

Photocatalytic additive for self-cleaning surfaces

CSIC has developed new photocatalytic material composed of TiO₂-anatase nanoparticles and an inorganic binder, which preserves the properties of the catalyst and adds resistance and stability, allowing the photocatalyst to be used as additive in paints, coatings and construction materials.

Industrial partners, interested in licensing the material for its industrial development and subsequent commercialization, are being sought.

An offer for Patent Licensing

Composite material with stabilized TiO₂ nanoparticles

TiO₂ is the world's leading pigment for providing whiteness, gloss, and opacity and is widely used in paints. In this kind of application, the particles that are usually added are in the crystallographic form called rutile, as it is more stable. However, the best photocatalytic activities are showed by the form called anatase when it is in nanometric format. To stabilize this type of nanoparticles is necessary to develop binders that disperse them, maximizing their effectiveness.

This new composite material shows a high photocatalytic activity and high stability due to the mixture of the TiO₂-anatase nanoparticles with a small proportion of an inorganic binder, which replaces the traditional polymeric binders that are used in additives and which have lower lifetimes, especially when exposed to light.

The photocatalytic activity of the composite was studied by applying ultraviolet light to methylene blue deposited on the new material and on pure TiO₂, resulting in the same degradation speed. Likewise, the measurement of the BET surface was only decreased by 15% in the new material. The flexural strength of the composite was also measured, increasing up to double with respect to the particles without binder.



Can of white paint (source: wikkimedia commons)

Main innovations and advantages

- The composite material can be handled without any risk to health or the environment, since the nanoparticles are supported in the binder and are not released into the environment
- The use of an inorganic support avoids the degradation in the color of the paint or the construction material due to the decomposition of the organic component commonly used as a binder.
- The additive provides self-cleaning capacity to paints, helping to remove carbon produced by atmospheric pollution or other types of stains or paint such graffiti.
- The additive can also be used in building materials for rooms that require self-cleaning.

Patent Status

PCT patent application filled

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