

INFORMATICS, COMPUTER ENGINEERING AND CONTROL

Ermolaev V.I., Potapychov S.N., Ivakin Ya.A.

GEOINFORMATION SUPPORT FOR THE MANAGEMENT OF THE MARINE DISTRIBUTED OBSERVING SYSTEM

Based on the model of multilevel information processing, the main methods of geoinformation support for the management of a marine distributed observation system are considered.

Keywords: *geospatial data, multilevel information processing, intelligent geographic information system.*

Demidov A.V., Rozhkov N.N., Orlova N.A.

ANALYSIS OF MONITORING DATA OF HIGHER EDUCATIONAL INSTITUTIONS OF ST. PETERSBURG FOR 2014-2015 BY METHODS OF MULTI-DIMENSIONAL STATISTICS

Monitoring data from 2014 and 2015 a number of universities in St. Petersburg were investigated using correlation analysis and the method of principal components. Statistically significant correlations were established between individual monitoring indicators. The most informative linear combinations of indicators have been constructed, which make it possible to rank universities in order to further build their ratings.

Keywords: *monitoring, principal component analysis*

E.V. Elaev

ABOUT THE METHOD OF CREATING BEHAVIORAL MODELS OF DIGITAL OBJECTS OF TEST CONTROL

The paper discusses a methodology for constructing a test program using CAD "SimTest". Two methods are proposed for the formation of software models of digital devices in the context of testing tasks.

Keywords: *test control, simulation, automated test design system, software model of digital devices*

CHEMICAL SCIENCES

Adamenko N.A., Agafonova G.V., Drobot L.Yu.

STRUCTURAL CHANGES IN POLYARYLATEFLUOROPLASTIC COMPOSITE DURING SHOCK-WAVE TREATMENT

In this work, studies of structural changes during shock-wave treatment of a polytetrafluoroethylene composition with 30% polyarylate in an ampoule have been carried out. The intensity of the action was varied by changing the initial porosity of the composite polymer mixture, which made it possible to obtain a material with different structural ordering.

Keywords: *polyarylate, polytetrafluoroethylene, structural heterogeneity, structure.*

Akim E.L., Simonova A.N.

CREATION OF CATION-EXCHANGE MATERIALS BASED ON CELLULOSE USED FOR SORPTION OF AMMONIA AND HEAVY METALS

The process of acid-catalytic treatment of wood cellulose has been carried out, which makes it possible to obtain effective sorbents. The work reflects the basic principles of creating cation exchangers from cellulose; data on the yield and exchange capacity, as well as the results of sorption of ammonia vapors and lead cations by the obtained ion exchangers are presented.

Keywords: *cellulose, sulfuric acid, cation exchangers, yield, exchange capacity, acid groups, sorption, ammonia, heavy metals.*

Burinsky S.V.

THERMO- AND FIRE-RESISTANT FIBROUS MATERIALS

Methods for obtaining the main types of organic thermo and fire resistant fibers are considered: steam and meta-aramid, para-aramid with heterocycles, steam, meta-aramid, polyimide, amido-imide and other types of fibers of domestic and foreign production, data on their strength, elastic, thermal, hygroscopic properties are given. , the action of active media and open flames. The assortment and properties of new high-strength and high-modulus heat-resistant threads Ruslan, Artek and AuTx, which are in high demand not only in Russia, but also abroad, are characterized.

Keywords: fibers, fibrous materials, heat resistance, fire resistance

Burinsky S.V., Tsybuk I.O., Antonova E.A.

PAPERS FOR TECHNICAL PURPOSE BASED ON HEAT RESISTANT FIBER

The article analyzes information on technical papers based on heat-resistant synthetic fibers. Various ways of obtaining papers are considered. The properties of the obtained samples of heat-resistant papers are given. The process of obtaining papers based on heat-resistant polyoxadiazole fiber is described. Some properties of the obtained papers are investigated.

