

CONTENTS

CHEMISTRY

(inorganic, organic, analytical, physical, colloid
and high-molecular compounds)

Bobova T.A., Kolobov A.V., Cherkalin M.S., Ovchinnikov K.L., Rozhkov S.S. Conjugate attachment of nitrogen-containing hetero cyclic compounds to derivatives of maleic and itaconic acids	3
Gasanova U.A. Synthesis of macrocyclic compound having 36-term cavity with two double bonds	5
Sharunov V.S., Chirkova Zh.V., Filimonov S.I., Abramov I.G., Plakhtinskiy V.V. Synthesis of 1-hydroxy-1 <i>H</i> -indol-5,6-dicarbonitriles based on 4-methyl-5-nitrophthalonitrile.....	8
Chemezova K.S., Khlynova N.M. Formation of iron hydroxide on graphite electrode surface	12
Degtev M.I., Dudukalov N.V., Rossikhin A.A. Extraction of zirconium ions from mixed solutions by alizarin and its aminomethylated derivatives	15
Amelin V.G., Tretiyakov A.V., Efremova A.A. Determination of fullerenes in water, juices and shungite by reversed-phase HPLC	19
Kulichenko S.A., Shcherbyna M.G. Micellar extraction of metal complexes with xanthene reagents into phase of cetylpyridinium chloride	23
Lytkin A.I., Chernyavskaya N.V., Litvinenko V.E. Thermodynamics of processes of Cd ²⁺ complexation with N-(carboxymethyl) aspartic acid in aqueous solutions	27
Popov I.A., Parfenyuk V.I., Semeiykin A.S. Influence of hydrocarbon chain length of lateral substitutes on electrochemical properties of tetrakis (4'-alkoxyphenyl) porphyrins solutions in methylene chloride.....	31
Kochnev S.V., Cherkasova T.G. Thermal analysis of complexes of manganese (II), cobalt (II), nickel (II) isothiocyanates with ε-caprolactam.....	36
Semenov I.A., Sitnikov D.N., Romanovskiy A.A., Ulianov B.A. Solubility and equilibrium in binary mixtures of methanol with <i>n</i> -pentane, <i>n</i> -hexane and <i>n</i> -heptane	39
Chernikov D.A., Palshin V.A., Bazhenov B.N., Safronov A.Yu., Kashevskiy A.V. Hydroxyacetophenones-new models at study of electro-oxidation of cvercetine	43
Gurbanov G.R. Interaction character in SnSbBiS ₄ -Bi ₂ S ₃ system	47
Dibirov Ya.A., Verdiev N.N., Arbukhanova P.A., Berengarten M.G., Dibirov K.Ya. Phase equilibria and heat accumulating materials in system LiCl - Li ₂ SO ₄ - CaMoO ₄	50
Chepenyayak P.A., Golovashin V.L., Lazarev S.I. Electrodifffusion permeability of ultrafiltration membranes in aqueous phosphate-containig solutions	52

CHEMICAL TECHNOLOGY

(inorganic and organic substances.
Theoretical fundamentals)

Kvasyuk A.V., Koltsova E.M., Sandu R.A., Bessarabov A.M. CALS-technology of flexible prodcution for phosphoric sludge utilization	57
Lapshin D.N., Kunin A.V., Smirnov S.A., Ilyin A.P. Adhesion properties of fire-extinguishing powder on base of ammophos	62
Shekhanov R.F., Gridchin S.N. Internal stresses in cobalt-nickel electroplatings	66

