

ПРЕИМУЩЕСТВА ПО ПОКАЗАТЕЛЯМ СЕБЕСТОИМОСТИ И КАЧЕСТВУ В КРУПНОМАСШТАБНОМ ПРОИЗВОДСТВЕ МЕТАЛЛУРГИЧЕСКОГО КРЕМНИЯ (MG-Si)

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В данном докладе представлены результаты с использованием нефтяного кокса и шлаковой очистки в крупномасштабном пилотном производстве с различными технологическими параметрами. Цель данного доклада продемонстрировать возможность удаления значительного количества В и Р в крупномасштабном производстве, с использованием соответствующих процессов шлаковой обработки, при этом сохраняя расплав кремния в жидкой форме. Получены результаты с высокой эффективностью удаления Al, Ca, В и Р из MG-Si - 99%, 99%, 64% и 68% соответственно.

Ключевые слова: металлургический кремний, шлаковое рафинирование, шлак, оксиды, UMG кремний.

DEVELOPMENT OF TECHNOLOGY FOR THE SPATIALLY CHALLENGING SPRUE OPENING IN THE LARGE CASTINGS MADE BY INVESTMENT CASTING

A.S. Gorukhin, E.S. Gayntseva, I.I. Shayhutdinova

In the paper discussed method of manufacturing the ceramic fragment complex shell portion forming the cored hole in the casting. The technique of analysis of stress-strain state of mold elements when casting alloys and calculation of the deflection of the core. Thermal deformation conditions in the mold of the core is considered.

Tags: casting, core, deflection core, prototyping

REFINING METALLURGICAL SILICON BY SLAG

A. Betekbaev, D. Skakov, V. Timoshenko, A. Pavlov

The article presents the results of industrial tests purification metallurgical silicon using special additives (fluxes). It is shown that the degree of purification of metallurgical silicon from impurities such as Al and Ca can be more than 95-97%. It is shows the effect the mass ratio of slag / molten silicon.

Keywords: metallurgical silicon, slag refining, slag, oxides, UMG silicon.

STRUCTURAL FEATURES OF CASTINGS

G. A. Okolovich, A. V. Gabets, O. E. Chertovskikh

The variable heat treatment modes providing improved operational reliability of large parts of the railway truck of a freight car designed. features of formation of the dispersed ferrite-pearlite structure under the influence of low speeds hladaniejanosikove . research into the influence of heat treatment on impact toughness at negative temperatures Held.

Keywords: low carbon steel, toughness, ferritic-pearlitic structure, fatigue strength.

THE CHOICE OF REFRACTORY COMPOUNDS FOR DISPERSION-HARDENED DIE NI-ALLOYS

O.B. Demenok, A.A. Ganeev, A.O. Demenok

In work uses a new approach to the problem of predicting the properties and synthesis of new dispersion-strengthened alloys of die wear. It relies on the selection criterial disperse reinforcers and application of methods of physical metallurgy.

Keywords: refractory compounds, nickel alloys, dispersions reinforcers, dies for isothermal deformation.

INCREASED TOOL LIFE IN CONDITIONS OF MUTUAL EFFECTS OF WEAR AND FATIGUE STEEL

G.A. Okolovich, T.G. Sharikova, E.V. Petrova

Article is devoted to the problem of increasing tool life in conditions of mutual influence of wear and fatigue of steel. Tests indicate the existence of a certain relationship between the hardness of a number of steels and fatigue resistance. Empirically found that the chemical heat treatment tool makes it difficult to deformation of the surface, increases the hardness and wear resistance, as well as cyclic strength due to surface compressive stresses.

Keywords: fatigue failure, increased durability, chemical and heat treatment, wear resistance, fatigue strength

FRICTION PAIR METAL Fe-C

E. O. Chertovskih, D.A. Gabets, A.V. Gabets

In this paper we consider the option of upgrading the freight-car bogie using wear-resistant materials. Installed wear properties of materials used in the construction of units of freight car bogie. Comparative ispytaniyatribosochetany, revealed the wear of cast-iron and steel. An metallographic analysis of alloys Fe-C.

Keywords: friction, wear-resistant, Fe-C, heat-treated at a compound cycle.

