

## GENERAL AND THEORETICAL CHEMISTRY

### STUDY OF 2,2'-BIS(3,5-DIMETHYLPYRAZOL-1-YL)DIETHYLSUFIDE OXIDATION

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*Oxidation of 2,2'-bis(3,5-dimethylpyrazol-1-yl)diethylsulfide by hydrogen peroxide in acetic acid was studied. It was found that depending on the temperature, either sulfoxide or sulfone is formed. Nitration of 2,2'-bis(3,5-dimethylpyrazol-1-yl)diethylsulfide by nitric acid proceeds concurrently with oxidation and yields the sulfoxide.*

*Keywords: pyrazole, oxidation, sulfoxides, sulfones*

### THE REACTION BETWEEN EPOXYPROPANE DIALKYLAMINO DERIVATIVES AND HYDROXYLAMINE

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*The results of experimental studies of the reaction between hydroxylamine and epoxypropane dialkylamino derivatives are presented herein. N,N-dibutyl-N'-hydroxy-2-methylpropane-1,3-diamine and N,N-diethyl-N'-hydroxy-2-methylpropane-1,3-diamine have been obtained for the first time.*

*Keywords: N,N-dibutyl-N'-hydroxy-2-methylpropane-1,3-diamine, N,N-diethyl-N'-hydroxy-2-methylpropane-1,3-diamine, hydroxylamine, epoxypropane*

### TO THE PROBLEM OF ETHYLATION SELECTIVITY OF THE SODIUM SALT OF 3-NITRO-1,2,4-TRIAZOLE IN WATER

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*The alkylation of the 3-nitro-1,2,4-triazole sodium salt with diethyl sulfate in water proceeds at three nitrogen atoms of the heterocycle to form a mixture of isomeric  $N_{(1)}$ -,  $N_{(2)}$ - and  $N_{(4)}$ -ethyl-3-nitro-1,2,4-triazoles. The ratio of the ethylation products by the nitrogen atoms  $N_{(1)}$ ,  $N_{(2)}$  and  $N_{(4)}$  is 66.4÷68.2/24.0÷26.7/6.9÷7.9 (mass. %) pursuant to GLC and  $^1\text{H}$  NMR spectroscopy data.*

*Keywords: 3-nitro-1,2,4-triazole, N-ethylation, diethylsulfate, N-ethyl-3-nitro-1,2,4-triazoles*

### THE SELECTIVITY INVESTIGATION OF ALKYLATION OF 3-NITRO-5-R-1,2,4-TRIAZOLES WITH DIHALOALKANES AND SOME PROPERTIES OF 3-NITRO-1-[(3'-NITRO-5'-R-1',2',4'-TRIAZOLE-1'-YL)ALKYL]-5-R-1,2,4-TRIAZOLES

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*The alkylation of nitrotriazole salts with dihaloalkanes such as dibromomethane, 1,2-dibromoethane and 1,3-dibromopropane is investigated. The process proceeds nonselectively to form a mixture of products substituted at the nitrogen atoms  $N_1$  and  $N_2$  of the heterocycle, which is composed of three reaction products:  $N_1, N_1'$ -,  $N_1, N_2'$ - and  $N_2, N_2'$ -isomeric derivatives of nitrotriazoles. The ratio of the  $N_1, N_1'$  :  $N_1, N_2'$  :  $N_2, N_2'$  isomeric reaction products is 68.3 ÷ 90.0 : 6.5 ÷ 21.2 : 3.5 ÷ 10.5.*

*Keywords: 3-nitro-5-R-1,2,4-triazoles, selectivity, alkylation, dibromomethane, 1,2-dibromoethane, 1,3-dibromopropane*

## **PREPARATION OF 1,3-DIAZIDO-2-NITRO-AZAPROPANE (DANP) FROM DIHYDROXYMETHYL NITRAMINE**

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*An alternative method to synthesize 1,3-diazido-2-nitro-2-azapropane, a promising liquid component of high-energy condensed systems, is suggested which involves subsequent stages: acetylation of dihydroxymethyl nitramine, chlorination of 1,3-diacetoxy-2-nitro-2-azapropane, and azidation to DANP. This method of synthesis is selective and allows the isolation of 1,3-diazido-2-nitro-2-azapropane free from impurities.*

*Keywords: azidoalkylnitroamines, 1,3-diazido-2-nitro-2-azapropane, DANP, liquid explosives, plastificator*

## **QUANTUM-CHEMICAL CALCULATION OF SUPPOSED STRUCTURE OF UNSTABLE HIDROXYCARBONATE COMPLEXES OF IRON (III)**

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*The supposed structure of unstable hidroxy carbonate complexes of iron (III) was calculated using program Gaussian 03, Revision C.01. Energy minimization and frequency calculation were performed using the basis set B3LYP/6-31G(d).*

*Key words: iron (III), hidroxy carbonate, quantum-chemical calculations*

## **CONJECTURAL MECHANISMS OF OXIDATION OF FERROUS COMPOUNDS IN SATURATED CARBONATE-HYDROCARBONATE SOLUTIONS**

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*Kinetics of oxidation of iron (II) carbonate in saturated carbonate-hydrocarbonate solutions were studied. Conjectural mechanisms of formation of hidroxy carbonate complexes of iron (III) were suggested on the ground of studied properties.*

*Key words: iron (III), carbonate-hydrocarbonate solutions, oxidation, hidroxy carbonate of iron (III)*

## **SYNTHESIS AND PROPERTIES HEXA(ISOTHIOCYANATE)CHROMATE(III)OCTA(ε-CAPROLACTAM)ITTRIUM**

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*Hexa(isothiocyanate)chromate(III)octa(ε-caprolactam)ittrium have been prepared and studies by physic-chemical analysis techniques.*

*Keywords: double complex sflt, innrium, (isothiocyanate)chromate, ε-caprolactam.*

## **SYNTHESIS, PROPERTIES AND PROSPECTS BIMETALLIC MIXED-LIGAND COMPLEXES**

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*The possibilities of using complex compounds as precursors for new materials are discussed. Physico-chemical properties and structure of new compounds are studied.*

*Keywords: complex compounds, thiocyanate, metals, organic ligands.*

## PHOTOCHEMICAL TRANSFORMATIONS IN SILVER AZIDE

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*As a result of an light irradiation silver azide ( $\lambda = 365$  nanometers,  $I > 1 \cdot 10^{15}$  quantum  $\text{sm}^{-2} \text{sec}^{-1}$ ) in vacuum ( $1 \cdot 10^{-5}$  Pa) along with increase in speed of a photolysis and a photocurrent is manifested new long-wave ( $\lambda = 1280$  nm) spectral response area. Constants of speed of a photolysis are defined. At photolysis silver azide microheterogeneous systems  $\text{AgN}_3$  ( $A_1$ ) – Ag (a product photolysis) are formed. A limiting stage of a photolysis silver azide is diffusion interjunction silver cation to the neutral centre ( $T_n \text{Ag}_m$ ).*

*Keywords: microheterogeneous systems, silver azide, photolysis*

## PHOTOSTIMULATED TRANSFORMATIONS INTO SILVER AZIDE – COPPER SYSTEMS

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*Creation of systems  $\text{AgN}_3$  ( $A_1$ ) - Cu, preliminary processing by their light  $\lambda = 365$  nanometers and various intensity ( $2,8 \cdot 10^{14} - 3,17 \cdot 10^{15}$  quantum  $\cdot \text{sm}^{-2} \cdot \text{s}^{-1}$ ) along with increase in photolysis speed and a photocurrent in the field of own absorption  $\text{AgN}_3$  ( $A_1$ ) leads to expansion of area of spectral sensitivity silver azide. It is shown that diffusion of a mobile ion of silver to the neutral center limits photolysis process systems  $\text{AgN}_3$  ( $A_1$ ) - Cu.*

