

A B S T R A C T S

*O.I. ODINTSOVA***SYNTHETIC POLYELECTROLYTES AND PECULIARITIES OF THEIR INTERACTION WITH SURFACTANTS**

The properties of poly electrolytes and the peculiarities of their behavior in solutions, general regularities of forming the complexes of synthetic polyelectrolytes with micelle forming surfactants are described. Conformation changes of poly electrolytes in the presence of SAS have been considered. The contribution of electrostatic and hydrophobic interaction into the formation of polyelectrolyte – surfactants complexes has been underlined. The effect of the chemical nature of surfactants and poly electrolytes on the process of polyelectrolyte complexes formation has been shown. The application of polyelectrolytes and their systems in various fields of industry are given.

Key words: polyelectrolytes, surfactants, solutions, complexes

*N.N. POLULYAKHOVA***FORECASTING OF ION-EXCHANGE PROPERTIES OF INORGANIC SORBENTS**

Data from literature on stability and forms of the state of the wide set of ions in aqueous solutions have been considered. The modern conceptions on the ions interaction with proper hydroxide and existing methods of forecasting of interaction results have been discussed. The interaction has been shown to describe with simplified mechanisms which do not take into account processes variety appearing under sorption the complex anions by metal hydroxides with the structure of hydro talc type.

Keywords: anions, sorbent, hydro talc, properties

*V.N. KAZIN, S.G. SIBRIKOV, S.O. PODARUEV, N.G. SAPOZHNIKOVA, V.V. PLAKHTINSKIY***INTERACTION OF 1, 1, 1-TRICHLORO-2, 2-DIPHENYLETHANES WITH ALKALI METAL NITRITES**

The reaction of the 1, 1, 1-trichloro-2, 2-diphenylethanes with alkali metal nitrites was investigated. Depending on substrate structure and media nature that reaction resulted in the 1,1-dichloro-2,2-diphenylethenes or benzophenones. The probable mechanism of process was discussed.

Key words: alkali metal nitrites, reaction, 1, 1, 1-trichloro-2, 2-diphenylethanes, reaction mechanism

*N.V. CHMELEVSKAYA, E.A. ILLARIONOVA***QUANTITATIVE DETERMINATION OF TRANS - 1 - CINNAMIL - 4 - DIPHENYL - METHYL OF PIPERAZINE WITH SPECTROPHOTOMETRIC METHOD**

The opportunity of use a spectrophotometric method for quantitative determination of cinnarizine with application as an external sample of comparison of the potassium dichromate has been shown. Optimal conditions of determination have been found: solvent – 0.1M solution of the hydrochloride acid, the analytical wavelength - 254 nm. Factor of recalculation has been determined; the calibration curves have been presented. Unified methods of spectrophotometric determination of cinnarizine on the potassium dichromate in substance and tablet have been developed. Relative error of determination was not more than 0.33% for substance and 0.96 % for tablets.

Key words: spectrophotometry, external standard method, external sample of comparison, cinnarizine, potassium dichromate, factor of recalculation

*V.V. BUDANOV***COMPENSATION EFFECT IN CHEMICAL REACTION KINETICS AND POSSIBILITY OF DETERMINATION OF ITS EXISTENS**

The linear correlation between activation entropy (ΔS^\ddagger) or logarithm of pre-exponential multiplier in Arrhenius equation ($\ln A$) and activation energy (E_a) appearing as compensation effect has been shown to have the approximate character and correlation is possible for arbitrary group of reactions which do not connect by common mechanism. The calculation method of absolute error of ΔS^\ddagger and $\ln A$ has been proposed. The given method allows determining the compensation effect existence. The advantage of compensation effect determination for liquid phase reactions on correlation between $\ln A$ and E_a has been shown.

Key words: activation entropy, Arrhenius equation, activation energy, compensation effect, kinetics

G.M. KIMSTATCH, V.A. SHCHAPOV
ABOUT FEATURES OF STRUCTURE FORMATION IN SALT MELTS

The process of structure formation in salt systems of the eutectic type has been considered using the cryoscopic method. The probable mechanism of salt dissolution causing a submicroheterogeneous structure of salt melts has been proposed.