THE INCREASE OF VIBRATION RESISTANCE OF THE FACE MILLING PROCESS

E.Y. Gorin, A.Y. Kryazhev, E.Y. Tatarkin, Y.A. Kryazhev

In this article the experimental method of determination of vibration resistance of the oscillating system - "part-tool" is described, in which the parameter of a signal of acoustic issue – account speed, can be used as the diagnostic parameter of vibration resistance. In this article a specially designed face mill with the damping elements, which is made of various materials is presented. This construction of a face mill with an adjustable rigidity increases vibration resistance of process of face milling due to decrease of the vibration loads on the cutting tool.

Key words: process of face milling, acoustic signal, roughness of the processed surface, damping elements, vibration resistance.

OPTIMIZATION OF FACE MILLING OPERATION BY MAXIMUM PERFORMANCE CRITERION BASED ON IMITATION SIMULATION

V.A. Khomenko, A.O. Cherdantsev, P.O. Cherdantsev

Authors presents method of building mathematical model of face milling process. Described optimization method by maximum performance criterion based on imitation simulation.

Keywords: imitation simulation, face milling, face mill, surface quality, optimization, cutting process.

AUTOMATION OF ULTRASONIC WELDING

V. N. Khmelev, D. V. Genne, D. S. Abramenko, S. S. Khmelev

Article is devoted to the development of the concept of an ultrasonic welding lines, their separate blocks and algorithms of functioning.

Keywords: Welding, ultrasound, automation.

FORMATION AND RECYCLING OF FOOD INDUSTRY IN THE ALTAI REGION

A. Mikhaylov, N. Teykhreb

This article is devoted to the effect of food-waste on the ecological environment in the Altai Territory. The experience of foreign countries to reduce the influence of food-waste to the eco-system. It suggests possible methods of utilization and the recycling of these types of waste in the Russian reality.

Keywords: waste, natural environment, the impact of the use of recycling.

EXPERT SYSTEM FOR DETERMING GRAIN SEED GERMONATION

O.V. Lukoyanycheva, S.P. Pronin

There is expert system for determining grain seeds germination in this article. Expert system based on the analysis of bioelectric signals. Expert system used Bayesian probabilistic approach.

Keywords: bioelectric signals, expert system, Bayes' theorem.

THE METHOD FOR CONTROL OF GROWING OF WHEAT SEEDS BY CHANGE THE MEMBRANE POTENTIAL

N.N. Barysheva, S.P. Pronin

The article is devoted to the study of the method for control of growing of wheat seeds by change the membrane potential. The method includes preparing seeds for experimental studies by soaking them for 12 hours at 20 ° C in distilled water, the measurement of the initial values of the membrane potential of wheat seeds, processing the data using statistical methods of analysis, calculation of germination using a mathematical formula.

Keywords: method of a control, the membrane potential, wheat seeds, germinability.

TECHNIQUE OF DESIGN OF COMPOUNDINGS OF INNOVATIVE PRODUCTS WITH USE OF THE GENERALIZED FUNCTION OF DESIRABILITY OF HARRINGTON

O. Evdokimova, V. Markov, O. Kurnakova

The technique of design of compoundings of innovative products with use of the generalized function of desirability of Harrington representing a mathematical method of the transfer of real values of parameters to a uniform dimensionless numerical scale with the fixed borders is offered. Stages of creation of the generalized function of desirability when developing the compoundings providing the set consumer properties and a functional orientation of a ready-made product and model of quality of prototypes of yogurts are given. Results of calculation of Harrington's desirability of D for all groups indicators of quality of prototypes of the yogurt enriched generalized functions are presented. The most preferable option from prototypes for creation of an optimum compounding of a new type of the yogurt enriched is established.

Keywords: development of compoundings of new types of functional foodstuff, the generalized function of desirability of S. Harrington, a qualimetrical assessment.

THE USE OF ELEMENTS OF SYSTEM HACCP IS IN TECHNOLOGY OF PRODUCTION OF THE ENRICHED BAKEGOODSS

S.V. Novoselov, L.A. Mayurnikova, A.A. Koksharov, N.S. Kokryatskaya,
N.V. Gornikov

Research of elements of the system is shown for providing of quality of HACPP in technology of production of the enriched bakegoodss. The sheet of HACCP, the necessary for providing of safety systems of monitoring, supervisory actions and registration-registration documents, allowing to carry out an account after the systems of monitoring and control of quality of food products, are reflected in that, is worked out.

Keywords: innovative activity, spheres of feed; innovation (innovation), innovation (innovation), scientifically-innovative activity, innovative environment, small innovative enterprise, creative collective.

