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Self cleaning cement composites containing TiO₂ and nano-silica

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ABSTRACT

At present, self-cleaning and anti-pollution concrete products are produced by various companies for use in the facades of buildings and road floors, and have been widely used in Europe and Japan. The facade of the building, as one of the most important items of the building, is always exposed to sunlight and harsh weather conditions, and its repair and repair will not only have high costs for the owners. Production of catalytic cement and new concrete compounds with titanium dioxide coating was designed and implemented for roofing and facades of buildings. In this paper, the effect of using nanosilica and titanium dioxide on the self-cleaning properties of concrete is investigated. Four designs were tested with zero, 2.5, 3.5 and 5% replacement of cement with TiO₂, each with 2% nanosilica percent adsorption percentage. Reducing the color change of soot between the designs of the studied mixtures shows the positive effect of TiO₂ in reducing the color of soot pollution on the concrete surface. An increase of titanium dioxide up to 5% leads to a decrease in soot color in the samples, and this is due to the photocatalytic properties of titanium dioxide for higher percentages. The intense chemical activity of titanium dioxide in the presence of ultraviolet rays can prevent bacteria and dirt from sticking to the facade of concrete walls and buildings.

Keywords

Titanium dioxide, Prefabricated facade, Nanotechnology, Self-cleaning property, Nanosilica.

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