

CONTENTS, ABSTRACTS AND KEYWORDS OF PAPERS

MODERN PROPAGATION SYSTEMS OF BEERS YEAST CLEAN CULTURE

D.D. Temershin, A.G. Novoselov, A.A. Smirnov

The article is devoted to a review of the main stages, methods and equipment that are involved in the process of cultivation of a pure culture of brewer's yeast. As a result, the shortcomings of the cultivation systems were analyzed, as well as the effect of structural elements on the process of biomass accumulation. Beer production is one of the most complex productions as it represents a set of physical, chemical and biological processes that are closely related to each other. Depending on the capacity of the beer factory, brewer's yeast can either be grown at the factory or purchased at other beer factories. To date, all operations related to the production, storage and monitoring of the state of brewer's yeast have the name of yeast management. Proper execution of the above-mentioned measures ensures success in obtaining a quality product, since the process of fermentation of wort is the main process in the development of beer.

Keywords: pure yeast culture, equipment, propagation, wort, carlsberg flask, aeration, flask of Carlsberg, pump, beer

EXPERIMENTAL INVESTIGATION OF THE DEPENDENCE OF SWELLING RATIO EXTRUDATES OF POTATO FROM THE FUNCTIONAL AND TECHNOLOGICAL PROPERTIES OF SEMI-FINISHED PRODUCTS

O.I. Aksenova, V.G. Alexeev, V.V. Krivopustov

The accelerated pace of life of modern society led to an increase in the consumption of fast food products including snacks. One of the most popular types of snacks are potato chips, which is due to the traditionality of raw materials and the breadth of potato cultivation in our country. However, potato chips are an unbalanced food they contain an excessive amount of fat, salt and flavoring additives, which negatively affects human health. Producing snacks of a balanced composition eliminating additional dipping operations in flavoring additives and frying in oil allows extrusion processing. However, as potato extrusion process in the world has not been studied it is necessary to determine the functional and technological properties of semi-finished products for quality extrudates. The main parameters of the quality of extruded expanded snacks include the coefficient of expansion and texture. In the course of this study, it was found that an increased level of moisture in semi-finished products leads to extrudates of a dense texture with a lower expansion coefficient and too low a moisture level of the mixture leads to a decrease in the expansion coefficient, burning of the mixture and undesirable darkening of the extrudate. The study determined that the optimum semi-finished product is milled dried to 18% moisture potato, thus achieved the maximum coefficient of expansion equal to 400% and good organoleptic characteristics observed low resource and energy consumption of the process.

Keywords: snack foods, extrusion processing, potatoes, expansion ratio, functional and technological properties, secondary raw material for edible products, biological value, semi-finished product, organoleptic properties.

PERSPECTIVES OF ELECTRIC RESISTANCE BREAD BAKING APPLICATION

B. A. Kulishov, A. G. Novoselov, S.Yu. Ivaschenko, V. A. Eskov

Relevance of electric resistance baking investigations in breadmaking is shown, especially in a field of manufacturing of therapeutic dietary bread and semifinished bread. Electric resistance baking is able to increase nutritional value of bread, to decrease energy costs of baking process, to decrease baking time, to obtain crustless bread for usage in therapeutic diary ration. Description of the baking process physical essence and advantages of the electric resistance baking in comparing with the traditional technology of radiation-convective baking are described. Pilot apparatus description for electric resistance baking studying designed in department of process and equipment in food production of ITMO University is given. Information about design features and electrical circuit is shown. Results of the preliminary experimental study of electric resistance baking are expounded, information about possible difficulties of the process and about defects of bread is provided. Plots of amperage versus time of baking with different concentrations of salt in dough formulation are shown. Calculation of energy costs for baking process is carried, and obtained values compared with energy costs values for radiation-convective baking that cited in literature. Further plan of studying is shown.

Keywords: electric resistance baking, nutritional value of bread, semifinished bread, therapeutic diary bread, crustless bread, energy costs, baking time, bread defects.

