

A B S T R A C T S

*R.M. KUMYKOV***SOLUBLE HEAT- AND FIRE-RESISTANT POLYHETEROARYLENES ON BASE OF CHLORAL DERIVATIVES**

The newest achievements in the field of synthesis of polyheteroarylenes containing penta- and hexa-term imide cycles on the base of di- and tetra functional monomers (chloral derivatives) have been considered. It was shown that the number of recently developed synthetic approaches allows to produce those compounds possessing the high thermal and chemical resistance in the form of soluble high-molecular products easily treating to goods with the help of traditional methods.

Key words: polyetherphthalimide, polynaphthylimide, polycyclodehydration, polynaphthylenebenzamidazol

*S.A. TSYRUL'NIKOV, M.Yu. KRASAVIN***OBTAINING ETHYL ESTERS OF SUBSTITUTED IMIDAZO[1,2-b] [1,3] THIAZOLECARBOXYLIC ACIDS ON REACTION OF GROEBKE-BLACKBURN**

The possibility of synthesis of new imidazo[2,1-b] thiazoles using the Groebke-Blackburn reaction at the catalysis with equimolar amount of three methyl silyl chloride in acetonitrile has been demonstrated. The possibility of further transformation of ester group in obtained structures to amide one through the hydrolysis and amidation has been shown.

Key words: multi-component reactions, amino heterocycles, imidazo[2,1-b] thiazoles, three methyl silyl chloride

*S.A. SHAPOVALOV, Ya.S. KISELIOVA***DISSIMILAR ASSOCIATION OF BROMOCRESOL GREEN IN AQUEOUS SOLUTIONS AND IN SOLUTIONS CONTAINING IONIC SURFACTANTS**

The formation of associates between one or two charged anions of sulfophthalein dye 3',3'',5',5''- tetrabromo-m-cresolsulfophthalein (bromocresol green) and cations of cyanine dyes (pinacyanol or quinaldine red) has been considered in aqueous solutions. On the base of spectrophotometric data the values of equilibrium constants of association have been determined. The geometric and energetic characteristics of associates were calculated by the AM1 method. The influence of ionic surfactants on associates has been studied.

Key words: bromocresol green, dye, absorption spectra, formation enthalpy, AM1 method

*A.M. MIKHAILOVA, L.V. NIKITINA, E.V. KOLOKOLOVA, S.A. EGOROVA***RESEARCH OF SENSOR OPERATION BASED ON POLYMERIC COMPOSITE MATERIAL FOR DETERMINATION OF HYDROGEN CONTENT**

This work is devoted to creation of sensor which is sensitive to hydrogen which is used as fuel in hydrogen power engineering. The results of measuring the dependence of emf change for electro-chemical sensor on the gas concentration under study are presented. The temperature dependence and sensitivity of measuring own emf of sensor has been determined. The relaxation rates of electrochemical cells under study have been obtained. Experimental results confirm that given electrochemical system can be considered as sensor for hydrogen.

Key words: sensor, hydrogen, hydrogen power, concentration, impedance, conductivity

*A.V. PETROV, M.I. BAZANOV, E.S. YURINA, N.E. GALANIN, L.A. YAKUBOV, G.P. SHAPOSHNIKOV***ELECTROCHEMICAL AND ELECTROCATALYTICAL PROPERTIES OF meso-trans-DI(HEXADECYL)-TETRABENZOPORPHINATE OF METALS**

The electrochemical and electro catalytic properties of meso-trans-di(hexadecyl)tetrabenzoporphinates of iron, copper, nickel and cobalt have been studied by cyclic voltammetry method in the alkaline solution. The influence potentials in the range of 0.5 -1.4 V and scanning velocity from 5 to 100 mV/s on catalyst characteristics has been studied.

Key words: cyclic voltamperometry, catalysis, oxidation-reduction potential

*B. KOVARSKA, M. MIKUL'SKA, R. YASIN'SKY, A. BARAN'SKY***SYNTHESIS AND PROPERTIES OF AZOLES AND THEIR LXIX DERIVATIVES. THERMODYNAMICS OF [2+3] CYCLO ADDITION OF α -METHYLNITROETHYLENE TO Z-C,N-DIARYLNITRONES ON DATA OF AM1/COSMO METHOD**

The thermodynamics of [2+3] cyclo addition of α -methylnitroethylene to the Z-C,N-diarylnitrones has been studying applying the AM1/COSMO method. A reaction equilibrium has been shown to depend essentially on temperature, medium polarity and nitrones structure.