Verner V.F., Bishimbayev V.K., Khudyakova T.M. Physico-chemical features of crystallizations in phosphoric-slag charges at production of synthetic wollastonite	68
Butman M.F., Ovchinnikov N.L., Arbuznikov V.V., Agafonov A.V. Synthesis and properties Al-pillared montmorillonite of natural origin	73
Kotlova E.S., Pavlovskaya M.V., Grishin D.F. Cyclopentadienyl manganese complexes in synthesis of (co)polymers of vinyl chloride	78
Abdulova T.M., Khaiybullin R.G., Latypova D.R., Biglova R.Z., Dokichev V.A. Synthesis of N-(3-hydroxy-2-methylpropyl) anabazines	84
Petrov A.A., Lebedev A.E., Zaiytsev A.I., Kapranova A.B. Rapid method for evaluating homogeneity of bulk materials mixtures	88
Kapranova A.B., Nikitina Yu.V., Lebedev A.E., Petrov A.A. Study of interface movement of viscous liquid along blade of centrifugal sprayer.....	90
Lebedev A.E., Zaiytsev A.I., Kapranova A.B., Sheronina I.S. The calculation of the process of viscous liquids flowing	93
Mitrofanov A.V., Ogurtzov A.V., Magnitskiy V.A., Mizonov V.E., Ovchinnikov L.N. Computational and experimental investigation of fluidization of polydispersed granular material	95
Yakimych P.V., Mizonov V.E., Elin N.N., Zaiytsev V.A. Identification of cell model of contact heat exchange and its industrial validation.....	98
Padokhin V.A., Kochkina N.E., Kalabin E.V., Kokina N.R., Groshev A.S. Stochastic approach to modelling kinetics of high-molecular systems destruction Part 1. Stepwise markov models of kinetics of mechanical destruction	101
Slivchenko E.S., Samarskiy A.P., Isaev V.N. Modeling of oscillation of crystallization system tiaminbromid - ethanol – water	104
Dyomin O.V., Pershin V.F., Smolin D.O. Intensification of mixing granulated materials in blade mixer	108
Golovanchikov A.B., Dulkina N.A., Aristova Yu.V. Calculation of chemical reactor with diffusive model of flows structure and pecelet different numbers on reacting components	111
Volkov S.V., Rybin C.V., Vinogradov E.I., Balmasov A.V. Influence of water on aluminium passivation process in electrolyts on base of organic solvents.....	115
Polyakov V.S., Padokhin V.A., Akulova M.V., Syrbu S.A. Improving strength properties of heavy concretes with chemical additives on base of ϵ -caprolactame oligomers.....	118

SHORT COMMUNICATIONS

Vashurin A.S., Tikhomirova T.V., Futerman N.A., Pukhovskaya S.G., Maiyzlish V.E., Shaposhnikov G.P. Catalytic properties of acylated metallophthalocyanines	122
Root E.V., Goncharov E.V., Goncharova L.A., Kukushkin A.A., Suboch G.A. Cyclocondensation of hydrazine with β -diketones containing pyridine fragment.....	124

CHRONICLE

Zaikov G.E., Zimina L.A. XX Enikolopov's readings. Modern methods of polymer morphology studies	126
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A B S T R A C T S

T.A. BOBOVA, A.V. KOLOBOV, M.S. CHERKALIN, K.L. OVCHINNIKOV, S.S. ROZHKOVA
**CONJUGATE ATTACHMENT OF NITROGEN-CONTAINING HETERO CYCLIC COMPOUNDS
TO DERIVATIVES OF MALEIC AND ITACONIC ACIDS**

New vicinal dicarboxylic acids were obtained with the Michael's reaction in which the compounds of pyridazine and phthalazine were used as nucleophilic agent whereas the derivatives of maleic and itaconic acids were used as acceptors.

Key words: phthalazine derivatives, pyridazine derivatives, succinic acid, itaconic acid, Michael's reaction

U.A. GASANOVA
**SYNTHESIS OF MACROCYCLIC COMPOUND HAVING 36-TERM CAVITY
WITH TWO DOUBLE BONDS**

On the base of 1,2-dibromethane, 1,4-dibrom-trans-2-butene, o-phthalic acid the synthesis of macrocyclic compound having 36-term cavity with two double bonds and ester groups was carried out.

