

Name:

Florymar Escalona Durán

Research Group (if relevant):

Laboratory of Electrochemical Engineering and Environmental

Research Centre (if relevant):

Faculty of Chemical

Department/School(s) (if relevant):

Department Chemical Engineering

College:

University of Castilla La-Mancha

Supervisor(s):

Dr. Manuel A. Rodrigo Rodrigo

Funding body:

CAPES PRINT

Area (field) of study:

Absorbents-electrolytes generated by advanced oxidation processes.

Thesis Title:

Treatment of residual gaseous emissions by electro-absorption technologies

Abstract:

The volatility of a lot of compound pesticides and industrial organic solvents favours their transfer to atmosphere, affecting importantly to the sustainability of ecosystems. For this reason, in recent decades, interest in the development of strategies capable to mitigate this problem has increased [1]. Scrubbing technology is known to be an efficient separation technology to remove gaseous pollutants and, recently, it has been proposed its combination with oxidation technologies that allow the regeneration of the absorbent-electrolyte. Formulation of this absorbent is a key input to reach high efficiencies and in the literature, it is reported the use of solutions containing precursors of Ag(II), Co(III) and Ce(IV) for the degradation of several air pollutants [2]. The combination of these processes is called electro-scrubbing technology. However, although this technology has made important contributions for the degradation of a lot of air pollutants, there are few studies on the organic volatile compounds in liquid phase as starting material.

This work focuses on the degradation of volatiles organic pollutants using absorbents-electrolytes containing metallic redox pairs, generated using advanced oxidation



PhD Candidate Profile

processes. Results demonstrate that this technology can face their removal efficiently and regenerated the absorbent avoids the use of an excess of reagent.

References:

- [1] G. Muthuraman, Il-S Moon, A review on an electrochemically assisted-scrubbing process for environmental harmful pollutant's destruction, *J. Ind. Eng. Chem.*, 18 (2012) 1540–1550.
- [2] B. Huang, C. Lei, C. Wei, G. Zeng, Chlorinated volatile organic compounds (Cl-VOCs) in environment — sources, potential human health impacts, and current remediation technologies, *Environment International*, 71 (2014) 118-138.

Collaborations:

Dr. Carlos Alberto Martínez Huitle

Adjunct teacher in the Federal University of Rio Grande do Norte
Center of Exact Sciences, Department of Chemistry.
Avenue Senador Salgado Filho, 3000 University Campus
Lagoa Nova - Natal
59078900, RN – Brazil

PhD in Johannes Gutenberg-Universität Mainz Duesbe, JGUMD, Germany (2020).

Publications:

ESCALONA-DURÁN, FLORYMAR; VILLEGAS-GUZMAN, PAOLA; DOS SANTOS, ELISAMA VIEIRA; DA SILVA, DJALMA RIBEIRO; MARTÍNEZ-HUITLE, CARLOS A.; Intensification of petroleum elimination in the presence of a surfactant using anodic electrochemical treatment with BDD anode. *Journal of Electroanalytical Chemistry JCR*, v. 832, p. 453-458, 2019.

ESCALONA-DURÁN, F.; ARAUJO, D. M.; BRITO, C. N.; SANTOS, E. V.; GANIYU, S. O.; MARTINEZ-HUITLE, C. A.; Electrochemical Technology for the Treatment of Real Washing Machine Effluent at Pre-pilot Plant Scale by Using Active and Non-active Anodes. *Journal of Electroanalytical Chemistry*, v. 818, p. 216-222, 2018.

Presentations:

ESCALONA-DURÁN, F.; ARAUJO, D. M.; SANTOS, E. V.; MARTINEZ-HUITLE, C. A.; Applicability of Electrochemical Oxidation for Treating Washing Machine Effluent using Active and Non-active Anodes. In: 3rd Iberoamerican Conference on Advanced Oxidation Technologies (III CIPOA), 2017, Guatapé.