

*Title:* **Functionalization of activated carbon by nanoparticles of titanium dioxide**

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Currently, one of the concerns of big cities is water and air pollution, which is why we must look for ways to reduce or counteract them. The photocatalytic titanium dioxide capacity ( $\text{TiO}_2$ ) has gained relevance as a material that can be used in the elimination of organic pollutants among many others. On the other hand, activated carbon (AC) is used as adsorbent of different synthetic organic pollutants, but it has a limited adsorption capacity. Therefore, if it is possible to use AC as a support for the nanoparticles of the  $\text{TiO}_2$ , it would be easier for the molecules that adhere to the AC to migrate to the  $\text{TiO}_2$  surface to be degraded per photocatalysis

This Final Degree Project aims at the synthesis of  $\text{TiO}_2$  nanoparticles through the sol-gel method. Subsequently to the synthesis, the titanium dioxide obtained will be deposited on activated carbon (AC) by immersion in the gel. After, the consequence of using different solvents (ethanol, isopropanol, butanol, and octanol) or additives (sodium dodecylbenzene sulfonate) in the sol-gel method to obtain nanoparticles will be studied.

Samples of  $\text{TiO}_2$  deposited or not in AC have been analysed with methylene blue (MB) adsorption tests, by electronic scanning microscope (SEM) and infrared (IR) spectroscopy. It has also been sent to analyse the specific surface area, the total volume of pores and the average pore size at department of Materials Science of Alicante University. Thanks to the Final Degree Project "Design of a photocatalytic reactor sensors-based analysis for the elimination of formaldehyde through photocatalyst,  $\text{TiO}_2$ " by Adrián Esteban, a comparison of the photocatalytic capacity of the samples for formaldehyde removal has been carried out.

The tests carried through permit to confirm that the activated carbon was coated with titanium dioxide particles. Finally, the images realized with the SEM showed the differences shape and size between the particles synthesized with different solvents.