

## A B S T R A C T S

*O.V. KOZLOVA, O.A. BORISOVA, A.V. CHESHKOVA***PROSPECTS OF CHEMICAL TECHNOLOGIES APPLICATION FOR ART DESIGN OF LINEN FABRICS**

The review of modern state and prospects of chemical technologies application for art design of linen textile materials is presented. Both import technological decisions and the new domestic innovative developments providing the application of effective, ecologically safe technologies and textile ancillary substances TBB are considered.

**Key words:** linen, textile materials, art design

*M. Yu. KRASAVIN, S.V. SHKAVROV, D.V. KRAVCHENKO, A. P. IIIYN, Yu.M. ATROSHCHENKO***SYNTHESIS OF IMIDAZO[1,2-a]QUINOXALINE FROM 1,2-DIAMINOBENZENE VIA SEQUENTIAL ISONITRILE-BASED MULTICOMPONENT REACTIONS**

The four-step synthesis of the N-cycloheptyl-2,4-diphenylimidazo[1,2-a]quinoxaline-1-amine from 1,2-diaminobenzene has been accomplished. The first step is a three-component reaction of 1,2-diaminobenzene with benzaldehyde and isooctylisocyanide. The resulting 1,4-dihydroquinoxaline is not isolated and it is further oxidized into the stable 2-isooctylamino-3-phenylquinoxaline with 1,4-quinone. The isooctyl group is easily removed with trifluoroacetic acid and the resulting 2-amino-3-phenylquinoxaline is again introduced into a three-component reaction with benzaldehyde and cycloheptylisocyanide forming the target product with the yield of 20%.

**Key words:** four-step synthesis of the N-cycloheptyl-2,4-diphenylimidazo[1,2-a]quinoxaline-1-amine

*A.A. PUDIKOVA, N.P. GERASIMOVA, Yu.A. MOSKVICHEV, E.M. ALOV, M.A. BARASHEVA, M.V. MAKAROVA***CHLOROSULFONYLATION OF 1,1-DIPHENYLETHYLENE, 1-METHYL- AND 1-PHENYLCYCLOHEXENE**

The aromatic sulfonylchlorides reaction and 1,1-diphenylethylene, 1-methyl- and 1-phenylcyclohexene has been studied. The addition of arylsulfonyl chlorides to these alkenes has been shown to accompany by the dehydrochlorination of adducts with unsaturated sulhones formation.

**Key words:** sulfonylchlorides, alkenes, unsaturated sulhones, reactions

*P.V. BORISOV A.V. KOLOBOV, A.A. SHETNEV, K.L. OVCHINNIKOV, E.R. KOFANOV***NITRATION OF (1R\*, 2S\*, 3R\*, 4S\*, 5S\*)-5-PHENYLDICYCLIC [2.2.1] HEPTANE-2,3-DICARBOXYLIC ACID AND ITS DERIVATIVES**

The nitration reaction of the (1R\*, 2S\*, 3R\*, 4S\*, 5S\*)-5-phenyldicycllic [2.2.1] heptanes-2,3-dicarboxylic acid and its derivatives in various systems has been studied. The ortho/para-ratio change at nitration in the acetic acid has been shown to connect with formation of anhydride during reaction.

**Key words:** nitration, ortho-para isomers, anhydride, reaction

*V.Ya. BADENIKOV, A.V. BADENIKOV, S.A. SIDOROV, L.G. EVSEVLEEVA***ELECTROCHEMICAL SENSOR FOR DISSOLVED OXYGEN MONITORING**

The electrochemical sensor for detecting oxygen in water on the base of the silver-cadmium electrical element has been developed. Detection limit was about 0.2 mg/L. Relative standard deviation was  $r \sim 0.01-0.05$

**Key words:** oxygen, electrochemical detecting, water solution

*O.V. ERINA, V.F. SELEMENEV, V.Yu. KHOKHLOV, G.V. SHATALOV***EXTRACTION OF FOLIC ACID BY WATER-SOLUBLE POLYMERS**

The possibility of extraction of the folic acid with the poly-N-vinylpyrrolidone and poly-N-vinyl-N-methylacetamide from water-salt solutions has been shown. Conditions for achievements of maximal extraction degree have been proposed. The spectrophotometric method for determination of the folic acid in water solution has been developed.