Keywords: heat-resistant fibers, heat-resistant papers

Byrkina T.S., Oltarzhevskaya N.D., Kolaeva A.V.

METHODS FOR STABILIZING MICROBIOLOGICAL AND RHEOLOGICAL INDICATORS OF THE "KOEDEL" TREATMENT COMPOSITION

The article describes methodological approaches to increasing the shelf life of a hydrogel composition based on sodium alginate with medicinal substances impregnated in it from the standpoint of both the microbiological characteristics of this medicinal material and the rheological properties, rate and degree of release of medicinal substances into the external environment. The data on the change in the viscosity of the alginate hydrogel composition and the desorption of medicinal substances from it, depending on the content of additional polyvinyl alcohol of various molecular weights in this composition, are presented, and an experimental justification for the introduction of potassium sorbate into the composition as a preservative is given.

Keywords: sodium alginate, extended shelf life, hydrogel, polyvinyl alcohol, preservative, sterility, potassium sorbate

Vasiliev M.P., Alekseeva G.A.

OBTAINING AND RESEARCH OF COLLAGEN MATERIALS FOR OPHTHALMOLOGY

To obtain occluders, dry collagen preparations with a solubility of 99% were selected. The conditions for obtaining ophthalmic occluders from collagen solutions in an acetone precipitation bath have been determined. The resistance of occluders to the action of biological media after modification with the antimicrobial drug p - 5-nitro-furyl - 2 - acrolein was studied. Preliminary medical testing with a positive result has been carried out.

Keywords: collagen, monofilament, occluder, ophthalmology, collagen drainage.

Vlasov P.P., Alexandrova L.Yu.

STUDY OF METHODS FOR REAGENT REDUCTION OF SODIUM CHLORIDE SOLUTIONS DURING REGENERATION OF CATIONITE FILTERS

Methods for the reagent recovery of spent regeneration solutions of sodium chloride containing calcium and magnesium chlorides with the introduction of various doses of reagents: Ca (OH) 2, Na2SO4, NaOH are analyzed. The resulting suspensions were subjected to electric heating or treatment with microwave radiation (power 10CH800 W) to a temperature of 95 ° C, after which the solution was softened with barium carbonate. Finally, the liquid phase contained practically no hardness salts.

Keywords: solution hardness and alkalinity, regeneration solution, sodium hydroxide and

sulphate, barium carbonate.

Vlasov P.P., Gorbunova E.A.

MOBILITY OF HEAVY METALS IN THE BOTTOM LAYER OF THE GULF OF FINLAND

The general regularities of the mobility of heavy metals in bottom water and bottom sediments, depending on pH, have been established. Correlation analysis of the mobility of Cd²⁺, Pb²⁺ and Zn²⁺ cations in bottom waters and bottom sediments, depending on the pH of the medium and their total content, has been carried out. The distribution coefficient of Cd²⁺, Pb²⁺ and Zn²⁺ in the heterogeneous system of bottom water - bottom sediments has been determined.

Keywords: bottom sediments, interphase distribution, stripping voltammetry.

Gafurova D.R., Krichevsky G.E.

OBTAINING THERAPEUTIC DEPOT MATERIALS BASED ON BIOPOLYMERS WITH SILVER NANOPARTICLES

The paper considers methods of obtaining silver nanoparticles and antimicrobial compositions based on them for subsequent use in medicine, and presents the positive characteristics of the obtained compositions.

Keywords: silver nanoparticles, antimicrobial properties, biopolymers, sodium alginate.

Zhukovsky V.A., Edomina N.A., Semelkin A.V., Anushchenko T.Yu.

DEVELOPMENT OF THE "ARTIFICIAL AGING" METHOD FOR ESTIMATING THE RELIABILITY OF A POLYGLYCOLIDE-BASED DISSOLUBLE SUTURE

A technique for artificial aging of absorbable suture material based on polyglycolide has been developed, which makes it possible to determine the reliability of the material throughout the entire shelf life. The thermal destruction of surgical threads was studied by changing their strength properties.

