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DECOMPOSITION OF ORGANIC COMPOUNDS IN AQUEOUS SOLUTIONS UNDER ACTION OF ELECTRICAL DISCHARGES OF ATMOSPHERIC PRESSURE

Results on application of atmospheric pressure discharges for processes of water purification from organic pollutants are considered. Main constructions of devices for utilization of such processes with application of various discharge types are given. Results of processes studies implemented for decomposition of concrete organic compounds including the data on kinetics, probable mechanisms as well as on composition of final and by-products of decomposition are described. The possible ways of intensification of plasma-discharge methods of water purification are considered.

Key words: electrical discharge, plasma, active species, organic pollutants, purification, decomposition

N.E. SIDORINA, V.A. OSYANIN, Yu.N. KLIMOCHKIN

SYNTHESIS OF 1N-1,2,4-TRIAZOLE-1-YLALKYL)PHENOLS

Effective method of synthesis of 1N-1,2,4-triazole-1-ylalkylphenoles from 1,2,4-triazole and 2- or 4-hydroxybenzyl alcohols was developed. This method could be applied to hydroxybenzyl alcohols containing both the donor and acceptor substitutes.

Key words: 1N-1,2,4-triazole-1-ylalkylphenols, 1,2,4-triazole, 2- and 4-hydroxybenzyl alcohols, o- and p- methylenequinones

S.I. FILIMONOV, Zh.V. CHIRKOVA, A.S. DANILOVA, V.B. LYSKOV, I.G. ABRAMOV,

S.I. FIRGANG, G.A. STASHINA

SYNTHESIS OF NEW SUBSTITUTED 6,7-DICYANO-1,2,3,4-TETRAHYDRO-QUINOXALINE-2-ONES

The method of synthesis of new substituted 5,6-dicyano-1,2,3,4-tetrahydroquinoxaline-2-ones with fluorescent properties was developed. Their structure and characteristics were determined.

Key words: fluorescence, activated N-nucleophylic substitution, 4-bromo-5-nitrophthalonitrile, reduction, diamine, cyclization, substituted 2,4-dioxobutyric acid ethyl ester, substituted 6,7-dicyano-1,2,3,4-tetrahydroquinoxaline-2-ones, tautomerism

D.P. ZARUBIN

AMORPHOUS SILICA SOLUBILITY AND ACTIVITY COEFFICIENTS OF SILICIC ACID IN AQUEOUS SODIUM CHLORIDE SOLUTIONS

A solubility of amorphous precipitated silica in aqueous solutions of NaCl has been determined. The analysis of silica solubility has been carried out as a function of solution pH. A correspondence of results obtained to Setchenov equation and literature data is discussed.

Key words: silica, solubility, the Setchenov equation, salting-out, activity coefficients

L.A. KOCHERGINA, O.M. DROBILOVA

THERMODYNAMIC CHARACTERISTICS OF COMPLEXATION REACTIONS IN SYSTEM COBALT (II) ION – GLYCYL-GLYCINE IN AQUEOUS SOLUTION

The heat effects of interaction between glycyl-glycine anion and cobalt (II) ion were measured by direct calorimetric method at various values of ionic strength 0.25; 0.50 and 0.75 on KNO₃ background and temperature of 298.15. Also, dilution heats of cobalt nitrate solution in solutions of background electrolyte were determined for introduction of corresponding corrections. Standard thermodynamic characteristics of complex formation reactions in system cobalt (II) ion - glycyl-glycine and standard enthalpies of formation of complex particles Co(GlyGly)⁺ and Co(GlyGly)₂ in aqueous solution were calculated.

Key words: thermodynamics, solutions, peptides, bioligands, calorimeter, complex formation

V.V. EGOROVA, A.V. KRYLOV, E.Ya. BORISOVA, D.M. ZVEREV

QUANTUM-CHEMICAL STUDY OF REACTION MECHANISM OF OPENING 1,2-EPOXIDES WITH “O”-NUCLEOPHYLES

A number of model reactions of cyclohexene oxide opening reactions by “O”- nucleophyls have been investigated. To estimate the kinetic and thermodynamic parameters the DFT- method in program PRIRODA has been used. The

transition states have been found and energy profiles have been calculated. The nucleophilic reactivity has been established to depend on its solvate environment. The energy minimum has been shown to have the system in which the attacking nucleophilic and alcohol molecules are coordinated with Na^+ anti-ion, the coordinating number being equal to 4.