**Key words:** extraction, folic acid, water-salt solutions

*S.V. LANOVETSKIY, V.Z. POIYLOV, O.K. KOSVINTSEV***STUDY OF GROWTH RATE OF CRYSTAL OF MAGNEZIUM NITRATE HEXAHYDRATE AT PERMANENT OVERCOOLING**

Results of study of growth rate of magnesium nitrate hexahydrate crystal are given. Data on influence of various factors on crystal growth rate in magnesium nitrate solution have been obtained. The solution temperature influence on crystal mechanism growth has been determined.

**Key words:** crystal, growth mechanism, magnesium nitrate

*E.S. CHUMADOVA, A.A. ISAKINA, V.V. RYBKIN, V.I. GRINEVICH***MODELING OF KINETICS OF DECOMPOSITION PROCESSES OF PHENOL IN VERTICAL FLOW REACTOR OF DIELECTRIC BARRIER DISCHARGE OF ATMOSPHERIC PRESSURE**

The results of numeric modeling of chemical processes kinetics of phenol decomposition in its aqueous solution being treated in vertical reactor of flowing type of dielectric barrier discharge of atmospheric pressure in oxygen are given. The model checking has been accomplished by means of comparison the calculated and measured kinetic dependencies of the phenol concentrations as a function of solution residence time with discharge zone. The results of process kinetic analysis of phenol decomposition under the action of various active species are given.

**Key words:** phenol, decomposition, kinetics, barrier discharge, ozone

*V.F. KOVTUN, V.A. KOZLOV*

**ACTIVATION ENERGY DETERMINATION OF REACTION OF CATALYTIC REDUCTION OF HEN FAT**

The estimation of activation energy of reaction of catalytic liquid phase hydrogenation of hen fat for fat basis obtaining replacing cacao oil has been done. The main criteria of reaction accomplishing have been found.

**Key words:** hen fat, hydrogenation, homogeneous catalysis

*S.A. LELYUSHOK, V.A. DOROSCHUK, S.A. KULICHENKO*

**ANTICOOPERATIVE INFLUENCE OF HYDROPHOBICITY OF CARBOXYLIC ACIDS AND AMINES ON MICELLAR EXTRACTION OF NICKEL AMINOCARBOXYLIC COMPLEXES**

The influence of ligands hydrophobicity on the distribution of nickel aminocarboxylic complexes between water and non-ionic surfactant-rich phases was investigated. The comparison of increments of methylene group of aliphatic amines and carboxylic acids showed the anticooperative influence of ligands hydrophobicity on the complexes distribution in the cloud point of extraction system.

**Key words:** hydrophobicity, extraction, carboxylic acids, amines

*A.V. LUZHETSKIY, I.N. DIYAROV, N.Yu. BASHKIRTSEVA, M.A. VARFOLOMEEV, O. Yu. SLADOVSKAYA*

**SYNTHESIS AND STUDY OF PROPERTIES OF OLIGOURETHANE TYPE DEMULSIFIERS**

Mechanism and yield of oligoisomerization reaction between polyether polyols and diisocyanates was studied by IR-spectroscopy method. The influence of structure of synthesized oligourethanes on its physicochemical and demulsifying properties was estimated. The demulsifying ability was established to increase in the increase of molecular weight of oligourethanes.