NUTRITIONAL VALUE OF BUTTER BISCUITS WITH SUNFLOWER FLOUR

V.A. Gaysina, L.A. Kozubaeva, S.S. Kuzmina

Modern trends that form a healthy diet, dictate the need to create food products, including flour confectionery products, characterized by increased nutritional value. However, the use of traditional technologies for the processing of plant raw materials leads to a reduction in the content of protein and food fibers in it. Therefore, there is a need to search for new sources of these compounds. The use of non-traditional types of raw materials in the production of food can help enrich them with proteins and micronutrients. Currently, secondary resources of plant raw materials are actively used in solving food, environmental and energy problems, being an additional source of substances of natural origin. A significant amount of secondary resources is formed during the processing of sunflower seeds. In the process of processing these seeds, in addition to oil, about 35% of the oilcake is obtained. Sunflower oilcake contains 32-35% protein, 5-7% fat, up to 20% carbohydrates. This article is devoted to the study of sunflower flour made from sunflower oilcake as a source of biologically active substances, including proteins, fats, carbohydrates, etc. The influence of sunflower flour on the content of basic chemicals and the energy value of biscuits is revealed. The utility of using this additive in the production of flour confectionery products is proved.

Keywords: flour confectionery, biscuits, sunflower flour, nutritional value, biological value, energy value.

FUNCTIONAL CHEESE PRODUCT WITH NETTLE AND ROSEHIPS

Y.M. Sagenova

The use of wild raw nettles and rosehips, in the production of functional curd products theoretically justified. The main regularities of properties formation, curd products, wild raw nettles, rosehip shown. Organoleptic characteristics of the new cheese product. Physical-chemical characteristics of the new cheese product presented. Comparative analysis of amino acid composition of a new cheese product and a control sample, cottage cheese 5% fat. Food and energy value of the new cheese product using whey syrup of wild plants, nettles and rose hips presented. Nutritional and biological value and vitamin composition of the product studied. The high content of complete protein, low caloric value, rich in vitamins B1, B2, C, beta-carotene, which are substances that perform antioxidant protection for the human body established in the new product. The use of local raw material resources from wild nettle and rose hips will expand the range of products of high nutritional value, the dairy industry and increase the competitiveness, the efficiency of the enterprise.

Keywords: functional product, wild-growing raw materials, food and biological value, amino acid skor, cheese product, nettle, rosehips, extract of wild raw materials, syrup of wild raw materials.

SEEDS OF OIL FLAX IS A SOURCE OF PROTEIN IN THE PRODUCTION OF FISH PRODUCTS

T. C. Fedorova, Y. Y. Zabalueva, I. V. Hamaganova

*The article considers the possibility of using oilseed flax (*Linum usitatissimum* L.) in the production of fish minced products, due to the high protein content, including salt-soluble. Lipids, minerals and carbohydrates represent the chemical composition of the seeds of the flax. From carbohydrates, contain dietary fiber (12, 5%), pectin (6.0 percent), reducing substances (4.9%) and starch (1.8 percent).*

*The ability to produce products in the technology, which provides for the process of salting, in particular from the raw materials of animal origin shown in the article. As the main raw material for production of fish product is a new generation of the selected raw materials – roach (Siberian roach), *Rutilus Rutilus lacustris* (Pallas) inhabiting in the unique lake Baikal.*

Improvement of functional and technological properties stuffing system of meat roach, containing finely ground flax seeds, protein preparation based on pork rind, vegetable oil, water installed. Given the high functional and technological characteristics of innovative emulsion with flax seeds, its high biological value, and ease of use of the developed technology of fish meatballs. Recipe provided by fish fillets (55%), bread wheat (10%), onion (5%), milk (5%) and protein-fat emulsion (25%). The introduction of protein-fat emulsion containing flax seeds, improves functional and technological characteristics of the meat system, and obtaining a finished product with high consumer properties, meeting the modern requirements of a healthy diet.

Keywords: flax seeds, roach, meat, proteins, nutritional value, protein-fatty emulsion, functional and technological characteristics, consumer characteristics, technology, quality.

