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NANOSTRUCTURAL COMPOSITE MATERIALS BASED ON SULPHATE CELLULOSE FIBRES FOR DIFFUSER PRODUCTION

This paper presents results of the crystalline structure, morphology and physical-mechanical properties investigation of diffusers based on composite materials from unbleached sulphate cellulose fibres with microfibrillar and nanofibrillar bacterial cellulose additives. It is found, that introduction of additives lead to changes in morphological parameters and the enhancement of the physical-mechanical characteristics of diffusers.

Keywords: sulfate pulp fibers, composites, diffusers, microfibrillar and nanofibrillar bacterial cellulose, structure, morphology, mechanical properties

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STUDYING PHOTOPOLYMERIZATION OF METHACRYLATE AND PROPERTIES OF MATERIAL CONTAINING TITANIUM DIOXIDE NANOPARTICLES

In the presence of titanium dioxide nano-size particles, photopolymerization of the methacrylate monomers has a higher rate and conversion level. It is shown that the copolymer with hydrophobic surface containing nanoparticles titanium dioxide has reversible hydrophilic properties under UV-light. The surface after «dark» period becomes hydrophobic again.

Keywords: nano-titanium dioxide, photopolymerization, hydrophobicity, hydrophilicity, polymer-inorganic nanocomposite

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MATHEMATICAL MODEL OF THE GETEROKOAGULATION DYEING BY NANOPARTICLES ANILINE OXIDATION

The mathematical model of geterokoagulatsion dyeing by nanoparticles aniline oxidation in acidic medium with hydrogen peroxide with used as a catalyst ferrous sulfate (Fenton reaction) «in the cold». Defined concentrations of components dyebath for maximum intensity of coloring and strength friction.

Keywords: Heterocoagulation, Fenton reaction, nanoparticles, oxidation of aniline, a mathematical model

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INFLUENCE EXPLOSIVE TREATMENT ON THERMOPHYSICAL PROPERTIES OF POLYTETRAFLUOROETHYLENE

The research results of structure and thermal properties of polytetrafluoroethylene (PTFE) subjected with explosive treatment (ET) at loading in a cylindrical ampoule scheme with sector charges. Established that ET sectoral charges alters the structure — the appearance of dense formations and loosening fibrillar structures. Also there is a general increase in thermophysical characteristics of the sample after the ET.

Keywords: explosive treatment, polytetrafluoroethylene, structure, thermophysical properties

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**COMPOSITE SURGICAL
ENDOPROSTHESES WITH
ANTIADHESION PROPERTIES**

Composite endoprostheses with antiadhesion membrane on the basis of carboxymethylcellulose has been developed. Influence of modes of forming and heat treatment has been defined.

Keywords: composite, adhesive illness, endoprosthesis, carboxymethylcellulose, heat treatment, degree of swelling

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**COPOLYMERIZATION OF
METHYLMETHACRYLATE-
METHACRYLIC ACID IN THE
PRESENCE OF RHODAMINE 6G AND
TIOUREIDOTIAZOLS**

The effect of 2-(3-phenylthioureido) — 4-methoxycarbonyl-5-phenyl-thiazole and 2-allylamino-4-methoxycarbonyl-5-phenyl-thiazole on kinetics the block radical copolymerization of methylmethacrylate-methacrylic acid dyed rhodamine 6G was studied. The spectral characteristics of the obtained copolymers were investigated. An inhibitory effect of tioureidotiazols on copolymerization was found which is compensated by their stabilizing influence in relation to the dye.

Keywords: rhodamine 6G, organic glass, methylmethacrylate, methacrylic acid, modification, tioureidotiazols, copolymerization, the absorption spectrum

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FUNCTIONAL POLYURETHANE COATINGS OF UV-CURED

This article devoted compositions double UV-curing with different ratio of components. Also the influence of silane on the final properties of coatings and experimental data are presented.

Keywords: dual UV-curing, urethane acrylate, modification, organoalkoxysilanes.

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STUDYING OF TECHNOLOGY OF RECEIVING FILMS ON THE BASIS OF POLYURETHANE POLYMERS FOR THE PIGMENTARY PRESS

In article the analysis of efficiency of polyurethane water dispersions application in the pigmentary print is carried out, results of use of the domestic polymers, showing properties film-forming binding are considered, ways of improvement of compoundings of pigmentary printing compositions on their basis are investigated.

