

**Name:**

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**Research Group (if relevant):**

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**Department/School(s) (if relevant):**

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**Supervisor(s):**

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**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 heterogeneous 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  $\cdot\text{OH}$  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 ( $\text{SO}_4^{\cdot-}$ ) is under development. In this Thesis, the focus is put on the development of electrocatalysts for  $\text{SO}_4^{\cdot-}$  production, as well as Fe-based homogeneous and heterogeneous catalysts for the decomposition of  $\text{H}_2\text{O}_2$  to  $\cdot\text{OH}$ . These two types of radicals, alone or in combination, will be employed to degrade antibiotics.

### Collaborations:

Prof. José Luis Nava

Universidad de Guanajuato, Mexico

### Publications:

**Paola Tirira**, Loudi 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.