Key words: macro cycle, crown ether, ionophore, receptor, conformation

V.S. SHARUNOV, Zh.V. CHIRKOVA, S.I. FILIMONOV, I.G. ABRAMOV, V.V. PLAKHTINSKIY
**SYNTHESIS OF 1-HYDROXY-1H-INDOL-5,6-DICARBONITRILES BASED ON 4-METHYL-5-
NITROPHthalONITRILE**

New 1-hydroxy-1H-indol-5,6-dicarbonitriles were synthesized on the base of 4-methyl-5-nitrophthalonitrile.

Key words: 4-methyl-5-nitrophthalonitrile, 4-R-ethenyl-5-nitrophthalonitrile, reduction cyclization, 1-hydroxy-1H-indol-5,6-dicarbonitrile

K.S. CHEMEZOVA, N.M. KHLINOVA
FORMATION OF IRON HYDROXIDE ON GRAPHITE ELECTRODE SURFACE

On voltammetry graphs of electro dissolution depositions forming on graphite electrode in solution containing ions of iron (II) the one peak of current is registered. The square under the peak of electro dissolution is linear dependent on concentration of iron ions in solution and may be used for their determination. The optimal conditions of electro deposition and electro dissolution of sediments were recommended.

Key words: voltammetry, electro deposition, electro dissolution, graphite electrode, iron ions

M.I. DEGTEV, N.V. DUDUKALOV, A.A. ROSSIKHIN
**EXTRACTION OF ZIRCONIUM IONS FROM MIXED SOLUTIONS BY ALIZARIN AND
ITS AMINOMETHYLATED DERIVATIVES**

Zirconium trace extraction was studied by 1,2-dioxyanthraquinone and its aminomethylated derivatives: 3-N,N-diethylaminomethylalizarin and 3-N,N-piperidylaminomethylalizarin from acetate-buffer and mixed solutions containing perchlorate-, nitrate-, chloride-, sulfate-, trichloroacetate-ions, into butanol and its mixture with chloroform (9:1). Aqueous phase pH and salting-out agent amount dependences of zirconium ions extraction were shown. Extracted complexes composition was analyzed by spectrophotometric and conductometric methods.

Key words: zirconium ion, complex, buffer solution, perchlorate-, trichloroacetate- ions, extraction, butanol, composition, complexes structure, 1,2-dioxyanthraquinone

V.G. AMELIN, A.V. TRETIYAKOV, A.A. EFREMOVA
DETERMINATION OF FULLERENES IN WATER, JUICES AND SHUNGITE
BY REVERSED-PHASE HPLC

The methods for determination of C₆₀ and C₇₀ in the water, shungite and juices in the concentration range of 0.05 - 20 mg / l were developed using the method of reversed-phase high performance liquid chromatography. The duration of the analysis is 30 - 40 minutes; the relative standard deviation of the results of the analysis does not exceed 5%.

Key words: fullerene C₆₀, C₇₀, HPLC, water and juice analysis

S.A. KULICHENKO, M.G. SHCHERBYNA
MICELLAR EXTRACTION OF METAL COMPLEXES WITH XANTHENE REAGENTS INTO
PHASE OF CETYLPYRIDINIUM CHLORIDE

Micellar extraction of xanthene reagents and their complexes with Sn (IV), Mo (VI) and W (VI) ions into modified micellar phase of cetylpyridinium chloride was studied. The suitability of the liquid cation-active phases for the pre-concentrating of the high-valence metal ions was shown. The procedure for spectrophotometric determination of molybdenum (VI) with bromopyrogallol red after micellar extraction was developed. The proposed method was tested for the determination of molybdenum in tap and natural waters, and urine.

