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# NEW HIGH PERFORMANCE NANOADDITIVES FOR PHOTOCATALYTIC CONCRETE: SYNTHESIS AND STUDY

**Nanotechnologies open up broad prospects for the creation of nanocatalysts, which are being more and more used in solving many problems associated with the protection of environment. Their behavior is directly related to the unique physical and chemical properties that are provided by quantum size effects, as well as the large specific surface area.**

**It is known that the presence of photo catalysts in the construction segment of nanomaterials is becoming more prominent. One of the most significant achievements of the last years are photo catalytic active cement composites, including cements and concretes produced with the use of nanoparticles of titanium dioxide $TiO_2$ sensibilized through a nanotechnology . Currently they are widely used in practice to produce self-cleaning structures and to make clean an air of megacities.**

**Further research in the field of development of new high-performance photo catalysts based on $TiO_2$ nanoparticles seems to be very relevant, because such R&D could significantly improve the technical characteristics of photo catalytic cements and concrete.**

**In this paper an improved method to produce photo catalysts has been proposed. New synthesized products are based on $TiO_2$ nanoparticles applied on different inert carriers, including nanosilica. It was showed that these products can be used as a high performance photo catalyst in cement and cement-gypsum composites suitable for the conversion processes of nitric oxide and volatile organic substances, and air purification. It was determined that performance of the cementitious composites containing synthesized samples is 1,5...3,0 times higher than that for the commercial sample of the nanotitanium dioxide.**

**The use of mechanical mixture of nanotitanium dioxide and inert supports is less effective and subjected to the «dilution law», in general.**

**Key words:** titanium dioxide, nanoparticles, inert support, photo catalytic properties, cementitiuos building materials, pollutants.

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