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RESEARCH TOPICS

My research interests focus on environment and protection of natural resources. I work on the treatment of industrial effluents and water regeneration and reuse using Advanced Oxidation Processes (AOPs). I am also interested in nanostructured semiconductors for environmental applications and photocatalytic hydrogen production.

PROJECTS

Funded by public institutions:

NEW DEVELOPMENTS IN PHOTOCATALYSIS FOR ENVIRONMENTAL APPLICATIONS (FOTOAMBIENTE) CTM2015-69845-R (MINECO/FEDER, UE)
01/01/2016 - 31/07/2019. Funding: 176.660€

CHALLENGES IN THE IMPLEMENTATION OF PHOTOCATALYSIS FOR ENVIRONMENTAL APPLICATIONS (CIPEA) RTI2018-099407-B-100 (AEI/FEDER, UE)
01/01/2019 – 31/12/2021. Funding: 135.520€.

LUV2INNOVATE: INNOVATIVE SYSTEMS FOR THE TREATMENT OF AQUEOUS EFFLUENTS WITH PHOTOCHEMICAL TECHNOLOGIES BASED ON LED UV-C (RTC2019-006820-5) (AEI/FEDER, UE)
01/04/2020 – 31/12/2022. Funding: 183.108€.

Collaborative projects with companies:

DEVELOPMENT OF AN ADVANCED PHOTOCATALYTIC SYSTEM FOR THE REMOVAL OF EMERGING CONTAMINANTS (FOTOEMERG)
02/02/2017 – 30/09/2018. Funding: Oxital Servicios, S.L. 53.603€

NEW GENERATION OF PHOTOCATALYTIC REACTORS UV-LED FOR THE REMOVAL OF PERSISTENT POLLUTANTS IN WATER (LED4FUTURE)
01/04/2019 - 31/03/2020. Funding: APRIA SYSTEMS, S.L. 21.780€

PUBLICATIONS

S Dominguez, P Ribao, M.J. RIVERO, I Ortiz. Influence of Radiation and TiO₂ Concentration on the Hydroxyl Radicals Generation in a Photocatalytic LED Reactor. Application to dodecylbenzenesulfonate degradation. Applied Catalysis B: Environmental, 178, 165-169 (2015) DOI:10.1016/j.apcatb.2014.09.072

O. Iglesias, M.J. RIVERO, A. M. Urtiaga, I. Ortiz. Membrane-based photocatalytic systems for process intensification. *Chemical Engineering Journal*, 305, 136-148 (2016) DOI: 10.1016/j.cej.2016.01.047

S. Dominguez, M.J. RIVERO, P. Gomez, R. Ibañez, I. Ortiz. Kinetic modeling and energy evaluation of sodium dodecylbenzenesulfonate photocatalytic degradation in a new LED reactor. *Journal of Industrial and Engineering Chemistry*, 37, 237-242 (2016) DOI: 10.1016/j.jiec.2016.03.031

J. Gómez-Pastora, S. Dominguez, E. Bringas, M.J. RIVERO, I. Ortiz, D. D. Dionysiou. Review and perspectives on the use of magnetic nanophotocatalysts (MNPCs) in water treatment. *Chemical Engineering Journal*, 310, 407-427 (2017) DOI: 10.1016/j.cej.2016.04.140

C. J. Escudero, O. Iglesias, S. Dominguez, M.J. RIVERO, I. Ortiz. Performance of electrochemical oxidation and photocatalysis in terms of kinetics and energy consumption. New insights into the p-cresol degradation. *Journal of Environmental Management*, 195, 117-124 (2017) DOI: 10.1016/j.jenvman.2016.04.049

S. Dominguez, M. Huebra, C. Han, P. Campo, M.N. Nadagouda, M.J. RIVERO, I. Ortiz, D.D. Dionysiou. Magnetically Recoverable TiO₂-WO₃ Photocatalyst to Oxidize Bisphenol A from Model Wastewater under Simulated Solar Light. *Environmental Science and Pollution Research*, 24 (14), 12589-12598 (2017) DOI: 10.1007/s11356-016-7564-6

P. Ribao, M.J. RIVERO, I. Ortiz. TiO₂ structures doped with noble metals and/or graphene oxide to improve the photocatalytic degradation of dichloroacetic acid. *Environmental Science and Pollution Research*, 24 (14), 12628-12637 (2017) DOI: 10.1007/s11356-016-7714-x

B. Gomez-Ruiz, P. Ribao, N. Diban, M J. RIVERO, I. Ortiz, A. Urtiaga. Photocatalytic degradation and mineralization of perfluorooctanoic acid (PFOA) using a composite TiO₂-rGO catalyst. *Journal of Hazardous Materials*, 344, 950-957 (2018) DOI: 10.1016/j.jhazmat.2017.11.048

Ulises Morales, Carlos J. Escudero, MARIA J. RIVERO, Inmaculada Ortiz, Juan Manríquez Rocha, Juan M. Peralta-Hernández. Coupling of the electrochemical oxidation (EO-BDD)/photocatalysis (TiO₂-Fe-N) processes for degradation of acid blue BR dye. *Journal of Electroanalytical Chemistry*, 808, 180-188 (2018) DOI: 10.1016/j.jelechem.2017.12.014

A.M. Urtiaga, R. Ibañez, M.J. RIVERO, I. Ortiz. Integration of Electrochemical Advanced Oxidation with Membrane Separation and Biodegradation in Electrochemical water and wastewater treatment. C.A. Martínez-Huitle, M.A. Rodrigo, O. Sicaldone editors. Butterworth-Heinemann, Oxford, UK, 496-510 (2018). ISBN: 978-0-12-813160-2 (Paperback)

