# PhD Candidate Profile

## Name:
Roger Oriol López

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

## Research Centre (if relevant):
Faculty of Chemistry

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

## College:
Universitat de Barcelona, Barcelona

## Supervisor(s):
Dr. Ignacio Sirés Sadornil

## Funding body:
MINECO

## Area (field) of study:
Removal of pollutants from real and simulated groundwater by Electrochemical Advanced Oxidation Processes

## Thesis Title:
Removal of contaminants of emerging concern from groundwater with integration of electrochemical technologies

## Abstract:
The main goal of this Thesis is to assess the performance of electrochemical methods, either single or combined, for the removal of groundwater pollutants associated with emerging concerns, such as pesticides and nitrates. The electrochemical treatment of this type of water has its own intrinsic particularities that need to be addressed: (i) low conductivity; (ii) presence of refractory organic matter; and (iii) high amount of Ca and Mg salts that may cause electrode fouling via precipitation as hydroxides.

Fully characterized real groundwater doped with pollutants and simulated solutions mimicking its most important parameters are electrochemically treated. The electrochemical processes used to treat these solutions are: electrocoagulation (EC), electrooxidation (EO), electro-Fenton (EF) or photoelectro-Fenton (PEF) and solar photoelectro-Fenton (SPEF), individually or coupled (EC/EAOPs). These processes can be combined with adsorption/desorption methods using nanomaterials such as zeolites or graphene. The electrochemical regeneration is also going to be studied. For the Fenton-

related processes, specific catalysts that allow to work at natural pH with high performance will be considered. The main by-products for the pollutants removal and their mineralization pathways are studied using different analytical techniques.

## Collaborations:

Adalgisa Rodrigues De Andrade

Departamento de Química, Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, 14040-901 Ribeirão Preto, SP, Brazil

National Institute for Alternative Technologies of Detection, Toxicological Evaluation and Removal of Micropollutants and Radioactives (INCT-DATREM), UNESP, Institute of Chemistry, P.O. Box 355, 14800-900 Araraquara, SP, Brazil

## Publications:

**Oriol, R.**, Sirés, I.*, Brillas, E., De Andrade, A. R.**, A hybrid photoelectrocatalytic/photoelectro-Fenton treatment of Indigo Carmine in acidic aqueous solution using TiO2 nanotube arrays as photoanode.
*Journal of Electroanalytical Chemistry* 847 (**2019**) 113088.

**Oriol, R.**, Bernícola, M.P., Brillas, E., Cabot, P.L., Sirés, I.*, Paired electro-oxidation of insecticide imidacloprid and electrodenitrification in simulated and real water matrices.
*Electrochimica Acta* 317 (**2019**) 753-765.

**Oriol, R.**, Clematis, D., Brillas, E., Cortina, J.L., Panizza, M., Sirés, I.*, Groundwater treatment using a solid polymer electrolyte cell with mesh electrodes.
*ChemElectroChem* 6 (**2019**) 1235-1243.

## Presentations:

*XIII Congreso Español de Tratamiento de Aguas.*
León, Spain. 18th – 20th June, **2018**

*XXXVIII Reunión del Grupo de Electroquímica de la Real Sociedad Española de Química & 3rd E3 Mediterranean Symposium*.
Madrid, Spain, 2nd – 5th July, **2018**.

*25th Topical Meeting of the International Society of Electrochemistry*.
Toledo, Spain, 10th – 15th May, **2019**.

*International Congress of Chemical Engineering* (ANQUE-ICCE-CIBIQ) - *First International Young Researchers Symposium on Applications of Electrochemical Technology.*
Santander, Spain. 19th – 21st July, **2019**

*XL Meeting of the Specialized Group of Electrochemistry of the Royal Spanish Society of Chemistry and XX Iberian Meeting of Electrochemistry.*
Huelva, Spain. 9th – 12th July, **2019**