*Keywords: silver azide, copper, photolysis*

## LAWS OF PHOTOSTIMULATED TRANSFORMATIONS IN NANOSIZED SYSTEMS Al – Al<sub>2</sub>O<sub>3</sub>

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*By gravimetry, optical spectroscopy methods it is established that as a result of a light irradiation in range  $\lambda = 300 - 750$  nm and intensity  $I = 6,9 \cdot 10^{14} - 1,1 \cdot 10^{16}$  quantum  $\cdot \text{cm}^{-2} \cdot \text{sec}^{-1}$  during  $\tau = 1 - 160$  minutes in atmospheric conditions, absorption and reflection spectrum, weight of aluminum films ( $d = 2 - 200$  nm) considerably change. Kinetic curves degrees of transformation are described within the limits of return logarithmic and parabolic laws depending on a thickness of aluminum films. The model including stages of generation and redistribution of charge carriers in a contact field of systems Al – Al<sub>2</sub>O<sub>3</sub>, to adsorption of oxygen, diffusion  $\text{Al}^{3+}$  and formations Al<sub>2</sub>O<sub>3</sub> is offered.*

*Key words: heterosystems, nanosize films, optical properties*

## PHOTOCHEMICAL TRANSFORMATIONS IN THALLIUM AZIDE - COPPER(I) OXIDE

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*The formation of  $\text{TlN}_3$  (A) – Cu<sub>2</sub>O systems and them preliminary treatment with light  $\lambda = 365$  nm led as to an increase of the rate of photolysis and photocurrent in the region of intrinsic  $\text{TlN}_3$  (A) absorption as the broadened of region spectral sensitivity of thallium azide. The rate constants for photolysis was evaluated. As a result of the measurements of the current-voltage characteristics, contact voltage, contact photoelectromotive force the diagram of the energy bands was constructed and the model of photolysis of  $\text{TlN}_3$  (A) – Cu<sub>2</sub>O systems was suggested. This model includes the generation, recombination, and redistribution of nonequilibrium carriers in the contact field, the formation of nanosize  $\text{TlN}_3$  (A) – Tl (photolysis product) systems and the formation of nitrogen.*

*Keywords: heterosystems, azide thallium, copper oxide (I), photolysis*

## **LAWS OF LEAD AZIDE PHOTOLYSIS PRODUCTS FORMATION**

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*Preliminary light irradiation of lead azide ( $\lambda=365$  nm,  $I=2\times10^{15}$  quantum $\cdot$ cm $^{-2}\cdot$ sec $^{-1}$ ) in vacuum ( $1\times10^{-5}$  Pa) along with increase of photolysis speed and a photocurrent leads to occurrence new long-wave (to  $\lambda=600$  nm) area of spectral sensitivity. Constants of lead azide photolysis speed are defined. It is set that a microheterogeneous systems PbN<sub>6</sub> (Am) – Pb (a product of photolysis) are formed by lead azide photolysis. A limiting stage of photolytic lead formation is diffusion of anionic vacancies to Pb<sub>n</sub><sup>0</sup> neutral center.*

*Keywords: lead azide, microheterogeneous systems, photolysis*

## **KINETICS OF COAGULATION OF THE SOL Fe(OH)<sub>3</sub> UNDER THE INFLUENCE OF ELECTROMAGNETIC FIELD**

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*High-frequency electromagnetic field influence on sol stability is investigated. It is shown, that in result of HF field influence there is a decrease of sol transmission. The efficiency depends on frequency and time of field irradiation and grows with increase of colloid concentration.*

*Keywords: a high-frequency electromagnetic field, stability, coagulation, optical properties, transmittance, sol*

## **SYNTHESIS N<sup>α</sup>-ACYL DERIVATIVES OF D,L-LYSINE**

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*Some are synthesised N<sup>α</sup>-acyl derivatives D,L-lysine. It is developed method alkylation sodium salts p-toluenesulfonamid ethyl ethers α-Bromine N<sup>ω</sup>- aminoalkanes acids.*

*Keywords: D,L-lysine, N<sup>ω</sup>-aminoalkanes acids*

## **SYNTHESIS 2-BROMINE -4-IODINESUBSTITUTED OF ACETALS TETROSE ON THE BASIS OF VINYL ETHERS**

E.V.Kryukova, YU.V. Morozhenko

*Work continues the search for the ways of the complete synthesis of the modified carbohydrates by the reaction of the condensation of derived acetals with β-substituted vinyl alkyl ethers. In this communication are occurred the possibility of obtaining iodine-containing polyfunctional D,L-tetrose with finalizing of the procedure of dimethylacetal of iodineacetaldehyde.*

*The keywords: iodinesubstituted acetals, galogensaccharides, the modified carbohydrates*

## **MECHANISMS OF SPONTANEOUS COMBUSTION OF BINARY SYSTEM RED PHOSPHORUS – NITRATES OF METALS**

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*The spontaneous combustion of system red phosphorus – nitrates are due to melting and formation of cracks of nitrates, as well as interacting nitrates with red phosphorus and red phosphorus derivatives H<sub>3</sub>PO<sub>2</sub>, H<sub>3</sub>PO<sub>3</sub>, H<sub>2</sub> and PH<sub>3</sub>, as found by DTA method.*

*Key words: red phosphorus, nitrates, oxidation*

## POTENTIOMETRIC DETERMINATION OF $\text{Ag}^+$ AND $\text{Cu}^{2+}$ IONS IN ALLOYS USING POTASSIUM DIHEPTYLDITHIOPHOSPHATE

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*The article, based on the approach to the degree of reaction, to predict the possibility of analyzing silver alloys, bronze, brass, and the results of potentiometric titrations of these alloys digeptilditiofosfatom potassium using the indicator electrode of silver. The results compare the proposed method with exemplary practices.*

*Key words: silver alloys, bronze, brass, digeptilditiofosfat potassium*

## SYNTHESIS AND IR SPECTROSCOPIC ANALYSIS OF REINECKATES OF CERIUM GROUP LANTHANIDES WITH HEXAMETHYLTRIAMIDOPHOSPHATE

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*IR spectroscopic method of analysis the coordination compounds obtained by merging solutions of  $\text{Ln}(\text{NO}_3)_3 \cdot 6\text{H}_2\text{O}$  ( $\text{Ln} - \text{La, Ce, Pr, Nd, Sm, Eu, Gd}$ ) c With hexamethyltriamidophosphate.*

*Keywords: coordination compounds, lanthanides, infrared spectroscopic analysis.*

## TEMPERATURE DEPENDENCE OF THE ENERGY STATES OF SOLID-PHASE SYSTEMS BASED ON TETRAETHOXYSILANE AND SALTS OF d-METALS

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*The temperature dependence of the energy state of solid-phase systems according to differential scanning calorimetry hydrolysates film-forming solutions based on tetraethoxysilane and salts of d-metals. The basic stages of formation of double oxides  $\text{SiO}_2\text{-M}_x\text{O}_y$  (where  $\text{M} - \text{Mn, Fe, Co, Ni}$ ), , and analyzed the behavior of systems during heating. Determined intervals of temperature treatment, which show differences in the behavior of systems depending on the nature of the metal.*

*Keywords: thermal analysis, film-forming solutions, Erofeev-Kolmogorov equation, the film*