S. Dominguez, J. Laso, M. Margallo, R. Aldaco, M.J. RIVERO, Á. Irabien, I. Ortiz. LCA of greywater management within a water circular economy restorative thinking framework. *Science of the Total Environment*, 621, 1047-1056 (2018) DOI: 10.1016/j.scitotenv.2017.10.122

P. Ribao, M.J. RIVERO, I. Ortiz. Enhanced photocatalytic activity using GO/ TiO₂ catalyst for the removal of DCA solutions. *Environmental Science and Pollution Research*, 25, 34893-34902 (2018) DOI: 10.1007/s11356-017-0901-6

M.J. RIVERO, O. Iglesias, P. Ribao, I. Ortiz. Kinetic performance of TiO₂/Pt/reduced graphene oxide composites in the photocatalytic hydrogen production. *International Journal of Hydrogen Energy*, 44, 101-109 (2019) DOI: 10.1016/j.ijhydene.2018.02.115

P. Ribao, J. Corredor, M.J. RIVERO, I. Ortiz. Role of reactive oxygen species on the activity of noble metal-doped TiO₂ photocatalysts. *Journal of Hazardous Materials*, 372, 45-51 (2019) DOI: 10.1016/j.jhazmat.2018.05.026

C. Ferreira, N. Villota, J.I. Lombraña, M.J. RIVERO, V. Zúñiga, J.M. Rituerto. Analysis of a hybrid suspended-supported photocatalytic reactor for the treatment of wastewater containing benzothiazole and aniline. *Water*, 11, 337-362 (2019) DOI: 10.3390/w11020337

C. Ferreira, N. Villota, J.I. Lombraña, M.J. RIVERO. An efficient catalytic process for the treatment of genotoxic aniline wastewater using a new granular activated carbon-supported titanium dioxide composite. *Journal of Cleaner Production*, 228, 1282-1295 (2019) DOI: 10.1016/j.jclepro.2019.04.198

J. Corredor, M.J. RIVERO, C. M. Rangel, F. Gloaguen, I. Ortiz. Comprehensive review and future perspectives on the photocatalytic hydrogen production. *Journal of Chemical Technology and Biotechnology*, 94, 3049-3063 (2019) DOI: 10.1002/jctb.6123

P. Ribao, M.A. Esteves, V.R. Fernandes, M.J. RIVERO, C.M. Rangel, I. Ortiz. Challenges arising from the use of TiO₂/rGO/Pt photocatalysts to produce hydrogen from crude glycerol compared to synthetic glycerol. *International Journal of Hydrogen Energy*, 44, 28494-28506 (2019) DOI: 10.1016/j.ijhydene.2018.09.148

I. Ortiz, M.J. RIVERO, M. Margallo. Chapter 6 - Advanced oxidative and catalytic processes in Sustainable Water and Wastewater Processing. Edited by: Charis M. Galanakis and Evita Agrafioti. Oxford, UK, 161-201 (2019). Paperback ISBN: 9780128161708. eBook ISBN: 9780128161715 Elsevier.

M.J. RIVERO, P. Ribao, B. Gómez-Ruiz, A. Urtiaga, I. Ortiz. Comparative performance of TiO₂-rGO photocatalyst in the degradation of dichloroacetic and perfluorooctanoic acids. *Separation and Purification Technology*, 240, 116637-116644 (2020) DOI: 10.1016/j.seppur.2020.116637

J. Corredor, M.J. RIVERO, I. Ortiz. New insights in the performance and reuse of rGO/ TiO₂ composites for the photocatalytic hydrogen production. *International Journal of Hydrogen Energy* (2020) DOI: 0.1016/j.ijhydene.2020.01.181

F. Fresno, O. Iglesias, E. Alfonso-González, M.J. RIVERO, I. Ortiz, V. de la Peña O'Shea. Assessing the feasibility of reduced graphene oxide as an electronic promoter for photocatalytic hydrogen production over Nb-Ta perovskite photocatalysts. *Catalysis Today* (2020) DOI: 10.1016/j.cattod.2020.05.027

M. Romay, N. Diban, M.J. RIVERO, A. Urtiaga, I. Ortiz. Critical Issues and Guidelines to Improve the Performance of Photocatalytic Polymeric Membranes. *Catalysts*, 10, 570-605 (2020) DOI: 10.3390/catal10050570

S. San Martín, M.J. RIVERO, I. Ortiz. Unravelling the Mechanisms that Drive the Performance of Photocatalytic Hydrogen Production. *Catalysts*, 10, 901-927 (2020) DOI: 10.3390/catal10080901

J. Corredor, E. Pérez-Peña, M.J. RIVERO, I. Ortiz. Performance of rGO/ TiO₂ Photocatalytic Membranes for Hydrogen Production. *Membranes*, 10, 218-231 (2020) DOI: 10.3390/membranes10090218

OTHER RESULTS

PhD Supervisor:

Progress and Challenges in the Photocatalytic Removal of Emerging Contaminants. Sara Dominguez Suárez. Universidad de Cantabria. 21/12/2017.

Progress on the Performance of Photocatalysis and Electrochemical Oxidation Technologies Applied to Wastewater Remediation. Carlos Javier Escudero. Universidad de Cantabria. 21/12/2017.

Design of TiO₂-Based Materials for Photocatalytic Environmental Applications. Paula Ribao Martínez. Universidad de Cantabria. 28/09/2018.