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A B S T R A C T S

*G.R. BEREZINA, I.S. FOMINA***SYNTHESIS AND PROPERTIES OF MACROHETEROCYCLIC COMPOUNDS WITH FRAGMENTS OF SUBSTITUTED M-DIAMINES**

Phenylendiamines and based on its macroheterocyclic compounds were synthesized by interaction indandione-1,3 with 2,4-diaminesulfonis acid and 2,4-diaminophenol. Data of infrared and electronic spectra were presented.

Key words: indandione, diamines, synthesis, spectroscopy, macroheterocyclic compounds

*A.M. EFREMOV, O.A. SEMENOVA, S.M. BARINOV***ELECTRO-PHYSICAL PARAMETERS AND DENSITIES OF CHARGE SPECIES IN METHANE AND ARGON MIXTURE PLASMA**

The investigation of steady-state plasma parameters and composition in CH₄-Ar mixtures under the condition of direct current glow discharge ($p = 40\text{--}200$ Pa, $i = 30\text{--}70$ mA) was carried out. The data on reduced electric field strengths, electron energy distributions and electron densities were obtained. The analysis of formation and decay kinetics for charged species was carried out

Key words: methane, argon, rate coefficient, rate, ionization

*L.A. KOCHERGINA, V.G. BADELIN, A.I. LYTKIN, O.N. KRUTOVA, K.V. DAMRINA***STANDARD ENTHALPIES OF FORMATION OF L-ISOLEUCINE AND D,L-NORLEUCINE AND PRODUCTS OF THEIR DISSOCIATION IN AQUEOUS SOLUTIONS**

Ethalpies of dissolution of crystalline L-isoleucine and D,L - norleucine in water and water solutions of potassium hydroxide were determined at 298.15K with direct calorimetric method. Standard enthalpies of formation of amino acids and products of their dissociation in aqueous solution were calculated.

Key words: thermodynamics, solutions, chemistry, calorimeter, amino acids

*I.N. SAMSONOVA, E.I. FROLOV, I.K. GARKUSHIN***RESEARCH OF PHASE EQUILIBRIA IN Na,K//Br,VO₃ TERNARY MUTUAL SYSTEM**

Phase equilibria of Na,K//Br,VO₃ ternary mutual system were studied by differential thermal analysis method. The ternary peritectic and eutectic compositions and temperature of peritectic and eutectic points were determined : NaBr-NaVO₃-KVO₃ (the temperature of peritectic point and the composition is 460°C, 15% equiv. NaBr; 42,5% equiv. NaVO₃ and 42,5% equiv. KVO₃); the temperature of eutectic point and the composition is 440°C, 13% equiv. NaBr; 14,5% equiv. NaVO₃ and 72,5% equiv. KVO₃); NaBr-KBr-KVO₃ (the temperature of eutectic point and the composition is 420°C, 13,33% equiv. NaBr; 6,67 % equiv. KBr and 80% equiv. KVO₃). Non- and mono variant equilibria were described.

Key words: phase equilibria, T-x-diagram, differential thermal analysis, eutectic, peritectic

*A.N. EVDOKIMOV, A.V. KURZIN***DATA CORRELATION ON VAPOUR-LIQUID EQUILIBRIUM FOR WATER-ALCOHOL SYSTEMS CONTAINING AMMONIUM SALTS USING ELECTROLYTE UNIQUAC MODEL**

The extended UNIQUAC model was effectively used for the description of vapour-liquid equilibrium data in the ammonium salt-alcohol-water systems. Mean absolute deviations of calculated data from experimental ones on alcohol mole fraction in vapour phase were 0.004-0.006.

Key words: liquid-vapor equilibrium, water-alcohol systems, ammonium salts, extended electrolyte model UNIQUAC

*M.A. FEOFANOVA, E.V. ZHURAVLEV, N.V. BARANOVA, S.S. RYASENSKIY, G.I. MANTROV***COMPLEXATION OF HEPARIN WITH ANTIBIOTICS OF PENICILLIN SERIES**

Results of research of equilibriums in systems: heparin-ampicillin, heparin-benzylpenicillin were presented. The existence of protonated complexes of various compositions was shown.

