PhD Candidate Profile

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Research Group (if relevant):
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N/A

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Funding body:
N/A

Area (field) of study:
Chemical Engineering

Thesis Title:
Biological and electrochemical hybrid systems for the removal of ionic liquids.

Abstract:
Ionic liquids (ILs) are an alternative to conventional organic solvents and they have great potential to improve and develop new processes in Green Chemistry. This paradigmatic characteristic has contributed to the fact that ILs have overcome the laboratory scale and they are postulated as candidates for their production and use on a large scale. Thus, the first family of ILs based on imidazolium cation is already applied at the industrial level, and consequently it has been registered in the REACH regulation of chemical substances. One of the differentiating aspects of these compounds is their high thermochemical stability, which in turn can pose a high environmental risk due to their persistence and toxicity after their release into aquatic and edaphic ecosystems. Based on these considerations, the search for effective remediation methods according to the family to be treated is a priority research line within the framework of the current Community Water Directive (2000/60/EC) and, in particular, ILs have been classified as “pollutants on the horizon”.

Therefore, it is necessary to advance in the development of technically and economically viable technologies that allow to degrade these liquid salts in an adequate time, with the minimum environmental and social impact. However, the lack of in-depth studies on this subject makes it necessary to present this thesis focused on the treatment of these emerging pollutants. The complex nature of these pollutants makes their complete remediation by conventional technologies difficult and costly. That is why in recent years, as an alternative to reduce the overall costs of the process

and to improve the overall effectiveness of the treatment, the use of electrochemical biological sequential treatments is being proposed. Thus, those ILs that are not biodegradable by conventional biological processes could be biodegraded after a short electrochemical treatment, which would be sufficient to reduce the toxicity of the source contaminants. In this context, the object of research will be the design of hybrid strategies that combine biological and electrochemical systems for the degradation of ILs in soils and water. This will allow solving the presence of new emerging pollutants of anthropogenic origin, so the benefits of this thesis reach not only the chemical industry, but society in general, by reducing the environmental impact that could be the growing application of these solvents.

Collaborations:

N/A

Publications:

N/A

Presentations:

N/A