Key words: [2+3] cyclo addition, nitrones, nitro alkenes, AM1/COSMO, thermodynamics

*Ch.I. ABILOV, M.F. AGAEVA***CHARACTER OF PHYSICO-CHEMICAL INTERACTION IN Pb-Fe-Sb SYSTEM****ON SECTIONS $Fe_{1,2}Sb-Pb_{0,825}Sb_{0,175}$ AND $Sb_{0,7}Pb_{0,3} - Fe_{0,7}Pb_{0,3}$**

On the base of the results of physico-chemical analysis the state diagrams of the sections $Fe_{1,2}Sb-Pb_{0,825}Sb_{0,175}$ and $Sb_{0,7}Pb_{0,3} - Fe_{0,7}Pb_{0,3}$ of the triple system Pb-Fe-Sb has been plotted. The sections are not quasi binary. The area of solid solutions

has been discovered on the base of $\text{Fe}_{1,2}\text{Sb}$. The boundary of that area reached of ~ 3 mole% of $\text{Pb}_{0,825}\text{Sb}_{0,175}$. By means of temperature dependence studies of some electro-physical parameters of solid solution $(\text{Fe}_{1,2}\text{Sb})_{0,98}(\text{Pb}_{0,825}\text{Sb}_{0,175})_{0,02}$ it has been established that the alloy refers to the class of narrow-zone semi-conductors with electronic type of conductivity.

Key words: triple system Pb-Fe-Sb, non- quasi binary section, eutectic, solid solution

M.V. BUZAEVA, E.N. KALYUKOVA, E.S. KLIMOV

SORPTION PROPERTIES OF SILICA CLAY, DOLOMITE AND SCHUNGITE WITH RESPECT TO NICKEL CATIONS

The adsorption of nickel cation on natural sorbents silica clay, dolomite and schungite has been investigated. Quantitative adsorption characteristics, maximum adsorption, ion extraction degree from solutions have been determined. The sorption ability decreases in series silica clay - schungite - dolomite.

Key words: adsorption, isotherm, dolomite, nickel cation, silica clay, sulphate ion, schungite

A.D. TSVETKOVA, O.P. AKAEV, A.V. SVIRIDOV

RESEARCH OF PROCESS OF CADMIUM IONS ADSORPTION ON SILICON DIOXIDE

In given article the adsorption characteristics of silicon dioxide (silica gel) – a large-tonnage by-product of aluminum fluoride production have been considered. The degree of purification the aqueous solution from the cadmium ions (both with the help of original and modified types of sorbent) has been also estimated. Kinetic parameters of adsorption process – constants, activation energy are given.

Key words: adsorption, silicon dioxide, heavy metal ions, modification

G.I. EGOROV, D.M. MAKAROV

INFLUENCE OF PRESSURE ON EXCESS THERMODYNAMIC CHARACTERISTICS OF WATER - 2-PROPANOL MIXTURE IN TEMPERATURE RANGE OF 278.15-323.15 K

Excess molar volumes V_m^E , changes of thermodynamic characteristics such as excess molar Gibb's energy $\Delta_{P_o \rightarrow P} G_m^E$, excess molar entropy $\Delta_{P_o \rightarrow P} S_m^E$ and excess molar enthalpy $\Delta_{P_o \rightarrow P} H_m^E$ of water - 2-propanol mixture were calculated in the range of temperature 278-323.15 K and of pressure 1-100 MPa. It was revealed, that V_m^E values are negative over the whole concentration range at all temperature and pressure values, and $\Delta_{P_o \rightarrow P} G_m^E = f(x)$, $\Delta_{P_o \rightarrow P} S_m^E = f(x)$ and $\Delta_{P_o \rightarrow P} H_m^E = f(x)$ functions are characterized by the presence of extremes. It was shown, that at low alcohol concentrations on $\Delta_{P_o \rightarrow P} S_m^E$ and $\Delta_{P_o \rightarrow P} H_m^E$ concentration dependences a positive extreme appears with pressure increasing or with temperature decreasing. It was found, that pressure growth leads to change of the S-shaped form of $H_m^E = f(x)$ function to parabola-like one, i.e. the exothermic minimum shifts to the area of higher alcohol concentrations, and endothermic maximum becomes more flat and is graded (x – mole fraction of 2-propanol).

