

## Photodegradation of Hydrocarbons Using Nanostructured TiO<sub>2</sub>/Cu Powder

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Nanostructured titanium oxide is one of the most promising materials in photocatalysis<sup>[1]</sup>. An increasing interest has generated its application in the photodegradation of hydrocarbons, due to the growing concern in relation of all kind of oil spills challenging the health of our environment<sup>[2]</sup>. However the effectiveness of TiO<sub>2</sub> alone has been shown to be very limited<sup>[3]</sup>. Several methods have been devised to increase the photodegradation ability of nanostructured TiO<sub>2</sub><sup>[3]</sup>. However the process involved are expensive and complex. In this work we explore the photodegradation of hydrocarbons using a novel nanomaterial TiO<sub>2</sub>/Cu generated by nitrogen plasma discharge. The process is studied in samples in which heavy oil obtained from Dos Bocas in the state of Tabasco in Mexico is dissolved in a mixture of acetone-methanol-water, with nanostructured TiO<sub>2</sub>/Cu powder. The samples were irradiated with UV/Vis light using a Xenon lamp operating at 400 W to simulate the radiation of the sun. In order to prevent the evaporation a system consisting of Erlenmeyer's balloon modified with a refrigerant was developed. The study of the evolution of the samples after the irradiation was done using Uv-vis emission, IR spectroscopy and photoacoustic piezoelectric detection. The results obtained with these techniques show an important effect after 1 hrs of irradiation. Those changes indicate that the degradation of compounds with complex structure is occurring.