Tatiana Rodríguez Flores

ORCID: 0000-0003-2655-7715

PhD graduate in Materials Science and Engineering with over 7 years of experience in nanomaterials research and catalysis, with a strong focus on magnetic nanomaterials and transition-metal oxides/ferrites. Skilled in synthesizing and characterizing advanced materials for energy applications, with expertise in synthesis and structural characterization of oxides and ferrites. My research focuses on structure-property relationships in transition-metal compounds, with applications in catalysis, energy, and magnetic materials. Proactive team player with a problem-solving mindset and a strong track record of delivering results and multidisciplinary research environments. I am currently a postdoctoral researcher at Università degli Studi di Milano-Bicocca, working on Fe-containing magnetic nanomaterials for photo(electro)catalysis.

+Contact

Phone: +39 351 409 4067

Email: tatiana.ro.flores@gmail.com

+Education

2019-2023 **Ph.D. in Materials Science and Engineering (9.55/10)**, Universidad Autónoma Metropolitana, Azcapotzalco, Mexico

2016-2018 **Master's degree in Materials Science and Engineering (9.76/10)**, Universidad Autónoma Metropolitana, Azcapotzalco, Mexico

2010-2016 **Bachelor's degree in chemical engineering (8.53/10),** Universidad Autónoma Metropolitana, Azcapotzalco, Mexico

+Carrier

June 2024 – Today: Postdoctoral researcher in the project "Development of Fe-containing magnetic nanomaterials for photo(electro)catalysis" led by Dr. Roberto Nisticò, Università degli Studi di Milano Bicocca, Milan, Italy.

December 2022 – May 2024: Co-worker in the project "Photodegradation of Pharmaceutical Contaminants with Cerium Oxide and Iron and Tungsten Modified Cerium Oxide" led by Dr. Isaías Hernández Pérez, Universidad Autónoma Metropolitana, Azcapotzalco, Mexico.

January – April 2023: Co-worker in the project "Synthesis and characterization of titanium dioxide (rutile-anatase) with nickel-cobalt impurities for photocatalytic applications" led by Dr. Leonardo González Reyes, Universidad Autónoma Metropolitana, Mexico.

July 2022 – January 2023: Research internship in the group led by Armando Reyes Montero, Universidad Nacional Autónoma de México, Mexico.

December 2019 – March 2020: Co-worker in the project "Synthesis of Tungsten Polyoxometalate and Caprolactam as a Lewis Organic Base, for Use in the Photooxidation of the Azo-Type Textile Dye Reactive Black-5 (RB-5)" led by Dr. Holguín Quiñones Saúl and Isaías Hernández Pérez, Universidad Autónoma Metropolitana, Mexico.

June-August 2018: Exchange student in the group led by Marina Elizabeth Rincón González, Universidad Nacional Autónoma de México, Mexico.

+Teaching Activity

June 28th-July 2nd, 2022: Tutor in the XVII School of Materials Science and Engineering for the Environmental Catalysis course, 10 hours, Universidad Nacional Autónoma de México.

April 2018-November 2022: Tutor in Workshop on Problem Solving in Physical-Chemistry of Materials, Kinetics and Catalysis, and Chemical Equilibrium, 4 h/week each one of them, Universidad Autónoma Metropolitana, Azcapotzalco.

May 2nd-August 19th, 2022: Supervisor of two undergraduate students of Universidad Tecnológica Fidel Velázquez and Universidad Autónoma Metropolitana on the project synthesis of ferrites for its application in photocatalysis.

February 6th-November 7th, 2023: Supervisor of two undergraduate students of Environmental Engineering at the Universidad Autónoma Metropolitana on the project effect of iron doping in the photocatalytic properties of CeO_2 for ibuprofen degradation.

October 27th-November 20th, 2025: Assistant in the didactic laboratory of Coordination and Organometallic Chemistry, course 24 hours in total, in the Department of Materials Science at the Università degli Studi di Milano Bicocca, Milan, Italy.

+Technical skills

Management of laboratory equipment: Bruker D8 Advance diffractometer, Siemens D5000 diffractometer, Rigaku Miniflex 600 diffractometer, Spectrophotometer Varian Cary I equipped with an integration sphere DRA-CA-30I, Varian Cary Eclipse spectrophotometer, Zetasizer Nano ZS90, Perkin Elmer FT-IR spectrometer (Frontier), Surface Photovoltage Spectroscopy (KP020-SPS), and potentiostat-galvanostat VersaSTAT4, Mettler Toledo TGA/DSC1 STARe System. Metallizer SD-900C, Vision Precision Instruments Ltd, SEM Thermo Scientific Phenom Pro, Alfatest. EZ-9 MicroSense Vibrating Sample Magnetometer (VSM).