Key words: cyclohexene oxide, nucleophilic, DFT- method, transition state, program Priroda

E.V. CHERKASOVA, I.V. ISAKOVA, T.G. CHERKASOVA, E.S. TATARINOVA
INVESTIGATION OF THERMOLYSIS PROCESSES OF ISOTHIOCYANATES COMPLEXES OF CHROMIUM (III) WITH CATIONS OF ϵ -CAPROLACTAM

Thermolysis processes of complexes $[\epsilon\text{-C}_6\text{H}_{12}\text{NO}]_3[\text{Cr}(\text{NCS})_6] \cdot 3(\epsilon\text{-C}_6\text{H}_{11}\text{NO})$ and $[\text{H}(\epsilon\text{-C}_6\text{H}_{11}\text{NO})_2][\text{Cr}(\text{NH}_3)_2(\text{NCS})_4]$ in the air and in the inert atmosphere have been studied by thermal, IR-spectroscopic, X-ray, mass spectroscopic methods of analyses. The composition of gaseous and solid products of thermal decomposition have been established.

Key words: thermolysis, differential-thermal analysis, complexes of chromium (III), ϵ -caprolactam

D.A. KAZAKOV, A.V. PORTNOVA, S.A. ONORIN, V.G. PONOMARYOV, V.A. TRET'YAKOV
APPLICATION OF FTIR-SPECTROMETRY FOR STUDY OF TITANIUM AND ZIRCONIUM ALKOXIDES HYDROLYSIS

The results of FTIR-spectrometry investigation of titanium and zirconium alkoxydes and mechanism of their hydrolysis process at organic-mineral media are presented.

Key words: titanium alkoxydes, zirconium alkoxydes, FTIR-spectrometry, hydrolysis, titanium dioxide, zirconium dioxide

O.V. GRECHIN, P.R. SMIRNOV, V.N. TROSTIN
STRUCTURAL REORGANIZATION OF $\text{PrCl}_3 - \text{H}_2\text{O}$ AND $\text{NdCl}_3 - \text{H}_2\text{O}$ SYSTEMS AT TRANSITION FROM CRYSTALLINE HYDRATES TO SOLUTIONS

Structures of crystalline hydrates of praseodymium and neodymium chlorides have been studied in the wide range of concentrations by X-ray diffraction method. The process of the structure self-organization has been shown to be different in the range of transition from the crystalline hydrates to the solutions but to be similar for the diluted solutions.

Key words: aqueous solutions of lanthanides, structure, X-ray diffraction analysis, intensity curves of scattering

M.Kh. ANNAGIEV, U.A. MAMEDOV, N.A. IMANOVA, S.G. MAMEDOVA
RESEARCH OF ACID CENTERS OF BENTONITES ON SPECTRA OF DIFFUSIVE REFLECTANCE OF DIPHENYLAMINE IN ULTRAVIOLET AND VISIBLE SPECTRAL REGIONS

The nature of acid centers on the surface of sorbents obtained on the base of the bentonite deposits Kizil-Dare was researched. On absorption spectra of adsorbed diphenylamine in the ultraviolet and visible regions of spectra it was established that there are acid centers of different power on the surface of researched sorbents.

Key words: bentonite, diphenylamine, aluminum silicate, catalyst

Ya.I. KORENMAN, A.V. ZYKOV, N.Ya. MOKSHINA
SEPARATION OF TRIPLE MIXTURES OF B GROUP VITAMINS WITH APPLICATION OF HYDROPHILIC EXTRAGENTS

Extraction systems for separation of triple mixtures of vitamins of B group have been developed. Components concentrations have been determined spectrophotometrically using the Firordt method. The distribution coefficients, extraction degree and separation factors for vitamins of B group in triple mixtures have been calculated.

Key words: vitamins, extraction, spectrophotometry, Firordt method, hydrophilic solvents

P.V. SERIYI, S.V. OSTROVSKIY
COMPREHENSIVE STUDY OF CARBAMIDE CRYSTALLIZATION PROCESS

This paper gives a review of comprehensive studies of crystal growth of carbamide. Experimental data were obtained on influence of temperature and hydrodynamic conditions on the crystal growth rate. Recommendations were formulated on controlling the crystallization process in industrial apparatus.

Key words: urea, mass crystallization, crystal growth kinetics, crystal habit, supersaturation

R.F. SHEKHANOV, S.N. GRIDCHIN, I.V. TOROPOV, T.F. YUDINA, A.O. SEMENOV
ELECTRODEPOSITION OF NICKEL-IRON ALLOY FROM OXALATE - BORATE ELECTROLYTE

The possibility of obtaining the electrolytic alloys of nickel-iron for the purpose of their use as magnetic coverings has been shown.