## ATOMIC FORCE MICROSCOPE IN THE INVESTIGATION OF NANOPARTICLES

T.A. Larichev, F.W. Titov, K.A. Bodak, D.V. Diaghilev, A.A. Vladimirov

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*The results of investigations of metallic Pd particles of different methods of atomic force microscopy. Established that semicontact AFM method is preferred for the study of particles obtained in the solutions. AFM defined sizes of metal particles produced Pd.*

*Key words: scanning probe microscopy, atomic force microscopy, catalysts, nanoparticles of palladium.*

## PATTERNS OF FORMATION OF AgI И CuI MICROPARTICLES

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*This work is devoted to obtaining particles AgI and CuI in aqueous solutions in the presence of protective colloid. X-ray diffraction analysis revealed the crystal structure of obtained particles. Shows the effect of a protective colloid on the particle size and their optical properties. Increasing the size of AgI particles leads to a gradual shift of the peak to longer wavelengths, until a peak is characteristic of bulk crystals of AgI, in excess of 150 nm.*

*Keywords: silver iodide, copper iodide, crystallization.*

## **SYNTHESIS AND CRYSTAL STRUCTURE OF OCTA(DIMETHYLSULFOXIDE)BISMUTH(III) HEXA(ISOTHYOCIANATO)FERRATE(III)**

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*Received ion mixed-ligand bimetallic complex composition  $[Bi(DMSO)_8][Fe(NCS)_6]$ . The crystals are triclinic materials, space group.  $P-1$ ,  $a = 11.2368(4)$ ,  $b = 11.4063(4)$ ,  $c = 21.0711(9)$  Å,  $\alpha = 92.9520(10)^\circ$ ,  $\beta = 99.9430(10)^\circ$ ,  $\gamma = 111.9290(10)^\circ$ ,  $V = 2447.69(16)$  Å<sup>3</sup>,  $Z = 2$ ,  $d_{\text{vych}} = 1.680$  g/cm<sup>3</sup>. The coordination polyhedron of bismuth represents a distorted square antiprism with a broken square faces. Bond lengths Bi-O vary from  $2.368 \div 2.582$  Å. Coordination environment of the iron atom - slightly distorted octahedron, the bond lengths Fe-N are in the range  $2.058\text{--}2.069$  Å.*

*Keywords: complex compounds, bismuth, iron, dimethyl sulfoxide, X-ray diffraction analysis, single crystal*

## **SYNTHESIS AND PHYSICO-CHEMICAL STUDY OF $\epsilon$ -CAPROLACTAMIUM TETRA(ISOTHYOCIANATO)DIAMMINCHROMATE(III)**

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*Synthesized and studied a new set of protonated  $\epsilon$ -caprolactam with tetra (isothiocyanato) diamminhromat (III)-anion. The compound was studied by chemical, infrared spectroscopy, thermogravimetric and X-ray analysis.*

*Keywords:  $\epsilon$ -caprolactam, chromium complexes, infrared spectroscopy, thermolysis, differential thermal analysis, X-ray analysis.*

## **SYNTHESIS AND STUDY OF THE STRUCTURE AND PROPERTIES OF MANGANESE(II), COBALT(II) AND NICKEL(II) ISOTHYOCYANATE WITH $\epsilon$ -CAPROLACTAM**

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*The investigation of the possibility of coordinating  $\epsilon$ -caprolactam to thiocyanate manganese (II), cobalt (II), nickel (II), we obtain new coordination compounds, study their properties and structure.*

*Key words: manganese, cobalt, nickel,  $\epsilon$ -caprolactam, coordination compounds.*

## **SYNTHESIS AND THERMAL STUDY OF SOME TETRAIODOMERCURATE(II) COMPLEXES OF CERIUM GROUP LANTHANIDES(III) AND $\epsilon$ -CAPROLACTAM**

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*Complexes  $[Ln(C_6H_{11}NO)_8]_2[Hg_2I_6]_3$  ( $Ln - La, Pr, Nd$ ) were prepared. The composition is set by means of chemical analysis. A thermal analysis of compounds in the air.*

*Keywords:  $\epsilon$ -caprolactam, tetralodomercurate, endoeffect, exothermic effect.*

## **IR SPECTROSCOPIC STUDY OF THE COMPLEX OF COBALT (III) WITH MONOETHANOLAMINE**

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*By chemical and IR spectroscopic analysis the complex compound of cobalt (III) with monoethanolamine, which is formed by the reaction of cobalt chloride (II) with monoethanolamine (molar ratio 1:6). Established that the obtained dual-core compound consisting of a complex cation  $[Co_2(OC_2H_4NH_2)_3(HOC_2H_4NH_2)_3]^{3+}$  and the chloride ion.*

*Keywords: complexes, cobalt, monoethanolamine, infrared spectroscopy*

## **THERMOLYSIS OF TETRA(ISOTHYOCYANATO)DIAMMIN–CHROMATE(III) COMPLEXES OF LANTHANE(III) WITH DIMETHYLSULFOXIDE AND DIMETHYLFORMAMIDE**

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*Methods of thermogravimetry, differential scanning calorimetry and infrared spectroscopy, the processes of thermolysis of complexes of composition  $[La(dmsO)_9][Cr(NH_3)_2(NCS)_4]_3 \cdot 4dmsO$  and  $[La(dmf)_9][Cr(NH_3)_2(NCS)_4]_3 \cdot 4dmf$ , in the temperature range 25-1000 ° C in air and inert atmosphere of argon. Found an irreversible color change agents at 150-160°C.*

*Key words: lanthanum complexes of chromium (III), infrared spectroscopy, thermolysis, differential thermal analysis*

## **APPLIED CHEMISTRY**

### **THERMOGRAVIMETRIC STUDIES OF HYDRATION PRODUCTS AND HARDENING SULFOMAGNESIUM ASTRINGENTS**

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*Method of thermogravimetry studied the mechanism of the formation, composition and nature of products of interaction of system components  $MgSO_4 - MgO - H_2O$  in conditions close to industrial production of magnesium binders. The results of practical interest in connection with the insufficient study of the mechanism of hardening of magnesium binders on the basis of caustic magnesite and magnesium sulfate, and can be used to develop methods of obtaining magnesia cements from natural minerals of the Altai Territory.*

*Keywords: thermogravimetry, magnesite cement, caustic magnesite*

### **WAYS OF ELIMINATION OF CRACKS MAGNESIUM OF THE STONE ON THE BASIS OF HIGHLY ACTIVE MAGNESIUM CEMENT SUBSTANCES**

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*Properties of magnesium cement substances received on a basis brucite of the Kuldursky deposit are considered*

*Keywords: brucite, magnesium cement substances.*

## **POWER EFFECTIVE MATERIALS ON A BASIS OF THE BURNED DOLOMITE**

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*Results of researches on application of the burned dolomite, as raw materials for reception magnesium power effective building materials are resulted.*

*Keywords: dolomite, roasting, a brick*

## **RECEPTION AND PROPERTIES OF CEMENTS WITHOUT PLASTER**

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*Structures composite cement without plaster of the raised stability to sulphatic corrosion are developed.*

*Keywords: cement without plaster*

## **ABOUT THE MECHANISM OF INFLUENCE OF ADDITIVES OF CARBONATES FOR TIMEFRAMES OF COUPLING OF THE CEMENT TEST**

V.K. Kozlova, A.V. Volf, A.A. Lihosherstov, E.V. Chepurnova

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*Influence of additives of plaster and carbonates on variation of a parameter pH the cement dough from an instant of introduction of water prior to the beginning of coupling is studied. It is shown, that at the cement dough without additives fast increase of a parameter pH up to the certain size at which there comes the beginning of coupling is observed. The specified additives slow down growth rate of a parameter pH a liquid phase of the cement dough.*