THE INFLUENCE OF GROUND BIRD CHERRIES ON THE QUALITY OF SUGAR BISCUITS

O. A. Bosenko, S.S. Kuzmina, A.S. Zakharova

The influence of powder from the fruit of the cherry ordinary, held a preliminary preparation, the taste, the smell, the color, the shape, the form of the fracture, humidity, soaking, alkalinity, mass fraction of sugar and fat sugar cookies. The use of powder from the fruit of the wild cherry in the production of biscuits, sugar in an amount of from 4% to 10% contributed to the production of products with more dark colouring, an attractive and unusual appearance, with a pleasant taste and aroma. However, reduced humidity and soakage finished goods, without affecting the alkalinity, mass fraction of sugar and fat in the received cookie. All had received good consumer dignity. The maximum number of points at the tasting appreciated sugar cookies with 8% of the powder from the fruit of the cherry ordinary. Thus, in the course of the research proved the possibility and expediency of use of powder from the fruit of the cherry ordinary in the production of biscuits, sugar in an amount of not more than 8 % by weight of flour with the aim of directional changes of taste, aroma, and appearance of finished products that will enrich and expand the range of non-traditional flour confectionery products of high nutritional value.

Keywords: cherry, powder, fruit, sugar cookies, performance, quality, nutritional value, range, soakage, humidity.

OPTIMIZING OF COMPOUNDING FOR SUGAR COOKIES WITH RED AND BLACK CHOKEBERRY

Larionova E.I., Cosubaeva L.A., Larionova I.A.

This investigation was devoted to optimization of the sugar cookie compounding with fruits of red and black chokeberry. To determine the optimal content of the rowan fruit, the test of mathematical planning the method of the full factorial experiment (FFE2ⁿ) was used. The determining factors were the absorptivity and organoleptic evaluation of the cookies. It was revealed that the best quality was cookies with the conjoint application of 3% red ashberry and 7% of black chokeberry.

Keywords: cookies, red mountain ash, chokeberry, full factor experiment, water absorption, organoleptic evaluation.

INFLUENCE OF MECHANOACTIVATION ON TECHNOLOGICAL PROPERTIES OF FLOUR

S. S. Kuzmina, L. A. Kozubaeva, D. N. Protopopov

Work is devoted to definition of influence of mechanoactivation of bran on an exit and quality of flour. It established, at a relative speed of fingers in a disintegrator to 129 meters per second from wheat bran 40% of a mealy product, which can be add to wheat flour of the 1st grade in an amount to 20% without significant deterioration of its technological properties. Thus, water-absorbing ability, a mass fraction of a gluten and quality of a gluten improve.

Keywords: mechanoactivation, disintegrator, bran, quality indicators, water absorbing capacity, flour.

GLUTEN-FREE BREAD FLOUR FROM THE SEEDS OF MILK THISTLE

Zhuravleva E. O., Pasko A., Kozubayeva L. A.

It analyzes the market gluten-free flour-based products from of milk thistle seeds. The compounding based on a mixture of flour and rice flour thistle seed in the production of gluten-free bread. The results of the study, the impact of flour from the seeds of milk thistle on the nutritional value of gluten-free bread.

Keywords: celiac disease, gluten-free products, rice flour, thistle, food and energy value

A STUDY OF THE INFLUENCE OF TECHNOLOGICAL PARAMETERS ON THE DRYING PROCESS OF HYDROBIONTS

Y.V. Karnaushenko

Industrial processing of aquatic organisms with a high biological value of protein in the Crimea is very difficult and finally not implemented for today. The development of technology of production of high-protein dried products from hydrobionts is relevant and necessary. During the experiments the research technique of the kinetics of drying meat of mussels is applied. The results shows that technologically it is useful to apply for hydrobionts the drying process in the fluidized bed with the use of oscillation.

Keywords: processing, the drying of mussel's meat, the fluidized bed, the mode of oscillation.

