called for sizeable measures to develop this industrial sector in the country as a whole. At that time, specialists of the scientific research and planning organizations developed a program for construction of a number of large enterprises. It was in this period (1959-1960) that erection of the first representatives of big chemistry

began--the Kedaynyay Chemical Plant, the Vilnius Plastic Articles Plant, the Kaunas Artificial Fiber Plant and the Ionava Nitrogen Fertilizer Plant (today the "Azot" Association). Facilities producing household chemicals were also built and rebuilt.

[Question] Please tell us why chemistry is significant to the republic's national economy and how effective the use of chemical products is.

[Answer] These products play an important role in satisfying the needs of all sectors of the national economy and in raising management effectiveness. I should first of all point out the significance of increasing consumption of mineral fertilizers in agriculture. One centner of such fertilizer increases the yield of cereal crops by about 1.3 centners. The republic's farmers are now using about 2.2 million tons of relative units of mineral fertilizers. Moreover not only are our enterprises supplying nitrogen and phosphorus fertilizers to the republic; they are also exporting some of their products.

Or look at plastics. Their use in machine building and instrument making reduces labor requirements, improves article construction and decreases consumption of ferrous and nonferrous metals. The estimated savings from using 1 ton of plastics in instrument making is over 1,200 rubles. And each year the Vilnius Plastic Articles Plant, a specialized producer and supplier of plastic articles in the republic, produces about 6,500 tons of such articles. You can imagine the economic impact. Moreover the plant produces large quantities of polyethylene film and tubing for agriculture and construction. Use of polymer tubing and molded parts reduces the labor of installing pipelines by 3-3.5 times.

Our traditional sectors--textile, knitted fabric and furniture--have become major consumers of acetate and triacetate filaments and carbamide resins produced in the republic.

It is also difficult to overstate the significance of microbiological products--nutrient yeast, additives and enzymes produced by the Kedaynyay Biological Plant and the Vilnius Enzyme Preparation Plant. We know for example that 1 ton of nutrient yeast helps to produce an additional 800 kg of pork or 1.5 tons of poultry or 15,000-20,000 eggs.

[Question] Let me ask you to describe the results of the sector's development in the 10th Five-Year Plan.

[Answer] In the last five-year plan chemical industry's commercial production volume increased by 32 percent, which was somewhat greater than the rate of growth of industrial production in general. Production of mineral fertilizers increased by a time and a half, while production of household chemicals increased by 30 percent. The sector's productive potential enjoyed further development. Large capacities producing mineral fertilizers (nitrophos and ammophos) have been placed into operation in the Ionava "Azot" Association and the Kedaynyay Chemical Plant, and the capacities for producing synthetic resins and artificial fibers have been enlarged. The cost of new fixed capital placed into operation is an impressive sum--152 million rubles.

The year 1980 was marked by a noteworthy event--the commissioning of the first generation of the Mazheykyay Petroleum Refinery. Its erection required major efforts from builders, installers and operators. CPSU Central Committee General Secretary, Chairman of the Presidium of the USSR Supreme Soviet Comrade L. I. Brezhnev congratulated them on their glorious labor victory.

[Question] And now to conclude, tell us about the prospects for the sector's development in the 11th Five-Year Plan.

[Answer] Attention is focused today mainly on reconstruction and reequipment of existing enterprises, and on further intensification of chemical production operations. We have plans for rebuilding the Kedaynyay Chemical Plant, increasing the existing ammonium and carbamide production capacities in the Ionava "Azot" Production Association and finishing reconstruction of the Kaunas Artificial Fiber Plant imeni 50-Letiye Oktyabrya. Builders of the Mazheykyay Petroleum Refinery face complex and important tasks. This year a bitumen facility must be placed in operation, and in 1983 the second petroleum refining complex is to become operable.

By completing the program spelled out by the five-year plan, we will be able to increase the republic's petroleum refining volume by six times in the five-year plan. By 1985, production of mineral fertilizers will rise significantly, and the volume of chemical consumer goods produced will reach almost 100 million rubles.

Almost the entire increment in production at chemical enterprises is to be reached through growth in labor productivity. The five-year plan foresees measures, already being implemented, to reduce harmful discharges into the atmosphere and into water basins. The Lithuanian SSR Scientific Research Institute of Construction and Architecture has created an original procedure for processing one of the wastes of mineral fertilizer production--phosphorogypsum--into building plaster. It looks like this procedure will be the basis for planning a large experimental shop at the Kedaynyay Chemical Plant.

11004

CSO: 1841/166

PROBLEMS BOG DOWN PORT CONSTRUCTION

Kiev RABOCHAYA GAZETA in Russian 24 Feb 82 p 1

[Article by RABOCHAYA GAZETA correspondent P. Shevtsov: "The Port's New Concerns"]

[Text] The administration building of the former "Odesskhimstroy" Trust is now the site for a meeting of the party staff of one of the republic's largest construction projects now underway on the shores of the Adzhalyk drowned river valley. This year erection of the "Karbamid" chemical complex of shops producing carbon dioxide and dry ice and of a methanol transloading line was started on the territory of the Odessa Portside Plant imeni Komsomol Ukrainy.

Construction did not even cease on these shores after the second ammonia production unit released its first products on 15 September 1979, three and a half months ahead of schedule, or after the Gorlovka-Odessa ammonia pipeline--the first in our country and the largest in Europe--went into operation on 11 October of the same year, or after builders and installers completely vacated the operating facilities to make way for the operators.

On one hand the plant increased its own output capacities: It produced and transloaded liquid ammonia, carbamide and superphosphate acid. On the other hand the residential settlement of Yuzhnyy--the future city of the chemists and port workers--grew a few kilometers from it. Also at that time, preparations were started on the east shore of the drowned river valley to erect deepwater moorings for a coal handling complex and a container terminal which, with time, will assume the burden of processing 25 million tons of cargo each year and which will transform the young port of Yuzhnyy into our country's largest harbor.

And now a new and very important stage in the biography of both the portside plant and port has begun. Construction of two carbamide production units with an output capacity of 330,000 tons each, and of a methanol transloading complex capable of moving up to a million tons of chemical cargo in a year will be completed by the end of the 11th Five-Year Plan. And this year the collectives of the "Odesspromstroy," "Chernomorgidrostroy," "Odesstransstroy," "Odesszhilstroy" and other trusts must assimilate about 30 million rubles and make dozens of facilities operational.

Unfortunately the "Odesskhimstroy" Trust, the collective of which participated successfully in the portside plant's construction for many years and which emerged the winner in socialist competitions among the republic's builders many times, was simply disbanded. Obviously the blame for this lies in the shortsightedness of the executives of the "Odesspromstroy" Combine, of which the trust was a part.

And so, what is on today's agenda for the meeting of the construction project's party staff?

Looking at the strategic concerns, we find that they are simple and understandable: Everything possible must be done to keep from stumbling at the starting gun, to keep from falling behind in the initial stage of construction. But the concrete tasks facing the client and the contractors are more diverse: Concern must be shown for the personal conveniences of the workers, public dining halls, stores, cafeterias and service booths must be created, housing construction must be accelerated, suitable buildings must be converted into residence halls, and simultaneously a more active effort must be made at the facilities themselves.

Unfortunately we have already "sprung some leaks." Take as an example construction of housing by the Construction and Installation Administration No 5 of "Odesszhilstroy" Trust: The required sense of urgency cannot yet be sensed, and important problems associated with providing bricks to the construction sites are being solved all too slowly. Incidentally the building plans called for panels but the contractor demanded something different. It was just not to his liking. And so the plan had to be redrawn, as a result of which the deadline for placing the housing into operation may have to be postponed.

Transport workers did not do their best in the first stage of construction either. This is even true of the "Odesstransstroy" Trust, which totally refuses to begin working on the new project.

Many complaints have accumulated against the "Odesszhelezobeton" Production Association. This is only the second month of the year, and it already owes the builders hundreds of tons of reinforced concrete articles.

The collective of the Order of Lenin "Chernomorgidrostroy" Trust landed a labor force on the east shore of the drowned river valley two and a half years ago. It was here that the Floating Facility Construction Detachment No 6 (PSO-6) settled itself, and it is here that the vast quayside of the future giant port is coming into being. It will still take much more time to complete the enormous volume of work before ocean-going bulk carriers and ore carriers will begin mooring to the new deepwater docks. Specialists of this famous trust have considerable experience and an enviable reputation--they are not troubled by the unusual nature of the coal complex and methanol transloading line they are to build. But we are forced to assert that the level of labor organization today in subdivisions of the PSO-6 is low, and to speak frankly, the quality of production is poor.

Electricians of Special Construction Administration No 404 are already holding back their associates: Specialists of the "Yuzhgidrospetsstroy" Trust have still not familiarized themselves adequately with what they have to do at facilities of the complexes under construction.

All of these problems might seem to be minor, and typical of most new construction projects. But it is no secret to anyone that these minor problems threaten failure of network schedules in the future. This is why the party staff of the construction project, which is headed by Ye. G. Borsh, secretary of the Odesskaya Oblast Committee of the Ukrainian SSR Communist Party, assumed, right from the start, a course of fighting for efficient labor organization, for high labor quality, a course toward creating an atmosphere of exactingness and a creative attitude toward assigned work at the construction project.

11004

CSO: 1841/166

ORGANIC SYNTHESIS INSTITUTE LISTS ITS SUCCESSES

Riga SOVETSKAYA LATVIYA in Russian 14 Mar 82 p 2

[Article by Doctor of Chemical Sciences E. Lukevits, deputy director, Order of the Red Labor Banner Institute of Organic Synthesis, Latvian SSR Academy of Sciences: "For Effective Research"]

[Text] Just in the 10th Five-Year Plan our institute created 19 new medicinal preparations with which to treat oncological, cardiovascular and psychoneural diseases and viral and bacterial infections. Medical practice uses a total of 32 of our preparations, and about 20 compounds are used in agriculture.

Such effective introduction of scientific developments is ensured in many ways by the structure itself of the institute, which embodies the principal links of a continuous chain: theoretical research--applied developments--experimental production--industrial production. The last two links are represented by two plants. One of them is experimental, and it runs all processes associated with the chemical transformations of many synthetic methods, and the other is the Riga Medical Preparations Plant, which assimilates and produces ready-to-use biochemical preparations. All of this has a significant influence on the countenance of the republic's chemical and chemical-pharmaceutical industry. Preparations created by the institute are also synthesized by the "Olaynfarm" Production Association, which produced 25 preparations in 1981, and the "Biokhimreaktiv" Scientific-Production Association, which produced 19 preparations. Outside the republic, synthesis of bioorganic compounds by the Riga methods has been assimilated at the Vurnary Chemical Combine, the Kursk, Moscow and Leningrad chemical-pharmaceutical plants and several other enterprises.

Each year our institute devotes increasingly greater attention to scientific research aimed at creating new, effective ways to chemicalize agriculture. About 20 compounds intended for such use are already being industrially produced and broadly applied. They include, for example, diludin, used to preserve the qualities of carotene in grass meal. It is also used as a feed additive to stimulate the growth of farm animals.

Antihelminthic drugs--tsiazon and tsiazid, and a new compound--divezid, active against intestinal parasites of ruminant animals, have also proven themselves well. The antibacterial drugs--furatsilin, furagin and furazolidon--and their diverse forms have gained a firm foothold in veterinary and medical practice.