Keywords: polyglycolide, absorbable threads, material reliability, polymer aging, thermal destruction.

Zenitova L.A., Ershov I.P.

DEVELOPMENT OF MATERIAL FILLED WITH PLASMA-MODIFIED FIBERGLASS FOR PRODUCTION OF NEW GENERATION MEDICAL PRODUCTS

The requirements for raw materials for the production of medical products are considered. It is proposed to use glass fiber as a filler for a polymer composite material to obtain the required properties. The influence of plasmomodification of glass fiber on its strength properties and the state of the lubricant has been studied.

Keywords: fiberglass, plasma treatment, composite material, medical instrument, medical products.

Kuznetsov A.G., Makhotina L.G., Vechur V.V.

STUDYING THE POSSIBILITY OF USING SECONDARY RAW MATERIALS OBTAINED BY PROCESSING PACKAGING TETRA PACK

In this work, the study of the possibility of using recycled fiber obtained from a package of the "tetra pack" type was carried out. The physical and mechanical properties of recycled fiber from a package of the "tetra-pack" type have been determined. The study showed that recycled fiber from a package of the "tetra-pack" type can be a potential raw material for the production of packaging types of cellulose-composite materials in a composition with virgin fiber.

Keywords: recycled fiber cardboard, tetra pak, recycled fiber, cardboard, tetra pak.

Kuznetsov A.Yu., Vasiliev M.P.

STUDY OF THE STRUCTURE AND PROPERTIES OF PLASTIC COMPOSITIONS OF SUPER-HIGH-MOLECULAR POLYETHYLENE

The structural and mechanical properties of UHMWPE solutions in paraffin have been studied in a wide range of shear stresses. The effect of nanofillers of aluminosilicates and magnetic nanoparticles on the nature of the flow of UHMWPE solutions is shown.

Keywords: ultra-high molecular weight polyethylene, paraffin wax, rheology, aluminosilicates and magnetic nanofillers.

Kurinova M.A., Skibina D., Galbraikh L.S.

RESEARCH OF THE PROCESS OF FORMATION OF CHLORINE THREADS MODIFIED BY BIOLOGICALLY ACTIVE SUBSTANCE - BETULINE

The rheological characteristics of solutions of a copolymer of vinyl chloride and vinylidene chloride (CPVC) containing a biologically active substance (BAS) have been investigated. It has been shown that in more concentrated (in terms of betulin) CPVC solutions, the associates of macromolecules are stronger and their destruction begins at higher rates. The conclusion is made about the influence of the introduction of a biologically active substance on the structure of the molding solution. The optimal composition of the molding bath for forming betulin-containing threads has been determined.

Keywords: cpvc, biologically active substance, phase diagrams, rheology, activation energy, coagulation molding.

Lysenko A.A., Astashkina O.V., Fedorova Yu.E.

DESORPTION OF BISMUTH IONS FROM THE STRUCTURE OF ACTIVATED CARBON FIBERS

The article is devoted to the study of the processes of adsorption and desorption of bismuth ions from the surface of activated carbon fibers. The dependences of the desorption process on its duration and temperature are given.

Keywords: adsorption, desorption, bismuth, nanoparticles, carbon activated fibers.

Makhotina L.G., Ivanova V.N., Karpov I.A.

ANALYSIS OF THE ABILITY OF TECHNICAL CELLULOSES FOR PROCESSING INTO MICROCRYSTALLINE AND NANOCELLULOSE

The main types of fibrous raw materials for the production of microcrystalline cellulose (MCC) and nanocellulose (NC) are cellulose for chemical processing and cotton cellulose. The article discusses methods for obtaining MCC, NC from technical celluloses: bleached sulphate softwood and bleached sulphate hardwood cellulose. The analysis of the influence of HMF treatment methods on the characteristics of the obtained cellulose preparations was carried out by determining the morphological characteristics and chemical properties of the samples.

