PhD Candidate Profile

Name:
Marcelino Pérez Edgar

Research Group (if relevant):
Photochemistry

Research Centre (if relevant):
Chemical Technology Institute (ITQ,UPV-CSIC)

Department/School(s) (if relevant):
Polytechnic University of Valencia, Campus Vera, Spain

College:
UPV

Supervisor(s):
Prof. Dra. Maria Luisa Marín

Dr. Francisco Boscá

Funding body:
PhD Scholarship 709357 from CONACYT, Mexico

Area (field) of study:
Environmental chemistry, removal of pollutants using organic photocatalysts and solar light

Thesis Title:
Synthesis of organic catalysts supported in microstructures of SiO_2 for the degradation of solar UV filters through heterogeneous photocatalysis

Abstract:
UV-filters are widely used in cosmetic formulations due to its capacity to avoid or reduce the risk of skin cancer that the solar irradiation produces. Nevertheless, in recent years the concentration of these contaminants on water is increasing and increasing. For this reason, these pollutants are becoming a important topic for the Europe Union due to the risk that it can produce to the humans and animals. In this sense, the developing of new economically and sustainable methods for the elimination of these pollutants is getting more interest. Photocatalysis has been growing in recent decades, with inorganic photocatalysts, such as TiO_2, being the most used. Nevertheless, satisfactory photocatalytic efficiency has not been reached due to the high excitonic recombination activity and a wide band gap (3.2 eV) which means that TiO_2 is only able to absorb in the UV region of solar light. For these reasons, researchers have turned their attention to the synthesis of organic photocatalysts. Compared to inorganic photocatalysts, they show strong visible light adsorption, are cheap, abundant element resources, and have structural tunability. Perylene diimide (PDM) is widely used as a

pigment, photoreceptor and photofunctional product in its application in fluorescent sensors and photovoltaic cells. This organic compound offers attractive optical and electronic properties due to their high oxidation potential, high molar extinction coefficient, and good thermal and photochemical stability. Furthermore, PDM based compounds have low water solubility and a high tendency to aggregate. PDM's ability to anchor to SiO_2 microparticles make it a promising material for waste water remediation due to the enhanced capacity to recover.

Collaborations:

N/A

Publications:

N/A

Presentations:

E. Marcelino-Pérez.; F. Bosca.; M. L. Marín.; "Synthesis and characterization of a perylene diimide anchored to SiO_2 microparticles for photocatalysis approach. III Summer school of the European PhD School on Advanced Oxidation Processes. 3-7 June 2019, Alcoy, Spain. Poster communication.