DEVELOPMENT OF BASIC HYDRAULIC CHARACTERISTICS OF AIR-BLOWING MACHINERY

V. P. Tarasov

The article presents an analytical view of the basic hydraulic characteristics of a number of blower machines that used in injection systems for pneumatic transport. The derived equation relates the performance of the blowers to the developed pressure and frequency of movement of the main working body. For some widely used blast machines in processing the available data, the numerical values of the coefficients of the equation found.

Keywords: air-blowing machine, hydraulic characteristics of capacity, pressure, performance, pressure, rotation frequency.

MEASUREMENT OF INTERNAL DIAMETER CONDUCTIVE PIPE WITH THE USE OF EDDY CURRENT TRANSDUCER

E. K. Kiselev, A. E. Goldstein

The previously proposed method of eddy current testing of the inner diameter of the conductive pipes and the proposed improvement described. The design of eddy-current Converter, the conversion algorithm of the sensor signals, a block diagram of a control system of the internal diameter of the pipe considered.

Keywords: amplitude-phase conversion, an eddy-current transducer system of eddy current testing, experiment, mathematical model, measurement.

MEASURING CONTROL OF THE PRESS-GLUING CONNECTION OF FLANGES WITH FIBERGLASS TUBES

A.A. Ovsyannikov, V.A. Abanin, I.I. Savin, V.N. Sedelkov

The article explains the technique of measuring the press-and-glue connection of flanges with fiberglass pipes. The structural and electrical circuits, software for controlling the measuring system have been developed. A version of the measuring system based on modern sensors and microprocessor technology is made. Testing of the control process of the press-glue joint of flanges with fiberglass pipes in production conditions was carried out. Analysis of the results of the application of the measuring system showed promising directions for its improvement.

Keywords: measuring control, sensors, microprocessor, fiberglass pipes, flange.

DEVELOPMENT OF PERIODIC SIGNALS DETECTOR BASED ON THE CHAOTIC OSCILLATOR FOR MEASURING DEVICES OPERATING UNDER THE BACKGROUND OF NON-STATIONARY INTERFERENCE

T.V.Patrusheva, E.M.Patrushev

The article considers a method for detecting periodic signals under the background of random interference. The implementation of the detector on the basis of a non-autonomous chaotic oscillator is proposed. The authors compiled requirements for the choice of the bifurcation underlying the detection mechanism. Parameters of the chaotic oscillator are initially selected in such a way as to ensure proximity to the bifurcation boundary. If there is no detectable signal at the input of the chaotic oscillator, the type of motion in it will be chaotic, and when a detectable signal is received, a periodic mode is established. A numerical model of the detector in Matlab / Simulink is presented, which implements a system of differential equations for the chaos generator Murali-Lakshmanan-Chua. As an informative parameter of the detector, the amount of chaotic emissions during the detection period was chosen. The proposed model allowed to carry out statistical studies for the number of chaotic emissions during the detection of periodic oscillations of the chaotic oscillator under the influence of random narrow-band interference. On the basis of the dependences obtained, the optimal value of the supercriticality of the system was chosen. A comparison of the histogram distribution obtained for the number of chaotic emissions made it possible to establish the independence of the statistical characteristics of the signal at the output of the detector from the interference power at the input. The study as a whole made it possible to conclude that it is possible to use a detector based on the chaotic oscillator for the case of non-stationary interference.

Keywords: Noise immunity, chaotic oscillator, periodic signals detector, normalized histograms, non-stationary interference

REACTION CALORIMETRY DETONATION NANODIAMONDS

A.L. Verecshagin, N.V.Bychin

The detonation nanodiamonds compared with the properties of the frozen drops of tempered glass, has extremely high internal mechanical stresses (drops of Prince Rupert). We consider the machining conditions of detonation nanodiamonds, leading to their destruction. Critically analyzed previously known results on the isolation, processing and use of DNA with the possibility of mechanical failure. Express opinions on the possibility of DNA consolidation.

Keywords: detonation nanodiamonds, drops of Prince Rupert, the conditions of preservation and destruction.

