JPRS-UCH-85-010

16 August 1985

USSR Report

CHEMISTRY

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UDC 541.183:661.185

CONSECUTIVE ADSORPTION OF METHANOL, BUTYLAMINE AND ACETIC ACID ON TITANIUM DIOXIDE

Moscow KOLLOIDNYY ZHURNAL in Russian Vol 47, No 2, Mar-Apr 85
(manuscript received 26 Dec 83) pp 273-278

ISIRIKYAN, A. A., MIKHAILOVA, S. S., POLUNINA, I. A. and TOLSTAYA, S. N., Institute of Physical Chemistry, USSR Academy of Sciences, Moscow

[Abstract] A study was made of successive adsorption in two systems: amine-alcohol and acid-alcohol, as well as the structure of the mixed adsorption layers formed as a function of the sequence of application of the two modifiers on a surface of TiO_2. It is found that methyl alcohol is capable of extracting a portion of previously adsorbed acetic acid from the surface of the rutile, while acetic acid extracts practically all of the alcohol previously adsorbed. Water vapor hydrolyzes and removes methoxyl radicals from the surface of the rutile successively modified with butylamine and methyl alcohol almost without interacting with the coordination bonded molecules of butylamine. Successive modification of TiO_2 with acetic acid, then methanol, results in the formation of a mixed adsorption layer of acetoxyl and methoxyl radicals. Water vapor causes hydrolysis and removal of the methoxyl and some of the acetoxyl radicals. Figures 6; references 9: 7 Russian, 2 Western.
[256-6508]

UDC 538.221-492.2:541.183.03

ADSORPTION PROPERTIES OF THERMOMAGNETIC POWDERS IN VARIOUS MEDIA

Moscow KOLLOIDNYY ZHURNAL in Russian Vol 47, No 2, Mar-Apr 85
(manuscript received 21 Sep 83) pp 359-362

KHACHATURYAN, A. A. and LUNINA, M. A., Moscow Institute of Chemical Technology imeni D. I. Mendeleyev

[Abstract] The purpose of this work was to study the adsorption of non-ionogenic surfactants, with varying molecular structure, on powders and highly dispersed iron and nickel media from toluene and alcohol solutions. The surfactants used were block copolymers of ethylene oxide and propylene oxide based on isooctylphenol. Adsorbents used were powders and colloidal precipitates of metals. The adsorption isotherms of the surfactants on iron and nickel powders

coincide with isotherms produced with highly dispersed precipitates of these metals. The surfactant adsorption isotherms from toluene solutions are of the Langmuir type. The total effect of adsorption is determined primarily by the length of the oxyethyl chain of the surfactant molecule. The calculated adsorption layer thicknesses correspond to the characteristics of adsorption of nonionogenic surfactants on dispersed metals. Full desorbability of nonionogenic surfactant molecules from the metal surfaces in polar and nonpolar media was observed. Figures 2; references 10: 9 Russian, 1 Western.
[256-6508]

UDC 541.183.26.3

CALORIMETRIC STUDY OF ADSORPTION OF WATER VAPOR ON SILICA GEL MODIFIED WITH SODIUM CHLORIDE

Moscow KOLLOIDNYY ZHURNAL in Russian Vol 47, No 2, Mar-Apr 85
(manuscript received 17 Nov 83) pp 392-394

BEREZIN, G. I., KRYKANOVA, O. N. and AVGUL', N. N., Institute of Physical Chemistry, USSR Academy of Sciences, Moscow

[Abstract] Adsorption and differential heat of adsorption of water vapor are measured over a broad range of filling of porous glass with silica gel containing NaCl in its pores. In order to prevent formation of a supersaturated solution and decrease the critical crystal seed size, modification of the specimens was performed by a new method involving rapid freezing of the salt solution in the pores with subsequent removal of water by sublimation in a vacuum. The adsorption isotherms of water vapor were measured for silica gel plus NaCl on a vacuum adsorption installation with a capillary liquid microburette, the differential heat of adsorption was measured on a calorimeter. The heat of adsorption of water in the initial area of filling of a monolayer decreases monotonically with increasing filling of the surface with NaCl. However, the heats of adsorption on pure silica gel and on silica gel containing NaCl in its pores are similar. In the area of capillary condensation, the heats of adsorption for the two systems are also similar and close to the heat of condensation of water. Only the beginning of the process of dissolution of the salt at 39 mmol/g is accompanied by a slight decrease in heat of adsorption. Figures 2; references 5: 3 Russian, 2 Western.
[256-6508]

UDC 541.183

GAS ADSORPTION BY ADSORBENT MICROPORES. REPORT 3. SYSTEMS NITROGEN, KRYPTON, XENON--MICROPOROUS CARBON ADSORBENTS

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian No 2, Feb 85 (manuscript received 27 Dec 83) pp 262-266

DUBININ, M. M., NIKOLAYEV, K. M. and POLYAKOV, N. S., Institute of Physical Chemistry, USSR Academy of Sciences, Moscow

[Abstract] Nitrogen, krypton and xenon adsorption isotherms on activated charcoal obtained in a previous work from coconut husks were analyzed employing a method based on a theory of bulk filling of micropores and linearity of adsorption isosteres developed by one of the authors. The results agreed well with experimental data, especially with those of nitrogen at high pressures. The coefficient of thermal expansion of the adsorbate was found to be a function of the micropore size of the carbon adsorbent. Figures 2; references 6: 5 Russian, 1 Western.
[208-12765]

UDC 541.135.5:546.34:621.351

RADIOCHEMICAL STUDY OF PROCESSES OF ADSORPTION ON THE ELECTRODES OF CHEMICAL SOURCES OF CURRENT WITH LITHIUM ANODES

Moscow ELEKTROKHIMIYA in Russian Vol 21, No 4, Apr 85 (manuscript received 27 Dec 83) pp 558-560

BASOV, V. P., KARAPETYAN, Yu. A., KRYSENKO, A. D., CHUVASHKIN, A. N. and ROGACHEV, Yu. A., Scientific Research, Planning-Design and Technologic Institute of Chemical Sources of Current, Saratov

[Abstract] Labeled atoms are used to study the kinetics of formation of adsorption films on the electrodes of an Li-$SOCl_2$ current source containing a lithium tetrachloroaluminate electrolyte. Experiments were performed in a glass cell in which lithium and graphite electrodes with an area of 1 square centimeter were suspended. The kinetics of film formation in pure $SOCl_2$ and in $LiAlCl_4$ solutions were studied in the concentration range of 0.25 to 1.0 M complex salt. The quantity of chloride and sulfur precipitated on the electrodes during both charging and discharging was determined in the temperature interval from -50 to +50°C. The kinetics of precipitation of chlorine and sulfur on the electrodes during charging showed that the elements are adsorbed only on the lithium electrode. Chlorine is precipitated as the maximum rate during the first one or two hours, and slows down but does not stop even after one hundred hours. Adsorption of chlorine increases with increasing $LiAlCl_4$ concentration. Adsorption of sulfur on the lithium electrode is significantly less, but increases with an increase in salt concentration. At -50 to +25°C

there is a slight increase in the quantity of adsorbed chlorine and a decrease in adsorption of sulfur with increasing temperature. Significant changes occur only at temperatures above 25°C. During discharging the quantity of chlorine and sulfur in the precipitate on the lithium anode remains practically unchanged. On the graphite cathode during discharging there is significant adsorption of chlorine, proportional to the quantity of electricity passing through the solution. Figures 4; references 4: 1 Russian, 3 Western.
[254-6508]

UDC 541.13

ADSORPTION OF CHLORIDE AND BROMIDE ANIONS ON THIN FILM GOLD ELECTRODE

Moscow ELEKTROKHIMIYA in Russian Vol 21, No 3, Mar 85
(manuscript received 7 Jul 83) pp 291-295

BLUVSHTEYN, A. S., MANSUROV, G. N. and PETRIY, O. A., Moscow Oblast Pedagogic Institute imeni N. K. Krunskaya

[Abstract] The resistometric method was used to study the adsorption of Cl^- and Br^- ions on a thin film Au electrode. Potentiodynamic and resistometric curves were recorded on a two-coordinate plotter. Measurements were performed at 20± 2°C. The background electrolyte was 0.5 M H_2SO_4. The data indicate that the construction of adsorption isotherms for ions involving only partial charge transfer upon adsorption can be performed only considering the variation in charge transfer coefficient as a function of potential and, possibly, adsorbate concentration. Figures 5; references 19: 6 Russian, 13 Western.
[255-6508]

UDC 541.183

NEW METHOD OF FINDING PARAMETERS OF IONIC ADSORPTION FROM CAPACITIVE EXPERIMENTAL DATA

Moscow ELEKTROKHIMIYA in Russian Vol 21, No 3, Mar 85
(manuscript received 27 Mar 84) pp 354-357

VOROTYNTSEV, M. A., Institute of Electrochemistry imeni A. F. Frumkin, USSR Academy of Sciences, Moscow

[Abstract] It has been shown that there is a broad area of distances of interaction of adsorbed ions in which U decreases approximately inversely as a function of distance R, whereas at greater distances a more rapid decrease is observed. This has required restudy of the development of adsorption isotherms on the basis of statistical-mechanical principles, since previous theories were based on a dipole-dipole rule with U varying inversely as the cube of R. As a result, a new adsorption isotherm has been developed which is correct for

moderate filling of the surface of the electrode with adsorbed ions. Equations are presented for the single-particle adsorption energy of an ion and the attraction constant. Existing methods of computation of ionic adsorption parameters encounter difficulties when initial adsorption data are used obtained by measurement of capacitive curves in mixed electrolyte solutions. This article presents a new method, which can be reduced to minimizing a function presented in the article, which avoids the difficulties of previous methods. References 10: 7 Russian, 3 Western.
[255-6508]

UDC 62-492.2:54-31.669:536.421.4

DETERMINATION OF MAXIMUM ICE-FORMING ACTIVITY OF METAL OXIDES. METAL OXIDE POWDERS

Moscow KOLLOIDNYY ZHURNAL in Russian Vol 47, No 2, Mar-Apr 85
(manuscript received 19 Sep 83) pp 227-235

BAKLANOV, A. M., GORBUNOV, B. Z., KUTSENOGIY, K. P., PASHCHENKO, S. E., SAFATOV, A. S. and GEN, M. Ya., Institute of Chemical Kinetics and Combustion, Siberian Department, USSR Academy of Sciences, Novosibirsk; Novosibirsk University; Institute of Chemical Physics, USSR Academy of Sciences, Moscow

[Abstract] There is at present no method allowing production of aerosol particles of metal oxides with the properties required for ice-forming particles to be used in rain-making. Therefore, to estimate the ice-forming characteristics of metal oxides their powders must be studied. Measurements of the ice-forming characteristics of powdered metal oxides were performed by studying the threshold temperature of nucleation. As a result, the maximum ice-forming activity of oxides of nickel and aluminum was estimated, indicating that the activity is less than that of silver iodide, copper acetylacetonate or fluoroglucine. A number of shortcomings of the calculations are noted which decrease the accuracy of the estimates. Means for improving the reliability of the estimates are suggested. Figures 5; references 53: 17 Russian, 36 Western.
[256-6508]

UDC 541.182.2/.3:536.421.4

DETERMINATION OF MAXIMUM ICE-FORMING ACTIVITY OF METAL OXIDES. DETERMINATION OF ICE-FORMING CHARACTERISTICS OF 'PURE' Al_2O_3 AEROSOL

Moscow KOLLOIDNYY ZHURNAL in Russian Vol 47, No 2, Mar-Apr 85
(manuscript received 19 Sep 83) pp 258-265

GORBUNOV, B. Z., KUTSENOGIY, K. P., PASHCHENKO, S. E. and SAFATOV, A. S., Institute of Chemical Kinetics and Combustion, Siberian Department, USSR Academy of Sciences, Novosibirsk; Novosibirsk University

[Abstract] A method is described allowing production of an aerosol with properties such that the influence of extraneous factors on ice-forming capacity is eliminated. The essence of the method of producing Al_2O_3 aerosol is

that aluminum oxide powder of analytic purity is sublimated in a current of inert gas in a generator in which the specimen holder is connected to a heating element made of spectrally-pure graphite heated by an electric current. A current of 500 A at 10-20 V heated the charge to about 2500 K, causing intensive evaporation of aluminum oxide which was cooled to yield aerosol particles of Al_2O_3 with mean radius 10 to 20 nm. The influence of argon flow rate and temperature of the generator on particle radius is studied. The aerosol particles produced were lacy aggregates consisting of smaller particles. The metal oxide particles are inferior in their ice-forming properties to the most active ice-forming reagents such as AgI, copper acetylacetonate and fluoroglucine, but comparable to such reagents as CuS, and nontoxic. Figures 7; references 22: 17 Russian, 5 Western.
[256-6508]

UDC 536.432.4:532.2

FORMATION OF CONDENSED AEROSOLS IN SPATIALLY HETEROGENEOUS SYSTEM

Moscow KOLLOIDNYY ZHURNAL in Russian Vol 47, No 2, Mar-Apr 85
(manuscript received 20 Oct 83) pp 341-347

SUTUGIN, A. G. and TOKAR', Ya. I., Physical-Chemical Scientific Research Institute imeni L. Ya. Karpov, Moscow

[Abstract] The purpose of this work was to create a microkinetic model of slow nucleation in a turbulent immersed jet considering transverse mass transfer and to use this model to determine the characteristics of the process of formation of condensation aerosols. The possibility is demonstrated of mathematical modeling of processes of formation of a dispersed phase by condensation of vapor considering the spatial heterogeneity and instability of the process. Nucleation in the zone of mixing of a turbulent immersed vapor-gas jet occurs qualitatively differently from the prediction of models based on averaging of the kinetics of mixing over the angle of dispersion of the jet of solution. Practically all the particles of the condensed phase are formed at the periphery of the jet, while the central portion of the jet serves as a source of vapor for their growth. The dispersed phase formed by homogeneous nucleation without coagulation should be monodispersed. The particle diameter should decrease, the concentration increase with increasing initial concentration of vapor and jet diameter, which is confirmed by experimentation. Figures 4; references 12: 9 Russian, 3 Western.
[256-6508]

UDC 543.848

USE OF DIRECT POTENTIOMETRY TO DETERMINE FLUORINE IN FLUOROORGANIC COMPOUNDS

Novosibirsk IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKIYE NAUKI in Russian No 5, Issue 2, Mar 85
(manuscript received 7 Aug 84) pp 85-88

FADEYEVA, V. P. and MORYAKINA, I. M., Novosibirsk Institute of Organic Chemistry, Siberian Department, USSR Academy of Sciences

[Abstract] A design of fluoride-selective electrode is suggested which is said to eliminate shortcomings of previous designs. The device consists of a fluoroplastic tube containing an LaF_3 single crystal activated with europium. The end of the tube with the single crystal has deep slots exposing the open surface of a membrane to eliminate retention of air bubbles. The comparison electrode is made of fluoroplastic, its lower end sealed with asbestos. The electrodes are shielded and grounded for protection from electrostatic charges. A cut-away diagram of the device is presented. The device was used for analysis of various polyfluoroaromatic compounds and aqueous-organic media in a study of certain nucleophillic substitution reactions. The device and its method of use allow rapid and accurate determination of fluorine both in individual organic compounds and in aqueous-organic solutions. Figures 2; references 5 (Russian).
[257-6508]

UDC 541:2:541:183.5

RADIOCOLLOIDS IN ADSORPTION SYSTEMS. PART 6. STUDY OF STATE OF IRON IN SEA-WATER-TYPE SOLUTIONS WITH SLIGHT SUPERSATURATION

Leningrad RADIOKHIMIYA in Russian Vol 27, No 2, Mar-Apr 85
(manuscript received 9 Mar 84) pp 143-147

BETENEKOV, N. D. and KAFTAYLOV, V. V.

[Abstract] Ultrafiltration and adsorption were used to determine the status of iron in imitation sea water with slight supersaturation. The imitation sea water included no organic component. A model is presented for the behavior of the adsorbate which explains the experimental curve of degree of adsorption of iron as a function of time. Adsorption of true dissolved forms of iron is most rapid in the first stage with gradual establishment of a steady state.

Subsequently, accumulation of metal in the sorbent determines the rate of dissolution of the true colloids. Finally, evolution of the colloids occurs in the direction of decreasing the fraction of freshly precipitated iron hydroxide. Figures 3; references 13 (Russian).
[260-6508]

UDC 541:2:541.183.5

RADIOCOLLOIDS IN ADSORPTION SYSTEMS. PART 17. KINETICS OF ADSORPTION OF YTTRIUM BY THIN LAYER TITANIUM HYDROXOPEROXIDE FROM SEA-WATER TYPE SOLUTIONS

Leningrad RADIOKHIMIYA in Russian Vol 27, No 2, Mar-Apr 85
(manuscript received 9 Mar 84) pp 147-150

KAFTAYLOV, V. V., BETENEKOV, N. D. and VASILEVSKIY, V. A.

[Abstract] A study is made of the kinetics of adsorption of yttrium from sea-water type solution by a thin layer of inorganic titanium hydroxoperoxide adsorbent. The adsorbent was obtained by precipitating a thin layer of titanium hydroxoperoxide on the surface of a carrier such as cellulose or a copolymer of styrene with divinylbenzene. Studies were performed with a labeled solution held for one day before the experiments were started. The temperature variation of adsorption rate constants was used to estimate the activation energy as 12±3kJ/mol·K. The adsorption rate also increases with increasing agitation. This is characteristic of the external diffusion mode of adsorption. Figures 4; references 6 (Russian).
[260-6508]

UDC 621.039.3+542.61:546.78+546.883

SEPARATION OF ISOTOPES OF TUNGSTEN AND TANTALUM WITHOUT CARRIERS FROM HAFNIUM TARGETS BOMBARDED WITH ALPHA PARTICLES

Leningrad RADIOKHIMIYA in Russian Vol 27, No 2, Mar-Apr 85
(manuscript received 4 May 84) pp 236-238

GASITA, S. M., SILANT'YEV, A. I., MAKLACHKOV, A. G. and IOFA, B. Z.

[Abstract] Based on a review of the literature and model experiments, an extraction method was developed for successive isolation of isotopes of tungsten and tantalum from bombarded hafnium targets. A target of metallic hafnium or hafnium dioxide was dissolved in 10 to 30 ml of concentrated hydrofluoric acid with heating in a teflon or platinum cup. After dissolution of the target and dilution with water, the isotopes of hafnium were extracted with an equal volume of TBP from 1-5 mol/l HF. The organic phases were combined and washed twice with 1 mol/l HF. The isotopes of tantalum were twice re-extracted with a half volume of ammonia diluted 1:1. Concentrated sulfuric acid was added to the aqueous phase after extraction of the tantalum and the hydrofluoric acid was removed by heating. After cooling of the solution, water was added to 4.5-5.5 or 11-12 mol/l sulfuric acid, not over 0.1 mol/l hafnium (IV). The

isotopes of tungsten were extracted twice with 0.01 mol/l cupron in chloroform, 4.5-5.5 mol/l H_2SO_4 or 0.1 mol/l BPHA in chloroform from 11-12 mol/l H_2SO_4. Tungsten isotopes were re-extracted with 1:1 ammonia solution. References 3 (Russian).
[260-6508]

UDC 546.799.7:539.144.6

DETERMINATION OF HALF-LIFE OF ^{249}Bk

Leningrad RADIOKHIMIYA in Russian Vol 27, No 2, Mar-Apr 85
(manuscript received 21 Apr 83) pp 238-240

POLYUKHOV, V. G., TIMOFEYEV, G. A. and LEVAKOV, B. I.

[Abstract] Analysis of previous results of the same authors on the half-life of Bk-249 revealed weak linear correlation between the mean value of counting rate of the preparations at the beginning of measurements and the mean value of decay constant. If the correlation is random, as the time of observation of the same preparations increases it should become less rigid. To provide an experimental check of the correlation, activity observation was increased to up to 1181 days. As a result of the new measurements, a refined half-life of Bk-249 of 330 $\pm$ 4 days is determined, differing from the previous value by only 0.3%. References 3 (Russian).
[260-6508]

UDC 543:422

REFINEMENT OF PARTIAL PRESSURE OF C_2 RADICALS IN GRAPHITE FURNACES FOR ATOMIC ABSORPTION ANALYSIS

Moscow ZHURNAL ANALITICHESKOY KHIMII in Russian Vol 40, No 4, Apr 85
(manuscript received 5 Apr 84) pp 626-629

L'VOV, B. V. and YATSENKO, L. F., Leningrad Polytechnic Institute imeni M. I. Kalinin.

[Abstract] A study was made of sources of distortions of absorption signals during determination of the content of free carbon in the gas phase in graphite furnaces by atomic absorption analysis. Measurement of the concentration of free aluminum atoms in the gas phase was performed by measurement of the autoionization line of Al at 193.6 nm. Experiments were performed on a Perkin-Elmer atomic absorption spectrophotometer model 5000. The measurement of the absorption of light from a deuterium lamp by this line and the band of the Al_2C_2 molecule with maximum at 205 nm refined the partial pressure of atomic aluminum and molecules of dialuminum dicarbide in the graphite furnace. It was found that the content of Al_2C_2 averaged through the volume of the furnace

at the moment of development of the carbothermic reduction of aluminum oxide was comparable to the content of free atoms while the partial pressure of C_2 radicals was three orders of magnitude greater than the value found in the standard tables. References 13: 12 Russian, 1 Western.
[270-6508]

UDC 543.544:547.254.7

GAS CHROMATOGRAPHIC ANALYSIS OF ZINC ALKYL DERIVATIVES

Moscow ZHURNAL ANALITICHESKOY KHIMII in Russian Vol 40, No 4, Apr 85 (manuscript received 22 Jul 83) pp 669-673

NOVOTOROVA, L. G., NOVOTOROV, Yu. N. and AGAFONOV, I. L., Scientific Research Institute of Chemistry, Gor'kiy State University imeni N. I. Lobachevskiy.