Key words: polarization curves, solutions pH, ionic equilibria

T.E. IVANOVA, V.V. CHEREPYANSKIY, V.V. POVETKIN
PECULIARITY OF SILVER ELECTRODEPOSITION IN PRESENCE OF THALLIUM IONS

The influence of thallium ions on different steps of silver electrodeposition from EDTA-electrolyts and on composition and structure of forming galvanic coatings has been investigated.

Key words: electrodeposition, electrocatalysis, adatoms, kinetics, nucleation, morphological effects

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L.M. BRONSTEIN, P.M. VALETSKIY*
**SELECTIVE CATALYTIC OXIDATION OF L-SORBOSE TO 2-KETO-L-GULONIC ACID
WITH USE OF BIMETALIC CATALYSTS**

The given work is devoted to selective catalytic oxidation of l-sorbose to 2-keto-l-gulonic acid with application of bimetallic catalysts. As a carrier the hypercrosslinked polystyrene containing Pt nanoparticles, and particles of the second metal of Sn, Pb has been used. The influence of different factors on the process of catalytic oxidation of l-sorbose has been studied. Developed catalytic system has shown a high selectivity in a synthesis of 2-keto-l-gulonic acid. In addition, on the base of results obtained the activation energy has been calculated.

Key words: oxidation, l-sorbose, 2-keto-l-gulonic acid, hypercrosslinked polystyrene, Pt nanoparticles

S.V. LUZGAREV, Yu.A. SHEVELEVA, V.Ya. DENISOV, E.S. MAXIMOVA, A.S. LUZGAREV
**PHOTOCHEMICAL TRANSFORMATIONS OF ANTHRONE AND ITS DERIVATIVES
IN POLYDIMETHYLSILOXANE MATRIX**

The photochemical reactions of 9-anthron and some the 10-substituted anthrons in the high molecular polydimethylsiloxane rubber SKT were studied by the method of luminescent spectroscopy. At the absence of oxygen under ultraviolet irradiation, the anthrol formation occurs accompanied by substituents removing in the position 10.

Key words: anthrones, siloxane matrix, polydimethylsiloxane rubber, ultraviolet light, photochemical reactions

A.A. KOLESNIKOV, M.O. MESNIK
RADIATION POLYMERIZATION OF AMINO ALKYL ESTERS OF METHACRYLIC ACID

The polymerization of aminoalkylesters of methacrylic acid has been studied under the action of irradiation. The most perspective esters were dimethylaminoethyl and diethylaminoethylmethy-methacrylate. In the presence of polyfunctional amino alkyl esters of methacrylic acid, the polymerization rate increases and both the induction period and necessary irradiation dose decreases.

Key words: radiation polymerization, esters of methacrylic acid, compositions of radiation curing, artificial skins

D.A. VASILIEV, A.A. ILYIN
INFLUENCE OF ORGANIC SOLVENTS ON ACRYLIC-URETHANE COATING MORPHOLOGY

The influence of organic solvents type on a morphology of acrylic-urethane coating based on low-viscous components has been studied. Using o-xylene and toluene has been shown to result in a formation of homogenous polymeric coating.

Key words: acrylic-urethane coating, morphology, organic solvents, swelling

N.V. KAMKINA, E.E. FROLOVA, S.V. KRASNIKOV
EPOXYDATION OF 4-ISOPROPENYL- AND 1-(4-CYCLOHEXENYL) BENZOIC ACIDS

4-(2-methyl-2-oxyranyl)benzoic and 4-perhydro-1-benzoxiren-1-ilbenzoic acids have been obtained and have been characterized by means of epoxydation reaction of 4-isopropenyl- and 1-(4-cyclohexenyl)benzoic acids. Products of their further interaction with amines have been obtained as well. The influence of reaction epoxydation conditions on a yield of acids mentioned above has been investigated.

Key words: epoxydation, alkenylbenzoic acid, peracetic acid, aminolysis

A.V. KOMIN, O.K. SHVETSOV, E.Yu. DUROSOVA
**COPOLYMERIZATION OF STYRENE AND ACRYLONITRILE IN PRESENCE
OF POLYMERIC EMULSIFIERS**

The possibility of realization of copolymerization of styrene and acrylonitrile in the presence of polymeric anionic emulsifiers on the base of methacrylic acid, acrylonitrile and 1,3-pentadiene has been shown. The interrelation of structure of polyemulsifier with kinetics of copolymerization of styrene and acrylonitrile, and also aggregate stability of corresponding latexes has been determined.