Key words: water, 2-propanol, thermodynamic parameters

N.Ch. MOVSUMADZE, I.V. DUMAEVA

CATALYTIC METHODS OF CYANOGEN-CONTENING COMPOUNDS

Catalytic transformations of hydrocarbons with nitrile formation have been shown in given article.

Key words: nitrile, acrylonitrile, oxidation, ammonolysis

O.A. ZAVALTSEVA, M.V. BUZAEVA, E.S. KLIMOV, V.V. DUBROVINA, O.A. DAVYDOVA

EXTRACTION OF HEAVY METALS FROM GALVANIC SLUDGES CONTENING FERRITES WITH PYROCATECHOL AND PHENANTROLINE

The extraction of copper, nickel, zinc, chrome from galvanic sludges containing ferrites with the complexones of pyrocatechol and phenantroline has been considered. The pyrocatechol shows the largest selectivity with respect to nickel, phenantroline - selectivity to copper.

Key words: galvanic sludge, metal ion, extraction, complex, pyrocatechol, selectivity, phenantroline, ferritization

E.A. CHUDINOV, O.V. KARLOVA

INFLUENCE OF CHARGE MODE ON PARAMETERS OF CARBON ELECTRODE OF LITHIUM-ION ACCUMULATOR

The mode of the charge first cycle has been shown to influence essentially on specific electrochemical characteristics of a negative electrode of lithium-ionic accumulator. Properties of layer forming on the carbon electrode surface from reduction products of SO_2 have been shown to depend on a current density and a charge mode.

Key words: lithium-ion accumulator, carbon electrode, charge cycle, electro-chemical reactions

A.B. SHEIN, V.S. POVROZNIK

INFLUENCE OF SURFACTANTS ON HYDROGEN EVOLUTION REACTION ON SILICIDES OF IRON TRIAD

The results of investigation of tetrabutylammonium chloride and threemethyltelluronium iodide influence on the cathode hydrogen evolution on iron group metal silicides in sulphuric acid are presented. It has been shown that the protective effect of salts on hydrogen evolution was higher on metals than on their silicides due to a slight influence of additives on the cathode process on the surface silicon atoms.

Key words: mono silicides, tetrabutylammonium, bromide, iodide of threemethyltelluronium, hydrogen cathode evolution, protective effect

A.V. AGAFONOV, A.S. KRAEV, O.I. DAVYDOVA, T.A. TRUSOVA, A.G. ZAKHAROV
**ELECTRORHEOLOGICAL AND POLARIZATION EFFECTS IN POLYDIMETHYLSILOXANE SUSPENSIONS
OF SOL GEL NANOCOMPOSITES OF TITANIUM DIOXIDE – POLYETHYLENGLYCOL AND TITANIUM
DIOXIDE – POLYPROPYLENGLYCOL**

Using sol-gel method the inorganic – organic hybrid materials titanium dioxide – polyethylenglycol and titanium dioxide – polypropylenglycol were synthesized. Physicochemical properties of obtained samples were investigated. The analysis of dielectric and polarization properties of suspensions based on hybrid powders in silicone oil PMS – 20 was carried out. Electrorheological activity of nanocomposite suspensions at various electric field strengths was measured. The influence of polymer type in nanocomposite composition on the value of electrorheological response of electrorheological fluids was established.

Key words: electro rheology, sol-gel synthesis, nano materials

M.N. PORTSEL, V.Yu. NOVIKOV, I.N. KONOVALOVA
KINETIC OF ACIDIC DEPOLYMERISATION OF CHONDROITINESULPHATE

The kinetic regularities of acidic hydrolysis of chondroitinesulphate to its monomer unit –galactose amine and glucuronic acid have been investigated. The hydrolysis of glycoside bounds in chondroitinesulphate with obtaining galactose amine can be described by the first-order kinetic equation.

Key words: chondroitinesulphate, acid hydrolysis, galactose amine, kinetic regularities

E.S. ILCHEVA, A.D. HUSAINOV, E.N. CHEREZOVA
**ACTION OF HIGH-MOLECULAR MODIFIERS WITH GRAFTED ANHYDRIDE SUBSTITUENTS
ON PHYSICO-MECHANICAL CHARACTERISTICS OF RUBBERS BASED ON SKI-3**

The action of high molecular modifiers obtained by interaction of the SCI-3 with unsaturated dicarboxylic acid anhydrides (maleic, endic, iso-methyltetrahydrophthalic) on physical and mechanical characteristics of rubbers based on SCI-3 has been studied. It has been revealed that for the rubber containing modified SCI-3 in amount of 7 mass parts on 93 mass parts of the SCI-3 there is the increasing resistance in tearing, relative breaking strength and the adhesive strength of rubber-metal contact.