[Abstract] To determine stable impurities in compounds which are active with respect to oxygen and moisture it is possible to use approaches such as hydrolysis or oxidation of the main component. It seemed expedient to use this approach in analysis of alkyl compounds of zinc. Preference was given to hydrolysis, which forms a more stable mixture of gaseous products. Chromatograms were produced of a specimen of dimethyl zinc containing 1.30% diethyl ether, 1.45 mol percent methyl iodide and 1.30 mol percent methyl acetate. The reproducibility of results following preliminary hydrolysis has a standard deviation of not over 0.09. Direct chromatographic analysis yields a standard deviation of 0.29. A significant narrowing of the limits of determination of alkyl iodide impurities is achieved by the use of a constant recombination rate detector. Figure 1; references 7 (Russian).
[270-6508]

UDC 546.776:662.765.54

DETERMINATION OF MOLYBDENUM (VI) IN SEA WATER WITH PRELIMINARY CONCENTRATION BY IONIC FLOTATION

Moscow ZHURNAL ANALITICHESKOY KHIMII in Russian Vol 40, No 4, Apr 85 (manuscript received 27 Dec 83) pp 694-698

ANDREYEVA, I. Yu., LEBEDEVA, L. I. and DRAPCHINSKAYA, O. L., Leningrad State University imeni A. A. Zhdanov

[Abstract] The purpose of this work was to estimate the possibility of using ionic flotation to concentrate microscopic quantities of molybdenum (VI) for its determination in sea water. A $1 \cdot 10^{-4}$ M solution of sodium molybdate in 0.1 M NaOH was used in the study. An aqueous solution of cetyl pyridinium and other cationic surfactants was prepared. The pH was regulated by dilution of the solutions with hydrochloric acid and sodium hydroxide. Foam was created by the use of gaseous nitrogen. The influence of various factors on the process of ionic flotation was studied: solution pH, flotation time, surfactant concentration, concentration of molybdenum (VI), concentration of secondary salts.

It was found that the method of ionic flotation is suitable for water with various mineral concentrations. The salt background greatly influences the degree of extraction of molybdenum (VI). As the concentration of NaCl or Na_2SO_4 increases from 0.05 to 1 M, the degree of extraction of molybdenum by one-time flotation decreases from 63% to 5%. A volume of 0.5 to 1 liter with a flotation time of 30 minutes achieved a molybdenum (VI) concentration factor of 30 to 400 for solutions containing 0.5-0.05 M NaCl.
Figures 4; references 10: 9 Russian, 1 Western.
[270-6508]

UDC 543.08:546.546.78

DETERMINATION OF METAL IMPURITIES IN TUNGSTEN BY INSTRUMENTAL NEUTRON-ACTIVATION METHOD

Moscow ZHURNAL ANALITICHESKOY KHIMII in Russian Vol 40, No 4, Apr 85 (manuscript received 9 Apr 84) pp 699-701

MUKHAMEDSHINA, N. M., SISENGALIYEV, A. G., USMANOVA, M. M. and KAGANOV, L. K., Institute of Nuclear Physics, Uzbek SSR Academy of Sciences, Tashkent

[Abstract] The purpose of this work was to develop instrumental methods for neutron-activation determination of metallic impurities such as Cr, Fe, Co, Ni, Zn, Mo, Sb and Ta in tungsten. The spectra of disk specimens 10 mm in diameter and 0.5 mm thick were recorded over 0.5 to 1 hour at a distance of 30 mm from the cover of the detector cryostat using aluminum, lead, cadmium and copper filters. Measurement conditions are presented for determination of the metallic impurities in tungsten. Self-shielding coefficients and perturbation of neutron flux are calculated for the specimens used. The filters used significantly decreased the input load on the equipment. Figures 1; references 14: 10 Russian, 4 Western.
[270-6508]

UDC 546.95

USE OF 1,10-PHENANTHROLINE FOR LUMINESCENT DETERMINATION OF OSMIUM

Moscow ZHURNAL ANALITICHESKOY KHIMII in Russian Vol 40, No 4, Apr 85 (manuscript received 21 Mar 84) pp 702-708

SADVAKASOVA, S. K., GOLOVINA, A. P., DMITRIYEVA, N. B., KHVOSTOVA, V. P., GOLOVANOV, S. P. and RUNOV, V. K., Moscow State University imeni M. V. Lomonosov; State Scientific Research Institute of the Rare Metal Industry, Moscow

[Abstract] A study was made of the possibility of using 1,10-phenanthroline for luminescent determination of osmium. A solution of osmium in HBr was prepared and absorption spectra recorded on a Hitachi-124 spectrophotometer, excitation and luminescence spectra on a Hitachi-512 spectrofluorimeter. The source of

excitation was a stabilized 100 W incandescent lamp with an SZS-10 filter (transmission area 350-600 nm). The optimal conditions for determination of osmium with a threshold of detection of $1 \cdot 10^{-3}$ µg/ml were determined. The influence of platinum, iron, cobalt, nickel and copper on the determination was studied. The method developed was slightly inferior to the most sensitive kinetic and neutron-activation methods, superior to other spectrometric methods and electrochemical methods, and superior to kinetic, spectrophotometric and electrochemical methods in selectivity. Results of analysis are highly reproducible and the method is simple to use. Figures 2; references 17: 12 Russian, 5 Western.
[270-6508]

UDC 577.15

FILM CARRIERS FOR IMMOBILIZATION OF ENZYMES

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 58, No 4, Apr 85
(manuscript received 27 Oct 83) pp 755-761

VINOGRADOV, Ye. L., GAVRYUCHENKOVA, L. P., MAL'KO, Ye. I., ZAYTSEV, P. I., BRITSYNA, N. S. and VOROB'YEV, V. P.

[Abstract] Study of properties and regions of use of new film carriers on a silicate base, with a firm (covalently bound) polymer coating with a high level of functional groups was described and discussed. Synthesis of the carriers (a 3-step process) is described. The structure of the new synthesized carriers was studied by adsorption and gel chromatography methods. The size distribution of pores, the specific surface and surface properties of the film carriers depend on the method of processing its surface by the polymer phase. The practical area of use of the film carriers with an epoxy layer containing NH_2-groups (immobilization of enzymes) is demonstrated. Figures 4; references 9: 7 Russian, 2 Western.
[264-2791]

UDC 541.128.34:542.941:546.262.3-31

EFFECT OF INTERMETALLIC COMPOUNDS Zr-Co COMPOSITION ON THEIR CATALYTIC PROPERTIES IN HYDROGENATION OF CARBON MONOXIDE

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA in Russian No 4, Apr 85 (manuscript received 27 Dec 83) pp 751-758

LUNIN, V. V., KRYUKOV, O. V. and LAPIDUS, A. L., Institute of Organic Chemistry imeni N. D. Zelinskiy, USSR Academy of Sciences, Moscow; Moscow State University imeni M. V. Lomonosov

[Abstract] Effect of the Zr/Co ratio on the composition and properties of catalysts for the reaction of CO with H_2 was studied. Intermetallic compounds Zr_2Co, ZrCo, $ZrCo_2$ and Zr_2Co_{11} were obtained by alloying individual metals in an electric arc under argon atmosphere. To improve their activity, the catalysts were pretreated by thermal oxidation-reduction reaction. In a series of Zr-Co compounds and their hydrides, the oxidative ability increased with an increased content of Zr. The content of catalytically-active Co in these catalysts increased in the following order: $[Zr_2Co_{11}]_{red\text{-}ox\text{-}red} < [ZrCo_2]_{red\text{-}ox\text{-}red} < [ZrCo]_{ox\text{-}red} \leq [ZrCo]_{red\text{-}ox\text{-}red} < [Zr_2Co]_{red\text{-}ox\text{-}red}$. These catalysts could be easily absorbed yielding large amounts of H_2, they led to selective segregation of catalytically active metal. As far as the effectiveness in formation of methane is concerned, the catalyst based on 1:1 Zr/Co intermetallide surpassed the coprecipitated Co/ZrO_2 (32%) catalyst. An assumption was expressed that hydrogenation of CO over these catalysts goes through a stage of dissociative breakdown of CO molecules, formation of surface cabalt carbides and their hydrogenation to CH_4. Figures 5; references 14: 5 Russian, 9 Western. [253-7813]

UDC 541.128:542.91:547.21

C_1-C_3 HYDROCARBON SYNTHESIS OVER CATALYSTS OBTAINED FROM IRON CARBONYL COMPLEXES

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian No 4, Apr 85 (manuscript received 6 Jan 84) pp 758-762

LAPIDUS, A. L., SAVEL'YEV, M. M., TSAPKINA, M. V. and SOLODOV, S. N., Institute of Organic Chemistry imeni N. D. Zelinskiy, USSR Academy of Sciences, Moscow

[Abstract] Metal carbonyls show high activity and selectivity in synthesis of olefines from CO and H_2. The goal of this work was to study carbonyl complexes of iron deposited on γ-Al_2O_3 pretreated with KOH as they affected the synthesis of hydrocarbons from CO and H_2. During the preparation process of the catalyst, a mononuclear complex $K_2[Fe(CO)_4]$ was formed on the surface of γ-Al_2O_3. The catalyst was found to be inactive below 350°C. Hydrocarbons are formed from CO and H_2 at 350-450° during the first 10 hrs of operation, when the activity of the catalyst and the yield of olefines is on the rise. With Fe concentration of 1.0-1.3%, the most active catalyst contained 6.8% K; selectivity of such a catalyst towards C_2-C_3 olefines was high, reaching a 49.3% yield. No hydrocarbons over C_3 were formed. Overall, at the optimal temperature of 400°C, with a catalyst containing 0.6% Fe and 7.0% K over γ-Al_2O_3, a total yield of 52.0% was reached of the C_2-C_3 olefines. Figure 1; references 10: 3 Russian, 7 Western.
[253-7813]

UDC 541.42:547.56:541.128:66.095.253:547.261]

REACTIVITY OF 3- AND 4-METHYLPHENOLS IN METHANOL ALKYLATION REACTION OVER VANADIUM CATALYST

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA in Russian No 4, Apr 85 (manuscript received 25 Oct 83) pp 762-765

KORENSKIY, V. I., SKOBELEVA, V. D., KOLENKO, I. P., VINOGRADOVA, V. N. and KHARLAMPOVICH, G. D., Institute of Chemistry, Ural Scientific Center, USSR Academy of Sciences, Sverdlovsk

[Abstract] 2,3,6- and 2,4,6-trimethylphenols (TMP) are used in preparation of vitamin E; usually they are obtained by vapor phase alkylation of 3- and 4-methylphenols (MP) over a number of catalysts, all of which require high temperature (410-440°C). In this study, an attempt was made to use vanadium-aluminum phosphoric catalyst which made it possible to lower the reaction

temperature to 320°C. The results obtained showed that a high yield of 2,3,6-TMP could be obtained from a mixture containing 90.4% 3-MP; increased content of 4-MP led to higher yields of 2,4,6-TMP. The reactivity of 3-MP was calculated from initial reaction rates to be 2.3:1. Figure 1; references 5 (Russian).
[253-7813]

UDC 541.124:541.128:542.92:546.215

MECHANISM OF CONJUGATED BREAKDOWN OF HYDROGEN PEROXIDE AND PERACETIC ACID CATALYZED BY VANADIUM COMPLEXES

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA in Russian No 4, Apr 85 (manuscript received 6 Feb 84) pp 765-768

MAKAROV, A. P., GEKHMAN, A. Ye., POLOTNYUK, O. Ya. and MOISEYEV, I. I., Institute of General and Inorganic Chemistry imeni V. S. Kurnakov, USSR Academy of sciences, Moscow; Scientific Research Institute of Organic Intermediates and Dyes, Moscow

[Abstract] Hydroperoxide oxidation catalyzed with coordinated vanadium compounds is characterized by a nonproductive breakdown of hydroperoxides with a negative effect of the overall technical-economic indices of this process. A concurrent breakdown of H_2O_2 and AcOOH catalyzed by vanadium complexes occurs much faster than decomposition of individual peroxides. To produce data from this process, its kinetics was investigated. It was established that the rate of conjugated decomposition of H_2O_2 and AcOOH is a first order reaction in respect to AcOOH and the catalyst; it does not depend on the concentration of protons or H_2O_2. A reaction mechanism was proposed providing for the formation of H_2O_2-V complex followed by reaction with AcOOH, possibly through a triple complex forming oxygen and regenerating the catalyst. Figure 1; references 5: 2 Russian, 3 Western.
[253-7813]

UDC 541.13,546.92

EFFECT OF STABILIZATION ON ADSORPTION AND CATALYTIC PROPERTIES OF ELECTRODEPOSITED PLATINUM CATALYSTS

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 4, Apr 85 (manuscript received 14 Jun 83) pp 942-946

GRISHINA, T. M. and MESHCHERYAKOVA, Ye. V., Chemistry Faculty, Moscow State University imeni M. V. Lomonosov

[Abstract] Stabilization kinetics of electroprecipitated platinum electrodes-catalysts and the effect of this stabilization on their adsorption properties and activity was investigated using the electroreduction of nitroethane.

In the course of this work, it was shown that thermal pretreatment of electrodeposited platinum catalysts drastically changed their adsorption capabilities towards hydrogen in sulfuric acid solutions. Stabilization of platinum electrodes resulted in lowering of the potential for the beginning of electroreduction of nitroethane. Freshly precipitated catalysts showed higher activity than the stabilized ones. No formation of ethylhydroxylamine was noted in either case. Figures 4; references 10 (Russian)
[267-7813]

UDC 541.183

KINETICS OF HYDROGEN REACTION WITH OXIDIZED SURFACE OF HIGHLY DISPERSED PLATINUM

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 4, Apr 85
(manuscript received 16 Jun 83) pp 947-950

BORONIN, V. S., (deceased), ABASOV, S. I. and POLTORAK, O. M., Chemistry Faculty, Moscow State University imeni M. V. Lomonosov

[Abstract] To develop reliable methods for determination of platinum dispersion in catalytic materials, it is necessary to know how sensitive are the processes used in such methods with respect to structural alterations. Reaction of hydrogen with oxidized surface of Pt and the chemosorption of oxygen and hydrogen over platinum deposited on silica gel was studied. The experimental results showed that an increase in the degree of reduction of an oxidized layer from 0.1 to 0.4 leads to an increased energy of activation from 33 to 59 kJ/mole. There are conflicting data in literature explaining slow hydrogen-oxygen titration. It was concluded in this study that the most probably reason for this is either an inhibition of the chemosorption of hydrogen on the oxidized surface of Pt, or lowered reactivity of oxygen due to an increased energy of its chemosorption to Pt particles. Figures 3; references 9: 5 Russian, 4 Western.
[267-7813]

UDC 541.183.03

ACTIVITY OF Pd-Rh CATALYSTS IN REDUCTION OF NITROBENZENE

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 4, Apr 85
(manuscript received 25 Jul) pp 994-996

GRISHINA, T. M. and LAZAREVA, L. I., Chemistry Faculty, Moscow State University imeni M. V. Lomonosov

[Abstract] Electroreduction and catalytic hydrogenation of nitrobenzene was studied on skeletal catalysts of the system: palladium-rhodium using pure Pd, Rd, and alloys with 5, 10, 35, 50 and 60% Pd. Addition of Pd to Rd increased slightly the specific surface of these catalysts, reached a maximum at about 10% Pd content and showed a minimum for skeletal Pd. The most active alloys used as catalysts for electroreduction of nitrobenzene contained 50-60% Pd;

minimal activity was shown by pure Rh or by the alloys with 5% Pd content. In case of liquid phase catalytic hydrogenation of nitrobenzene, the highest catalytic activity was exhibited by the alloy containing 10% Pd. Figures 4; references 6 (Russian).
[267-7813]

UDC 541.128

EFFECT OF METHANOL ADDITION ON OXIDATION OF ETHANOL OVER IRON-MOLYBDENUM OXIDE CATALYST

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 4, Apr 85 (manuscript received 19 Jul 83) pp 998-999

ZHABINA, L. A. and KURINA, L. N., Tomsk State University imeni V. V. Kuybyshev

[Abstract] Formaldehyde and acetaldehyde were shown to be the principal products of the oxidation of alcohol mixtures at 235-320°C. At temperatures above 300°C, the content of CO and CO_2 increased considerably with trace formation of acetic acid. Addition of methanol lowered the oxidation rate of ethanol, especially in the range of its low concentration, as compared to the oxidation of ethanol alone. Figure 1; references 5 (Russian).
[267-7813]

UDC 541.14

ROLE OF SINGLET OXYGEN IN CATALYTIC OXIDATION OF NAPHTHALENE

Moscow ZHURNAL FIZICHESKOY KHIMII in Russian Vol 59, No 4, Apr 85 (manuscript received 28 Sep 83) pp 1023-1024

ZAV'YALOV, S. A., MYASNIKOV, I. A. and ZAV'YALOVA, L. M., Scientific Research Physical-Chemical Institute imeni L. Ya. Karpov, Moscow

[Abstract] It was shown that catalytic oxidation of naphthalene to phthalic anhydride over V_2O_5 catalyst occurs with active participation of the singlet oxygen generated by a thermal process from clusters of V_2O_5 rather than from single molecules. Furthermore, a catalyst prepared from powdered quartz showed activity in emission of $^1O_2$ singlets and in oxidation of naphthalene; the yield of phthalic anhydride and the intensity of $^1O_2$ emission depended on the temperature. However, heating the freshly powdered quartz to 500°C led to the loss of emissive ability and of the catalytic activity. Figure 1; references 5 (Russian).
[267-7813]

UDC 541.128

RHODIUM-RUTHENIUM CATALYSTS ON TITANIUM DIOXIDE IN HYDROGENATION OF VARIOUS TYPES OF UNSATURATED BONDS

Leningrad NEFTEKHIMIYA: SBORNIK NAUCHNYKH TRUDOV in Russian 1985 (signed to press 7 Feb 85) (manuscript received 7 Apr 82) pp 21-24

DUKHOVNAYA, T. M., DZHARDAMALIYEVA, K. K., KIL'DIBEKOVA, G. A. and SOKOL'SKIY, D. V.

[Abstract] Results are presented from a study of the effect of 1% rhodium-ruthenium catalysts on titanium dioxide in liquid-phase hydrogenation of 1-hexene, cyclohexene, potassium o-nitrophenolate, acetone and dimethylethinylcarbinol (DMEC). The catalysts were prepared by precipitating metal compounds on a carrier from aqueous solutions of rhodium chloride and potassium ruthenate with subsequent reduction in a current of H_2 at 200°C., two hours. The data obtained show that the unsaturated substance and type of unsaturated bond significantly influenced both the hydrogenation rate and optimal catalyst composition. The optimal catalysts for saturation of double and triple bonds contain 90-100 weight percent rhodium, those for reduction of nitro- and carbonyl groups contain 70-90 weight percent ruthenium. Hydrogenation rate decreases in the sequence 1-hexene, cyclohexene, potassium o-nitrophenolate, DMEC, acetone. Figures 4, references 7: 6 Russian, 1 Western.
[259-6508]

UDC 547.31:541.128

COMPARATIVE REACTIVITY AND ADSORPTION CAPACITY OF UNSATURATED HYDROCARBONS WITH DOUBLE AND TRIPLE BONDS ON PALLADIUM BLACK

Leningrad NEFTEKHIMIYA: SBORNIK NAUCHNYKH TRUDOV in Russian 1985 (signed to press 7 Feb 85) (manuscript received 24 Dec 81) pp 29-30

SOKOL'SKIY, D. V., VOLKOVA, L. D. and BILYALOVA, K. Zh., Institute of Organic Catalysis and Electrochemistry, Kazakh SSR Academy of Sciences

[Abstract] A study was made of Pd-black with a specific surface of 60 $M^2 \cdot G^{-1}$ prepared from palladium hydroxide by reducing it with hydrogen. The hydrogen was removed by blowing through helium for 24-48 hr. The rate of hydrogenation of unsaturated hydrocarbons was measured with a charge of 0.2 g Pd-black, the adsorption measurements were performed with a charge of 0.4 g of catalyst. The thermal effect of adsorption and the quantity of adsorbed 1-heptyne was twice as great as 1-heptene. The activity of the hydrocarbons studied increases by almost an order of magnitude upon transition from compounds with the ethylene bond to compounds with the acetylene bond. Figures 2; references 6 (Russian).
[259-6508]

UDC 547.538.141

OXIDATIVE DEHYDROGENATION OF ALKYLAROMATIC HYDROCARBONS ON CaA ZEOLITE

Leningrad NEFTEKHIMIYA: SBORNIK NAUCHNYKH TRUDOV in Russian 1985
(signed to press 7 Feb 85) (manuscript received 14 Dec 81) pp 31-32

KOLESNIKOV, V. A., YEFREMOV, R. V., DANOV, S. M., LASHMANOVA, N. V. and ZRAKOVA, L. A., Dzerzhinsk Branch, Gor'kiy Polytechnic Institute imeni A. A. Zhdanov.

