The influence of nano-Fe_3O_4 on the microstructure of cementitious composites

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Nanotechnology is one of the most active research areas with both novel science and useful applications that has gradually established itself in the last two decades. Nanoparticles belong to be prospective materials in the field of civil engineering. Due to their unique properties, nanomaterials can contribute to the improvement of wide variety of cement-based composite properties.

Most of the research are focused on the influence of nanosilica and titanium dioxide on the properties of cementitious composites. There are just few studies focsed on the influence of nano-Al_2O_3, nano-Fe_2O_3 and nano-Fe_3O_4 in comparison with that regarding to nanosilica and titanium dioxide.

In the presented study the influence of nano-Fe_3O_4 on the microstructure of the cement mortars has been tested.

Study has shown that nanomagnetite can be successfully applied in the cement-based composites and seems to be interesting material for concrete applications. Mercury intrusion porosimetry (MIP) tests have shown that nano-Fe_3O_4 can act as a filler to improve the microstructure of cement matrix. Moreover, nano-Fe_3O_4 contributed to improve the strength of tested mortars and did not affect negatively the rheological properties.

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