*Keywords: ettringit, taymasit*

## **TECHNOLOGY OF RECEPTION OF MINERAL SORBENTS AND RESEARCH OF PROCESS OF THEIR DRYING BY INFRA-RED RADIATION**

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*Advantages of infra-red radiators in drying manufacturing are considered. To Izuche Thy influence of a thickness of a layer of a material and temperature in сушильной to the chamber from 100°C to 180°C for speed of drying of mineral sorbents. Recommendations about selection of a techno-logic of parametres in the course of drying are given out.*

*Keywords: drying, a sorbent, lk-radiators, basalt fibres*

## **STUDYING OF PROCESS OF DEHYDRATION FIBROUSMATERIAL ON THE SQUEEZING DEVICE**

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*In article the review of installations is made for dehydration of the granulated and fibrous materials. Represented scientific and practical interest research of possibility of application of squeezing devices for dehydration of fibrous materials with high water absorption on an example of basalt fibres. In the literature practically there are no data on application of squeezing devices for removal of a moisture from fibrous materials. Authors study 2 methods of removal of a moisture from fibrous materials-basalt fibres for the purpose of their use in various industries.*

*Keywords: dehydration, the fibrous material, dehydrating devices, capillaries, basalt fibres.*



## **SUPERACIDIC ZEOLITES CATALYTIC SYSTEMS FOR THE ALKYLATION OF ISOBUTANE BY OLEFINS**

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*For process of solid-acid alkylation of isobutane by olefins based on modification (decationated, dealuminizing, ion exchange) were synthesized superacidic catalytic systems - ultrastable zeolites of type Y in the polycation-decated form with silica-zirconia binder, additionally promoted by nickel, which are capable of showing high catalytic activity and stability in the process of manufacturing of alkylation gasoline*

*Keywords: alkylation, zeolite, isobutane, olefins.*

## **ABOUT POSSIBILITY OF PREPARATION THE GASOLINE-SPIRIT AND WATER-FUEL EMULSIONS IN ROTOR DEVICE**

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*In article it is offered to raise efficiency processes for preparation stable homogeneous compounds gasoline-spirit and water-fuel emulsions with minimization of power expenses for the account of application of the new device – the rotor-disk mixer.*

*Keywords: device, disk, fuel emulsion.*

## **IMPROVEMENT OF THE SERVICE PROPERTIES OF A REPAIR COMPOUND BY MODIFICATION THEREOF WITH IRON OXIDE NANOPARTICLES**

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*The paper presents the results of studies on the effect of nano-sized iron oxide upon characteristics of a composite material designed for repair and restoration of engineering constructions and massifs, including marble ones.*

## **DEVELOPMENT OF A METHOD TO SYNTHESIZE TRINITROFLOROGLUCINE**

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*The paper reports results of experimental studies of the effects of nitrating systems type, initial floroglucine characteristics, and nitration process modes upon the quality and yield of trinitrofloroglucine. It has been found that trinitrofloroglucine is preferable to obtain in the nitric acid/sulphuric acid nitrating system (80/20) with a mass modulus of 15.*

## **METHODS OF ENERGY CONSERVATION IN THE RECTIFICATION OF MIXTURES OF ORGANIC SUBSTANCES**

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*The 114 literary sources (1999-2009) were reviewed on the energy consumption and conservation at the distillation. The most effective approaches were identified to solving the problem of energy saving at multicomponent mixtures distillation by structural optimization and different types of thermal coupling.*

*Keywords: distillation, thermal coupling, thermally coupled complexes, energy saving*

## **POLYISOPRENE SULFUR VULCANIZATE DESTRUCTION PROCESSES STUDYING**

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*Polyisoprene sulfur vulcanizate destruction processes were studied. It was found that sulfur cross-link decay under hydroperoxide influence accelerates macromolecules destruction. The relation was introduced to estimate contribution of cross-link decay under hydroperoxide influence*  
*Polyisoprene, sulfur cross-link, destruction*

## **INVESTIGATION OF MODIFY PETROLEUM RESINS AS INFLUENCED AGENTS ON RHEOLOGIC BEHAVIOR OF PETROLEUM**

A.V. Bondaletova, V.G. Bondaletov, V.M. Sutyagin, L.I. Bondaletova, E.I. Ionova

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*Possibility of application of dark petroleum resins was investigated. Dark petroleum resins were synthesized by oxidative polymerization of heavy-weight pyrolysis resin of once-run petrol (oxygen, salts  $\text{Co}^{3+}$ ) in presence of atactic polypropylene. It was established average pour-point depressant effectiveness and lowering of dynamical viscosity down to 11 % by example Duklinskoe oilfield.*  
*Keywords: petroleum resins, oxidative modification, oil rheology, pour-point depressant*

## **INVESTIGATION OF ACRYLIC MONOMERS – TITANIUM TETRACHLORIDE COMPLEX BY MEANS OF $^1\text{H}$ -NMR SPECTROSCOPY**

O.V. Bondaletov, V.G. Bondaletov, V.M. Sutyagin, L.I. Bondaletova, V.V. Bochkarev

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*Complex of acrylic monomers – titanium tetrachloride has been investigated by means of  $^1\text{H}$ -NMR spectroscopy. It was established, that synthesized complex can not be polymerized under the action of catalytic system  $\text{TiCl}_4\text{-Al}(\text{C}_2\text{H}_5)_2\text{Cl}$ . But copolymerization of this complex with components of liquid pyrolysis products of hydrocarbons lead to modified petroleum resins.*  
*Keywords: complex, titanium tetrachloride, ether of acrylic acids,  $^1\text{H}$ -NMR spectroscopy*

## **SYNTHESIS OF MODIFIED RESINS ON THE BASE OF FRACTION $\text{C}_9$ OF LIQUID PYROLYSIS PRODUCTS AND VINYL BUTYL ESTER**

V.G. Bondaletov, L.I. Bondaletova, Y.B. Varakina

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*The modified petroleum resins were received by copolymerization of fraction  $\text{C}_9$  of liquid pyrolysis products with vinyl butyl ester by different catalysts such as titanium tetrachloride, diethyl aluminium chloride and catalyst system of titanium tetrachloride - diethyl aluminium chloride (molar ratio 1:1). It was shown, that these resins have improved properties: strength, adhesion, elasticity.*  
*Keywords: Modified resins, copolymerization, vinyl butyl ester, titanium tetrachloride, diethyl aluminium chloride.*

## **COPOLYMERIZATION DICYCLOPENTADIENE WITH INDENE UNDER THE INFLUENCE OF TITANIUM TETRACHLORIDE**

E.I. Ionova, A.A. Lyapkov, V.G. Bondaletov

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*Copolymerization dicyclopentadiene and indene in a solution of toluene under the influence of titanium tetrachloride is investigated. The synthesized values of reactivity ratios testify that indene is more active monomer in studied copolymerization and as dicyclopentadiene, and indene in studied*

system is formed by homopolymers. It is shown that the structure of copolymers dicyclopentadiene with indene is defined by more active monomer – indene. In particular it results in that molecular weight of samples of copolymers with the prevailing maintenance of indene grows.