Key words: micellar extraction, cetylpyridinium chloride, pre-concentrating, molybdenum

A.I. LYTKIN, N.V. CHERNYAVSKAYA, V.E. LITVINENKO
THERMODYNAMICS OF PROCESSES OF Cd²⁺ COMPLEXATION WITH N – (CARBOXYMETHYL) ASPARTIC ACID IN AQUEOUS SOLUTIONS

The constants and heat effects of complexation of N – (carboxymethyl) aspartic acid (H₃L) with Cd²⁺ ion at 298.15 K and ionic strength values of 0.2, 0.5 and 1.0 (KNO₃) were determined by the potentiometric and calorimetric methods. The thermodynamic characteristics of the reaction of CdL complexation in aqueous solutions were calculated. The values obtained were interpreted.

Key words: thermodynamic characteristics, stability constant, heat effects, complexon, cadmium

I.A. POPOV, V.I. PARFENYUK, A.S. SEMEYKIN
INFLUENCE OF HYDROCARBON CHAIN LENGTH OF LATERAL SUBSTITUTES
ON ELECTROCHEMICAL PROPERTIES OF TETRAKIS (4'-ALKOXYPHENYL) PORPHYRINS
SOLUTIONS IN METHYLENE CHLORIDE

The influence of the different length hydrocarbon substitutes on the capacitance of electric double layer and solution resistance of initial substances were studied for tetrakis (4'-alkoxyphenyl) porphyrin in methylene chloride. The experimental data were obtained by the electrode impedance method. It was established that the increase in hydrocarbon chain length of alkoxy-substitutes results in the decrease both in solution conductivity and in capacity maxima of electric double layer which appropriates to processes of organic ligand oxidation.

Key words: tetrakis (alkoxyphenyl) porphyrin, electrode impedance, capacitance of the electrical double layer

S.V. KOCHNEV, T.G. CHERKASOVA
THERMAL ANALYSIS OF COMPLEXES OF MANGANESE (II), COBALT (II), NICKEL (II) ISO-
THIOCYANATES WITH ε-CAPROLACTAM

The processes of thermal decomposition of new coordination compounds of [Me(KIIJ)₄ (NCS)₂] (Me=Mn (I), Co (II), Ni (III), KIIJ=ε-kaprolaktam) composition were investigated by thermo gravimetric and IR-spectroscopic methods

Key words: complex compounds, isothiocyanates, manganese, cobalt, nickel, thermolysis

I.A. SEMENOV, D.N. SITNIKOV, A.A. ROMANOVSKIY, B.A. ULIANOV
SOLUBILITY AND EQUILIBRIUM IN BINARY MIXTURES OF METHANOL WITH
n-PENTANE, n-HEXANE AND n-HEPTANE

Equilibrium compositions of phases in liquid-liquid systems consisting of binary mixtures of methanol with n-pentane, n-hexane and n-heptane are given in the paper. Binary interaction parameters of NRTL model for studied systems were calculated and its temperature dependencies were determined.

Key words: liquid-liquid equilibrium, methanol-n-pentane, methanol-n-hexane, methanol-n-heptane, NRTL model

D.A. CHERNIKOV, V.A. PALSHIN, B.N. BAZHENOV, A.Yu. SAFRONOV, A.V. KASHEVSKIY
HYDROXYACETOPHENONES-NEW MODELS AT STUDY OF ELECTRO-OXIDATION
OF CVERCETINE

Cvercetine, number of hydroxyacetophenones and number of phenols modeling some structural fragments of its molecule were studied with the method of cyclic voltammetry on graphite electrode in water-alcohol buffer solutions. The oxidation of cvarcetine molecule was shown to proceed with participation of various molecule fragments, partially, hydroxyl groups of A-ring rather than B-ring as it was declared in some fresh studies. The cvarcetin oxidation in the range of high positive potentials can proceed with participation of that molecule fragments which form the A and C-rings and are modeled with 2'-GAF, 2'4'-DGAF molecules and resorcin and fluoroglucene as well.

