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A. PROFESSIONAL PREPARATION

INSTITUTION	LOCATION	MAJOR/AREA	DEGREE & YEAR
Universidad Nacional Autónoma de México (UNAM)	Mexico City	Chemical Engineering	B. Sc., 1998
UNAM	Mexico City	Chemical Engineering	M. Sc., 2000
University Paris VI	Paris, France	Engineering and Technology	Ph. D., 2003
Universidad Nacional Autónoma de México	Mexico City	Nanotechnology	Post-doc, 2004-05

B. APPOINTMENTS

20018– Present	Director, Instituto de Ciencias Aplicadas y Tecnología-UNAM, Mexico City
2018-Present	Titular Researcher, Instituto de Ciencias Aplicadas y Tecnología-UNAM, Mexico City
2013-2018	Director, Centro de Ciencias Aplicadas y Desarrollo Tecnológico-UNAM, Mexico City
2011-2013	Academic Deputy, Centro de Ciencias Aplicadas y Desarrollo Tecnológico-UNAM, Mexico City
2009– 2018	Titular Researcher, Centro de Ciencias Aplicadas y Desarrollo Tecnológico-UNAM, Mexico City
2006 – 2008	Associated Researcher, Centro de Ciencias Aplicadas y Tecnología-UNAM, Mexico City

C. MAIN RESEARCH AREAS

1. Deposition of monometallic and bimetallic nanoparticles of gold, silver, nickel, copper and iridium on reducible and non-reducible powder oxides (e.g. TiO₂, CeO₂, Al₂O₃, SiO₂, ZrO₂, MgO, ZnO, CuO) by liquid phase methods (deposition precipitation, ion adsorption, impregnation and colloidal routes).
2. Synthesis of metal oxides, pure and doped.
3. Catalysis focused on exhaust gas reactions (CO oxidation, NO reduction, total oxidation)
4. Catalysis focused on the production and purification of H₂ (Water Gas Shift reaction (WGS) and preferential CO oxidation (PROX))
5. Photocatalytic degradation of organic compounds
6. Photocatalytic production of hydrogen.
7. Artificial Photosynthesis

D. PUBLICATIONS

(I) RECENT PUBLICATIONS

- P. Acevedo Peña, D. Ramírez Ortega, D. Guerrero Araque, A. Hernández Gordillo, R. Zanella, E. Reguera, Boosting the Photocatalytic Hydrogen Production of TiO₂ by using Copper Hexacyanocobaltate as Co-Catalyst, **International Journal of Hydrogen Energy** (2021), <https://doi.org/10.1016/j.ijhydene.2020.12.135>
- R. Camposeco, M. Hinojosa-Reyes, S. Castillo, N. Nava, R. Zanella, Synthesis and characterization of highly dispersed bimetallic Au-Rh nanoparticles supported on titanate nanotubes for CO oxidation reaction at low temperatures, **Environmental Science and Pollution Research** (2021), <https://doi.org/10.1007/s11356-020-11341-7>
- G. Che-Galicia, V. Ruíz-Santoyo, R. Zanella, N.Y. Mendoza-González, I.I. Ruiz-López, A. Sampieri, Kinetic mechanism of CO oxidation on gold catalyst supported on TiSBA-15 previously treated in a hydrogen atmosphere, **Chemical Engineering Journal** 405 (2021) 126644, <https://doi.org/10.1016/j.cej.2020.126644>
- Y. Kotolevich, O. Martynyuk, J.C. García Ramos, J.E. Cabrera Ortega, R. Vélez, V. Maturano-Rojas, A. Aguilar-Tapia, S. Martínez-Gonzalez, H.J. Tiznado Vazquez, M. Farías, R. Zanella, A. Pestryakov, N. Bogdanchikova, V. Cortés Corberán, Nanostructured silica-supported gold: effect of nanoparticle size distribution and electronic state on its catalytic properties in oxidation reactions, **Catalysis Today** (2021), <https://doi.org/10.1016/j.cattod.2020.08.028>
- C. V. Montoya-Bautista, P. Acevedo-Peña, R. Zanella, R. M. Ramírez-Zamora, Characterization and evaluation of copper slag as a bifunctional photocatalyst for alcohols degradation and hydrogen production, **Topics in Catalysis** (2020), <https://doi.org/10.1007/s11244-020-01362-4>
- D. Ramírez-Ortega, A. B. Ramos, A. Hernández-Gordillo, R. Zanella, S. E. Rodil, Enhancing the photocatalytic activity of CdS-ZnS(EN)_{0.5} hybrid sheets for the H₂ production, **International Journal of Hydrogen Energy** 45 (2020) 30496-30510 <https://doi.org/10.1016/j.ijhydene.2020.08.049>
- D. Ramírez-Ortega, D. Guerrero-Araque, P. Acevedo-Peña, L. Lartundo Rojas, Rodolfo Zanella, Effect of Pd and Cu co-catalyst on the charge carrier trapping, recombination and transfer during photocatalytic hydrogen evolution over WO₃-TiO₂ heterojunction, **Journal of Materials Science** 55 (2020), 16641–16658 <https://doi.org/10.1007/s10853-020-05188-z>
- R. Camposeco, S. Castillo, M. Hinojosa-Reyes, I. Mejía-Centeno, R. Zanella, Surface acidity, adsorption capacity, and photocatalytic activity of SiO₂ supported on TiO₂ nanotubes for rhodamine B degradation, **Topics in Catalysis** (2020), <https://doi.org/10.1007/s11244-020-01339-3>
- R. Camposeco, S. Castillo, N. Nava, V. Maturano, R. Zanella, Comparison of the performance of Au, Pt and Rh nanoparticles supported on Mn/alkali titanate nanotubes in formaldehyde oxidation at room temperature **Catalysis Letters** 150 (2020), 3342–3358, <https://doi.org/10.1007/s10562-020-03254-4>

