TiO2 and SiO2 Nanoparticles, Most-used Nanomaterials in Construction Industry Products

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Recent analysis of Nanotechnology Products Database (NPD) shows that the nanoparticles TiO2 and SiO2 have been used most in construction industry nanoproducts.

Due to its need for firm, durable, and efficient materials, construction industry is among the most important consumers of nanostructures. That is why nanotechnology has entered all parts of the building including framework, facade, building systems, and interior design.

A recent study on the nanoproducts in NPD database shows that until 1st January 2018, 600 products from 227 companies from 31 different countries have been registered in construction industrial sector. NPD database has monitored materials for the making of walls and framework, structural and masonry materials, paints, coating, and chemicals that are used in various parts of the construction products.

Study of the products shows that the nanostructures of titanium dioxide, silicon dioxide, silver, graphene, carbon nanotubes, lithium nanoparticles, aluminum oxide, calcium silicate hydrate, boron nitride, silicon, calcium carbonate, zinc oxide, and aluminum sulfate have been used in them.

Titanium dioxide (TiO2) nanoparticle has been used in 109 brands in construction industry. This photocatalyst has a good ability to create a wide spectrum of self-cleaning, antibacterial, hydrophobicity, fire extinguishing, properties, and the resistance against pollution, algae and fungi growth, chemicals such as acids and alkaline, fingerprint, and corrosion. Coats that contain titania nanoparticles have a strong capability to adhere to the surface and they have a good mechanical firmness against scratch and wear. Among the monitored companies, 70 have used titania nanoparticles in their products. The United States, Germany, China, and Spain are the main users of this nanomaterial in their construction industry products.

Silicon dioxide (SiO2) has been used in 271 products in NPD, but it has been reported only in 89 products in construction industry. Brands from construction materials, paints, coats, chemicals, and materials for the building have been recorded in NPD. They include tiles, concrete, cement, pipes, glasses, solutions, and coats. Germany, the United States, Spain, and Iran are the main users of silicon dioxide nanoparticles in construction industry products. These nanoparticles create various properties in the products. Silisium dioxide nanoparticles have a wide spectrum of hydrophobicity, self-cleaning properties, and the resistance against pollution, algae and fungi growth, chemicals such as acids and alkaline, fingerprint, and corrosion.

Silver nanoparticle ranks 3rd in this industry. The most important property of silver nanoparticle is its antibacterial feature which can be observed in almost all products that contain it. This nanoparticle has been reported in 860 products out of all recorded brands in the databank and in 41 products in construction industry. Tiles, paints, and antibacterial solutions are the most important products that contain silver nanoparticles. The United States, Germany, China, and South Korea are the main users of silver nanoparticles in construction industry products.