

Ph.D. Position Available at UC3M

Title: Metal-Organic Framework Composites for Wastewater Treatment and Sustainable Soil Fertilization

Description:

This PhD thesis will be carried out in the framework of the **CIRQUA project** that is funded by the **PRIMA (Partnership for Research and Innovation in the Mediterranean Area Programme) Foundation** with the support of by the European Union's Horizon 2020 Programme. The CIRQUA project entitled: **Integrated Approaches at Local Scale for Enhancing Water Reuse Efficiency and Sustainable Soil Fertilization from Wastewater's Recovered Nutrients** aims to improve both water quality and quantity through better water management practices, while simultaneously enhancing soil fertility. This will be achieved by converting biomass into metal-organic framework-based composites (MOFCs) with high organic content. These solids can act as conducting solids able to store nutrients, i.e. nitrogen and phosphorus. These MOFCs will be produced by using elements commonly applied as plant nutrients. MOFCs synthesized will be applied directly to soils, serving as soil improver and low-cost fertilizer, free of pathogens.

The main objectives of this PhD thesis are: (i) To synthesize Metal Organic Framework (MOF) nanomaterials to be used in wastewater treatment and soil fertilization (ii) evaluate MOF and MOF composites nanomaterials stability and capacity to absorb pollutants (iii) and produce innovative MOF-based composites as novel fertilizers for upscaling applications

The candidate will acquire knowledge acquire skills in synthesizing and characterizing materials, specifically, Metal-Organic Frameworks (MOFs) for water treatment and soil fertilization. They will specialize in assessing MOF stability, pollutant absorption, and innovatively developing MOF-based composites as fertilizers. The interdisciplinary research involves environmental

science, soil science, nanomaterials, fostering critical thinking and effective communication. The researcher will gain expertise in several areas of high employability and experience in both fundamental and applied research opening perspectives in both academia and industry.

Interested candidates should submit their Curriculum Vitae (in English), a brief cover letter addressing their motivation and scientific interests, as well as their academic certificate, including grades and dates, issued by the corresponding academic institution.

Requirements:

The candidates should be highly motivated to do research aiming to contribute towards. They should have undergraduate studies in Chemistry, Materials Science, Biology or Chemical Engineering, with excellent academic credentials.

Candidates with prior knowledge or experience in Metal Organic Framework synthesis will be positively evaluated. Experience in analytical chemistry techniques. Proficiency in English, oral and written is required.

Conditions

Full-time contract including security coverage

Start date: between 15 th Feb 2024 and 15th March 2024. Duration contract: 3 years

Owner: Dr. Sophia A. Tsipas

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