Key words: cryoscopy, melt, salt system, eutectic

S.N. YASHKIN, N.V. KUDASHEVA
DETERMINATION OF EQUILIBRIUM PARAMETERS "LIQUID - VAPOR" FOR ADAMANTANE AND ITS DERIVATIVES. PART II. CRITICAL PARAMETERS AND SATURATED VAPOUR PRESSURES

Using boiling temperatures obtained from the GLC-data on non polar stationary liquid phases [1] within the frame of additive - group Lidersen method the values of critical parameters for adamantane's derivatives have been determined for the first time. The obtained values are in a good agreement with known experimental values of T_c and P_c for reference substances – 1,3-dimethyladamantane and 1,3,5-trimethyladamantane. On the base of the concept of corresponding states with application of the Lee-Kesler form of the Pitzer equation the values of saturated vapor pressures for adamantane's derivatives have been determined. These values have been used for calculation of infinite dilution activity coefficients of investigated molecules and other thermodynamic sorption functions characterizing «solute in stationary liquid phase - vapor» equilibrium.

Key words: boiling temperature, gas-liquid chromatography, adamantane, saturated vapor pressure, activity coefficients

V.N. AFANASIEV, V.A. GOLUBEV
STRUCTURAL CHARACTERISTICS OF WATER SOLUTIONS OF UREA DETERMINED WITH METHOD OF ADIABATIC COMPRESSIBILITY

Hydration numbers and molar adiabatic compressibility of hydrated complexes $\beta_h V_h$ have been determined on the base of obtained data on the molar adiabatic compressibility of water solutions of urea. The comparison of dependences $\beta_h V_h = f(h)$ for water solutions of urea, some electrolytes and non-electrolytes have been carried out. The value of compressibility of hydrated water has been established to be the same for all possible non-electrolytes.

Key word: molar adiabatic compressibility, hydration numbers, urea, solutions

A.S. VASHURIN, N.Sh. LEBEDEVA, A.I. VYUGIN, T.V. TARARYKINA, V.E. MAYZLISH, G.P. SHAPOSHNIKOV
DIMERISATION OF COPPER (II)TETRA-4-ALKOXYBENZOYLOXIPHthalOCYANINE IN BENZENE, O-XYLENE AND CHLOROFORM

For the first time, association of Cu (4-O-CO-C₆H₄-OC₇H₁₅)₄Pc in benzene, o-xylene and chloroform has been studied by calorimetric dilution method and electron absorption spectroscopy. In benzene, o-xylene and chloroform the solutions of Cu(4-O-CO-C₆H₄-OC₇H₁₅)₄Pc of $5 \cdot 10^{-6} \div 7 \cdot 10^{-5}$ M concentration the Monomer+ Monomer \leftrightarrow Dimer equilibrium takes place. The dimerization has been shown to be due to π - π interaction. The thermodynamic parameters of dissociation of the (Cu(4-O-CO-C₆H₄-OC₇H₁₅)₄Pc)₂ dimers have been determined. The thermodynamic stability of the dimers increased in the following order of the solvents: o-xylene < benzene < chloroform. The order is connected with solvating ability of solvents.

Key words: calorimetric dilution, thermodynamic parameters of dissociation, dimerization

T.V. UTKINA, E.A. GERASIMOVA, T.G. CHERKASOVA
TETRAISOTHIOCYANATODIAMINECHROMATE (III) OF MANGANESE (II), NICKEL (II), COBALT (II), CADMIUM (II), ZINC (II), CUPPER (II) AND MERCURY (II)

Physical-chemical studies of salts of the M[Cr(NH₃)₂(NCS)₄]₂ (M = Mn²⁺, Co²⁺, Ni²⁺, Cu²⁺, Cd²⁺, Zn²⁺, Hg²⁺) type have been carried out.

Key words: tetraisothiocyanatodiaminechromate of metals

I.A. KUDINKINA, A.A. ILYIN, E.A. INDEIYKIN, M.E. LADININ
CURING OF POLYESTER COMPOSITIONS IN PRESENCE OF VARIOUS SOLVENTS

The quantum chemical method PM3 the intermolecular interactions have been studied. Also, rheological properties of polyester compositions (PE) with various volatile components have been studied experimentally. Adhesive films on the base of PE compositions with solvents of different dissolving ability have been obtained on the aluminum substrates. Polymer film microstructure and hardness have been studied. The correlation between dissolving ability of organic solvents and polymer film homogeneity and their hardness has been established.