It was emphasized at the 26th CPSU Congress that close integration of science with production is an urgent requirement of the modern era. The institute's scientific research is proceeding within the framework of 22 research topics contained within the all-union specific-purpose integrated programs, in the program for solving scientific-technical problems and in the coordination plans of the USSR Academy of Sciences in the field of natural sciences. The institute is the principal executor of two integrated programs. In one of them, "Peptide-Protein Bioregulators," we are creating a production sector new to our republic and the country, production of drugs based on natural raw materials--peptides and proteins.

Oxytosin, one of the preparations of this class, deserves special attention. The results obtained in the laboratory and at scientific research farms such as the "Sigulda," "Krimulda," "Liyelplatone" and others are demonstrating the high effectiveness of oxytosin in stimulating labor and lactation in sows and cows. The plant is now using a new procedure for synthesizing this compound. This has significantly reduced its cost in comparison with that of the same products of foreign companies. This major effort by the institute's scientists earned the USSR State Prize in 1981. New methods of synthesizing prostaglandins--compounds stimulating growth in farm animals--have also been developed in conjunction with research on peptide-protein hormones.

One of the most pressing problems in animal husbandry is the heightened sensitivity of young animals to disease, especially of animals shipped to large industrial complexes for fattening. As a rule young piglets and calves are reluctant eaters: They become listless, and they gain weight slowly. This problem can be surmounted by a new stimulator of growth in animals as well as birds--kvaterin. Animals fed this drug exhibit a dramatic improvement in appetite and food assimilation, and their resistance to disease rises. Piglets 2 months old gain 9-12 percent more weight than animals not receiving kvaterin.

Extensive introduction of original medicinal preparations and agricultural chemicals is being promoted in many ways by a socialist competition that has taken shape at the institute. In 1981 our collective adopted higher socialist pledges, which were completely satisfied. The procedures for making several new forms of medicinal preparations and three veterinary drugs were created. The institute's colleagues published one monograph, two collections of articles and several dozen articles in all-union journals and in the international press.

In 1981 the Institute of Organic Synthesis collaborated on the basis of 203 agreements of scientific-technical cooperation in chemistry, medicine and agriculture with 60 institutes of the USSR Academy of Sciences and the academies of the union republics, with 88 sector institutes, with 20 institutions of higher education and with 35 republic institutions. It also cooperated in international scientific projects. Many of our projects have been exhibited at several international fairs and exhibitions, and the institute is a permanent participant of the Exhibition of the Achievements of the National Economy of the USSR and the Latvian SSR.

This is far from a complete list of the projects our scientists are working on. The collective of the Order of the Red Labor Banner Institute of Organic Synthesis, Latvian SSR Academy of Sciences won the all-union socialist competition for successful fulfillment of the state plan for the USSR's economic and social development

in 1981, and it was awarded the perpetual Red Banner of the CPSU Central Committee, the USSR Council of Ministers, the AUCCTU and the Komsomol Central Committee. This great honor is inspiring the institute collective to new achievements.

11004

CSO: 1841/166

CAUSTIC SODA RAISES AGRICULTURAL PRODUCTIVITY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 20 Mar 82 p 2

[Article by special correspondent I. Mordvintsev: "Fertility Vitamins"]

[Text] Neat rows of cellophane bags containing milky-white crystals stand beside the wall. These are the first products of a granulated caustic soda shop that has just begun production. What are the crystals for?

"For agriculture," explains Ye. Sviridenko, chief of this production operation, which belongs to the Volgograd "Kaustik" Association. "There is a great demand for them in feed preparation."

How can this be, since it is not even safe to touch this product with bare hands (there is good reason for its name)? Is this a mistake, that it is to be used as cattle feed? No, we find, no mistake has been made.

Research conducted in recent years showed that by processing a relatively low grade feed such as straw with 2 percent caustic soda solution we can raise its nutrient content by a time and a half. When this "dish" was fed to an experimental herd of cows, their milk yields grew noticeably. The effect is even more significant than that produced by steaming straw; moreover it is achieved with significantly lower material and labor outlays.

In former times this product was sent to users in liquid form or as monocrystals in barrels. This was highly inconvenient. Therefore Volgograd workers began creating a new production operation from the "tail end": They built a granulation shop, and only after that did they begin working on the shops producing the "raw" semi-finished product. Meanwhile they got the semifinished products they needed from the association's other operations that were already producing. This made it possible to start delivering granulated caustic soda to agriculture a whole 2 years sooner.

The raw material from which caustic soda is produced is ordinary table salt. Let me test your knowledge of geography: From where can this salt be obtained? How about from the Baskunchak salt works in Astrakhanskaya Oblast?

"Wrong," smiled V. Sitanov, the association's general director. "True, we did get salt from Baskunchak at first. But our new way is much easier."

Millions of years ago waves of an ancient sea splashed over our part of the country. On drying out, this sea left a salt "lens" many kilometers wide. It was just such a "lens," discovered almost right next door to "Kaustik," that the Volgograd chemists decided to utilize. They drilled a deep well and began pumping river water into it to obtain a saturated salt solution. And now they pump hundreds of thousands of tons of this solution into the electrolysis shop. They supply both themselves and neighboring chemical enterprises.

But as we know, table salt contains not only sodium--the principal element from which caustic soda is produced, but also chlorine. This element was put to work here as well. Volgograd chemists use it to make a large complex of toxic chemicals for agriculture. First among them is chlorofos, of which "Kaustik" is the country's main producer.

And not that long ago production of an effective plant protection resource, fenazon, was started here. By applying a 2 percent solution of this drug in the space between sugar beet rows, weeding would not be required all summer. Because they are not inhibited by weeds, the beets accumulate a larger quantity of sugar, and the yield grows noticeably. It does not take any special wisdom to see why delegations from rural regions often come to Volgograd for this miracle powder. Last year the fenazon production plan was exceeded by 15 percent, and production is ahead this year as well.

Workers and specialists of "Kaustik" are increasing production of goods for the countryside from one day to the next. The association collective is in the first ranks of Volgograd laborers competing for an honorable welcome for the USSR's 60th anniversary.

11004

CSO: 1841/166

BRIEFS

FIBER PRODUCTION COMPARED--In 1913, Russia manufactured just 25 tons of artificial fiber out of imported cellulose. Last year the USSR produced 1.2 million tons of chemical fibers and filaments. [Text] [Vilnius SOVETSKAYA LITVA in Russian 3 Mar 82 p 2] 11004

CHEMICAL PRODUCTION AHEAD--Laborers in chemical industry surpassed their planned total production volume in the first year of the 11th Five-Year Plan. The country received 2.8 million tons of caustic soda, more than 4 million tons of synthetic resins and plastics and more than 1 million tons of synthetic detergents. [Text] [Vilnius SOVETSKAYA LITVA in Russian 3 Mar 82 p 2] 11004

SAVINGS FROM SYNTHETICS--The USSR national economy saves almost 1,900 rubles per ton of products by using polyethylene and 5,000 rubles by using propylene. [Text] [Vilnius SOVETSKAYA LITVA in Russian 3 Mar 82 p 2] 11004

KINGISEPP FERTILIZER PRODUCTION--Leningrad Oblast. The Kingisepp "Fosforit" Association has exceeded its production plan by tens of hundreds of rubles since the beginning of the year. Huge new fertilizer production capacities have reached their planned output ahead of schedule here. Komsomol members and young people are making a great contribution to the overall success. They have initiated an extensive socialist competition to complete the annual production program ahead of schedule, to achieve high product quality, to raise labor productivity and to economize on materials. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 16 Mar 82 p 3] 11004

FERGANA 'AZOT' PRODUCTION ASSOCIATION--"The product sales plan was completed by 80 percent, and the labor productivity plan was completed by 78 percent." So reads a line from a report on the work of "Azot" (director, R. Akramov) for the last 2 months. Nor were things any better at the enterprise in March: There were interruptions in production, the work was nonrhythmical, and the quality of the products was below standard. This is already the second year that such a situation has persisted, and it came into being mainly due to the failure to reach the planned output capacity of the acetate cellulose production operation. Construction took a long time, and the time of its start-up and assimilation dragged on unjustifiably. And this was mainly at the fault of the chemists themselves: Unable to get production running smoothly, they overconsumed scarce raw materials, exceeded the norms for consumption of fuel and electric power and caused equipment to break down. The repair base of "Azot" is weak. Thus the Ministry for Mineral Fertilizer

Production has been forced to perpetually send troubleshooting teams of instrument control specialists, repairmen, fitters, welders and mechanics from kindred enterprises to Fergana. The low qualifications of the personnel and the turnover resulting from the shortage of living space are also making it difficult. The personnel situation is now being rectified, and management of the shops and sections has improved. But as we can see, there is still much more to be done. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 16 Mar 82 p 3] 11004

CSO: 1841/166

DIRECTION OF GROWTH OF UKRAINIAN FUEL-ENERGY COMPLEX

Kiev VISNYK AKADEMIYI NAUK UKRAYINS'SKOYI RSR in Ukrainian No 2, Feb 82
pp 50-53

KAL'CHENKO, V. N., doctor of economic sciences, KUBRUSHKO, A. M.,
candidate of economic sciences, and PIRIASHVILI, B. Z., candidate of
economic sciences

[Abstract] Further growth of the fuel-energy complex is a major goal of the 11th Five-Year Plan. The present energy situation in the Ukrainian SSR is a decreasing supply of energy resources in face of greater fuel and energy demands. Some ways of increasing the supplies of energy resources are the development of a gas pipeline network, installation of oil pipelines to petroleum refineries, economic use of fuel and energy resources, and a program for the development of the nuclear energy industry. Goals in the area of coal, a major resource of the Ukrainian SSR, include the development and introduction of technology and methods for mechanizing and automating cleaning operations on sloping and steeply inclined coal seams and increasing the efficiency of utilizing low-quality solid fuels. Goals for the oil and gas industry are increasing the supply of raw materials and improving the means and methods for finding and working oil and gas deposits. Because of the difficult geological conditions for working oil deposits in the Ukrainian SSR, the oil recovery factor is lower here than for other parts of the country, and new methods for working under these specific conditions are needed. Increased use of gas condensate and development of a technology for working gas condensate deposits should increase gas supplies. The efficiency of fuel and energy sectors would also be increased by combining all sectors into a single complex under a single administrative agency. Coordination of research carried out by various organizations and institutions by a regional centralized agency is also recommended. References: 2 (Ukrainian).
[139-9307]

EXPERIENCE AND PROSPECTS FOR USING TITANIUM EQUIPMENT AND UTENSILS IN
CHEMICAL PRODUCTION

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 2, Feb 82 pp 100-102

FOKIN, M. N., RUSKOL, Yu. S. and KORNEYEVA, G. B.