[Abstract] A study is presented of the process of oxidative dehydrogenation of ethylbenzene and isopropylbenzene on type CaA zeolite. Oxidative dehydrogenation was performed at atmospheric pressure in a quartz flow-through reactor 20 mm in diameter placed in an electric furnace. The reactor was filled with cylindrical 3 x 3 mm granules of CaA zeolite preliminarily heated in air at 450-500°C for 12 hours. The reaction was performed at 350-500°C., molar ratio of aromatic hydrocarbon to oxygen 1:0.2-1:1.2 flow rate of vapor-gas mixture 50-300 M^3 (stp)$\cdot M^{-3} \cdot hr^{-1}$. Conversion of ethyl benzene was 17-48%, isopropylbenzene 22-44%, selectivity of the process 44-82 and 39-78%, respectively. Conversion and selectivity depend on reaction temperature and hydrocarbon/oxygen ratio. At 300°C or higher with high ratios of hydrocarbon to oxygen, selectivity was near 100%, though conversion was only a few percent. Increasing temperature and decreasing the ratio between alkylaromatic hydrocarbon and oxygen helps to increase conversion while decreasing selectivity. The reaction apparently occurs in the external diffusion area. Best results for oxidative dehydrogenation of ethylbenzene were obtained at 350-400°C with molar ratio of ethylbenzene to oxygen 1:06. Conversion is 31-33%, selectivity 77-82% under these conditions. References 3 (Russian).
[259-6508]

UDC 66.094.18:66,094.3

SOME REGULARITIES OF OXIDATIVE DEHYDROGENATION OF n-BUTANE ON MAGNESIUM-MOLYBDENUM CATALYSTS

Leningrad NEFTEKHIMIYA: SBORNIK NAUCHNYKH TRUDOV in Russian 1985
(signed to press 7 Feb 85) (manuscript received 13 Nov 81) pp 32-36

TMENOV, D. N., DOROSHENKO, V. A. and SHAPOVALOVA, L. P., Department of Petrochemistry, Institute of Physical-Organic Chemistry and Coal Chemistry, Ukrainian SSR Academy of Sciences

[Abstract] Results are presented from a study of the catalytic activity of magnesium-molybdenum catalysts with various contents of MoO_3 in oxidative dehydrogenation of n-butane to 1,3-butadiene. Tests of catalytic activity were performed in a flow-through quartz reactor containing 7 g of catalyst mixed with crushed quartz, ratio 1:3 by volume. Butane mixed with inert argon and oxygen was fed into the lower portion of the reactor. The reaction products were analyzed chromatographically. The greatest activity was found in specimens containing 20-35% MoO_3 by weight. The greatest specific catalytic activity

was observed in specimens containing 55% MoO_3 by weight. Decreasing oxygen concentration in the gas phase increased selectivity of the reaction with respect to the dehydrogenation products. With no oxygen, butadiene selectivity is 60-65 mol. percent. Figure 1; references 5: 4 Russian, 1 Western.
[259-6508]

UDC 542.973.6:66.097.3.36:665.644.442

DEACTIVATION OF REFORMING CATALYSTS WITH MOISTURE IN PROCESS OF REDUCTION

Leningrad NEFTEKHIMIYA: SBORNIK NAUCHNYKH TRUDOV in Russian 1985
(signed to press 7 Feb 85) (manuscript received 18 Dec 81) pp 36-41

PAVLIKHIN, B. M., DYURIK, N. M. and LEVINTER, M. Ye., Kuybyshev Polytechnic Institute imeni V. V. Kuybyshev

[Abstract] Moisture present in a catalyst and hydrogen reducing agent deactivates nonsulfurated platinum catalyst during reduction. However, achievement of very low moisture content of hydrogen-containing gas during reduction on existing reforming apparatus is not always possible. This requires that measures be developed both to decrease the moisture content of the reaction medium and to decrease the negative effect of moisture on the catalyst in reduction. The influence of moisture is not as great on preliminarily sulfurated catalyst such as type AP catalyst, which is little sensitive to reduction conditions. Reasons are listed for the lower sensitivity of sulfurated catalyst to reduction conditions, primarily the basically different nature of the processes involved in reducing these to catalytic forms. Figures 4; references 13 (Russian).
[259-6508]

UDC 665.554.44

PRODUCTION OF XYLENES BY CATALYTIC REFORMING OF GASOLINE FRACTIONS

Leningrad NEFTEKHIMIYA: SBORNIK NAUCHNYKH TRUDOV in Russian 1985
(signed to press 7 Feb 85) (manuscript received 2 Nov 81) pp 41-46

MASLYANSKIY, G. N., YABLOCHKINA, M. N., POTAPOVA, A. A. and PANNIKOVA, R. F., All-Union Scientific Research Institute of Petrochemical Processes; All-Union Scientific Institute of Petrochemistry, Leningrad

[Abstract] A study was made of problems related to the production of aromatic C_8 hydrocarbons by catalytic reforming and their isolation in pure form by ordinary fractional distillation. Gasoline fractions were obtained by fractional distillation of straight-run gasoline on a column with a resolution of 35 theoretical plates, reflux ratio 5-7. Fractions boiling between 105 and 124-132°C were selected. Catalytic reforming experiments were performed on a flow-through installation with recirculation of the hydrogen-containing gas

formed. Polymetallic industrial reforming catalysts were used. A mixture of aromatic C_8 hydrocarbons with a purity of 99.5%, yield 93-97% by mass, was obtained. Catalytic reforming conditions should be selected so as to achieve the greatest possible conversion of saturated C_9 hydrocarbons to aromatic hydrocarbons and hydrocracking products not forming azeotropic mixtures with C_8 aromatic hydrocarbons. References 8: 6 Russian, 2 Western.
[259-6508]

UDC 665.554.44

MODELING OF PROCESS OF CATALYTIC REFORMING USING DATA FROM A PILOT PLANT

Leningrad NEFTEKHIMIYA: SBORNIK NAUCHNYKH TRUDOV in Russian 1985
(signed to press 7 Feb 85) (manuscript received 18 Aug 81) pp 46-49

FEDOROV, A. P., SHKURATOVA, Ye. A., RABINOVICH, G. B., MAMONOTOVA, N. I. and KASHINA, V. V.

[Abstract] The purpose of this work was to refine the kinetic parameters and check the adequacy of a mathematical model of the process of catalytic reforming, considering changes in the individual composition of the raw material based on data obtained from installations with intermediate selection of specimens at several points in the reactor. Based on the experimental results obtained, considering data on the change in temperature, the kinetic parameters suggested for the model were evaluated, and satisfactory agreement was demonstrated between experimental and calculated data on concentrations of individual reaction mixture components. The disagreement of calculated and experimental values of concentrations of individual aromatic hydrocarbons did not exceed 25%. The studies thus demonstrate that the model suggested provides a satisfactory description of the process of catalytic reforming. Figure 1; references 3 (Russian).
[259-6508]

UDC 547.562:66.095.253.7

VAPOR-PHASE ALKYLATION OF PHENOL WITH METHANOL ON A CATALYST CONSISTING OF PHOSPHORIC ACID ON ALUMINOSILICATE

Leningrad NEFTEKHIMIYA: SBORNIK NAUCHNYKH TRUDOV in Russian 1985
(signed to press 7 Feb 85) (manuscript received 16 Apr 82) pp 63-68

LIMANKINA, N. D., VDOVTSOVA, Ye. A. and SULTANOV, A. S.

[Abstract] In order to increase the activity and selectivity in the process of producing anisol by vapor-phase alkylation of phenol with methanol, the authors studied (as catalyst) an aluminosilicate modified with phosphoric acid. To select optimal conditions of alkylation, the temperature was varied from

250 to 325°C., the space velocity of raw material feed from 0.5 to 1.25 hr^{-1}, the molar ratio of phenol to methanol from 1:1 to 1:2. Experiments were performed on a catalyst specimen containing 21.5% P_2O_5. The solid acid phosphoric acid on aluminosilicate catalyst obtained was found to be the most active and selective of all phosphoric acid catalysts for the production of anisol, superior in its activity and selectivity to catalysts reported in the literature for vapor-phase O-alkylation. Figure 1; references 7: 5 Russian, 2 Western.
[259-6508]

UDC 547.583:66.094.3

SYNERGIC EFFECT OF TWO-COMPONENT CATALYSTS IN OXIDATION OF m-XYLENE

Leningrad NEFTEKHIMIYA: SBORNIK NAUCHNYKH TRUDOV in Russian 1985
(signed to press 7 Feb 85) (manuscript received 30 Dec 81) pp 109-114

SUKHAREVA, N. I., FREYDIN, B. G. and SUKHAREV, B. N.

[Abstract] A study was made of the influence of the nature of variable valence metals and their molar ratio on catalytic activity of mixed catalysts. Naphthenates of Co(III), Cr(III), Ni(II), Mn(II) and Cu(II) were used. The catalytic activity of mixtures of variable valence metals with potassium naphthenate was also studied in the hope of obtaining an effect similar to the known effect for the potassium-manganese catalytic system for oxidation of paraffins. Oxidation of m-xylene in the presence of two-component catalysts such as mixtures of naphthenates of cobalt and chromium or cobalt and nickel is distinguished by the high rate of accumulation of m-toluylic acid, higher than oxidation using commercial cobalt salt catalyst. The maximum synergic effect is observed with a cobalt-chromium catalyst with a molar ratio of cobalt to chromium of 1:1. Optimum conditions for oxidation of m-xylene on this catalyst were determined. Figures 6; references 8: 6 Russian, 2 Western.
[259-6508]

UDC 541.127:547.391.1'261

REGULARITIES OF ESTER INTERCHANGE OF METHYLACRYLATE WITH BUTYL ALCOHOL USING TETRABUTOXYTITANIUM AS CATALYST

Leningrad NEFTEKHIMIYA: SBORNIK NAUCHNYKH TRUDOV in Russian 1985
(signed to press 7 Feb 85) (manuscript received 18 Feb 82) pp 129-132

CHUBAROV, G. A., DANOV, S. M. and LOGUTOV, V. I., Dzerzhinsk Affiliate, Gor'kiy Polytechnic Institute imeni A. A. Zhdanov

[Abstract] A study was made of the synthesis of butylacrylate by ester interchange of methylacrylate with butyl alcohol using tetrabutoxytitanium as the catalyst. Experiments were performed in sealed glass ampules with a volume of up to 1.5 ml. The reagents were carefully dried by fractional distillation to

a moisture content of not over 0.2 gram per liter. A 15% solution of tetrabutoxytitanium in butyl alcohol was used as the catalyst, the process being studied over a broad range of initial reagent ratios. The influence of tetrabutoxytitanium concentration on reaction rate was determined over a concentration range of 0 to 30 $g \cdot l^{-1}$ at 50°C. When the catalyst is absent, the reaction does not occur. The variation of reaction rate as a function of catalyst content is clearly nonlinear, reaction increasing by a factor of 1.42 as catalyst concentration is doubled. The influence of temperature was studied at 50 to 100°C, and follows the Arrhenius equation. The decrease in reaction rate during the course of the process is more rapid than would be expected for an inverse first order reaction with respect to each reagent. The reaction seems to be self-inhibiting, probably a result of the accumulation of methyl alcohol in the system. To maximize the reaction rate, the methanol must be removed from the system as it is formed. Figures 2; references 3 (Russian).
[259-6508]

UDC 547.313.3:66.094.4:66.097

VAPOR-PHASE CATALYTIC CHLORINATION OF PROPYLENE

Leningrad NEFTEKHIMIYA: SBORNIK NAUCHNYKH TRUDOV in Russian 1985
(signed to press 7 Feb 85) (manuscript received 24 Aug 82) pp 146-149

POTAPOV, A. M., RYSAYEV, U. Sh., RAFIKOV, S. R. and VALITOV, R. B., Ufa Institute of Petroleum

[Abstract] Data are presented on the selection of a catalyst and on a study of the influence of conditions of direct chlorination of propylene for selective formation of allyl chloride. Catalytic chlorination of propylene was performed in a reactor designed to allow complete filling of the volume of the reactor with catalyst. The rate of direct chlorination of propylene was found to depend little on the specific surface of the carriers. Salt compositions of metal chlorides are more active and selective catalysts for synthesis of allyl chloride by direct chlorination of propylene than are pure carriers. Conditions of production of allyl chloride with $CuCl_2$-pumice, LiCl-carborundum and LiCl-silica gel (fluidized bed) are selected. Figure 1; references 8 (Russian).
[259-6508]

UDC 66.097.3;658.001.7:661.53

IMPROVEMENT OF CATALYSTS FOR AMMONIA PRODUCTION--BASIS OF INTENSIFICATION OF LARGE AMMONIA PRODUCTION UNITS

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 4, Apr 85 pp 197-201

SEMENOVA, T. A.

[Abstract] Modest increases in efficiency at various stages in ammonia synthesis can significantly improve the overall process economy. This article reviews a number of achievable and potential process improvements, beginning with reducing hydraulic resistance by removing dust and fines from catalyst beds and increasing throughput by raising the feed rate. Improved catalysts are critical to such increases. A first step is improving the removal of sulfur with standard Al-Co-Mo catalysts by controlling the level of added hydrogen and the physical parameters of zinc oxide absorbents. At the steam conversion stage, Ni catalysts can be more effective in a modified Raschig ring form, especially if their size is matched to the working temperature in specific tube areas. Improved Fe-Cr and Cu-containing catalysts for carbon monoxide conversion can allow lower temperature processing at that stage of the operation. Finally, improvement of the catalysts for ammonia synthesis can support an increase in the feed rate of 10-15%. These changes must be integrated with one another, although improvements in the low-temperature catalysts for carbon monoxide conversion would give a positive contribution in any case. Modified Fe catalysts can also improve ammonia synthesis; newer Ru-containing catalysts show some promise, but are expensive. Overall, energy reductions of 40-60% are possible, while more effective catalysts could both raise throughput and reduce equipment sizes. [Note: Text repeatedly refers to work at the State Scientific Research and Planning Institute of the Nitrogen Industry and of the Products of Organic Synthesis]. References 32: 9 Russian, 23 Western.
[267-12672]

UDC 66.094.373.002.237.001

SCIENTIFIC BASES OF IMPROVING CATALYSTS FOR PARTIAL OXIDATION OF HYDROCARBONS

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 4, Apr 85 pp 208-214

KRYLOV, O. V. and MARGOLIS, L. Ya.

[Abstract] This is a survey of the literature focusing on high efficiency catalysts suitable for new process applications, particularly using multicomponent and multiphase catalysts with high selectivity. For example, ethylene oxide yields can be increased to 80% with additives to standard Ag catalysts or with a new system using Pd and V_2O_5. Similarly, complex catalysts based on bismuth molybdate can attain 90% or better oxidation of propylene into acrolein or 70% oxidative ammonolysis into acrilonitrile, with catalytic centers apparently on phase boundaries within the catalyst. The actual

mechanism may involve transfer between different types of active centers--multistage processes which help explain high selectivity. Small amounts of additives can alter the phase structure or the electron state of the active centers; the surface presence of acids or bases can also have a significant effect. Analogous results can be achieved with other olefins and with simple aromatic hydrocarbons. Direct oxidation of paraffins (e.g., butane into maleic anhydride) can also be achieved with over 50% yield using complex oxide catalysts or newer systems based on vanadium and phosphorus. Oxidative dehydrogenation processes can support condensation reactions--for example, using a modified PbO/SiO_2 catalyst at 740°C gives a 50% conversion of methane to ethane. Figures 2; references 68: 29 Russian, 39 Western.
[267-12672]

UDC 66.097.3+658.001.7:661.7

IMPROVEMENT OF CATALYSTS IS BASIS FOR INTENSIFYING INDUSTRIAL PROCESSES OF ORGANIC SYNTHESIS

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 4, Apr 85 pp 215-216

CHISTYAKOVA, G. A. and TYURYAYEV, I. YA

[Abstract] When catalysts can achieve a selectivity of 90-95%, product costs are generally decreased 15-20%. Several examples of foreign applications are noted along with the local development of catalysts for producing halogenated anilines and aminophenols from nitroso compounds and tetrahydrofuran from maleic anhydride. This supports the need to develop a new generation of catalysts based on a better understanding of the theory of catalysis. [Note: Text refers to work at the State Institute of Applied Chemistry]. References 12: 9 Russian, 3 Western.
[267-12672]

UDC 66.097.3.002.237:665.6

NEW CATALYSTS FOR OIL REFINERY PROCESSES

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 4, Apr 85 pp 216-219

NEFEDOV, B. K. and RADCHENKO, Ye. D.

[Abstract] This is a survey of the role of new catalysts based on experimental and practical work over the last 5-7 years. Catalytic removal of sulfur, nitrogen and oxygen compounds by Al-Ni-Mo catalysts on zeolite and aluminum silicate carriers was 10-20% more efficient than the standard catalysts. New catalysts for catalytic cracking, based on zeolite microspheres, give a 48-50% gasoline yield under vacuum gasolysis. Similarly, hydrocracking of vacuum distillates with new zeolite-containing and Ni-Mo catalysts allows a one-stage recirculating process at 15 MPa and 405-410°C to give a 70-72% yield of diesel; alternative catalysts can provide more flexible two-stage operations at lower

process temperatures. New metal hydrosilicate catalysts allow operations at pressures of 5-10 MPa with better regulation of products at higher yields. Selective hydrocracking for deparaffination also allows significant product improvement. [Note: Text refers to work at the All-Union Scientific Research Institute of Oil Refining]. References 15: 14 Russian, 1 Western.
[267-12672]

UDC 66.097:665.6

CATALYTIC PROCESSES IN PETROCHEMISTRY

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 4, Apr 85 pp 219-225

CHERNYKH, S. P., CHEKRIY, P. S., BERENBLYUM, A. S., BERENTS, A. D. and AVREKH, G. L.

[Abstract] This is a survey of the most important catalytic processes used for high-volume products of modern industrial organic synthesis. Efficient hydrogenation catalysts based on Pd with substrates carefully matched to the process can reduce Pd use and improve operations. Solutions of organic Pd complexes can provide high selectivity, reducing the acetylene content of pyrogases to below 0.0003%. For refining of liquid pyrocondensates, catalysts are being sought which selectively hydrogenate alkyl compounds but not aromatic rings, and also ones which can provide final removal of unsaturated and sulfur-containing hydrocarbons. A new catalyst for oxidation of ethylene into acetaldehyde provides yields of 98% while lowering equipment requirements, while a Zr-based catalyst allows oligomerization of ethylene at 30-80°C. Fe catalysts regulate the formation of adducts of carbon tetrachloride with alkenes; a proposed mechanism is described. Catalysts play an important role in hydroxylation of dienes, including hydrolysis of allyl acetate and, using Rh-based compounds, hydrosilane formation. Consideration is also being given to syntheses based on alternative feedstocks. Co-based systems can selectively promote formation of ethanol or acetataldehyde from methanol, but side effects include reactor corrosion; direct synthesis from carbon monoxide and hydrogen is also possible. New routes to ethylene glycol include F-based and zeolite catalysts modified with rare earth elements. [Note: Text continuously refers to the All-Union Scientific Research Institute of Organic Synthesis]. References 70: 61 Russian, 9 Western.
[267-12672]

UDC 541.128/541.49

METAL COMPLEX CATALYSIS. ITS PLACE IN INDUSTRIAL ORGANIC SYNTHESIS AND SOME CURRENT TASKS

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 4, Apr 85 pp 226-233

MOISEYEV, I. I.

[Abstract] Metal complex catalysts have lowered energy use, reduced requirements for raw materials and allowed replacement of multistage processes with single-stage ones. The article lists 53 processes based on metal-complex catalysis presently operational in the West, ranging from mercaptan removal from petrochemical fractions to pharmaceutical production. Expected developments include the use of Pd or Mo-complexes to form propylene oxide or to produce diethyl ketone from ethylene, carbon monoxide and hydrogen. Similarly, other metal complexes will catalyze the formation of acetaldehyde from methanol, carbon monoxide and hydrogen, or ethanol from methanol. Direct production of acetylene from carbon monoxide and hydrogen is also possible with a 95% selectivity at a mild 100°C using a newly developed Fe catalyst. References 43: 27 Russian, 16 Western.
[267-12672]

UDC 66.097.3+62.001.7:66

DEVELOPMENT OF SCIENTIFIC BASES OF CATALYSIS TECHNOLOGY--AN IMPORTANT FACTOR OF PROGRESS OF CHEMICAL INDUSTRY

Moscow KHIMICHESKAYA PROMYSHLENNOST' in Russian No 4, Apr 85 pp 234-237

SAMAKHOV, A. A.