INVESTIGATION OF RHEOLOGICAL PROPERTIES AND LAWS OF MOTION OF AQUEOUS SUSPENSIONS OF CELLULOSE-CONTAINING RAW MATERIAL

A. G. Karpov, O. S. Ivanov, M. S. Vasilishin, V. V. Budaeva, N. V. Bychin

The effect of the mass fraction of the solid phase and temperature on the effective viscosity of aqueous suspensions of cellulose-containing raw materials investigated. The evaluation of the effect of process parameters on the flow characteristics and the magnitude of the pressure loss during the hydrotransport of the slurry in the horizontal section of a hydraulically smooth cylindrical channel carried out. The values of tangential stresses arising on the channel wall during the motion of the suspension are determined.

Keywords: aqueous suspensions of cellulose-containing raw materials, effective viscosity, regularities of motion in horizontal cylindrical channels.

THE STUDY OF THE CONTENT OF VALUABLE COMPONENTS IN THE VAPOR FURNACE FOR FLUORINATION OF TUNGSTEN CONCENTRATE

I. G. Shestakov, R. I., Kraidenko, Y. V. Perederin, A. S. Kantaev

Sampling in several areas of ventilation drum of the rotary kiln carried out in the course of the research. The content of the various components in a sublimator oven fluorination of tungsten concentrate studied. Graphics elements content in the samples given. The work deals with comparative data on the content of valuable component in various parts of the apparatus. The results of differential scanning calorimetry and thermogravimetric analysis given graphically. The analysis of graphs presented. The urgency of research used by necessity of reduction of losses of valuable components, which leads to the improvement of the quality of the finished product.

Keywords: drum rotary furnace, sump, alloy, fluorinated product, fluorination of tungsten concentrate, sublimator, atomic emissary spectrometer, differential scanning calorimetry, before ammonium, valuable component.

NONENZYMATIC BROWNING PRODUCTS'S STRUCTURE FORMATION OF D-LACTOSE REACTION IN THE PRESENCE OF p-TOLUIDINE IN ALKALINE AQUEOUS-ETHANOLIC MEDIA

I.S. Cherepanov

Results on studying of D-lactose behavior in reaction with p-toluidine in alkaline aqueous-ethanolic media by UV-Vis, FT-IR-spectroscopy, and thin-layer chromatography are presented. It is shown that on initial stages lactose degradation is follows and its isomerization and dehydration products converting to active reductons capable to further aldol-crotonic condensation with cyclic deoxyhexosulose formation, transformed to the colored products in which structure including the multiple bonds conjugated systems and ionized carboxylic groups is proved. Based on data of an element analysis it is observed that aryl amine nitrogen is practically not included in final products. At the same time rising of D-lactose destruction rate in the presence of p-toluidine in comparison with caramelization is noted, and the structure of final products in both cases is close that suggested about immediate amine participation in initial stages of browning, but the mechanism of their action remains not clear.

Keywords: D-lactose, nonenzymatic browning, p-toluidine, aqueous-ethanolic media, retro-aldol reaction, reductons.

STUDY INTO THE EFFECT OF HYDROTROPIC DELIGNIFICATION PARAMETERS ON PHYSICOCHEMICAL PROPERTIES OF OAT HULL PULP

M.N. Denisova, A.A. Kukhlenko, I.N. Pavlov

Hydrotropic delignification of oat hulls in a versatile thermobaric setup was studied. The effect of pulping parameters was considered and an experimental statistical model to predict the variation of lignin content in the feedstock being pretreated was constructed. The ranges of variation of the factors of the experiment were, respectively, at a temperature – from 160 to 180 °C; initial concentration hydrotropes solution – from 30 to 38 %, for the duration of the cooking process – from 3 to 6 h. It is shown that the factors having the greatest impact on removal recellular impurities are temperature and cooking time. Increase cooking temperature to 180 ° C and increasing the processing time up to 6 h leading to a fuller hydrolysis of the carbohydrate fraction of the plant raw materials and, consequently, decreases the yield and mass fraction of pentosans in the cellulose. A decrease in the active acidity of the cooking liquors at the end of cooking to 4.6 to 5.0, although its initial level is equal to 8,3-8,5. When the concentration of benzoate in the cooking solution also reduced the proportion of recellular impurities in the resulting product, but this effect is less pronounced compared to the effect of temperature and duration of the process. Optimum conditions for the pulping process, which ensure minimum residual lignin content in the resultant pulp, were identified.

