Dra. Leticia M. Torres Guerra

Información Personal

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Galardón Nacional

Premio Nacional de Ciencias 2018 en Tecnología, Innovación y Diseño.

RESUMEN

Es Licenciada en Química Industrial por la Universidad Autónoma de Nuevo León. Doctorado en Materiales Cerámicos Avanzados por la Universidad de Aberdeen. Reino Unido. Líder Certificada en Energías Aplicadas Renovables y Eficiencia Energética por la Universidad de Harvard. USA. **Desde el 6 de diciembre del 2019 es Directora General del Centro de Investigación en Materiales Avanzados (CIMAV).** Es miembro de: a) Sistema Nacional de Investigadores e Investigadoras (SNII) de manera ininterrumpida desde 1986. En el año 2002 **obtuvo la distinción de Investigadora Nivel III por parte del SNII. En el año 2022, le otorgaron la distinción de Investigadora Emérita por parte del SNII. La Dra. Torres fue la primera mujer en el estado de Nuevo León en obtener estas dos distinciones;** b) la Academia Mexicana de Ciencias, c) Sociedad Mexicana de Materiales y d) la International Union of Materials Research Society (USA).

Cuenta con los siguientes productos académico-científicos: más de 230 artículos científicos indexados, 74 tesis dirigidas, 1 patente autorizada y 4 registadas ante el IMPI, 4 libros, 11 capítulos de libro, 400 presentaciones en congresos y eventos científicos, 9 memorias de congreso internacionales, 27 innovaciones y desarrollos tecnológicos, 58 proyectos de investigación; 4,000 citas auténticas a publicaciones, líder de 5 grupos de investigación y 3 redes científicas nacionales, 5 programas de posgrado diseñados e implementados. Dos de estos posgrados fueron diseñados y adaptados para las compañías Vitro y Cemex. Además, para la compañía Cemex, diseñó y adaptó el Programa Especial de Becarios UNI-EMPRESA mediante el cual se desarrollaron proyectos tecnológicos de interés mutuo, implementándose el 85% de los estudios desarrollados en la compañía y un 31% en pruebas industriales, logrando una eficiencia terminal del 100%. Diseñó e implementó el Centro de Investigación y Desarrollo de Materiales Cerámicos (CIDEMAC), el cual fue autofinanciable durante su liderazgo. En el año 2009. lideró un proyecto tecnológico con la compañía PEMEX, cuyos resultados permitieron el prearranque por cambio de tecnología en sus procesos. Este proyecto tecnológico concluyó exitosamente en Diciembre del 2012.

EXPERIENCIA PROFESIONAL

- Directora General del Centro de Investigación en Materiales Avanzados (CIMAV-CONACYT). (2019-2024)
- Jefe del Departamento de Ecomateriales y Energía. Instituto de Ingeniería Civil, UANL. (2005-2019).
- Profesor Titular C Tiempo Completo. Universidad Autónoma de Nuevo León: a) Facultad de Ciencias Químicas (1985-2005); Facultad de Ingeniería Civil . (2005-2019).
- Directora Adjunta de Desarrollo Científico del CONACYT. (2011-2013).
- Líder y Fundadora del Centro de Investigación y Desarrollo de Materiales Cerámicos (CIDEMAC) de la Facultad de Ciencias Químicas de la UANL. (1990-1995). En el año 2000, el CIDEMAC fue nominado como finalista del Premio Nacional de Tecnología, convocado por la Secretaría de Comercio y Fomento Industrial y la Presidencia de la República Mexicana.
- Subdirectora de Investigación. Facultad de Ciencias Químicas, UANL. (1995-2001).
- Presidenta de la Sociedad Mexicana de Materiales. (2000-2002).
- Líder de diversos proyectos y desarrollos tecnológicos con la industria cerámica nacional.
- Coordinadora de diversos grupos de investigación nacionales (materiales cerámicos), para desarrollar varios proyectos tecnológicos con industrias cerámicas nacionales.
- Líder, diseñadora e implementadora de dos programas de posgrado (maestría y doctorado) en ingeniería cerámica, reconocidos por CONACYT por su Excelencia (PNPC). Ha dirigido mas de 60 estudiantes de posgrado.
- Líder, diseñadora e implementadora de 3 programas de posgrado especializados en cemento y vidrio para las compañías: CEMEX, S.A. de C.V., VITRO S.A. de C.V. y Crisa Libbey México, S. de R.L. de C.V.