[Abstract] Four components are cited in development of a scientific foundation for catalyst production. The theory of their preparation includes the assessment of what properties of a catalyst influence its performance. Specific catalytic activity can provide a measure of this performance; it depends on a number of factors including porosity, dispersion, and even the conditions of preparation. The economics of the catalytic processes must also be taken into consideration, along with scientifically-based testing of the properties of the catalysts. Finally, the theory of catalyst production must address scale-up from laboratory conditions and the use of laboratory experiments to model industrial processes. A systematic approach to the study of processes and equipment of catalyst production is still lacking. Figures 1; references 34: 29 Russian, 5 Western.
[267-12672]

UDC 541.128.13:546.743:549.73

EFFECT OF CHARACTERISTICS OF INITIAL RAW MATERIAL ON PROPERTIES OF BASIC COPPER CARBONATE-CALCIUM ALUMINATE

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 58, No 4, Apr 85 (manuscript received 1 Jul 83) pp 891-893

ARTAMONOV, V. I. and GOLOSMAN, Ye. Z., State Scientific Research and Design Institute of Nitrogen Industry and Products of Organic Synthesis, Novomoskovsk

[Abstract] Proceeding from the fact that copper hydroaluminate (GAM) is a product of interaction of basic copper carbonate (OKM) and products of hydration of "Talyum" or commercial calcium aluminate (a mixture of calcium monoaluminate $CaO \cdot Al_2O_3$ (CA) and calcium dialuminate $CaO \cdot 2Al_2O_3$ (CA_2), a study of the effect of such characteristics of "Talyum" as the Ca/Ca_2 ratio and the fineness of grinding of S on the formation of the GAM phase in the process of mixing the initial components in an ammoniacal liquor medium is performed and discussed. Formation of copper aluminate in the OKM-"Talyum" system increases the catalytic activity of the system in the steam conversion of carbon monoxide reaction. Calculation of the optimum composition of the OKM-"Talyum" system for formation of a maximum quantity of copper hydroaluminate with consideration of the CA/CA_2 ratio and degree of hydration of the aluminates is discussed. The CA/CA_2 ratio has a greater effect on GAM formation than does the fineness of grinding of the "Talyum". References 4 (Russian).
[264-2791]

UDC 66.097.3:66.074.48

REGENERATION OF OXIDE CATALYSTS, DEACTIVATED BY SULFUR COMPOUNDS

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 58, No 4, Apr 85 (manuscript received 25 Nov 83) pp 734-736

LYAPKIN, A. A., ANAN'INA, L. P. and ANDREYKOV, Ye. I., Eastern Scientific Research Coal Chemistry Institute

[Abstract] Effect of regenerating gases on activity of oxide catalysts of deep oxidation of organic substances, deactivated by sulfur compounds during their operation, was studied with the aid of a laboratory flow device. A mixture of polycyclic aromatic hydrocarbons found in pitch coke production emissions was oxidized by oxygen in air. Catalysts were deactivated by oxidizing the hydrocarbons in the presence of hydrogen sulfide. Hydrogen, carbon monoxide, ammonia, propane and organic substances found in the oxidized emissions were used as regenerating gas to regenerate the catalysts. The possibility of total regeneration of oxide catalysts of deep oxidation of organic compounds, deactivated by sulfur compounds by treating them with regenerating gas, was demonstrated. Hydrogen, carbon monoxide, ammonia, hydrocarbons and gases containing these components may be used as reducing agents. Figure 1; references 9: 7 Russian, 2 Western.
[264-2791]

UDC 542.973+546.87

MODIFICATION OF APPLIED CATALYSTS BY BISMUTH

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 58, No 4, Apr 85
(manuscript received 12 Apr 84) pp 737-740

NADIROV, N. K., LYKOVA, L. F., and PETROSYAN, L. S., Institute of Chemistry of Petroleum and Natural Salts, KazSSR Academy of Sciences

[Abstract] Study of the use of bismuth as an additive to catalysts produced by modification of an aluminum platinum rhenium (APR) composition by non-transition elements from groups III and IV and by elements of the iron subgroup is described and discussed in order to explain the role of bismuth in multi-component catalysts. All samples were prepared by impregnating tempered gamma aluminum oxide, and the catalytic properties of the modified samples were studied in the dehydrocyclization of n-hexane in a pulsed regime. Addition to the catalyst (wt, percent) 0.3 Pt-0.3 Re/gamma-Al_2O_3 of 0.5 wt. percent of nickle increases the benzene yield from n-hexane by 5.7 percent. Bismuth in a quantity of 0.1-0.25 wt. percent has a catalyst poisoning effect on the two-component and three-component samples containing 0.25-0.3 wt. percent of platinum. Figure 1; references 9 (Russian).
[264-2791]

UDC 541.138

INFLUENCE OF ANODE PROCESSING ON ELECTROCATALYTIC ACTIVITY OF NICKEL SURFACE SKELETAL CATALYST IN CATHODIC EVOLUTION OF HYDROGEN

Moscow ELEKTROKHIMIYA in Russian Vol 21, No 3, Mar 85
(manuscript received 20 Dec 83) pp 383-387

KOROVIN, N. V., KOZLOVA, N. I. and KUMENKO, M. V., Moscow Institute of Power Engineering

[Abstract] Information is presented on the influence of oxidation of skeletal nickel catalyst on its activity in the reaction of cathodic evolution of hydrogen. The nickel catalyst was oxidized by application of an anode pulse at a potential scanning rate of 1 mV/s between 0.25 and 1.00 V on freshly leached catalysts. A new electrode was used for each cycle of oxidation. Catalytic activity was determined by measurement of polarization curves of cathodic evolution of hydrogen. Adsorption capacity for hydrogen was estimated from the quantity of electricity obtained by integrating the anode course of the potentiometric curves in the 0.0-0.2 V potential range. Oxidation of the surface was found to cause both acceleration and retardation of the reaction. Acceleration of the process occurred up to a preliminary pulse potential of 0.7 V and encompassed not only the area of existence of reversible oxides on the surface of the nickel, but also a portion of the area of existence of irreversible oxides. It is assumed that states of adsorbed oxygen are characteristic for these potential areas which are capable of accelerating cathodic reduction of

hydrogen. Deeper anodic impulses probably form phase oxide layers which block the surface and retard the process. Figures 4; references 9: 8 Russian, 1 Western.
[255-6508]

UDC 541.135.3

CATHODIC PROCESSES ON PLATINUM ELECTRODES UPON ELECTROLYSIS OF Na_2MoO_4-MoO_3 MELT

Moscow ELEKTROKHIMIYA in Russian Vol 21, No 3, Mar 85
(manuscript received 23 Jan 84) pp 399-402

KOMAROV, V. Ye., SMOLENSKIY, V. V., BOVE, A. L. and ZYRYANOV, V. G., Institute of Electrochemistry, Urals Scientific Center, USSR Academy of Sciences, Sverdlovsk

[Abstract] In order to determine conditions under which a platinum electrode can be used as an indicator electrode in electrochemical studies in molybdate melts, an experimental study was performed with MoO_3 and $Na_2MoO_4 \cdot 2H_2O$. The experiments were performed in a standard 3-electrode cell of quartz glass with platinum electrodes. The studies indicate that at relatively low content of MoO_3 in the melt, a layer of platinum with molybdenum is formed on the cathode. At 10 mol. % MoO_3 or more, in the area of potentials where Pt-Mo melts are formed, the reduction currents of the background electrolyte and MoO_2 precipitation current significantly exceed the currents of the melt formation process, so that melts are not formed. It is thus proven that pure Na_2MoO_4 or a mixture of Na_2MoO_4 with MoO_3 can be used as background electrolytes for electrochemical studies with platinum cathodes, the concentration of the background electrolyte being at least 10 mol.%. Figures 4; references 9: 7 Russian, 2 Western.
[255-6508]

UDC 541.138.2

INFLUENCE OF ADSORBED THALLIUM ON THE PROCESS OF ELECTROOXIDATION OF FORMATE IONS ON A Pt ELECTRODE IN AN ALKALINE MEDIUM

Moscow ELEKTROKHIMIYA in Russian Vol 21, No 3, Mar 85
(manuscript received 28 Mar 84) pp 413-417

VASINA, S. Ya., VETTSEL', R., MYULLER, L. and PETRIY, O. A., Moscow State University imeni M. V. Lomonosov

[Abstract] A comparison is presented of the influence of adsorbed thallium ions on the process of electrooxidation of formate ions under steady and nonsteady conditions. Measurements were performed on platinum electrodes in a solution

of 1 M NaOH. Thallium was precipitated onto the surface of the electrodes from NaOH solutions containing $5 \cdot 10^{-4}$ or 10^{-3} M $TlNO_3$ or Tl_2SO_4 with the circuit open after preliminary stabilization of E_r = 0.5 V (potential measure relative to hydrogen electrode in background solution) or at constant E_r = 0.5 V. These variations made no difference on the results obtained. It was found that modification of the plantinum surface with thallium inhibits the process of electrooxidation of formate ions under steady conditions and with variation of the potential if its anode value does not exceed 1.1 V. The process is accelerated under nonsteady conditions only at over 1.1 V. The catalytic effect increases as E_r is shifted in the anodic direction, with an increase in holding time at constant E_r and with an increase in the rate of change of the potential. The data are explained by assuming that the catalytic effect under nonsteady conditions is related to the state of the electrode surface arising upon incomplete reduction of the oxide layer formed at E_r over 1.1 V.
Figures 4; references 7: 2 Russian, 5 Western.
[255-6508]

PROBLEMS, PROGRESS IN CHEMICAL INDUSTRY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 May 85 p 1

[Article by V. Listov, minister of the chemical industry: "Adding to Achievements"]

[Text] The April (1985) Plenum of the CPSU Central Committee set the goal of stepping up economic growth by accelerating the rate of scientific and technical progress. Successful realization of this goal depends to a great extent on the degree of chemicalization of the national economy. The chemical industry has a signficant influence on the development of the fuel and energy complex, machine building, light and food industry, agriculture, transportation, and the production of household articles.

Working to meet the growing demands of numerous consumers, during the current five-year plan enterprises in the sector have developed industrial production of about 3500 new types of chemical products. These include filled cable masticated rubber for the electrical equipment industry, a polyethylene film with selective light permeability for greenhouses, and a polyamide cord material for heavy tires. Enterprises are now producing polypropylene film threads used in manufacturing packing material, bailing wire, and packing tape. There has been an increase in the production of "Siblon" fiber, which is being used successfully in place of cotton.

However, our chemical industry is still not meeting current demands in a number of areas. The industry is not meeting the demands of the economy for the most progressive types of products and materials, both in terms of the volume produced and the variety and quality.

I will give just one example. If chemical workers were able to meet all the demands for plastics and synthetic fibers, this would make it possible during the current five-year plan to free up over 1 million workers, save more than 3 billion rubles in capital investments, and save about 4 million tons of ferrous and nonferrous metals and 7 million cubic meters of lumber. Unfortunately, there is still a shortage of these and other chemical products.

In the final year of the five-year plan chemical production is supposed to increase by 5 percent. We are having a hard time fulfilling the plan, however. The results from the first quarter were not what we had expected. Many

enterprises were ill prepared to operate under the harsh winter conditions, and this had a negative effect on production.

But it would not be right to blame all the shortfalls on the weather. There are internal factors as well. These include a low level of equipment utilization at certain enterprises, and violations of manufacturing and labor discipline. Similar problems contributed to the poor operation of the Ziminskiy Chemical Plant and the "Khimvolokno" [Chemical Fiber] associations in Rustavi and Barnaul.

With the aim of overcoming these difficulties more rapidly, greater demands are being made on managers, workers at All-Union industrial associations, and the central staff with respect to fulfilling plan quotas, and vocational training has been organized for workers and engineering and technical personnel. In order to improve the organization of labor at these enterprises, the methods used by leading collectives are being put into practice extensively. These steps have already had results. Many enterprises that fell behind in the first quarter improved their operations in April and May.

The quality of several types of chemical products is a source of complaints. There is still a shortage of high-quality paints in a wide range of colors for use in light industry. There has been justified criticism of the quality of synthetic cleaning substances, paint and varnish products, and movie and photographic materials for sale to the public.

With the aim of eliminating these shortcomings, the ministry, scientific organizations in the sector, and enterprises are taking steps to improve manufacturing processes, replace outmoded equipment, strengthen production discipline, and develop production capacities as quickly as possible that will put out products that are as good as the best foreign models. Product quality control is being stepped up. With this aim, a network of testing centers is being created, and some of the responsibilities of these centers include establishing a unified technical policy and providing assistance to enterprises in setting up production and maintaining quality control. The centers will have an influence on the quality of products manufactured not just by enterprises under the Ministry of the Chemical Industry, but also by enterprises under other ministries.

Considerable capital investments are being allocated to develop the chemical industry. Since the beginning of the five-year plan more than 400 major industrial projects have been put into operation. But still, not everything is running smoothly in the area of capital construction. The plan for construction and installation work is not being met. As a result, there is a serious shortage of products that are in great demand in the national economy.

Building chemical projects is a complex task, especially small-scale chemistry plants, and it becomes even more complicated when these plants are being built at enterprises already in operation. But we must build and rebuild. Therefore, our ministry, construction organizations, and local organs must devote greater attention to chemical construction projects.

The resolution of the complex and difficult tasks facing our sector depends primarily on greater activity on the part of the workers, and on the interest of each labor collective in improving its work. Chemical workers, like all Soviet people, totally support the measures outlined by the party and government to strengthen discipline and overcome negative phenomena both in production and everyday life.

In honor of their professional holiday, over 6000 chemical workers have fulfilled the quotas for the five-year plan. Collectives at the "Polymer" Production Association in Novopolotsk, the "Khimvolokno" Production Association in Kursk, the "Glass and Plastic" Production Association in Severodonetsk, the "Slavicha" Production Association in Pereslavskiy, and many others are in the vanguard of the socialist competition. The sector as a whole has met the goals of freeing up workers by introducing and developing the Shchekino method.

Workers in the chemical industry are preparing to meet the 27th CPSU Congress with fitting achievements. All the collectives are seeking out reserves for increasing production efficiency, and they are looking for ways to step up labor productivity and improve product quality. There is one major goal--to fulfill this year's stepped-up plans and obligations and to accelerate the rate of growth in the chemical industry.

9967
CSO: 1841/262

POLYVINYLCHLORIDE PRODUCTION LANDMARK

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 Apr 85 p 1

[Article by V. Noskov, SOTSIALISTICHESKAYA INDUSTRIYA correspondent]

[Text] Dzerzhinsk, Gorkiy Oblast -- Chemical workers at the "Caprolactam" Association in Dzerzhinsk have put out their millionth ton of polyvinylchloride, a synthetic resin. It took the enterprise, one of the first in the country to produce this valuable chemical product which is used in machine building, light industry, and other sectors of the national economy, 15 years to reach this goal. For this reason today's triumph is not just a tribute to a round number in the production control records, it is also evidence of the Dzerzhinsk workers' persisent campaign to increase output and improve product quality.

Polyvinylchloride produced at the Dzerzhinsk plant has been displayed a number of times at international and Soviet exhibits. It has enjoyed no small success at these exhibits: it won a gold medal at the Plovdiv exhibit in Bulgaria, and a silver medal at the Exhibition of USSR National Economic Achievements. The enterprise marks all the different varieties of this product with its emblem of quality, a pentagon.

9967
CSO: 1841/262

UDC 532.135:541.182.65

RHEOLOGIC PROPERTIES OF HIGHLY CONCENTRATED OIL-COAL SUSPENSIONS

Moscow KOLLOIDNYY ZHURNAL in Russian Vol 47, No 2, Mar-Apr 85
(manuscript received 10 Nov 83) pp 355-358

UR'YEV, N. B., IL'IN, V. K. and CHERNOMAZ, V. Ye., Institute of Physical Chemistry, USSR Academy of Sciences, Moscow

[Abstract] A study is presented of the rheologic characteristics of oil-coal suspensions with high solid phase concentration, as well as the changes in structural and rheological properties of these dispersed systems under the influence of vibration. Oil-coal pastes were prepared of dry brown coal with residual moisture content 1-1.5 wt. percent, particle size 0-0.5 mm. Sedimentation analysis was used to determine the fractional composition of the dispersed phases. The rheologic properties of the pastes were studied under both static and dynamic (with vibration) conditions by means of a rotary vibroviscosimeter. As the rate of shear deformation increased, the effect of the vibration field as a factor facilitating breakdown of structure decreased, since the contribution of shear deformation to this process increased. The rotation of non-isometric particles in the direction of action of the shear stress and the breakdown of the stronger contacts caused by vibration require additional energy, manifested as an increase in effective viscosity. The possibility cannot be excluded of development of microturbulence near particle surfaces as they move inertially relative to the liquid or vibrate if the rate of this movement is comparable to the rate which corresponds to development of turbulence in the medium. A significant factor influencing the sharp increase in viscosity with vibration is concentration of the solid phase. Figures 2; references 4 (Russian).
[256-6508]

UDC 534.222.2+533.6.011

POSSIBLE MECHANISM OF REDUCING LOWER LIMIT OF DETONATION IN HYBRID SYSTEMS

Moscow KHIMICHESKAYA FIZIKA in Russian Vol 4, No 4, Apr 85
(manuscript received 7 Jun 84) pp 572-576

GUBIN, S. A. and GEL'FAND, B. Ye., Institute of Chemical Physics, USSR Academy of Sciences, Moscow

[Abstract] Hybrid systems with suspended solid particles in a flammable gas mixture can have the lower detonation limit substantially reduced as the concentration of solid particles rises. Tests were conducted with uniformly dispersed, like-sized solid particles suspended in a methane-oxygen mixture; both reactive (Mg) and inert (MgO & WC) particles (radius 0.5, 2.5, and 12.5) were used at concentrations of 0.06-0.28 kg/m^3 at a starting temperature of 298°K with shock waves Mach 4.0-5.1. Particle size greatly influences the delay time of ignition, with larger particles decreasing the time delay, while smaller particles increase it. Particle density also has a significant effect, with lighter particles giving a shorter time delay. With reactive particles of Mg, the particles may reach ignition temperature before the gas mixture, sharply reducing the induction period compared to the gas mixture alone. Figures 4; references 15: 5 Russian, 10 Western.
[268-12672]

UDC 661.715.342.536.468+614.833

STUDY OF ADIABATIC SPONTANEOUS IGNITION OF ACETYLENE-OXYGEN MIXTURE

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 5, May 85, pp 21-22

NASONOV, V. V., candidate of technical sciences, (deceased), PUZANOVA, S. V. and POVELYAYEV, V. V., engineers

[Abstract] The possibility of spontaneous ignition of acetylene-oxygen mixtures upon compression in a semiclosed volume has been theoretically proven. The results obtained by calculation were tested experimentally at 'Avtogenmash' Production Association. A detonation wave was produced by explosive heating of a wire. The wave caused a membrane to move downward, compressing the gas mixture. Ignition was determined by photosensors. The results indicated that the

quantity of heat liberated upon compression of the gas mass is directly proportional to the gas volume, while the quantity of heat carried away is proportional to the total surface area of the chamber. The experiments showed that increasing the volume from 1 to 20 cc causes an almost ten times increase in heat loss, causing spontaneous ignition to stop. Graphs are presented illustrating the variation in probability of ignition and critical membrane travel as functions of initial volume. Figures 4.
[272-6508]

UDC 543.422.27:621.315.5:678.769

STUDY OF ORGANIC CONDUCTORS BASED ON POLYTHENE AND POLYACETYLENE IN 3-CENTIMETER AND 2-MILLIMETER EPR RANGE

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian No 2, Feb 85 (manuscript received 30 May 84) pp 467-469

KRINICHNYY, V. I., GRINBERG, O. Ya., NAZAROVA, I. B., KOZUB, G. I., TKACHENKO, L. I., KHIDEKEL', M. L. and LEBEDEV, Ya. S., Chernogolovka Department of Institute of Chemical Physics, USSR Academy of Sciences

[Abstract] The relationship of the magnetic resonance parameter to the nature of the anion was established for polythiophene and several anions as examples of an organic conductor. The anisotropic g-tensor values were measured with EPR spectroscopy in the 3-centimeter and 2-millimeter ranges and the conductivities of polythiophene (BF_4^-) and polyacetylene (I^-) at 200°K were estimated. Figure 1; references 9: 3 Russian, 6 Western.
[208-12765]

UDC 541.138.2

ANODIC BEHAVIOR OF TITANIUM IN SODIUM CHLORIDE SOLUTION AFTER DISRUPTION OF OXIDE FILM

Moscow ELEKTROKHIMIYA in Russian Vol 21, No 4, Apr 85
(manuscript received 29 Nov 83) pp 505-509

DAVYDOV, A. D. and ZEMSKOVA, O. V., Institute of Electrochemistry imeni A. N. Frumkin, USSR Academy of Sciences, Moscow

[Abstract] A study is reported of the anodic behavior of titanium after anodic activation is begun in a 1 M aqueous solution of NaCl. Potentiostatic and galvanodynamic studies were performed using a rotating disk electrode. A study of both the forward and reverse courses of the polarization curve were used to obtain more complete data on the anodic behavior of the metal. The results of this and previous works indicate that the first condition for beginning of anodic activation of titanium in NaCl solutions is formation of defects such as pores or cracks in the oxide film as it thickens in the area below the anodic activation potential E*. Defects may be either repassivated, overgrown with oxide, or converted into activation centers, pitting points. The repassivation process occurs due to an increased electric field intensity

in defects. Activation is facilitated by factors accelerating dissolution of the oxide, such as an increase in acidity of the layer near the anode due to rapid growth of oxide at a thinner point, additional oxidation as a result of hydrolysis of titanium cations in solution, or redistribution of anode potential upon formation of defects. Reinforcement of processes facilitating dissolution of the oxide with an increase in anode potential leads to conditions such that the rate of repassivation is less than the rate of dissolution of the oxide. A slight increase in E results in rather rapid development of activation centers after the first is formed. Figures 2; references 10: 8 Russian, 2 Western. [254-6508]

UDC 541.135.3

MASS TRANSFER IN MAGNETIC FIELD NEAR HORIZONTAL ELECTRODES

Moscow ELEKTROKHIMIYA in Russian Vol 21, No 4, Apr 85
(manuscript received 2 Dec 82) pp 519-523

MIKHALEV, Yu. G., ISAYEVA, L. A. and POLYAKOV, P. V., Krasnoyarsk Institute of Nonferrous Metals imeni M. I. Kalinin

[Abstract] A study is reported of the effect of a homogeneous constant magnetic field on mass transfer during anodic dissolution of a horizontal silver electrode 1.6 cm in diameter in a KNO_3-$AgNO_3$ melt containing 1, 2, 4, 7 and 10 weight percent $AgNO_3$ at 613 K under galvanostatic conditions. Studies were performed in an atmosphere of purified argon in quartz cells for two hydrodynamic situations: 1) the reacting surface of the electrode studied was turned downward; the counter-electrode was above it; 2) the reacting surface of the electrode studied was turned upward; the counter-electrode was beneath it. The nonreacting surface of the electrode was isolated from the melt by a boron-aluminonitride shield with added liquid glass. The polarization curves indicate that when a magnetic field is applied, the overvoltage decreases for both orientations of the electrode, particularly in situation 2). A significant change in electrolyte flow is observed, particularly with the reacting surface downward. Without the magnetic field the electrolyte flows away from the electrode as vortexed jets; with the magnetic field the vortexed jets merge and the speed of movement of the electrolyte increases by an order of magnitude. Figures 4; references 7: 5 Russian, 2 Western.
[254-6508]

FERTILIZERS

MINERAL FERTILIZER PRODUCTION IN URKAINE

Kiev PRAVDA UKRAINY in Russian 16 Apr 85 p 2

[Article under the rubric "Our Special Investigations": "An Urgent Springtime Order"]

[Text] A powerful chemical industry has been created in this republic in a short period of time, which has made it possible to improve the supply of mineral fertilizers to the agro-industrial complex. This has had a direct effect on improving farming practices, increasing the crop yield, and it has significantly reduced dependence on unfavorable weather conditions. Farmers are now laying the foundation for the new harvest. What kind of harvest they get will also depend on collectives at enterprises engaged in the production of mineral fertilizers. The special investigations teams of PRAVDA UKRAINY visited some of these enterprises.

One Good Turn Deserves Another. In the first quarter the "Styrene" Production Association in Gorlovka fell short of its plan for the production of mineral fertilizers by 5000 tons. Disruptions in the delivery of chemicals by rail had a negative effect on the association's operations. In March alone the Donetsk Railroad was 107 cars short of its obligations to deliver ammonium nitrate.

The Gorlovka workers are often put in a bad position by workers in related industries, but they also do not make full use of their own internal reserves. There are frequent breakdowns of large-tonnage equipment as a result of poor maintenance and violations of manufacturing discipline. The first ammonia production shop was put into operation at the end of last year. Already there have been many interruptions in its work. The organization of repair work at the enterprise is poor, and the quality of the work is low.

Party and workers' meetings have been held in all the shops that produce mineral fertilizers. The communists provided a critical evaluation of the first quarter's results and called on all the workers to improve the organization of labor at the plant and to work out personal production plans for each job. A unanimous decision was made to write off debts in April and May and to do everything possible to meet the quotas for the final year of the 11th Five-Year Plan and provide grain farmers in the oblast wih 5000 tons of mineral fertilizers above that called for in the plan.