Key words: intermolecular interactions, polyester compositions, solvents

O.V. SUROV
**EFFUSION SET UP FOR SATURATED VAPOR PRESSURE DETERMINATION
IN WIDE PRESSURE RANGE**

The experimental effusion set up for saturated vapor pressure determination in the wide pressure range was created on the base of VUP-4 vacuum unit. The systems with saturated vapor pressures of $10^{-4} - 10^3$ Pa were studied.

Key words: saturated vapor pressure, organic substances, set up

A.A. ISCHENKO
STUDY OF NUCLEAR COHERENT DYNAMICS BY ELECTRON DIFFRACTION METHOD WITH TEMPORAL RESOLUTION. II ELECTRON SCATTERING BY COHERENT EXCITED MOLECULES

Time Resolved Electron Diffraction (TRED) or Ultrafast Electron Diffraction (UED) technique uncovered new possibilities for direct determination of the structure and nuclear dynamics with spatial resolution of tenth part of picometer and time resolution from nano to femtoseconds in a variety areas of chemistry, biology, materials science for a gaseous and condensed matter. Earlier, it was published the theoretical studies, giving the possibilities for interpretation the evolution of the electron diffraction intensities, scattered by molecular ensembles excited by the short pulsed laser irradiation. Described theory have presented some idealized picture, when the molecules from the ground state transfer to excited state and interaction with the laser field do not considered explicitly. In a present article the developed earlier theory for interpretation TRED (UED) data was extended by explicit consideration the interactions between molecular ensemble under study and pumping laser field. The interference term appears in the diffraction molecular intensity at the coherent excitation of the molecular system. This term gives principal possibility for determination of non-diagonal density matrix elements of the molecular system and opens the possibility for tomography reconstruction of the molecular quantum state of the system under investigation. The interference term describes qualitatively new information on the coherent nuclear dynamics, and this information can be obtained under analysis of the expanded temporal sequences of diffraction intensities of scattered electrons, observed with TRED (UED) techniques.

Key words: electron diffraction, nuclear dynamics, excited states, quantum state

A.I. BALUNOV, D.I. CHUPRASOV
AUTOMATED INFORMATION-CONTROLLING SYSTEM FOR HYDROCARBON OIL PRODUCTION

The structure and the functionality of the automated information-controlling system for hydrocarbon oils production as well as the implementation algorithms of the main functions have been considered. The advantages of the evolutionary development of controlling automation have been discussed. The results of implementation of system mentioned above for paraffin and oil production complex and its integration in the unified information-controlling system have been presented.

Key words: information-controlling system, hydrocarbon oils production

A.V. NOSKOV, E.P. GRISHINA
PHENOMENOLOGICAL MODEL OF THREE-DIMENSIONAL GROWTH OF POROUS PASSIVATING LAYERS ON METALS

A three-dimensional formation of a porous passivating layer on metal during its electrochemical oxidation in an electrolytic solution has been studied theoretically. An analytical relationship "the current peak height - the potential sweep rate" has been obtained. The method allowing on the basis of results of electrochemical measurements to determine character of growth (2D or 3D) of passivating layer and to calculate parameters of it's operating has been offered.

Key words: metal electrochemical oxidation, porous structure, passivation

A.V. KHMELYOV, L.V. GOLOVUSHKINA, E.A. FEYODOROVA
INFLUENCE OF MODES OF NON-STATIONARY ELECTROLYSIS AND ORGANIC ADDITIVES IN COMPOSITION OF COPPER COATING ELECTROLYTE ON HOLE PROCESSING OF PRINTED-CIRCUIT-BOARDS OF SIZE UP TO 0.3 MM

Modern trends of development of information technology have caused an occurrence of high density printed-circuit-boards with micro transitions, layers of resistors and capacitors. Thus, the factor of ratio of hole diameter to its length increased essentially. Therefore, a problem of metallization smoothing in board hole became very serious.

