

Summary

N. V. Sysoeva, A. V. Dyu, V. K. Dubovy

BASALT FIBER — RAW MATERIAL FOR CAPILLARY-POROUS COMPOSITE MATERIALS

The main standardized characteristics are presented to evaluate the quality of basalt fiber used as raw material to obtain fiber composites. We have showed the significance of staple basalt fiber's length which has an effect on composite material characteristics. Also we have studied basalt fiber's length and its fractional distribution during repulping and dispersion of raw material.

Key words: basalt fiber, capillary-porous paper composite, basalt fiber's length, fractional length distribution

T. P. Aleynikova, I. A. Khardina, Z. S. Aleynikova, Y. S. Sorokina

TECHNOLOGY OF PRODUCTION AND EMPLOYMENT IN POLYMER COMPOSITION OF MONO- AND POLYPEROXYACETALS

The technology of production of (poly) peroxyacetals is worked out. Method includes a synthesis of the starting compound — 1-chloroalkylperoxide and the final compound — peroxyacetal. The employment of monoperoxyacetals in the vulcanization of rubber based on ethylene-propilenediene elastomer and polyvinyl alcohol polyperoxyacetal in the modification of polycapromamide linens was shown.

Key words: peroxyacetals, polyperoxyacetals, 1-chloroalkylperoxides, alcohols, polyatomic alcohols, polyvinyl alcohol, calcium carbonate, ethylene-propilenediene elastomer, polycapromamide linens

I. A. Novakov, M. A. Vaniev, N. V. Sidorenko, Dang Cong Nghia, R. D. Guseynov

EFFECT OF NANO-TITANIUM DIOXIDE ON PHOTOPOLYMERIZATION OF METHYL METHACRYLATE-RUBBER SOLUTIONS.

Optimal conditions for the homogenization of titanium dioxide nanoparticles in solutions of urethane rubber in methyl methacrylate are studied. By monitoring the UV spectra and the regularity of the change in optical density of the material at all stages of polymerization is learnt. Physico-mechanical properties and the content of cross-linked active phase of the composites are determined.

Keywords: nano-titanium dioxide, methyl methacrylate, urethane rubber, photopolymerization, optical density, gel-fraction

A. I. Burya, M. I. Gubskaya

THE INVESTIGATIONS OF THERMAL CHARACTERISTICS OF THE ULTRA-HIGH MOLECULAR POLYETHYLENE REINFORCED BY THE TERLON FIBER

In this work was investigated the influence of terlon fiber's content on the organoplastics' thermostability on the bases of the ultra-highly molecular polyethylene. Kinetic equations are determined and they describe the thermodestruction process of organoplastics in the most adequate way.

Key words: organoplastics, the ultra-highly molecular polyethylene, terlon, thermostability, kinetic equations

E. P. Konstantinova, P. A. Nadezhin, P. V. Nikolaev

SYNTHESIS OF DIMERIC SURFACTANTS — OLIGOETHERALKYLPHOSPHATES

The reasonability of dimeric surfactants synthesis on the base of low-molecular epoxy oligomers in the medium of nucleophilic solvents is shown. The surface activity of synthesized oligoetherphosphates and -sulphates is proved by Rebinder's method and kinetics of water solutions surfactant isolation from air-mechanical foams research. The double-stage synthesis method of dimeric oligomeric surfactants containing fragments of both inorganic and organic acids (naphthenic, fatty acids of tall oil) in structure of molecules is suggested.

Key word: epoxy oligomers, dimeric surfactants, oligoetherphosphates and sulphates, oligoethersulfosuccinates, maleic anhydride, water dispersion

N. A. Godlevskay, O. I. Nikolaeva, T. A. Ageeva

SYNTHESIS AND RESEARCH OF COPOLYMERS OF COPPER COMPLEXES OF METHYLPHAEOPHORBIDE «A» AND METHYL METHACRYLATE

The method of copolymerizing copolymers of copper complex methylphaeophorbide «a» and methyl methacrylate of different composition were synthesized in a solution. The possibility of controlled synthesis of copolymers with adjustable molecular-mass characteristics by varying the parameters of the reaction medium was shown. The effect of the presence of metal in the coordination center porphyrin on the properties of copolymers is established.

