

Yi Chen

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EDUCATION

UNIVERSITY OF CALIFORNIA, LOS ANGELES

Doctor of Philosophy, Chemistry

Master of Science, Chemistry

Los Angeles, CA

(Expected) Summer 2024

March 2021

FUDAN UNIVERSITY

Bachelor of Science, Chemistry

Shanghai, China

June 2019

SKILLS

Chemistry: Electrochemistry, Chemical process development and optimization

Semiconductor: General photolithography, Etching, ALD, Sputter, e-beam evaporator

Characterization: SEM, confocal microscopy

Programming: Python, MATLAB, C++

People skills: Proven communication and presentation skills, Multi-task ability, Problem-solving skills

Other software: Adobe Illustrator, COMSOL Multiphysics, MS Office Suite, Image J, Origin

RESEARCH EXPERIENCE

CHONG LIU RESEARCH GROUP

Los Angeles, CA

Ph.D. Student for Inorganic Chemistry Research

Sept 2019 – Present

- Generate oxygen and hydrogen peroxide concentration gradient in an electrochemical microfluidic device
 - Led a team of three working on a multidisciplinary project and arranged weekly meetings
 - Designed photomask patterns based on different collaborators' requirements
 - Developed micrometer-scale pattern on silicon wafer by photolithography and conducted deep reactive-ion etching (DRIE) to construct microwire arrays of the desired length
 - Developed a cost-efficient method for rapidly measuring microwire length using a standard optical microscope, eliminating the need for time-consuming and expensive scanning electron microscope (SEM)
 - Utilized electrochemical oxygen reduction reaction to establish oxygen or hydrogen peroxide gradient within a fluidic system
 - Modified electrochemical setup and electrode morphologies to generate oxygen and hydrogen peroxide concentration gradient to mimic gradient in bacterial environment
 - Performed SEM imaging of fine features (around 20 nm) of microwire array electrodes
 - Presented research findings at two international conferences and within the research group
- Research on surface-modified electrode using mesoporous silica
 - Electrochemically deposit a spatially uniform layer of mesoporous silica onto the surfaces of gold and platinum electrodes
 - Fine-tuned the mesoporous silica surface morphology by changing applied potential, deposition time, and precursor solution composition
 - Conducted SEM imaging to measure surface morphology of the silica coating
 - Performed cyclic voltammetry (CV) to evaluate the ion permselectivity of the silica coating
 - Provided guidance to an undergraduate student in collaborator's group on the synthesis and characterization of mesoporous silica materials

- Research on surface-modified electrode using porous copolymer
 - Electropolymerize a uniform layer of porous copolymer to coat the surfaces of gold and platinum electrodes
 - Performed electrochemical measurement on rotating disk electrodes to study the permselectivity of the copolymer coating and identify the threshold size for molecule passage

PROCESS DEVELOPMENT & INSTRUMENT MANAGEMENT

CHONG LIU RESEARCH GROUP

Los Angeles, CA

Atomic layer deposition (ALD) equipment superuser

Jan 2022 – Jun 2023

- Set up an ALD equipment and designed the gas supply pipelines
- Managed maintenance, calibrations, basic troubleshooting, and unit replace of ALD equipment by executing and documenting all associated activities
- Optimized a TiO₂ deposition recipe to achieve 100% increase in deposition rate
- Customized TiO₂ deposition recipes to meet different working temperature tolerance
- Created standard operating procedures and trained new users

Electrodeposition group specialist

Oct 2021 – Present

- Developed and modified a Pt electrodeposition recipe enabling tunable Pt surface morphology
- Developed and modified a mesoporous silica electrodeposition recipe enabling tunable silica surface morphology and thickness
- Developed a copolymer electrodeposition recipe

Electrochemical microfluidic system designer

Oct 2020 – Present

- Designed an electrochemical microfluidic system with tunable flow chamber height
- Modified an electrochemical microfluidic system to achieve both high-resolution bacteria imaging and stable electrochemical performance
- Established protocols of inoculation in microfluidic devices for three bacterial strains
- Incorporated a mixing subunit at the inlet of the flow system

Confocal microscopy group lead

Oct 2020 – Present

- Established confocal microscopy settings for hydrogen peroxide and oxygen sensing
- Modified confocal microscopy settings to reduce photobleaching of bacterial fluorescence protein and increase signal noise ratio
- Created a fluorescence detection protocol for live/dead staining imaging

PUBLICATION

[1] **Chen, Y.**; Wang, J.; Hoar, B. B.; Lu, S.; Liu, C., Machine learning–based inverse design for electrochemically controlled microscopic gradients of O₂ and H₂O₂. *Proc. Natl. Acad. Sci. U.S.A.* **2022**, *119*, e2206321119.

PRESENTATIONS & SYMPOSIUM

2023 ACS Fall

August 2023

Title: Machine learning–based inverse design for electrochemically controlled microscopic gradients of O₂ and H₂O₂

2022 MRS Fall Meeting Symposium

Nov 2022

Title: Machine learning–based inverse design for electrochemically controlled microscopic gradients of O₂ and H₂O₂