ACTIVIDADES SINERGÉTICAS

La Dra. Leticia Torres Guerra fue líder y fundadora del Centro de Investigación y Desarrollo de Materiales Cerámicos (CIDEMAC), ubicado en la Facultad de Ciencias Químicas de la Universidad Autónoma de Nuevo León. Este Centro fue nominado como finalista al Premio Nacional de Tecnología 2002, organizado por la Secretaría de Comercio y Fomento Industrial (SECOFI) y la Presidencia de la República Mexicana. Durante el período 1995 al 2001, se desempeñó como Subdirectora de Investigación de la Facultad de Ciencias Químicas, UANL. Fue Presidenta de la Sociedad Mexicana de Materiales del 2000 al 2002. Diseñó, estructuró e implementó 2 programas de posgrado (maestría y doctorado) en ingeniería cerámica, los cuales fueron reconocidos por el CONACYT como programas de calidad en el PNPC. Diseñó 3 programas de posgrado especializados en cemento para CEMEX, S.A. de C.V.; y en vidrio para VITRO S.A. de C.V. y Crisa Libbey México, S. de R.L. de C.V. Ha dirigido mas de 74 estudiantes de posgrado. Coordinó por cuatro años varios grupos de investigación en el área de materiales cerámicos para desarrollar diversos proyectos tenológicos con la industria cerámica nacional. En el año 1999 fue Editora científica para la Edición Especial: Inorganic Chemistry in Latin America para la Revista Polyhedron. Adicionalmente, contribuyó como Coordinadora en Latinoamérica para la Edición especial en Solid State Science del Journal of Solid State Chemistry. Como Directora Adjunta de Desarrollo Científico del CONACYT (2011-2013), implementó diversos programas como iniciativas nacionales para promover y apoyar proyectos de investigación a gran escala, enfocados en la generación de soluciones articuladas y estructuradas que contribuyan al desarrollo nacional y al bienestar de la población de nuestro país. También impulsó al Consorcio Nacional de Recursos de Información Científica y Tecnológica (CONRICYT), el cual tiene como misión fortalecer las capacidades de las Instituciones de Educación Superior y Centros de Investigación facilitando el acceso a la información científica en formatos digitales.

ALGUNAS CONTRIBUCIONES CIENTÍFICAS

El liderazgo en investigación de la Dra. Leticia Torres Guerra se distingue por el desarrollo de nuevos materiales con propiedades semiconductoras que presentan combinaciones favorables de estructura electrónica y propiedades de absorción de la luz, en adición de propiedades adecuadas de adsorción de especies para alcanzar altas eficiencias fotocatalíticas tanto en la reacción de descomposición del agua para la producción de hidrógeno, así como en la degradación de compuestos orgánicos y la reducción de CO_2. Su grupo tiene experiencia en el estudio de nuevos diagramas de fase, nuevos métodos de síntesis, cristaloquímica de materiales, y el estudio de propiedades eléctricas, catalíticas y fotoelectrocatalíticas. Su grupo de investigación es uno de los pocos que seleccionan materiales basándose en el análisis exhaustivo de diversos parámetros para establecer relaciones estructurales de semiconductores en relación a su desempeño en procesos fotoinducidos, con el propósito de mejorar la eficiencia de los materiales en estos procesos. En la búsqueda de nuevos materiales con altas eficiencias fotocatalíticas, el grupo ha desarrollado métodos de síntesis alternativos que hacen posible obtener materiales altamente cristalinos, así como materiales con alta área superficial y con micro y nanoestructuras avanzadas apropiadas para cada proceso en particular. La Dra. Torres ha dirigido las investigaciones de dos familias de materiales con las más altas eficiencias reportadas en la producción fotocatalítica de hidrógeno, con producciones 20 veces más grandes a las reportadas en revistas indexadas por otros grupos internacionales de investigación.