[Abstract] The implementation of titanium in chemical production processes is reviewed from initially isolated applications in the 1960s, to intensive consumption in the mid-1970s, to a more rational utilization presently, particularly in the production of chlorine compounds and caustic soda. Production of many toxic chemicals would be impossible without titanium containers to combat corrosion. Waste waters, including sewage and industrial waste containing mercury, processes requiring great purity, and production of aniline dyes and nitrogen compounds, are other important activities where titanium vessels are indispensable. Since titanium is not abundant, an important area for research is in determining suitable but not excessive thicknesses of the metal in heat-exchange and chemical applications, and in improving the production processes. Figures 2; references 10: 8 Russian, 2 Western.
[168-12131]

COAL GASIFICATION

UDC 662.749.33

ABSORBING OIL QUALITY

Moscow KOKS I KHIMIYA in Russian No 3, Mar 82 pp 34-36

KOGAN, B. Ye. and KUZ'MINA, Ye. Ya., Eastern Scientific Research Institute of Coal Chemistry

[Abstract] Several methods for reducing naphthalene content in the absorbing oil fraction, including applying additional heat to rectifying columns, redistilling, and live steam additions, have shortcomings. In the USSR, best results in producing absorbing oil to meet the standards for 2nd quality oil are achieved at the Nyzhniy Tagil Metallurgical Plant; none of the methods produce 1st quality oil. That plant uses the system of reducing the high-boiling fraction by cutting the absorbing fraction, thus increasing reflux at lower levels. However, this process leaves more than 13% naphthalene. The authors suggest distilling fresh oils that will boil off at below 300° C with 90-92% yield, and also revising the standards for absorbing oil to allow more naphthalene (11-12% in 1st quality, and elimination of it as a rejecting parameter for 2nd quality). References 5 (Russian).

[169-12131]

UDC 662.74 : 547.56 : 661.717

PRINCIPLES OF DISTRIBUTION OF NITROGEN BASES IN RECTIFICATION PRODUCTS OF COAL-TAR PHENOLS

Moscow KOKS I KHIMIYA in Russian No 3, Mar 82 pp 36-39

MARKUS, G. A., TEREENT'YEV, V. Kh. and KIRSANOVA, V. S., Phenol Plant

[Abstract] The process of removing phenols from coal-tar is described, along with the complexities of nitrogen base distribution due to the interaction of phenols and those bases. To study this distribution, special samples from controlled plates were taken, along with samples from the supply plate, from residue and from the steam phase of

distillation. Gas-liquid chromatography and perchloric acid titration in an anhydrous medium showed that in the phenol column, nitrogen bases practically do not distil with phenol, but concentrate in the residue. In o-cresol, dicresol and xylenol columns, nitrogen bases distil off in part as azeotropes containing o-cresol and in part remain in the residue. Process variations, such as of temperature and pressure, bring changes in these distributions. Maximum elimination of bases from dicresol can be achieved by adding a column after the o-cresol column, where with reduced vacuum the o-cresol fraction can be obtained with less than 2% nitrogen bases. Figures 4; references 6 (Russian).
[169-12131]

COMBUSTION

UDC 620.97

FUEL ECONOMY: THERMOCHEMICAL REGENERATION AND NEW METHOD OF COAL GASIFICATION

Kiev VISNYK AKADEMIYI NAUK UKRAYINS'KOYI RSR in Ukrainian No 2, Feb 82
pp 47-49

NOSACH, V. H., candidate of technical sciences

[Abstract] Heat regeneration and coal gasification are two means of increasing the efficiency of utilizing fossil fuel resources. Two methods of heat regeneration are discussed: air regeneration and a new method, thermochemical regeneration. Use of thermochemical regeneration in heat-utilizing aggregates has increased fuel efficiency by 15-20%, and the combined use of both heat regeneration methods is also highly effective. The increased use of coal is generally associated with greater air pollution. The most effective method of controlling harmful atmospheric emissions by coal-fueled power plants is a two-stage combustion system with preliminary coal gasification to remove sulfur and ash and combustion of the pure gasification products. But the introduction of coal gasification has created the need for designing new gas generators. The advantages of using coal gasification at electric power plants include increasing the reliability of steam generators, decreasing expenditures for transporting fuel, and more complete utilization of coal. Coal gasification also broadens the use of low-quality coal. Gasification of Siberian coal with the production of synthetic natural gas also lessens the problem of transporting energy resources from Siberia to central regions of the USSR. A continuous method has been developed for producing synthetic gas by steam gasification of coal without use of oxygen. References: 9 (Russian).
[139-9307]

FERTILIZERS

UDC 631.851

PHOSPHORITE FERTILIZER AS PROMISING ACID-FREE FORM OF PHOSPHORUS FERTILIZERS

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 2, Feb 82 pp 3-6

BORISOV, V. M., professor, and KRASIL'NIKOVA, N. A., professor,
Scientific Research Institute of Fertilizers and Insectofungicides
imeni Ya. V. Samoylov

[Abstract] Phosphorus fertilizers play an important role in agriculture and its impact on world's economy. They are obtained exclusively from natural phosphorite. One of the most important scientific and economical problems is the production of phosphorus fertilizers without consumption of sulfuric acid. For this reason new deposits of phosphorite in Siberia and in Middle Asia is most desirable. The use of phosphorite fertilizer should be expanded, this being the fastest and most practical way of increasing soil fertility. The effectiveness of phosphorite fertilizer depends to a large extent on its particle size. Since, powdered minerals create problems in their application this fertilizer should be used in granulated form. There are several large scale deposits of crude phosphorite which could be used to increase the production of these fertilizers. No references.
[156-7813]

UDC 631.84

EFFECT OF NITRIFICATION INHIBITORS ON MICROBIOLOGICAL ACTIVITY OF SOIL AND TRANSFORMATION OF FERTILIZER NITROGEN

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 2, Feb 82 pp 14-16

SEMENISHEN, N. G. and KARBOVSKAYA, A. V., Uladovo-Lyulinetsk
Experimental-Selection Station

[Abstract] Effectiveness of mineral fertilizers depends on the development of biological processes in the soil. Denitrification is but one of a series of examples where nitrogen is lost after application of a fertilizer. To

prevent these nonproductive losses, nitrification inhibitors have been successfully used in the past. The effect of "Dzhakos"---a Soviet nitrification inhibitor---on the microbiological activity of soil, on nitrogen dynamics and on the production of sugar beets during 1977-1979 has been studied. The inhibitor appeared to affect the activity of bacteria rather than their total number. Against other microorganisms "Dzhakos" showed no toxic activity. Its biological activity lasted about six weeks. As a result, the yield of sugar beets increased by 26-32 hundredweight per hectare. References 6 (Russian).
[156-7813]

UDC 546.185

DICALCIUMPHOSPHATE CONVERSION WHEN DISSOLVED IN WATER

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA KHIMICHESKAYA
in Russian No 1, Jan-Feb 82 (manuscript received 21 Jul 80) pp 68-71

KOROTEYEVA, N. Ya. and URIKH, V. A., Institute of Chemical Sciences,
KASSR Academy of Sciences, Alma-Ata

[Abstract] The effects of pH and temperature on the speed and nature of dicalcium phosphate conversion when dissolving in water were studied. Temperatures and pH factors were close to those found as fertilizers dissolve in the soil under natural conditions; initial, intermediate and final products were determined by chemical, X-ray-structure and crystalloptical analyses. The most stable compound in the $\text{CaO}-\text{P}_2\text{O}_5-\text{H}_2\text{O}$ system, and the final product of phosphate hydrolysis, was hydroxylapatite. Diffusion limited the activity of the chemical constituents of the initial compound. When dicalcium phosphate was dissolved in an alkaline medium, the pH gradually fell to the 6--6.5 range found when the compound was dissolved in an acid or neutral medium. Thus the solution that resulted had a buffering effect. In alkaline and neutral media, hydrolysis continued until hydroxylapatites formed, while in acid media it continued until the formation of calcium monophosphate. Figures 4; references 8; 6 Russian, 2 Western.
[160-12131]

UDC 541.123.6 + 546.226.32 + 546.229.39 + 546.185.325

SOLUBILITY IN FOUR-COMPONENT SYSTEM K_2SO_4 -- $(NH_4)_2SO_4$ -- P_2O_5 -- H_2O AT 80° C

Alma-Ata IZVESTIYA AKADEMII NAUK KAZAKHSKOY SSR: SERIYA KHIMICHESKAYA
in Russian No 1, Jan-Feb 82 (manuscript received 30 Sep 81) pp 71-74

KAIPOVA, Z. K., LITVINENKO, V. I. and BEKTUROV, A. B., Institute of
Chemical Sciences, KaSSR Academy of Sciences, Alma-Ata

[Abstract] An isothermal method consisting of adding a fourth component at nonvariant points in a triple system, was used to study mutual solubility in the title four-component system. This study was to determine the solubility of a chlorine-free fertilizer which would simultaneously supply N, P and K. The three-component starting systems were i) K_2SO_4 -- P_2O_5 -- H_2O ; ii) $(NH_4)_2SO_4$ -- P_2O_5 -- H_2O ; and iii) K_2SO_4 -- $(NH_4)_2SO_4$ -- H_2O . In i) and ii) the sulfates react with phosphoric acid to form potassium and ammonium hydro-sulfate-dihydrophosphate; in iii) solid solutions of potassium and ammonium sulfates. The composition of solid phases was determined by chemical, crystalloptical and X-ray-phase analysis. Two nonvariant points of mutual crystallization of three salts--variants each containing N, P and K--were determined. Figures 3; references 9: 8 Russian, 1 English.
[160-12131]

UDC 662.74.002.5 : 66.099.2

METHODS FOR GRANULATING CHEMICAL PRODUCTS IN LIQUIDS

Moscow KOKS I KHIMIYA in Russian No 3, Mar 82 pp 46-48

KHUSTOCHKIN, P. P., Khar'kov Polytechnical Institute, SIMONOV, N. F. and SHKODKIN, V. G., KBaIM [expansion unknown--perhaps, Design Bureau for Automation and mechanization] of the State Institute for Planning of Establishments of the Byproduct Coke Industry

[Abstract] Considering that the most rapid cooling and granulation of nitrogen fertilizers occurs when a liquid coolant is used, but immediate entry into the liquid causes poor granulation, a new process was developed in which various compounds to be granulated could be injected into a tower in which a two-phase foam suspension causes spherical granules to form, instead of the scaly products obtained when chemical compounds strike a flat liquid surface. The system was tested at the Stakhanovsk Coal-Tar Byproduct Plant for indene-coumarone resins. By providing "soft" passage through the highly gaseous foam, positive results were obtained in preventing granule deformation. Figure 1; references 11: 10 Russian, 1 English.
[169-12131]

PROCESSING PHOSPHORITES OF KHUBSUGUL' DEPOSIT INTO COMPLEX CONCENTRATED FERTILIZERS

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 2, Feb 82 pp 91-92

YAROSH, Ye. B., DMITREVSKIY, B. A., DMITRIYEVA, N. V., KOPYLEV, B. A., ZAIKINA, L. I. and TOKAREV, G. I.

[Abstract] Khubsugul' phosphorites, consisting of calcium phosphate, dolomite and calcite carbonates and quartz, were dissolved in phosphoric and nitrogen acids. The solubility of the $\text{CaO}-\text{P}_2\text{O}_5-\text{H}_2\text{O}$ system formed was assayed to determine the degree of phosphorite dissolution. Results indicated that the degree to which the basic components of the phosphorite entered the liquid phase depended on the specifications and concentration of the acids used, and not on dissolving temperature. Best results were obtained with a solution containing mass percentgges of the following substances: 6.0% P_2O_5 , 10.7% HNO_3 , 0.9% MgO , and 0.4% CaO . It was possible to obtain the desired complex concentrated fertilizers by using an ecologically-closed method, without sulfuric acid. Figures 4; references 10 (Russian).
[168-12131]

UDC [620.197.2:66.061.3.023].661.634

UTILIZING EXTRACTORS WITH ANTICORROSION PROTECTION

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 2, Feb 82 pp 102-104

DOBROLYUBOV, V. V., KALINICHENKO, V. A., ILYUKHIN, A. S., BUGAYENKO, N. N., STOLYAR, A. I., RADZEVICH, V. E. and LYUBANOVSKIY, V. D.