Key words: hydroxyacetophenones, flavonoids, electrooxidation

G.R. GURBANOV

INTERACTION CHARACTER IN SnSbBiS₄-Bi₂S₃ SYSTEM

For the first time the phase equilibrium in SnSbBiS₄-Bi₂S₃ system was investigated using a number of experimental methods of physical-chemical analysis: differential thermal one, X-ray, microstructure one, micro hardness and density determination. The state diagram of system was plotted. It was established that SnSbBiS₄-Bi₂S₃ section is quasi-binary cut of triple system SnS-Sb₂S₃-Bi₂S₃. In system under study the 7 mol% of α on the base of SnSbBiS₄ and 3 mol% of β on the base of Bi₂S₃ are formed. Coordinates of eutectic point obtained for SnSbBiS₄-Bi₂S₃ system are 30 mol% of Bi₂S₃ and 700 K.

Key words: physical-chemical analyze, phase equilibria, SnSbBiS₄- Bi₂S₃ system

Ya.A. DIBIROV, N.N. VERDIEV, P.A. ARBUKHAHOVA, M.G. BERENGARTEN, K.Ya. DIBIROV
PHASE EQUILIBRIA AND HEAT ACCUMULATING MATERIALS

IN SYSTEM LiCl - Li₂SO₄ - CaMoO₄

Differential-thermal and visual-polythermal methods of physical and chemical analysis the stable cutting triangle LiCl - Li₂SO₄ - CaMoO₄ of quadruple mutual system Li, Ca // Cl, SO₄, MoO₄ was studied. It was established that the liquidus surface of system consists of crystallization fields of initial components. The heat-physical and thermodynamic parameters of non-variant alloys of system were determined.

Key words: physical-chemical analysis, quadruple mutual system, liquidus, phase transition heat, eutectic, heat accumulator

P.A. CHEPENYAK, V.L. GOLOVASHIN, S.I. LAZAREV

ELECTRODIFFUSION PERMEABILITY OF ULTRAFILTRATION MEMBRANES IN AQUEOUS
PHOSPHATE-CONTAINING SOLUTIONS

Experimental studies on determination of the coefficient of electrodiffusion permeability of trisodium phosphate and sodium tripolyphosphate from aqueous solutions on ultra filtration membranes UAM-50P, UPM-100 and UFM-100 were carried out. It was pointed out that the increasing in concentration the electrodiffusion coefficient of permeability decreases. With increasing the current density the electrodiffusion permittivity coefficient was increased.

Key words: electrodiffusion permeability, electro ultra filtration, membrane mass transfer

A.V. KVASYUK, E.M. KOLTSOVA, R.A. SANDU, A.M. BESSARABOV

CALS-TECHNOLOGY OF FLEXIBLE PRODCUTION FOR PHOSPHORIC
SLUDGE UTILIZATION

For utilization of phosphoric sludge (one of the main waste of phosphoric industry) the information project of the flexible production for processing the phosphoric sludge to sodium and lead phosphates and to sodium hypophosphite was developed. The project was created on the base of information CALS-technologies (ISO-10303 STEP).

Key words: information technologies, CALS, flexible production, waste utilization, phosphoric sludge

D.N. LAPSHIN, A.V. KUNIN, S.A. SMIRNOV, A.P. ILYIN

ADHESION PROPERTIES OF FIRE-EXTINGUISHING POWDER ON BASE OF AMMOPHOS

To improve properties of the fire-extinguishing powder compositions on the base of ammophos, the white carbon (WC-120) and the waterproofing silicoorganic liquids (WSL 136-14) was used. It was shown that

it is possible to obtain the powders for fire extinguishing possessing the high ability to water –repellency (250-300 min) and low ability to water absorption. For this purpose it is necessary to apply the mechano-chemical activation of ammophos in meals with energy density of 21.942 kJ/(s kg) in the presence of additives of white carbon (WC-120) and waterproofing silicoorganic liquids (WSL 136-14)..