Key words: heparin, anticoagulant, antibiotic, ampicillin, penicillin

N.P. SHABELSKAYA, I.N. ZAKHARCHENKO, A.K. ULYANOV
ON INFLUENCE OF CATION NATURE ON SPINEL SYNTHESIS PROCESS

In the given work the chromites formation processes for a number of transitional elements are considered. The influence of structure of electron shell of ions of transitional elements participating in processes of formation of structure on spinel forming rate was confirmed. It was pointed out that in a case of formation of spinel with high value of stabilization energy by a crystal field it is necessary to expect receiving stronger compound and delay of diffusive processes.

Key words: spinels, chromites, crystal field energy, solid phase synthesis

N.V. SAUTINA, K.I. SITDIKOVA, Yu.G. GALYAMETDINOV
IDENTIFICATION OF MICROEMULSION AND LIQUID CRYSTALLINE PHASES IN SYSTEM OF WATER/MONODODECYL ETHER OF TETRA ETHYLENE GLYCOL/VASELINE OIL BY CONTACT ANGLE METHOD

The ternary phase diagram of water/ monododecyl ether of tetraethylene glycol /vaseline was obtained by the set of methods. The boundaries of the phases were found and the nature of the equilibrium between the liquid crystal emulsion and microemulsion on polymer substrates were investigated. Using extreme changes in the values of the contact angle to identify the areas of the phase diagram was proposed. The influence of the polarity of polymer surfaces on wetting by various emulsion systems was considered.

Key word: phase diagram, lyotropic crystal emulsions, micro emulsions, wetting

Yu.I. ZOLOTOVA, T.N. NEKRASOVA, O.V. NAZAROVA, A.V. DOBRODUMOV, E.V. DIDENKO, E.F. PANARIN

COPOLYMERS OF N-METHYL-N-VINYLAETAMIDE WITH N,N-DIMETHYL- AND N,N-DIETHYLAMINOETHYL METHACRYLATE

New copolymers of open-chain N-vinylamide N-methyl-N-vinylacetamide with N,N-dimethyl-aminoethyl methacrylate and N,N-diethylaminoethyl methacrylate were synthesized by the method of free radical copolymerization. Copolymers of various composition and molecular mass were obtained. By the method of potentiometric titration it was shown that conformation states of macromolecules are different. Copolymers of more hydrophobic N,N-diethylaminoethyl methacrylate form hydrophobic domains at low degrees of protonation.

Key words: aminoethylmethacrylates, hydrophobicity, N-methyl-N-vinylacetamide, radical polymerization, structure formation

A.S. TIMIN, E.V. RUMYANTSEV

SYNTHESIS OF INORGANIC HYBRID MATERIALS WITH JOINT PRECIPITATION OF Mg(II), Al(III), Cr(III) HYDROXIDES AND ADSORPTION ON IT Cu^{2+} AND Pb^{2+} IONS

By means of joint precipitation of Mg(II), Al(III) и Cr(III) hydroxides the hybrid materials were obtained for subsequent adsorption of Cu^{2+} and Pb^{2+} ions. The sorbent based on SiO_2 including jointly precipitated Al(III) and Mg(II) hydroxides was obtained with sol-gel technology. The obtained adsorbents were characterized by IR-spectroscopy and laser diffraction. The high efficiency of use of synthesized sorbent was shown. It allows recommending given materials as prospective sorbents for waste water purification.

Key words: adsorption, heavy metals, sorbents, sol-gel, hydroxides

A.E. LESNOV, O.S. KUDRYASHOVA, L.G. RIZVANOVA

ION FLOTATION OF SOME MULTIPLY CHARGED METAL CATIONS BY OKSIFOS B

The ion flotation of number of multiply charged cations by commercially available anionic surfactant – oksifos B (bis(alkylpolyoxyethylene) phosphate) was studied. The optimal conditions for the flotation of rare earth ions were determined.

Key words: ion flotation, oksifos B, rare earth elements

A.V. DUNAEV, S.A. PIVOVARENOK, D.B. MURIN

INTERACTION OF PLASMA OF MIXTURE OF HYDROGEN CHLORIDE - ARGON - CHLORINE - HYDROGEN WITH GALLIUM ARSENIDE

The study of plasma etching of GaAs in mixtures of HCl-Ar, HCl- Cl_2 and HCl- H_2 in a DC glow discharge was carried out. The rate of GaAs etching at dilution of HCl by argon and hydrogen was shown to decrease faster than the concentration of chlorine atoms. In mixtures of HCl- Cl_2 etching rate goes through a maximum at a content of about 75 % of chlorine. On the rising part of the curve, etching rate is proportional to the flow rate of the chlorine atoms, and after passing the maximum rate-limiting step is the desorption of etching products under ion bombardment.

