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А Б С Т Р А К Т С

*N.V. STEPYSHEVA, P.N. KUCHERENKO***RETARDATION OF STARCH RETROGRADATION BY AMYLOLYTIC ENZYMES USAGE**

The article is the analytical review of published works devoted to the problem of retarding the starch retrogradation. The retrogradation process was considered using the bread hardening as an example. The most important mechanisms of hardening were described and main methods of conservation of goods freshness were named. Different aspects of application of starch-converting enzymes for retardation of starch retrogradation and bread hardening are considered.

Key words: retrogradation, freshness, hardening, enzyme, amylase

T.A. BOBOVA, E.S. KULESHOVA, A.A. SHETNEV, A.V. KOLOBOV, G.G. KRASOVSKAYA, V.V. PLAKHTINSKIY
DEHYDROGENATION OF CYCLOHEXANE-1,2-DICARBOXYLIC ACIDS DERIVATIVES

A dehydrogenation reaction of 4-cyclohexane-1,2-dicarboxylic acid derivatives with bromine action was studied. Phthalic or 1-cyclohexene-1,2-dicarboxylic acids derivatives were obtained depending on reaction conditions.

Key words: dehydrogenation, derivatives, cyclohexane-1,2-dicarboxylic acids, 1-cyclohexene-1,2-dicarboxylic acids, phthalic acids

*S.V. BAIYKOV, G.G. KRASOVSKAYA, A.A. BAKANOVA, E.R. KOFANOV***OXIDATION OF 5-ALKYL- AND 5-CYCLOALKYL-3-PHENYL-1,2,4-OXADIAZOLES**

The oxidation of 5-alkyl-3-phenyl-1,2,4-oxadiazoles and 5-cycloalkyl-3-phenyl-1,2,4-oxadiazoles was examined. Alicyclic and aliphatic groups of linear structure are stable to oxidation. Oxidation products of 5-isopropyl-3-phenyl-1,2,4-oxadiazole depend on the reagents and conditions.

Key words: 1,2,4-oxadiazole, oxidation

*S.S. ROZHKOVA, K.L. OVCHINNIKOV, A.V. KOLOBOV***SYNTHESIS OF N-ARYL MALEINIMIDES USING ETHYL CHLOROFORMATE**

A universal method of obtaining N-aryl maleinimides under mild conditions was developed. The effect of substituents in the aromatic ring of N-aryl maleinamide on a process of their cyclization to the corresponding N-aryl maleinimides was considered.

Key words: vicinal dicarboxylic acid, N-aryl maleinamide, N-aryl maleinimide, ethyl chloroformate

V.A. IONOVA, S.I. TEMIRBULATOVA, A.V. VELIKORODOV, O.L. TITOVA, E.A. MELENT'EVA
THIOSEMICARBAZONE AND SEMICARBAZONE OF METHYL N-(4-ACETYLPHENYL) CARBAMATE IN SYNTHESIS OF NITROGENOUS HETEROCYCLES WITH PHENYLCARBAMATE FRAGMENT

By boiling of methyl N-(4-acetylphenyl) carbamate thiosemicarbazone in acetic anhydride the methyl N-{4-[3-acetyl-5-(acetylamino)-2-methyl-2,3-dihydro-1,3,4-thiazol-2-yl] phenyl} carbamate was synthesized. An interaction of methyl N-(4-acetylphenyl) carbamate thiosemicarbazone with phenacylbromide and monochloroacetic acid at boiling in ethanol results in reception of methyl N-[4-(1-{2-[4-phenyl-1,3-thiazol-2(3H)-ylidene]hydrazono}ethyl)phenyl] carbamate and methyl N-(4-{1-[2-(4-oxo-1,3-thiazolan-2-ylidene)hydrazono]ethyl}phenyl) carbamate, respectively. At acting the selenium dioxide and thionyl chloride on methyl N-(4-acetylphenyl) carbamate semicarbazone the 1,2,3-selenodiazole and 1,2,3-thiadiazole derivatives were received. The structure of new compounds is confirmed by IR and ¹H NMR spectra.

Key words: methyl-N-(4-acetylphenyl) carbamate semicarbazone and thiosemicarbazone, heterocyclization reactions, 1,3,4-thiazole, 1,2,3-thiadiazole, 1,2,3-selenodiazole derivatives

*L.A. ALAKAEVA, A.Z. BAKHOVA***LUMINESCENCE PROPERTIES OF TERBIUM COMPLEXES WITH S-BUTYL-METHYL ETHER OF SULFOSALICYLIC ACID**

As a result of carried out searches the existence of bright high-sensitive luminescent reaction of green color was established for terbium complex with S-butylmethyl ether of sulfosalicylic acid. Optimal conditions for terbium complexation with S-butylmethyl ether of sulfosalicylic acid were chosen. High-sensitive luminescent methods for terbium determination in various objects were developed.