RESEARCH OF INFLUENCE OF TEMPERATURE AND TIME OF INFLUENCE OF IRONS FOR TIGHTNESS OF CORKING OF PLATINKAMI YOGHURTS

O. Evdokimova, O. Kurnakova

The characteristic of packing of foodstuff, the factor as keeping, motivating and a data carrier in modern conditions of fierce competition is given. It is established that for consumers convenience of opening of a foil that can reduce consumer ability is important. The factors influencing opening a platinok a uniform cloth are defined. Requirements to polymeric glasses when packing yogurts are provided and results of tests of glasses. Influence of parameters of soldering on tightness and opening a platitnok is established, the modes of impact of irons on opening a platinok are optimized by a uniform cloth.

Keywords: packing of consumer goods, temperature of irons, influence time, opening platinok uniform cloth.

USING WOOD GREEN PINE FOR MANUFACTURING PLATE MATERIALS

V.V. Konshin, A.N. Afankov, N.V. Koreneva, M.V. Vododokhova

The processing of Scotch pine woody crops was performed with the method of explosive autohydrolysis. Slabby materials were obtained on the basis of modified plant raw materials. The impact of processing and pressing parameters on performance properties was investigated.

Key words: explosive autohydrolysis, woody crops, slabby materials, ultimate tensile strength, water absorption ability.

PHYSICOCHEMICAL FEATURES OF HYDROTROPIC PULP AND STRUCTURAL-DIMENSIONAL CHARACTERISTICS OF ITS FIBER

V.V. Budaeva, M.N. Denisova, I.N. Pavlov, Yu.A. Gismatulina, G.V. Sakovich

It is the first time that physicochemical features of hydrotropic pulp samples obtained from easily renewable non-woody raw materials (Miscanthus and oat hulls) and structural-dimensional characteristics of the fibers have been studied. The findings revealed both common patterns and fundamental distinctions in properties of the Miscanthus and oat hull pulp samples, which are attributed to the use of a "mild" pulping reagent, the food preservative sodium benzoate. Samples have been obtained to conduct basic research into structural-dimensional characteristics of the fibers and to determine strength properties of the laboratory paper specimens; the research will be performed in Innovation-Technology Center "Modern Conversion Technologies for Bioresources of the North", Northern (Arctic) Federal University named after M.V. Lomonosov, in order to substantiate that non-woody fibers have a unique capability of forming specific types of paper.

Keywords: Miscanthus, oat hulls, hydrotropic pulping, pulp

RESULTS OF THE STUDY ON THE USE OF SMOKE SUPPRESSANT ADDITIVES TO DIESEL FUEL

A.A. Melbert, A.A. Novoselov, K.S. Bokov

Describe the characteristics of barium-containing smoke suppressant additives EFAP-B, Angharad-2401, Lubrizol-8288 for internal combustion engines operating on diesel fuel.

Keywords: smoke suppressant additive, barium, diesel fuel, exhaust gases, sooting.

THE THEORETICAL AND EXPERIMENTAL RESEARCHES OF CHANGE OF THE CONTRAST IN THE IMAGE OF THE TWO IR-LED BY CHANGING OF THE CONCENTRATION OF THE DISPERSED PARTICLES

A.A. Pinus, S.P. Pronin

In this article narrates about the theoretical and experimental researches of change of the contrast in the image of the two IR-LED by changing of the concentration of the dispersed particles. All calculations in this article are based on the deterministic model of the convolution of the two functions and the hypothesis about the possibility to approximate the images of the two IR-LED with the help of the function of the rectangular impulse with the determined duty factor. The comparison of the theory and experiment executed with the help of the developed experimental device. The results confirmed the truth of the mathematical model. We have determined the dependence of the contrast from the selected section. The calculations allowed to fix the influence of the selected section on the sensitivity of the system.

Keywords: contrast, concentraion of the despersed particles, environmental monitoring, optical signal, duty factor.

TECHNOLOGY OF PROCESSING OF THE SOLID RESIDUE OF PYROLYSIS OF TIRES IN A MOLDED FUEL

A.V. Papin, A.Y. Ignatova, A.V. Nevedrov, K.A. Shikanova

The article includes the possibility of obtaining a molded fuel from the solid carbon-containing residue of pyrolysis of tires. Bad quality solid carbon residue which obtained by pyrolysis of tires almost can not find their applications directly and stored at the production site of the enterprise. The obtained data show the efficiency of the process of enrichment of bad quality technical carbon by the method of oil agglomeration and, consequently, the possibility to obtain low-ash and low-sulphur concentrate, which can serve as raw material for the production of composite fuels. New types of fuels can be used for combustion in domestic and industrial furnaces.