Key words: monomers, porphyrins, metal complexes, spectrums, solutions, copolymerization

**A. R. Tagirov, G. N. Bespalova,
A. N. Larin, T. A. Ageeva, A. O. Leb-
edenko**

ALTERATION OF ELECTROCOATED PAINT FILMS BY MACROHETEROCYCLIC COMPOUNDS

Performed alteration of CCH-0125 lacquer-based water diluting paint-and-lacquer electrocoating applied compositions by porphyrins and their derivatives. Proposed structure of the altered film-former micelle. Shown that altered coatings can be hardened at lower temperature and that they possess good protective and aesthetic properties.

Key words: paint-and-lacquer coatings, electrocoating, alteration, porphyrins

L. N. Mizerovsky

WHY ARE LINEAR CRYSTALLIZING POLYMERS MELTING IN THE WIDE TEMPERATURE RANGE?

The point according to the wide range of semicrystalline polymer melting reflects thermomechanical nature of process of their main mass of crystallites destruction is proved.

Keywords: polymers, melting, crystallization

A. R. Ibatullina, E. A. Sergeeva

CREATING OF COMPOSITE MATERIALS BASED ON ARAMID FIBERS MODIFIED BY PLASMA TREATMENT

Manufacture of composite materials from fibers of the third generation grows and actual problem in this area is hydrophilization of synthetic reinforcing materials. The increase of wettability of aramid fiber with polymer binder and increase bond strength of reinforcing aramid fiber with an epoxy matrix using plasma activation of the fiber surface was shown.

Keywords: composite, aramid fiber, plasma treatment, the wettability of epoxy resin

Ya. V. Redko, O. V. Romankevich

THE GETEROCOAGULATION OF MAGNETITE DISPERSION ON THE POLYAMIDE FIBROUS MATERIAL

Experimentally established the possibility of creating fibrous materials based on polyamide fibers by the synthesis of the dispersion of magnetite in the dye bath and the deposition of particles of colloidal degree of dispersion on the surface of polyamide fiber materials by geterocoagulation.

Keywords: magnetite dispersion, nanoparticles, geterocoagulation, polyamide fibrous materials, process of dyeing

**O. V. Romankevich, N. A. Bardash,
O. A. Garanina**

THERMODYNAMICS OF DYEING OF PAN- FIBERS BY CATIONIC DYES

Thermodynamics of dyeing of PAN-fibers by cationic dyes was researched. The material effect of the nano-sized interfacial layer between fibrous material and dye bath was showed. The chemical potential of dye was described by means of the change of partial mole enthalpy of dye and entropy activity coefficient.

Key words: cationic dye, multilayer system, nano-sized interfacial layer

**A. A. Rybakov, L. A. Shcherbina,
I. A. Budkute, V. M. Boiko, L. O. Trzhet-
setskaja**

INVESTIGATION OF THERMOOXIDATIVE STABILISATION OF FIBER-FORMING TERCOPOLYMERS OF ACRYLONITRILE WITH ACID COMONOMERS

Process of thermooxidation of fibers on the basis of copolymers of acrylonitrile with the various maintenance of acid comonomer by means of thermal method is investigated. Activating influence of the maintenance of acrylic acid on polycyclization reaction of nitrile groups of the polymeric substrate is shown. Influence of modes of thermooxidation on properties of the thermooxidized polyacrylic fibers is observed.

Key words: polyacrylonitrile fiber, acid comonomer, thermooxidative stabilization, polycyclization

**P. V. Chvirov, I. S. Gorodniakova,
L. A. Shcherbina**

RESEARCH PROCESS FOR PRODUCING ACRYLIC FIBER WITH INCREASED STRENGTH

The investigated impact of various technological factors on the process of obtaining polyacrylonitrile fibers. Obtained data are needed to optimize the process of obtaining polyacrylonitrile fibers for special applications.

Key words: polyacrylonitrile, spinning, fiber, strength, elongation, shrinkage

**O. N. Osipenko, A. R. Baykova,
N. A. Branovets, A. G. Kharytanovich,
L. A. Shcherbina**

INFLUENCE OF THE NATURE OF ACID COMONOMERS ON SYNTHESIS OF FIBER-FORMING COPOLYMERS OF ACRYLONITRILE

The kinetics synthesis of copolymers acrylonitrile (AN) with various acid comonomers is studied and kinetic parameters of this process are defined. The inhibiting in-

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fluence carboxylated monomers on dynamics of synthesis of copolymers acrylonitrile is shown.