Key words: polymeric anionic emulsifiers, copolymerization of styrene and acrylonitrile, styrene-acrylonitrile latexes

I.G. AKHMETOV, D.R. AKHMETOVA
INFLUENCE OF TEMPERATURE ON BUTADIENE POLYMERIZATION IN PRESENCE
OF MODIFIED NEODYMIUM-BASED CATALYTIC SYSTEM

The temperature influence on butadiene polymerization in the presence of a modified neodymium-based catalytic system was studied. The molecular characteristics and the microstructure of the obtained butadiene samples were determined. Also, the kinetic parameters of the process were calculated.

Key words: polybutadiene, Ziegler-Natta catalysts, polymerization temperature

T.I. SMIRNOVA, Ya.M. KHALYAPINA, V.M. NIKOL`SKIY, A.N. MASLOV, Yu.V. CHERVINETS
STUDY OF NEW LIGAND AND WEAK CONSTANT MAGNETIC FIELD EFFECT
ON THE BAKER'S YEAST

Under laboratory conditions at $t=22\pm 1^\circ\text{C}$ and pH 6.0 for the first time the possibility of adsorption of iminodisuccinic acid (IDSA, H_4L) from aqueous media by the baker's yeast *Saccharomyces cerevisiae* and the influence of weak constant magnetic field (CMF) on this process has been studied. It was found a well-sorbed ability of IDSA and the positive impact of the ligand on the rate of oxidation of glucose by yeast growing in a weak CMF.

Key words: ligand, iminodisuccinic acid, magnetic field, yeast

S.Yu. KHASHIROVA, Yu.I. MUSAEV, E.B. MUSAEVA, N.A. SIVOV, M.Kh. LIGIDOV,
S.V. PAKHOMOV, A.K. MIKITAEV
SYNTHESIS AND STUDY OF NOVEL COMPOSITIONS BASED ON CELLULOSE
AND GUANIDINE METHACRYLATE

The samples of modified cellulose fibrous and powder materials have been obtained in heterogeneous phase by means of interaction between guanidine methacrylate monomer and polymer and activated cotton cellulose. It has been shown that both activated cotton cellulose and guanidine polymethacrylate can be the matrix for production of composites. Composite materials based on mentioned compounds have been revealed to form due to the van-der-waals forces; intra- and intermolecular coordination and hydrogen bonds; C-C bonds forming at radical polymerization of immobilized guanidine methacrylate in situ or during a radical copolymerization of guanidine methacrylate with activated cotton cellulose as well as owing to the formation of labile covalent aldimin C=N bonds. The composition, structure and bactericide effect of composites have been studied.

Key words: guest-host, IR-spectra, modification, nanocomposites, cellulose

Yu. A. DMITRIEV, A.B. SHIPOVSKAYA, L.Yu. KOSOVICH
ELECTRICAL FORMING OF NANOFIBERS FROM CHITOSAN SOLUTION

The influence of viscosity and specific conductivity of chitosan solution of 1.5-8% weight concentration in concentrated acetic acid on the electrostatic forming of nano fibres has been studied. The concentration range of polymer solution for obtaining the homogeneous defects-free fiber with the average diameter of 180-300 nm has been determined.

Key words: electrical forming, nanofiber, fibers-porous material, chitosan solution

S.A. KOKSHAROV, S.V. ALEEVA, O.A. SKOBELEVA, A.Yu. KUDRYASHOV
POLYMER COMPOSITION OF SCUTCHED FLAX FIBRE OF SELECTIVE KINDS
OF LONG-FIBRED FLAX "ZARYANKA" AND "MOGILEVSKIY-2"

By means of consecutive extraction of polycarbohydrates, the content of pectic compounds, hemicelluloses, cellulose and lignin insoluble in acid has been determined in the fibre from flax of domestic and Belarus kinds of selection grown in Tver and Kostroma. The influence of the soil factor on biosynthesis of polymers in the bast parts of stalk and their degradation at biological methods of processing flax-straw has been retraced.