- Diana L. Hernandez-Arellano, Juan C. Durán-Álvarez, Rodolfo Zanella, Rigoberto López-Juárez, Effect of heat treatment on the structure and photocatalytic properties of BiYO₃ and BiY_{0.995}Ni_{0.005}O₃ ceramic powders, **Ceramics International** 46 (2020) 20291–20298, <https://doi.org/10.1016/j.ceramint.2020.05.115>
- J. A. Macías-Vargas, R. Zanella, R. M. Ramírez-Zamora, Degradation of ciprofloxacin using a low-grade titanium ore, persulfate and artificial sunlight, **Environmental Science and Pollution Research** 27 (2020), 28623–28635 <https://doi.org/10.1007/s11356-020-08293-3>
- E. J. Moreno-Román, A. Cruz-López, C. García-Gómez, R. Zanella, S. I. Suárez-Vázquez, Evaluation of the catalytic oxidation of soot by CeO_x-LaMnO₃ at different O₂ pressures synthesized by ultrasonic-assisted hydrothermal method, **Environmental Science and Pollution Research** 27 (2020) 15475–15487 <https://doi.org/10.1007/s11356-020-08003-z>
- R. Camposeco, S. Castillo, N. Nava, R. Zanella, Boosting of soot combustion on alkaline Mn/ZrO₂ nanostructures, **Topics in Catalysis** 63 (2020) 481–491 <https://doi.org/10.1007/s11244-020-01224-z>
- D. Guerrero-Araque, D. Ramírez-Ortega, P. Acevedo-Peña, R. Zanella, R. Gómez, Photocatalytic degradation of 2,4-dichlorophenol on ZrO₂-TiO₂: influence of crystal size, surface area and energetic states, **Journal of Materials Science: Materials in Electronics** 31 (2020) 3332–3341, <https://doi.org/10.1007/s10854-020-02881-2>
- R. Camposeco, S. Castillo, Noel Nava, Juan Carlos Medina and Rodolfo Zanella, Effect of gold nanoparticles on MnO_x/TiO₂ nanostructures for improving the CO oxidation at low temperature, **Topics in Catalysis** 63 (2020) 492–503 <https://doi.org/10.1007/s11244-019-01220-y>
- T. Tabakova, I. Ivanov, R. Zanella, Y. Karakirova, J. W. Sobczak, W. Lisowski, Z. Kaszkur; L. Ilieva, Unraveling the effect of alumina-supported Y-doped ceria composition and method of preparation on the WGS activity of gold catalysts, **International Journal of Hydrogen Energy** 45 (2020) 26238-26253 <https://doi.org/10.1016/j.ijhydene.2019.12.199>
- J. C. Medina-Álvarez, S. Rodil, R. Zanella, Synthesis of CeO₂/Co₃O₄ catalyst with a remarkable performance for soot oxidation reaction, **Catalysis Science & Technology** 10 (2020) 853-863 <https://doi.org/10.1039/C9CY01821B>
- R. Camposeco, S. Castillo, M. Hinojosa-Reyes, N. Nava, R. Zanella, Manganese promoted TiO₂ and ZrO₂ nanostructures for soot combustion with boosted efficiency, **Surface and Coatings Technology** 384 (2020) 125305 <https://doi.org/10.1016/j.surfcoat.2019.125305>

