

# FINAL MASTER PROJECT PROPOSAL



## Title

**New solar-light-active photocatalysts for persistent organic pollutants (POPs) removal in wastewater**

## Supervisor(s)

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## Summary of the project

Advanced oxidation processes (AOPs) are very effective in removing persistent organic pollutants (POPs). However, they are expensive because they require high consumption of energy (UV-light) and expensive reactants. With the aim of reducing prices, we will look for a process able to work under solar light.

The MAIN OBJECTIVE of this project is the development of new photocatalyst for removal, or valorisation, of persistent organic pollutants under visible or solar light. In the literature, we can find several photocatalysts able to generate free radical species, which can degrade the POPs in aqueous medium, after illumination. However, they are not efficient under visible or solar light. In this context, we suggest synthesising composites based on titanium oxide and metallic sulfides, efficiently absorbing most wavelengths of the solar spectrum, and use them in the photodegradation of POPs in wastewater.

MAIN TASKS of the project:

- Literature review: limitations of traditional photocatalysts, what are wastewater pollutants, how to detect them, how to remove them
- Synthesis of new titanium oxide/metallic sulfides composites. Chemical and structural characterisation.
- POPs photodegradation (or valorisation) under visible (or solar) light study employing the synthesised photocatalysts. Operating conditions optimization.
- Degradation product characterisation. Comparison with traditional systems.

This project combines synthesis and characterisation of nanomaterials, and their use in pollutant removal processes. For that reason, it will be supervised by two researchers with complementary background.