[Abstract] Studies of mineral fertilizer extractors working in a corrosive medium containing 28-32% P_2O_5 , 1-5% sulfuric acid and 1-5% fluorine at temperatures of 70-75° C showed the most likely failure occurs in the lining at the base and under the mixing blade, along with corrosive damage to the cover. Various protective plates were tried on metallic and iron-concrete extractors seeking domestic products that would lengthen operational life before overhauls. The welds at the bottom seams where the protective plates were attached also proved to be of short service. It was recommended that paddle mixers be replaced by propeller or turbine devices, and that acid-resistant ceramic materials be used for protective blocks. Studies of new materials for covers indicated that new polymer materials, such as "Polan," should be used for lining covers. Together with "Furankor" cement, this latex can help reduce the need for importing such products.
[168-12131]

TECHNICAL AND ECONOMIC QUESTIONS FOR INCREASING OPERATIONAL EFFECTIVENESS
OF LARGE SCALE PLANTS FOR PRODUCING AMMONIA

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 2, Feb 82 pp 119-122

KIRYUSHKIN, V. M., KAZHDAN, Ye. Z., SEMENOV, V. P. and SOSNA, M. Kh.

[Abstract] Increased efficiency and ecological advances have come with use of natural gas, gas centrifuges and air cooling in producing ammonia. Technical stoppages continue to plague ammonia plants, thus reducing production and wasting raw materials. At some Soviet plants regular inspection and maintenance has made it possible to cut down time from 10% the first year to 4% the second, and 1.4% the third year of operation. Improvements in temperature stabilization at the reforming stage of processing have made possible reductions in natural gas consumption; at the "New Moscow Nitrogen" plant, testing led to establishing a steam : gas ratio of 4.0 as the optimum for efficient operation. Figures 3.

[168-12131]

UDC: 631.81.036

HYGIENIC ASPECTS OF FERTILIZER USE IN AGRICULTURE

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 3, Mar 82 pp 14-15

TIMOSHENKOVA, L. P. and PERELYGIN, V. M., professor, Moscow Oblast Planning and Research Station for Chemization of Agriculture; Institute of General and Communal Hygiene imeni A. N. Sysin, USSR Academy of Medical Sciences

[Abstract] Dangers of overfertilization are pointed out, including contamination of water supplies, introduction of excessive nitrogen, phosphorus, heavy metals and trace elements to soils and plants and recycling of nitrates and other substances through manure used as fertilizer. The authors call for theoretical studies and hygienic standardization of application of mineral and other fertilizers to agricultural areas, with determination of the stability of chemical substances in the soil, and of the permissible concentrations of chemical substances in the soil to assure that the soil will retain its self-purification properties. References 17; 15 Russian, 2 Western.

[177-6508]

FREE RADICALS

UDC 541.124.7 + 547.53

FREE RADICAL REACTION MECHANISMS, PART 13: MECHANISM AND SELECTIVITY OF FREE RADICAL HALOGENATION OF ALKYLAROMATIC HYDROCARBONS WITH FLUOROALKYL SUBSTITUENTS

Leningrad ZHURNAL ORGANICHESKOY KHIMII in Russian Vol 18, No 2, Feb 82
(manuscript received 17 Feb 81) pp 365-373

DNEPROVSKIY, A. S., YELISEYENKOV, Ye. V. and MIL'TSOV, S. A.,
Leningrad State University imeni A. A. Zhdanov

[Abstract] Free radical halogenation of 1-fluoro-2-acylethanes (I) and 1,1,1-trifluoro-2-acylethanes with sulfuryl chloride and N-bromosuccinimide was investigated. An attempt was made to determine the mechanism of the chain transfer during SO_2Cl_2 chlorination. On the basis of experimental data it was concluded that the chain development in SO_2Cl_2 chlorination goes exclusively through the chlorine atom. Calculations of the relative rates of halogenation showed a good correlation between $\log K_{\text{rel}}$ and Brown's σ^+ constants. The change in selectivity found upon changing from one reaction series to another indicated an influence of two independent factors responsible for the reactivity of the system: polar effect of the substituents and changes in the dissociation energy of the C-H bond. A single function between the reactivity and selectivity can be expected only in those cases when both the reactivity and selectivity are controlled by varying a single characteristic of a substrate. References 24: 7 Russian, 17 Western.
[161-7813]

UDC 547.533+547.295.1

FREE RADICAL REACTION MECHANISMS, PART 14: SELECTIVITY OF FREE RADICAL CHLORINATION OF VALERIC ACID DERIVATIVES USING ARYLCHLOROIODINIUM CHLORIDES

Leningrad ZHURNAL ORGANICHESKOY KHIMII in Russian Vol 18, No 2, Feb 82
(manuscript received 17 Feb 81) pp 373-377

DNEPROVSKIY, A. S. and KRAYNYUCHENKO, I. V., Leningrad State
University imeni A. A. Zhdanov

[Abstract] Studying the polar effects in free radical substitution reactions, the selectivity of radical chlorination of $\text{C}_4\text{H}_4\text{Y}$ with

arylchloroiodinium chlorides $\text{XC}_6\text{H}_4\text{ICl}_2$ was studied (where $\text{X} = \text{p-C(CH}_3)_3$, H , m-CF_3 , m-NO_2 and $\text{Y} = \text{COOCH}_3$, COCl , CN and Cl). The reactions were carried out in sealed ampules at 30°C using photochemical initiation. The chlorination occurred primarily along the secondary C-H bonds. The reactivity of these bonds increased as the distance from the electronegative substituent increased. The reaction was accelerated with electron donor substituents, the electrophilicity of this process being higher than that in chlorination with atomic chlorine. References 12: 8 Russian, (3 by Western authors), 4 Western.
[161-7813]

ION EXCHANGE PHENOMENA

UDC: 183.24 : 549.67

ADSORPTION OF URANYL IONS BY MORDENITE AND CLINOPTILOLITE

Leningrad RADIOKHIMIYA in Russian Vol 24, No 1, Jan-Feb 82
(manuscript received 3 Feb 81) pp 9-13

ANDREYEVA, N. R. and CHERNYAVSKAYA, N. B.

[Abstract] A study is presented of the adsorption of uranyl by mordenite and clinoptilolite, as well as its influence on adsorption of cesium and strontium radionuclides by these zeolites. The adsorption of uranyl was studied under static conditions and under dynamic conditions with a contact time of forty minutes. The isotopes used in the study were purified of decay products by diethyl ether extraction followed by peroxide precipitation. The studies showed adsorption by both zeolites. Equilibrium was established in seven to fourteen days. The substances can therefore be used to purify solutions containing uranyl of cesium and strontium radionuclides. Figures 4; references 8: 6 Russian, 2 Western.
[176-6508]

UDC: 669.882; 621.039.325

KINETICS OF SORPTION OF URANIUM (VI) FROM FLUORINE-CONTAINING AMINOPHOSPHATE SOLUTIONS BY AMPHOLITES

Leningrad RADIOKHIMIYA in Russian Vol 24, No 1, Jan-Feb 82
(manuscript received 11 May 81) pp 14-18

PAKHOLKOV, V. S. and RYCHKOV, V. N.

[Abstract] A study is made of experimental and theoretical data on the kinetics of sorption of uranium ions from UO_2F_2 solutions containing HF and NH_4F by a number of aminophosphate ampholites. The ampholites ANKF-2B, ANKF-3G and ANKF-80 were used in their H^+-Cl^- forms. The influence of ionite grain size, agitator rotation speed, compound concentration and temperature on the rate of the process was established. The aminophosphate

ampholites were found to have high sorption rates, a result of the mutual influence of acid and base groups on the degree of ionization. The contribution of complex formation reactions does not change the nature of intradiffusion kinetics of sorption of the uranium ions from the fluorine-containing solutions. Figures 5; references 12 (Russian).
[176-6508]

ORGANOMETALLIC COMPOUNDS

UDC: 542.61

PHYSICAL DISTRIBUTION OF EXTRACTION AGENTS AND EXTRACTED COMPOUNDS BETWEEN AQUEOUS SOLUTIONS AND VARIOUS DILUENTS, PART 3; DISTRIBUTION OF DIALKYLPHOSPHORIC ACIDS, BETA DIKETONES AND EXTRACTED METAL-CONTAINING COMPOUNDS

Leningrad RADIOKHIMIYA in Russian Vol 24, No 1, Jan-Feb 82
(manuscript received 16 Dec 80) pp 22-24

SHMIDT, V. S., RYBAKOV, K. A. and RUBISOV, V. N.

[Abstract] The purpose of the present study was to evaluate the applicability of equations (of the type $\lg P_0 = \alpha + \beta VR^*$) derived in previous work to describe the dependences of the physical distribution constants (of acid extracting agents such as dibutylphosphoric, diamylphosphoric, dihexylphosphoric and dioctylphosphoric acids, beta-diketones, acetylacetone and benzoylacetone and certain extracted compounds of acetylacetone with metals) on the nature of the organic diluent. The study was based on published experimental data on distribution of compounds as well as chelates formed by acetylacetones with zinc, beryllium, copper (II) and uranium (VI). The results confirm the effectiveness of the concept of consolidation of the information on extraction equilibria using equations based on linear free energy relationships. Figures 3; references 11: 8 Russian, 3 Western.
[176-6508]

SYNTHESIS, STRUCTURE AND PROPERTIES OF COMPOUNDS WITH CHALCOGEN-NITROGEN BONDS, PART 4: Se-ARYL, Se-BENZOYL-N-PHENYLSULFONYLSELENIMIDES

Leningrad ZHURNAL ORGANICHESKOY KHIMII in Russian Vol 18, No 2, Feb 82
(manuscript received 23 Apr 81) pp 259-265

NADDAKA, V. I., KRASNOV, V. P., POPOVA, L. L. and MINKIN, V. I.,
Scientific Research Institute of Physical and Organic Chemistry;
Rostov-na-Donu State University

[Abstract] A series of Se-aryl and Se-benzyl-N-phenylsulfonylselenimides was synthesized by reacting equimolar quantities of acylbenzylselenide and tert-butylhypochlorite in CHCl_3 followed by addition of N-sodium derivatives of benzylsulfonamide. The IR, UV and PMR spectra of these compounds were analyzed in detail. These compounds are bipolar structures with a strong positive charge on the selenium atom, facilitating strong resonance interaction and a strong bathochromic shift in the UV system. Determination of pK_a values indicated that these compounds are quite basic, comparable to araldaniles. PMR data indicated a high threshold of inversion for selenium pyramide in N-phenylsulfonylselenimides. Figures 5; references 11:
4 Russian, 7 Western.
[161-7813]

ORGANOPHOSPHORUS COMPOUNDS

UDC 547(569+241)+543.226

SYNTHESIS OF SOME THIOPHOSPHINIC ACID ESTERS AND INVESTIGATION OF THEIR THERMAL STABILITY

Baku AZERBAYDZHANSKIY KHIMICHESKIY ZHURNAL in Russian No 5, Sep-Oct 81
pp 33-37

MAMEDOV, F. A., MAMEDOV, F. N., and MIRZOYEVA, M. A., Institute of the Chemistry of Additives