Key words: non-stationary electrolysis, copper coating, organic additives

M.A. ABRAMOV, E.G. STEPANOV, O.P. YABLONSKIY
INFLUENCE OF MECHANO-CHEMICAL ACTIVATION ON PHYSICAL-CHEMICAL PROPERTIES OF QUARTZ SAND AND ON STRUCTURAL-MECHANICAL PARAMETERS OF BINDING COMPOSITIONS ON ITS BASE

The basic physicochemical properties of different types of quartz sand of various prehistories have been studied before and after mechanical activation processing in the disintegrator. The possibility of application of disintegrated sand

as micro filler of fine-grained concrete has been considered. The positive influence of mechano-activated silica on concrete structure has been shown.

Key words: mechano-chemical activation, quartz sand, filler, concrete

N.F. KOSENKO, E.V. MALIKOVA, L.A. VINOGRADOVA
INFLUENCE OF abrading AND IMPACT TREATMENT OF CaO UPON THE CALCIUM CARBIDE SYNTHESIS

The calcium carbide synthesis from the mixture of CaO and amorphous carbon after the mechanical action of abrading and impact type has been studied. The formation rate of the CaC₂ depends upon the method of preliminary materials pretreatment. The joint mechanical treatment of charge intensifies the carbide formation whereas the CaO microstructure ordering taking place under its abrade slows down the reaction.

Key words: mechano chemistry, micro wave treatment, calcium carbide, calcium oxide

M.O. MESNIK, V.K. GORSHKOV, E.A. PAVLOV, S.S. SIMUNOVA
FORMATION OF PROTECTIVE POLYMER COATING BASED ON KCH-0125 LACQUER AND ACRYLIC CO-POLYMER OBTAINED BY METHOD OF AUTO-PHORETIC PRECIPITATION

The influence of acrylic co-polymer on decrease in formation temperature of coating obtained by the autophoretic method has been shown. The mechanism of physical-chemical processes of thermo-hardening of lacquer coatings on aluminum and copper-zinc alloys has been proposed.

Key words: acrylic co-polymer, auto-phoresis, thermo-hardening, coatings

A.V. KOSTITSYN, I.V. GOLIKOV, O.A. KULIKOVA
INFLUENCE OF CONCENTRATION OF NET-FORMING COMPONENT ON PROPERTIES OF POLYMER MIXTURES BASED ON POLYVINYLIDENE FLUORIDE

The influence of concentration of thermoreactive oligomer hexamethoxymethylmelamine (HMMM) on properties of polymer mixtures based on polyvinylidene fluoride (PVDF) has been investigated. The introduction of the HMMM in composition of PVDF polymers mixture with polymethylmetacrylate has been shown to form the structure of interpenetrating polymer network type. At result, it leads in the change of morphology and physical properties of polymer mixtures, partially, in the heat stability.

Key words: polyvinylidene fluoride, thermoreactive oligomer, heat stability, structure

O.A. LESCHYOVA, L.V. SHARNINA
ROLE OF SILICATE STABILIZERS IN DISCHARGE PRINTING COMPOSITION

It was shown that sodium silicate used as hydrogen peroxide stabilizer has a number of new properties in discharge printing composition. It forms labile complex with dyes, thus it protects active dyes from hydrolysis. Sodium silicate possesses properties of thickening agent and provides possibility for using direct dyes in printing.

Key words: sodium silicate, stabilizer, active dye, printing

T.G. DMITRIENKO, A.I. GORSHKOV
PHOTOCHEMICAL OXIDATION OF 2,4,6 – TRIARYLSELENO(THIA) - CYCLOHEXANES

The processes of photochemical conversions of 2,4,6 – triarylseleno(thia) – cyclohexane ; 2,6 – dimethoxyphenyl – 4 – phenyl – selenocyclohexane; 2,4,6 – triphenylselenocyclohexane; 2,6 – diphenyl – 4-methoxy-phenyl-selenocyclohexane and 2,4,6 – trimethoxy-phenyl-selenocyclohexane in a medium of diisopropyl ether and ethyl alcohol in the presence of carbon tetrabromide have been studied. It is found that chalcogenocyclohexanes can be treated with photochemical oxidation in the presence of CCl₄ and CBr₄ with heteroaromatic cations formation. It is pointed to the fact that chalcogenocyclohexanes are available as sensitizers in the process of photochemical oxidation. A new modification of Pummerer (Stevens) rearrangement has been found. It is followed by complete reagent elimination with formation of corresponding unsaturated compounds.

