

Best Chemical Sciences Presentation by an Early Career Researcher

Winner Adriana Rioja Cabanillas, Ulster University and Delft-IMP

WO₃ photoanodes for the oxidation of urea in wastewater and hydrogen production

Adriana is a 3rd year PhD student from Ulster University and Dutch-based company Delft-IMP. She is part of the REWATERGY project, a Marie Curie European Industrial Doctorate (EID) training network funded by the European Commission within the Horizon 2020 research and innovation action. This programme aims to develop an academic-industrial partnership within the water-energy nexus.

Her PhD focuses in coupling the treatment of pollutants contained in wastewater to energy recovery using photo-electrochemistry, aiming to simultaneously reduce environmental pollution and provide alternative energy sources. In particular, she concentrates in removing nutrient pollution cause by nitrogen compounds and produce hydrogen.

Nutrient pollution due to intense human activities, affects the quality of the soil, air and water and have a detrimental impact on the ecosystems. Nutrient pollution in water bodies can occurs due to excess of nitrogen compounds. Nitrogen excess is typically removed in wastewater treatment plants by several biological treatment steps. However, spatial or economical constrains prevent the full implementation of these processes for the required discharge limits in some plants. Moreover, wastewater has a great potential for energy recovery, which is not exploited at present. Consequently, there is a need to develop technologies that could improve the management of the nutrient cycle in a more cost efficient, sustainable and effective use of resources. In the work presented at Environ 2022, she fabricated different photoanodes formed by WO₃ and TiO₂ and evaluated their photoelectrochemical properties and performance for the removal of nitrogen pollutants coupled to hydrogen production. Her work shows that the recovery of energy from wastewater through photo-electrochemistry could be a valuable alternative to conventional water treatment processes.

- For more information on the topic, you are welcome to check her recent publication:



Rioja-Cabanillas, A., Valdesueiro, D., Fernández-Ibáñez, P., & Byrne, J. A. (2020). Hydrogen from wastewater by photocatalytic and photoelectrochemical treatment. *Journal of Physics: Energy*, 3(1), 012006.

- For more information on the project:

info@rewatergy.eu

@REWATERGY_EID

@adri_riojacab