MATHEMATICAL MODELING.
METHODS AND INFORMATION PROTECTION SYSTEMS, INFORMATION SECURITY

CHEMICAL SCIENCES

THERMODYNAMIC FUNCTIONS OF ZN55AL ALLOY

Heat capacity is the most important characteristic of substances, and from its change with temperature it is possible to determine the type of phase transformation, the Debye temperature, the energy of vacancy formation, the coefficient of electronic heat capacity, and other properties. In this work, the heat capacity of the Zn55Al alloy with titanium was determined in the "cooling" mode from the known heat capacity of a reference copper sample. For this purpose, polynomials describing their cooling rates were obtained by processing the curves of the cooling rate of samples made of the Zn55Al alloy with titanium and the standard. Further, according to the experimentally found values of the cooling rates of the standard and samples from alloys, knowing their masses, the polynomials of the temperature dependence of the heat capacity of the alloys and the standard were established, which are described by a four-term equation. Using the integrals of the specific heat, models of the temperature dependence of the change in enthalpy, entropy and Gibbs energy were established. The obtained dependences show that with an increase in temperature, the heat capacity, enthalpy and entropy of alloys increase, while the values of the Gibbs energy decrease. In this case, titanium additives increase the heat capacity, enthalpy, and entropy of the initial Zn55Al alloy. In this case, the value of the Gibbs energy decreases.

Keywords: *alloy zn55al, titanium, heat capacity, cooling mode, heat transfer coefficient, enthalpy, entropy, Gibbs energy*

Dashchenko N.V., Kiselev A.M.

THE APPLICATION OF HYDROPHILIC NANOEMULSIONS FOR A TARGETED CHANGE IN THE PROPERTIES OF SYNTHETIC TEXTILE MATERIALS

The process of modification of synthetic textile materials with hydrophilic aminosilicon-organic nanoemulsions has been studied. Recommended preparations and treatment mode for polyester and polyamide fabrics with the formation of nanocoatings in order to regulate the hydrophilic-lipophilic properties of the fibrous material and impart improved consumer and special properties to textiles.

Keywords: *synthetic material, hydrophilic nanoemulsion, modification, nanocoating, hydrophilic-lipophilic properties, finishing effects*

Semikhina L.P., Karelin E.A., Shtykov S.V.

THE INFLUENCE OF THE DETERGENT ACTION OF AQUEOUS SOLUTIONS OF SURFACE-ACTIVE SUBSTANCES ON THE REMOVAL OF OIL FROM THE FORMATIONS

Using the example of several surfactants (surfactants), their ability to extract oil from bulk core and wash off oil films from the surface of a solid was investigated. It was found that in the area of low oil saturations (less than 50%), the effect of using surfactants during waterflooding significantly depends not only on the interfacial tension σ at the oil-water interface, but also on the washing ability of their solutions. An expression is obtained for the generalized parameter on these two properties of surfactant solutions, on which a linear dependence of the oil recovery factor is observed.

Keywords: *enhanced oil recovery methods, washing action, surfactants, interfacial tension*

Lysenko A.A., Tsybuk I.O.

PAPER ASH BASED ON HEAT-RESISTANT AND FIRE-RESISTANT POLYMER FIBERS

The article analyzes information on technical papers based on heat-resistant synthetic fibers. Various ways of obtaining papers are considered. Investigated one of the most important characteristics of the paper - ash content.

Keywords: heat-resistant fibers, heat-resistant papers, technical papers, autohesion, ash content

Melnikova E.A., Kornakova V.G., Korobeynikova E.V.

PHYSICAL AND CHEMICAL PROCESSING OF A PHOTOGRAPHIC IMAGE AS AN OPTION FOR INCREASING THE QUALITY OF THE SOURCE MATERIAL

Methods for the processes of attenuation of a photographic positive image of increased density using an attenuator in which iron-cyanide potassium is used as an oxidant are considered.

Keywords: photographic image, weakening, restoration, additional processing, film

Kryuchkova A.V., Susanin A.I., Sashina E.S.
MIXED MATERIALS BASED ON POLYACRYLONITRILE WITH INCREASED HYGROSCOPICITY AS A POSSIBILITY OF UTILIZATION OF Poultry down waste
The possibility of utilizing poultry down waste by obtaining materials based on mixtures of keratin with polyacrylonitrile has been studied. The solubility of down keratin in ionic liquids has been investigated. The compatibility of the studied polymers was evaluated by vibrational spectroscopy.
Keywords: fluff keratin, mixed films, IR spectra, hygroscopicity, ionic liquids, polyacrylonitrile

AUTOMATION AND CONTROL OF TECHNOLOGICAL PROCESSES AND PRODUCTIONS

Suzdalov E.G., Kravets T.A.
JUSTIFICATION METHOD FOR THE NECESSARY NUMBER OF RECEPTION AND DISPENSING WINDOWS IN A MULTIFUNCTIONAL CENTER
The process of receiving and issuing documents in a multifunctional center was investigated by the method of mathematical modeling. A method has been developed to substantiate the required number of windows for receiving and issuing documents using the software packages MS Excel, Mathcad.
Keywords: criterion, performance indicator, mathematical model, modeling, justification method

Drozdova E.N., Margolin A.L.
DEVELOPMENT AND IMPLEMENTATION OF AN APPLICATION FOR MANAGING A GROUP OF ENTERPRISES AND AUTOMATION OF INTERNAL PROCESSES OF A PRINTING COMPLEX
The development and implementation of an automated control system for a printing complex is considered. An overview of existing software solutions is given. The main stages of development are described. The procedure for interacting with the database is described. Marketing support of the sales department is being considered. Sections-catalogs of the system are presented: segment "Editions" and segment "Production".
Keywords: *information system, automation, control*

Sigacheva V.V., Maksimov V.O.
ROBUST FOOTWEAR DRYER CONTROL SYSTEM
A control system for the drying chamber has been developed, which takes into account the uncertainty of drying parameters - temperature and humidity, and performs simultaneous control of two actuators, taking into account the general change in input parameters according to a program written on the basis of fuzzy modeling.
Keywords: *robust system, drying chamber, temperature, humidity, fuzzy modeling, measuring unit, program, microcontroller*

Krasnikova K.M., Litvinchuk V.L.
THE NEED FOR INFORMATION SUPPLY OF THE MANAGEMENT SYSTEM OF THE TECHNOLOGICAL SECTION FOR SEWING DUPLICATIONS
The tasks of information support in the sewing industry, namely, at the sewing area for sheepskin coats, are considered. The necessity of information support at several stages of production, including at the stages of working with raw materials and equipment, is explained. In addition, it is considered how information support affects the quality of the product and the technology of its production.
Keywords: *information support, sewing production, sheepskin coats*

ENGINEERING AND ENGINEERING

Egorov V.V., Denisenkova A.A., Blokhin M.Yu., Markovets A.V.
DETERMINATION OF KINEMATIC EXTERNAL EFFECTS ON NEEDLE THREAD IN A HOOKSTITCH SEWING MACHINE
The problem of identifying the kinematic external influence on the needle and shuttle threads during the tightening of the stitch is considered. A technique is proposed that makes it possible to