

PhD Candidate Profile

Name:

Kourosh Nasr Esfahani

Research Group (if relevant):

Center for Process and Environmental Engineering (CEPIMA)

Research Centre (if relevant):

Center for Process and Environmental Engineering

Department/School(s) (if relevant):

Chemical Engineering

College:

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Supervisor(s):

Moisès Graells

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Funding body:

FI SDUR 2020 Ph.D. grant (BDNS 481561)

Area (field) of study:

Advanced Oxidation Processes (Photo Fenton)/ Modelling of the Photo-Fenton Process with Flexible Hydrogen Peroxide Dosage: sensitivity analysis and parameter estimation

Thesis Title:

Integrated Management of Advanced Oxidation Processes and Conventional Bio-Processes for the Efficient Removal of Recalcitrant Components from Wastewaters.

Abstract:

The combined use of Advanced Oxidation Processes (AOP) and conventional bio-processes has been suggested for the efficient treatment of wastewaters with a significant presence of recalcitrant contaminants. Hence, we are studying to propose models for such combined processes, which facilitates further design and operational optimization. In the case of AOPs, the supply of hydrogen peroxide controlling the amount of highly oxidant hydroxyl radicals is the most critical operational issue for the photo-Fenton process. Accordingly, we are working on the development of a model for photo-Fenton processes including a flexible supply given as a function of time. The model is aimed at its future exploitation in treatment optimization and the determination of the optimal profile for supply.



Collaborations:

BACO Environmental Engineering & Technology S.L

Publications:

1. K. Nasr Esfahani, M. Pérez-Moya and M. Graells, Modelling of the photo-Fenton process with flexible hydrogen peroxide dosage: Sensitivity analysis and experimental validation, *Science of the Total Environment* (2022) 839, <https://doi.org/10.1016/j.scitotenv.2022.1559412>.
2. K. Nasr Esfahani, M. Farhadian, and A.R. Solaimany Nazar, Interaction effects of various reaction parameters on the treatment of sulfidic spent caustic through electro-photo-Fenton, *International Journal of Environmental Science and Technology* (2019) 16 (11): p. 7165-7174. <https://doi.org/10.1007/s13762-018-2126-83>.
3. K. Nasr Esfahani, M. D. Zandi, J. A. Travieso-Rodriguez, M. Pérez-Moya and M. Graells, Manufacturing and Application of 3D Printed Photo Fenton Reactors for Wastewater Treatment, *Int. J. Environ. Res. Public Health* (2021) 18, 4885. <https://doi.org/10.3390/ijerph180948854>.
4. N. Mahmoudi, M. Farhadian, A. R. Solaimany Nazar, P. Eskandari, and K. Nasr Esfahani, Investigation and optimization of the performance of sono-photo-electro-Fenton process for removal of Acid Black 172 and Disperse Blue 56 from polluted water: comparison of the degradation activity with electro-Fenton-based processes, *International Journal of Environmental Science and Technology* (2022) 19, 1671–1682, <https://doi.org/10.1007/s13762-021-03296-05>.
5. K. Nasr Esfahani, M. Farhadian, A. Solaimany Nazar, and G. Ghaffari, Treatment of Isfahan Refinery Spent Caustic by Electro-Fenton Process, *Journal of Petroleum Research*, (2016) Vol. 26, No. 89.

Presentations:

1. K. Nasr Esfahani, M. Graells, and M. Pérez-Moya, Modelling and Parameter Fitting of the Dosage of Hydrogen Peroxide in a Photo-Fenton Process, Part of volume: **32nd European Symposium on Computer Aided Process Engineering**, (2022), Toulouse, France, [32nd European Symposium on Computer Aided Process Engineering, Volume 51 - 1st Edition \(elsevier.com\)](https://doi.org/10.1016/B978-0-323-88506-5.50137-6)
2. K. Nasr Esfahani, M. Graells, and M. Pérez-Moya, A Hybrid Model Coupling Advanced Oxidation Processes (AOP) and Conventional Bio-processes for the Removal of Recalcitrant Contaminants in Wastewaters, Part of volume: **31st European Symposium on Computer Aided Process Engineering**, (2021) 50, 883-889, <https://doi.org/10.1016/B978-0-323-88506-5.50137-6>
3. K. Nasr Esfahani, M. Graells, and M. Pérez-Moya, Integrated Mathematical Modelling of Advanced Oxidation Processes and Conventional Bio-Processes for Wastewater Treatment, **14th Mediterranean Congress of Chemical Engineering (MeCCE)**, Barcelona, Spain, 16-20 November, 2020. (Oral presentation) <https://doi.org/10.48158/MeCCE-14.DG.06.07>
4. K. Nasr Esfahani, M.D. Zandi, J.A. Travieso-Rodriguez, M. Graells, and M. Pérez-Moya, 3D printed lab-scale raceway ponds reactors applied to photo-Fenton processes, **16th International Conference on Environmental Science and Technology**, Rhodes, Greece, 4-7 September, 2019. (Poster) <http://hdl.handle.net/2117/173322>
5. K. Nasr Esfahani, M.D. Zandi, J.A. Travieso-Rodriguez, M. Graells, and M. Pérez-Moya, Manufacturing and application of raceway ponds for wastewater treatment, **6th European Conference on Environmental Applications of Advanced Oxidation Processes (EAAOP-6)**, Portorož-Portorose, Slovenia, 26-30 June 2019. (Poster) <http://hdl.handle.net/2117/173323>