Key words: reagent, luminescence, structure, terbium, lanthanides

D.A. SHUTOV, A.N. IVANOV, A.A. ISAKINA, V.V. RYBKIN
HEAT BALANCE OF DIRECT CURRENT ATMOSPHERIC PRESSURE DISCHARGE
WITH LIQUID CATHODE

The average gas temperatures were measured using non-resolved rotational structure of the second positive system bands of N_2 in a DC discharge of atmospheric pressure with liquid cathode. The electric field strength was measured as well. On the base of solution of the Boltzman equation and equations of the vibrational kinetics the energy ratio transferred from the electron to the gas heating was calculated. Using the heat conductivity equation solution for the 1D and 2D dimensions it was shown that for the balancing the experimental and calculated temperatures the heat losses to the cathode and anode should be considered.

Key words: plasma, liquid cathode, heat balance calculation

G.K. SHURDUMOV, Yu.L. KARDANOVA, B.K. SHURDUMOV
SOLID-PHASE SYNTHESIS OF COPPER MOLYBDATE ON BASE OF $CuSO_4 - Na_2CO_3 - MoO_3$ SYSTEM

The thermodynamic and kinetic bases for components interaction of copper sulfate (II) - sodium carbonate - molybdenum oxide (VI) system were studied. The reaction of MoO_3 with sulphate-carbonate mixture of copper (II) and sodium was established to proceed at a lower temperature and at a faster rate than with pure copper sulfate (II) and sodium carbonate. A rational method for a synthesis of molybdate copper (II) was developed and the classification of the particles of obtained $CuMoO_4$ powder was given.

Key words: copper molybdate, solid phase, synthesis, kinetics, interaction

Yu.V. POLENOV, E.V. EGOROVA, E.V. MAKAROVA
KINETIC OF NICKEL IONS REDUCTION IN WATER-AMMONIAC SOLUTION BY THIOUREA DIOXIDE

Kinetics of the nickel ions reduction by thiourea dioxide in water-ammoniac solution was studied. It was revealed that reaction proceeds not completely even at high excesses of reducer and the increase in ammonia concentration promotes the increase in reaction rate. The limiting step of process was shown to be the destruction of reducer molecules with the formation of sufoxylic acid anions.

Key words: thiourea dioxide, sufoxylic acid, rate constants, activation energy, nickel ions

D.B. MURIN, A.M. EFREMOV, V.I. SVETTSOV, S.A. PIVOVARENOK, E.M. GODNEV
EMISSION INTENSITIES AND CONCENTRATIONS OF NEUTRAL SPECIES IN DIRECT CURRENT GLOW
DISCHARGE PLASMA IN $HCl-H_2$ AND $HCl-O_2$ MIXTURES

The investigation of the effects of hydrogen and oxygen on both emission intensities and composition of the neutral components under the conditions of direct current glow discharge plasma in hydrogen chloride was carried out. The excitation rate coefficients for all emissive fragments as well as the electron density as functions of oxygen or hydrogen mixing ratios were determined by mathematical modeling.

Key words: plasma, emission, intensity, excitation, concentration, hydrogen chloride, hydrogen, oxygen

A.A. KHASANOV, V.A. EFIMOV, O.O. TIKHOMIROVA, G.A. EFIMOVA
CHANGE IN MOLECULAR- MASS DISTRIBUTION IN PROCESS OF REVERSIBLE POLYMERIZATION

Change in the molar mass distribution in reversible living polymerization process was considered. Analytical solutions for a numerical average, weight-average degree of polymerization and dispersity index were received.

Key words: molecular-mass distribution, reversible polymerization, polydispersity, analytical solution

M.I. KHALILOVA, Y.Kh. KHALILOV, N.I. ABBASOVA, M.M. AKHMEDOV
STUDY OF PECULARITIES OF ADSORPTION INTERACTION OF OIL WETTING AGENT
AND PARTICLES OF CALCITE ROCKS

The adsorption interaction of stearic acid with fine-dispersed calcite rocks was studied. Results of investigations established that in spite of similar chemical composition, the interaction character of calcite rocks with polyatomic carboxylic acid differs. Change in interaction character is related to various structures of particles of studied rocks, as well as different content of active sites on their surface, which should be considered at their hydrophobization.