- N. S. Portillo-Vélez, R. Zanella, Comparative study of transition metal (Mn, Fe or Co) catalysts supported on titania: Effect of Au nanoparticles addition towards CO oxidation and soot combustion reactions, **Chemical Engineering Journal** 385 (2020) 123848 <https://doi.org/10.1016/j.cej.2019.123848>
- L. A. Calzada, C. Louis, Ch. Wan-Han, V. Ortalan, R. Zanella, Au-Ru/TiO₂ Prepared by Deposition-Precipitation with Urea: Relevant synthesis parameters to obtain bimetallic particles, **Applied Catalysis B** 264 (2020), 118503 <https://doi.org/10.1016/j.apcatb.2019.118503>
- J.C. Durán-Álvarez, V.A. Hernández-Morales, M. Rodríguez-Varela, D. Guerrero-Araque, D. Ramirez-Ortega, F. Castellón, P. Acevedo-Peña, R. Zanella, Ag₂O/TiO₂ nanostructures for the photocatalytic mineralization of the highly recalcitrant pollutant iopromide in pure and tap water, **Catalysis Today** 341 (2020) 71-81 <https://doi.org/10.1016/j.cattod.2019.01.027>
- J.C. Durán-Álvarez, R. Del Angel, D. Ramírez-Ortega, D. Guerrero-Araque, R. Zanella, An alternative method for the synthesis of functional Au/WO₃ materials and their use in the photocatalytic production of hydrogen, **Catalysis Today** 341 (2020) 49-58, <https://doi.org/10.1016/j.cattod.2018.09.018>
- A. Cruz-López, S. Suárez-Vazquez, D. A. Solís-Casados, C. A. Ramos-Rivera, Rodolfo Zanella, Characterization of RuO₂-Rh₂O₃ supported on Ag_{1-x}NbO₃; at x=0, 0.1 and 0.5 for the H₂ production, **Materials Science in Semiconductor Processing** 107 (2020) 104806, <https://doi.org/10.1016/j.mssp.2019.104806>
- J. C. Durán-Álvarez, C. Martínez, E. González-Cervantes, R. A. Gutiérrez-Márquez, M. Rodríguez-Varela, A. S. Varela, F. Castellón, R. Zanella, Degradation and mineralization of oxytetracycline in pure and tap water under visible light irradiation using bismuth oxyiodides and the effect of depositing Au nanoparticles, **Journal of Photochemistry and Photobiology A** 388 (2020), 112163 <https://doi.org/10.1016/j.jphotochem.2019.112163>
- L. Ilieva, P. Petrova, G. Pantaleo, R. Zanella, J.W. Sobczak, W. Lisowski, I. Ivanov, Z. Kaszkur, L.F. Liotta, A.M. Venezia, T. Tabakova, Impact of ceria loading on the preferential CO oxidation over gold catalysts on CeO₂/Al₂O₃ and Y-doped CeO₂/Al₂O₃ supports prepared by mechanical mixing, **Catalysis Today** 357 (2020) 547-555, <https://doi.org/10.1016/j.cattod.2019.06.006>
- Durán-Álvarez, J. C., Martínez, C., Mera, A. C., Del Angel, R., Gutiérrez-Moreno, N. J., Zanella, R. A Facile Synthetic Method to Obtain Bismuth Oxyiodide Microspheres Highly Functional for the Photocatalytic Processes of Water Depuration. **J. Vis. Exp.** (145), (2019) e59006, <https://doi.org/10.3791/59006>.
- J. C. Durán-Álvarez, M. Méndez-Galván, L. Lartundo-Rojas, M. Rodríguez-Varela, D. Ramírez-Ortega, D. Guerrero-Araque, R. Zanella, Synthesis and Characterization of the All Solid Z-