Keywords: water dispersions, polyurethane, polymeric films, pigmentary press, dry friction

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POLYAMIDE-6, MODIFIED OXIDIZED GRAPHITE: SYNTHESIS, STRUCTURAL FEATURES AND PROPERTIES

In this paper, we identifies the parameters of synthesis and composition of polyamide-6, modified oxidized graphite. Study the structural characteristics and properties of the developed materials. The expediency of using the oxidized graphite for modification of polyamide matrix, thus enhancing the frictional and thermal properties of the obtained composites based on polyamide-6.

Keywords: Polyamide-6, polymerisation filling, modification, oxidized graphite, physico-mechanical and functional properties

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USING LOCAL PH MONITORING METHOD TO EXPLORE THE PROCESS OF MODIFIED OLIGOMERS ELECTROCOATING

Explored the process of water diluting oligomers electrocoating using local pH monitoring method. Found that adding modifiers does not change colloid nature of oligomer water solution but affects electrocoating parameters and polymer coating properties.

Keywords: Paint-and-lacquer coatings; electrocoating; modification; pH monitoring

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ELECTROCONDUCTIVE FIBER MATERIALS, OBTAINING WITH USING OF NANOTECHNOLOGY

We present a new type of electrically conductive fibrous materials using dyeing mechanism of geterocoagulation within nanotechnology, in which particles of polyaniline fiber sorption carried out nanosystems. Experimentally determined the influence of the synthesis conditions on the properties of polyaniline nanoparticles obtained conductive fibrous material.

Keywords: polyaniline, nanosystems, nanoparticles, mechanism of geterocoagulation, fiber materials, process of dyeing

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FIREPROOF POLYMER MATRIX COMPOSITES BASED ON EPOXY RESIN AND CARBON FIBER

Developed epoxy compounds, characterized high complex of physical-mechanical and physical-chemical properties, providing production of plastics with high mechanical properties. The influence of the plasticizers of polyfunctional action on the processes in the pyrolysis and combustion of epoxy polymer and strength properties were proved. Possibility to purposefully regulate the properties of the epoxy polymers and carbon composites, changing their recipe composition, reinforcement schemes were proved.

Keywords: epoxy oligomers, curing agents, fillers, structure formation, methods of combustibility reduction, properties

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**THE PHOTOPOLYMERIZABLE
COMPOSITIONS FOR A RAPID
PROTOTYPING**

The article is devoted to the development of innovative materials for 3D prototyping processes (rapid prototyping), in particular — photopolymers for professional 3D printers working on the technology of stereolithography (SLA-process).

Keywords: photopolymerizable composition, rapid prototyping

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**THE PROBLEM OF SELECTION OF 'IONIC
SOLVENT — PRECIPITANT' SYSTEMS
FOR PROCESSES OPTIMIZATION
OF PREPARATION BIOPOLYMER-
BASED FILM AND NANOCOMPOSITE
MATERIALS**

Experimental data showing the strength, structure and mobility of solvate complexes for ionic solvents in water, monoatomic and polyatomic alcohols. The obtained results can be useful in the selection of precipitation bath for forming of polymer materials from solutions in ionic solvents.

Keywords: ionic liquids, precipitant, biopolymers, electrical conductivity, calorimetry

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**M. A. Salyahova, I. Sh. Abdullin,
I. P. Karaseva, E. N. Puhacheva,
V. V. Uvaev**Kazan National Research Technological University
Kazan Chemical Research Institute**RESEARCH OF PHOTOCATALYTIC ACTIVITY OF THE
FILTER-SORBENT MATERIAL**

In this article photocatalytic activity of the filter-sorbent material is studied. High photocatalytic activity of the filter-sorbent material is shown. The possibility of decontamination of contaminated high-toxic organic compound on the

■ summary

material, containing a titan-silicate complex wherein UV irradiation without use of special degassing solutions is studied.

