PhD Candidate Profile

Name:
João Lincho

Research Group (if relevant):
GERST – Group on Environment, Reaction, Separation and Thermodynamics

Research Centre (if relevant):
CIEPQPF – Chemical Engineering Processes and Forest Products Research Center

Department/School(s) (if relevant):
Department of Chemical Engineering

College:
University of Coimbra, Portugal

Supervisor(s):
Doctor Rui C. Martins, Doctor João Gomes, and Doctor Adriana Zaleska-Medynska

Funding body:
Foundation for Science and Technology (FCT), Portugal

Area (field) of study:
Removal of contaminants of emerging concern by advanced oxidation processes, namely by Solar Photocatalysis and Photocatalytic Ozonation using supported nanostructured photocatalysts. Development, preparation and characterization of novel photocatalysts

Thesis Title:
Photocatalysis and Ozone based technologies through supported catalysts using Solar radiation for contaminants of emerging concern removal

Abstract:

Water scarcity is a reality for some populations worldwide, which can be solutioned by recovering and reusing wastewater. Traditional wastewater treatment plants (WWTP) are not capable of removing contaminants of emerging concern (CEC) from wastewater, due to their persistent behaviour. The use of advanced oxidation processes (AOP) in WWTP's allow the removal of these contaminants and wastewater disinfection, obtaining reusable water that is safe for humans, animals, and the ecosystems.

This thesis pretends to remove CEC's using photocatalysis and ozone-based technologies (such as photocatalytic and catalytic ozonation) and investigate the toxicity of the treated solutions. The performance of these technologies will be evaluated using supported

catalysts coupled with solar radiation, since it improves their efficiency and lowers their operational costs. Industrial application using powder catalysts is difficult, since it needs more operational steps and cannot be easily implemented in continuous systems, which can be avoided using supported catalysts.

Collaborations:

Faculty of Chemistry, University of Gdańsk, Poland

Publications:

Gomes, J., Lincho, J., Domingues, E., Quinta-Ferreira, R. M., Martins, R. C. (2019) N-TiO$_2$ Photocatalysts: A Review of their Characteristics and Capacity for Emerging Contaminants Removal. Water, 11, 373.

Gomes, J., Lincho, J., Domingues, E., Gmurek, M., Mazierski, P., Zaleska-Medynska, A., Klimczuk, T., Quinta-Ferreira, R. M., Martins, R. C. (2019) TiO$_2$ Nanotube Arrays-Based Reactor for Photocatalytic Oxidation of Parabens Mixtures in Ultrapure Water: Effects of Photocatalyst Properties, Operational Parameters and Light Source. Science of The Total Environment, 689,79–89.

Gomes, J., Lincho, J., Mazierski, P., Miodyńska, M., Zaleska-Medynska, A., Martins, R. C. (2020) Unexpected Effect of Ozone on the Paraben's Mixture Degradation Using TiO$_2$ Supported Nanotubes. Science of The Total Environment, 743:140831.

Lincho, J., Martins, R. C., Gomes, J. (2021) Paraben Compounds – Part I: An Overview of Their Characteristics, Detection, and Impacts. Applied Sciences, 11:2307.

Lincho, J., Gomes, J., Martins, R. C. (2021) Paraben Compounds – Part II: An Overview of Advanced Oxidation Processes for Their Degradation. Applied Sciences, 11:3556.

Lincho, J., Gomes, J., Kobylanski, M., Bajorowicz, B., Zaleska-Medynska, A., Martins, R. C. (2021) TiO$_2$ Nanotube Catalysts for Parabens Mixture Degradation by Photocatalysis and Ozone-Based Technologies. Process Safety and Environmental Protection, 152, 601–613.

Lincho, J., Zaleska-Medynska, A., Martins, R. C., Gomes, J. (2022) Nanostructured photocatalysts for the abatement of contaminants by photocatalysis and photocatalytic ozonation: An overview. Science of the Total Environment, 837:155776.

Presentations:

13th International Chemical and Biological Engineering Conference (CHEMPOR). Aveiro, Portugal, 2-4 October 2018.