Key words: ammophos, hygroscopicity, water-repellency, moisture absorption, wettability, limiting wetting angle, wetting rate, hygroscopic point

R.F. SHEKHANOV, S.N. GRIDCHIN

INTERNAL STRESSES IN COBALT-NICKEL ELECTROPLATINGS

The possibility of obtaining cobalt and nickel electrochemical alloys with various component ratio was shown. The bath compositions and electrochemical deposition modes were developed. Internal stresses in the coatings obtained were measured.

Key words: electro deposition, electrolytes, binary alloys, internal stresses

V.F. VERNER, V.K. BISHIMBAYEV, T.M. KHUDYAKOVA

PHYSICO-CHEMICAL FEATURES OF CRYSTALLIZATIONS IN PHOSPHORIC-SLAG CHARGES AT PRODUCTION OF SYNTHETIC WOLLASTONITE

At study of processes of mineral formation in system “slag-quartz sand” it was established that under sintering the granulated phosphoric-slag charges the temperature range of 850-950°C is the most interesting. In this range the phase transformations are dominate ones. These transformations connect with the appearance and increase in amount of liquid phase forming at decomposition of akermanite and cuspidine. In this medium the correcting silica addition is solved. Also, under the next temperature increase up to 1000-1050°C the preferred crystallization of low temperature wollastonite of needlelike habitus takes place.

Key words: electrothermophosphoric slag, synthetic wollastonite, correcting additive, whitening additive, granulation, crystallization, mineral formation

M.F. BUTMAN, N.L. OVCHINNIKOV, V.V. ARBUZNIKOV, A.V. AGAFONOV

SYNTHESIS AND PROPERTIES Al-PILLARED MONTMORILLONITE OF NATURAL ORIGIN

The samples of Al-pillared montmorillonite were obtained throughout intercalation of enriched Dash-Salakhlin sky bentonit with hydroxyalumina polycations. X-ray diffraction, Fourier-transform infrared spectroscopy and simultaneous thermal analyses, photometry, nitrogen adsorption - desorption were used to study the structural and sorption properties of pillared materials: basal spacing $d_{001}=1.6$ nm, the BET specific surface area of $S_{\text{BET}} = 140$ m²/g, the average pore size $D_{\text{average}} = 5.5$ nm, the most probable pore size $D_{\text{most}} = 4.3$ nm, total porous volume $V_{\text{total}} = 0.19$ sm³/g.

Key words: lamellar aluminum silicates, intercalation, alumina polyhydroxocomplex, pillared montmorillonite

E.S. KOTLOVA, M.V. PAVLOVSKAYA, D.F. GRISHIN

CYCLOPENTADIENYL MANGANESE COMPLEXES IN SYNTHESIS OF (CO)POLYMERS OF VINYL CHLORIDE

The features of polymerization of vinyl chloride in the presence of cyclopentadienyl complexes of manganese of various structures were studied. The metal complexes containing olefin fragment were established to show the highest catalytic activity for the synthesis of polyvinyl chloride. The effect of halogen coinitiators on the process of polymerization of vinyl chloride was estimated, and also a block copolymerization was carried out. The molecular-weight distribution and some physical-chemical properties of the synthesized (co) polymers were investigated.

Key words: manganese cyclopentadienyl complexes, vinylchloride, radical polymerization, copolymers

T.M. ABDULOVA, R.G. KHAIYBULLIN, D.R. LATYOVA, R.Z. BIGLOVA, V.A. DOKICHEV

SYNTHESIS OF N-(3-HYDROXY-2-METHYLPROPYL) ANABAZINES

N-(3-hydroxypropyl) and N-(3-hydroxy-2- methylpropyl) anabazines were synthesized by interaction of L-anabazine and methyl esters of acrylic and methacrylic acids followed by reduction of obtained N-(2-methoxycarbonylalcy) anabazines with lithium aluminum hydride. The influence of catalyst nature and conditions of reaction proceed on yield and product composition of anabazine reaction with methylacrylate was studied.