LÍNEAS DE INVESTIGACIÓN

a) Desarrollo de materiales avanzados en polvos y películas delgadas para sistemas de energía renovable y descontaminación ambiental sustentable.
b) Síntesis, caracterización y desempeño de materiales multifuncionales en procesos fotoinducidos .
c) Preparación de materiales semiconductores para foto(electro)catálisis ambiental: producción de H_2, fotoconversión de CO_2 y purificación de agua.
d) Síntesis de nuevos óxidos cerámicos avanzados basados en diagramas de equilibrio de fases.

PREMIOS Y DISTINCIONES

La Dra. Torres Guerra ha obtenido más de 70 premios y reconocimientos nacionales e internacionales, entre los que destacan: 1) **Premio Nacional de Ciencias 2018** en el campo de Tecnología, Innovación y Diseño; otorgado por el Presidente Lic. Enrique Peña Nieto y celebrada en Los Pinos. 2) **29 Premios de Investigación UANL** por el mejor trabajo de investigación en las áreas de Ciencias Exactas e Ingeniería y Tecnología; el mas reciente obtenido en el año 2022, en el área de Ingeniería y Tecnología 3) Reconocimiento como Miembro del Comité de Evaluación de CONACYT (2017-2019). 4) Premio UERRE al Valor Regiomontano, otorgado por su destacada contribución a la cultura nuevoleonés en la ciencia, investigación trabajo, valores o acciones humanitarias 5) Medalla al Mérito Cívico, Presea Estado de Nuevo León (2015) por su desempeño exitoso en el área de investigación científica en el Estado de Nuevo León. 6) Reconocimiento "Flama, Vida y Mujer" por su carrera destacada y trabajo sobresaliente en el campo de Educación e Investigación, como parte del día internacional de la mujer UANL 2012.7) Reconocimiento como Miembro del Comité Representativo de Investigadores en las áreas VI y VII del SNI en el Foro Científico y Tecnológico del 2008-2011. 8) Nominación del CIDEMAC al Premio Nacional de Tecnología SECOFI, siendo una de las tres compañías finalistas de investigación tecnológica (entre 180 participantes). Este reconocimiento se otorgó en Los Pinos por el Presidente Ernesto Zedillo Ponce de León en el año 2000.

PUBLICACIONES CIENTÍFICAS SELECCIONADAS (2010-2023)

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2. Renewable formic acid production from CO_2 reduction using green ZnO nanoarchitectures. Luis F. Garay-Rodríguez, E. Luévano-Hipólito, Leticia M. Torres-Martínez. **Materials Science in Semiconducto Processsing,** Volume 161 (2023) pp 107458 https://doi.org/10.1016/j.mssp.2023.107458 ISSN Print: 1369-8001 ISSN Online: 18734081
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6. Development of SnO_2-ZnO thin films as a photocatalyst for obtaining alternative fuels through photocatalytic reactions. M.R. Alfaro Cruz, A. Saldaña-Ramírez, I. Juárez-Ramírez, Leticia M. Torres-Martínez. **Solid State Sciences,** Volume 137 (2023) pp 107112-107120 https://doi.org/10.1016/j.solidstatesciences.2023.107112 ISSN Print: 12932558 ISSN Online: 18733085
7. High oxygen-yield homogeneous sonophotocatalysis for water-splitting using theraphtal. Oxana V. Kharissova, Leticia M. Torres-Martínez, E. Luévano-Hipólito, Luis F. Garay-Rodríguez, M.R. Alfaro Cruz, Boris I. Kharissov. **Journal of Photochemistry and Photobiology A: Chemistry,** Volume 437 (2023) pp https://doi.org/10.1016/j.jphotochem.2022.114463 ISSN Print: 1010-6030 ISSN Online: 18732666
8. A critical review of the use of bismuth halide perovskites for CO_2 photoreduction: stability challenges and strategies implemented. Edith Luévano-Hipólito, Oscar L. Quintero-Lizárraga, Leticia M. Torres-Martínez. **Catalysts,** Volume 12 (11) (2022) pp 1-23 https://doi.org/10.3390/catal12111410 ISSN Print: 09205861 ISSN Online: 20734344
9. Novel strategies to tailor the photocatalytic activity of metal-organic frameworks for hydrogen generation: a mini-review. Luis A. Alfonso-Herrera, Leticia M. Torres-Martínez, J. Manuel Mora-Hernandez. **Frontiers in Energy,** Volume (2022) pp https://doi.org/10.1007/s11708-022-0840-x ISSN Print: 20951701 ISSN Online: 20951698
10. MgO and Mg $(OH)_2$ thin films prepared by the SILAR method and their CO_2 photocatalytic performance. M.R. Alfaro Cruz, E. Luévano-Hipólito, R. Garza-Hernández, Leticia M. Torres-Martínez. **Journal of Materials Science,** Volume (2022) pp https://doi.org/10.1007/s10853-022-07837-x ISSN Print: 00222461 ISSN Online: 15734803
11. E. Luévano-Hipólito, Leticia M. Torres-Martínez, M.A. Ávila-López**.** Visible-light-driven CO_2 reduction and H_2 evolution boosted by 1D Cu_2O/CuO heterostructures. **Journal of Physics and Chemistry of Solids,** Volume (2022) pp https://doi.org/10.1016/j.jpcs.2022.110924 ISSN Print: 0022-3697 ISSN Online: 18792553