[Abstract] The goal of the present study was to synthesize aryl-, cyclohexyl-, chlorocyclohexylthiophosphines and to investigate their thermal stability. These products were obtained by reaction of respective tri-chlorophosphines with thiophenols and aliphatic mercaptans. The thiophosphines obtained are transparent liquids resistant to the action of moisture. Analysis of thermal stability showed the following order of activity: $\text{C}_6\text{H}_5\text{-CH}_2\text{-C}_6\text{H}_4\text{-}$ $\text{C}_6\text{H}_5\text{-iso-C}_3\text{H}_7\text{-}$. When the substituents at the sulfur atoms were considered, introduction of chlorine was found to lead to a sharp drop in thermal stability. Chlorocyclohexylthiophosphines were as stable as chlorocyclohexylphosphines. Oxygen containing compounds differed markedly from their sulfur analogues only in the very early stages of decomposition (oxygen derivatives were than more stable), but as the temperature rose, their properties became the same. Figure 1; references 2 Russian, (1 by Western author),
[167-7813]

UDC 542.91:547.1'118

ORGANOPHOSPHORUS ANALOGUES OF BIOLOGICALLY ACTIVE COMPOUNDS, PART 11: SYNTHESIS OF ACYLPHOSPHATE ANALOGUES BASED ON METHYLENEDIPHOSPHONATES

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian No 2, Feb 82 (manuscript received 4 Jun 81) pp 402-404

TARUSOVA, N. B., NOVIKOVA, Z. S., PRISHCHENKO, A. A., YAKOVLEVA, G. M. and KHOMUTOV, R. M., Institute of Molecular Biology, USSR Academy of Sciences, Moscow; Moscow State University imeni M. V. Lomonosov

[Abstract] Equimolar quantities of methylenediphosphonates and aldimine, $\text{Ph}_2\text{CHN=CHCHMe}_2$ reacted at 100°C in presence of Et_3N yielded

1-methyl-2-aminopropyl-2-phosphinomethylene- and -phosphinomethylenemethylphosphonic acids. In presence of dicyclohexylcarbodiimide, these analogues could be selectively esterified with protected adenosine to yield respective P_{β} -adenosinyl esters. References 6: 3 Russian, 3 Western (1 by Russian authors).
[165-7813]

UDC 542.91:547.1'128'118

SYNTHESIS AND PROPERTIES OF HEPTAMETHYLCYCLOTETRASILOXANOMETHYLPHOSPHONIC ACID DERIVATIVES

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian No 2, Feb 82 (manuscript received 10 Jul 81) pp 404-408

GODOVIKOV, N. N., POLYAKOVA, L. A., KIREYEVA, Ye. G. and KABACHNIK, M. I., Institute of Heteroorganic Compounds imeni A. N. Nesmeyanov, USSR Academy of Sciences, Moscow

[Abstract] Reaction of sodium dialkylphosphite with bromomethylheptamethylcyclotetrasiloxane yielded a series of 0,0-dialkylheptamethylcyclotetrasiloxanomethylphosphonates which, when treated with oxalyl chloride, could be converted to 0-alkylheptamethylcyclotetrasiloxanomethylphosphonic acid chlorides (I). 0-ethylheptamethylcyclotetrasiloxanomethylphosphonic acid chloride was converted to 0-ethyl-0-(p-nitrophenyl)heptamethylcyclotetrasiloxanomethylphosphonate (II), a potent pesticide against rice weevil. When I was treated with SbF_3 in benzene, respective fluorides (III) were obtained in 44-59% yield, II and III were found to be potent irreversible inhibitors of cholinesterases. References 7: 5 Russian (1 by Western author), 2 Western.
[165-7813]

UDC 542.952.1:542.91:547.1'118:547.56:547.233.2

DIPHENOXYTHIOPHOSPHORYLIMIDOTRICHLOROPHOSPHATE, ITS THERMAL ISOMERIZATION AND ITS REACTIONS WITH PHENOL AND DIMETHYLAMINE

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian No 2, Feb 82 (manuscript received 24 Jul 81) pp 465-468

KHODAK, A. A., GILYAROV, V. A. and KABACHNIK, M. I., Institute of Heteroorganic Compounds imeni A. N. Nesmeyanov, USSR Academy of Sciences, Moscow

[Abstract] Thermal isomerization of diphenoxythiophosphorylimidotrichlorophosphate (I) (8-10 hrs at 220°C) gave diphenyl(dichlorothiophosphorylimido)chlorophosphate (II), which upon reaction with phenol yielded

triphenyl(dichlorothiophosphorylimido)phosphate. Gradual replacement of Cl atoms in I was achieved by heating I with phenol. A 1:1 ratio of the reagents at 140-150°C led to replacement of one Cl atom; a 1:2 ratio of I to PhOH, at 170-180°C, replaced two chlorines and complete conversion to the triphenyl derivative occurred at 180-200°C and a 1:3 ratio of I to PhOH. Reaction of I with dimethylamine taken at a 1:2 and 1:4 ratio also replaced one or two chlorine atoms yielding dimethylamido- and tetramethyldiamido(diphenoxythiophosphorylimido)dichloro-(or chloro)-phosphate respectively. To obtain hexamethyltriamido(diphenoxythiophosphorylimido)-phosphate, the above tetramethyldiamido homologue had to be reacted with 2-3 fold excess of dimethylamine. References 5 (Russian).
[165-7813]

UDC 542.91:547.1'118

REACTION OF PYRIMIDINYLPHOSPHITES WITH CARBOXYLIC ACIDS

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian
No 2, Feb 82 (manuscript received 25 Aug 81) p 475

GINIYATULLINA, M. A., PODZIGUN, G. I. and REZNIK, V. S., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan' Branch, USSR Academy of Sciences

[Abstract] Dialkylpyrimidinylphosphites react with carboxylic acids at 20-35°C to yield corresponding acyloxyphosphites and 4,6-dialkyl-1,2-dihydropyrimidone-2. References 3 (Russian).
[165-7813]

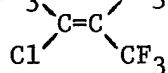
UDC 542.91:547.464.5-312:547.1'118'161

WITTIG REACTION OF PERFLUOROACYL HALIDES AND ANHYDRIDES WITH HEXAFLUOROISOPROPYLIDENETRIETHOXYPHOSPHORANES

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian
No 2, Feb 82 (manuscript received 16 Oct 81) pp 477-478

VOLKONSKIY, A. Yu., ROKHLIN, Ye. M. and MYSOV, Ye. I., Institute of Metallorganic Compounds imeni A. N. Nesmeyanov, USSR Academy of Sciences, Moscow

[Abstract] A 45 day reaction of CF_3COCl with $(\text{EtO})_3\text{P}=\text{C}(\text{CF}_3)_2$ (I) at 20°C gave a 19% yield of $\text{CF}_3\text{C}(\text{Cl})=\text{C}(\text{CF}_3)_2$. However, CF_3COOEt , Ac_2O and Bz_2O did not



with I even at 100°C, while COCl_2 reacted by splitting off the Cl atoms. References 3 (Western).
[165-7813]

CONTINUOUS PRODUCTION OF SILICON PYROPHOSPHATE OF REACTION PURITY

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 2, Feb 82 pp 95-96

STARENCHENKO, V. G., KOSHCHYEV, G. G., KOZEL', V. Ye., GAREYEV, A. M.
and MOKHOSOEYEV, M. V.

[Abstract] A new method for obtaining silicon pyrophosphate based on drying an aerosil-phosphoric acid mixture is described. The laboratory set-up mechanically produced reaction-pure pyrophosphate with processing loss of 5-6%, requiring pulverization. X-ray-phase analysis showed a phase transformation from the initial silicon pyrophosphate from a low-temperature to a high-temperature, cubic modification, while thermal and thermogravimetric analyses indicated losses of about 18% during processing. The product consisted 30-40% of an acid salt and 60-70% of a normal salt, with crystalline structure a mixture of tetragonal and monoclinical modifications. Further heat processing at 900° and 1040° C led to a pure cubic modification with the composition $\text{SiO}_2 \cdot \text{P}_2\text{O}_5$. The experimental set-up could produce 10 tons of commercial product per year. Figures 2; references 7 (Western).
[168-12131]

PESTICIDES

UDC 632.952;633.11

TREATMENT OF SEEDS IN CONTROL OF WINTER WHEAT ROOT ROT

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 2, Feb 82 pp 24-26

PIDOPLICHKO, V. N., candidate of biological sciences, Ukrainian Scientific Research Institute of Plants, and ANDREYEVA, Ye. I., doctor of agricultural sciences, All-Union Scientific Research Institute of Chemical Plant Protective Agents

[Abstract] During the period 1976-1980, field studies were carried out with a number of systemic and complex fungicides used to disinfect seeds about two weeks before the planting time. Two winter wheat brands were studied: Mironovskaya 808 and Poleskaya 70. The results showed that seed treatment with Bavistin, Fundozol, Vitavax, Vitathiuram, Khomay, Chloronizid-GP and Chloronizid-BP prevented to a varying degree development of cercosporiasis. No effect was noted against Ophiobolus graminis. References 6: 1 Russian, 2 Czech, 3 Western.
[156-7813]

UDC 632.951

PHYTOCIDIC ACTIVITY OF ETAPHOS AND ITS MIXTURES WITH FUNGICIDES

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 2, Feb 82 pp 27-28

GAR, K. A., doctor of agricultural sciences, GUSHCHINA, N. I., candidate of agricultural sciences, KHOKHRYAKOVA, V. S., ROBAS, G. Ya., and BAKANOVA, S. M., candidate of chemical sciences, All-Union Scientific Research Institute of Chemical Plant Protective Agents

[Abstract] Etaphos is a new organophosphoric insectoacaricide produced in the USSR. Its phytocidic activity was evaluated on hydrangea leaves and in several orchards during the 1975-1979 period. Results show that emulsions of up to 0.2% of the 50% concentrate have practically no phytocidal activity on all cultures tested, except for beans. Etaphos mixed with other fungicides,

especially those containing copper, exhibited increased phytocidal activity exceeding the effect of the starting components alone. When applied during a dry season on apple trees, such mixtures led to a defoliating effect. Caution is advised against indiscriminate mixing of etaphos with other fungicides. Figures 2; no references.
[156-7813]

UDC 632.951

TOXICITY OF APHICIDES AGAINST PEA APHIS AND COMMON SPRING GRAIN APHIS

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 2, Feb 82 p 29

MIKHINA, N. G., All-RSFSR Scientific Research Institute of Plant Protection

[Abstract] Toxicological evaluation of a number of insecticides was carried out on common spring grain and pea aphids which had never been exposed to pesticides before. The following was the order of toxicity towards both aphids: Reldan > Metaphos > Malathion > Phozalon > Rogor > Etaphos. Among the derivatives of carbaminic acid, the most effective were Pirimor and Croneton. Mecarbenyl was not effective, especially against the pea aphid.
[156-7813]

UDC 632.951

ETAPHOS USED TO CONTROL EUROPEAN RED MITE

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 2, Feb 82 pp 29-30

AVAKYAN, A. A., candidate of biological sciences, Armenian Institute of Agriculture

[Abstract] Etaphos was found to exhibit high initial toxicity against European red mite (*Eriosoma lanigerum* Hausm.) which was, however, short lasting. A triple application 5-6 days apart was necessary for etaphos to be effective. Phozalon used as a control was effective after a single application.
[156-7813]

PERSISTENCE OF HERBICIDES IN SOIL AND IN PLANTS

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 2, Feb 82 pp 53-57

KAVOLIUNAITE, I. A. and MELAMED, B. V., candidates of agricultural sciences, Vokė Branch of the Lithuanian Scientific Research Institute of Agriculture

[Abstract] The stability of 2,4-D, triazine preparations and linuron in plants and in soil varies considerably. A serious problem with 2,4-D is its accumulation in plants; the problem with herbicides is their long stability in soil and a danger of their washout into ground waters. The goal of this study was to investigate the persistence of 2,4-D in various plants and the washing out of simazin, prometrin and linuron from the soil. Experimental data showed that 2,4-D was not retained for any appreciable time in barley seeds but it did persist in corn and rye for 3-4 weeks. 2,4-D accumulated markedly in grass, its level depending on the dose and schedule of application. The washing out studies of long lasting herbicides showed that their penetration from the application area into neighboring sites was insignificant. The most important route for the removal of long lasting herbicides from the soil is their decomposition. It occurs at different rates. Prometrin and linuron break down faster than simazin. References 14: 7 Russian, 7 Western.