Key words: plasma, radiation, etching, concentration, hydrogen chloride, argon, chlorine, hydrogen

R.F. SHEKHANOV, S.N. GRIDCHIN, A.V. BALMASOV, K.E. RUMYANTSEVA
ELECTRODEPOSITION OF COBALT-NICKEL AND ZINC-NICKEL ALLOYS
FROM SULFAMATE AND CHLORIDE ELECTROLYTES

Processes of electrodeposition of zinc-nickel alloys from sulfamate and chloride electrolytes were investigated. The possibility of obtaining the good-quality electroplating was shown at current densities from 0.5 to 5.0 A/dm².

Key words: binary alloys electrodeposition, nickel, cobalt, zinc, corrosion

T.V. SAFONOVA, V.I. VERESHCHAGIN
PHYSICO-CHEMICAL PROCESSES OF INTERACTION OF DISPERSE MALACOLITE
WITH MONTMORILLONITE IN MULTIMINERAL CLAY MATERIALS AT BURNING

This article discusses the basic physical and chemical processes of interaction of malacolite with montmorillonite in fusible clay raw materials. It was established that after burning the maximum strength is increased for samples in compositions of which the ratio of montmorillonite and malacolite approaches to 2/1.

Key words: fusible clays, malacolite, montmorillonite

D.F. GRISHIN, M.V. PAVLOVSKAYA, E.V. SAZONOVA
SYNTHESIS OF POLYVINYL CHLORIDE AND ITS COPOLYMERS IN PRESENCE
OF CARBONYL COMPLEXES OF IRON

Iron complexes with cyclopentadienyl ligands were used for the synthesis of homo- and copolymers of vinyl chloride. A comparative analysis of the characteristics of vinyl chloride polymerization in the presence of dimer cyclopentadienyl iron and chlorine- and bromine-containing cyclopentadienyl iron complexes in combination with carbon tetrachloride and α -ethyl-2-bromoisobutyrate was conducted using experimental data. The molecular-weight characteristics of the polymer samples were studied. Block - copolymers of polyvinyl chloride with some vinyl monomers were prepared and their characteristics were evaluated.

Key words: polyvinyl chloride, iron carbonyl complexes, polyvinyl chloride copolymers, radical copolymerization

K.A. SAGDEEV, R.F. GALLYAMOV, A.A. SAGDEEV, F.M. GUMEROV
STUDY OF REGENERATION PROCESS OF ALUMINUM- PALLADIUM CATALYST
BY METHOD OF SUPERCRITICAL FLUID EXTRACTION

Results of study of catalyst regeneration using supercritical carbon dioxide are presented.

Key words: benzene, supercritical carbon dioxide, catalyst

V.E. MIZONOV, I.A. BALAGUROV, A.V. MITROFANOV
MATHEMATICAL MODEL OF FORMATION OF MULTI-COMPONENT MIXTURE
OF SEGREGATING DISPERSE SOLIDS

A non-linear cell mathematical model of evolution of mixture components distribution at mixing more than two components was proposed. The optimal mixing time for such mixture was shown to differ strongly from optimal mixing time for separate components. Some examples of the process numerical modeling are presented.

Key words: multi-component mixture, segregation, Markov chain, state vector, transition matrix, mixture homogeneity

S.V. NATAREEV, N.R. KOKINA, O.S. NATAREEV
HEAT TRANSFER IN SPHERICAL FORM BODY IN CONVECTIVE FLOW OF HEAT CARRIER

Mathematical model of heat transfer for body of spherical form is given for conditions of convective supply of heat. The model adequacy was verified using clay heating as example.

Key words: heat transfer, heat conductivity, mathematic model

V.A. BADOEV, M.V. VOLKOV, M.Yu. TARSHIS, A.I. ZAITSEV
ON CALCULATION OF GRAIN MATERIAL CROSS SECTION PARAMETERS IN ROTATING
CYLINDRICAL DRUM

The equation of grain materials free surface which is taking place in the drum-type device working in a tumbler mode was received. Areas of material characteristic behavior were determined.