Keywords: copolymerization, titanium tetrachloride, dicyclopentadiene, indene, reactivity ratios, a molecular-mass distribution, turbidimetry, heat release

## **POLYMERIZATION OF STYRENE UNDER THE INFLUENCE OF CATALYST COMPLEX ON THE BASIS OF $TiCl_4$**

E.I. Ionova, A.A. Lyapkov, V.G. Bondaletov

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Laws of polymerization of styrene under the influence of catalyst complex on the basis of  $TiCl_4$  in a toluene solution are studied. Polymerization rate of styrene in a solution of toluene under the influence of catalyst complex  $TiCl_4 \cdot (C_2H_5)_2AlCl$  in a molar parity 1: 1 submits to the kinetic equation of the first order practically before full exhaustion of monomer. It is shown that presence of slower stage, during which concentration of active sites can increase to a steady state, causes a S-shaped kind of kinetic curves. It is found that initiation efficiency the yielded catalytic system equals 0,8.

Keywords: polymerization, titanium tetrachloride, diethylaluminium chloride, styrene, propagation constants, molecular weight, heat effect, computer simulation

## **THE INFLUENCE OF ALTERNATING BENDING ON THE MECHANICAL PROPERTIES OF SINGLE CRYSTAL FIBERS OF HALIDES OF HEAVY METALS**

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Powered by pre-bending effect on the strength and plastic properties of the fibers of halides of heavy metals.

Keywords: fiber, strain, dislocation.

## **PHOTOCONDUCTIVITY OF POLYVINYL CARBAZOLE**

O.V. Rotar, V.M. Sutyagin, A.V. Lumareva

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The dependence of the photosensitive properties polyvinylcarbazole and its derivatives on the mechanism of polymerization. By electron spectroscopy, fluorescence found donor-acceptor interaction vinylcarbazole with carbon tetrachloride. The possibility of using polymer containing chlorine in the main chain, as a photosensitive material.

9-vinylcarbazole, carbon tetrachloride, donor-acceptor interaction, photosensitive material

## **MODERN METHODS OF DISPOSAL OF UNCONDITIONED PESTICIDES**

T.N. Volgina, V.T. Novikov, D.V. Reguzova

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The paper provides an overview of the literature on modern methods and technologies of clearance of substandard pesticides and related toxicants. It is shown that the increasing practical importance given to the methods of liquid-phase oxidation using environmentally safe and cost-oxidants.

Key words: pesticides, potent poisons, neutralization, oxidation, oxidizing agents

## **SURFACE PHENOMENA. BINARY COMPOUNDS**

### **PHOTOCATALYTIC PROPERTIES OF COPPER (I) OXIDE**

L.V. Sotnikova, Y.N. Dudnikova, T.A. Larichev, M.I. Ryabova, V.S. Laricheva

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*This work is devoted to synthesis and investigation of nanosize  $\text{Cu}_2\text{O}$  dispersions. This dispersions are used for manufacturing of advanced systems for preventing of environmental pollution and self-cleaning materials. The influence of polymeric stabilizers on shape and size of  $\text{Cu}_2\text{O}$  particles formed by reaction of copper cations with glucose was studied. The photocatalytic activity of  $\text{Cu}_2\text{O}$  dispersions in reaction of photodegradation of methyl orange in water solution was revealed. The electron microscopy and spectrophotometry were used for experimental work.*

*Keywords: copper (I) oxide, photocatalysis, self-cleaning, pollution preventing*

### **THE EVOLUTION OF DISPERSIONS IN A LIQUID-DROPLET AEROSOL CLOUD GENERATED BY THE EXPLOSIVE METHOD**

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*The results of experimental study of the evolution of dispersions in a liquid-droplet aerosol cloud generated by an explosive-type atomizer under conditions of various humidity contents are reported. A significant influence of the evaporation upon the aerosol cloud evolution is demonstrated.*

### **CALCULATION OF THE FRACTION COMPOSITION AND SURFACE AREA OF SOLID PARTICLES IN PROCESS OF DISPERSION THEREOF IN A ROTARY-PULSED APPARATUS**

A.A. Kukhlenko, M.S. Vasilishin, S.E. Orlov, D.B. Ivanova

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*A mathematical model of the destruction of solid particles in a rotary-pulsed apparatus is expounded. Dependencies to calculate the disperse composition and surface area of solid particles in process of treatment are obtained. A comparison between theoretical dependences and experimental data on the milling of various model systems in apparatuses of rotary-pulsed type is shown.*

### **THERMAL TRANSFORMATIONS IN NANOSIZE INDIUM LAYERS**

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*Indium (III) oxide is formed by thermal treatment of indium layers in the thickness 2 – 100 nm in the range of temperatures 473 – 573 K during 1 – 240 minutes in atmospheric conditions. Kinetic curve of transformation degrees of indium layers which thickness  $d_l = 40\text{--}50$  nm (at temperatures of thermal treatment 473 K and 573 K) are well described within the limits of the parabolic law. As a result of measurements of a contact potential difference and a photo-eds the model including stages of adsorption of oxygen, redistribution of charge carriers in contact field  $\text{In}_2\text{O}_3 - \text{In}$  (a negative sign from party  $\text{In}_2\text{O}_3$ ) and formations of indium (III) oxide is offered.*

*Keywords: indium, thermotransformations, optical properties*

## **PRELIMINARY ACTIVATION INFLUENCE ON NANOSIZE TUNGSTEN (VI) OXIDE LAYERS OPTICAL PROPERTIES**

E.P. Surovoi, S.V. Bin, N.V. Borisova, G.O. Ereemeeva, A.I. Mohov

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*By optical spectroscopy method it is set, that in the course of thermal processing of preliminarily promoted nanosize tungsten (VI) oxide layers ( $d = 7 - 160$  nm) within  $\tau = 1 - 140$  min in a temperature range  $T = 373 - 573$  K, along with reduction in range  $\lambda = 400 - 1100$  nanometers with maximum  $\lambda = 850$  nm, are observed increase of optical density in area  $\lambda = 300 - 400$  nm with a maximum  $\lambda = 350$  nm and displacement of edge of a strip of absorption in long-wave area of a spectrum. The model of thermal conversion in  $WO_3$  layers, including thermal ionization  $[(eV_a)^{++}e]$ -center and formation of center  $[(eV_a)^{++}e]$ .*

*Key words: tungsten (VI) oxide, thermal activation, optical properties*

## **RESEARCH OF CHEMICAL COMPATIBILITY ENERGY-MATERIALS WITH NANOPOWDERS OF METALS**

V.N. Popok, N.P. Vdovina

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*In work results of researches of chemical compatibility nanopowders of metals with energy-materials are presented. Base components compatible with nanopowders of metals are chosen.*

*Keywords: nanopowders, energy-materials, oxides, chemical compatibility*

## **PHYSICAL AND CHEMICAL BASES OF CONTROLLING THE COMPOSITION AND PROPERTIES OF HARD LAYERS ON SURFACES OF RESTORED DETAILS**

N.T. Krivochurov, V.V. Mironov, A.V. Ishkov

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*Authors investigate ways of management by composition and properties of the surface layers received at electro contact baking on metal powder of iron which surface is inoculated by various organic polymers. The adsorptive processes in systems iron powder - polystyrene and iron powder - carbamide-formaldehyde resin КФ-Ж are investigated, optimal relationships of components are established and is shown, that the achieved contents of metalloids (0,85 % C and 0,38 % N) in received at electro contact baking wear-resistant bed ( $T = 950$  °C,  $t = 3$  s.) correlates with physical and chemical characteristics of adsorption, composition, functionality and a phase condition of polymer.*