There Are Still Reserves. Ammonium phosphate, a valuable mineral fertilizer, accounts for a large proportion of the output of the "Titan" Production Association in Crimean Oblast; the enterprise supplies this fertilizer to many agricultural regions in the Ukraine and Moldavia. It should be noted that the ammonium phosphate shop maintained stable operations during the winter months. In the first quarter the fertilizer production quota was surpassed by 4500 tons. The association also took a careful, thrifty approach to the utilization of raw materials and energy resources. The enterprise conserved a total of 308 tons of ammonia during the first quarter, along with more than 2 million cubic meters of natural gas, 924,000 kilowatt-hours of electrical power, and more than 8.5 million cubic meters of compressed air.

A. M. Terent'yev, shop chief, said, "We still have a lot of reserves. Consider this fact. Because our shop was not supplied with enough steam, there was an overexpenditure of 900 tons of apatite in the first quarter."

A. M. Terent'yev's dissatisfaction is understandable. As a result of the failure of the steam supply shop to produce enough steam, there was a shortfall of hundreds of tons of fertilizer. The shop's workers also see reserves in progressive labor methods. The industrial services unit has already shifted to the brigade system using the labor participation coefficient. In April the mechanical services unit will also start operating under the new system.

Some Quotas Are Met...Some Are Not. In the first quarter the collective at the Cherkassy "Nitrogen" Production Association exceeded its sales plan by more than 2 million rubles. Chemical workers in the A-4 shop also did a good job in the production of ammonia. In the first three months they exceeded the production plan by 4000 tons. We asked V. P. Garanin, brigade leader in the third shift, the reasons behind this success.

Vladimir Pavlovich said, "Organization, strong labor and production discipline, a high level of equipment utilization, and a strong sense of responsibility on the part of each worker for the fate of the state plan."

But still, the Cherkassy "Nitrogen" Association failed to fulfill the state quotas for certain products. The A-5 and A-3 shops fell 6000 tons short in supplying ammonia to the state. The reason was local planning miscalculations. The association ships ammonia to its customers in its own tank trucks, but unfortunately, the managers have not learned how to make rational use of the tankers. The fertilizer production schedule often does not coincide with the tanker turnover schedule. It is quite typical for there to be tankers available, but no ammonia, and for there to be ammonia, but no tankers.

The facts indicate that the association does not provide the necessary coordination between production, planning and economic, and technical services, and that their workers are still limited by gross indicators and have not developed a deep sense of responsiblity for fulfillment of contract obligations and production of their assigned products. The same can be said about the commercial services, which failed to provide the raw materials for the ammonium phosphate production shop. The quarterly plan for the production of this substance was met by only 87 percent.

The Pace Has Dropped Off. There was a shortfall of more than 1000 tons of ammonium phosphate and almost 3000 tons of liquid compound fertilizers in terms of the plan for the first quarter. What were the reasons for this slump?

If we examine the records of the liquid compound fertilizer production shop, we see that the shop stopped operations when it had produced only one-third of the quota for the March plan. This was because the superphosphate acid was not delivered on time. The collective of the ammonium phosphate production shop is not in the best position either. And the reason is the same--a disruption in the delivery of raw materials.

M. G. Siryachenko, deputy general director of the "Khimprom" [Chemical Industry] Association, said, "According to the established norms, our enterprise should have a constant emergency reserve of apatite of no less than 24,000 tons. But the Ministry of Mineral Fertilizer Production not only does not allocate the funds to create this kind of reserve, it violates schedules for the delivery of raw materials needed to fulfill the production plan. There are also disruptions in the delivery of superphosphate acid. The Ministry of Railways is also at fault here."

The disruptions in the delivery of raw materials to "Khimprom" have started to have a serious effect on production regularity at the association. It is to the credit of the chemical workers in Sumy Oblast that they have not become discouraged by this situation. But the collective is in extreme need of specific assistance from the Ministry of Mineral Fertilizer Production.

Partners Are Letting Each Other Down. It was only in the final hours of March that superphosphate producers in Odessa were able to breathe a little more easily: the quarterly plan for shipping mineral fertilizers was finally met. In one 24-hour period they sent consumers in the republic's southern oblasts and in neighboring Moldavia a record quantity of valuable fertilizers. But the next two days the railroad tracks were empty again. Even though every day the railroad workers are supposed to dispatch an average of 25 railcars.

"This is not an exception," explained L. A. Maksimova, chief of the plant's sales department. "The railroad workers let us down constantly. In the first quarter alone they fell short of their obligations by 340 railcars. And April has gotten off to a similar start. In the first five days, for example, they didn't even fill half of our orders."

Maybe there's nothing to be shipped? That is hardly the case. The plant's warehouses now hold over 30,000 tons of superphosphate, and agricultural workers doing the spring sowing work are waiting for this fertilizer.

The plant's director, V. G. Kuz'min, said, "In spite of the problems with the supply of raw materials, which is also due to a shortage of empty railcars, our collective managed not only to fulfill, but even exceed the quarterly plan for fertilizer production. But we certainly are aware of irregularities in the shipment of superphosphate--there is a chronic shortage of empty railcars. Kolkhozes and sovkhozes are asking for shipments of fertilizers now, at the height of the spring field work, and we are not always able to meet their demands."

The collective of the Odessa port plant has managed to make the necessary fertilizer shipments. Rural workers received 1725 tons more nitrogen fertilizer than planned. The carbamide shop made the greatest contribution.

9967
CSO: 1841/262

PROGRESS IN FERTILIZER PLANT CONSTRUCTION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 17 Apr 85 p 3

[Article under the rubric "SOTSIALISTICHESKAYA INDUSTRIYA Special Investigation": "Constrasts in Fertilizer Projects"]

[Text] At the beginning of the year, collectives of construction and installation workers and operations specialists working on new projects at the Krasnodar and Chardzhou chemical plants, the "Apatite" Production Association in Murmansk Oblast, and the "Nitrogen" Production Association in Dneprodzerzhinsk, took on obligations (which were published in SOTSIALISTICHESKAYA INDUSTRIYA) to put the planned capacities for the production of mineral fertilizers into to operation ahead of schedule, and to make a contribution to the fulfillment of the Food Program.

The first quarter is over. How did the initiators of the competition do?

The Apatite Plant

Here even in April there are snowstorms that make it necessary to halt construction. The winter months, with all the polar blizzards and storms, were especially hard for the construction workers. That makes the results of this first quarter even more significant. At the "Apatite" Production Association, where new capacities are being created, the "Apatitstroy" [Apatite Construction] Trust carried out work valued at just under 18 million rubles, which surpassed the plan by 1.2 million rubles.

Viktor Fedorovich Novikov, chief of the trust, described these results in a telephone interview: "First of all, I would like to say that the workers and specialists in our trust always viewed the obligations of the collective as their own personal obligations. The concern of every individual for the common tasks, the feeling of responsibility for the work at hand, are the key factors contributing to the high level of labor activity in all sectors of the construction project.

"I think that organization of our work under a multiple flow line contract system has a great deal to do with this. This system creates favorable conditions for close coordination of the work done by individuals in related sectors; all the brigades have an interest in achieving final results as

quickly as possible; and it helps organize clear competition along specific points of the construction schedule.

"A total of 130 brigades and links are included in this multiple flow line contract system. Each collective has specifically defined tasks, the fulfillment of which ensures that new capacities will be put into operation on schedule.

"In the second quarter there will be a 20 percent increase in the program at manufacturing projects, which means that the work performed during the second quarter should exceed that of the first quarter by 5 million rubles. This is a hefty increase. We are sure of ourselves and we will meet this goal. It is important, though, that our suppliers and other partners not slow things down. In the first quarter, for example, the Belgorod Metal Structures Plant under the USSR Ministry of Installation and Special Construction Work failed to deliver 900,000 tons of the 1500 tons of metal structures required [as published]. This metal represents a huge amount of work. The Leningrad "Mekhanobr" [Mechanical Processing] Institute has still not completed equipment documentation corrections. And it is already time to install the equipment. In other words, the efforts of all those participating in the construction process should be directed primarily toward realization of the priority project program."

Belorechensk

Since the very beginning of the year construction workers at the Krasnodar Chemical Plant imeni the 60th Anniversary of the USSR have been waging a steady campaign to fulfill their obligations to put a sulfuric acid plant and a feed phosphate complex into production ahead of schedule. The collective of the "Krasnodarkhimstroy" [Krasnodar Chemical Construction] Trust, together with installation organizations, fulfilled the first quarter's plan for general contracting work by 102 percent. It is important to note that the plan was not fulfilled during a frantic period of intensive work, but on the basis of scientific organization of labor, increased work efficiency, and stronger discipline and order in the collectives.

The efforts of dozens of collectives of construction and installation workers, planners and operations specialists, and plants that supply construction materials and structures are united by a comprehensive socialist agreement on competition. A great deal of work on introducing scientific and technical achievements and rationalization proposals aimed at increasing the efficiency of construction is carried out within the framework of the agreement. The production line-junction method is being used. Weekly and daily planning has been introduced. Extensive use is being made of the brigade contract system, with about 65 percent of all the work organized in this way.

A great deal of attention is given to any suggestions that would increase work efficiency, and more important, they are introduced into practice. I will cite just one example of the many suggestions. S. Chakryan, a construction foreman, suggested that a change be made in the design of foundation columns for rotating furnace drums. Round columns started to be used instead of square columns and 1220 millimeter pipes that could be separated were used as molds.

Wood was no longer needed for the molds, and time and labor was not wasted on setting up the molds. A total of 72,000 rubles was saved on the foundations in the furnace section alone.

Competition using "workers' relay races" is an important factor that accelerates construction work. This competition strengthens cooperation among brigades at various trusts and subdivisions and it develops a feeling of camaraderie. For example, the brigade of carpenters and concrete workers led by A. Kuteynikov in the furnace section of the fodder phosphates complex and the brigade of fitters and welders led by Yu. Usenko at the "Krasnodarkhimstroy" Trust took on obligations to deliver furnace foundations to installation workers V. Pavlenko and A. Zhilina at the "Sevkavtekhmontazh" [Northern Caucasus Technical Installation] Trust. They, in turn, send the furnaces to fettling workers at the "Teplomontazh" [Thermal Installation] Trust. There has not been been one delay at any of the stages. The first six furnaces have already been sent for installation and adjustment.

Construction workers at the Krasnodar Chemical Plant have got the year off to a good start, and they are developing even more extensive competition with the aim of meeting the 27th CPSU Congress with fitting achievements. The program of operations for the second quarter represents an almost two-fold increase. But no one in the collective has any doubts about fulfilling the program. A solid foundation was laid in the first quarter for a major upsurge.

Dneprodzerzhinsk

At the end of last year a powerful ammonia complex was put into operation at the Dneprodzerzhinsk "Nitrogen" Production Association, and it is already producing ammonia. Another new project has been started here--a carbamide complex that the Ukrainian Komsomols have named as a key construction project. As a key construction project, the pace of work here should be worthy of Stakhovites. And the intensity of the labor competition should been even greater. Each collective has outlined its goals and has set deadlines for completion of work in each sector. The management staff of the construction project has set up control posts at the major projects in the complex. There are now 13. It seems that everything has been covered, everything has been taken into account. And there have been clear results. The huge screen illustrating the competition contains a new "lightning bolt," where the names of the victors are listed: the brigades led by A. Siniy, V. Budyanskiy from the "Dneprokhimstroy" general contracting trust, and V. But from the Krivoy Rog Steel Structures Trust.

On the whole the plan for the first quarter was surpassed by a little over 80,000 rubles. There would not seem to be any cause for concern. But if you take a close look at the gains already made by the construction workers, you will see that they are too small to assure a successful finish.

There is another general contractor at the construction project--the Nikopol Construction Trust. But the two trusts do not have any official contacts. There have been some serious problems at the carbamide complex: there are projects that have not even been started yet, even though the schedule indicates that work should have started there on 1 January. It is primarily

purification installations that are involved here. The area set aside for these facilities is flooded, since the ground water at the site is high. Adjustments should have been made in the plans. No one did anything about this earlier, and then the agreement was delayed, and the deadlines passed. Usually 16 months are allotted for the construction of purification facilities. And there are now less than 9 months remaining before the start-up date.

There are projects in the complex where a great deal of construction work has already been done, such as the thermal and electric power plant, which is supposed to have three boilers. But just one boiler is working there now, and it is supplying the ammonia production plant. Another boiler could be installed for the new complex. But in order to do this, the deadlines for the delivery of another evaporator must be moved up. The erection of the chemical water purification plant could also be stepped up if two more clarifying units were added to the one already installed. Once again, everything depends on the suppliers. The key construction project is in serious need of bimetallic sheet and crushed coal, but the Dnepropetrovsk Territorial Material and Technical Supply Administration is in no hurry to help the construction project. V. Pereverzev, chief of the completion and supply control department for priority construction projects, promised to send a representative to operational meetings in order to find out what the collective's needs are first hand. But somehow, a representative has never made it to the construction site.

There are other breakdowns that have appeared in the measures that are supposed to ensure prompt completion of the project. The coordinating staff of the Dneprodzerzhinsk gorkom should intervene in the affairs of the construction project to prevent further delays. Prompt completion of the complex depends to a great extent on the results of the second quarter.

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CSO: 1841/262

FERTILIZERS AND HARVEST IMPROVEMENT

Moscow KOMMERCHESKIY VESTNIK in Russian No 4, Feb 85 pp 2-3

[Article by A. Kochetko under the rubric "28th CPSU Congress--"A Worthy Reception"]

[Text] The USSR Ministry of Mineral Fertilizer Industry organized only three years ago, can already state with complete justification that the increase in the number of products offered the nation by its enterprises and its activity in this sphere are highly significant. It is enough to mention that the plants under its jurisdiction currently produce 20 different types of products. These include synthetic detergents, bleaches, starches and blueings, as well as other cleaning agents, adhesives, paints and varnishes. The level of production of these products has been steadily rising. Thus, there was an 8 percent increase from 1983 to 1984. Since the time that the ministry was established, total production has amounted to 908 million rubles; more than 13 million rubles in excess of the plan. Of this amount, 98.6 million rubles (versus 93.3 million rubles called for by the plan) are accounted for by mineral fertilizers and chemicals used for plant protection. First Deputy Minister Anatoliy Aleksandrovich Kochetkov tells our correspondent S. Pankova about the accomplishments, plans, and future of this new ministry.

Mineral fertilizers and chemicals used to protect garden crops, a prophylactic type of product produced by the enterprises of our branch, are of course deserving of separate consideration.

There has been an increase in the manufacture of such products in packaged form for sale to the general populace, in response to the resolution of the CPSU Central Committee and the USSR Council of Ministers "On Supplementary Measures for Increasing Production of Agricultural Products in Private Subsidiary Farms of Citizens" as well as in ways for implementing the Food Program laid out by subsequent Central Committee plenums.

At present 28 enterprises of the ministry are manufacturing first- and superior-quality fertilizers in granular form. In 1984 private subsidiary farms produced 130,000 metric tons of feed, a third more than in the previous year.

Such a significant increase in yield and a greater range of products of course call for major reorganization and specialization of manufacturing facilities. Such measures are provided for by the Comprehensive Program for Supplying the Population with Mineral Fertilizers for 1982-1985 and later years, which was developed by and is now in effect in the fertilizer industry.

Since its very founding the ministry has made great efforts to determine market demands for this type of product. Together with scientific research institutes of our ministry and the USSR Gossnab, we have investigated such indices as scientifically justified standards for fertilizer application, soil and climatic conditions of different regions of the country, future growth of the private plot sector, the biological requirements for chemical compounds used for the protection of all types of agricultural crops grown on private subsidiary farms, orders placed by the USSR Ministry of Trade for mineral fertilizers, and the predicted growth of consumer demand.

In March 1984 these issues were discussed by the Science and Technology Council of the ministry, with participation by representatives from the areas of trade, health care, and horticultural associations. We now have a clearer idea of the requirements of private farms.

It was resolved, for the purpose of increasing production volume and product range of these important "vitamins of the fields", that 19 new plants would soon be put into operation in Belorussia, Siberia, the Vologda Oblast, and other areas. These goals will be successfully realized with the aid of more than 50 automatic fertilizer packaging machines. It should be noted, unfortunately, that a large number of products, which are now or will be manufactured, have not been ordered by the USSR Ministry of Trade. This, of course, gives the erroneous impression that little attention is being paid to consumer demand, while in actuality the consumers are not as well informed as they should be. We are making no little effort to acquaint consumers with new developments in the area of fertilizers. For example, in order to increase consumer demand, the All-Union Scientific Research Institute of Chemical Compounds for Plant Protection (VNIIKhSZR) developed a plan of comprehensive measures for the period 1984-1985 concerning these products, which is already in effect. In addition, the All-Union Association Soyuzkhimzashchita, in charge of public relations, has also drawn up a working program which calls for television advertising, newspaper announcements and the publication of informational leaflets. There is also a need for our own printing facilities, for purposes both of improving the level of packaging quality and of increasing the volume of packaged products. This is a business matter, and calls for the creation of logos and the demonstration of our products to potential customers. The creation of a specialized warehouse would be an excellent way to advertise and to study consumer demand for this type of product.

I would like to take advantage of the space afforded this topic in KOMMERCHESKIY VESTNIK to say a few words about the great amount of labor contributed by our scientists before any product reaches the consumer. It is carefully tested in the laboratory, in experimental fields, and by the USSR Ministry of Health. Fruit and vegetable growers are given only those compounds which, when properly used, are harmless to both crops and humans.

Specialists have calculated that protective measures have brought about a 70-90% decrease in the susceptibility of our crop plants. The correct distribution of fertilizers assures a high yield.

Factories for fertilizers and plant-protecting compounds operate year-round. The products are utilized only during specific seasonal periods, very brief ones. Understandably, the briefer the period of fertilizer use, the longer the products must be stored in warehouses. Retail organizations require that 80% of total production be sold during the first six months of the year. But this is difficult for us to do, since our enterprises must maintain a steady output all year long.

There is only one possible outcome: the construction of factory warehouses for finished products. This makes it possible to deliver goods in response to customer orders.

The Scientific Research Institute for Fertilizers, Insecticides and Fungicides imeni Professor Ya. V. Samoylov has developed a branch program of scientific research on the creation of new types of fertilizer. The comprehensive program has already been mentioned. Thus, in the period 1985-1990, the populace will be offered 12 to 15 new types of mineral fertilizers containing special-purpose trace elements. The creation of comprehensive fertilizers with a specific ratio of nutrient minerals is the primary goal in manufacturing such products for general use.

Until recently, mineral fertilizers for private subsidiary farms were manufactured in solid form (powder or granules). Several years ago our chemists proposed that we begin to manufacture and use liquid comprehensive fertilizers. These are prepared from liquid components and are sprayed onto the fields. One of the advantages of such fertilizers is that they are always ready for use. One can easily maintain the necessary proportions of nutrients easily absorbed by the plants. Such fertilizers have been manufactured by our industry since 1984 (for example by the Azot Production Association in Rovno).

Production levels of vitaminized preparations have been rising steadily. While one year ago there were seven types of chemical substances used for plant protection, the number is now double that. These include the tried and true foxim and insectofoxim as well as new products such as benzophosphate and polikhom, used in combatting agricultural pests, including the Colorado beetle. The Pervomaysk Production Association "Khimprom" has been manufacturing such new products. Soon to reach the market is oleocuprite, used to treat apples against scale-insects, blind-worms and aphids. Oleocuprite will be manufactured by the Chapayev Chemical Fertilizer Plant. One additional plant is now commencing large-scale manufacture of isophene, a proven compound useful against such plant diseases as powdery mildew and spider mites. These and similar diseases can also be curtailed by the use of rtisof, a new product of the Shchelov Experimental Plant on the VNIIKhSZR. A particularly promising product is thizone, already available in retail stores. This is the first Soviet compound which can be used in greenhouses, whose soil requires particular care.

Advertising is absolutely necessary for the efficient utilization of mineral fertilizers and plant-protection chemicals in private plots.

In this respect, the system of agrotechnical servicing of private plots is of interest. In Hungary, for example the owners sign a contract with the cooperative or the Goskhoz, according to which the cooperative and the Goskhoz agree to supply the private plot owners with fertilizers, chemical herbicides and pesticides, machinery and other materials, i.e., they assume the primary responsibility for private farms. They are also responsible for state farms and for the agrochemistry of land currently in private use. Treatment of the holdings with herbicides and pesticides is centrally organized (carried out at the same time as fertilization and cultivation), and must be done under expert supervision. Such experience in working with mineral fertilizers and chemical substances for plant protection should perhaps be used to our own advantage. According to data of the USSR Central Statistical Administration, approximately 8 million hectares of cultivated land in our country are privately cultivated. Of this, 3.7 million hectares of crop land are sown with potatoes, and 0.55 million hectares with green vegetables. Approximately one fourth of agricultural products on the market are privately grown. It follows that one cannot neglect their contribution in supplying the market with vegetables. It was not without reason that, in the Auditing Report of the Central Committee of the 26th CPSU Congress, it was noted that those fruit orchards, vegetable gardens, poultry and other livestock belonging to our workers were a part of our common wealth.

Further increases in the range and quality of products for our nation will be closely based on the initiative, the enterprise exhibited and the economical approach of enterprise leaders to this important state affair. There must be greater emphasis on the use of bank credit, on an economical method of construction for expanding specialized shops and districts for the manufacture of products based on consumer demand, on more economical utilization of the material resources chosen, and on greater use of side products and residues from basic manufacture.

At the August 1984 Interrepublic Market Fair for Wholesale Distribution of Farm Goods, the entire output of mineral fertilizers offered by our industry was brought up.

As stated at the October 1984 Plenum, by General Secretary of the CPSU Central Committee, K. U. Chernenko, it is high time to obtain guaranteed harvests from the land. Our industrial sector has as its goal the use of every hectare for maximum yield.

But spring is not just around the corner. Many horticulturalists and private farmers are preparing the land for bountiful harvests and in so doing for more active participation in the implementation of the Food Program. In turn, the capabilities of our enterprises make it possible to produce and deliver to fertilizer retailers just as much as is needed. It is now up to the chemists: a shortage of polyethylene is delaying packaging operations. If it were not for this unfortunate factor, our sector would be able to provide all those, who wanted, with packages of fertilizer.