Key words: acrylonitrile, copolymer, copolymerization, kinetic

M. V. Stefanenko, T. V. Pyrkh, A. A. Rybakov, L. A. Shcherbina, Yu. M. Mozheyko

RESEARCH OF POLYCONDENSATION OF LACTIC ACID

The lactic acid polycondensation process was studied. Conditions of polylactic acid synthesis was defined. Polymers are having temperatures: of glass transition in a range 50 65°C, of cold crystallisation — 70 100°C, of melting — 150 175°C, of maximum speed of a thermal destruction above 275°C.

Key words: lactic acid, polycondensation, polylactic acid, catalyst, molecular weight, glass transition temperature, crystallisation temperature, melting temperature, thermal destruction temperature

Krasnovskii A. N., Kazakov I. A.

THE IMPACT OF A RESIN PRESSURE AND EXTERNAL FORCE ON STRESS-STRAIN STATE OF THE MATERIAL IN PULTRUSION

The article presents the main results of theoretical investigations of the stress-strain state of polymer composite materials for large pultruded products. The relations for stress and strain determining in any section of a circular rod are obtained. The solutions are offered for strain reducing to prevent the appearance of defects in the composite products.

Keywords: composite material, pultrusion, stress-strain state, permeability, oversized rod

Krasnovskii A. N., Kvachev K. V.

MATHEMATICAL MODELING OF MECHANICS PULTRUSION PROCESS OF POLYMERIC COMPOSITE MATERIALS

The paper presents the mathematical formulation of the problem Pultruded process for products of cylindrical shape. The material in the spinneret is divided into two areas: cured provided in the form of a transversely isotropic elastic medium, and uncured provided in the form of Newtonian viscous fluid. The model assumes a more accurate determination of the parameters of the process of pultrusion.

Keywords: pultrusion, composite material, polymerization, mathematical model, die

A. G. Kuznetsov, L. G. Makhotina, E. L. Akim

USAGE OF BIOPOLYMER ARABINO GALACTAN IN PRODUCTION OF CELLULOSE COMPOSITES

Nowadays using of recycled fiber and noncarbon filler abundantly in body of cellulose composites leads to reduce of its' mechanical properties. In this paper possibility of arabinogalactan usage as an agent for increase of cellulose composite dry strength was studied.

Key words: composites, arabinogalactan, cationic starch, paper dry strength, biorefining, hemicellulose

E. L. Akim, I. N. Abramov, M. V. Kovalenko, E. V. Denisova

MODIFICATION OF CELLULOSE NANOSTRUCTURE DURING LARCH PULP DRYING PROCESS

The article is made under the project «Larch» This article describes a number of works on nanostructure of pulp fibers, also it was investigated the main morphological properties and water retention value of larch and pine pulp fibers, depending on the refining degree and type of drying process. Due to the results obtained in this research it is possible to explain the influence of contact and contactless drying processes on cornification and properties of secondary (recycled) fibers.

Key words: larch, cellulose nanostructure, nanocomposites, nanotechnology, relaxation state of cellulose amorphous regions, drying process, morphological properties of fiber, fiber water retention value

R. F. Vitkovskaya, I. G. Rumynskaya, A. Yu. Smirnov, Z. I. Nikultseva.

ASSESSMENT OF THE RELATIONSHIP OF CATALYTIC PROPERTIES OF POLYMER METAL-CONTAINING MATERIALS AND TECHNOLOGY METHODS OF THEIR PRODUCTION

Investigation of catalytic properties of the metal-polymer catalysts is carried out. The interrelation between technological parameters of support modification and metal content in active form on it. The contribution of the metal of various chemical forms on catalytic layer in formation is determined.

Key words: polyacrylonitrile, fibres, catalytic activity, stability, modification, fixation of metal

N. A. Tichomirova, V. A. Popova
DISPERSION OF DYE AS CRITERION
OF EFFICIENCY OF COLORATION
TECHNOLOGY OF TEXTILE MATERIALS

The sizes of particles of insoluble and soluble forms of dyes with use of the laser NANOTRAC analyzer are defined. It is shown that both insoluble, and water-soluble forms of dyes at temperature 25°C are in the aggregated condition; applied for a drop — jet technology the high-concentrated solutions of dyes shouldn't contain a particle in the size more than 2 microns.

Key words: dyes, dispersion, measurement of the size of particles, ink jet printing

O. A. Moskalyuk, E. S. Tsobkallo,
V. E. Yudin

EFFECT OF CARBON NANOPARTICLES
OF ELECTRICALLY CONDUCTIVE
POLYMER MATERIAL ON VALUE OF
ELASTICITY MODULE IDENTIFIED BY
DIFFERENT METHODS

Obtained electrically conductive composite materials (CM) based on polypropylene matrix filled with nanoparticles of carbon black and carbon nanofibers. Defined changes in electrical resistance and modulus of elasticity of the CM, depending on the type and concentration of conductive filler injected. A comparison of the values of the modulus of elasticity, a certain mechanical, dynamic and acoustic methods.