A.A. PETROV, A.E. LEBEDEV, A.I. ZAIYSEV, A.B. KAPRANOVA
RAPID METHOD FOR EVALUATING HOMOGENEITY OF BULK MATERIALS MIXTURES

The rapid method for determining component concentrations of two component mixtures of bulk materials followed by determination of heterogeneity coefficient is presented on the base of analysis of sample images.

Key words: method, concentration, mixture, component, bulk material, image, distribution, gray tint, heterogeneity coefficient

A.B. KAPRANOVA, Yu.V. NIKITINA, A.E. LEBEDEV, A.A. PETROV
STUDY OF INTERFACE MOVEMENT OF VISCOUS LIQUID ALONG BLADE OF CENTRIFUGAL SPRAYER

The method of the determination of the slipping coefficient of viscous liquid along curvilinear blade at condition of its uniform flow from the chamber of centrifugal sprayer as a function of design and regime set-up's parameters was proposed. The results obtained can be used at the development of the engineering method of calculation of the centrifugal sprayer.

Key words: centrifugal sprayer, curvilinear blade, isothermal viscous liquid, slipping coefficient, deformation tensor, movement model, cylindrical coordinate system, design and regime set-up's parameters

A.E. LEBEDEV, A.I. ZAIYSEV, A.B. KAPRANOVA, I.S. SHERONINA
THE CALCULATION OF THE PROCESS OF VISCOUS LIQUIDS FLOWING

The mathematic description of dispersion process of viscous liquid with the pressure injector taking into account broadening of formed flow is presented on the base of stochastic approach. The differential distribution function of the number produced particles on scattering angles was obtained.

Key words: process, impact, flow, particle distribution function, diameter

A.V. MITROFANOV, A.V. OGURTZOV, V.A. MAGNITSKIY, V.E. MIZONOV, L.N. OVCHINNIKOV
COMPUTATIONAL AND EXPERIMENTAL INVESTIGATION OF FLUIDIZATION OF POLYDISPERSED GRANULAR MATERIAL

A cell mathematical model of fluidization of polydispersed ensemble of particles in fluidized bed is proposed. The model describes the bed expansion and fractions concentration distribution over its height. The experimental validation of the concentration distribution was done which showed satisfactory correlation of calculated and experimental data

Key words: fluidized bed, polydispersed material, state vector, transition matrix, concentration distribution

P.V. YAKIMYCHEV, V.E. MIZONOV, N.N. ELIN, V.A. ZAIYSEV
IDENTIFICATION OF CELL MODEL OF CONTACT HEAT EXCHANGE AND ITS INDUSTRIAL VALIDATION

The objective of the study is to provide the proposed earlier cell model of heat and mass transfer in a contact heat exchanger with empirical correlations for calculation heat and mass transfer coefficients and aerodynamic resistance, as well as validate the data obtained on an industrial scale heat utilizer.

Key words: cell model, heat and mass transfer, condensation, aerodynamic resistance, criterial equation

V.A. PADOKHIN, N.E. KOCHKINA, E.V. KALABIN, N.R. KOKINA, A.S. GROSHEV
STOCHASTIC APPROACH TO MODELLING KINETICS OF HIGH-MOLECULAR SYSTEMS DESTRUCTION

PART 1. STEPWISE MARKOV MODELS OF KINETICS OF MECHANICAL DESTRUCTION

The stochastic Markov model of kinetics of polymer macromolecules destruction was developed and analyzed. It was found, that under certain simplifying assumptions the model leads to the well-known in physical chemistry of polymers the Tang molecular weight distribution.

Key words: destruction, mechanodestruction, polymers, mathematical modeling, stochastic Markov process, evolution, molecular-weight distribution

E.S. SLIVCHENKO, A.P. SAMARSKIY, V.N. ISAEV
**MODELING OF OSCILLATION OF CRYSTALLIZATION SYSTEM
TIAMINBROMID - ETHANOL – WATER**

The numerical simulation of oscillations in the crystallization system tiaminbromid - water – ethanol was carried out. The influence of operational parameters on the crystallization system stability and characteristics of the crystals obtained was analyzed.

