

GREEN TECHNOLOGY OF MICROCRYSTALLINE CELLULOSE

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ABSTRACT

In this paper, a green, zero-discharge technology for production of microcrystalline cellulose (MCC) was proposed. The hydrolysis of pulp was carried out with boiling 1-1.5 M sulphuric acid at liquid/solid ratio 5 for 1-1.5 h. The obtained MCC had average particle sizes of 50-150 x 15-20 µm, degree of polymerization of 150-170 and crystallinity of 71-73%. The proposed green technologies provide the complete utilization of acidic wastewater and their use for the production of valuable by-products, the selling of which covers main part of the production cost of MCC. Furthermore, all washing water is returned in the production line. Another version of green technology was used for the production of composite containing microparticles of MCC and CaSO₄. Thus, the cheap cellulose products, wetcake of MCC or MCC & CaSO₄ composite, were obtained without discharge of production waste into the environment. The obtained microcrystalline products can be used as auxiliary additive in pharmaceuticals, dental remedies, cosmetics, personal care and food products, as well as in various technical applications.

STRENGTH PROPERTIES OF THE NANOSTRUCTURED HARDENED CEMENT PASTE

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ABSTRACT

The article describes the findings of experimental studies in the field of nanostructured cement mortars collected for introduction in the processes of cementing oil and gas wells. Using the theory of "minor concentrations and disturbances" new cement slurry compositions have been worked out and evaluated.

CONTROLLING THREE-DIMENSIONAL NETWORK FOR MARINE AND AERONAUTICAL APPLICATIONS

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ABSTRACT

In structural materials and composites based on thermoset matrices, it is important to control reactions related to the crosslinking network. A fully cured system appears when a physical properties become non-variable and reach a plateau such as T_m , T_g , hardness, etc. The gel time G_t is a simple way to characterize the beginning of the crosslinking and the formation of a network or at least to mark the time beyond which the implementation is no longer possible. Therefore it is important, when processing a composites, to be able to measure and control the gel time. We discuss on this paper about the possibility to regulate the gel time according the domain concerned i.e. Marine and Aerospace applications.

TOTAL ANTIOXIDANT ACTIVITY OF PLANTES IN DYNAMICS

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ABSTRACT.

The authors carried out in the fieldwork with a new variety of amaranth «Lipetsky». In order to identify qualitative and quantitative laws of manifestation of the total antioxidant activity of amaranth leaves collected in different phases of plant vegetation and dehydrated in mild conditions of air-shadow drying and subsequent drying under harsh conditions 105° C to a constant mass of samples. Testing of plant samples was carried out using coulometric method of titration (author's method) of free bromine radicals generated in the aquatic environment by plant titrant (water extract dried in the shade at a temperature of 22°±3° C of leaves). Examined combined samples of 10 samples of plant leaves of different tiers and of different ages with field plot of 10 ha. Given biometric averages of plants during the growing season: growth, weight of plants, number of leaves, weight of leaves, stem and inflorescence of the plant. This shows the dynamics of total antioxidant activity of leaves of amaranth during the growing season. Tested the thermal stability of the total antioxidant activity (TAA) for combined extracts of 10 samples of leaves of different ages and from different parts of plants when they are drying at 105° C. The dynamics of change, TAA aqueous extracts of the dried amaranth samples with different stages of the growing season corresponds to the previously identified trends in the availability of high quantitative values in the phase of mass budding beginning of flowering and minima in the initial growth phases (3-8 leaves) and ripening of seed for different varieties of amaranth. Revealed the increase in antioxidant activity upon drying amaranth samples at 105 ° C., revealed a new type of qualitative dynamics of TAA, while vegetation with a characteristic quantitative changes by more than 50% for the beginning of the growth phase (the first phase of 3-8 leaves) and the final phase of seed maturation.

CONCEPT OF DEVELOPMENT THE MEDITERRANEAN COASTAL TERRITORY OF ISRAEL

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ABSTRACT

Possible ways of creating along the Mediterranean coast of Israel a transport and industrial infrastructure within the territorial sea, as well as an intellectual sea complex of rest, health improvement and mass tourism are considered.

PREPARATION OF INITIAL COMPOSITIONS IN THE MANUFACTURE OF WATER-DISSOLVED FORM-FORMING ELEMENTS

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ABSTRACT

This article is devoted to the development of materials for the manufacture of water-destroying forming elements. It solves one of the problems associated with the development of scientific principles for obtaining materials for the manufacture of water-destroying shaping elements with specified properties and the search for methods for the purposeful regulation of their properties. The article describes a promising method for obtaining water-destroying forming elements by structuring the initial dispersed system as a result of separation of a new phase from solutions. It is shown that for highly filled systems, it is possible to achieve a significant change in their properties due to a variation in the fractional composition of the filler, the size and shape of the inclusions. The structure of such materials has a decisive influence on their effective behavior and, above all, on their strength properties. When carrying out experiments to obtain water-destroying materials, the components of the dispersed phase based on sodium, potassium chlorides and silicon dioxide of various granulometric composition. In all cases, water-soluble organomineralic additives were used in the form of technical lignosulfonates. The additives of lignosulfonates perform several functions in the composition. They are both superplasticizers and binders. The obtained results showed that technical lignosulfonates could be used as promising additives with binders and superplasticizing properties for materials of water-destroying forming elements of increased heat resistance capable of operating under conditions of thermal curing of polymer composite materials