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Microstructural analysis of allowanced cementitious mortar with diferents nanoparticles

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Abstract

Nanomaterials are materials with new properties that interact through complex processes at the nanometric scale that include reactions in the quantum field and which still represent an unknown for many researchers. Improving the performance of cement mortar is generally achieved with the help of various additions. Nanoparticles have recently become a material very often used in the additive of various recipes of cementitious materials and not only, because at such a size their properties change surprisingly and their behavior passes into the quantum domain where the size and shape can produce new nanostructured materials with functions of self-repair or self-assembly. Even if progress in this field has been made and these nanomaterials have been introduced as part of many new and modern material recipes, there are still questions related to their true influence on the physical-mechanical properties. The current paper presents the achievements in the field regarding the use of nanomaterials in the cementitious materials component, but especially the influence on their physical-mechanical properties, which seem to be slightly different depending on the technical conditions of production. In parallel the mechanical properties such as compressive strength and flexural strength were analyzed to understand the behavior and influence of nanoparticles on them. Also structural and morphological studies of samples was performed by X-ray diffraction, optical microscopy, scanning electron microscopy. As a result, presence of the (ZnO, Fe:ZnO, Fe3O4 NPs) had prominently higher mechanical properties compared to that of the traditional mortar.

Keywords: *cement mortar, mechanical characteristics, microstructure analyses, nanoparticles*

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