Keywords: waste tires, pyrolysis, technical carbon, molded fuel.

MANAGING THE STAGES FORMULATION DEVELOPMENT LIFECYCLE MAGNESIA OIL-WELL DRY MIXTURE FOR CEMENTING OIL AND GAS WELLS

A. G. Shumikhin, M. V. Malimon

The article describes the approach to the development of the formulation of magnesia oil-well dry mixture for solution to cementation oil and gas wells, based on the formal processing of the accumulated data on the formulation of such mixtures used previously in the wells, taking into account the conditions of their construction and geological features of the deposit. To this end, two methods discussed in the article - the method of precedents and the method of expert evaluations. To reduce the time to search for information by all the participants of the life cycle of magnesia oil-well dry mixture creates a common information space on the basis of PLM-systems.

Keywords: oil and gas wells, magnesia oil-well dry mixture, formulation, expert evaluation method, precedents method.

CHEMICAL-ANALYTICAL SUPPORT OF ENVIRONMENTAL MONITORING OF SPACE-ROCKET ACTIVITY

A.D Kondratiev, T.V. Koroleva

Environmental monitoring is essential to ensure the safety of rocket and space activity. The most important element of monitoring is the right choice of methods for quantitative chemical analysis of samples of environmental objects and compliance with the necessary requirements. This article examines relevant aspects of analytical support work in environmental monitoring activities of the Baikonur cosmodrome, the analysis of the requirements and approaches to optimize the cost of chemical analyses.

Keywords: Missile and space activities, environmental monitoring, quantitative chemical analysis.

STUDY OF THE HOMOGENEITY AND THE COMPOSITION OF DETONATION NANODIAMOND HYDROSOLS BY MEANS OF THERMAL ANALYSIS

A.L. Vereshchagin, N.V. Bychin, V.N. Belyaev

The article presents the results of a study of dehydration hydrosols of detonation nanodiamonds by methods DTA/TGA at speed of heating 0.2, 0.5, 2.0 and 10 °C/min. It was established the presence of five types of hydrosols and proposed description of the dehydration process.

Keywords: detonation nanodiamond hydrosols, DTA, TGA, and various speed of heating.

A MATHEMATICAL MODEL FOR MODIFICATION OF EPOXY MATRICES WITH NANOPARTICLES

A.N. Blaznov, D.E. Zimin, E.S. Alemaeva, Yu.I. Ladygin, V.F. Savin

A model is suggested for the modification of an epoxy polymer binder with nanoparticles. Recommendations are given how to improve the binder properties through optimization of the matrix structure by concentrating nanoparticles. The model has been experimentally verified and its adequacy shown. An important role is played by the uniform distribution of particles within the binder, which is physically difficult to provide because detonation diamond nanoparticles are prone to agglomeration.

Keywords: modification model, nanoparticles, binder, epoxy matrix, glass fiber-reinforced plastic, detonation nanodiamonds

SELECTIVITY OF ALKYLATION OF 3-NITRO-5-R-1,2,4-TRIAZOLES WITH DIMETHYL SULFATE IN BASIC MEDIA

G.T. Sukhanov, A.G. Sukhanova, Yu.V. Filippova, K.K. Bosov, I.A. Krupnova

3-Nitro-5-R-1,2,4-triazoles were shown to react with dimethyl sulfate in an alkaline medium to form substitution products at all the three nitrogen atoms of the heterocycle. The ratio of the isomeric derivatives depends on temperature, medium polarity, and substituent at the C(5)-position in the nitrotriazole heterocyclic ring. Elevated temperature, polar solvents, and substitution of the alkyl group for the proton at the C(5)-position in 3-nitro-5-R-1,2,4-triazoles lead to an increase in proportion of the substitution products at the N(4) atom.

Keywords: 3-nitro-1,2,4-triazole, dimethyl sulfate, alkylation, selectivity, N-methyl-3-nitro-1,2,4-triazole.

PLATE MATERIALS BASED ON THE MODIFIED PINE BARK

N.P. Mus'ko, O.S. Beusheva, S.S. Saushkina

Modification of pine bark by explosive autohydrolysis, studied its chemical composition. Plate materials are made based on the modified pine bark and studied their physical and mechanical properties.

Keywords: bark, explosive autohydrolysis, board materials, physical and mechanical properties.