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CSO: 1841/278

UDC 541.123.7

REGENERATION OF POTASSIUM-MAGNESIUM SALTS FROM MOTHER LIQUORS IN PRODUCTION OF CHLORINE-FREE POTASSIUM FERTILIZER

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 58, No 4, Apr 85
(manuscript received 27 Sep 83) pp 721-724

SOLIYEV, L., GOROSHCHENKO, Ya. G., BORISENKO, L. A. and GORNIKOV, Yu. I.,
Institute of General and Inorganic Chemistry, UkSSR Academy of Sciences

[Abstract] Regeneration of potassium-magnesium salts from schoenite mother liquors is described and discussed and the sequence of crystallization of precipitates of the salts and their properties explained. The procedure is explained on the basis of phase equilibrium diagrams of solubility isotherms of an Na, K, Mg|| SO_4, Cl-H_2O system in a wide interval of temperatures. Essentially important--when selecting optimum conditions of regeneration of potassium and magnesium salts from mother liquors--is the nature of the sulfate phase, isolation of which in the sediment makes it possible to extract solutions of potassium and magnesium and sulfate ion from the evaporated solution. Data concerning changes of concentrations of solutions with composition resembling a commercial solution at the boiling point are discussed. The optimum temperature for separating kainite in the sediment is 50°. At isotherm 50° of the Na, K, Mg|| SO_4 , Cl-H_2O system is a field of halite+kainite bisaturation in the region of low concentrations of magnesium chloride in the evaporated solution. At this temperature, increase of the magnesium level in the evaporated solution up to 18-20 percent, makes it possible to separate kainite in the sediment directly from the solution. Figure 1, references 11: 7 Russian, 4 Western. [264-2791]

UDC 541.127:542.943:541.515:541.15

REACTION KINETICS OF RADICALS FORMED DURING PULSED ELECTRON IRRADIATION OF CYCLOALKANOLS IN LIQUID PHASE IN PRESENCE OF OXYGEN

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian No 2, Feb 85 (manuscript received 29 Nov 83) pp 282-290

LADYGIN, B. Ya. and REVINA, A. A., Institute of Electrochemistry imeni A. N. Frumkin, USSR Academy of Sciences, Moscow; State Scientific-Research and Design Institute of the Nitrogen Industry and of Products of Organic Synthesis, Moscow

[Abstract] An absolute reaction rate constant of $(0.4\text{-}2)\cdot10^7$ liters/mole·sec and an apparent activation energy of 20 kJoules/mole for the oxidation of alpha-oxycyclohexyl radicals by pulsed radiolysis was determined. alpha-Oxycyclododecyl radicals react with oxygen at 95°C at $2\cdot10^6$ liters/mole·sec. alpha-Oxycycloalkylperoxyl radicals, formed in liquid cyclohexanol and cyclododecanol, perish as a result of spontaneous decomposition. Figures 4; references 10: 6 Russian, 4 Western.
[208-12765]

UDC 548.736.64

FORMATION OF CRYSTALLINE STRUCTURE IN FLAKY SILICATE

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA in Russian No 4, Apr 85 (manuscript received 21 Mar 84) pp 727-730

TSODIKOV, M. V., KATSOBASHVILI, Ya. R., BUKHTENKO, O. V., KORNEYEVA, G. A. and LOKTEV, S. M., Institute of Petrochemical Synthesis imeni A. V. Topchiyev, USSR Academy of Sciences, Moscow

[Abstract] Acid-activated flaky silicon matrix interacts with group VIII metal carbonyls by its acceptor centers; the structure of such a silicon matrix was studied after decomposition of $Ni(CO)_4$ adsorbed on a surface of activated flaky silicon. The degree of crystallinity of the formed structure depended on the concentration of the reacting Ni, increasing with its increase. The skeleton of the crystalline lattice of silicon did not change when nickel was selectively removed from the formed structure by its carbonylation. An assumption was made that conversion of the microcrystals of amorphous silicon matrix along with their unification into a tetragonal configuration results from clustering of initially formed active particles of nickel bound to the matrix' microcrystallites. Figures 3; references 5 (Russian).
[253-7813]

UDC 532.612.3.64:546.28

STUDY OF WETTABILITY AND SURFACE TENSION OF SILICON SINGLE CRYSTAL

Moscow KOLLOIDNYY ZHURNAL in Russian Vol 47, No 2, Mar-Apr 85 (manuscript received 23 Sep 83) pp 236-240

BERENSHTEYN, G. V., D'YACHENKO, A. M. and RUSANOV, A. I., Odessa University

[Abstract] A study is reported of the influence of bending deformation on the contact wetting angle of silicon by water. Circular plates of single-crystal silicon 75 mm in diameter and 300 mm thick were cut perpendicular to the crystallographic direction III. Following surface treatment typical for silicon chip production, the crystals were flexed and contact wetting angle determined. This simple experiment indicates that during bending deformation the density of the substance on the convex surface and its free surface energy decrease. In contrast to liquids in molecular crystals it is possible that

$\gamma^{SL} > \gamma^{SV}$, and mechanical surface tension is probably negative. Young's equation is not applicable to surface stresses. The force of internal stresses in a solid is significant in the balance not only of normal, but also of shear components of forces at a three-phase contact line. Excess surface tension decreases in the process of bending deformation. Figure 1; references 9: 6 Russian, 3 Western.
[256-6508]

UDC 541.14

PHOTOELECTROCHEMICAL BEHAVIOR OF GALLIUM ARSENIDE AND POSSIBILITY OF ITS PROTECTION FROM PHOTOCORROSION BY TITANIUM DIOXIDE FILM

Moscow ELEKTROKHIMIYA in Russian Vol 21, No 3, Mar 85
(manuscript received 27 Jun 83) pp 370-372

ALIYEV, A. Sh., ALEKPEROV, A. I., PAKHOMOV, V. P. and FATEYEV, V. N.,
Institute of Inorganic and Physical Chemistry, AzSSR Academy of Sciences, Baku; Institute of Atomic Energy imeni I. V. Kurchatov, Moscow

[Abstract] This work continues a study of the possibility of using a heterogeneous structure generated applying a film of titanium dioxide to a gallium phosphide surface for photoelectrochemical decomposition of water. The electrolyte used was 0.5M H_2SO_4. The light source used was a type DRSH-500m lamp. Electrolyte temperature was 20°C. Best results were obtained by applying the TiO_2 film in a vacuum or in argon. Application of the film in a vacuum practically does not reduce the photocurrent resulting from absorption of GaAs but significantly decreases the dark current and, therefore, the dissolution of the semiconductor. Application of TiO_2 to GaAs thus suppresses photocorrosion of the gallium arsenide while retaining the sensitivity of the system to visible light. Figures 3; references 5: 3 Russian, 2 Western.
[255-6508]

UDC 541.135.5:541.133.1

APPEARANCE IN MEMBRANE POTENTIAL OF CONJUGATION OF ION AND NEUTRAL COMPLEXON FLUXES WITH ION EXCHANGER PRESENT IN MEMBRANE

Moscow ELEKTROKHIMIYA in Russian Vol 21, No 4, Apr 85
(manuscript received 6 Oct 83; after revision 11 Apr 84) pp 540-543

MOKROV, S. B. and STEFANOVA, O. K., Leningrad State University imeni A. A. Zhdanov

[Abstract] A previous work discussed the manifestation of nonequilibrium distribution of a neutral complexon over a membrane in the membrane potential for the case when the interacting cation is the only electric charge carrier in the membrane. This work also discusses this effect, though under somewhat different conditions, when the membrane contains simultaneously both a complexon and an ion exchanger with mobile lipophilic anions which practically do not penetrate into the aqueous phase. The introduction of the exchanger to the membrane is found to influence the EMF directly and indirectly, due to the appearance of an additional charge carrier. The general form of the membrane potential curves is expressed by an equation presented in the article. The placement of individual curves relative to each other indicates that the degree of complex formation depends directly on the concentration of the ion exchanger.
Figures 2; references 3 (Russian).
[254-6508]

UDC 542.91:547.495.4

NITROSOALKYLUREAS HAVING QUATERNARY NITROGEN ATOM. REPORT 1. SYNTHESIS OF NEW CHOLINOID NITROSOALKYLUREAS

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian No 2, Feb 85 (manuscript received 28 Nov 83) pp 365-369

BELYAYEV, A. A., GOPKO, V. F. and RADINA, L. B., Institute of Chemistry, Urals Scientific Center, USSR Academy of Sciences, Sverdlovsk

[Abstract] Some derivatives of nitrosoalkylureas are effective antitumor preparations. In the present work eight new di-substituted cholinoid nitrosoalkylureas were synthesized, wherein one of the substituents is an ethyltrimethylammonium group and the other is methyl, chloroethyl or cyclohexyl. The latter three were chosen for their known antitumor activity. The compounds were synthesized from N,N-dimethylethylenediamine as starting compound. References 8: 3 Russian, 5 Western.
[208-12765]

UDC 542.91:547.495.4

NITROSOALKYLUREAS HAVING QUATERNARY NITROGEN ATOM. REPORT 2. SELECTIVITY OF NITROSATION REACTION DURING PREPARATION OF CHOLINOID NITROSOALKYLUREAS

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian No 2, Feb 85 (manuscript received 28 Nov 83) pp 369-371

BELYAYEV, A. A. GOPKO, V. F. and RADINA, L. B., Institute of Chemistry, Urals Scientific Center, USSR Academy of Sciences, Sverdlovsk

[Abstract] Cholinoid nitrosoalkylureas, potential antitumor agents, were prepared by nitrosation of alkylureidoethyltrimethylammonium salts. This reaction could theoretically result in two isomers. The selectivity of the reaction is explained in terms of the limiting orbital theory employing quantum chemical data. References 8: 4 Russian, 4 Western.
[208-12765]

UDC 542.91:547.796.1

SYNTHESIS OF TETRAZOLES BY REACTION OF FURAN AND THIOPHENE NITRILES WITH ORGANIC AZIDES UNDER HIGH PRESSURE

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian No 2, Feb 85 (manuscript received 25 Apr 84) pp 461-463

KRAYUSHKIN, M. M., BESKIPYL'NYY, A. M., ZHURAVLEVA, Ye. B. and ZHULIN, V. M., Institute of Organic Chemistry imeni N. D. Zelinskiy, USSR Academy of Sciences, Moscow

[Abstract] Compounds having directly-bound heterocyclic and tetrazole groups are of interest owing to their physiological activity. In the present work compounds containing the tetrazolylfuran and tetrazolylthiophene groups were synthesized by reaction of furan and thiophene nitriles with organic azides. References 6: 3 Russian, 3 Western.
[208-12765]

UDC 542.91:547.1'127

BORONORGANIC COMPOUNDS. REPORT 418. SYNTHESIS OF CYCLIC TETRA-COORDINATED BORON COMPOUNDS FROM N,N'-DIPHENYLACETAMIDINE AND BORON TRICHLORIDE

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian No 2, Feb 85 (manuscript received 10 Nov 83) pp 428-430

BOLDYREVA, O. G., DOROKHOV, V. A. and MIKHAYLOV, B. M. (deceased), Institute of Organic Chemistry imeni N. D. Zelinskiy, USSR Academy of Sciences, Moscow

[Abstract] Derivatives of 4,4-dihydroxy-2-methyl-3-phenyl-1,4-dihydro-1-aza-3-azone-4-borate naphthalene were prepared by reaction of boron trichloride with N,N'-diphenylacetamidine in boiling benzene and hydrolysis of the reaction mix with water, methanol or a carboxylic acid. References 7: 5 Russian, 2 Western. [208-12765]

UDC 542.91:547.1'127

BORONORGANIC COMPOUNDS. REPORT 419. BORNITROGEN HETEROCYCLICS FROM N'-ARYL-N-(THIAZOL-2-YL)UREAS AND ORGANOBORANES

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian No 2, Feb 85 (manuscript received 10 Nov 83) pp 431-435

DOROKHOV, V. A., BOLDYREVA, O. G., MIKHAYLOV, B. M. (deceased), STARIKOVA, Z.A. and TESLYA, I. A., Institute of Organic Chemistry imeni N. D. Zelinskiy, USSR Academy of Sciences, Moscow

[Abstract] Cyclic tetra-coordinated boron compounds O-dialkylboryl-[2-(N-aryl)-carbamoylaminothiazolates], or their N-isomers may be prepared by reaction of N'-aryl-N-(thiazol-2-yl)ureas with organoboranes. The crystal and molecular structures of O-dipropyl boryl[-2-(N-phenyl)carbamoylaminothiazolate] were determined by X-ray analysis. References 12: 10 Russian, 2 Western. [208-12765]

UDC 546.18+547.36

REACTION OF TERTIARY PHOSPHINES WITH PROPARGYLIC ALCOHOL

Yerevan ARMYANSKIY KHIMICHESKIY ZHURNAL in Russian Vol 37, No 12, Dec 84 (manuscript received 20 Jul 84) pp 763-765

GASPARYAN, G. Ts., KINOYAN, F. S., OVAKIMYAN, M. Zh. and INDZHIKYAN, M. G., Institute of Organic Chemistry, ArSSR Academy of Sciences, Yerevan

[Abstract] Tributylphosphine was found to react with propargylic alcohol after heating at 120° for 8 hours to form tributylphosphine oxide, dipropargylic ether and allyl alcohol at 62.5, 13 and 65.4% yields, respectively. A reaction mechanism is presented along with experimental data which support triple bond hydrogenation of beta-acetylenic alcohols with tertiary phosphines. References 3 (Russian).
[204-12765]

UDC 541.6:541.49:547.558.1:546.175-323

STRUCTURAL FEATURES OF TRIPHENYLPHOSPHINE OXIDE-NITRIC ACID COMPLEX

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian No 2, Feb 85 (manuscript received 17 Oct 83) pp 320-324

MATROSOV, Ye. I., TKACHYEV, V. V., ATOVMYAN, L. O. and KABACHNIK, M. I., Institute of Heteroorganic Compounds imeni A. N. Nesmeyanov, USSR Academy of Sciences, Moscow

[Abstract] Complexes of phosphoryl compounds with nitric acid are interesting from the standpoint of extraction processes employing organophosphorus extractants. In the present work, an X-ray structural study was made of the $Ph_3PO \cdot HNO_3$ complex. IR-spectra show a strong fork-shaped H-bond in the crystalline state. The properties of the complex change markedly with changes in the aggregate status and change in solvent. This is evidently related to ease of polarization of the NO_3 fragment. Figures 2; references 14: 6 Russian, 8 Western.
[208-12765]

UDC 542.91:541.515:547.1'118

REACTION OF PHOSPHONYL RADICALS WITH SPATIALLY-INHIBITED CARBONYL COMPOUNDS

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian No 2, Feb 85 (manuscript received 2 Nov 83) pp 420-427

NASIROV, R. N., TUMANSKIY, B. L., MALYSHEVA, N. A., KARDANOV, N. A., GODOVIKOV, N. N., BUBNOV, N. N., PROKOF'YEV, A. I., SOLODOVNIKOV, S. P. and KABACHNIK, M. I., Institute of Heteroorganic Compounds imeni A. N. Nesmeyanov, USSR Academy of Sciences, Moscow

[Abstract] A study was made of the EPR spectra of some phosphonyl radicals and reactions with spatially-inhibited carbonyl compounds. The phosphonyl radicals add on to di-tertbutyl-p-benzoquinone either at the carbonyl oxygen atom to form a phenoxyl group, or at the double bond in the ring to form a cyclohexadienyl group. Phosphonyl groups react with spatially-inhibited methylenequinones in a similar manner. They add on to 4,4-dialkyl-2,6,-di-tertbutylcyclohexadiene-2,5,1-one at the ring double bond only, to form the corresponding cyclohexadienyl groups. Phosphonyl groups also react by addition to 3,3,5,5-tetratertbutyldiphenylquinone at the ring double bonds. Figures 2; references 11: 5 Russian, 6 Western.
[208-12765]

UDC 542.91:541.63:547.1'118

PYRIDINIUM-1-PHENYL-3,5,8-TRIS(TRICHLOROMETHYL)-1-BORONATE-2,6,7-TRIOXA-4-PHOSPHABICYCLO[2.2.2]OCTANE

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian No 2, Feb 85 (manuscript received 5 Jun 84) pp 469-471

ARBUZOV, B. A., NIKONOV, G. N., IGNAT'YEVA, S. N. and YERASTOV, O. A., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan Branch, USSR Academy of Sciences

[Abstract] Pyridinium-1-phenyl-3,5,8-tris(trichloromethyl)-1-boronate-2,6,7-trioxa-4-phosphabicyclo[2.2.2]octane was prepared by reaction of tris(alpha-oxy-beta,beta,beta-trichloroethyl)phosphine with phenylboric acid anhydride in the presence of pyridine. This is a new type of bicyclic compound containing a Group III element. References 5: 2 Russian, 3 Western.
[208-12765]

UDC 541.63:547.1'118

SPACIAL STRUCTURE OF PHOSPHORUS CONTAINING HETEROCYCLES. REPORT 36. 2-DIALKYLAMINO-1,3,2-DIOXAPHOSPHEPINES WITH TETRACOORDINATED PHOSPHORUS

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA in Russian No 4, Apr 85 (manuscript received 3 Jan 84) pp 799-803

KADYROV, R. A., ARSHINOVA, R. P., KLOCHKOV, V. V., AGANOV, A. V. and ARBUZOV, B. A., Chemical Institute imeni A. M. Butlerov, Kazan State University imeni V. I. Ul'yanov-Lenin

[Abstract] 2-Dialkylamino-1,3,2-dioxaphosphepines (2DA-1,3,2-DOP) with tricoordinated phosphorus P(III) show a conformational equilibrium between a chair form with equatorial dialkylamino group and a twist form. In the present study the effect of the P atom on conformation of 2-DA-1,3,2-DOP was investigated. Based on the NMR^{1}H spectra, DM and Kerr constants, the 1,3,2-DOP with the $P{=}NR_2$ bond in non-polar solvents were characterized by an equilibrium e-K$\rightleftarrows$T shifted towards the chair form with the e-orientation of dialkylamino group analogously to the corresponding six-membered 1,3,2-dioxaphosphorinanes. The tendency to stabilize the K-form increased in this series of compounds going from P(III) to P(IV). Figures 2; references 13: 8 Russian, 5 Western (1 by Russian authors).
[253-7813]

UDC 542.97:547.1'118'161

CATALYTIC PHOSPHORYLATION OF POLYFLUOROALKANOLS. REPORT 10. CATALYTIC PHOSPHORYLATION OF α-POLYFLUOROALKYLBENZYL ALCOHOLS WITH DIARYLCHLOROPHOSPHATES

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA in Russian No 4, Apr 85 (manuscript received 23 Jan 84) pp 878-882

GORYUNOV, Ye. I., ZAKHAROV, L. S., PETROVSKIY, P. V. and KABACHNIK, M. I., Institute of Heteroorganic Compounds imeni A. N. Nesmeyanov, USSR Academy of Sciences, Moscow

[Abstract] The direction of catalytic phosphorylation of α-polyfluoroalkylbenzyl alcohols with diarylchlorophosphates was studied as a function of the catalyst, type of substituent in the alcohol benzene ring, the chain length and the structure of polyfluoroalkyl radical, using α-trifluoromethylbenzyl alcohol, its p-methyl homologue, α-heptafluorobenzyl alcohol and α-(heptafluoro-3-oxabutyl)benzyl alcohol as phosphorylating objects and diphenylchlorophosphates or di(m-tolyl)chlorophosphate as the phosphorylating agents. It was shown that in contrast to $POCl_3$, reaction of catalytic phosphorylation of α-polyfluoroalkylbenzyl alcohols with diarylchlorophosphates leads practically exclusively to (α-polyfluoroalkylbenzyl)diarylphosphates, regardless of the structure of alcohol or reaction conditions. References 11: 6 Russian, 5 Western.
[253-7813]

UDC 541.6:547.1'118

STRUCTURE OF RIBITE DIPHOSPHATE $C_5H_7ClO_5P_2$

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA in Russian No 4, Apr 85 (manuscript received 26 Jan 84) pp 883-885

MAKAROVA, N. A., MUKHMENEV, E. T. and ARBUZOV, B. A., Institute of Organic and Physical Chemistry imeni A. Ye. Arbuzov, Kazan Branch, USSR Academy of Sciences

[Abstract] An attempt was made to determine the size of cyclic chlorophosphite fragment in ribite diphosphite (I). Based on NMR^{31}P spectral data it was shown that I has the structure of 6-chloro-2,5,7,11,12-pentaoxa-1,6-diphosphatricyclo-[7.2.1.0^{4,8}]dodecane and not that of the previously reported 8-chloro-2,4,7,9,12-pentaoxa-3,8-diphosphatricyclo[4.4.1.1^{3,11}]dodecane.
References 12: 8 Russian, 4 Western.
[253-7813]

UDC 541.128.34:542.953:547.313.6:546.7

CATALYTIC ACTIVITY OF LOW TEMPERATURE COCONDENSATION PRODUCTS OF OLEFINES WITH TRANSITION METAL VAPORS

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA KHIMICHESKAYA in Russian No 4, Apr 85 (manuscript received 29 Jan 84) pp 914-919

VASIL'KOV, A. Yu., ZAKURIN, N. V., KOGAN, A. S., SERGEYEV, V. A. and LISICHKIN, G. V., Institute of Heteroorganic Compounds imeni A. N. Nesmeyanov, USSR Academy of Sciences, Moscow

[Abstract] Hexene-1 reactions in presence of condensed vapors of Cr, Mn, Fe, Co, Ni and Pd were studied evaluating catalytic activity of these elements under conditions of low temperature vacuum cocondensation. The stability of metal ashes in olefines was determined along with the possibilities of the formation of metalorganic compounds by the reaction of metal vapors with hexene. The following series of catalytic effectiveness was noted: Cr>Mn>Ni≃Co>Fe. Pd was inert and the activity of Cr and Mn was so high that kinetic isomerization could not be properly studied. In presence of these metals, catalytic reactions of hexene-1 went far beyond simple positional and cis-trans isomerization, all the way to oligomerization. In respect to the latter, the following series of effectiveness could be constructed: Cr>Mn>Ni≃Co≃Fe. In addition, dehydrocyclization of hexene-1 also took place under these reaction conditions.
Figure 1; references 13: 4 Russian, 9 Western.
[253-7813]

MINISTRY OFFICIAL DESCRIBES PIPELINE CONSTRUCTION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 19 May 85 p 1

[Article by G. Sudobin, deputy minister of construction of petroleum and gas industry enterprises]

[Text] The Urengoy--Center-2 gas pipeline has been tested, filled with gas, and put into operation; it is the last of the six transcontinental gas pipelines, the most important construction projects of the 11th Five-Year Plan. Workers in the Ministry of Construction of Petroleum and Gas Industry Enterprises, together with specialists from the Ministry of the Gas Industry and other ministries and departments, have managed to fulfill the five-year program for the construction of powerful main gas pipelines outlined by the 26th CPSU Congress ahead of schedule.