Key words: composite material, polypropylene, carbon nanoparticles, electrical resistance, elastic modulus, stiffness, mechanical modulus, dynamic modulus, acoustic module

O. Z. Akhmetshina, V. A. Zhukovskiy,
V. E. Nemilov, V. A. Khokhlova
SURGICAL ANTIADHESION
MATERIALS ON BASE OF
CARBOXYMETHYLCELLULOSE

Film antiadhesion materials on the base of carboxymethylcellulose with a specified absorption period are developed. The kinetics of swelling of the polymer film materials in depend of the temperature and duration of heat treatment are studied.

Key words: carboxymethylcellulose, adhesive illness, heat treatment, barrier antiadhesion materials, degree of swelling, kinetics of swelling

V. A. Zhukovskiy, V. A. Khokhlova,
T. Yu. Anuschenko, N. I. Mukhina,
V. V. Svistov, I. M. Kirichenko

POLYGLYCOLIC ABSORBABLE
ANTIMICROBIAL SURGICAL THREADS

Absorbable braided threads on the basis of polyglycolic acid can be infected because of interfiber capillarity. In order to obtain antibacterial properties, technological process of formation on threads of absorbable copolymer (glycolic and lactid acid) coating with miramistin has been developed.

Key words: surgical threads, biodistruction, polymeric coating, antimicrobial properties, technological process

Mikhalchan A. A., Lysenko A. A.,
Kryskavets M. V.

ELECTROPHYSICAL PROPERTIES OF
CARBON NANODISPERSED MATERIALS

The influence of different factors on electrophysical properties of carbon nanotubes and their agglomerates is discussed. Electrical resistivity of different types of carbon black and carbon nanotubes was observed. Comparative analysis of electrophysical properties of carbon nanodispersed materials based on the correlation with their morphology and compacting ability was made.

Key words: carbon nanodispersed materials, carbon nanotubes, carbon black, electrical resistivity

E. L. Illarionova, T. N. Kalinina,
L. E. Vinogradova, L. M. Shtyagina
DEVELOPMENT OF NATURAL-BASED
FIBROUS COMPOSITE MATERIALS
WITH IMMOBILIZED MICROORGANISMS
FOR REVEGETATION OIL-
CONTAMINATED SOILS

Technological process for obtaining of highly efficient and stable biological product based on natural polysaccharide alginate sodium with immobilized microorganisms for oil-destruction is proposed.

Key words: polysaccharide, biomass, dehydration, biological preparation, oil-destruction

**G. V. Aleksandrov, M. M. Kardash,
D. V. Aynetdinov, D. V. Oleynik**

**THE REINFORCEMENT AS AN
IMPROVEMENT PROCESS FOR RISING
PROPERTIES' COMPLEX OF CATION-
EXCHANGE MEMBRANES «POLYCON»**

The general advantages of polycondensation inflation method for production of membranes were described. Improvement of technology by means of using the material from novolak formaldehyde fiber as reinforcement system was suggested. The main properties of material were presented. The results of her influence on composite heterogeneous membrane properties were proposed.

Key words: polycondensation inflation, heterogeneous membrane, electro dialysis

**Yu. A. Kadykova, S. V. Ulegin,
K. D. Lure, S. E. Artemenko**

**DEVELOPMENT
BAZALTONAPOLNENNYH EPOXY
COMPOSITE HIGH SET OF PROPERTIES**

The possibility and effectiveness of particulate basalt as a filler for epoxy resin, thus expanding the scope of the filler to create a composite polymermatrix with a wide range of applications.

Keywords: Basalt, epoxy, physico-chemical and mechanical properties, the kinetics of curing

**I. A. Tyurin, M. M. Kardash,
D. V. Terin, M. N. Batura**

**COMPOSITE CHEMOSORPTION
FIBROUS MATERIALS, PERSPECTIVES
OF MODIFICATION AND APPLICATIONS**

The aim of this work is the production of high-performance, cation-exchange chemisorption fibrous materials on basis of phenol, formaldehyde, sulfuric acid, polyacrylonitrile fiber — «POLYCON K». We carried out research to state structure characteristics, morphology and other properties of «POLYCON K» formed on basis of PAN fiber with addition of super dispersed admixture iron and nickel nanopowder.