Keywords: nano-sized titanium dioxide, photocatalytic activity, decontamination

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INFLUENCE OF THE REGIME AND SOLUTION FOR FORMATION OF COLOUR ON ALUMINUM OXIDE NANO

A study on the influence of unsteady regime of oxide nanostructures on aluminum. Established that the presence of cations and duration of the cathodic pulse influence on the formation of nanostructures

Keywords: aluminum, colored oxide nanostructures, non-stationary mode

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RECEIVING COLLOIDAL- GRAPHITE COMPOSITIONS MECHANO-ELECTROCHEMICAL METHODS

Experimentally demonstrated by example of graphite-sulfuric acid possibility obtaining colloidal -graphite products with high film-forming ability and electrical intercalation dispersed graphite followed by mechano-anodic treatment

Keywords: colloidal- graphite preparations, the anodic intercalation, mechano-electrochemical processing, properties of carbon films

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SURFACE MODIFICATION OF CARBON MATRIX TO FORM A COPPER COATING

The influence of surface treatment of carbon material in solution activation of copper on structure and porosity of the coating. It is established that the application of a chemical process, copper substrate allows producing high quality shiny copper coating having a homogeneous structure of the surface.

Keywords: metallization, carbon material, surface preparation

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THE DIE ANGULAR VELOCITY DETERMINATION IN PULTRUSION OF A COMPOSITE ANISOTROPIC ROD

Obtaining equation for the die angular velocity in pultrusion of a composite anisotropic rod is presented in this paper. Anisotropic pultruded rods can be manufactured using a special technology complex, developed by the authors. The equations of structural mechanics were used, as well as specific approach to determine the shear modulus of the heterogeneous Fiber/Resin System. As result of this, equations for fiber orientation angle of a composite anisotropic solid rod with a circular cross section and angular velocity of the die were obtained. The results will be applied to die design.

Keywords: pultrusion, composite material, rotating die, anisotropic rod, pit-prop anchor

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ELECTROLYSIS NITRIC ACID SPENT SOLUTIONS FOR THE ANODIC PRODUCING CARBON NANOSTRUCTURES AND CATHODIC RECOVERY OF COPPER

Shown to be applicable nitrate-containing spent solutions etching for the anodic synthesis of graphite intercalation compounds with lower temperature thermal expansion. Investigated cathodic process in these electrolytes in order to create complex technology of reception of oxidized graphite and simultaneous metal extraction.

Keywords: thermally expanded graphite, intumescent compound graphite intercalation compounds of graphite, anodic nanostructuring of graphite

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THE PHOTOPOLYMERIZABLE COMPOSITION FOR RELIEF-PHASE DIFFRACTIVE OPTICAL ELEMENTS

This paper presents the results of a study of photopolymerizable compositions for making replicas of diffractive optical elements. Also provides comparison of compositions based on polyester acrylates with photopolymer OKM-2, used in the production.

Keywords: photopolymerizable composition, oligomers, diffractive optical elements, UV-curing, holographic diffraction grating

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DYE ADSORPTION ON THE PARTICLES OF THE PHOTOCATALYST TITANIUM DIOXIDE

The article describes some aspects of the adsorption of various dyes on the surface of the photocatalyst particles of titanium dioxide. Was shown the influence on the dye adsorption amount of time and solution pH.

Keywords: titanium dioxide adsorption dyes photocatalysis

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STRUCTURE AND PROPERTIES OF HEAT-TREATED POLYOXADIAZOLE FIBERS

The analysis of the mechanical properties of heat-treated fiber Arselon C. Proved, that in the process of additional heat treatment at temperatures 420–465 °C, probably happen acid thermolysis that deplete the polymer structure, together with the process of formation of intermolecular interactions on the radical mechanism that reduces elasticity.

ty. The data obtained allow us to estimate the temperature range for thermal processing in the production process.

Keywords: polyoxsadiazol, heat treatment, mechanical properties, breaking load, coefficient of elasticity, creep

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MODIFIED POLYOXSADIAZOLE FIBERS OF REDUCED FLAMMABILITY

The article describes the background selection additives flame retardants for heat-resistant polymers, in particular to modify polyoxadiazole fibers. Shown that supplementation does not reduce the physical and mechanical properties, heat resistance, and can improve the oxygen index of the materials received.

Keywords: heat-resistant fiber, polyoxsadiazole, flame retardants, oxygen index, phthalocyanine

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DEVELOPMENT AND INVESTIGATION OF ORGANOPLASTICS BASED PHENYLON C-1 FIBER-REINFORCED T-SULFONE

The physico-mechanical, tribological and thermomechanical properties of aromatic polyamide phenylene C-1 fiber-reinforced T-sulfone. The optimum fiber content for the introduction of new materials in industrial production.