Keywords: oat hulls, hydrotropic delignification, versatile thermobaric setup, sodium benzoate, pulp, lignin, experimental statistical model, temperature, cooking time, concentration

THEORETICAL DETERMINATION OF MODES OF ACTION, ENSURING THE FORMATION OF A HIGHLY DISPERSED AEROSOLS IN A TWO-STAGE ULTRASONIC ATOMIZATION

V.N. Khmelev, A.V. Shalunov, R.N. Golykh, R.S. Dorovskikh, V.A. Nesterov

The article is devoted to the theoretical study of the two-stage process of highly dispersed liquids atomization comprising a process of initial formation of large droplets by ultrasound (US) action on thin liquid film and secondary breakup droplets obtained by the action of high-frequency ultrasound field in the airborne droplets environment. Identified physical mechanism and proposed physical and mathematical model of the breakup of the droplets allowed to determine the limit sound pressure levels for different sizes of droplets depending on sprayed liquid properties and types of action. It was found that the most effective way of ultrasonic action providing droplets breakup is a radiation of sequence of different frequency pulses at a high concentration of aerosol (more than 10% vol.) which creates the conditions for sound speed dispersion. It has been shown that the action of single frequency vibrations limits sound pressure level required for the droplets breakup, which can exceed 190 dB. At pulsed action required sound pressure level is reduced to 155 – 160 dB in continuous air.

Keywords: ultrasound, spraying, drop, performance, sound pressure level, optimal modes

WAYS OF REDUCING SHRINKAGE STRAIN WITH THE THE SOLIDIFICATION AND THE SERVICE OF AERATED CONCRETE

E. V. Bozhok, A. V. Wolf, A. M., Manoha, V. K. Kozlova

The causes of elevated shrinkage deformation during hardening and service of aerated concrete. It is believed that the main direction of increasing of fracture toughness of concrete is to reduce the magnitude of shrinkage deformations, which are caused by humidity shrinkage of the material and carbonizing shrinkage. However, in the literature there are no results specific definitions of each share composing the shrinkage deformation. Investigation of the properties of concretes of different compositions, using the method of forced carbonation, show that the major share of the total shrinkage deformations in the service process of the aerated concrete is carbonizing shrinkage, which significantly exceeds the moisture shrinkage. The article notes that the replacement parts sand high calcium ash in production of autoclaved aerated concrete contributes to its strength, leads to some reduction in humidity and moisture shrinkage. This trend is preserved also when using a high calcium angry together with the addition of dolomite. Ash and ash-dolomite component in the composition of the concrete mixture lead to higher resistance of concrete against carbon dioxide corrosion. Under identical test conditions the degree of carbonation of aerated concrete with ash, which is 54,1 %, significantly lower than that of concrete at 73,4 %. Introduction to the composition of concrete mixture additives of dolomite can reduce the degree of carbonation to 42,4 %.

Keywords: concrete, carbonation, corrosion resistance, shrinkage, high calcium ash of brown coal, dolomite, deformation, durability.

PECULIARITIES OF COMPOSITION OF PRODUCTS OF HYDRATION OF GYPSUM CEMENT GYPSUM BINDERS WITH CARBON ADDITIVES

V. K. Kozlova, A. M. Manoha, E. V. Bozhok, A. V. Wolf, E. V. Skrobko

The phase transition in the hydration process of gypsum cement gypsum binders in the presence of carbonate additives. It is shown that the composition of the products hydration these binders may exist such as the phase gidrocarboalumination calcium, calcium hydrocarbosilicate, calcium gidroksicarbonat (mineral defernit), hydrosultokarbosilicate calcium, containing thaumasite motives.