Key words: long fibred flax, selective kind, scutched fibre, polymer composition, physico-mechanical properties

S.V. FEDOSOV, V.E. RUMYANTSEVA, K.E. RUMYANTSEVA, V.A. KHRUNOV
SIMULATION OF BOUNDARY LAYER DURING MASS TRANSFER AT LIQUID CORROSION
OF CONCRETE STRUCTURES

Results of experimental studies of the corrosion behavior of iron-carbonaceous alloys as the reinforcement of building concrete structures are given. The possibility of applying the general unified approach to modeling mass transfer processes at a corrosion degradation which proceed at the interface concrete - corrosive liquid medium and at the interface metal - corrosive liquids has been shown.

Key words: mass transfer, corrosion, steel, reinforced concrete

A.E. BAROCHKIN, V.P. ZHUKOV, A.N. BELYAKOV, A.K. LAPSHIN
STRUCTURAL OPTIMIZATION OF MULTI-FLOW PLATE-TYPE HEAT EXCHANGERS BASED ON GENETIC ALGORITHM

A system of multi-flow plate-type heat exchangers codification has been developed. The algorithm of a computational model construction based on its code and the algorithm of flow structure optimization of heat carriers for a plate-type heat exchanger has been proposed. The example of solution of optimization task is given.

Key words: heat exchangers, structure code, structural optimization, genetic algorithms

A.E. LEBEDEV, A.I. ZAITSEV, A.A. PETROV, I.S. SHERONINA, A.S. SUKHANOV
ON CALCULATION OF IMPACT INTERACTION PROCESS OF SOLID PARTICLES FLOW AND BARRIER

On the base of the stochastic approach, the mathematical description of impact interaction process of solid particles flow and fender elements is presented. Differential distribution function of produced particles number on diameters has been obtained.

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

A.E. LEBEDEV, A.B. KAPRANOVA, Yu.V. NIKITINA, A.A. PETROV
EXPERIMENTAL STUDY OF LIQUID DISPERSION AT MECHANICAL SPRAYING

Experimental investigations of mechanical spraying process of liquid to create a uniform distribution of its mass at zones reflux of check section have been carried out. At fender exist the analysis of mentioned distributions has been carried out as a function of disk rotation frequency and feed parameters. Correlation indexes have been determined.

Key words: mechanical spraying, liquid, disk, fender, uniformity, distribution, density, control section, correlation index

A.M. DUNAEV, K.S. LATUKHINA, A.A. ABDALLA, A.Yu. NIKIFOROV
LEVEL OF LEAD, CADMIUM AND 3D-ELEMENTS PRESENCE INTO SOIL LAYER OF IVANOVO REGION

In present study, the aspects of accumulation of metals in a soil and their role in natural ecosystems were discussed by example of Ivanovo region. Fixed levels of content of metals argue about allowable quality of a soil. The factor analysis of obtained data with comparison with maps of distribution of the metals in soils was carried out. The probable sources of pollutions were revealed.

Key words: monitoring, heavy metals, soil

A.V. ZIMICHEV, M.N. ZEMTSOVA, P.L. TRAKHTENBERG, Yu.N. KLIMOCHKIN
SYNTHESIS OF 2 - (1-ADAMANTYL)-4- QUINOLINECARBOXYLIC ACID AND ITS DERIVATIVES

The accessible synthesis method of 2-(1-adamantyl)-4-quinolinecarboxylic acid, its methyl ester, and carbohydrate showing the high antimicrobial activity against M. Tuberculosis H37Rv has been proposed.

Key words: 2-(1-adamantyl)-4-quinolinecarboxylic acid, 2-(1-adamantyl)-4-quinolinecarboxylic acid ester

V.I. ABDRAKHMANOV, V.R. SAKHIPOV, A.V. KRASNOV, V.L. KRASNOV, N.V. NIKITINA, A.I. KVASHENNIKOV
IMPROVEMENT OF XYMEDON OBTAINING TECHNOLOGY FROM UREA

The advanced technology of obtaining hymedon has been developed. This technology includes four steps: obtaining (2-hydroxyethyl)urea from carbamide and ethanolamine followed by recrystallization of 2-propanol; condensing (2-hydroxyethyl)urea with acetylacetone in 2-propanol in the presence of hydrochloric acid with the formation of hymedon hydrochloride; neutralization of hymedon hydrochloride in an ion-exchange column filled with strong alkaline anionite resulting in the production of 4-5% water solution of xymedon; condensing of xymedon water solution to 15-20% of the substance content by vacuum distillation and drying in a spray drier.

Key words: xymedon, carbamide, (2-hydroxyethyl) urea, anionite, technology of obtaining