

## **Nanocomposites and nanomaterials**

### **The water polyurethane dispersion, modified carbon nanotubes - effective component cementitious compositions**

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The use of nanotechnology in the construction industry is becoming a large scale, as in the modification of building materials nanoscale additives is not only the improvement of existing ones, but also provide new material properties [1]. Previous studies have shown a positive effect on the strength of the cement composition in the presence of carbon nanotubes [2].

The aim of this study is to investigate the impact of nano-sized water polyurethane dispersion (86nm), modified by carbon nanotubes, of basic physico-mechanical and deformation properties of the cement composition.

To study samples were prepared on the basis of portland cement (CEM I) and an water polyurethane dispersion with carbon nanotubes. Investigation of the basic physical and mechanical characteristics of the samples showed that the compressive strength increased by 35%, the bending - by 25% compared to a control sample.

When crack resistance comparative study of the method has been found that the presence in the cement composition an aqueous polyurethane dispersion increases the fracture toughness of more than twice.

Thus the possibility of synthesis of the cement composition with improved physical-mechanical and deformation properties by introducing into its composition nanoscale additives of organic origin in an water medium (polyurethane dispersion) with carbon nanotubes, that can be effectively used to create a thin layer of cement coverings for special purposes: repair, waterproofing, corrosion and the like.

1. *P.J.M. Bartos, J.J. Hughes, P. Trtik. Nanotechnology in construction // RSC publications. – 2004. - P. 150–157.*
2. *Sukhanovich M. Nanotubes and nanoplates as effective additives in cement // Abstract book NANO-2015– Lviv: Eurosvit, 2015. P. 215.*