**Key words:** oligoisomerization, block-copolymers, demulsifiers, oligourethanes

*E.I. YARMUKHAMEDOVA, Yu.I. PUZIN, Yu.B. MONAKOV*

**FREE RADICAL POLYMERIZATION OF METHYL METHACRYLATE IN PRESENCE OF HEXAMETHYLENETETRAMINE**

The influence of the hexamethylenetetramine on the radical polymerization of methyl methacrylate was studied. The hexamethylenetetramine was shown to be the slight chain transfer. The relative chain transfer constant onto the amine was determined. The polymers synthesized in the presence of hexamethylenetetramine were discovered to have heightened content of syndio- and isotactic sequence in macromolecule.

**Key words:** radical polymerization, methyl methacrylate, hexamethylenetetramine

*A.A. ISHCHEENKO*

**STUDY OF COHERENT NUCLEAR DYNAMICS BY ELECTRON DIFFRACTION METHOD WITH TIME RESOLUTION. III TOMOGRAPHY OF MOLECULAR QUANTUM STATE**

The theory and its application for tomography reconstruction of quantum state of molecular ensemble on the base of probability density function of internuclear distance depending on the time and being determined by the electron diffraction method with the time resolution is presented. The procedure allows determining the Wigner function in phase space for system under study or corresponding that function the density matrix. The new equation for electron diffraction intensity which uses the relationship of electron scattering intensity with the Wigner function in explicit form has been proposed. The application of developed theory opens new possibilities of study of coherent nuclear dynamics of molecular systems in 4d space-time continuum.

**Key words:** electron diffraction, Wigner function, molecular ensemble, quantum state

*E.I. CHEREVACH, T.P. YUDINA, G.M. FROLOVA, Yu.V. BABIN*

**PHYSICAL, CHEMICAL AND MICELLAR PROPERTIES OF SAPONINS OF SAPONARIA OFFICINALIS L. ROOTS CULTIVATED IN PRIMORSKIY REGION**

Physical, chemical and functional properties of two and three year old aqua extracts of two forms of Saponaria officinalis L. roots cultivated in Primorskiy region have been investigated. The purpose of those investigations was to choose effective natural emulgator on the base of saponins. The influence of plants growing period on the main parameters required for the extracts such as the structural and functional food additives has been analyzed.

**Key words:** extract, Saponaria officinalis L. roots, natural emulgator

*S.N. YASHKIN, A.A. SVETLOV*

**STUDY OF GEOMETRICAL HETEROGENEITY OF SURFACE OF CARBON ADSORBENTS WITH INVERSE GAS CHROMATOGRAPHY**

For the first time, the estimation method of surface geometrical heterogeneity degree of the various sorbents, based on correlation between measured by gas chromatography of sorption heats as a function of various physicochemical parameters of sorbents in volumetric gas state (three-dimensional critical temperature, pressure, and polarizability), and also topological indexes has been offered. As sorbate-probes the n-alkanes with linear structure and adamantane with volumetric high symmetrical molecular structure have been considered. The principal difference of these compounds at adsorption to reproduce the adsorbent surface relief due to the different conformation mobility of units in molecule has been shown. The dependence of heat adsorption of adamantane molecule on various adsorbent surfaces on the value of its fractal dimension has been established. The various types of carbons (graphitized and non-graphitized), hydroxylated silica-gel, hexadecyl silica gel as well as non-polar stationary liquid phase of C<sub>78</sub>H<sub>158</sub> and OV-101 have been considered as model sorbents.

**Key words:** sorbent, surface heterogeneity, adsorption, adsorption heat

*M.G. STRYAPAN, M.K. ISLYAIKIN*

**SYNTHESIS AND PROPERTIES OF MACROHETEROCYCLIC COMPOUNDS OF ABAB-TYPE WITH DIETHYLPYRAZINE FRAGMENTS**

Macroheterocyclic compounds of ABAB-type with diethylpyrazine fragments were synthesized by condensation of the m-phenyldiamine and the 2,6-diaminopyridine with the products of the 5,6-diethyl-2,3-dicyanopyrazine and sodium alcohols interaction

in methanol-butanol mixture. The synthesized macrocycles were characterized by the element analysis, mass spectrometry, IR - and  $^1\text{H}$  NMR- spectroscopy data.

