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Article 1

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Silicate modulus as a structure determine criterion

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Key words: glass, structure, silicate modulus, factor of structure connection, standard isobaric-isothermic potential, unit bond energy

Abstract

The necessity using of silicate modulus as a structure determine criterion was proofed. The connection between silicate modulus, factor of glass structure connection, standard isobaric-isothermic potential and unit bond energy was investigated for near 100 glass forming compositions.

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Article 2

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X-ray and infrared spectroscopic study of natural zeolite

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Key words: X-ray diffraction, IR-spectrum analysis, natural zeolite, mordenite, crystal system, crystallization

Abstract

Nakhchivan natural zeolite (mordenite) was investigated by X-ray and infrared spectroscopic analysis methods. Mineral crystallizes in the orthorhombic crystal system, it contains mainly mordenite phase and a small amount of quartz. Installed chemical formula of mordenite, in which there are cations of sodium, potassium and calcium.

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Article 3

Afanas'ev D. A., Sarkisov Yu. S., Kugaevskaya S. A., Safronov V. N., Gorlenko N. P., Kovaleva M. A., Shevchenko M. Yu.

Spectral studies of mixing water, treated with constant magnetic field

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Key words: mixing water, aqueous solutions of electrolytes, disperse systems, magnetic field, spectral studies

Abstract

Discussions on the interpretation of experimental data on the influence of magnetic field on water, aqueous solutions of electrolytes and different disperse systems, continues during all centuries-old history of studying of this problem. Thus the irreproducibility, discrepancy and sometimes the complete opposite of the results of researchers force to look for objective methods of analysis received in the automatic mode and do not depend on the person. The article presents the results of a study of mixing water subjected to the magnetic field effect with application of modern methods of spectral analysis (infrared spectroscopy, ultraviolet spectroscopy, electron paramagnetic resonance spectroscopy, nuclear magnetic resonance spectroscopy).

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Article 4

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Use of limestone of the Republic of Bashkortostan in production of cement

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Key words: Portland cement, composition of clinker, limestone additive, fineness of grinding, strength of cement

Abstract

The feasibility of using limestone as the main component of cement produced in the Republic of Bashkortostan is investigated. It has been established that the strength characteristics of cement stone are preserved when you replace up to 10 wt. % of cement limestone. Further increase in the share of limestone leads to the strength decrease of samples, mainly due to insufficient content of calcium aluminate in the clinker of local production. Increasing the fineness of cement mixture containing limestone not only helps to preserve the strength of the cement stone, but also provides its reserve. Particles of limestone content in cement with the specific surface area of about 4000 sm²/g is not more than 10 wt. %, play the role of micro-filler, and the strength of such cement exceeds the strength of the original Portland cement.

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Article 5

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Modifier based on zeolite-containing rocks for cement compositions

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Key words: modifier, filler, hydration, hydrosilicates, high-strength concrete

Abstract

As a result of theoretical and experimental researches the possibility of obtaining effective composite binders based on mineral additive aluminosilicate and superplasticizer is established. Application of the developed complex modifier allows to produce concrete mixes with high rate of a set strength, that contribute to a significant increase of production efficiency concrete and ferroconcrete products.

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Article 6

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Influence of coal waste on the porosity of heat-insulating materials based on interslate clay

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Key words: heat-insulating material, slimes flotation coal enrichment, interslate clay, roasting, density, heat conductivity

Abstract

Use of slimes flotation coal enrichment in ceramic masses on the basis of interslate clay without application of traditional natural materials allows to obtain heat-insulating materials with heat conductivity and density accordingly less than 0,20 W/(m·°C) and 1200 kg/m³. Carbonaceous wastes (slimes flotation coal enrichment and waste products of combustible slates) not only increase the porosity of pottery, but also contribute to uniform sintering of the ceramic crock. Obtaining ceramic material from power system waste without application of traditional natural raw materials promotes recycling of industrial wastes, environmental protection and expansion of raw materials base for production of construction materials.

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