Key words: crystallization system, complete mixing cell, crystals formation rate, crystals growth rate, supersaturation, oscillation, stability

O.V. DYOMIN, V.F. PERSHIN, D.O. SMOLIN
INTENSIFICATION OF MIXING GRANULATED MATERIALS IN BLADE MIXER

The investigation results of granulated material particles movement in blade-mixers are presented. The mixing time decrease method of granulated materials by means of particle active exchanging in radial direction, and construction of single-shaft blade mixer (for its implementation), providing mixing intensification and unloading prepared mixture without the loss of its uniformity was considered.

A.B. GOLOVANCHIKOV, N.A. DULKINA, Yu.V. ARISTOVA
CALCULATION OF CHEMICAL REACTOR WITH DIFFUSIVE MODEL OF FLOWS STRUCTURE AND PECKET DIFFERENT NUMBERS ON REACTING COMPONENTS

The diffusion influence of two different indicators on the flow structure in unit of continuous action was considered. The calculation algorithm of diffusion model for the case of simple reaction on reacting component A and B when the Peclet' numbers are different essentially was proposed.

Key words: flow structure, diffusion model, Peclet' number, mixing reactor, displacement reactor

S.V. VOLKOV, C.V. RYBIN, E.I. VINOGRADOV, A.V. BALMASOV
**INFLUENCE OF WATER ON ALUMINIUM PASSIVATION PROCESS IN ELECTROLYTS
ON BASE OF ORGANIC SOLVENTS**

Influence of water content in electrolyte on the base of γ -butyrolactone on processes of anode oxidation and aluminum corrosion in oxide electrolytic capacitors was investigated. It was shown that for aluminum preservation in a passive state and providing the reliable operation of high-voltage aluminium electrolytic capacitor the water content in working electrolyte should be in limits from 1.5 to 2.5 %.

Key words: aluminum, passivation, oxide layer, electrolytic capacitor

V.S. POLYAKOV, V.A. PADOKHIN, M.V. AKULOVA, S.A. SYRBU
**IMPROVING STRENGTH PROPERTIES OF HEAVY CONCRETES WITH CHEMICAL
ADDITIVES ON BASE OF E-CAPROLACTAME OLIGOMERS**

Paper reports on the influence of chemical additives on the base of ϵ -caprolactame oligomers which improve the strength properties of concrete mixtures. The obtained compositions possess with competitive ability.

Key words: e-caprolactame oligomers, concrete mixtures, strength properties, plastisizing additives, lignosulphonates, calcium chloride, epoxy resin

*A.S. VASHURIN, T.V. TIKHOMIROVA, N. A. FUTERMAN, S.G. PUKHOVSKAYA,
V.E. MAIYZLISH, G.P. SHAPOSHNIKOV*
CATALYTIC PROPERTIES OF ACYLATED METALLOPHTHALOCYANINES

For the first time in given article it was shown the catalytic activity a number of metallophthalocyanines in oxidation reaction of sodium diethyldithiocarbamate by oxygen of air. The dependence of the catalytic properties of phthalocyanine catalysts on the nature of the metal and the structure of the macrocycle was established.

Key words: metallophthalocyanine, heterogeneous catalyst, sodium diethyldithiocarbamate

E.V. ROOT, E.V. GONCHAROV, L.A. GONCHAROVA, A.A. KUKUSHKIN, G.A. SUBOCH
**CYCLOCONDENSATION OF HYDRAZINE WITH β -DIKETONES CONTAINING PYRIDINE
FRAGMENT**

Appropriate 4-nitrozopyrazoles were obtained with the cyclocondensation of hydrazine and pyridyl-substituted isonitroso- β -diketones.

Key words: 4-nitroso-pyrazoles; β -dicarbonyl compounds; cyclocondensation; hydrazine hydrate; pyridyl-substituted pyrazoles; mass-spectrometry