**Key words:** 5,6-diethyl-2,3-dicyanopyrazine, macroheterocyclic compounds, azoanalogue, properties

*N.F. KOSENKO, N.V. FILATOVA*

#### **MAGNESIUM OXIDE SINTERING REGULATION BY MECHANOCHEMICAL TREATMENT OF VARIOUS TYPES**

It has been established that for intensification of oxide sintering process it is advisably to take into account their crystal structure for type choice of optimal mechanical activator. Advantages of mechanical-chemical treatment of abrasive type for magnesium oxide against impact action for next grain sintering have been shown. The periclase preliminary treatment in ball-ring mill in the presence of additives (magnesium borate or nitrate) allows to obtain sintered at 1400 °C oxide with compression strength not lower the strength which can possess the material without mechano-chemical treatment under sintering at 1600 °C

**Key words:** oxides, sintering, mechanical activation, strength

*V.K. GORSHKOV, E.A. PAVLOV, M.O. MESNIK, S.S. SIMUNOVA*

#### **TECHNOLOGY OF AUTODEPOSITION ON CARBOXYL-CONTAINING COMPOSITE MATERIALS ON ALUMINUM SURFACE AND ITS ALLOYS**

The main parameters influencing on auto deposition process have been considered. The technological process of surface preparation and auto-phoretic covering of carboxyl-containing lacquer which allows obtaining the coatings on aluminum and on its alloys possessing the good protective properties has been proposed.

**Key words:** auto deposition, auto-phoretic process, lacquer coating, aluminum

*I.V. BULGACOVA, Yu.A. LYSOVA, V.I. CHURSIN*

#### **FEATURES OF HYDROTHERMAL DENATURATION OF CHROME FREE TANNED LEATHER**

The hydrothermal denaturation of chrome free tanned leather has been studied. The definite amount of cross-linkages has been shown to preserve in denaturated collagen. It provides the collagen ability to partial reduction of initial conformation. The estimation of tanning action of various organic tanning agents has been done as well as the interpretation of mechanism of its interaction with the collagen.

**Key words:** denaturation, leather, tanning, collagen

*N.S. GURKO*

#### **OPTIMIZATION OF PROCESS OF FRACTIONATION OF N-PARAFFINS IN PLANT LAB-LABS**

The optimization of process of n-paraffins fractionation to the linear alkylbenzenes and alkylbenzenesulfoacid (LAB-LABS plant) has been carried out. The possibility of productivity increase of LAB-LABS has been studied. Ways of more complete usage of set up internal reserve on the increase of separate column productivity have been shown. Propositions on optimal accomplishing of technological process have been formulated.

**Key words:** alkylbenzene, alkylbenzenesulfoacid, fractionation, n-paraffins

*O.Yu. SOLOVYOVA, D.V. OVSYANNIKOVA, V.G. MARKELOV, N.S. KOBZEV, M.E. SOLOVYOV*

#### **MODIFICATION OF RUBBERS BASED ON NITRILE-BUTADIENE RUBBER AND SILICA FILLER**

The effect of modification of binary compositions "nitrile-butadiene rubber – silica filler" with hexachloroparaxylene has been studied. At chosen conditions the preparation of compositions from hexachloroparaxylene at 0.5-3 mass parts on 100 mass parts of rubber has been shown to influence essentially on deformation properties of mixtures and rubbers. However, the static strength of vulcanizates is changed slightly.

**Key words:** rubber, modification, filler

*A.G. LIPIN, O.S. KALYONOVA, K.V. POCHIVALOV, M.Yu. YUROV*

#### **MODELING OF PROCESS OF POLYMER DISSOLUTION IN STIRRED TANK REACTOR**

Influence of temperature, speed of rotation of stirrer and the mass ratio polymer-solvent on kinetics of dissolution has been studied experimentally. The mathematical model of the dissolution of polymer in low-molecular solvent in the stirred tank reactor has been developed.

