TECHNIQUE AND TECHNOLOGY OF SILICATES

INTERNATIONAL JOURNAL OF BINDERS, CERAMICS, GLASS AND ENAMELS

Vol. 22, no. 2 **April – June, 2015**

Article 1

Rakhimov R. Z., Rakhimova N. R., Gayfullin A. R.
The influence of additives in Portland cement glinit from polymineral clay on the properties of hardened cement paste
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Key words: Portland cement, additive, glinit, clay, mineral, calcination, grinding, hardened cement paste, properties

Abstract

The results of comparative studies of influence of additives in Portland cement glinit obtained by polymineral non-kaolin clay calcination at temperatures of 400–800 °C and ground to a specific surface area of 250–800 m^2/kg and metakaolin of specific surface area of 1200 m^2/kg on the compressive strength, average, density, water absorption, softening coefficient of hardened cement paste are presented.

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Article 2

Mulevanov S. V.
Improvement the technological characteristics of alkali-free aluminoborosilicate E-glass based phosphate doping

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Key words: aluminoborosilicate glass, small additives, phosphorus oxide, fluorine, apatite, phosphate tailings, clarification, crystallization, cyclogram

Abstract

The possibility of improving the process of melting and refining calciumaluminoborosilicate glasses due to the introduction of small additives of phosphorus oxide. As phosphate raw materials can be used apatite or phosphate tailings. The optimal concentration of P_2O_5 is in the range 0.4–0.6 wt. %. Thus observed the lowest densities due to increase of polymerization of the structural skeleton and the reduction of the crystallization ability of glasses. The technological scheme of the application of phosphate tailings in the production of staple fiber type E.

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Article 3

Pshenichnyy G. N.
On the sawtooth hardening of cement concrete
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Key words: stage-surface hydration of cement, microconcrete, residual surface-active zone, discharges strength, sawtooth hardening, reliability concrete

Abstract

Showed a sawtooth increase the strength of cement concrete, which is based on stage-superficial hydration changes. The interaction of «cement – water» is performed by stepwise formation in the interfacial zone of transition energy complexes with their development (energy storage), reaching the critical level, the collapse (the appearance of active particles) and fleeting (explosive) chemistry of the phenomenon. Clarified «constructive arrangement» metastable transition complexes, which are dispersed in a certain way on the clinker substrate spatial polymolecular composition tent configuration in terms of the size of about 0.5 microns. Hydration process includes consecutive filling microsurface clinker particles of amorphous silicate with the consequent slowing hardening and the formation of residual surfactant zones detected by microscopy as cylindrical pores and channels in hydrosilicate of the size of 0.3 microns or less. These non-hydrated zone are objects of chemical transformations later, the cause of internal stresses and discharges microconcrete strength (concrete and reinforced concrete as a whole), that requires mandatory accounting in the science of concrete and construction practice.

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Article 4

Samchenko S. V., Makarov E. M.

Influence of superplasticizer on ettringite crystal morphology

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Key words: ettringite, hydration, superplasticizer, crystal growth, crystal morphology

Abstract
Influence of superplasticizer on ettringite crystal morphology was studied. Conducted radiographic and IR spectroscopic studies of morphological forms crystals of ettringite. It is shown that superplasticizer contributes to the formation large quantity of crystallization centers with small acicular ettringite crystals.

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Article 5

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Thermodynamic analysis of hydration of alite and belite
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Key words: alite, belite, hydration, free energy, ion activity

Abstract

Using the method of thermodynamic cycles of Born – Haber and ionic theory of solutions Debye – Huckel calculations allow to clarify scheme of the hydration belite and alite. Verification of the results produced by the heat of hydration of these minerals.

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Article 6

Krivoborodov Yu. R., Yas'ko D. A.
Influence of plasticizers on the properties of cement with the additive of calcium sulfoaluminate
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Key words: sulfoaluminate cement, strength, expansion, water requirement, setting

Abstract
Results of tests of Portland cement with the additive of calcium sulfoaluminate and superplasticizers are given. It is shown that superplasticizers reduce water requirement of cement paste, lengthen setting time, provide increased the strength of sulfoaluminate cement. Portland cement with the additive of calcium sulfoaluminate has high strength and expansion. Superplasticizers added to this mix cement provide increased strength and stabilization of cement paste expansion.

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