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Article 1

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The Dependence of the activity of the cement clinker from the input in raw slurry of petroleum coke

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Keywords: petroleum coke, cement clinker, hydraulic strength, heat consumption

Abstract

Petroleum coke has a high calorific value (up to 33,5 MJ/kg) and therefore may be partially (up to 25%) is used as an alternative fuel. Due to the excess temperature of the gas flow over the temperature of the material at approximately 750 °C, coke can be fed into the mill during grinding of raw slurry for wet process cement production. Burnable petroleum coke creates microportions material calcined at different temperatures and atmospheric gas, which leads to the formation of clinker with various properties of the individual phases of the clinker. The hydration of the clinker provides a dense structure and increased strength of the cement stone.

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Article 2

Zakharov A. I., Andreev D. V., Andreeva Zh. V., Neklyudova T. L.

Optimization of the form of porous ceramics

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Keywords: porous ceramics, shape optimization, form factor

Abstract

The purpose of this article is to illustrate the possibility of shape optimization, based on the criteria describing both the conditions of their operation and production, on the example of porous ceramic products used as an adsorbent material.

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Article 3

Molchan N. V., Krivoborodov Yu. R., Fertikov B. I.

The interaction of silicon with the chemical elements, forming with it a binary connection

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Keywords: concentration of electrons, density, enthalpy, silicon, structure of compounds

Abstract

The presented method of calculation and the calculation results are compaction and concentration of electrons in the binary silicides on the basis of reference data on the density of matter in the condensed state. The obtained data allow to analyze the mechanism of formation of structure of binary silicides to further predict the characteristics of the created materials. On the basis of the calculations are encouraged to use the compaction factor and electron concentration as a structural material properties.

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Article 4

Svetskaya N. V., Beletskii B. I., Lukina Yu. S.

Pore structure regulation of highly alkaline calciumsilicaphosphate biocomposite materials for osteoplastic surgery

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Keywords: bioactive glass, hydroxyapatite, biocomposition materials, technology of production, porosity

Abstract

Technology of biocomposite materials based on high-alkaline calciumsilicaphosphate glass 50S25N20C5P and calcium hydroxyapatite with controlled pore structure and adjustable pore size is obtained. An empirical regularity of the pore structure formation of biocomposite materials from the properties of the initial mixtures is established. The materials, approaching the level of properties of cortical and trabecular bone tissue are obtained.

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Article 5

Smoliiy V. A., Kosarev A. S., Yatsenko E. A., Klimova L. V.

Study of spectrophotometric characteristics of the decorative layer multilayered silicate composite heat-insulating and decorative material

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Keywords: multilayered silicate composite material, cellular glass, the granulated porous filler, decorative layer, color, spektrofotometric characteristics

Abstract

Possible options are considered, the look and color schemes of a decorative layer of multilayered silicate composite heat-insulating and decorative material is chosen. As a result of a research the spektrofotometric characteristics of a decorative layer of multilayered silicate composite heat-insulating and decorative material optimum amounts of the dyes necessary for creation of a decorative layer of the set color are established: chromic green antrakhinonovy – 0,10 mas. %; the oxide is lame technical, the OHP-1 brand – 1,00 mas. %; a pigment blue ftalotsianinovy – 0,15 mas. %; a pigment red iron oxide – 1,50 mas. %; the pigment is yellow iron oxide, the Zh-0 brand – 1,00 mas. %; a pigment cadmium orange – 1,50 mas. %.

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Article 6

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Method of detoxication of soils by silica sol in transportation systems

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Keywords: detoxification, strengthening, soils, ions, heavy metals, sol, gel

Abstract

Method of heavy metal ions detoxication is suggested for soil. Thermodynamical calculation of the detoxication reactions is suggested as well for Pb(II) and Cu(II) as samples. It is being shown the resolution of the reaction due to negative change meaning of Gibbs energy.

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