Keywords: hydration products, gypsum cement gypsum binders.

THE STUDY OF THE PROPERTIES OF DISPERSED BASALT AND ITS INFLUENCE ON THE CHARACTERISTICS OF POLYOLEFINS

A. Z. Bekeshev, P. A. Bredihin, M. K. Akmetova,
Y. A. Kadykova, S. V. Arzamastsev

Analysis of the trends and technology of obtaining of new polymeric composite materials has shown that traditional methods of polymer synthesis — has largely exhausted itself, and the probability of occurrence of polymers with characteristics that are far superior famous levels, decreased significantly.

Therefore, the modification of polymer composite materials is an intensively developing direction, allowing on the basis of known polymers to develop technologies for qualitatively new materials with improved physico-chemical and performance properties.

The most effective option for achieving the objectives is the creation of polymatrix composites (PMC) filled with particulate mineral fillers.

To create a competitive PMK need it cheaper without compromising performance, this is possible through the use of cheap fillers, such as basalt and its derivatives.

Basalt and its products have high strength, high chemical properties, fire resistance, durability, sound and thermal insulation properties.

Keywords: polyethylene, polypropylene, dispersed basalt, mechanical properties, thermal stability, chemical composition, electron microscopy.

POROUS PERMEABLE CERMET SHS-MATERIALS USING ORE MONAZITE

O. V. Yakovleva, A. A. Sitnikov, N. P. Tubalov, M. A. Kolomeets,
T. V. Novoselova, M. S. Kanapianov

The characteristics of the powders for obtaining SHS materials. The dispensability of powders shown. The influence of the content of monazite in the charge on the physical-mechanical and functional properties of porous SHS materials studied.

Keywords: porous metal-ceramic materials, SHS materials, particle size distribution, ore, monazite, self-propagating high-temperature synthesis.

EVALUATION OF THE FRACTAL STRUCTURE OF THE EPOXY COMPOUND WITH A CERAMIC FILLER ACCORDING TO THE MICROSCOPIC IMAGES

N. N. Minakova, A. A. Sivkov, A. S. Silutin,
N. V. Timoshenko, A. S. Ivashutenko

The article is devoted to search of ways of numerical estimation of characteristics of structures in microscopic images. Epoxy with high thermal conductivity insulating sealing compounds based on epoxy resins with dispersed ceramic fillers, used to increase reliability of electrical devices are considered in the article.

Photomicrographs epoxy with high thermal conductivity compound with the use of aluminum nitride synthesized by self-propagating high-temperature synthesis are studied.

The possibility of applying the fractal approach to the study of the structure filled with the epoxy compound according to the microscopic images evaluated. The method of analysis of images was developed. The Minkowski dimension and the Renyi's dimensionality was determined through the analysis of images. The results obtained allowed to conclude that the fractal dimensions of the analyzed structure and the possibility to quantitatively study the parameters of "structure – properties".

Keywords: filled polymers, epoxy with high thermal conductivity electro insulating casting compounds, nanoparticles, aluminum nitride, microscopic images, the fractal estimation, the Minkowski dimension, Renyi's dimensionality.

THE STUDY OF THE STRUCTURE OF THE INTERFACE PROTOTYPE CORIUM WITH STEEL 15H2NMFA

Baklanov V. V., Gradoboev A.V., Skakov M. K., Kukushkin I. M.

When conducting experiments on physical modeling of processes occurring during severe accidents at nuclear power plants, demand is information on the properties of emerging materials. While studying the issue of in-vessel corium confinement materials of the reactor core (corium), it is important to establish the nature of its impact on case material. This paper presents the results of material science investigations of the interface prototype of the corium with the material of the bottom casing of the reactor. The results obtained by the methods of optical metallography and by x-ray diffractometry of polycrystals.

Keywords: modeling a severe accident, the prototype of the corium, the bottom of the reactor vessel, steel 15H2NMFA, optical metallography, x-ray diffraction.