**Key words:** polymer, mixing, dissolution, modeling

*N.N. POLULYAKHOVA*

#### **EFFECTIVE SORBENT FOR DYNAMIC EXTRACTION OF IONS**

Possibilities of sorbent on the base of hydroxide of the magnesium and aluminium with the structure of gidrotal'kita for dynamic extraction of ions of Cr(VI), Hg(II),  $[\text{Fe}(\text{CN})_6]^{3-}$ ,  $[\text{Fe}(\text{CN})_6]^{4-}$  have been revealed. Using of the program favorit the atlas of solutions of the system of differential equations has been obtained for the sorption process modeling of ions at dynamic conditions. Mathematical models for the experimental data treatment have been offered.

**Keywords:** ions, sorbent, filtration, dynamics

*G.A. ZUEVA, G.N. KOKURINA, V.A. PADOKHIN, N.A. ZUEV*

#### **MATHEMATICAL MODELLING OF FIBRES DRYING**

With the purpose of construction of the mathematical description of various periods of fibrous materials drying a number of heat conductivity problems for a cylinder, including Stefan problem with moving boundary of phase transfer have been solved analytically. The analytical solution of that problem has been obtained with the differential series method. The comparison of calculated and experimental data on drying a fibrous material has been carried out.

**Key words:** drying, fibres

*O.V. UGRYUMOV, O.A. VARNAVSKAYA, G.V. ROMANOV*

#### **STUDY OF INHIBITOR PROTECTIVE ACTION OF CORROSION OF SNPH-6438 IN HYDROCHLORIC ACID MEDIA**

The corrosion inhibitor SNPH-6438 has been established to increase acid corrosion of metal. That inhibitor is essentially better than widely used inhibitor SHPH-1004R. The application of SNPH-6438 in 15% hydrochloric acid at temperature of + 105 °C allows to

decrease the metal corrosion rate in 5.4 time. Physical and chemical properties of given corrosion inhibitor allows to recommend it under acid treatments in the form of buffer solution before acid addition.

**Key words:** inhibitor, corrosion, acid, metal

*V.F. KOVTUN*

#### MOVEMENT KINETICS OF BULK MATERIALS IN IMPULSE MIXER

The theoretical foundations of effective mixing conditions in impulse mixer have been done.

**Key words:** mixing, impulse mixer

*V.I. GRINEVICH, T.V. IZVEKOVA, N.A. PLASTININA, Kh. SHURENTSETSEG*

#### PURIFICATION OF NATURAL WATERS BY OZONATION AND IN DIELECTRIC BARRIER DISCHARGE

The study of pollutants content change in natural water after chlorination, ozonation and treatment in dielectric barrier discharge (DBD) has been carried out. After chlorination the content of chlorine-organic substances in drinking water has been shown to increase in 1.2-24 times whereas after ozonation and treatment in DBD to decrease in 1.2-48 and 1.3-146 times, respectively. However, under ozonation and DBD treatment the formaldehyde and ammonia nitrogen content were increased in 1.2-5.9 times.

**Key words:** purification, organic compounds, ozone, dielectric barrier discharge (DBD), water preparation; water quality

*N.F. KOSENKO, L.A. VINOGRADOVA*

#### MECHANOCHEMICAL CONTROL OF HYDRATION ACTIVITY OF CALCIUM OXIDE IN SALT SOLUTIONS

The abrasive mechanical treatment influence of the calcium oxide powder upon its hydration in salt solutions (chloride and nitrate of calcium) has been studied. Determined essential retardation of the reaction rate (by the factor of 1.4-34) is connected with the surface state change of grains, particles compaction and their specific surface decrease.

