Application of Photocatalytic Filler Materials for the Preparation of Functional Composites with Designed Properties

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Several materials can be utilized to obtain composite systems, including photocatalyst filler materials, which can enhance both inorganic and organic matrices with photoreactivity, as well. By the proper choice of matrix materials and surface functionalization, the surface properties, and therefore the antimicrobial and self- cleaning nature of the photocatalyst filler materials can also be tuned in order to achieve the best performance in specific scenarios [1,2]. Thanks to this versatility, visible light-active composite materials have increasing worldwide popularity in healthcare and environmental remediation applications as a demand for greener, cheaper and preferably chemical-free solutions emerges in these fields [3,4].

In this presentation, the preparation and characterization of visible light-active plasmonic Ag-TiO_2-containing composites are introduced: a brief overview will be given concerning our recent work on incorporating the photocatalyst nanoparticles into different inorganic and organic matrices, featuring the resulting photocatalytic, surfacial and mechanical properties. To open new perspectives in photocatalysis, stimuli-responsive systems with real-time tunable wettability and photoreactivity will also be introduced. Owing to these beneficial properties, these composite materials may seek potential roles in sophisticated liquid manipulation applications.

References:

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