[156-7813]

CRYSTALLIZING CHLOROPHOS ON ROLLER CRYSTALLIZER WITH RIBBED SURFACE

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 2, Feb 82 pp 106-108

PONOMARENKO, V. G., BEY, V. I., POTEBNYA, G. F., BELOMYTTSEV, S. N. and TKACHENKO, K. P.

[Abstract] Calculations are presented for the crystallization of chlorophos on a cooled, slowly revolving roller with microscopic fractures that gather scales of the compound. This phenomenon was utilized by employing a ribbed roller to speed crystallization. The results indicated that kinetic factors influenced accumulation as heat moved from the crystallizing smelt to the cooled wall of the roller. Calculations for rollers of 1600 mm and 500 mm coincided with the experimental results using a 150 mm roller. Thus the ratios obtained can be applied in practical calculations for industrial devices. Figures 3; references 5 (Russian).

[168-12131]

ZONING OF UKRAINIAN LANDSCAPES WITH RESPECT TO CAPABILITY FOR SELF
PURIFICATION FROM PESTICIDES

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 3, Mar 82 pp 23-25

SHOSTAK, L. B., Kiev Medical Institute

[Abstract] The self purification capacity of soils is determined primarily by their biological activity, usually estimated from the heterotrophic fixation of carbon dioxide gas, its liberation, the total quantity of microorganisms, potential nitrification capacity and capacity for other hydrolytic processes. The principle of landscape-biogeochemical and soil-climatic zonality was used to subdivide the territory of the Ukraine in terms of self purification capacity, considering the capabilities of the various areas to liberate themselves of organic industrial compounds and data obtained by various researchers on the behavior of pesticides in soils as a function of type, weather conditions and other factors. Areas with weak and very weak self purification capacity represent 38.2% of the total land area, areas with moderate capacity represent 25.3%, while areas of high and very high capability for self purification represent 36.5% of the land territory of the Ukraine. The intensive level of use of pesticides in the Crimean, Transcarpathian, Odessa, and Moldavian areas represents a threat of pollution to the territories processed, as well as the to the Bug, Ingul, Prut and Dnester rivers. Figures 5; references 8: 5 Russian, 3 Western.

[177-6508]

GAS CHROMATOGRAPHIC ASSAY OF 2,4-D AND 2M-4C DERIVATIVES IN SOIL
AS CHLOROETHYL ESTERS

Moscow KHIMIYA V SEL'SKOM KHOZYAYSTVE in Russian No 3, Mar 82 pp 57-58

BABKINA, E. I., candidate of chemical sciences, ALEKSEYEVA, L. B.,
FANASKOVA, T. P. and DIBTSEVA, A. V., Institute of Experimental Meteorology

[Abstract] A method is suggested for gas chromatographic determination of chlorophenoxyalkane acid group herbicides, intended for analytic monitoring of soil pollution. The addition of 1 to 2% acetone by volume to the extraction mixture, allowed a 20-30% increase in the degree of extraction of the herbicides from the soil. The influence of esterification conditions on the yield of esters was studied. The use of acetone as the solvent doubled the height of the chloroethyl ether peak in comparison to the use of ether, quadrupling it in comparison to the use of hexane. Reliability and reproducibility can be achieved only if the standard solutions are

chloroethyl esters obtained by esterification of dry residues by herbicide extracts applied to objects identical to those studied. The method suggested is now being used to analyze soil specimens from various regions of the Soviet Union to determine the desirability of monitoring soil pollution with these herbicides. Instructions for sample preparation, esterification, chromatography and safety techniques are outlined. References 6:
4 Russian, 2 Western.
[177-6508]

UDC 547.873 : 542.951

SYNTHESIZING ACYLATED (2'-HYDROXYETHYL)AMINO- AND (2'-AMINOETHYL)AMINOTRIAZINES-1,3,5

Riga KHIMIYA GETEROTSIKLICHESKIKH SOYEDINENIY in Russian No 2, Feb 82
(manuscript received 11 Feb 81) pp 260-263

SAPOZHINKOVA, Zh. Z., PROKOF'YEVA, A. F., KOROLEVA, T. I. and MEL'NIKOV, N. N.,
All-Union Scientific Research Institute of Chemical Plant Protection
Substances, Moscow

[Abstract] To obtain biologically active compounds, chloroacetylchloride was combined with (2'-hydroxyethyl)aminotriazines, and the resulting product was combined with chloroacetylchloride in acetone in the presence of potassium carbonate, yielding (2'-chloroacetoxyethyl)-aminotriazines-1,3,5. Infrared spectra of these compounds and proton magnetic resonance of NH protons showed acylation on the OH group. The active chlorine atom in this compound led to its reaction with potassium thiocyanate to produce (2'-thiocyanoacetoxyethyl)-aminotriazines-1,3,5 in a nucleophilic substitution. The nature of the acylating agent affected the length of reaction time of ethylenediamine with carboxylic acid ethyl alcohol. Chlorotriazines reacted with monoacylethylenediamines in acetone at 40-50°C in the presence of sodium bicarbonate as the nitrogen chloride acceptor. Details of reactions and their evaluation are presented in an experimental section. References 6:
4 Russian, 2 English.
[171-12131]

PETROLEUM PROCESSING TECHNOLOGY

UDC 547.495.2 ; 542.91 : 665.753.2.038

SYNTHESIS AND STUDY OF ANTIOXIDANTS OF TYPE OF CARBAMIDE DERIVATIVES OF 2,6-DI-TERT-BUTYLPHENOL

Moscow NEFTEKHIMIYA in Russian Vol 22, No 1, Jan-Feb 82
(manuscript received 2 Jul 80) pp 82-85

GLEBOVA, Ye. V., VISHNYAKOVA, T. P., LEBEDEV, V. N. and RAGULIN, L. I.,
Institute of Petrochemical and Gas Industries imeni I. M. Gubkin, Moscow

[Abstract] Synthesis of new carbamide derivatives of 2,6-di-tert-butylphenol, including N,N-di-(3,5-di-tert-butyl-4-oxyphenyl)carbamoylechloride, and their subsequent condensation with amines, are described. 3,5-Di-tert-butyl-4-oxyphenylamine was boiled in toluene under argon and the product phosgenated at room temperature in the presence of triethylamine to obtain N,N-di-(3,5-di-tert-butyl-4-oxyphenyl)carbamoylechloride. It reacts with aliphatic amines producing high yields of carbamide derivatives, but does not react with aromatic amines. Results showed that the radical at the nitrogen atom determined the antioxidant effectiveness of carbamide derivatives of 2,6-di-tert-butylphenol. The most effective compound for use with T-6 fuel was N,N-di-(3,5-di-tert-butyl-4-oxyphenyl)-N'-tert-butylcarbamide. Figure 1; references 8 (Russian).
[163-12131]

UDC [547,535.1 + 547.569.2] : 542.943 : 541.127 : 66.094.382

EFFECTS OF POLYPHENOLSULFIDE-TYPE ANTIOXIDANTS ON PROCESS OF OXIDIZING OF HYDROCARBONS

Moscow NEFTEKHIMIYA in Russian Vol 22, No 1, Jan-Feb 82
(manuscript received 1 Jun 81) pp 86-92

KASHKAY, A. M., FARZALIYEV, V. M., KULIYEV, F. A., KASAIKINA, O. T. and GAGARINA, A. B., Institute of Chemistry of Additives, AzSSR Academy of Sciences

[Abstract] Polyphenolsulfide [PPS] reactions with cumyl hydroperoxide and effects on cumene oxidation were studied. After synthesis, the tested

compounds were purified by adsorption chromatography and their purity verified by thin-layer chromatography. Cumene oxidation was determined by oxygen absorption at 60° C with an azobisisobutyronitril initiator. PPS reaction with cumyl hydroperoxide was conducted in a chlorobenzene solution in a nitrogen atmosphere at 70-110° C. Cumyl hydroperoxide was determined to be thermally stable at 70-110°, until the addition of PPS, which brought thorough decomposition. Increased temperature speeded the reaction. Kinetic evidence indicates a multi-stage process. Study of PPS reaction with free radicals showed that it inhibited oxidation, particularly for 4-tert-butyl-2,6-di-(5"-tert-butyl-2'-oxyphenylthiomethylene-thio)phenol and 4-tert-butyl-2,6-di-(5"-tert-butyl-2'-oxyphenyldithio)-phenol. PPS had long-lasting inhibiting effect. Figures 3, references 11 (Russian).
[163-12131]

POLYMERS AND POLYMERIZATION

UDC 678.742.3 : 66.095.262 ; 66.097

PROPYLENE POLYMERIZATION WITH CATALYTIC SYSTEM $\text{TiCl}_3 + (\text{C}_2\text{H}_5)_2\text{AlCl}$
+ $\text{C}_2\text{H}_5\text{AlCl}_2$ + TETRAETHOXY-SILANE

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 82 pp 9-10

KASHIRINA, G. N. and VOLOSHIN, I. A.

[Abstract] The modifying effects of tetraethoxysilane on the catalytic system TiCl_3 + diethylaluminum chloride and ethylaluminum dichloride were studied, including the hydrogen effect and ratio of components of the catalytic system on the polymerization rate of propylene, the isotactic index, and the physicomechanical properties of the polypropylene. After initial polymerization, the tetraethoxysilane was injected and the mix heated to 70° C. After cooling to room temperature, a calculated amount of diethylaluminum chloride in a hexane fraction was injected. Results indicated that the modifying additive did not reduce the polymer's isotacticity, but speeded polymerization and improved the mechanical properties of the polymer produced. Figure 1; references 6 (Russian).
[143-12131]

UDC 678.742.3-137.422 : 539

STRUCTURE AND PROPERTIES OF COMPOUNDS OBTAINED BY SUCCESSIVE POLYMERIZATION OF PROPYLENE AND ETHYLENE

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 82 pp 12-14

POPOV, V. P., PANIN, A. L., DUVANOVA, A. P., ZARETSKAYA, Ye. M.,
BUDNITSKIY, Yu. M., KERBER, M. L. and AKUTIN, M. S.