Key words: photochemical oxidation, selen(thia) – cyclohexanes, reaction product

A.M. SYROVAROVA, O.P. FILIPPOVA, V.M. MAKAROV
STUDY OF PROCESS OF ELECTROCHEMICAL OXIDATION OF ACID TAR AT ITS MODIFICATION WITH SULFUR

The process of acid tar oxidation into bitumen material with electrochemical method has been presented. The influence of elementary sulfur introduction on material under oxidation has been considered. That modifying additive has been shown to influence strongly on softening temperature of obtained products and to increase in extensibility of bitumen materials from acid tar.

Key words: electrochemical oxidation, acid tar, bitumen

N.V. LISITSYN, V.K. VIKTOROV, A.Yu. MALYUTIN

PROGRAM COMPLEX FOR SYNTHESIS OF OPTIMAL ENERGY SAVING SYSTEMS OF RECTIFICATION

The program complex allowing to synthesize optimal rectification systems on reduced year expenditure has been developed. The optimization has been achieved by choice of separation scheme, pressures in columns and heat integration between condensers and column boilers. The heat integration has been shown to allow the increase essentially in reduced year expenditure.

Key words: program complex, rectification systems, optimization

V.P. KRUGLOV, I.S. GUDANOV, G.M. GONCHAROV

METHOD FOR DETERMINATION OF RUBBER-COATED CORD QUALITY INDEX

The proposed method enables the process control staff to determine qualitative characteristics of rubberized cord during the process of production and to carry out their automatic adjustment.

Key words: rubberized cord, qualitative characteristics, control

V.F. KOVTUN

EXISTENCE CONDITIONS OF VIBRO-LIQUATED LAYER IN PULSE MIXER

Conditions of existence of pseudo-liquid in model of pulse mixer have been found theoretically.

Key words: pulse mixer, model, pseudo-liquid

V.M. MILUSHKIN, A.P. ILYIN

INTENSIFICATION OF ADMIXTURES EXTRACTION PROCESSES OF HEAVY METALS FROM WATER BY ACTION OF ULTRASOUND IN BOILING BED OF DOLOMITE

The sorption ability of natural mineral dolomite with respect to soluble impurity of the iron (II), (III), copper (II) and mercury (II) after treatment of model solution by ultrasound in boiling bed of dolomite has been studied. The admixtures content has been shown to decrease in several times after 5-10 seconds of treatment.

Key words: dolomite, sorption ability, heavy metals, ultrasound

E.V. VEDERNIKOVA, M.M. GAFUROV, M.B. ATAEV

SPECTRAL MANIFESTATIONS AND THERMODYNAMIC PARAMETERS OF HYDROGEN BOND OF ALCOHOLS UNDER SOLVATION IN ALCOHOL SOLUTIONS WITH NITRILES AND KETONES AND IN C_2H_3N AND C_3H_6O WITH ADDITIVES OF PERCHLORATES AND IODIDES SALTS OF Na, Li, Mg, Ca AND Ba

On the base of the IR-adsorption spectra analysis of alcohol and ketone solutions (the solvents are: carbon tetrachloride, n-heptane, n-hexane) the thermodynamic parameters of the H-bonds formed in these compounds have been calculated. The adsorption parameters of O-H stretching vibrations of studied alcohols in solution have been established to depend on the number of atoms in alcohol molecule, while the charge, radius and mass of the ions of dissolved salts influence considerably on solvation process in alcohols. Parameters of Brownian reorientation of molecules in solutions have been calculated on the base of temperature dependence data on FWHM (Full Width on Half Maximum) of nitrile and ketone molecules IR-adsorption bands in triple solutions.

Key words: alcohol, ketone, hydrogen bond, thermodynamic parameters

V.F. KOVTUN, V.A. KOZLOV

CHOICE OF CATALYSTS FOR LIQUID-PHASE CATALYTIC REDUCING OF FAT FROM WASTES OF INDUSTRY OF POULTRY RECYCLING

The possibility of chemical (hydration) and physical (freezing) modification of fat composition obtained from poultry recycling wastes for pharmaceutical purposes has been studied. The specific features of fat bases according to their types and fractions have been studied. Catalysts have been chosen and approaches on theoretical and experimental foundation of catalysts choice and their application have been studied.