At our editors' request, G. Sudobin, deputy minister of construction of petroleum and gas industry enterprises, tells about this event.

The scale of this pipeline transport system is unprecedented anywhere in the world. The financial outlays on the construction of all six lines exceed the cost of building the Baykal-Amur Mainline, the Kama Motor Vehicle Plant, the Volga Motor Vehicle Plant, and "Atommash" combined. Suffice it to say that during the construction period, the workers laid over 20,000 kilometers of large-diameter pipeline, weighing approximately 15 million tons. Workers dug up over 700 million cubic meters of earth, completed 9500 kilometers of welded joints, and built compressor stations with a total capacity of 15 million kilowatts. Consumers received over 14.5 billion cubic meters of gas above the plan because each line was put into operation ahead of schedule. For comparison, let me remind you that in 1955 gas extraction throughout the country as a whole totalled only 9 billion cubic meters.

The use of powerful, high-productivity equipment played a major role in stepping up the construction of the gas pipelines. The technical retooling of the industry, which started at the beginning of the current five-year plan, made it possible to devote machinery and mechanisms representative of the best world models to these construction projects. Suffice it to say that the

power-worker ratio was over 55 kilowatts. The over-all average capacity of the machinery at a single spread was about 14,000 kilowatts.

Social measures carried out in the sector also played an important role. The expedition-shift construction method was utilized on a large scale, and social and domestic facilities and working and recreation conditions were improved. Systems were introduced for restoring and improving the construction workers' working ability. A social infrastructure was created, which included stationary and mobile field villages, and specialized institutions and facilities to provide the construction workers with domestic, personal, trade, medical, and cultural services. All this made it possible to achieve a high level of stability among the collectives and raise their productivity. Labor input per kilometer of pipeline was reduced by almost one-third compared to the beginning of the five-year plan.

Organizational and other changes also affected ground construction. The self-contained block method was a powerful stimulus here. The essence of this method is that the basic blocks of compressor stations and other technological and social and domestic units are manufactured or "started" by equipment at a plant, and are then delivered to the construction sites. All that remains to be done is installation and connection. Application of the self-contained block method on a large scale, for example, in the erection of the No 9 unit for comprehensive preparation of gas at the Urengoy gas condensate deposit, made it possible to complete construction in 6 months, instead of the usual 2.5 years. The erection of projects using block-pontoons weighing between 250 and 1300 tons will be important in the near future; this will make it possible to transfer almost all the construction processes to plant shops.

But people are the main force behind construction. It was their dedication to their work, their experience, and their enthusiasm that helped break all the world records. I would like to make special mention of V. Madenov, a brigade leader in an insulation and laying column; in 10 years his collective insulated and laid over 1000 kilometers of pipeline under extreme conditions. N. Minayev was the first in the sector to master the "Sever-1" electric contact welding unit, and he has now pledged to weld 100 kilometers of pipeline ahead of schedule. The technological units under the supervision of P. Sazonnik, A. Rekoshetov, and others long ago mastered the art of working in snowstorms and heavy frosts. Last summer they also managed to lay a large section of pipeline in warm weather. In the "inter-seasonal" period from June to October, for the first time in the Tyumen project the workers laid about 200 kilometers of pipeline.

We can say a great deal in praise of the workers in the Main Tyumen Pipeline Construction Administration, the Main Tyumen Petroleum and Gas Construction Admnistration, the Siberian Finishing and Installation Association, the Main Ukrainian Petroleum and Gas Construction Administration, the Main Pipeline Construction Administration, and other organizations under the Ministry of Construction of Petroleum and Gas Industry Enterprises. In the 11th Five-Year Plan alone, 8 workers in the sector were awarded the title of Hero of Socialist Labor, and there are 55 Heroes of Socialist Labor working in the sector now. In the first 4 years of the five-year plan almost 4000 workers under the

ministry were awarded USSR medals and orders, and 18 workers won the State Prize for outstanding achievements in labor.

We would like to express our sincere thanks to our partners in other sectors, especially the workers in the Ministry of the Gas Industry. They have demonstrated a great deal of initiative and energy in supplying technical equipment on schedule and they have helped construction workers resolve problems that arise in the process of laying the pipeline. River, maritime, rail, and air transport workers, along with specialists and collectives under other ministries and departments have also done a good job of fulfilling their obligations. Local party and soviet organs devote constant attention to the needs of the pipeline workers, and particpate actively in educational work. It was only through the combined efforts of all those involved that we were able to achieve the needed organization of labor and proper living conditions along the pipeline.

Over 600 brigades and sectors are already working toward the goals of 1986. They are setting new records through their outstanding labor. In the past 4 years labor productivity in the Ministry of Construction of Petroleum and Gas Industry Enterprises has increased by 21 percent. This growth made it possible to put the six Urengoy pipelines into operation ahead of schedule. This will also be one of the factors in the rapid development of the Yamburg gas condensate deposit, which should become a major raw materials base for further expansion of gas production in Western Siberia in the 12th Five-Year Plan.

9967
CSO: 1841/262

UDC 541.14:547.639.5

PHOTOCHEMISTRY OF 2,6-DIPHENYLCYCLOHEXANONE

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA in Russian No 2, Feb 85 (manuscript received 10 Nov 83) pp 361-365

TARASOV, V. F., KLIMENOK, B. B., ASKEROV, D. B., and BUCHACHENKO, A. L., Institute of Chemical Physics, USSR Academy of Sciences, Moscow

[Abstract] Photolysis of cis-, trans-2,6-diphenylcyclohexanone results in the formation of cis-, trans-1,2-diphenylcyclopentane and cis-, trans-1,5-diphenylpentene-1. The yield is independent of the configuration of the original ketone. Under the action of light, cis-, trans-2,6-diphenylcyclohexanone dissociates to form acylbenzyl biradicals, which decarboxylate into benzylbenzyl biradicals. The recombination and disproportionation reactions of the latter determine the nature and yield of the above products, the recombination reaction being significantly less stereospecific than that of the disproportionation which results chiefly in the formation of the trans-isomer. References 8: 2 Russian, 6 Western.
[208-12765]

UDC 661.185.2

MONOSODIUM SALTS OF SULFOMALEIC ACID DIESTERS (STRUCTURE AND PROPERTIES)

Leningrad NEFTEKHIMIYA: SBORNIK NAUCHNYKH TRUDOV in Russian 1985 (signed to press 7 Feb 85) (manuscript received 26 Nov 81) pp 138-141

PANAYEVA, S. A., GERMASHEVA, I. I. and SALIKOVA, R. I., All-Union Scientific Research and Planning Institute of Surface-Active Agents

[Abstract] The authors have previously studied the influence of the number and nature of hydrophilic substituents in the molecules of surfactants on chemical and colloid-chemical properties. Continuing these studies, an investigation is reported of the influence of the double bond in the hydrophillic portion of the surfactant molecule on the colloid-chemical properties of compounds. Monosodium salts of sulfomaleic acid diesters were synthesized and their spectra are discussed. Some of the colloid-chemical properties of these salts were studied in comparison to previously known surfactants. The new salts are micelle-forming surfactants, the critical concentration of micelle formation being

within limits typical for sulfosuccinic acid derivative surfactants. Very low minimal surface tension of aqueous solutions at the boundary with air results from the influence of the double bond on the adsorption of surface-active molecules. The new compounds are more surface active than previously known ones. Figure 1; references 12: 11 Russian, 1 Western.
[259-6508]

UDC 547.572:66.095

METHOD OF PRODUCING ALPHA-TETRALON

Leningrad NEFTEKHIMIYA: SBORNIK NAUCHNYKH TRUDOV in Russian 1985
(signed to press 7 Feb 85) (manuscript received 30 Nov 81) pp 118-121

AMOSOV, Yu. I., TERPUGOVA, M. P. and KOMLYAREVSKIY, I. L., Institute of Chemical Kinetics and Combustion, Siberian Department, USSR Academy of Sciences

[Abstract] The possibility of oxidizing alpha-tetralol to alpha-tetralon as a method of producing alpha-tetralon was studied. Dilute HNO_3, hydrogen peroxide in acetic acid, hypochlorites, solutions of sodium bichromate or potassium bichromate in dilute sulfuric acid were tested as oxidizers. Best results were obtained by oxidation of alpha-tetralol with sodium bichromate or potassium bichromate in dilute sulfuric acid at 40-50°C. The reaction occurs quite rapidly, the major product (94%) being alpha-tetralon. The data indicated that it is also possible to further oxidize the oxidate containing a mixture of alpha-tetralon, alpha-tetralol and tetraline hydroperoxide, the yield of alpha-tetralon from this reaction depending on the rate and sequence of mixing of the oxidate and oxidizer. The total yield of alpha-tetralon from reacted tetraline is 93%. References 8 (Russian).
[259-6508]

UDC 661.726:547.422.5"898

STUDY OF CERTAIN PHYSICAL-CHEMICAL AND TOXICOLOGIC PROPERTIES OF CROWN ESTERS

Novosibirsk IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKIYE NAUKI in Russian No 5, Issue 2, Mar 85
manuscript received 5 Oct 84) pp 117-120

KOBRINA, V. N., LAPIK, A.S., DOLGIKH, M. P., KRUGLIK, G. Z., OBUT, S. M. and KHMEL'NITSKIY, A. G., Novosibirsk Institute of Organic Chemistry, Siberian Department, USSR Academy of Sciences

[Abstract] Results are presented from studies of certain physical-chemical and toxicologic properties of crown esters required for introduction of these macrocycles into the national economy. Solubility was determined in nineteen solvents. Introduction of aromatic substituents greatly reduces the solubility of the macrocycles in comparison to aliphatic polyesters. Hygroscopicity was determined at room temperature and various moisture contents. The introduction of aromatic substituents also greatly reduces the capacity of the macrocycles to absorb moisture from the air. All of the crown esters studied are moderately dangerous or practically nontoxic compounds except benzo-15-crown-5 which has comparatively low LD_{50} and a clearly expressed skin resorptive effect.

Figure 1; references 12: 6 Russian, 6 Western.
[257-6508]

NEW ORGANIZATION OF LABOR HELPS EXPAND PRODUCTION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 19 May 85 p 1

[Article by S. Vidgof: "Order Is to Everyone's Liking"]

[Text] Dnepropetrovsk--The "Dnepropolimermash" [Dnepropetrovsk Polymer Machinery] Plant specializes in the production of equipment for the tire, rubber, and asbestos industries. For this reason, it was quite a surprise to see harvesters in one of the machine assembly shops.

A. Danil'chenko, director of the plant, said proudly, "Last year we produced 1000 units, and this year we plan to triple that."

Is agricultural machinery a new direction in the plant's operations?

Anatoliy Vasil'yevich smiled and said, "It is really a graphic example of the effect of work place certification, a lesson in overcoming stereotypes."

Two years ago when the Dnepropetrovsk Oblast Party Committee instructed the plant to help provide machinery for agriculture, the managers of the plant were in a difficult position: they didn't have any space to set up this kind of production, and they had no extra workers. In their search for a solution, they decided to learn from the experience of the Dnepropetrovsk Combine Plant, neighbors who had managed to increase production efficiency signficantly through work place certification. The machine plant managers visited the combine plant and studied the certification method, and then organized training in their own shops.

A. Danil'chenko said, "Frankly, we didn't really expect much success. Compared to the combine plant, our plant is very new and modern, just 17 years old. We are constantly changing our products list, and we are engaged in small-series production, which means that we must constantly focus attention on utilization of equipment. Therefore, we thought: certification will not require a lot of work, and it won't open up a lot of reserves. As it turned out, we got much more than we expected."

In just the first two months that the certification commission was in operation some unexpected results were obtained; the commission was aided by special groups formed in the shops. Much that had been customary in the past on examination turned out to be inconvenient, and sometimes unnecessary.

Forty-five work places were eliminated altogether, 136 of the 878 examined had to be reorganized, it was decided that some machine tools should be removed and sold, and the same kind of equipment was grouped together. This is how space was found for producing harvesters, and it was not necessary to provide any more workers after the work was redistributed.

They say that one picture is worth a thousand words...So this vivid demonstration of the effect of certifcation provides more eloquent proof of the need to continue this work. A competition was announced at the plant for the best organization of certification operations. The results were compiled recently. The metal structures shop won first place.

The first impression one gets in the shop is one of order. The bright room with high ceilings does not have the piles of metal all over the floor that are typical of shops of this nature. Parts and structures are arranged neatly on low, wide shelves. The sections in the shop are laid out efficiently. The machine tools are marked with a blue "A" in a white oval, which indicates that that work place has been certified. At first glance one can see that the equipment is organized in a rational way--there is easy access, good lighting, and the manufacturing instructions and accessories are located conveniently within reach on special shelves.

A. Slyusar', the shop foreman, laughed and said, "We still have to mix some colors, repaint some things, and fit the welding shop with the latest equipment. Then it will be hard to drag yourself away from here."

Together with the engineers, the workers examined every section of the shop, and analyzed every minute. They literally saw everything with new eyes. If the fitters go get parts 10 times during a shift, and have to look for them in a pile on the floor, they ask: Why waste so much time on this? If some workers are assembling a structure on a work bench, why should the others wait until the bench is free? It takes several men to haul two-ton sheets of metal to the guillotine cutters along rollers. But automatic rollers for feeding the metal into the cutters were developed a long time ago.

The commission evaluated each work place from the standpoint of ergonomics, esthetics, and norm setting, and people tried to help the commission, not only by introducing suggestions more clearly, but also by participating in the realization of the suggestions.

A. Fedorov, leader of a brigade of fitters and assemblers, said, "They were working for themselves, because order is to everyone's liking."

The formation of his brigade was also the result of certification. Previously this collective was part of a large combined brigade of fitters that served a huge sector. Certification indicated that the collective was difficult to manage, and the work place was not equipped in a rational way. With the help of the scientific organization of labor services, and taking into account the workers' suggestions, the sector was reorganized. The effect was as follows: before the brigade had 22 people, now there are 27 people in three brigades, and they are working on quotas 1.5 times larger than before.

Similar figures have been reported in other shops as well. Labor is organized more rationally in the sections that underwent certification, which means that the output is higher and the discipline is markedly improved.

Most important, however, is that one can sense that the new effort has touched the entire collective, and given people a feeling of real participation. This is reflected in practical terms in the enterprise's economic operations: the yield on capital has increased by almost 12 percent in the past 2 years, 98 percent of the space is being used, instead of 86 percent, and labor productivity has risen by 17 percent.

9967
CSO: 1841/262

UDC 547.419.4(088.8)

COPOLYMERIZATION OF METHYL-alpha-THIOCYANOVINYL KETONE WITH VINYL MONOMERS

Yerevan ARMYANSKIY KHIMICHESKIY ZHURNAL in Russian Vol 37, No 12, Dec 84 (manuscript received 10 Mar 83) pp 759-763

DURGARYAN, A. A., GRIGORYAN, A. S. and YESAYAN, G. Ye., Yerevan State University

[Abstract] Sulfur-containing polymers, used as ionites or polyelectrolytes, may be prepared by modification of polymers not containing sulfur or from monomers that contain sulfur. The latter, however, are difficult to convert to thiol polymers and therefore copolymerization of a monomer such as methyl-alpha-thiocyanovinyl ketone is especially interesting. A study was made of the copolymerization of the cited ketone with styrene and vinyl acetate in the presence of azo-bis-alpha, alpha'- isobutyronitrile at 70°C, and the reaction rate constants were determined. Copolymerization of the ketone with a mixture of ethylstyrene and divinylbenzene resulted in a crosslinked polymer which may be used to prepare an ionite containing a mercapto group and having an ion exchange capacity of 1.44-2.85 mg-eq/g for 0.1N NaOH and 1.25-2.5 mg-eq/g for $Hg(NO_3)_2$. Figure 1; references 14: 6 Russian, 1 Polish, 7 Western.
[204-12765]

UDC 678.032.2.541.24.08

PROPERTIES OF STAR STRUCTURED BLOCK-COPOLYMERS OF BUTADIENE-METHYLSTYRENE

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 85 pp 20-21

POLYAKOVA, G. R., GRIGOR'YEVA, L. A., GLUKHOVSKIY, V. S., BALASHOVA, N. I., IZYUMNIKOV, A. L. and POLYAKOV, D. K.

[Abstract] Diene-vinylaromatic block-copolymers are widely used as high strength elastomers or as additives to modify the properties of various plastics, especially styrene. Star structured block-copolymers containing alpha-methylstyrene and having improved physical-mechanical properties are synthesized by a process which includes a so-called "virulent" homopoly-alpha-methylstyrene stage which block-copolymerizes with butadiene and forms cross-links to form star structured diblock-copolymers with polyfunctional coupling agents. Under normal conditions, it is almost impossible to avoid deactivating

the active chain terminals, and the final product thus contains fragments of low molecular weight polymer chains. A study of the effects of these fragments and their molecular weight distribution on the physical-mechanical properties of the material showed that strength has an extremal relationship to composition in three-component block-copolymers, and that adding a diblock-copolymer, having no strength of its own, can cause a significant ordering effect. The results of this study may be used to improve the process for making star-structured block-copolymers and to control the properties of thermoelastic plastics by changing their compositions. Figure 1; references 3: 1 Russian, 2 Western.
[198-12765]

UDC 678.675.002.612.3.01

EFFECT OF COMPATABILITY PARAMETER ON PROPERTIES OF BINARY MIXTURES BASED ON POLYHEXAMETHYLENE ADIPINAMIDE

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 85 pp 21-22

LAPSHIN, V. V., ANDREYEVA, T. I., VAKHTINSKAYA, T. N., SOLOV'YEVA, I. I. and TRIFONOVA, L. V.

[Abstract] A study was made of the effects of a compatability parameter, beta, on the engineering and mechanical properties, warping, anisotropy of mechanical properties and shrinkage of cast samples of binary mixtures polyhexamethylene adipinamide and a filler consisting of a mixed polyester, a polycarbonate or a polyolefin such as polypropylene. Beta is defined by a formula which correlates the cohesion energies and solubility parameters of the polymer pair. Seven polymer fillers used in the study showed that a decrease in beta for a binary mixture helps lower the anisotropy of mechanical properties, shrinkage, warping of cast products, and increases the work required to rupture on impact in respect to elongation during rupture and the flow limit during stretching. References 4: 3 Russian, 1 Western.
[198-12765]

UDC 678.5.033.046:678.026.3:63

STRUCTURE AND PROPERTIES OF HIGHLY FILLED PE FILMS

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 85 pp 43-44

LOBKOVA, M. L., STAL'NOVA, I. O., ROMANOVA, Z. A. and ABRAMOV, V. V.

[Abstract] A study was made of the structure and properties of polyethylene film compositions containing fillers such as kaolin, chalk, talc, tuf and mica for the purpose of finding materials suitable for agricultural needs. High pressure polyethylene and polypropylene matrices were combined with the filler materials in the molten state and extruded in a "Brabender" extruder and then

granulated. Effects of mixing parameters on structure were studied on a "Banbury" mixer and a "Goettfert" extrusiometer. The results showed that 0.1-2.0% filler content improves strength, and addition of titanium-calcium pigment together with other stabilizers significantly raises heat resistance. The study demonstrated the suitability of using highly filled polyethylene compositions for agricultural purposes. Figure 1; references 5: 4 Russian, 1 Western.
[198-12765]

UDC 678.744.4.198.686

OLIGOPOLYESTER COMPOSITIONS BASED ON FUNCTIONAL PEROXIDE OLIGOMERS

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 85 pp 45-46

KUCHER, R. V. and BRATYCHAK, M. N.

[Abstract] A study shows that peroxide oligomers based on epoxy and polyglycidylphenolformaldehyde resins can be used as structuring agents in oligopolyester compositions to give composite materials having high dielectric and mechanical properties and are heat and chemical resistant. Figure 1; references 6 (Russian).
[198-12765]

UDC 678.675-19.678.019.394

THERMAL STABILITY OF MOLTEN FILLED POLYAMIDE 6

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 85 pp 46-48

BOBKOV, S. A. and USHAKOVA, O. B.

[Abstract] Polymeric materials subjected to pressure casting undergo intense thermal and mechanochemical breakdown which can lessen the properties of the finished product. A study was made of the effects of natural graphite, thermoanthracite and kaolin clay on the thermal stability of molten secondary polyamide 6 (PA-6). A comparison of differential thermal analysis (DTA) and isothermal thermogravimetric analysis (TGA) curves obtained by heating compositions in air and in nitrogen indicate that compositions containing thermoanthracite are mainly governed by desorption of surface moisture, while compositions containing kaolin and graphite displayed analogous conversions in an inert medium at much higher temperatures. Evidently, small amounts of filler have a screening effect on the active polyamide groups, while large amounts decrease the mobility of the macromolecules thereby ruffling the system and facilitating oxygen entry to the active groups. The TGA data agreed well with that obtained rheologically, so that the latter method may be used to determine the onset of molecular, rheological and physical mechanical breakdown. Figures 2; references 15: 14 Russian, 1 Western.
[198-12765]

UDC 678.032.067

SHAPING CAPABILITIES OF THERMOSETTING PLASTICS

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 85 pp 48-50

SOKOLOV, A. D.

[Abstract] A detailed discussion on thermosetting plastics lists their advantages over thermosoftening plastics for shaping various products such as thin walled containers and bulkier items. Thermosetting plastics are easier to handle, lend themselves well to pressure casting and produce products having fewer defects. Figures 3; references 14 (Russian).
[198-12765]

UDC 678.84-278

GAS SEPARATION MEMBRANES BASED ON SILICON-ORGANIC POLYMERS

Moscow PLASTICHESKIYE MASSY in Russian No 2, Feb 85 pp 61-62

SAMSONOVA, A. N. and AKSENOVA, A. R.