*Keywords: powdered materials, adsorption, polystyrene, carbamide-formaldehyde resin, electro contact baking.*

## **NATURE INFLUENCE OF THE BORATING AGENT, FLUXES AND ACTIVATORS ON CHARACTERISTICS OF THE COVERINGS RECEIVED AT HIGH-SPEED BORATING OF ALLOY STEELS**

V.V. Ivanajsky, A.V. Ishkov, N.T. Krivochurov, A.A. Maximov, N.M. Mishustin

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*In the article results of research of processes of interacting of a surface of high-carbon manganese steel 65Г with  $B_4C$  and amorphous B in medium of flux with additives of various activators of borating are given, at high-speed induction-heating. It is shown, that the nature of the borating agent, the additive of flux, activators  $CaF_2$  and  $NH_4Cl$  influence structure and properties formed on a surface eutectics with boron.*

*Keywords: boron, carbide of boron, induction heating, chemical and thermal treatment*

## **FEATURES OF STRUCTURE AND MECHANISM OF ANODIC ALUMINUM OXIDE FORMATION**

A.V. Vikharev, A.A. Vikharev

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*Experimental data on the anodic aluminum oxides prepared using different conditions and electrolytes are presented. The results are interpreted treating the anodic oxide as a special kind of clatrate. Mechanism of anion inclusion into the anodic films is discussed.*

*Keywords: anodic aluminum oxide, anodation, clatrates, structural anions, structure of anodic films*

## **INFLUENCE OF SYNTHESIS CONDITIONS ON THE PROPERTIES OF CERIUM(IV) OXIDE THIN FILMS**

V.V. Kozik, S.A. Kuznetsova, O.S. Chalipova

*From a film-forming spirit solution on the basis of nitrate of cerium (III) and salicylic acid on silicon substrates films of  $\text{SeO}_2$  are received. Influence of concentration of a solution and thermal processing of a film on its morphology of a surface both some optical and electrophysical properties is shown.*

*Keywords: thin films, film-forming solutions, synthesis ceric oxide (IV)*

## **NATURAL PRODUCTS AND FOOD CHEMISTRY**

### **COMPARATIVE ANALYSIS BY GAS-LIQUID MASS SPECTROMETRY OF VOLATILE COMPONENTS OF PHYTOPREPARATIONS FROM THREE SPECIES OF SWEETVETCH (H. NEGLECTUM, H. THEINUM, H. ALPINUM)**

Y.S. Fedorova, P.V. Kuznetsov, A.S. Sukhih

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*Modern gas chromatography gas liquid chromatography with mass spectrometric detection, the basic components of the volatile active substances of herbal medicines from some types of kopeck (K. forgotten, K. tea, K. alpine).*

*Keywords: gas chromatography-mass spectrometry, plant genus Sweetvetch*

### **TO THE PHENOMENON OF COMPARATIVE STUDY BY HPLC OF SOME TYPES OF BIOLOGICALLY ACTIVE SUBSTANCES IN PHYTOPREPARATIONS OF SWEETVETCH H. NEGLECTUM, H. THEINUM, H. ALPINUM**

Y.S. Fedorova, P.V. Kuznetsov, A.S. Sukhih, K.M. Minaev

E-mail: Suhih\_as@list.ru

*Method of high performance liquid chromatography, the characteristic vegetation types of low-molecular biologically active substances typical of certain types of the genus Sweetvetch.*

*Keywords: high performance liquid chromatography, Sweetvetch*

## **MATHEMATICAL MODEL OF THE MATERIAL LIGNOCELLULOSE ACYLATION ALIPHATIC $\alpha$ -AMINO ACIDS**

A.V. Drofeev, D.D. Efryushin, V.N. Ermolenko, N.A. Chemerys, V.V. Konshin

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*Using the method of full factorial experiment 2<sup>3</sup>, the mathematical model was built for of the process of acylation lignocellulose material system "aliphatic  $\alpha$ -amino acids - thionyl chloride - trifluoroacetic acid. The effect of basic reaction conditions (temperature, time of synthesis, and used  $\alpha$ -amino acid) on some properties of the synthesized materials was investigated.*

*key words: cellulose ester, mathematical model aliphatic amino acid, acylation*

## **INFLUENCE OF CONDITIONS OF BAROTERMICHESKY PROCESSING ON BEHAVIOUR OF THE BASIC COMPONENTS OF STRAW OF WHEAT**

D.V. Shiryayev, N.P. Musko, O.S. Beusheva, O.S. Gurova, M.M. Chemeris

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*In this research are represented by barothermal behavior a pinewood bark research process results. We are studied the influence of pressure and dwell time in the reactor on hydrolytic processes of polysaccharose.*

*Key word: barothermal processing, wheat straw, lignocellulosik material*

## **OPTIMIZATION OF EXPLOSIVE AVTOGIDROLIZA CRUST OF PINE WOOD**

O.S. Beusheva, D.V. Shiryayev, N.P. Musko, M.M. Chemeris

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*In this research are represented by explosive autohydrolysis of a pinewood bark process optimization results. The analysis results show that the mathematical model is determined which provides a way to make a forecast influence of parameters of process of explosive autohydrolysis of a pinewood bark.*

*Key words: explosive avtogidroliz, bark of pine wood, lignocarbhydrate mass*

## **MODIFICATION OF ASPEN WOOD IN ORDER TO OBTAIN THE M- AMINO BENZOATE OF CELLULOSE**

A.V. Protopopov, V.V. Konshin,

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*Researche the process of acylation of aspen wood m-aminobenzoic acid in the presence of trifluoroacetic acid and thionyl chloride. Kinetic regularities of the reaction of acylation of wood m-aminobenzoic acid was study in the presence of thionyl chloride in the medium of trifluoroacetic acid. Researche the thermodynamic parameters of acylation reaction and activation energy of the process.*

*key word: cellulose ester, aromatic amino acid, acilation*

## **RESEARCH SILILIRATION OF THE WASTE OF WOOD OF ASPEN DICHLOREDIMETHYLSILANE**

N.G. Komarova, E.S. Struleva

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*Influence of preliminary processing of wood of an aspen and conditions of chemical modifying (duration and temperature) on a gain of weight and the maintenance of the connected silicon is investigated.*

*Keywords: sililiration, aspen wood, dichloredimethylsilane, siliconorganic connections.*

## **METHYLATION OF CELLULOSE PRODUCED BY NITRATE METHOD**

V.V. Budaeva, V.N. Zolotukhin, N.A. Tomiltseva, A.A. Sevodina

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*The liquid phase synthesis conditions and characteristics of methylcelluloses obtained from pilot samples of cellulose derived from oat fruit coats and Miscanthus are presented herein for the first time.*

## **SORPTION INTERACTION OF OAT WITH WATER**

L.V. Anisimova

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*Hygroscopic properties of oat (whole oat kernel, kernel and hull) were researched. Equation of water vapors sorption isotherm in the form of polynomial of the third power was offered. Oat moisture critical values were received on the basis of sorption isotherms analysis. Key words: oat, grain, hygroscopic properties, sorption isotherm*

## **MISCANTHUS CELLULOSE PROPERTIES**

V.V. Budaeva, R.Yu. Mitrofanov, V.N. Zolotukhin, O.S. Arkhipova

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*The paper reports the results of determination of the chemical composition of the Russian Miscanthus of various ages and those of the study of the dependence of yield and Miscanthus cellulose characteristics upon the plant age and the method of its processing.*

