PhD Candidate Profile

Name:

Raisa Estefanía Núñez Salas

Research Group:

Laboratorio de Fotocatálisis y Electroquímica Ambiental (LAFEAM)

Research Centre:

N/A

Department/School(s):

Facultad de Ciencias Químicas

College:

Universidad Autónoma de Nuevo León

Supervisor(s):

Prof. Ma. Aracely Hernández Ramírez

Prof. María de Lourdes Maya Treviño

Funding body:

CONACYT

January 2019

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Area (field) of study:

Synthesis of materials to application on wastewater treatment by advanced oxidation processes

Thesis Title:

Antibiotics degradation and pathogens bacteria inactivation present in wastewater using PVDF/CB/ZnO photocatalytic membranes

Abstract:

Zinc oxide is one of the most used semiconductor in the heterogeneous photocatalysis (HP). Recently, different ways to improve its photocatalytic activity and its ability to absorb visible light have been considered among which is the coupling of ZnO with a sensitizer. Carbon-based materials are an economic sensitizers option that have a broad spectrum of absorption in the visible region. On the other hand, although the photocatalyst in suspension is, in general, considered more efficient in HP, the use of these immobilized materials is more practical due to its easy separation at the end of the treatment. In addition, it allows the reuse of the catalyst, thus justifying the growing interest in the preparation of this type of systems. The immobilization of ZnO on polymers offers important advantages such as high area/volume ratio and considerable porosity, which allows its use in specialized applications such as degradation of pollutants and water disinfection by heterogeneous photocatalysis. Vinylidene polyfluoride (PVDF) arises as a viable polymer because it is a thermoplastic material characterized by high resistance, non-toxicity and high chemical stability which makes this material particularly interesting for photocatalytic applications. Therefore, in the present investigation will be synthesized ZnO/carbon-black immobilized in polymeric nanofibers in particular with PVDF, in order to evaluate their photocatalytic activity in the degradation of emerging contaminants. Aditioanlly the antibacterial behaviour of the catalyst will be investigated in a real matrix under UV and visible radiation.

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PhD Candidate Profile

Collaborations:

Jorge Rodríguez Chueca, Department of Industrial Chemical & Environmental Engineering, Escuela Técnica Superior de Ingenieros Industriales, Universidad Politécnica de Madrid, Madrid, Spain

Publications:

Núñez-Salas Raisa Estefanía, Hernández-Ramírez Aracely, Hinojosa-Reyes Laura, Guzmán-Mar Jorge, Luis Villanueva-Rodríguez Minerva, Maya-Treviño María De Lourdes, "*Cyanide degradation in aqueous solution by heterogeneous photocatalysis using boron-doped zinc oxide*", Catalysis Today, 2018, DOI: 10.1016/j.cattod.2018.11.061

Presentations:

1er Congreso Internacional de Nanobioingeniería
Evaluación del fotocatalizador ZnO-B en la degradación de cianuro y desinfección de agua residual. ***Raisa Estefanía Núñez Salas****, Ma. Araceli Hernández Ramírez, Jorge Rodríguez Chueca, Lourdes Maya Treviño*
CYBIN, Monterrey, México, November 2018

10th European meeting on Solar Chemistry and Photocatalysis: Environmental Application (SPEA 10)
Application of a central composite faced design to optimize the cyanide degradation by heterogeneous photocatalysis. ***Nuñez-Salas R.E.,*** *Hernández-Ramírez, A., Hinojosa-Reyes, L. Villanueva-Rodríguez, M., Guzmán-Mar, J.L., Maya-Treviño, M.L.*
Almeria, Spain, June 2018

3rd Iberoamerican Conference on Advanced Oxidation Technologies (III CIPOA) and 2nd Colombian Conference on Advanced Oxidation Processes (II CCPAOX)
Cyanide degradation by heterogeneous photocatalysis using sol-gel boron doped zinc oxide. ***R.E. Nuñez-Salas****, D. Pino- Sandoval, M.A. Hernández-Ramírez, L. Hinojosa-Reyes, J.L Guzmán-Mar, M. Villanueva-Rodríguez, E.J. Ruiz-Ruiz, M.L. Maya-Treviño***.**
Medellín, Colombia, November 2017

IV Congreso Internacional de Química e Ingeniería Verde
Degradación fotocatalítica de cianuro utilizando ZnO modificado con boro
Raisa Estefanía Núñez Salas, María de Lourdes Maya Treviño, Aracely Hernández Ramírez, Laura Hinojosa Reyes, Minerva Rodríguez Villanueva, Jorge Luis Guzmán Mar
Monterrey, México, September 2017

XXVI International Materials Research Congress: Materials and the Environment Symposium
*Sol-gel synthesis of ZnO modified with boron and its application in degradation of cyanide by heterogeneous photocatalysis****. Raisa Estefanía Núñez-Salas****, María de Lourdes Maya-Treviño, Aracely Hernández-Ramírez, Laura Hinojosa-Reyes, Jorge Luis Guzmán-Mar, Minerva Villanueva-Rodríguez.*
Cancún, México, August 2017

PhD Candidate Profile

250th American Chemical Society National Meeting.
Degradation of phenol by Electro-Peroxone process. ***Raisa Nunez,*** *Diego Pino, John Rodríguez, Nilson Marriaga*.
Boston, USA, August 2015