Yi Chen

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EDUCATION

UNIVERSITY OF CALIFORNIA, LOS ANGELES — Los Angeles, CA
Doctor of Philosophy, Chemistry — (Expected) Summer 2024
Master of Science, Chemistry — March 2021

FUDAN UNIVERSITY — Shanghai, China
Bachelor of Science, Chemistry — 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 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 scanning electron microscope (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 TiO_2 deposition recipe to achieve 100% increase in deposition rate
- Customized TiO_2 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 O_2 and H_2O_2. *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 O_2 and H_2O_2

2022 MRS Fall Meeting Symposium — Nov 2022

Title: Machine learning–based inverse design for electrochemically controlled microscopic gradients of O_2 and H_2O_2