**Key words:** mechano-chemistry, reaction ability, hydration, calcium oxide

*A.I. MAXIMOV, A. V. KHLUSTOVA, I. N. SUBBOTKINA*

#### STUDY OF METHYLEN BLUE DYE DESTRUCTION IN WATER SOLUTION UNDER ACTION OF GLOW AND DIAPHRAGM DISCHARGES

Data on the methylene blue dye destruction in acid, neutral and alkali media under the action of glow and diaphragm discharges were obtained. The optimization of plasma-solution parameters has been established can result in increase in the rate of oxidative destruction of dye on the one order of magnitude.

**Key words:** destruction, dye, glow and diaphragm discharges

*T.G. DMITRIENKO, A.I. GORSHKOV*

#### ELECTROCHEMICAL SYNTHESIS OF SELENIUM-CONTAINING HETEROCYCLES

The new electrochemical method of synthesis of the 4N-selenopyranes and salts of the selenopyrilliy from 1,5-diketones under conditions of acid catalysis at oxidative activation of the hydrogen selenide with electrochemical method in the presence of one-electron oxidants in non-aqueous media has been developed. Electrolysis products have been analyzed by gas-chromatography with mass-selective detector and ESR method. The obtained 4N-selenopyranes react easy in disproportion reaction forming salts of the 2,6-diphenylselenopyrilliy and hydrated products: 2,6-diphenylselenocyclohexane and 2,6-diphenyl-4N-dihydroselenopyrane.

**Key words:** electrochemical synthesis, selenopyranes, selenopyrilliy

*V.L. GOLOVASHIN, S.V. KOVALEV, S.I. LAZAREV, A.Yu. BULANOV*

#### MATHEMATICAL MODEL OF DIFFUSION CELLS CALCULATION WITH TURBULATORS

The mathematical model of calculation of diffusion cells with turbulators has been developed. The set up and method for research of diffusion permeability in membrane devices with flat channels have been presented.

**Key words:** model, diffusion cell, turbulator

*A.S. BYCHENKOV, A.V. TARASOV, P.K. PISAREV, Yu.A. MOSKVICHEV*

#### SYNTHESIS OF DIBENZO[C,F][1,4,5]OXOTHIAZEPIN-N-METHYL-S,S-DIOXIDES ON THE BASIS OF AROMATIC SULPHONYLCHLORIDES OF CHLOROBENZENE SERIES

The method of synthesis of the dibenzo[c,f][1,4,5]oxothiazepin-N-methyl-S,S-dioxides by intramolecular cyclization of products of reaction of the sulphonylchlorides of 2-chloro-5-nitrobenzene, 2,5-dichlorobenzene and 2,4,5-trichlorobenzene with N-methyl-ortho-aminophenol has been realized.

**Key words:** synthesis, dibenzo[c,f][1,4,5]oxothiazepin-N-methyl-S,S-dioxide

*V.K. LEONTIEV, E.V. SHALYGIN, P.V. DMITRIEV*

#### MASS-EXCHANGE STUDY IN GAS FLUID EJECTION REACTOR

The methodology of calculation of coefficients mass-transfer and mass-transport for absorption in gas-fluid ejection reactor has been proposed. The experimental values of mass-transfer coefficients have been obtained using the absorption process of air-oxygen with sodium sulphite solution as example. A comparison of calculated data and experimental ones have been accomplished.

**Key words:** mass-transfer, mass-transport, adsorption, calculation method

*ERSHOVA J.N., NOVIKOV I.V., BURMISTROV V.A., KOIFMAN O.I.*

#### SOME ASPECTS OF MINERAL ACIDS TRANSFER THROUGH CELLULOSE ACETATE MEMBRANES MODIFIED BY MACROHETEROCYCLIC COMPOUNDS

The diffusion membranes on the base of cellulose acetate modified by macroheterocyclic compounds were obtained. The values of permeability, solubility and diffusion coefficients for mineral acids were measured. The influence of modifying agents nature on the diffusion transport parameters and selectivity was shown.

**Key words:** microheterocycles, membranes, porphyrins, cellulose acetate, permeability