Key words: grain material, drum, characteristic behavior areas

F.F. CHAUSOV

DEPENDENCE OF GROWTH RATE OF CRYSTALS OF SLIGHTLY SOLUBLE SALTS FROM SOLUTIONS ON DEGREE OF SURFACE COVERING BY ADSORBABLE IMPURITY NEAR ITS CRITICAL VALUE

The dependence of growth rate of crystals of slightly soluble salts from solutions on the degree of surface covering by adsorbable impurity near its critical value was studied. The analysis explains discrepancies between the experimental data and the theoretical estimates which are given by model. Experimental data are partly less than theory.

Key words: crystal growth, crystallization from solution, effect of impurities, percolation transition, critical indexes of percolation

A.G. NAGIEV, J.I. MAMEDOV, N.A. GULIEVA

MODELING OF NON-STATIONARY PROCESSES OF MASS TRANSFER AND ADSORPTION IN POROUS MEDIA BASED ON " DENDRITE " FRACTAL

As statistical equivalents of highly porous catalysts and adsorbents the consideration of dendritic aggregates with different diameters inlets on their surface is proposed. The model of a dendrite in a class of fractals is developed. The approach for the binding parameters of fractal structures with the kinetic parameters of the transport process in porous media based on the " pseudochannel " is offered. The application efficiency of the concept of fractals manifests itself in the fact that these models allow not to simulate the equilibrium phenomena in porous media only, but also suitable for the inclusion of fractal parameters in the differential equations of dynamics.

Key words: high porous catalysts, adsorption, fractals, mathematic modeling mass-exchange processes

V.K. LEONTIEV, O.N. KORABLEVA

ON PHASE CONTACT SURFACE IN GAS-LIQUID EJECTION APPARATUS

"Sulfite numbers" were experimentally determined for the gas-liquid ejection apparatus. The specific interphase surface was calculated on the method proposed. A comparative assessment of the performance efficiency of gas-liquid ejection apparatus was carried out.

Key words: gas-liquid ejection apparatus, dispersion, specific interphase surface, "sulfite number", efficiency

E.V. NAYANOVA, E.V. ELIPASHEVA, G.M. SERGEEV

PHOTOMETRY OF CHLORINE, BROMINE AND IODINE ION ACID FORMS IN HYPOCHLORITE SOLUTIONS

To control the content changes of toxic oxoanions of chlorine (ClO^- , ClO_2^- , ClO_3^- , ClO_4^-), bromine (BrO_3^-) and biogenic form of iodine (IO_3^-) during storage of sodium and calcium hypochlorite solutions (disinfection of drinking water) it was proposed to use the method of photometry with phenothiazine methylene blue dye. It was established that during the storage time of sodium and calcium hypochlorite solutions the concentration of hypochlorite and chlorite ions were reduced and the concentrations of redox reactions products: chlorate, perchlorate, bromate and Iodate were increased.

Key words: chlorine, bromine, iodine. acid ion form, determination, photometry, hypochlorite solution

O.V. IGNATENKO, N.A. MESHCHEROVA

STUDY OF SOIL CHEMICAL COMPOSITION IN AREA OF ANTHROPOGENIC ACTION OF INDUSTRIAL PLANTS OF BRATSK CITY

The chemical pollution of soil covers in an area of emission action of sulphate-cellulose production of "Gruppa Ilim" corporation branch in Bratsk city and heat station was studied. Soils are characterized with higher content of compounds of sulfur, calcium and sodium.

Key words: soil, pollution, sulphate-cellulose production, sulphate ions, calcium ions, sodium ions

A.A. MERKIN, Yu.E. ROMANENKO, O.V. LEFEDOVA

DETERMINATION OF HYDROGEN ADSORPTION RATE CONSTANTS ON NICKEL CATALYSTS SURFACE

The kinetic characteristics of the porous nickel saturation with hydrogen at various initial contents on the catalyst surface were studied. The effective constants of the process were calculated and were compared with complex modeling results of reaction kinetics on porous and Raney nickel catalyst samples.

Key words: porous nickel, Raney nickel, 2-propanol, hydrogen adsorption, kinetic modeling, rate constant