Chemical Engineering Software: Pro/ II + PROVISION, ASPEN.

Material Characterization by Chemical Software: XRD (FullProf, Cristal Match, X'Pert Pro, PDXL-2 software), IR (KnowItAll), Photoluminiscence (Scan), UV-Vis (Scan), and Versa Studio software.

Operating Systems: GNU-Linux and Windows 95-11.

Other software: GIMP, Microsoft Office 2007-2019, Microsoft Office 365, Illustrator, Photoshop, Origin, VESTA, Inkscape, and Mathematica.

+Oral and poster contributions

September 9-12th, 2025: 50th Conference of the Divisione di Chimica Inorganica (INORG2025). **Oral presentation**: Magnetic ferrite-based materials as electrocatalysts for energy applications.

September 7-12th, 2025: 76th Annual Meeting of ISE. **Oral presentation**: Comparative study of various metal oxides in different oxidation states for the Electrochemical Reduction of Nitrate to Ammonia (NO3-RR).

July 23-25th, 2025: International School of Electrocatalysis 2025. **Poster presentation:** Comparative study of various metal oxides for the Electrochemical Reduction of Nitrate to Ammonia.

June 2-5th, 2025: International Conference on Environmental Catalysis ICEC 2025. **Oral presentation**: Design of nanostructured Cu oxides for the electrocatalytic CO_2 reduction.

June 2-5th, 2025: International Conference on Environmental Catalysis ICEC 2025. **Oral presentation**: Magnetic ferrite-based materials for hydrogen generation via water photo-electrolysis.

August 13-18th, 2023: XXXI International Materials Research Congress and International Conference on Advanced Materials, Cancun, Mexico. **Oral presentation**: Synthesis of ZnO-Based nanoparticles by sonochemistry for photocatalysis applications to dye degradation.

August 13-18th, 2023: XXXI International Materials Research Congress and International Conference on Advanced Materials, Cancun, Mexico. **Poster presentation**: Decolorization of Azo RB-5 dye with $La_{0.8}Sr_{0.2}Fe_{0.8}Co_{0.2}O_{3\pm\delta}$(LSFCO).

August 13-18th, 2023: XXXI International Materials Research Congress and International Conference on Advanced Materials, Cancun, Mexico. **Poster presentation**: Enhanced ibuprofen degradation using tungsten-modified cerium oxide nanoparticles.

August 13-18th, 2023: XXXI International Materials Research Congress and International Conference on Advanced Materials, Cancun, Mexico. **Poster presentation**: Photocatalytic degradation of paracetamol using Fe-doped CeO_2 nanoparticles.

June 5-9th, 2023: Summer School of Catalysis, Mexico City, Mexico.

August 14-19th, 2022: XXX International Materials Research Congress and International Conference on Advanced Materials, Cancun, Mexico. **Poster presentation**: Sono-degradation of RB-5 on $La_{0.8}Sr_{0.2}Fe_{0.9}Co_{0.1}O_{3\pm\delta}$ perovskite.

August 14-19th, 2022: XXX International Materials Research Congress and International Conference on Advanced Materials, Cancun, Mexico. **Poster presentation**: Comparative study on the photocatalytic properties of ZnO synthesized with different surfactants.

October 26-28th, 2021: 7th Latin American Congress of Photocatalysis, Photochemistry and Photobiology-LACP3, Mexico City, Virtual Edition. **Oral presentation**: Synthesis and Characterization of ZnO and its application in Photocatalysis.

August 15-20th, 2021: XXIX International Materials Research Congress, Cancun, Mexico. **Poster presentation**: Synthesis and Characterization of ZnO nanoparticles stabilized by different surfactants for their application in photocatalysis.

May 21st, 2021: University chapter of the Mexican Materials Society (SMMater). **Oral presentation**: Determination of the crystal size of $La_{0.9}Sr_{0.1}Fe_{0.8}Co_{0.2}O_{3\pm\delta}$ by graphical methods at different calcination temperatures.

November 19-27th, 2020: Structural Materials Online symposium Mexico, Virtual Edition.

February 1st-19th, 2018: Course on "Theoretical-Practical Course: Infrared Spectroscopy Applied to Catalysts and Adsorbents", Mexico.

+Soft skills

Time management, Multitasking, Effective teamwork, Decision-making, and Teaching activities (Chemistry, Mathematics).

+Language

English (B2), French (A1), Italian (A1), Spanish (mother tongue).