Key words: SCI-3, anhydrides of unsaturated dicarboxylic acids, modification, cohesion, adhesion.

A.S.VYSOKOVSKIY, I.S. KOROTNEVA
**INFLUENCE OF EMULSIFIERS NATURE OF LATEX SYNTHESIS PROCESS OF GRAFT CARBOXYL-
CONTAINING BUTADIENE-STYRENE-BUTYLACRYLATE-METHACRYLAMIDE COPOLYMER**

Synthesis of graft carboxyl-containing butadiene-styrene-butylacrylate-methacrylamide copolymer latexes by method of two-stage emulsion copolymerization has been carried out. The sodium salt of the ether of alkylphenol sulfate and its mixture with Sulfanol NP-3 has been used as surfactant. The particles size distribution has been determined for seed and graft copolymers latexes by dynamic light scattering method.

Key words: latex, emulsifier, emulsion polymerization, co-polymer, particles size distribution

T.Yu. STEPANOVA, V.A. TALANOVA, S.G. SAKHAROVA
**STATISTICAL MODEL OF INFLUENCE OF PHYSICAL PROPERTIES OF SURFACTANTS SOLUTIONS
ON WEAR RESISTANCE OF POLYESTER FIBRES**

The analysis of influence of surfactant solution properties on a wear resistance of polyester materials has been carried out. The mathematic model of various factors influence on wear resistance of textile materials has been created. The positive influence on a wear resistance of polyester yarn has been established to render the viscosity and concentration of surfactants solution.

Key words: surfactants, polyester, wear resistance, mathematic model

V.V. LITVYAK, S.M. BUTRIM, V.V. MOSKVA
**OBTAINING SWELLING STARCH AND RESEARCH OF ITS MOLECULAR
AND PERMOLECULAR STRUCTURE**

The study results of morphological structure of native and physically modified potato starch are given. The X-ray analysis and structure analysis have been carried out. It has been established that under starch modification by contact drying of 30-40% starch suspension on single roll dryer at vapor pressure of 6-7 atm and temperature of 130–140°C the starch granules are completely destroyed forming film porous structure. Also, the complete amorphization of native sample as well as an accumulation of C=O groups in starch molecules occurs.

Key words: starch, swelling, crystallinity degree, amorphization

M.V. KONYCHEVA, V.G. STOKOZENKO, Yu.V. TITOVA, A.P. MORYGANOV
**STUDY OF SODIUM SULFIDE EFFECT ON LIGNOCARBOHYDRATE COMPLEX OF BAST FIBERS
IN PROCESSES OF THEIR CHEMICAL MODIFICATION**

The possibility of Na₂S application for the chemical modification of bast fibers was under study. Alkali-sulfide systems were show to be of high delignification action. Time-concentration ranges were found out for the use of such systems in modification processes of bast fibers. On the base of IR spectroscopy data the most possible courses of chemical interactions between sodium sulfide and fiber lignin were proposed under investigated conditions.

Key words: bast fibers, delignification, sodium sulfide

R.M. GORSHKOVA, A.S. NASRIDINOV, Z.K. MUKHIDINOV, D.Kh. KHALIKOV, S. KHALIKOVA, Kh.I. TESHAEV
POLYSACCHARIDES FROM ROCKY RHUBARB (RHEUM RUPESTRE)

In this work the rhubarb stalks and leaves of rocky rhubarb were used as raw materials for a pectin extraction. Two methods were applied to extract pectin polysaccharides from this raw material: the traditional and method of fast extraction - pectin

extraction into autoclave under a pressure for a short period of time. Pectin substances of rocky rhubarb were shown to possess with optimal parameters and the given method application allows controlling the target product obtaining with given physical-chemical parameters.

Key words: rocky rhubarb, polysaccharide matrix, micro gel, pectins, oligosaccharides, fast extraction

N.S. TANGYARIKOV

DEVELOPMENT AND STUDY OF NEW POLYFUNCTIONAL CATALYSTS FOR ACETYLENE HYDRATION

Properties of new mixed poly functional catalysts for the vapor-phase hydration of acetylene have been studied. It was shown that the hydration process accomplishing in the presence of mixed cadmium-zinc-aluminum catalysts results in formation of acetate aldehyde or acetone or their mixture. Process selectivity depends mainly from the catalyst content.