## **METHOD FOR DETERMINING DOCKAGE IN COMPOSITION OF WHEAT GRAIN**

R. Iskrin, V. Luzev

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*A study of grain mass in the presence of impurities using the scanner. A computer program with a database, automating the process of analyzing the dockage.*

## **COMPOSIT MIXES FOR MANUFACTURE OF BREAD WITH THE RAISED MAINTENANCE OF FOOD FIBRES**

S.I. Koneva

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*It is carried out research of an opportunity of increase of food value of bread on the basis of composit mixes. Theoretically also complex influence of components of composit mixes on components carbo-hydratous and albuminous complexes is experimentally studied. Composit mixes are developed for manufacture of bread of the raised food value.*

*Keywords: a composit mix, bakery products, carbo-hydratous complex, albuminous complex, food value.*



## **MILK BEVERAGE WITH BUCKWHEAT FLOUR ADDITION**

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*The possibility of fried buckwheat flour using is studied for expansion of milk beverages range. Buckwheat flour heat treatment conditions are theoretically and experimentally well-grounded and the addition dose of cereal component and milk fat content is determined.*

*Keywords: milk beverage, heat treatment, buckwheat flour, milk, organoleptic characteristics.*

## **EXPANSION OF ASSORTMENT OF THE COMBINED MEAT SEMIFINISHED ITEMS**

M.A. Vajtanis

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*New compoundings of the meat half-finished products enriched by vegetative raw materials are developed. The estimation is functional-technological and organoleptic indicators of the combined mincemeat is spent. Optimum entering into a mincemeat of a vegetative component is established.*

*Keywords: the combined mincemeat, barley and gram chick-pea flour*

## **BREAD OUT OF HIGH FOOD VALUE'S FLOUR**

S.S. Kuzmina, E.P. Mogucheva

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*With the aim of dietary fiber's enrichment, which includes physiologically important components, is worked out a formulation and bread's preparation parameters out of flour of high food value.*

*Key words: bread, dietary fibers, formulation.*

## **ABSORBTIVE ABILITY AND PHYSICOTECHNOLOGICAL PROPERTIES PERSPECTIVE GRADES OF BARLEY OF ALTAY TERRITORY, GROWN UP ON FIELDS WITH HEAVY METALS**

V.S. Iunihina, L.E. Melyoshkina, M.A. Vajtanis, L.I. Kostrova,

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*Accumulation of toxic elements by grain of barley of the various grades which have been grown up on fields with heavy metals is investigated and their physicotechnological properties are studied.*

*Keywords: barley, toxic elements, safety of production*

## **WAY OF PREPARATION OF A BARLEY FLOUR TO USE IN STRUCTURE OF FOOD CONCENTRATES OF DRINKS**

A.B. Snegireva, L.E. Melyoshkina

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*It is carried out research of an opportunity of replacement of starch in structure of food concentrates of kissels on a flour of grain crops. Theoretically also modes of thermal processing of a barley flour for use in structure of food concentrates of drinks are experimentally proved.*

*Keywords: food concentrates, thermal processing, a barley flour, starch, acidity, viscosity*

## **THE BARK OF SIBERIAN LARCH IS NEW RAW MATERIAL FOR BAKING OF BREAD**

A.S. Zakharova, L.A. Kozubaeva, E.P. Mogucheva

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*The possibility of using Siberian Larch's bark as a source of dyhydroguercetin under the production of wheat and wheat-rue sorts of bread is proved.*

*Key words: bread, dark, Larch*

## **ON THE PROBLEM OF JOINT PROCESSING OF EXCESS ACTIVATED SLUDGE AND SOLID WASTE CARBON**

A.G. Ushakov, B.G. Tryasunov, G.B. Ushakov

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*The studies, based on theoretical and practical data marked by the use of residue from the anaerobic digestion of dewatered surplus sludge as a binder for solid propellant granulation method. The kinetics of drying of fermented residue to elucidate the nature of interaction and forms of communication of water and solid particles.*

*Keywords: dehydrated excess activated sludge, drying, drying kinetics, the binder, fermented residue*

## **INVESTIGATION OF MOISTURE MATERIAL TO LEAVE AND COMPOSITION OF PRODUCTS ANAEROBIC WASTE POULTRY**

E.S. Brukhanova

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*To study the effect of raw material moisture on the yield and composition of the products of anaerobic treatment of waste poultry farms specializing in growing turkeys. The optimum moisture content of raw materials to produce the maximum amount of combustible gas.*

*Keywords: anaerobic digestion, biogas, bio-fertilizers, manure turkey*

## **THE POSSIBILITY OF USING MASHED SHADBERRY FRUITS IN THE PRODUCTION OF YOGURT**

O.V. Koltugina

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*The chemical composition of shadberry was analyzed the possibility of using the products of its processing as an ingredient in dairy products.*

*Keywords: shadberry, chemical composition, mashed fruit, yogurt*

## **ECOLOGY**

### **ADDRESSING ENVIRONMENTAL SAFETY ALTAI REGION THROUGH THE SYSTEM ADDITIONAL PROFESSIONAL EDUCATION**

L.A. Kormina, L.F. Komarova, L.N. Beldeeva, I.V. Seselkin

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*The paper discusses the problem of additional vocational training in the field of environmental protection and ecological safety, reviewed existing educational structures operating in the Altai State Technical University named. IIPolzunov at the Regional Training Center (RTC) and the Department of Chemical Technology and Environmental Engineering (HTIE).*

*Keywords: environmental security,*

### **RESEARCHES OF SOFTENING NATURAL WATER WITH USE OF NEW MINERAL SORBENT**

L.V. Kurtukova, V.A. Somin, L.F. Komarova, E.M. Obuhova, E.V. Udalova

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*The paper considers the treatment natural water from ion of calcium and magnesium with use of mineral materials on the basis basaltic fibre, process with acid, and bentonite clay. The static and dynamic parameter of water treatment from ion of calcium and magnesium is defined.*

*Keywords: natural water, hardness ions, basalt fibers*

### **OPTIMIZATION OF PROCESS OF WATER TREATING ON THE NEW SORBENTS WITH THE MATRIX FROM BASALT MICROFIBRES**

V.O. Buravlev, A.V. Panasenko, E.V. Kondratyuk, L.F. Komarova

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*In work researches of hydrodynamics of basalt microfibres and modelling of process of filtering are presented. Comparison of efficiency of water treating from iron and manganese ions on fibrous and granular loadings is spent.*

*Keywords: hydraulic resistance, a filtration, basalt fibres*

### **ALTERNATIVE DECISIONS OF PROBLEMS OF CLEARING OF INDUSTRIAL AND STORM SEWAGE FROM OIL PRODUCTS AND SURFACE-ACTIVE SUBSTANCES**

A.V. Panasenko, E.V. Kondratyuk, L.F. Komarova

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*In work experimental researches of efficiency of water treating from oil products and superficially active substances are presented by a method of pressure head flotation, and also the way of reception nanocomposite a material on technology zol-gel is considered, are investigated him сорбционные and catalytic properties, efficiency of use of the received material in a combination to flotation process is estimated.*

*Keywords: superficially active substances, flotation, zol-gel technology, a fibrous sorbent*

## **APPLICATION OF THE SORBENT ON THE BASIS OF WASTE WOODWORKING PRODUCTION FOR CLEARING OF GALVANIC DRAINS**

A.A. Fogel, V.A. Somin, L.F. Komarova, D.G. Shimonaeva

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*The paper considers the treatment wastewater of the galvanic origin, containing ions of copper, by means of the received sorbent on the basis bentonite clay and waste woodworking production (sawdust). The static and dynamic capacity of a sorbent is defined, the way of its regeneration is studied.*