[Abstract] Copolymer polypropylene and polyethylene materials were compared with mixtures of these polymers and with polypropylene-rubber compositions. Divinylstyrene with 10% rubber gives 6 times higher blow resistance than the initial polypropylene, and consequently it was chosen as the concrete material for comparison with mixed copolymers and with block-copolymers of polypropylene and polyethylene. Tests were conducted in a temperature

range of -160 to $+150^{\circ}$ C. It was found that new relaxational processes were found only for a polypropylene-copolymer ethylene-propylene composition, at -50° C. All tested materials showed low-temperature loss maxima analogous to the gamma-maximum of polyethylene. The cold resistance of PP-CEP and PP-divinylstyrene-30 was determined by the rubber phases present. Any chemical bond between PP and rubber molecules was regarded as unimportant in forming properties, but the lack of chemical bonds between PP and PE phases led to a sharp drop in desirable properties. Figures 3; references 19: 11 Russian, 7 Western, 1 (unknown).
[143-121 1]

UDC 678.01 : 536.7

EVALUATING THERMODYNAMIC STABILITY OF POLYMER COMPOSITIONS

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 82 pp 15-17

CHALYKH, T. I. and TAGER, A. A.

[Abstract] Using the Gibb's theory that free energy is a function of the state of a system and is determined by the difference between initial and final states, the average free energy value for a mixture of two polymers was determined according to thermodynamic cycles. Theoretical premises are presented and then applied to mixtures of cellulose nitrate and polyvinylacetate and to each one separately. Electron microscopic data show these to be a single-phase system. This method of calculations was also applied to mixtures of cellulose acetate, polymethylmethacrylate with polybutylmethacrylate, cellulose acetate with cellulose nitrate, and polyvinylchloride with polymethylmethacrylate. Changes in supermolecular structure, limited accuracy and the heterogeneity of compositional materials offer problems in applying this method. Figures 2; references 13; 10 Russian, 3 Western.
[143-12131]

UDC 678.033 : 66.095.262

PROPERTIES AND PROCESSING POLYMERIZATION-FILLED COMPOSITIONAL MATERIALS

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 82 pp 17-20

FRIDMAN, M. L., POPOV, V. L., SABSAY, O. Yu., GEVORGYAN, M. A. and TOPOLKARAYEV, V. A.

[Abstract] The use of low-cost, readily available natural substances as fillers for polymers is discussed in terms of adhesion, polymerization on the filler surface by catalysts, and other physical, mechanical and rheological

aspects, Studies were made of low pressure polyethylene and a concentrate of expanded perlite with a grafted linear polyethylene coating. Perlite content was varied from 0 to 50%. Deformation and durability properties were then evaluated during unidirectional stretching and compacting, under blows, through thermomechanical analysis and with a capillary rheometer. Physicomechanical properties included a durable mechanical linking of macromolecules with the filler, although during mechanical mixing the filler pores were practically blocked for the matrix. Viscosity was only slightly related to the method of introducing the filler. Hydrodynamic and elastic properties were better for the test group of compositions, which were made by diluting the low pressure polyethylene, than for the control compositions made by mixing the substances mechanically. The second group tended to clog the matrix as filler content increased and extrusion temperature decreased. The polymer coating formed in group 1 reduced the agglomeration of filler particles, thus decreasing the danger of clogging canals. Practical applications are suggested. Figures 4; references 22: 16 Russian, 6 Western.
[143-12131]

UDC 678.762,2-134.622-134.532.019.394.048

MAKING THERMOSTABLE ABS-PLASTICS

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 82
(manuscript received 15 Apr 80) pp 21-22

KOLOSOVA, T. O., YEMEL'YANOVA, A. T., BLASHCHUK, A. L., KERZHKOVSKAYA, V. V., LOZOVSKAYA, T. A. and LOVYAGINA, L. D.

[Abstract] Non-volatile antioxidant tri-n-nonylphenylphosphite (poligard) was added to rubber latex during its synthesis, to ABS-copolymer at the synthesis stage, as an emulsion during coagulation of ABS plastic latex, and to ABS plastic powder during high speed mixing. Thermal stability of the products was then compared to production ABS plastics stabilized with ionol at the coagulation stage. A slight drop in the rate of synthesis was noted when the antioxidant was added to rubber latex, and quantities up to 1.5% had no effect on physicomechanical properties. The greatest stabilization effect came when the antioxidant was added during latex rubber synthesis, with no practical loss in blow resistance after aging at 80° C for 3000 hours. The tri-n-nonylphenylphosphite had little effect on thermostability when added at later stages of synthesis. Figures 2; references 9: 6 Russian, 3 Western.
[143-12131]

LINKING DURABILITY WITH FOUNDATION OF FILLED POLYMER COVERINGS

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 82 pp 46-47

BATISHCHEV, L. I., ZELENEN, V. G. and LEKHIKOYNEN, M. M.

[Abstract] A colloidal graphite was injected into polycaprolactam by dusting granules during mechanical mixing. This composition was applied to etched iron sleeves. The graphite content of the polycaprolactam was up to 10% of the polymer mass. Durability was tested by a tangential shift method at 300 mm/min. Increased cohesion at 240-260° C was attributed to increased motion of the polymer macromolecules, reduced viscosity and the formation of a fine spherulite structure in the presence of the filler. Higher temperatures brought breakdown of the polymer and volatile products were released causing blisters and flaws. Increasing the graphite caused reduced coating stress. The optimal temperature for centrifugal coating was determined to be 255-265° C with centrifugal pressure at 0.4-0.8 MPa. Figures 2; references 5 (Russian).
[143-12131]

UDC 678.742.2-197.424.01 ; 539.3

IMPROVING MECHANICAL PROPERTIES OF LOW PRESSURE POLYETHYLENE

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 82 p 59

POPOV, V. P., KANTOR, L. A. and DUVANOVA, A. P.

[Abstract] Commercial low pressure polyethylene and stereoregular polybutene produced on a test production set-up were combined using a laboratory rolling mill at 160°C. Viscosity limits under tension, cracking resistance, creep and density were then measured. It was found that as polybutene content increased (from 1 to 20%), viscosity under tension decreased while cracking resistance grew. The least creep was found with 10% polybutene; this concentration was determined to be optimal. References 6: 3 Russian, 3 Western.
[143-12131]

MODIFYING THREE-DIMENSIONAL OLIGOCARBONATE METHACRYLATE POLYMER

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 82 pp 59-60

GRACHEV, A. V. and KISELEV, M. R.

[Abstract] Liquid rubbers were used to modify oligoestercarbonate methacrylate. Rubbers included polydivinylisoprene, butadiene with acrylonitril links and carboxylate groups at the ends of the compound, and "SKN-30" rubber with carboxylate groups. The first two mixed poorly with the polymer, hence a monooleinate of polyoxyethylene sorbite was added to enhance blending. It was found that these first two rubbers reduced rigidity destructive tension when stretched and relative elongation, but deformation resistance was somewhat reduced as well. The polar "SKN-30" rubber caused but a slight drop in rigidity while increasing relative elongation from 2.6 to 4% although changing destructive stretching tension. References 3 (Russian).

[143-12131]

UDC 678.674'448-19 : 66.095.3 + 678.01 : 539.3

UNSATURATED POLYESTERS MODIFIED WITH NITROGEN-CONTAINING COMPOUNDS

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 82 p 60

ASRAR, Dzh., SHMELEV, V. V., FEDOTOVA, O. Ya., KORSHAK, V. V., SLONIM, I. Ya., BRY SIN, Yu. P. and SMIRNOVA, T. A.

[Abstract] The effects of phenylhydrazine and hydrazides of benzoic and terephthalic acids were studied for the rate of forming polyethyleneglycol-maleinaphthalate, its setting by oligoesteracrylates, and the properties of the final products obtained. Potentiometric titration was used to establish the correlation between reaction time and acidity. The high activity levels of the compounds tested was confirmed, in the order benzoic hydrazide > phthalic hydrazide > terephthalic hydrazide. The latter's lesser effectiveness was related to poor solubility in the reactive mass. Improved polyester properties after modification were attributed to high fumarate activity in forming lateral bonds, and reduced likelihood of double glycol bonds, as compared to maleates.

[143-12131]

VISCOSITY AND RESILIENCE FACTORS OF COMPOSITIONS BASED ON FILLED POLYMERS
[NORPLASTS]

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 82 p 61

NIKITIN, L. N., GLAZUNOV, M. P., KISELEV, M. R., GEVORGYAN, M. A.,
SIVERGIN, Yu. M. and NOVOKSHONOVA, L. A.

[Abstract] Mechanospectroscopy was used to study viscosity and resilience properties of mechanical mixtures of low pressure polyethylene with perlite and norplasts. Perlite content ranged from 10 to 50%, while polymer content of the norplast was 12.3%. Two maxima were found for the logarithmic decrement dependency of damping on temperature for the materials. Low temperature peaks had the order low pressure polyethylene > norplast-based compositions > mechanical mixture. The high temperature peak was related to internal friction in the crystalline areas. Here the order was reversed, with norplasts 10° C higher than mechanical mixtures, apparently due to partial amorphization and increased defects in the polymer binder.
[143-12131]

REVIEW OF BOOK 'ADHESION DURABILITY'

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 82 p 61

FILYANOV, Ye. M.

[Book "Adgezionnaya prochnost'" by V. Ye. Basin, Moscow, Izdatel'stvo
"Khimiya", 1981, 208 pages]

[Abstract] The current state of a study of adhesive strength of the bonding of polymers is surveyed in this book of four chapters. The book describes a continuation of the research by Basin and A. A. Berlin ["Fundamentals of Polymer Adhesions"]. The first two chapters consider the effect of molecular reaction on the durability of adhesion and the roles of various factors in forming the adhesive contact. An earlier conclusion about the decisive role of interphasal molecular forces in adhesive strength is reconfirmed. Mechanical factors in adhesion and causes for failure of additive principles are related to polymer reactions with the foundation in Chapter three, while the final chapter presents a kinetic approach to describing adhesion properties. The reviewer suggests that more attention be paid in a subsequent edition to highly reinforced and filled systems.
[143-12131]

DIRECTED REGULATION OF HIGHLY-FILLED POLYMER MATERIAL PROPERTIES

Moscow PLASTICHESKIYE MASSY in Russian No 3, Mar 82
(manuscript received 3 Aug 80) pp 10-11

STROYEVA, O. A., AKUTIN, M. S., SALINA, Z. I., EL'TEKOV, Yu. A. and UKLONSKIY, D. A.

[Abstract] The valuable properties of oligomer plastics as binders in the production of highly-filled composite polymer materials has resulted in their extensive use. One effective method of decreasing residual stresses in such materials is the introduction of microquantities of substances helping to accelerate relaxation processes and form a more compact, uniform and less stressed supermolecular polymer structure. Highly-filled polymer materials based on carbamide binder and quartz sand filler were used, with 97-98 percent filler. The additives used were organosilicon block copolymers based on polyorganosiloxane and polyoxyalkylene. The properties of the composite materials produced were studied for various contents and types of oligomer additives. The introduction of the additives at 0.25-0.3 percent decreased residual stresses in the system by 40-50 percent, improving the properties of the products produced upon storing and use. Figures 3; references 3 (Russian).

[175-6508]

NONWOVEN REINFORCING MATERIALS WITH IMPROVED PROPERTIES

Moscow PLASTICHESKIY MASSY in Russian No 3, Mar 82
(manuscript received 15 Oct 80) pp 11-12

NOVIKOVA, O. A., GAVRILYUK, N. N., SHOROKHOV, V. M. and GLUKHOVSKAYA, M. I.

