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Engineering & Scientific Consulting

Natalia Sergienko, Ph.D.

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Professional Profile

Dr. Sergienko specializes in corrosion and electrochemistry, water chemistry and treatment, and advanced characterization methods, bringing these together to tackle complex technical and environmental challenges. She is skilled in electrochemical techniques such as electrochemical impedance spectroscopy (EIS), potentiodynamic polarization, and cyclic voltammetry, as well as in a broad range of analytical methods including X-ray diffraction (XRD), scanning electron microscopy with energy-dispersive spectroscopy (SEM/EDS), X-ray photoelectron spectroscopy (XPS), Raman and FT-IR spectroscopy, X-ray absorption spectroscopy (XAS), UV–Vis spectroscopy, high-performance liquid chromatography (HPLC), and ion chromatography (IC).

Before joining Exponent, Dr. Sergienko completed her Ph.D. in Environmental Engineering at the Catalan Institute for Water Research (ICRA) in Spain, where she investigated electrochemical processes for prevention of sulfide induced corrosion in anaerobic systems. She then joined the University of California, Berkeley, as a postdoctoral researcher, where she conducted corrosion assessments of gas diffusion electrodes, studied cathodic mineral scaling in water treatment systems, and evaluated the performance of advanced oxidation processes for contaminant removal. Her experience also includes supporting scale-up of electrochemical reactors, assessing electrode performance under realistic operating conditions, and collaborating with cross-disciplinary teams to solve treatment and corrosion challenges.

Academic Credentials & Professional Honors

Ph.D., Program in Water Science & Technology, Girona University, 2021

M.Sc., Environmental Engineering, Ghent University, 2016

Academic Appointments

Postdoctoral Researcher, Civil & Environmental Engineering, University of California, Berkeley, USA, 2021 – 2023

Postdoctoral Researcher, Catalan Institute for Water Research (ICRA), Girona, Spain, 2021 – 2021

Publications

Sergienko N, Bandaru SRS, Gadgil A, Sedlak DL. The influence of Mg^{2+} on scale formation and its implications for electrochemical hydrogen peroxide generation by gas diffusion cathodes. Under review. 2025.

Sergienko N, Haddad A, Kinigstein E, Gadgil A, Sedlak DL. A new perspective on the role of Mg^{2+} in calcite electroscaling formation. Under review. 2025.

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Segues Codina A, Sergienko N, Borrego CM, Radjenovic J. Manganese oxide-functionalized graphene sponge electrodes for electrochemical chlorine-free disinfection of tap water. Chemical Engineering Journal. 2023; 472:145082.

Sergienko N, Cuervo Lumbaque E, Duinslaeger N, Radjenovic J. Electrocatalytic removal of persistent organic contaminants at molybdenum doped manganese oxide coated TiO□ nanotube-based anode. Applied Catalysis B: Environmental. 2023; 334:122831.

Sergienko N, Cuervo Lumbaque E, Radjenovic J. (Electro)catalytic oxidation of sulfide and recovery of elemental sulfur from sulfide-laden streams. Water Research. 2023; 245:120651.

Sergienko N, Radjenovic J. Manganese oxide coated TiO□ nanotube-based electrode for efficient and selective electrocatalytic sulfide oxidation to colloidal sulfur. Applied Catalysis B: Environmental. 2021; 296:120383.

Sergienko N, Radjenovic J. Manganese oxide-based porous electrodes for rapid and selective (electro)catalytic removal and recovery of sulfide from wastewater. Applied Catalysis B: Environmental. 2020; 267:118608.

Sergienko N, Irtem E, Gutierrez O, Radjenovic J. Electrochemical removal of sulfide on porous carbon-based flow-through electrodes. Journal of Hazardous Materials. 2019; 375:19–25.

Rehman A, Baek JW, Rene ER, Sergienko N, Behera SK, Park HS. Effect of process parameters influencing the chemical modification of activated carbon fiber for carbon dioxide removal. Process Safety and Environmental Protection. 2018; 118:384–396.

Rene ER, Sergienko N, Goswami T, López ME, Kumar G, Saratale GD, Venkatachalam P, Pakshirajan K, Swaminathan T. Effects of concentration and gas flow rate on the removal of gas-phase toluene and xylene mixture in a compost biofilter. Bioresource Technology. 2018; 248:28–35.

Lahel A, Fanta AB, Sergienko N, Shakya M, López ME, Behera SK, Rene ER, Park HS. Effect of process parameters on the bioremediation of diesel contaminated soil by mixed microbial consortia. International Biodeterioration & Biodegradation. 2016; 113:375–385.

Presentations

Sergienko, N., Sedlak, D.L. Aging of gas-diffusion cathodes: Mechanisms and implications for electrochemical AOPs. Oral presentation, ACS National Meeting, San Diego, CA, 2025.

Sergienko, N., Sedlak, D.L. Scale formation on gas diffusion cathodes and its effect on electrochemical hydrogen peroxide generation. Oral presentation, ACS National Meeting, San Francisco, CA, 2023.