Scheme Bi₂WO₆/Ag/AgBr for the Photocatalytic Degradation of Ciprofloxacin in Water, **Topics in Catalysis** 62 (2019) 1011–1025, <https://doi.org/10.1007/s11244-019-01190-1>

- A. Aguirre, R. Zanella, C. Barrios, S. Hernández, A. Bonivardi, S. E. Collins, Gold Stabilized with Iridium on Ceria–Niobia Catalyst: Activity and Stability for CO Oxidation, **Topics in Catalysis** 62 (2019), 977–988
<https://doi.org/10.1007/s11244-019-01185-y>
- M. Stucchi, A. Jouve, A. Villa, G. Nagy, M. Németh, C. Evangelisti, R. Zanella, L. Prati, Gold-silver catalysts: ruling factors for establishing synergism, **ChemCatChem** 11 (2019), 4043–4053 <http://dx.doi.org/10.1002/cctc.201900591>
- R. Camposeco, S. Castillo, M. Hinojosa-Reyes, N. Nava, R. Zanella, Efficient CO (carbon monoxide) oxidation using gold catalysts supported on WO₃/titanate protonated nanotubes **Materials Research Bulletin** 115, (2019) 247–256,
<https://doi.org/10.1016/j.materresbull.2019.04.004>
- R. Camposeco, S. Castillo, M. Hinojosa-Reyes, R. Zanella, Julio C. López-Curiel, Gustavo A. Fuentes, Isidro Mejía-Centeno, Active TiO₂-nanostructured surfaces for CO oxidation on Rh model catalysts at low-temperature, **Catalysis Letters** 149 (2019) 1565–1578,
<https://doi.org/10.1007/s10562-019-02757-z>
- L. Ilieva, P. Petrova, G. Pantaleo, R. Zanella, J.W. Sobczak, W. Lisowski, Z. Kaszukur, G. Munteanu, I. Yordanova, L.F. Liotta, A.M. Venezia, T. Tabakova, Alumina supported Au/Y-doped ceria catalysts for pure hydrogen production via PROX, **International Journal of Hydrogen Energy** 44 (1) (2019) 233–245 <https://doi.org/10.1016/j.ijhydene.2018.03.005>
- Y. Cruz-Hernández, M. Villalobos, M. A. Marcus, T. Pi-Puig, R. Zanella, N. Martínez-Villegas, Tl(I) sorption behavior on birnessite and its implications for mineral structural changes, **Geochimica et Cosmochimica Acta** 248 (2019) 356–369
<https://doi.org/10.1016/j.gca.2019.01.020>
- Tatyana Tabakova, Lyuba Ilieva, Ivan Ivanov, Maela Manzoli, Rodolfo Zanella, Petya Petrova, Zbigniew Kaszukur, Structure-activity relationship in water-gas shift reaction over gold catalysts supported on Y-doped ceria, **Journal of Rare Earths** 37, (2019) 383–392.
<https://doi.org/10.1016/j.jre.2018.07.008>

E. SYNERGISTIC ACTIVITIES

1. President of the Mexican Academy of Catalysis 2017–2019.
2. Chair of the XXVII International Materials Research Congress 2019 held in Cancún, Mexico in August 2019.
3. I led the transformation of the Center for Applied Science and Technological Development into the Institute for Applied Sciences and Technology (ICAT) at UNAM.
4. Founder and head of the University Laboratory of Environmental Nanotechnology at UNAM
5. Head of the Catalysis and Surface Processes group at ICAT