Key words: acetylene vapor-phase hydration, cadmium-zinc-aluminum catalysts, selectivity, conversion degree

A.M. ALIEV, S.M. MEDGIDOVA, T.N. SHAKHTAKHTINSKIY, K.A. GUSEIYNOV

VAPOR-PHASE OXYDATION OF METHYL ALCOHOL TO FORMIC ACID ON MODIFIED ZEOLITE CATALYST

The catalytic properties of Cu and Pd introduced to zeolites of various acidities for the oxidative transformation of methyl alcohol to formic acid have been studied in the temperature range of 95-180°C, at flow rates of 900-3200 h⁻¹, and at atmospheric pressure. The metal-zeolite catalyst Pd-mordenite containing of 0.1% of Pd²⁺ has been established to show the highest activity in given reaction. The reaction kinetics on the Pd-mordenite catalyst has been studied.

Key words: oxidation, methanol, formic acid, zeolite

A.B. KAPRANOVA, A.E. LEBEDEV, V.A. VASILIEV

ABOUT MOVEMENT OF BEARING PHASE OF DISPERSED MEDIUM AT IT DEGASSING IN GAP OF ROLL DEAERATOR WITH SPHERICAL DIE

In the frame of the heterogeneous media mechanics the pressure of the bearing phase of the dispersed mixtures in the process of it degassing in the gap of the roll deaerator with spherical die has been determined under material detachment from shaft surface. The calculation results can be used for creation of boundary conditions for degassing model of fine dispersed media in the gap of roll device at obtaining packed granule-spheres.

Key words: degassing, dispersed medium, roll deaerator, spherical die, dispersive and bearing phase, Darsi low

E.P. GRISHINA, N.O. KUDRYAKOVA, A.M. PIMENOVA, L.M. RAMENSKAYA

TRANSPORT PROPERTIES OF BINARY LOW-TEMPERATURE IONIC MELT BMImBr-CuBr₂

The influence of copper (II) bromide concentration on a specific conductivity and viscosity of BMImBr-CuBr₂ ionic liquid has been studied. The isotherms of binary system conductivity in the range of CuBr₂ concentration of 2.2-30.2 mol. % have been obtained and discussed. Absolute and relative temperature coefficients, effective activation energy of the specific conductivity have been calculated. The introduction of copper (II) bromide in over cooled BMImBr melt has been shown to promotes a dissociate process in this ionic liquid. The dissolution of copper (II) bromide in BMImBr resulted in formation of CuBr₄²⁻ complex ions.

Key words: ionic liquid, 1-butyl-3-methylimidazole bromide, dynamic viscosity, specific conductivity

S.V. KOVALEV, S.I. LAZAREV, V.V. MAMONTOV, V.Yu. POPOV

RESEARCHES OF SEPARATION FACTORS AND WATER PERMEABILITY OF MEMBRANES MGA-95 AND MGA-80P AT REVERS OSMOTIC PURIFICATION OF WASTE WATER OF GALVANIC PRODUCTIONS

The experimental set up and single-modular roll device for the study of separation coefficients and water permeability of membranes MGA-95 and MGA-80P for a waste water purification of galvanic productions have been developed. In given work the separation coefficient decreases with pressure growth whereas the permeability increases with the growth of process motive force.

Key words: acetate cellulose membranes, reverse osmosis, separation coefficient, water permeability.

N.M. LADAEV, E.V. ZHBANOVA, P.P. GUYUMDZHYAN

DEHYDRATION OF BRITTLE MATERIALS UNDER SHOCK LOADING

The article gives experimental results of research of the destruction process of single particles of brittle materials which contain free moisture at impact against a stationary surface. The influence of impact velocity on the dehydration process has been considered. Dependencies between amounts of removed moisture, impact velocity, size of initial product and its physical-mechanical properties have been found.

Key words: impact, milling, dehydration, wet material, impact velocity

A.A. LUKYANOV, E.N. KALYUKOVA, M.V. BUZAEVA, E.S. KLIMOV

ADSORPTION OF SULFATIC IONS ON MODIFIED SILICA CLAY

The adsorption of sulphate ions on the thermo modified natural sorbents silica clay has been investigated. Quantitative adsorption characteristics, maximum adsorption, ion extraction degree have been determined.

Key words: adsorption, silica clay, modification, sulphate ions, isotherm