[Abstract] The physical and mechanical characteristics of nonwoven glass fiber materials depend on fiber properties and the chemical nature of the binder. Binder compositions based on polyvinyl acetate dispersions have been developed to improve properties. The dispersions were modified by water-soluble polyester and aldehyde resins, as well as simple cellulose esters. The compositions were used to produce films and their water absorption, strength and deformation characteristics were determined. The greatest adhesion strength was achieved by a binder consisting of 1.5% PVA, 0.6% PN-M and 0.3% MC-100 methylcellulose, remainder water. The three-component binders significantly improve the physical and mechanical properties of the glass fibers and expand the area of their application.

[175-6508]

INFLUENCE OF SURFACTANTS ON ELECTRIFICATION OF HPPE BY FRICTION

Moscow PLASTICHESKIYE MASSY in Russian No 3, Mar 82
(manuscript received 3 Mar 80) pp 13-14

BODROV, A. V., SAKOV, D. M., SHABANOVA, S. A., VASILENOK, Yu. I.
and LAGUNOVA, V. N.

[Abstract] A study was made of the influence of various surfactants on electrification of HPPE [high pressure polyethylene] by friction. Surfactant content was varied from 0.001 to 2.5% of the polyethylene mass. Cation active compounds and anion active compounds were used. The specific volumetric and surface resistivity, dielectric permeability and initial surface charge density were determined. The specimens were charged by rubbing them with a felt belt for twenty seconds at 6.42 cm/s, relative humidity 60±5%, temperature 22±2°C. Only the use of dialkyldimethyl ammonium was found to be effective in decreasing σ_0 and moving the peak of thermostimulated discharge across an air gap into a lower temperature area. Figures 3; references 8: 6 Russian, 2 Western.
[175-6508]

PROPERTIES OF COMPOSITE NORPLAST MATERIALS

Moscow PLASTICHESKIYE MASSY in Russian No 3, Mar 82 pp 15-16

STAL'NOVA, I. O., POPOV, V. L., GEVORGYAN, M. A., BRIKENSHTEYN, A. A.,
ABRAMOV, V. V., MAKSIMOVA, T. V. and FRIDMAN, M. L.

[Abstract] A method has been developed for producing composite materials in the process of polymer synthesis. It consists of polymerization of the monomer brought to the surface of the filler particles by an activated complex catalyst. The filler is thus covered with a film of polymer firmly bonded to the surface, producing composites called norplasts in which the filler content varies over broad limits. One way of using norplasts containing up to 90% filler is to introduce them to the corresponding polymer to the required content of mineral filler, then process the composite produced by traditional methods. This should improve the compatibility of filler and base polymer, due to the identical nature of the polymer component of the norplast and the matrix and the more uniform distribution of filler. This article studies the physical-mechanical and technological properties of these new materials. Varying the content of the polymer component in the norplast can be used to regulate the properties of the composites produced. Foamed perlite breaks down significantly during processing. The new surfaces thus formed can interact with the basic

polymer, improving the physical and mechanical properties of the end product. Figures 4; references 6; 3 Russian, 3 Western, [175-6508]

UDC: 678.5.01:539.3

MECHANICAL PROPERTIES OF CERTAIN POLYMER MATERIALS

Moscow PLASTICHESKIYE MASSY in Russian No 3, Mar 82 pp 22-23

GORNOV, V. N.

[Abstract] The strength and rigidity of solid polymer materials under short term loading were tested by bending and axial extension tests. Young's modulus was found to vary in a linear manner with tensile strength. The data produced can be used to predict the variation in deformation of polystyrene foam products as a function of stress. An index relating elongation to Young's modulus and tensile strength is produced which can be used for accelerated aging testing and to determine the service life of solid polymer materials. Figure 1; references 6 (Russian). [175-6508]

RADIATION CHEMISTRY

UDC: 542.61 ; 546.799.5/8

EXTRACTION AND CONCENTRATION OF TRANSPLUTONIUM ELEMENTS FROM NITRATE MEDIA BY OXIDES OF DIPHENYL [DIALKYL CARBAMOYLMETHYL] PHOSPHINE

Leningrad RADIOKHIMIYA in Russian Vol 24, No 1, Jan-Feb 82
(manuscript received 26 Mar 81) pp 31-37

CHMUTOVA, M. K., NESTEROVA, N. P., KOCHETKOVA, N. Ye., KOYRO, O. E. and MYASOYEDOV, B. F.

[Abstract] A series of new diphenyl [dialkyl carbamoylmethyl] phosphine oxides was synthesized in an effort to find optimal reagents for extraction of actinides from nuclear fuel processing wastes. The new compounds differ from compounds studied previously in that they contain a phosphinoyl group instead of a phosphonate group. The possibility of using two of the reagents for quantitative extraction and concentration of transplutonium elements from acid salt solutions was studied. The reagent best suited in terms of its capacity for extraction and subsequent purification was $(C_6H_5)_2 POCH_2CON(C_4H_9)_2$. Figures 6; references 7: 3 Russian, 4 Western. [176-6508]

UDC: 621.039.327 : 546.98

INFLUENCE OF IRRADIATION ON EXTRACTION OF PALLADIUM FROM NITRATE SOLUTIONS BY TRIBUTYLPHOSPHATE

Leningrad RADIOKHIMIYA in Russian Vol 24, No 1, Jan-Feb 82
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ZAGORETS, P. A., SMELOV, V. S., OCHKIN, A. V., CHUBUKOV, V. V., TVERDOVSKIY, A. N., KONDRAT'YEV, B. A. and KIRPIKOV, S. V.

[Abstract] A study is presented of the extraction of palladium from nitrate solutions by tributylphosphate in the presence of the most probable radiolysis solution, as well as the influence of irradiation, Benzene, m-xylene, nitric acid, sodium nitrite, uranyl nitrate and trilon B, as well as dodecane, hexene-1, octene-1, octene-2, dodecene-1,

alpha-nitroso-beta-naphthene, n-butanol, butyric acid and technical hydrogenated synthine were used. After extraction of palladium the solutions were tested for content of the metal by colorimetric analysis. The specific diluent was found to have little influence on distribution and extraction of palladium, so dodecane was used as the standard diluent to study the influence of concentration and nature of acid used to treat the organic phase before bombardment. The influence of several radiolysis products on extraction by 30% tributylphosphate was studied. Butanol, DBP, nitric and butyric acids were found to have practically no influence on palladium distribution. A study of the extraction of palladium from aqueous solutions containing 300g/l uranyl nitrate showed that this compound suppresses extraction of palladium even in the presence of 1-hexene, apparently by decreasing the concentration of the free extracting agent. Bombardment of the organic phase in enclosed vessels may result in an oxygen deficit in the solutions and, therefore, in predominance of the process of nitration over the process of oxidation. Figures 2; references 4: 2 Russian, 2 Western.
[176-6508]

UDC; 661.781.1

MONO-AND-DI-N-BUTYLPHOSPHATES OF CERTAIN METALS OF SIGNIFICANCE IN
REGENERATION OF IRRADIATED NUCLEAR FUEL

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[Abstract] Results are presented from studies performed in the Soviet Union over the past ten years to determine the composition, structure, formation conditions and solubility of mono- and di-n-butylphosphates of certain metals of significance in radiochemical technology. The metals studied included zirconium, iron, uranium, plutonium, thorium, americium, rare earth elements, and neptunium. The least soluble (in water and organic solvents) of all the compounds of metals with MBP and DBP studied are the zirconium mono- and di-n-butylphosphates. Fe^{3+} and Am^{3+} are slightly soluble in aqueous solution. The remaining compounds are satisfactorily soluble in moderately acid aqueous solutions of DBP and TBP with diluents. The results also indicate similarity of the chemical properties of zirconium and plutonium (IV). Thorium is not an analog of plutonium in this respect. References 24 (Russian).
[176-6508]

INTERACTION OF URANYL IONS WITH AMINES INVOLVING DEACTIVATION OF EXCITED STATES IN AQUEOUS SOLUTIONS

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YAKSHIN, V. V., KHOKHLOVA, N. L., KAZAKOV, V. P. and AFONICHEV, D. D.

[Abstract] A study was undertaken to determine whether there is any interaction between amines and the uranyl ion in aqueous solutions and, if complex formation occurs, what is the nature of the complexes and how are they related to the structure of the amines used in the process. Fluorescence of the solutions was measured on a spectrofluorimeter based on a monochromator. Luminescence was excited by light at 365 nm wave length produced by a mercury lamp and a monochromator. The lifetime of excited states was measured in an installation in which the exciting light was produced by a pulsed nitrogen laser. It was found that introduction of aliphatic amines to an aqueous solution of the uranyl ion effectively depresses fluorescence. The change in fluorescence intensity and uranyl ion lifetime in the excited state were used to calculate the extinction constants in sulfate solutions. The results indicate that there is chemical interaction between the uranyl ion and aliphatic amines in aqueous sulfate solutions. The basicity of the amine influences the donor capacity of ammonium salts, which then take active part in deactivation of the excited state of the uranyl ion by the formation of donor-acceptor complexes with the common sulfate ion in the coordination sphere of both cations. Amines in sulfate solutions are thus uranyl fluorescence inhibitors. Figures 2; references 10: 6 Russian, 4 Western. [176-6508]

WATER TREATMENT

UDC 662.74 ; 628.34

SEEKING METHODS TO INCREASE OIL REMOVAL FROM EFFLUENT WATERS

Moscow KOKS I KHIMIYA in Russian No 3, Mar 82 pp 41-42

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[Abstract] A study had shown that still residues of fatty acids from the Shchebekinsk Chemical Plant were inefficient in removal of oil from that plant's effluent waters. Hence spun glass filters were developed for use in a cooling jacket of 45 mm diameter through which the water was directed along a 440 mm-long filtering tube at a controlled speed. The filter did remove the oil; the filter was regenerated with benzene when its efficiency in removing oil fell below 50%. Better filtration came after treating the filter with benzene, and the benzene was then reused. In addition to the water purification, it was possible to redistil the oil-benzene mix, yielding a product similar to absorbing oil and components of "heavy benzene," [169-12131]

UDC 662.74 ; 628.543.12

SYSTEMIC ANALYSIS OF WATERS FROM COAL CHEMISTRY PRODUCTION

Moscow KOKS I KHIMIYA in Russian No 3, Mar 82 pp 42-45

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[Abstract] As part of a broader work, this article describes methods for determining H_2S , HCN and free NH_3 in waste waters from coal chemistry industries. The work is a part of a broader program of assay of 8 components of the effluent water, the others being CO_2 , NH_4^+ , $S_2O_3^{2-}$ organic bases and phenols. Steps for a proposed simpler procedure include separating systemic components, determining initial states related to chemical reactions, determining physical characteristics such as volatility, selecting suitable chemical reagents that will react with several components, controlling the overall chemical functions of the system and its subsystems, and simplifying and eliminating interference related to previously measured components. The

first products determined were the unstable sulfide, cyanide, and free ammonia. Features of the procedures such as pH levels and electrode selection are discussed in reaching the conclusion that the titrant $K_2[Hg(NCS)_4]$ should be used in potentiometer titration to determine H_2S , HCN and free NH_3 content; titration is accomplished in 10-15 minutes. Figures 4; references 12 (Russian).
[169-12131]

CSO: 1841

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