*Key words: wastewater treatment, electroplating, the copper ions*

## **RELATED FIELDS**

### **SIMULATION AND PREDICTION OF THE PERFORMANCE PARAMETERS OF ENERGETIC CONDENSED SYSTEMS ON THE BASIS OF PHYSICOCHEMICAL PROPERTIES OF ORIGINAL COMPONENTS THAT ARE EXPLOSIVES**

Yu.V. Perederin

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*Properties of a number of energetic condensed systems have been analyzed using a linear regression analysis and neural networks to create a prediction mathematical model capable of approximating the properties under study.*

### **CONSTRUCTION OF SPRINKLER FOR INDUSTRIAL COOLING TOWER**

E.V. Boev, S.P. Ivanov, V.G. Afanasenko, E.A. Nikolaev

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*Observance of temperature condition of any production is carried out through the circulating water systems, equipped more frequent than all by a ventilator and tower cooling tower. The basic element of all types of cooling tower, influencing on efficiency of cooperation of tiny liquid with the ascending current of air and, accordingly, on efficiency of work of cooling tower, is a sprinkler. The construction of polymeric tiny-pellicle sprinkler of cooling tower is described in this article, and also the results of researches of this attachment construction are presented.*

*Keywords: circulating water-supply, evaporated cooling, cooler, liquid, attachment, sprinkler*

### **DEVELOPMENT OF MODEL OF OPTIMAL DISTRIBUTION OF INVESTMENTS IN DEVELOPMENT FIBERGLASS PRODUCTION IN BIYSK**

N.V. Morozova

*In this paper, we propose to evaluate the prospects of investment in the production of fiberglass products in the science city of Biisk.*

*Key words: investment, fiberglass, Science City*

### **COMPLEX INVESTIGATION OF ACOUSTIC COAGULATION OF FINE AEROSOL**

V.N. Khmelev, A.V. Shalunov, K.V. Shalunova, R.N. Golykh

*The article demonstrates the results of research of the acoustic coagulation, including theoretical analysis of the process and experimental research of its effectiveness. The obtained results revealed*

*that for the fine aerosols must take into account viscosity of gas medium, causing an increase in optimum frequency of exposure up to ultrasonic range (20 kHz) at sound pressure level, not less than 130 dB. It was shown that the practical application of developed equipment, which provides an ultrasonic influence at frequency of 27 kHz with level of acoustic pressure up to 150 dB, allows reducing the time of smoke destruction up to by 10 times, liquid aerosol up to by 11,5 times.*

*Key words: acoustic influence, aerosol, coagulation*

## **ULTRASONIC CAVITATION OF THE SUSPENSIONS DETONATION NANO-DIAMONDS**

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*Is studied the action of ultrasonic cavitation on the suspension of detonation nanodiamonds. The results of the microscopic, thermal and X-ray diffraction analysis of models are given.*

*The keywords: ultrasonic cavitation, detonation nanodiamonds, lonsdaleite, electron microscopy, thermal analysis, synchrotron radiation.*

## **THE RESEARCH OF ULTRASOUND CAVITATION IN WATER**

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*The article demonstrates the results of research of the ultrasound cavitation which obtained in chamber of the Acoustic Cavitation Emitter with Wide Specter.*

*Keywords: cavitation cluster , wide specter ultrasound, fluid*

## **DEVELOPMENT HIGH-FREQUENCY ULTRASONIC OSCILLATORY SYSTEMS FOR FINE-DISPERSED OF LIQUID**

V.N. Khmelev, A.V. Shalunov, M.V. Khmelev, S.S. Khmelev, D.V. Genne, R.V. Barsukov, A.V. Shalunova

*In this article the design developed by the ultrasonic vibration system allowing for an increase in radiating surface area to increase productivity dispersion, to increase the reliability of the system, to ensure its optimal performance when load changes and to allow for spraying viscous liquids. As a result, research staff provided by the operating frequency of the oscillatory system of 180 kHz spraying water with a capacity of up to 0,8 ml / s and an average diameter of droplets generated by 13 microns, and the spraying of viscous fluid (18 cSt) with a capacity of up to 0,25 ml / s and average diameter of droplets generated by 18 microns. Created equipment will significantly improve the classical processes associated with the spraying of liquid media, and will ensure the receipt of new materials.*

*Keywords: spraying, ultrasonic vibrating system, liquid*

## **IMPROVING THE EFFICIENCY OF ULTRASONIC CAVITATION TREATMENT OF VISCOUS AND DISPERSED LIQUID MEDIA**

V.N. Khmelev, S.S. Khmelev, R.N. Golikh, R.V. Barsukov

*The article is devoted to solving problems arising in the ultrasonic processing of liquid media with high attenuation of ultrasonic vibrations. Identified shortcomings of the existing ultrasonic equipment and offer new approaches to the implementation process of ultrasonic cavitation treatment of viscous medium that would allow the production processes can not be realized under normal conditions without ultrasound exposure.*

*Key words: ultrasound, cavitation, viscous liquid, the intensity.*

## **EXPERIMENTAL AND COMPUTER RESEARCH OF PERSPECTIVE PHYSICAL PROCESS BATCHWISE VIBRATING DISPERGATION OF LIQUIDS FOR TECHNOLOGIES GRANULATION FROM FUSIONS**

G.V. Leonov, R.G. Leonov, V.N. Hmelev

*On the basis of computer modelling of thermal processes at granulation from fusions at direct contact with coolant quality influence dispergation on characteristics resources consumption is studied. results of modelling researches (computer and natural) allow to recommend the offered method batchwise vibrating dispergation fusions to application in technological practice granulation as most perfect of possibilities of quality management of a product known in respect of maintenance and optimisation of resource expenses.*

*Keywords: batchwise vibrating dispergation, granulation from fusions, granulation a column, a drop, computer modelling.*

## **COOPERATION OF CHEMICO-TECHNOLOGICAL FACULTY KUZSTU WITH THE ENTERPRISES OF THE CHEMICAL COMPLEX**

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*Formation of a personnel reserve - one of the important strategic problems of maintenance of system of continuity of generations of technical shots at the chemical enterprises. Investments into personnel development are serious non-material motivation for employees and "fix" them in the company. The personnel reserve cuts down expenses on selection of new workers and finally promotes formation of a command of highly skilled professionals. Since 2009 the himiko-technological faculty of the Kuzbass state technical university works under the program of preparation of a personnel reserve for the branch enterprises. The initiative is directed on revealing of the capable students focused on development, disclosing of their personal potential, granting to them possibility for training and career growth.*

*Keywords: chemical technology, faculty, a professional training, practice, a target set, a personnel reserve.*

## **STUDY OF INTERACTION OF SIMPLE MOLECULES WITH POROUS SURFACE OF SOLID BASED ON MEDIUM ANISOTROPY**

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*From a microscopic point of view of a real crystal surface is uneven, which leads to a significant degree of anisotropy of the intermolecular interaction potential. In physical adsorption in the surface layers of the solid nature of the intermolecular interaction changes significantly compared to the conditions of a homogeneous environment. The interaction of simple molecules with a solid surface involving the potential of electrostatic interaction.*

*Keywords: porous surface, physical adsorption, electrostatic interaction potential*

## **INFLUENCE OF METALS OXIDES ON RED PHOSPHORUS OXIDATION**

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*The activity series of metal oxides on the oxidation of amorphous red phosphorus was found. Electronic mechanisms of oxidation and models of electron transitions on contact red phosphorus – metals oxides were suggested and discussed.*