Key words: hydrophobization, chalk, marble, limestone, wetting angle, adsorption, stearic acid, acidic sites

T.M. VASILIEVA, K.B. BALAKIN
CONTROLLABLE DEGRADATION OF BIOPOLYMERS FOR BIOMEDICAL PURPOSES STIMULATED BY
ELECTRON-BEAM OXYGEN PLASMA AND WATER VAPOR

The article reviews the results obtained in studies of proteins and polysaccharides degradation in the electron-beam plasma of oxygen and water vapor. The procedure and mechanisms of the plasmachemical destruction of the biopolymers, physicochemical and biological properties produced low molecular weight compounds and their potential use in medicine and pharmaceuticals are discussed.

Key words: biopolymers, proteins, polysaccharides, electron-beam plasma

*N.P. SHABELSKAYA, M.V. TALANOV, I.N. ZAKHARCHENKO, R.O. KIRYUSHINA, A.K. ULYANOV,
L.A. REZNICHENKO*

RESEARCH OF PROCESSES OF $M\text{Cr}_2\text{O}_4$ (M = Co, Ni, Zn, Cd, Mg) CHROMITES FORMATION

In the work the formation process of chromites of a number of transitional elements was studied. The energy, U , of crystal lattice of oxides was calculated. It was established that with reduction of U value the completeness of spinelforming is increased. Accelerating influence of thermal dissociation of oxides on synthesis process of spinel was revealed.

Key words: spinels, chromites, lattice energy, solid-phase synthesis

S.V. RYBIN, E.L. KRYSOVA, E.P. GRISHINA

PECULIARITIES OF ALUMINIUM FOIL POTENTIOSTATISTIC ETCHING WITH HYDROCHLORIC ACID FOR ANODES OF HIGH VOLTAGE ALUMINIUM OXIDE-ELECTROLYTIC CAPACITORS

Peculiarities of recrystallized aluminium foil (produced by different manufactures: Russia, France, China) etching with hydrochloric acid for anodes of aluminium electrolytic capacitors with non-solid electrolyte were studied by the chronoamperometry method. It was established that chronoamperograms of the foils suitable for tunnel etching have two current peaks with different ratio of the peak's heights. We suppose that parameters of the first current peak depend upon macroimpurities allocation in the surface oxide layer, parameters of the second current peak depend upon macroimpurities allocation in the near-surface aluminium layers.

Key words: aluminium, aluminium foil, anode etching, tunnel etching, etching with hydrochloric acid, chronoamperometry, aluminium capacitors

A.S. NIKONOV, Yu.T. PANOV

FOAMING AGENTS FOR MANUFACTURE OF LOW-DENSITY POROUS GLASS

It was shown that the use of combined blowing agent based on calcium carbonate and sodium nitrate allows to obtain foam material with a density of 80 kg/m^3 using the glass industry wastes. The properties of developed heat-insulating material are given.

Key words: glass industry wastes, foam glass, blowing agents, decomposition kinetics, calcium carbonate, sodium nitrate

O.G. VOLOKITIN, V.I. VERESHCHAGIN

FEATURES OF PHYSIC-CHEMICAL PROCESSES OF OBTAINING HIGH-TEMPERATURE SILICATE MELTS

Basic physic-chemical processes for high-temperature silicate melt producing were considered. Results of X-ray and IR-spectroscopic analyses were given. The complex analysis of silicate raw materials and products of its melting by plasma technology were carried out.

Key words: physical-chemical processes of silicates melting, high temperature melt, electro-plasma technology

G.L. PASHKOV, S.V. SAIYKOVA, M.V. PANTELEEVA, E.V. LINOK, R.D. IVANTSOV, A.M. ZHIZHAEV

SYNTHESIS OF FERRITE GARNET NANOPOWDER AND STUDY OF MAGNETO-OPTICAL PROPERTIES OF COMPOSITE ON ITS BASE

The method of synthesis of yttrium-ferrum garnet nanopowder with step by step precipitation of yttrium and iron (III) hydroxides from chloride solutions by AB-17-8 strong-base anionite in OH-form followed by the calcination at 700°C was proposed. Products were characterized by XRD, FTIR spectroscopy and electron microscopy. Additionally, magneto-optical behavior of the nanocomposite based on a formed powder was studied.

