PhD Candidate Profile

Name:
Paola Cecilia Tirira Arteaga

Research Group (if relevant):
Laboratory of Electrochemistry of Materials and the Environment (LEMMA)

Research Centre (if relevant):
Faculty of Chemistry

Department/School(s) (if relevant):
Department of Materials Science and Physical Chemistry (Physical Chemistry section)

College:
Universitat de Barcelona, Barcelona

Supervisor(s):
Dr. Ignacio Sirés Sadornil

Funding body:
MICINN, Spain

Area (field) of study:
Environmental application of Electrochemical Advanced Oxidation Processes for degradation of pharmaceuticals from water at circumneutral pH using new electrochemical reactors.

Thesis Title:
Induction of radical species in the presence of electrocatalysts and homogeneous or heterogenous catalysts for water treatment.

Abstract:
Water is a key resource for life. Nevertheless, population growth and related consumption of pharmaceuticals have multiplied the number of persistent organic pollutants (POPs) in water bodies. Most of these chemicals are toxic and hardly eliminated by conventional technologies. In response, the electrochemical advanced oxidation processes (EAOPs) based on $^{\bullet}OH$ production via Fenton's reaction, which include electro-Fenton (EF) and UVA or solar photoelectro-Fenton (PEF and SPEF), have emerged as highly effective methods to degrade the POPs within few minutes at acid pH. In addition, a new technology based on the electrochemical activation of persulfate (PS) to sulfate radicals ($SO_4^{\bullet-}$) is under development. In this Thesis, the focus is put on the development of electrocatalysts for $SO_4^{\bullet-}$ production, as well as Fe-based homogeneous and heterogeneous catalysts for the decomposition of H_2O_2 to $^{\bullet}OH$. These two types of radicals, alone or in combination, will be employed to degrade antibiotics.

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Collaborations:

Prof. José Luis Nava

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Publications:

Paola Tirira, Louidi L. Albornoz, Pere L. Cabot, Enric Brillas, Ignasi Sirés**.** Electro-Fenton homogéneo para el tratamiento de antibióticos a pH cercano al neutro usando hierro quelado. *XLII Reunión del Grupo Especializado de Electroquímica de la RSEQ (42 GERSEQ 2022)*. Libro de Resúmenes, **2022**, TI-P7. ISBN: 978-84-09-42511-2.

Presentations:

XLII Reunión del Grupo Especializado de Electroquímica de la RSEQ (42 GERSEQ 2022). Santander, Spain. 6th-8th July, 2022.