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Gretchen Tibbits, Ph.D.

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Professional Profile

Dr. Tibbits has expertise in the areas of electrochemistry, electroprecipitation, microsensors, biohazard materials, radionucleotides, and electroceutical medical devices. She has experience with multiple electrochemical methods in addition to material characterization techniques including scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy (EDS), Fourier-transform infrared spectroscopy (FTIR), and light microscopes.

Dr. Tibbits also has experience with wound healing and infectious disease treatments. She is interested in applying this knowledge to understand and characterize corrosion and failure of materials, particularly for medical devices testing and explant analysis.

Dr. Tibbits completed her doctoral work at Washington State University where she utilized electrochemical techniques to study a number of systems. She preconcentrated radionucleotides on microelectrodes, developed thin-filmed microsensors, engineered an electrochemical assay to determine antibiotic susceptibility and resistance of bacterial pathogens, studied the corrosion of orthopedic implants, and contributed to product development of electroceutical devices for wound infection treatments. As a Department of Energy Nuclear Energy Radiochemistry Fellow, she expanded the techniques for separation of radionucleotides via electrochemical preconcentration and detection. In several other multidisciplinary collaborations, she expanded methods of infection treatment and prevention using antibiotic-alternative methods or by improving antibiotic susceptibility testing.

Academic Credentials & Professional Honors

Ph.D., Chemical Engineering, Washington State University, 2022

B.S., Chemical Engineering, Washington State University, 2018

Department of Energy Nuclear Energy Nuclear and Radiochemistry Fellowship

Publications

Efficacy and toxicity of hydrogen peroxide producing electrochemical bandages in a porcine explant biofilm model. J Appl Microbiol. 2022 Dec;133(6):3755-3767. doi: 10.1111/jam.15812. Epub 2022 Sep 22. PMID: 36073322; PMCID: PMC9671841.

G. Tibbits, A. Mohamed, D. Call, H. Beyenal, Rapid differentiation of antibiotic-susceptible and –resistant bacteria through mediated extracellular electron transfer, Biosensors and Bioelectronics, 2021.

Mohamed A, Anoy MMI, Tibbits G, Raval YS, Flurin L, Greenwood-Quaintance KE, Patel R, Beyenal H. Hydrogen peroxide-producing electrochemical bandage controlled by a wearable potentiostat for treatment of wound infections. Biotechnol Bioeng. 2021 Jul;118(7):2815-2821. doi: 10.1002/bit.27794. Epub 2021 May 3. PMID: 33856049.

Interactions between Hyaluronic Acid and CoCrMo-Alloy Surface in Simulated Synovial Fluids" by Radice, Simona; Tibbits, Gretchen; Lin, Alex; Beyenal, Haluk; Wimmer, Markus. Biosurface and Biotribology, 2021.

G. Tibbits, N.A. Wall, S. Saunders, J. Babauta, H. Beyenal, Electrochemical detection of flavin mononucleotide using mineral-filmed microelectrodes, Journal of Electroanalytical Chemistry, Volume 892, 2021, 115307, ISSN 1572-6657.

Medina AS, Tibbits G, Wall NA, Ivory CF, Clark SB, Beyenal H. Electrochemical precipitation of neptunium with a micro electrochemical quartz crystal microbalance. J Radioanal Nucl Chem. 2020 Jun;324(3):1021-1030.

Presentations

Tibbits, G.; Wall, N.A.; Saunders, S.; Babauta, J.; Beyenal, H. Thin Hematite Film Based Flavin Microsensor. Oral presentation, 235th Electrochemical Society Conference, Dallas, TX, 2019.