Key words: yttrium-ferrum garnet, anionite, synthesis

A.A. MERKIN, D.O. KORPATENKOV, A.A. KOMAROV, O.V. LEFEDOVA

INFLUENCE OF CATALYST MODIFICATION AND SOLVENT ON KINETICS OF REACTIONS OF SUBSTITUTED NITROBENZENES HYDROGENATION

The influence of modification of skeletal nickel by titanium and molybdenum on its catalytic activity for hydrogenation reactions of substituted nitrobenzenes was study. The act of medium composition on the hydrogenation kinetics was analyzed.

Key words: nitrobenzene, 2-nitroanizole, 4-nitroanilin, liquid phase heterogeneous catalysis, solvent, skeletal nickel, catalyst modification

A.A. ALEKSEEV, A.V. LOBANOV, V.S. OSIPCHIK, A.F. ZHUKOV, A.A. ALEKSEEV (jun)

PLASTICIZATION OF STYRENE-BUTADIENE BLOCK-COPOLYMER WITH HIGH CONTENTS OF STYRENE BY INDUSTRIAL OIL

The influence of additives of I-40A industrial oil on the basic properties of polystyrene-stat-copoly (butadiene/styrene/1, 2-butadiene)-polystyrene of StyroTEP-70 brand containing 70% of styrene was studied. Technological features of blending the initial components, fluidity, stretching curves, conditional flexural strength and hardness of materials form in the order determined by the molecular plasticization of polymers. The limit of compatibility between the initial components was determined. It was 25 g of oil per 75 g of StyroTEP-70.

Key words: butadiene-styrene block copolymers, StyroTEP-70, plasticization, industrial oil

E.V. MELENCHUK, O.V. KOZLOVA

USE OF POLYMERS-MODIFIERS UNDER COLORING PARA-ARAMID FABRICS

The results of dyeing the achromatophilous fabrics from para-aramid fibers in the presence of polymers- modifiers are represented. The use of mineral pigments and specially selected polymers and fillers was shown to allow to achieve durable and deeply colored synthetic textiles.

Key words: para-aramid fabric, film-forming polymers, pigments, mineral additives

M.Z. ZARIFYANOVA, I.Sh. KHUSNUTDINOV, S.D. VAFINA, I.V. ARISTOV, Kh.E. KHARLAMPIDI
EFFICIENCY OF SULPHIDES OXIDATION OF DIESEL FRACTIONS IN PRESENCE OF MOLYBDENUM-CONTAINING CATALYSTS

The comparative analysis of oxidation catalysts of sulfides of the diesel fraction of 225-350 °C was carried out. Influence on the oxidation process of peroxocomplexes of molybdenum obtained from the market forms of molybdenum and molybdenum recovered from the wastes of the process of obtaining the oxide of propylene is studied. The efficiency of the sulfides oxidation with the application of molybdenum catalysts was compared with the oxidation of sulfides in the presence of glacial acetic acid.

Key words: diesel fraction, sulfides, sulfoxides, oxidation, catalyst, oxidation product, molybdenum peroxocomplexes, glacial acetic acid

O.V. MANAENKOV, V.Yu. DOLUDA, A.E. FILATOVA, O.Yu. MAKEEVA, E.M. SULMAN, A.I. SIDOROV
NEW TYPE OF Ru-CONTAINING CATALYST FOR HYDROLYTIC HYDROGENATION OF CELLULOSE

The results of process study of the cellulose hydrolytic hydrogenation in the presence of Ru-containing polymeric catalysts of new type on the base of hypercrosslinked polystyrene (HPS) and its functionalized analogues are presented. The replacement of the traditional support (carbon) on HPS was shown to increase in a yield of main products of cellulose conversion - hexitols.

Key words: cellulose, heterogeneous catalysis, hypercrosslinked polystyrene, hydrolysis, hydrogenation, sorbitol, mannitol

Yu.M. BAZAROV, D.A. KAZAKOV, T.S. USACHEVA

PA-6 MICROHETEROGENEITY AS A RESULT OF TECHNOLOGY OF ITS SYNTHESIS

A method for the evaluation of PA-6 microheterogeneity based on the increase in the concentration of the polymer solution in the Ubbelohde viscometer was proposed. It was shown that the molecular mass of industrial PA-6 ranges from 14000 to 33000. Laboratory-scale set up for experimental low temperature hydrolytic polymerization of caprolactam in the melt produces a polymer with a significantly lower molar mass gradient namely, from 16300 to 20000.