[Abstract] A review of the patent and technical literature (mostly western) on silicon-organic gas separating, i.e., diffusion membranes, gives a breakdown by country (USA and France predominating). The review covers methods of preparation and areas of application (medicine, industry and agriculture). References 24: 5 Russian, 19 Western.
[198-12765]

UDC 532.135:678.674.046

RHEOLOGIC PROPERTIES OF FILLED UNSATURATED OLIGOESTERS

Moscow KOLLOIDNYY ZHURNAL in Russian Vol 47, No 2, Mar-Apr 85 (manuscript received 23 Mar 84) pp 246-251

BEL'NIK, A. R., ZHUKOVA, N. S. and ROGINSKIY, S. L., All-Union Scientific Research Institute of Glass-Reinforced Plastics and Glass Fibers, Kryukovo, Moscow Oblast

[Abstract] A study was performed to establish the relationship of rheologic properties of filled saturated oligoesters to concentration and to characteristics of dispersed fillers used in the production of polyester pressed materials. Flow curves were constructed from the results of measurements on a rotary viscosimeter with kaolin, calcite and milled chalk fillers. The dispersion medium used consisted of solutions of oligopropylene maleinate phthalate in triethylene glycol dimethacrylate. It is found that as the degree of filling of the compositions increases the ratio of maximum viscosity to

minimum viscosity passes through a maximum corresponding to the formation of a continuous framework of filler particle agglomerates in contact with each other. The rheologic properties of filled compositions based on the low viscosity binder were determined at 20°C, that of the higher viscosity binder with 60 mass percent concentration at 20-50°C. Figures 4; references 6: 5 Russian, 1 Western.
[256-6508]

UDC 541.6:546.16+541.127

DIRECT FLUORINATION OF POLYETHYLENETEREPHTHALATE FILMS

Moscow KHIMICHESKAYA FIZIKA in Russian Vol 4, No 4, Apr 85
(manuscript received 3 Apr 84) pp 538-543

KHARITONOV, A. P., MOSKVIN, Yu. L. and KOLPAKOV, G. A., Section of the Institute of Chemical Physics, USSR Academy of Sciences, Chernogolovka

[Abstract] Polyethyleneterephthalate (PETP) film was directly fluorinated using gaseous fluorine in a stainless steel reaction vessel. Final sample mass was 1.89 compared to the starting mass. Spectral data indicated fluorination was complete, and also showed the presence of peroxide radicals, approximately 1 per 1000 fragments of PETP. Apparently only some double bonds were broken in the process. Interference spectroscopy indicated that there was a sharp boundary between the fluorinated and nonfluorinated portions during the process, that density remained constant, and that the thickness of the fluorinated layer depended on the fluorination time and the pressure of the fluorine; i.e., the process is diffusion controlled. The HF produced, even at a 3% concentration, approximately halved the reaction rate; NaF acted as an efficient adsorbent of this byproduct. Permeability of the fluorinated layer to pure fluorine depended only on the pressure, but when oxygen was admixed, it dropped sharply; however, helium, nitrogen and carbon dioxide did not inhibit the process. Figures 4; references 12: 6 Russian, 6 Western.
[268-12672]

UDC 661.872.28

RADIOCHEMICAL STUDY OF HYDROXIDE FILMS. PART 3. STUDY OF PROCESS OF PRECIPITATION OF IRON HYDROXIDE FILMS ON GLASS

Leningrad RADIOKHIMIYA in Russian Vol 27, No 2, Mar-Apr 85
(manuscript received 18 Aug 83; in final form 28 Feb 84) pp 137-142

PECHERSKIKH, Ye. G., BETENEKOV, N. D. and YEGOROV, Yu. V.

[Abstract] The purpose of this study was to determine the regularities of growth of hydroxide films, the significance of anions in the process of precipitation and the composition of the materials synthesized. This was done by radiometric analysis of solutions and flat specimens with hydroxide films, observing changes in the concentration of components in the solution and solid phase over time. The films synthesized were studied with an electron microscope, sediments formed simultaneously were studied by x-ray phase and differential thermal analysis. The iron hydroxide films and sediments contained impurities consisting of compounds of sulfur and carbon. The composition of the films and sediments was found to change as a function of the duration of the precipitation process. The content of bound and weakly-bound water decreases as the time the specimen spends in the reaction solution increases. The decrease in content of water of crystallization is apparently a result of the presence of goethite and hematite in the specimen during the stage of synthesis. Figures 5; references 16: 14 Russian, 2 Western.
[260-6508]

UDC 546.31

EXTRACTION CHEMISTRY OF PLUTONIUM AND NEPTUNIUM

Lenigrad RADIOKHIMIYA in Russian Vol 27, No 2, Mar-Apr 85
(manuscript received 13 Jun 83; in final form 16 Apr 84) pp 156-169

LASKORIN, B. N., SKOROVAROV, D. I., FILIPPOV, Ye. A. and YAKSHIN, V. V.

[Abstract] Various methods have been suggested for extraction and regeneration of plutonium and neptunium from spent nuclear fuel, but extraction concentration and purification to remove secondary impurities remains the most promising means. The mechanism of interaction of salts of Pu and Np with organic compounds has been little studied, which remains an obstacle for the creation of more effective processes of extraction of these elements. The authors have

developed a complex program for the study of the chemistry of processes of extraction of Pu and Np in various oxidation states based on the use of the latest, most effective and selective extracting agents. The optimal extracting agent for $Pu^{(IV)}$ and $Np^{(IV)}$ has been found to be dicyclohexyl-18-crown-6. The significant progress in this scientific area is noted, a result of the great expansion of the variety of effective and selective extracting agents of the actinides. It is now time to begin synthesis of the extracting agents, based on scientific prediction of their physical and chemical characteristics. References 45: 41 Russian, 4 Western.
[260-6508]

UDC 542.61+541.183

INFLUENCE OF NATURE OF EXTRACTION SYSTEM COMPONENTS USED TO EXTRACT RADIONUCLIDES ON INTERPHASE TENSION. PART 8. COMPOUNDS OF THORIUM (IV) NITRATE WITH DI-2-ETHYLHEXYLPHOSPHORIC ACID

Leningrad RADIOKHIMIYA in Russian Vol 27, No 2, Mar-Apr 85
(manuscript received 27 Apr 84) pp 179-183

NIKITIN, S. D., PANTELEYEVA, A. N. and SHMIDT, V. S.

[Abstract] A study was made of the influence of type of metal compounds formed in the organic phase under various extraction conditions on interphase tension at the division boundary with an aqueous nitrate solution on the example of extraction of a solvate and chelate with thorium (IV) di-2-ethylhexylphosphoric acid. Interphase tension was measured at 298 ± 0.2 K by drop exchange. With identical summary concentrations of di-2-ethylhexylphosphoric acid the interphase tension of the organic solution at the division boundary with 6 mol/l HNO_3 is practically identical to the interphase tension of the free extracting agent solution. The presence of the acid solvate in the system thus does not increase the interphase tension. The interphase activity of the mixture was found to be higher than the activity of its components, possibly because the addition of TBT breaks closed cycles in the dimer molecules of di-2-ethylhexylphosphoric acid, the interphase activity of which is less than that of the corresponding monomers. Figures 2; references 11: 8 Russian, 3 Western.
[260-6508]

UDC 546.794+541.11

TENSIMETRIC STUDY OF POLONIUM-PALLADIUM, IRIDIUM SYSTEMS

Leningrad RADIOKHIMIYA in Russian Vol 27, No 2, Mar-Apr 85
(manuscript received 2 Oct 83) pp 210-216

ABAKUMOV, A. S., MALYSHEV, M. L., REZNIKOVA, N. F. and KHOKHLOV, A. D.

[Abstract] A study is reported of the thermal interaction of polonium-210 with palladium and iridium. The vacuum-thermal method of direct synthesis was used, a study of the interaction of vapor-phase polonium with specimens of

metals placed at the opposite ends of an evacuated closed ampule at various temperatures. Studies of the thermal stability of the compounds synthesized were performed in the synthesis installation with gradual heating only of the end of the evacuated closed ampule containing the specimen studied. Observations of movement of polonium within the ampule were based on the gamma-radiation of the polonium. It was found that there are at least three intermetallic compounds in the polonium-palladium system: PdPo, Pd_2Po and Pd_3Po. The absence of bends on the synthesis curve of the compounds of polonium with palladium probably indicates a very rapid reaction, intensive diffusion of polonium in palladium and insufficient sensitivity of the measurement apparatus. The polonium-palladium system is similar in its properties to the polonium-nickel and polonium-platinum systems. Figures 3; references 10: 8 Russian, 2 Western.
[260-6508]

UDC 550.93:551.71

MIGRATION OF RADIOACTIVE AND RADIOGENIC ISOTOPES IN K-Ca AND Rb-Sr ISOTOPE-GEOCHEMICAL SYSTEMS

Leningrad RADIOKHIMIYA in Russian Vol 27, No 2, Mar-Apr 85
(manuscript received 26 Sep 83; in final form 13 Mar 84) pp 216-222

GERLING, E. K. and KOSTOYANOV, A. I.

[Abstract] This article deals with use of radioactive methods for determination of the age of geological formations. It studies the capabilities of the K-Ca method based on the beta decay of potassium 40. The comparative study of this geochronometer was undertaken in combination with rubidium-strontium determinations. Determination of the radiologic age of potassium-containing minerals isolated from various types of pegmatites was used as the basis for studying the behavior of K-Ca and Rb-Sr isotope-geochemical systems. It is determined that the behavior of the K-Ar-Ca and Rb-Sr isotope-geochemical systems is identical and fixes the time of the process which caused complete homogenization of the isotope composition of the daughter products upon formation of the objects thus dated. Figures 6; references 10: 7 Russian, 3 Western.
[260-6508]

UDC 541.15+546.110.23+541.117

REACTION OF TRITIUM ATOMS WITH POLYETHYLENE AT 290-55 K

Leningrad RADIOKHIMIYA in Russian Vol 27, No 2, Mar-Apr 85
(manuscript received 20 Sep 83) pp 222-227

BADUN, G. A., KOSTIN, A. I. and FILATOV, E. S.

[Abstract] Determination of the reaction mechanism of production of tritium-labeled organic compounds by thermal activation of tritium requires that the reaction be performed over a broad temperature range, but the interpretation of results of such studies can be performed only with thermal equilibrium of atoms obtained initially at about 2000 K and the target substance. It is assumed reliable experimental proof could be obtained by using as a target a long film of polyethylene in a tube with a temperature gradient through which the tritium atoms diffuse. An installation for production of tritium atoms by thermal dissociation of the gas on a tungsten spiral was attached to a glass vessel consisting of a tube 3 cm in diameter and 80 cm long within which a polyethylene strip was placed with 0.95 density, degree of crystallinity about 70%. The necessary temperature was obtained with various cooling agents or a current of evaporating nitrogen or helium vapor. Study of the reaction of tritium atoms with polyethylene at constant temperature showed logarithmic variation of specific radioactivity per unit surface area of polyethylene as a function of position. An equation was derived describing the ratio of contents as a function of temperature in the 55 to 290 K area. The normal logarithm of the ratio does not vary linearly as a function of inverse temperature over a broad range of temperatures. Three linear sections with temperature transitions of 80, 180 and 250 K are found. Figures 5; references 14: 8 Russian, 6 Western.
[260-6508]

UDC 543.53.621..039.3

SEPARATION OF GALLIUM AND GERMANIUM IN DISSOLUTION OF Ga-Ge ALLOYS

Leningrad RADIOKHIMIYA in Russian Vol 27, No 2, Mar-Apr 85
(manuscript received 23 Sep 83) pp 228-233

GROMOV, V. V. and BONDARENKO, G. P.

[Abstract] A study is presented of the kinetics of dissolution of liquid metal alloy of gallium with germanium in alkaline hydrogen peroxide solutions. The parameters of dissolution were found from the quantity of gallium and germanium entering the aqueous phase. Germanium was analyzed spectrometrically with phenylfluorone; gallium was determined by spectral analysis. Expressions are derived which allow not only estimation of the extraction of germanium from the liquid metal Ga-Ge alloy, but also determination of the optimal relationship of S and V, t. A mechanism of rapid transition of germanium from the alloy to the liquid phase is suggested for the process, since the Ga-Ge bond is broken in the stage of formation of the alloy. Figures 3; references 8 (Russian).
[260-6508]

UDC 541.718.051:678.041

INFLUENCE OF COMPONENTS OF HEAT-SENSITIVE LATEX MIXTURE ON STABILITY OF SYSTEM

Moscow KOLLOIDNYY ZHURNAL in Russian Vol 47, No 2, Mar-Apr 85
(manuscript received 31 Oct 83) pp 337-340

SOLOV'EVA, T. S., IVANOVA, N. N., GORYACHEVA, G. B. and AKSENOVA, V. Ye.,
Institute of Precision Chemical Technology imeni M. V. Lomonosov, Moscow

[Abstract] A study was made of heat sensitive mixtures based on butadiene acrylonitrile carboxylated latexes recommended for saturation of nonwoven fiber materials in the production of artificial leather. Standard methods were used to determine colloid chemical properties of the latexes. The influence of heat-sensitizing agents on stability of the latexes was studied. The introduction of these agents causes a greater decrease in latex stability than does the introduction of an electrolyte. The heat sensitizing agent is the component which determines the level of stability at room temperature. However, upon heating, both the heat sensitizing agent and the electrolyte have a destabilizing influence. At room temperature, stability is determined by the quantity of heat-sensitizing agent and the order of addition of the components. Figures 3; references 5: 3 Russian, 2 Western.
[256-6508]

UDC 543.257

DETERMINATION OF ORGANIC MATTER IN WATER BY INVERSION VOLT-AMPERE MEASUREMENTS

Novosibirsk IZVESTIYA SIBIRSKOGO OTDELENIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKIYE NAUKI in Russian No 5, Issue 2, Mar 85
(manuscript received 16 May 84) pp 80-84

SITNIKOVA, L. L., PEVNITSKAYA, M. V. and ZAKHARCHUK, N. F., Institute of Solid State Chemistry and Processing of Mineral Raw Materials, Siberian Department, USSR Academy of Sciences, Novosibirsk

[Abstract] Ion-exchange materials used for deionization of water are 'poisoned' by adsorption of organic substances contained in the water. Chemical methods presently used to determine total organic substances in water are insufficiently sensitive to be used to monitor the required deep purification. Electrochemical methods using surface activity, characteristic of most organic substances, can be used to reduce the level of detection. Electrochemical methods such as inversion volt-ampere measurement can detect surfactants at 10^{-2}-10^{-4} mg/l. This article studies the use of the method in water with metal impurities in addition to organics. The standard system selected was cadmium plus mercury at $6 \cdot 10^{-6}$ and $6 \cdot 10^{-5}$ mol/l for Cd and Hg. The results obtained show that the method can be used for comparative quantitative determination of organic matter not only in very pure, deeply deionized water, but also in tap water. Figure 1; references 13: 12 Russian, 1 Western.
[257-6508]

UDC 547.491.6

SOME PHYSICO-CHEMICAL PROPERTIES OF AQUEOUS SOLUTIONS, CONTAINING CARBAMIDE, DICYANDIAMIDE, AMMONIA, CYANAMIDE AND CARBON DIOXIDE

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 58, No 4, Apr 85
(manuscript received 21 Feb 84) pp 939-941

GOLOV, V. G., PECHNIKOV, A. V., ZHDANOVICH, A. L. and KOZYRIKHINA, Ye. A.

[Abstract] Study of densities and viscosities and aqueous solutions in $(NH_2)_2CO$-$(NH_2)_2CNCN$-NH_3, $(NH_2)_2CNCN$-NH_3-NH_2CN, $(NH_2)_2CNCN$-NH_3-NH_2CN-CO_2 systems and of boiling points of aqueous solutions in an $(NH_2)_2CO$-$(NH_2)_2CNCN$ system is

described and discussed. Experimental relationships of density and viscosity of the aqueous solutions containing carbamide, dicyandiamide, ammonia and carbon dioxide to the temperature and concentration of the components are determined. Boiling points of aqueous solutions of carbamide containing dicyandiamide are determined. References 8: 6 Russian, 2 Western.
[264-2791]

UDC 661.961.1

CALCULATING COST OF PRODUCTION OF HYDROGEN FROM WATER

Kiev PROBLEMY MASHINOSTROYENIYA in Russian Vol 20, 1983
(manuscript received 25 May 82) pp 73-75

TROSHEN'KIN, B. A. and KLEVAN, I. Ye., Institute of Problems of Machine Construction, UkSSR Academy of Sciences, Khar'kov

[Abstract] Economic aspects of hydrogen production with use of an installation which includes a device for producing energy accumulating substances (EAV), a hydrogen-producing reactor, a turbine for use of carbon monoxide energy from the EAV and an energy installation, using the energy of the hydrogen and steam mixture from the reactor, are described and discussed. A diagram of the installation is presented and its operation is described. The cost of producing hydrogen from water with the use of Ekibastuz coal is calculated and the figures are presented and discussed. The cost is approximately 412 rubles/ton of this coal. Long-term development of hydrogen power engineering oriented around the use of energy from coal is recommended. Figure 1; references 5: 4 Russian, 1 Western.
[258-2791]

UDC 541.124-13:551.510.536

ANALYSIS OF INFLUENCE OF VIBRATIONAL EXCITATION OF OZONE ON CONCENTRATION OF OZONE AND ATOMIC OXYGEN IN EARTH'S UPPER ATMOSPHERE

Moscow KHIMICHESKAYA FIZIKA in Russian Vol 4, No 4, Apr 85
(manuscript received 27 Dec 83) pp 544-550

GERSHENZON, Yu. M., GRIGOR'YEVA, V. M., KONOPLEV, A. V., and ROZENSHTEYN, V. B., Institute of Chemical Physics, USSR Academy of Sciences, Moscow

[Abstract] The article reviews the various mechanisms for the formation and removal of ozone and atomic oxygen in the upper atmosphere. In a dry atmosphere model, assuming daytime conditions below 90 km altitude, the concentration of atomic oxygen reaches 1% of molecular oxygen at altitudes of 80-85 km. The concentration of excited ozone reaches a maximum at 85 km, approximately 3-4 times above equilibrium, with $E > 9$ kcal/mol. In a moist atmosphere, calculations must take hydrogen into account. Although reliable data is sparse,

calculations show such a significant effect on ozone and atomic oxygen, that the effect of excited ozone on their concentrations is unimportant. Overall, vibrationally excited nonequilibrium ozone can have a noticeable effect on ozone and atomic oxygen concentrations at altitudes of 60-85 km through the effective reaction of highly excited states of ozone when the probability of relaxation of these states is no more than 10^{-3}. Figures 3; references 18: 6 Russian, 12 Western (one by Russian authors)
[268-12672]

UDC 541.8:546.11:547.298.11'211

SOLUBILITY OF HYDROGEN IN AQUEOUS SOLUTIONS OF DIMETHYLFORMAMIDE

Leningrad NEFTEKHIMIYA: SBORNIK NAUCHNYKH TRUDOV in Russian 1985 (signed to press 7 Feb 85) (manuscript received 9 Jul 82) pp 187-190

LESKIN, V. V., LARIONOV, V. A., TUDOROVSKAYA, G. L., SAFONOVA, N. A. and SEDACHEVA, N. P., All-Union Scientific Research and Plannning Institute of Monomers

[Abstract] A study was made of the solubility of hydrogen in dimethylformamide and its aqueous solutions. The studies were performed at temperatures of 50-150°C, pressures of 0.4 to 2.0 MPa on a static-type installation for study of phase equilibria in gas-liquid systems. The error of determination of solubility was about 5%. The solubility of hydrogen was found to increase with increasing temperature, pressure and DMFA content in the solution. The heats of dissolution of hydrogen in DMFA and its aqueous solutions were calculated and it was shown that the variation in heat of dissolution of hydrogen as a function of DMFA concentration has a maximum. Figure 1; references 13: 12 Russian, 1 Western.
[259-6508]

UDC 66.067.38.532.58

STUDY OF HYDRAULIC RESISTANCE OF REVERSE OSMOSIS AND ULTRAFILTRATION APPARATUS WITH HOLLOW FIBER MEMBRANES

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 5, May 85 pp 22-23

KOCHAROV, R. G. and ZAKHAROV, S. L., candidates of technical sciences

[Abstract] A study was made of the variation of hydraulic resistance of an apparatus with a hollow fiber membrane as a function of diameter and packing density of the fibers. It was determined that as the flow moves along large diameter fibers, practically parallel in a bundle, the major pressure losses of the channel are related to friction. Small diameter fibers cross each other and form spirals, significantly increasing pressure loss in the channel. Earlier studies showed that increasing packing density of small diameter

fibers increases A, a coefficient dependent on the form of the transverse cross section of a channel. One reason is the increase in the influence of nonuniformity of distribution of the fibers over the cross section of a bundle, since the fluid attempts to flow down channels with the least packing density of fibers, spreading them and consequently increasing the packing density of that portion of the bundle where the fibers are already more densely located. As a result the actual flow rate of the fluid is higher than the computed rate. Figures 2; references 3 (Russian).
[272-6508]

UDC 628.3

OXIDATION OF LOW CONCENTRATIONS OF LIGNOSULFONATES BY OZONE

Leningrad ZHURNAL PRIKLADNOY KHIMII in Russian Vol 58, No 4, Apr 85
(manuscript received 27 Oct 83) pp 858-863

MEDVEDEV, M. I., ZUL'FIGAROV, O. S. and GRECHKO, A. V., Institute of Colloid Chemistry and Water Chemistry imeni A. V. Dumanskiy, UkSSR Academy of Sciences

[Abstract] A study of the breakdown of aqueous solutions of lignosulfonates (LS) by ozone is described and discussed. The effect of Fe(III) and Al(III) ions and molecular weight of LS on the process and qualitative changes occurring in the molecules are explained. The amount of ozone required to break down LS to the extent that it loses its specific properties such as chelation properties and surfactant properties is approximately 30-50 percent of the content by weight of LS in water. It is recommended that salts of iron be used for preliminary removal of LS from water since they catalyze the following process of breakdown of LS by oxidants. Figures 2; references 9: 7 Russian, 2 Western. [264-2791]

CSO: 1841 - END -