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Article 1

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Thermodynamic analysis of the lime slacking process using Born – Haber cycle

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Key words: chemical thermodynamics, Born – Haber cycle, gas-silicate materials, calcium hydrosilicates, calcium hydroaluminates, β -cristobalite, β -tridymite

Abstract

By thermodynamic calculations established the mechanism of hydration of lime – the main component of the gas-silicate materials. As a result, it became possible to conduct targeted searches of additives that slow the lime slacking process. The hypothesis of the transformation of β -quartz at the temperature 150–200 °C into β -cristobalite and β -tridymite was justified. This causes the Hedwall effect and an accelerated synthesis of the calcium hydrosilicates and calcium hydroaluminates during the autoclave treatment of gas-silicate materials.

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Article 2

Tyukavkina V. V., Kasikov A. G., Gurevich B. I., Semushin V. V.

Magnesia cement hydration products, modified by the addition of amorphous silica

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Key words: magnesia binders, amorphous silica, strength, water resistance, hydration, phase composition

Abstract

A complex of physical and chemical methods of analysis has been employed to investigate the effect of fine-grain silica, obtained from copper-nickel smelter slag, on hardening and phase composition of magnesia oxychloride binder. In the composition of the magnesia cement, modified by the addition of silica, along with the main products of hardening binder found oxyhydrochloride compound of magnesium and silicon, which contributes to the improvement of water resistance of cement stone. The average composition of the magnesia binder, modified by the addition of silica, is reported.

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Article 3

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Influence of parameters foam-forming mixture on the morphology of insulation foam glass

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Key words: foam glass, heat insulation, heat conductivity coefficient, porosity, strength, water absorption, foaming, annealing, heat-insulating material

Abstract

One of the most promising directions of researches in the building industry is development of resource-saving technology of producing heat-insulating materials, efficient in saving the energy resources, spent

for providing and maintaining the necessary temperature conditions indoors. Increased requirements to the heat insulation of buildings pose for technologists and designers the new tasks associated with improved the heat retention properties of materials used in construction. The article describes the parameters of the foaming mixture, affecting the intensification of pore-formation processes and the high-porosity heat-insulating materials structure formation.

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Article 4

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Photo- and radiation-chemical stimulation of hydration processes and structure of oxide systems

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Key words: oxides, laser radiation, ultraviolet radiation, gamma radiation, durability, structure of hardening

Abstract

The influence on the strength and other performance characteristics of oxide systems based on elements of the second group of the periodic system D. I. Mendeleev laser, ultraviolet and gamma radiation. It is shown that the effect of these external influences on the hydration processes and structure in many ways is the same – to improve the reactivity of the systems studied.

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Article 5

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High-strength cellular concrete

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Key words: cellular concrete, Portland cement, mechanical strength, lime and sulfur mixing, hydrazine

Abstract

Use in the manufacture of cellular concrete lime-sulfur mixing obtained by dissolving sulfur heated to 95 °C mechanically mix the lime suspension provides increased mechanical strength and coefficient of constructive quality cellular concrete. It is caused by formation of polysilicates in structure of a cement stone and its interporous structure.

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