Key words: composite, chemisorbent, fiber, structure, electrical conductivity, modification, ultra-additive

**M. O. Ibaev, V. N. Stoudentsov,
I. V. Cheremouhina**

**IMPROVEMENT OF CROSS-LINKED
POLYMER STRAIGHTS TECHNOLOGY ON
BASE OF CONSTANT ELECTRIC FIELD
APPLICATION**

New method of reinforced cross — linked polymers physical modification in constant electric field is offered. Advantages of produced polymer straight are shown comparatively with steel straight.

Key words: Cross — linked polymers, polymer composite material, electric field, steel straight, polymer straight

**A. S. Mostovoy, E. V. Plakunova,
L. G. Panova**

**COMPOSITIONS DEVELOPMENT
AND STUDY OF FIREPROOF EPOXY
COMPOSITIONS PROPERTIES**

As the result of the investigations, compositions of epoxy compounds with high mechanical properties and relating to a class of nonflammable materials were developed. Individual and combined effect of plasticizers — trichlorethylphosphate, tricresylphosphate and filler — ammonium polyphosphate on the curing kinetics and physico-mechanical properties of epoxy composites was found.

Key words: Epoxy oligomer, hardeners, modification, reduction of flammability, elastic properties

**A. V. Afonina, A. I. Finayenov,
S. L. Zabudkov**

**ANODE INTERKALIROVANIYE
OF GRAPHITE FOR RECEIVING
PRECURSORS OF THE DECANTER**

Possibility of receiving the high-split thermoexpanded graphites (VTRG) in one stage is experimentally shown in the electrochemical way. The bulk density of VTRG thus makes 0,6–0,8 g/dm³. It is established that the repeated anode intercalirovaniye of compacts of VTRG leads to partial stratification of packs of decanters and receiving preparations of 2–3 grafenovy layers containing in carbon particles.

Keywords: an anode interkalirovaniye, connections of introduction of the graphite, the high-split thermoexpanded graphite, graphene

**A. A. Tantserev, O. V. Frolova,
A. I. Finayenov, E. A. Savelyeva**
**ONE-PHASIC ELECTROCHEMICAL
FORMATION OF THE
NANOSTRUCTURES PAINTED
OKSIDNYKH ON ALUMINIUM**

Prospects and possibilities of non-stationary modes in processes of formation and coloring of oksidny nanostructures on aluminum of various color scale with high operational characteristics are considered.

Keywords: nanostructures, aluminum oxide, electrochemical coloring, non-stationary modes

**Vasilyeva A. A., Belyaeva E. A.,
Schatsky S. V., Kychkin A. K., Osip-
chik V. S.**

**NANO-MODIFIED EPOXY BINDERS FOR
STRUCTURAL COMPOSITES**

The thesis represents researches reference influence of little amount of additives of nano-materials (NM) of carbonic and silicate types on service properties of epoxyanhydride compositions (EC) as well as methods of injection of the mentioned NM and EC which would provide uniform distribution of nano-particles in EC including preparation of colloidal solutions of silicate NM in the ingredients of EC. A considerable positive effect was established in the result of nanomodification of EC by the indicated NM, it established that modification of EC with silicate NM is preferable taking into account the criterion «price — quality».

Key words: carbonic and silicate nano-modifiers, epoxy binders, ultrasound treatment, physical and mechanical characteristics, textural features (spherulites)

M. P. Vasiliev, E. V. Lekomceva
**STRUCTURAL CONVERTING OF
PHTHALOCYANINS IN POLYOXSYDIAZOL
SOLUTIONS**

Structural transformations of complexes of phthalocyanin-polyoxsydiazol are studied at forming of composite on glass substrate. From data of instrumental methods of analysis is appraised phase converting into a polymer in presence the structures of phthalocyanin.

Key words: metallphthalocyanines, polymer matrix, composite

Shirshova E. P., Dokuchaev V. N., Gladunova O. I., Lysenko A. A.

**POLIOKSADIAZOL FIBRES DYED IN THE
MASS**

Dyeing by thermally stable and acid resistance pigments during the synthesis of polioksadiazol fibers is proposed. It was shown that introduction of dry pigments does not affect on polioksadiazol spinning solutions. Fibers with a wide range of colours and high physical-mechanical characteristics were produced.

Key words: dyeing, dyeing in mass, pigments, phthalocyanine pigments, spinning solution, polioksadiazol fiber