+Publications

1. Giulia Rando, **Tatiana Rodríguez-Flores**, Silvia Sfameni, Falak Shafiq, Matteo Cantoni, Maria Rosaria Plutino, Roberto Nisticò, “Smart Magnetic Ferrite/Organoclay Composites for Sustainable Water Remediation”, *Royal Society of Chemistry*, **2026**.

2. Simone Lombardi, **Tatiana Rodríguez-Flores**, Gabriele Prina, Viviana Cigolotti, Nicola Lisi, Enrico Berreti, Mohsin Muhyuddina, Rosanna Viscardi, Roberto Nisticò, Carlo Santoro, “Comparative study of cobalt, copper and zinc oxides for the electrochemical reduction of nitrate to ammonia”, *Electrochimica Acta*, **2026**, 548, 147870.

3. **Tatiana Rodríguez Flores**, Falak Shafiq, Gabriele Bona, Giulia Bragaggia, Matteo Cantoni, Roberto Scotti, Silvia Gross, Roberto Nisticò, “Mixed hydro-solvothermal synthesis process: An unconventional route to obtain mixed iron oxide systems”, *Ceramics International*, **2025**, 51: 65640-65647.

4. **Tatiana Rodríguez-Flores**, Isaías Hernández-Pérez, Gloria Elena de la Huerta-Hernández, Yadira Ayala-Parada, Jessica Guadalupe Cadena-Silva, and Catalina Haro-Pérez, “Comparison of

Photocatalytic Performance of Sonochemically Synthesized ZnO with Different Capping Agents", *ACS Omega*, **2025**, 5c00929.

5. **Tatiana Rodríguez-Flores**, Falak Shafiq, Roberto Nisticò, "Synthesis, properties, and application in catalysis of Cu, Ni, Co, Zn ferrites: A comprehensive review study", *J. Alloys and Comp.*, **2025**, 1036: 181926.

6. **Tatiana Rodríguez-Flores**, Isaías Hernández-Pérez, Raúl Suárez-Parra, Gloria Elena de la Huerta-Hernández, and Catalina Haro-Pérez, "Sonocatalytic degradation of RB-5 dye using ZnO nanoparticles doped with transition metals", *Environ Sci Pollut Res*, **2025**, 32:783–797.

7. Gloria E. de la Huerta-Hernández, **Tatiana Rodríguez-Flores**, Armando Reyes-Montero, Iván Castro-Cisneros, Isaías Hernández-Pérez, and José A. Chávez-Carvayar, "Perspectives of $La_{0.9}Sr_{0.1}Fe_{0.9}Co_{0.1}O_{3\pm\delta}$ perovskite obtained by Pechini and sonochemical methods: a case study", *R. Soc. Open Sci.,* **2024**, 11240627.

8. Tania Merit Pérez-Martínez, Gloria Elena de la Huerta-Hernández, **Tatiana Rodríguez-Flores**, José A. Chávez-Carvayar & Isaías Hernández-Pérez, Decolorization of RB-5 azo dye with $La_{0.8}Sr_{0.2}Fe_{1-y}Co_yO_{3\pm\delta}$ (LSFC) perovskite. *MRS Advances* 9, **2024**, 1631–1636.

9. Gloria Elena de la Huerta-Hernández, José Chávez-Carvayar, **Tatiana Rodríguez-Flores**, Iván Castro-Cisneros, Armando Reyes-Montero, and Isaías Hernández Pérez, "Analysis of the photocatalytic activity of $La_{0.9}Sr_{0.1}Fe_{0.8}Co_{0.2}O_{3\pm\delta}$ perovskite as a catalyst in the degradation of RB-5 dye", *Environ Sci Pollut Res*, **2023**, 1614-7499.

10. **Tatiana Rodríguez-Flores**, Catalina Haro-Pérez, Erick E. Gerardo-Morales, Gloria Elena de la Huerta-Hernández, Leonardo González Reyes, and Isaías Hernández-Pérez, "Influence of Precursor Concentration in the Synthesis of ZnO Nanoparticles on their Morphological, Structural, and Photocatalytic Properties", *Top Catal,* **2022**, 65, 1149–1162.

+References

Dr. Roberto Nisticò Associate professor, Materials Sciences Department, University of Milano-Bicocca, Via Roberto Cozzi, 55, 20126, Milano roberto.nistico@unimib.it	Dr. Isaías Hernández Pérez Full professor, División de Ciencias Básicas e Ingeniería, Universidad Autónoma Metropolitana, Azcapotzalco Av. San Pablo 180 - 02200 Ciudad de México ihp@azc.uam.mx

+Hobbies

Reading, Writing, and Yoga.