Key words: polyamid PA-6, polymer solutions, PA-6 molecular mass determination, PA-6 synthesis

A.V. MOROZ, Yu.P. KUDYUKOV, N.F. TYUPALO

SOLID «ALLOYS» ON BASE OF 4,4' AND 2,2'-DIACYLAMINOANTHRAQUINOYLES. ITS SYNTHESIS AND PROPERTIES

By a spectrophotometry, X-ray methods of analysis, IR-spectroscopy and derivatography the process of synthesis of solid «alloys» from mixtures of 4,4'- and 2,2'-diacylamino-1,1'-diantraanthraquinoyles in different ratios was studied. It was shown that solid «alloys» not only extend the colour gamut of polycyclic pigments but also improve physical and chemical properties and coloristic indexes as compared to mechanical mixtures. The results of researches allowed to develop technology of production of pigmental solid «alloys» for atmospheric- and heat-resistant paint-and-lacquer materials at the conditions of enterprise.

Key words: synthesis, solid «alloys», mechanical mixtures, colour gamut, physical-chemical and coloristic indexes

V.A. BADOEV, M.V. VOLKOV, M.Yu. TARSHIS, A.I. ZAIYTSSEV

RESEARCH OF GRAIN MATERIALS GRINDING PROCESS IN BOLL MILL

The identification factors of model for portion grinding of grain materials in a boll mill are determined. The statistical check of conformity of experimental data to theoretical distribution is carried out.

Key words: grinding, specific surface, statistical check, distribution

A.B. KAPRANOVA, M.N. BAKIN, A.E. LEBEDEV, A.I. ZAIYTSSEV

EVALUATION OF RECOVERY PARAMETER OF SHOCK INTERACTING FLOWS OF SOLID DISPERSION MEDIA WITH SLOPING BAFFLE

The method for determining the recovery parameter was proposed for the average flow rate of dilution solid bulk materials mixed at the impact on breaking surface with established experimental relationship between the spray angles of flows mentioned above and a slope angle of the bump stop taking into account the design and operational parameters of a drum mixer with flexible elements.

Key words: parameter recovery, shock interaction, solid dispersed material, dilution flow, mixing, bump stop, spray angle, incidente angle, reflection angle, mixer parameters

A.E. LEBEDEV, A.I. CHADAEV

MATHEMATICAL DESCRIPTION OF SHOCK SEPARATION OF SUSPENSION IN BRUSH DEVICE

Based on a probabilistic approach the mathematical description of the shock separation of suspension in a brush device was made. The obtained expression for the distribution differential function of particles on sizes can be used to estimate the composition of solid fraction of condensed phase of suspension.

Key words: process, separation, flow, diameter, suspension, probability, particle

E.S. SLIVCHENKO, A.P. SAMARSKIY, V.N. ISAEV., V.N. BLINICHEV

EVALUATION OF NATURAL ABILITY OF CRYSTALLIZATION SYSTEM TO PHASE FORMATION

The method of extensive and intensive evaluation of crystallization system natural ability to the phase formation was developed. The problem of creation of crystallization systems classification on their ability to form the new phases was formulated.

Key words: crystallization system, complete mixing cell, crystals formation rate, crystals growth rate, supersaturation, particle size, classification

V.E. MIZONOV, V.V. KOSTAREV, V.A. ZAIYTSSEV

MATHEMATICAL MODEL OF CONVECTION HYDRAULIC CONDUCTIVITY IN MULTI-LAYER MEDIUM WITH VARIABLE NUMBER OF LAYERS

A cell mathematical model to describe evolution of moisture content distribution at forced diffusion in a multi-layer medium with variable number of layers was proposed. The medium was presented as 1D Markov chain with growing number of cells, at which a new incoming cell brings its own moisture content. Two variants of the process were examined: in the first one the convection transitions are directed to the very first cell, and in the second one – from it. Some examples of calculation of evolution of moisture content distribution are presented.

Key words: forced diffusion, cell model, Markov chain, state vector, transition matrix, moisture content distribution

A.I. LEONTIEVA, V.S. OREKHOV, M.Yu. SUBOCHEVA, M.A. KOLMAKOVA

STUDY OF KINETICS OF PROCESS OF REMOVING WATER-SOLUBLE IMPURITIES FROM SOLID PRECIPITATIONS ON FILTER PARTITION

The results of studies of removing water-soluble impurities from sediments formed by fine particles of organic pigments forming clay-like structure were presented. The experimental set-up was shown. The optimal flow of wash liquid which provides the required concentration of water-soluble impurities in the precipitate formed by organic pigments or orange G was determined.

Key words: filtering, filter press, washing, suspension, pellet, paste, organic substance particles, liquid phase, solid phase, water-soluble impurities, washing liquid, filtration and washing pressure, pores