



## NOVEL NITROGEN PLASMA DOPING ON CDS/GO COMPOUNDS AND THEIR PHOTOCATALYTIC ASSESSMENT

Ricardo Rangel<sup>1</sup>, Armando Ramos<sup>1</sup>, Javier Lara<sup>1</sup>, Rafael García<sup>2</sup>, Antonio Ramos<sup>2</sup>, Dainet Berman<sup>2</sup>

<sup>1</sup> *División de Estudios de Posgrado de la Facultad de Ingeniería Química, Universidad Michoacana de San Nicolás de Hidalgo, Gral. Francisco J. Múgica S/N, Ciudad Universitaria, Z.P. 58030 Morelia, Michoacán, México*

<sup>2</sup> *Departamento de Investigación en Física, Universidad de Sonora, Departamento de Investigación en Física, Universidad de Sonora, Rosales y Luis Encinas, C.P. 83000 Hermosillo, Sonora, México*

[rrangel@umich.mx](mailto:rrangel@umich.mx)

Nitrogen-doping of cadmium sulfide nanostructured compounds was carried out under a nitrogen plasma source to produce CdS-N compounds. Once prepared, it was supported on graphene oxide sheets for producing CdS-N/GO photocatalysts, which were tested in the degradation of lignin and methylene blue (MB) molecules. Photocatalytic reactions were carried out under UV and visible (vis) energy irradiation. To provide insight on the catalytic behavior the CdS, CdS-N, GO, and CdS-N/GO compounds were characterized using different techniques including x-ray diffraction, scanning electron microscopy, Raman, and UV-vis diffuse reflectance spectroscopy. X-ray photoelectron spectroscopy allowed determining the chemical composition in samples. It was observed an outstanding performance in photocatalytic activity tests, attributed to the extended response towards the visible light regime, and the synergistic effect between CdS-N and GO particles. The catalytic activity tests, reveal that the CdS-N/GO compound achieved over 90% lignin degradation and 100% of MB degradation. In addition, a remarkable performance is observed in the CdS-N/GO compound which exhibited stability after performing several reaction cycles.

### Referencias

- [1] Suresh M and Sivasamy A, "Fabrication of graphene nanosheets decorated by nitrogen-doped ZnO nanoparticles with enhanced visible photocatalytic activity for the degradation of methylene blue dye" *J. Mol. Liq.* 317 114112, 2020.
- [2] R. Trejo-Tzab, A. Ávila-Ortega, P. Quintana-Owen, R. Rangel, M. Álvarez-Lemus, "Platinum-Decorated TiO<sub>2</sub>: One Step Fast Monometallic Impregnation and Plasma Effect on Nanoparticles". *J. Compos. Sci.* 2021. ISSN: 2504-477X. <https://doi.org/10.3390/jcs6010004>. 24/Diciembre/2021.
- [3] A. Ramos-Corona, R. Rangel, J. Lara, R. Trejo-Tzab, P. Bartolo-Pérez, J. J. Alvarado. "Novel nitrogen plasma doping on CdS/GO compounds and their photocatalytic assessment". *Nanotechnology*. Vol. 33 (2022) 055705. <https://doi.org/10.1088/1361-6528/ac328c>. Enero 2022.