

Nanocomposites and nanomaterials

Heatexpanded graphite is effective nanoadditives in cement

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Researches are devoted to studying of a possibility of use of heatexpanded graphite as an additive to modifier of cement composites. Works [1] showed positive experience of use the nanotubes for increase of mechanical properties of cement mortars. At the same time slight increase of composites strength (to 30%) is noted, at rather high cost of a nano-additive that is unacceptable for mass construction. It was offered to use carbon material which is produced in Kyiv on “TM Spetsmash”, and is raw materials for receiving nanotubes and nanoplates.

Heatexpanded graphite was entered into composition as a component of a complex additive with plasticizers. Content of nanosubstance was changed from 0,25% to 0,5%. Studying of physico-mechanical properties of cement showed that compressive strength of samples increased by 40% and bending strength - for 20%. Changing a chemical composition of cement and type of plasticizer, it is possible to regulate physico-mechanical properties of a composite and to give its special properties.

So, use of cement with an additive of granulated blast furnace slag (CEM-II) promotes increase of the activity of cement samples and receiving a cement stone exceeding initial structure with the strength at 2 brands. The received results can be explained with changes of processes of structurization in the nanomodified cement stone. Formation of a large number the needle similar crystals wich reinforcing a stone, and the lamellar chaotically located crystals is observed. However after 1 year of curing the microstructure is presented by the new growths forming a dense matrix with regularly located packings of the low-main hydrosilicates of calcium. It is also noted ability of crystals to be increased on a surface of carbon particles.

The received composites are perspective to be used as protective waterproofing and crack-proof coverings of concrete designs. and restoration of hydraulic and underground construction.

1. *Sukhanevych M.V, Mala O.V.* Features of processes of structurization of the cement compositions nanomodified by heatexpanded graphite// Messenger ODABA.- Odesa, 2016. -№ 62.-P.165-170.