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13. Ali Margot Huerta-Flores, Francisco Ruiz-Zepeda, Cavit Eyovge, Jedrzej P. Winczewski, Matthias Vandichel, Miran Gaberscek, Nicolas D. Boscher, Han J.G.E Gardeniers, Leticia M. Torres-Martínez, Arturo Susarrey-Arce. Enhanced photocatalytic hydrogen evolution from water splitting on $Ta_2O_5/SrZrO_3$ heterostructures decorated with Cu_xO/RuO_2 cocatalysts. **ACS Applied Materials & Interfaces,** Volume () (2022) pp A-O https://doi.org/10.1021/acsami.2c02520 ISSN Print: 19448244 ISSN Online: 19448252
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15. B. María E. Zarazúa-Morín, Arturo S. Galindo-Luna, Victor J. Gallegos-Sánchez, B.B. Zermeño-Resendiz, Leticia M. Torres-Martínez. Novel hydrothermal-assisted microwave synthesis of NitiO3/ZnO and sonophotocatalytic effect for degradation of rhodamine Topics in Catalysis, Volume () pp 101053 (2022) https://doi.org/10.1007/s11244-022-01645-y ISSN Print: 1022-5528 ISSN Online ISSN: 1572-9028
16. Manuel Alejandro Ávila-López, E. Luévano-Hipólito, Leticia M. Torres-Martínez. Optimizing the CO_2 reduction to produce CH_3OH using flexible $NiMoO_4$ coatings as a photocatalyst. **Journal of Alloys and Compounds**, Volume 918 () pp (2022) https://doi.org/10.1016/j.jallcom.2022.165549 ISSN Print: 0925-8388 ISSN Online: 1873-4669
17. Mirabbos Hojamberdiev, J. Manuel Mora-Hernandez, Ronald Vargas, Eva Maria Heppke, Kunio Yubuta, Akira Yamakata, Zukhra Kadirova, Leticia M. Torres-Martínez, Katsuya Teshima, Martin Lerch. Eliciting the contribution of TiN to photoelectrochemical performance enhancement of Imma-$LaTiO_2N$ at neutral pH. **Materials Today Energy**, Volume 27 pp (2022) https://doi.org/10.1016/j.mtener.2022.101053 ISSN Print: 2468-6069
18. Christian A. Celaya, Melissa Méndez-Galván, O.Castro-Ocampo, Leticia M. Torres-Martínez, Edith Luévano-Hipólito, Jorge Noé Díaz de León, Hugo A. Lara-García, Gabriela Díaz, Jesús Muñiz. Exploring the CO_2 conversion into hydrocarbons via a photocatalytic process onto M-doped titanate nanotubes (M=Ni, and Cu). **Fuel,** Volume 324 Part A (2022) pp 1-11 https://doi.org/10.1016/j.fuel.2022.124440 ISSN Print: ISSN Online: 18737153
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