Key words: modification, hen fat, catalysis, hydration

T.V. MELENCHUK, E.A. DANILOVA, A.A. VORONTSOVA, M.K. ISLYAIKIN,

Yu. Yu. ENAKIEVA, Yu.G. GORBUNOVA

SYNTHESIS AND PROPERTIES OF TERT-BUTYLSUBSTITUTED MACROHETEROCYCLIC COMPOUND WITH 1,2,4-THIADIAZOLE FRAGMENTS

A new representative of substituted macroheterocyclic compounds of ABAB-type was obtained by condensation of the 3,5-diamino-1,2,4-thiadiazole with the product of interaction of the 4-tert-butylphthalonitrile with sodium alkoxides in butanol-methanol mixture or the 5-tert-butyl-1,3-diiminoisindoline. The compound was characterized by IR, UV-VIS and 1H NMR-spectroscopy, mass-spectrometry and element analysis.

Key words: condensation, macroheterocyclic compound, synthesis

E.A. SALAKHOVA, F.S. NOVUZOVA, V.A. MEDZHIDZADE, P.E. KALANTAROVA
SEMICONDUCTING PROPERTIES OF THIN COVERS OF RHENIUM CHALCOGENIDES

The change of electroconductivity of thin covers of rhenium chalcogenides dependently on the temperature has been investigated. The increase in temperature has been established to result in the resistance decrease, i.e. there is a semi conducting way of conductivity. On the curves of temperature dependences on the logarithm of the specific resistance and specific electroconductivity there are two linear areas which correspond to various values of activation energy. The increase in temperature has been shown to occur the transfer from the doped electro conductivity to the own on. The forbidden gap has been calculated in the field of own and doped conductivity.

Key words: rhenium, semi conducting properties, conductivity, thin films

N.M. ALYKOV, E.A. PICHUGINA, A.G. TYRKOV, E.A. TYRKOVA
**STUDY OF ACID ANTICORROSIVE ACTIVITY OF HYDRAZONES
OF NITRO-1,2,4-OXADIAZOLE-5-YL-CARBALDEHYDE**

Results of study of anticorrosive activity of hydrazones of the nitro-1,2,4-oxadiazole-5-yl-carbaldehyde are given.

Key words: hydrazones, anticorrosive activity

E.A. BARANTSEVA
ON OPTIMAL FEED OF A SEGREGATING KEY COMPONENT TO BATCH MIXER

The mathematical model of mixing kinetics of segregating key component at its distributed on time feed to the operating volume has been proposed. The optimum feed program providing the best mixture quality has been shown to exist. If the optimal feed program is realized, the mixture quality only slightly depends on the segregation velocity and on the coefficient of particles macro-diffusion.

Key words: model, mixing, segregation

B.Sh. BRAVERMAN
SCALE EFFECT AT SELF-PROPAGATING HIGH-TEMPERATURE SYNTHESIS OF CHROMIUM NITRIDES

The product macrostructure of the self-propagating high-temperature synthesis of chromium nitrides has been shown to change with sample size.

Key words: high-temperature synthesis, chromium nitrides, scale effect

S.S. POPOVA, A.Yu. ZOBKOVA, R.Yu. BOCHAROV
**ROLE OF MAGNESIUM CATIONS AT PAINTING ANODIC OXIDIZED ALUMINUM IN SOLUTION
OF COPPER SULFATE**

The influence of solution composition of preliminary oxidizing on processes of introduction of magnesium cations in the structure of anodic aluminum oxides as well as on the further process of painting has been studied.

Key words: magnesium cations, painting, oxidizing aluminum

O.I. KOIFMAN, V.I. SVETZOV
PROBLEMS OF SPECIALIST TRAINING IN NANO TECHNOLOGY FIELD

The model of the managerial procedure for preparing graduates on technical and technological specialties and directions in the nanotechnology-related areas was proposed. The model includes such measures as the creation of general integrated courses on the nano technological problems, the reflection of the nanotechnology-related issues in the courses on the natural sciences, general professional and special sciences as well as the creation of special nanotechnology-directed courses for the master course students.

Key words: nano-technology, training, specialists, masters, university graduates