Keywords: nanocellulose, microcrystalline cellulose, technical cellulose.

Mostovoy A.S., Panova L.G., Kurbatova E.A.

DIRECTED REGULATION OF THE STRUCTURE AND PROPERTIES OF EPOXY COMPOSITES

As a result of the studies carried out, it was found that the organization of chemical interaction at the filler-binder interface, due to the treatment of the filler surface of the epoxy composition (brick dust) with a silane sizing agent and the use of ultrasonic treatment of the composition, leads to an increase in the physical and mechanical properties of the epoxy composite: it increases 2-3 times breaking stress and modulus of elasticity in bending, especially a significant (2.5 times) increase in shock resistance even at 50% degree of filling should be noted. With the introduction of modified brick dust into the epoxy composite, the heat resistance increases and the material passes into the class of

hardly combustible.

Keywords: epoxy resin, modification, filler, brick dust, ultrasonic action, finishing, physicochemical and mechanical properties.

Ogorodnikov V.A., Shcherbina L.A., Chikunskaya V.M.

STUDY OF ION-EXCHANGE PROPERTIES OF POLYMERIC SORBENTS BASED ON FIBER-FORMING COPOLYMERS OF ACRYLONITRILE AND 2-ACRYLAMIDE-2-METHYLPROPANESULPHOIC ACID

The paper considers the ion-exchange properties of granular and fibrous ion-exchange materials obtained on the basis of fiber-forming copolymers of acrylonitrile (AN) and 2-acrylamide-2-methylpropane sulfonic acid (AMPS). It was found that the behavior of sorbents based on poly [AN - co - AMPS] is not typical for ion exchangers containing sulfo groups. Using the sorption of zinc ions as an example, the possibility of superequivalent sorption is shown. An assumption was made about the possibility of binding zinc ions with nitrogen-containing polymer groups by the mechanism of complexation.

Keywords: acrylonitrile, 2-acrylamide-2-methylpropanesulfonic acid, copolymers, ion exchangers, sorption.

Redina L.V., Goreslavets E.Yu.

OBTAINING NEW TYPES OF FLUOROPOLYMER LATEX

A new method for producing polyfluoroalkyl acrylate latexes for modification of the surface of chemical fibers is considered. The effect of the amount of fluorine-containing surfactant and ultrasonic treatment on the stability and particle size of the resulting dispersions was investigated. It has been shown that nanodispersed polyfluoroalkyl acrylate latex imparts ultrahydrophobic and oleophobic properties to fibrous materials.

Keywords: nanoparticles, fluoropolymers.

V.N. Studentsov, V.V. Martsenyuk

DEVELOPMENT OF POLYMER ELECTRET TECHNOLOGY FOR MICROPHONES BASED ON REACTOPLAST

A technology for obtaining new electret long-life membranes based on thermosetting compositions has been proposed. The advantages of the new membranes: high stability of surface charges and higher quality of the recorded sound.

Keywords: thermosetting resins, thermosetting plastic, binder, filler, electrets, physical modification, microphone.

Yakovlev N.A., Plakunova E.V., Panova L.G., Zakharova E.V.

NEW EPOXY COMPOSITIONS BASED ON SODIUM SILICON AND AMMONIUM POLYPHOSPHATE

In this work, the processes of interaction of a low-molecular polyamide resin of the PO-ZOO brand with an epoxy composition filled with a complex of fillers have been investigated. The properties of the epoxy compound cured with TETA have been determined. Also, the recipe mixture and its influence on a number of properties of the investigated epoxy compound were determined. The properties of fillers NKF and APP-2 have been investigated. The effect on the compositions of ultrasonic action and temperature rise during curing has been studied.

Keywords: activation, flammability, filler, sodium fluorosilicate, low molecular weight polyamide, ammonium polyphosphate, functional groups, physical and mechanical properties, epoxy resin.