Keywords: organoplastics organic fiber, aromatic polyamide, glassy, rubbery, viscous-fluid state

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A. A. Burinskaia, A. V. Polianskii

Saint-Petersburg State University of Technology and Design RECEIVING OF SILVER NANOPARTICLES ON POLYMERIC MATERIALS FOR MEDICAL APPOINTMENT

The method of reduction of ions of silver was applied to receive nanoparticles of silver on a surface of polymeric materials and in water solution from silver nitrate with use of glucose, sucrose and sodium citrate. Using the method of dynamic light scattering and scanning electronic microscopy the sizes and distribution of the received particles of silver in solution and on a surface of polymeric materials are established.

Keywords: nanoparticles, silver, silver nitrate, reduction

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**S. V. Burinskii, N. A. Sharashova,
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Saint-Petersburg State University of Technology and Design CARBON-CARBON PRECURSORS FOR GAS DIFFUSION LAYER PRODUCTION

Dependence of carbonized and graphitized rayon fibers length, as well as the of PVA binder fibers length on the carbon paper properties with an initial surface density of 120 g/m² after hardening curable phenol-formaldehyde resin, carbonization and graphitization by transformation into carbon-carbon precursor for gas diffusion layers production is investigated.

Keywords: carbon paper, carbonized and graphitized fibers, PVA fibers, phenol-formaldehyde precondensate, surface density, толщина, volume resistivity

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HYDROPHOBIZED CARBON-CARBON PRECURSORS FOR FUEL CELLS GAS DIFFUSION LAYERS

The properties of carbon-carbon composites with a carbon paper filler based on rayon fibers after carbonization, graphitization and hydrophobization are investigated. It is shown that obtained composites are not inferior to foreign analogues and can be used as fuel cell gas diffusion electrodes for hydrogen energy.

Keywords: fuel cell, gas diffusion layers, carbon-carbon composite, graphitization, hydrophobisation, porosity, electrical resistivity, contact angle, air permeability

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SORPTION-ACTIVE MATERIALS FOR OIL PRODUCTS FROM WATER SURFACE REMOVING

The paper discusses methods of obtaining sorption-active composites for the removal of oil and oil products, the properties of composite sorbents, absorption of oil from the water surface and the water-repellent impregnation influence on the sorption of oil.

Keywords: oil removal, thermally expanded graphite intercalated graphite, porous sorbent

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**Y. O. Perminov, E. S. Sveshnikova,
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POROUS CARBON-CARBON COMPOSITES FOR HEAT INSULATION

The article considers the main carbon materials used for heat insulation in furnaces of resistance, given characteristics such as density and heat conductivity, shows a general scheme production of heat insulation, study the influence of porosity and density by coefficient of heat conductivity of the samples carbon-carbon composites.

Keywords: heat insulation, carbon-carbon composites, coefficient of heat conductivity, electric resistance furnaces

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CARBON MATERIALS, MODIFIED BY BISMUTH NANO- AND MICROPARTICLES

The article describes the process modification of activated carbon fibers and thermo-extended graphite of nano- and microparticles by bismuth. The analysis of the properties of activated carbon fibers and thermo-extended graphite before and after modification of bismuth were investigated.

Keywords: adsorption, activated carbon fibers, bismuth, thermo-extended graphite

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**N. V. Rusova, O. V. Astashkina,
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INVESTIGATION OF SORPTION KINETICS OF IRON IONS BY CARBON SORBENTS

Article presents the results of iron ions sorption from ferric alum solutions by different types of carbon sorbents. Effect of contact time, sorbent concentration and pH was studied.

The obtained results have been compared and the expe-diency of using activated carbon fiber materials for thin wa-ter purification from the iron ions was shown.

Keywords: an activated carbon fiber, activated carbon adsorption, iron ions

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HYDROPHOBIC PROPERTIES OF CARBON-CARBON COMPOSITE MATERIALS

The comparative analysis of methods applying polytetrafluoroethylene coatings on surfaces of carbon-carbon composites was conducted. The article presents the results of the evaluation of the hydrophobic properties of the surface

according to a certain the contact angle. It is shown that the water repellent properties of composites with the fluoroplastic coating are significantly higher than the initial hydrophobic properties of the carbon-carbon materials.

Keywords: hydrophobization, carbon-carbon composite materials, fluoropolymers, contact angle

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