Yi Chen

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EDUCATION

UNIVERSITY OF CALIFORNIA, LOS ANGELES — Los Angeles, CA
Doctor of Philosophy, Chemistry — Fall 2019 – Present

- Anticipated Summer 2024
- Advanced to Ph.D. candidate in September 2021
- Master of Science in Chemistry conferred in March 2021
- GPA (Cumulative Total): 3.992

FUDAN UNIVERSITY — Shanghai, China
Bachelor of Science, Chemistry — Fall 2015 – Summer 2019

- Graduated: June 2019

RESEARCH & WORK 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 on microwire array electrodes 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
  - Resolved pattern blurring in photolithography by cleaning photoresist residual on the photomask and reducing hard bake temperature
  - Resolved fractured microwire array in the etching process based on DRIE working principle
  - 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
  - Characterized oxygen and hydrogen peroxide concentration gradient under confocal microscopy
  - Used ImageJ and MATLAB to analyze confocal microscope images
  - 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 (Collaborated with Prof. Yixian Wang group at California State University, Los Angeles)
  - Electrochemically deposit a spatially uniform layer of mesoporous silica onto the surfaces of gold and platinum electrodes
  - Fine-tuned the mesoporous silica thickness and 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 a student in Prof. Wang's group on the synthesis and characterization of mesoporous silica materials

- Investigated *P. aeruginosa*'s metabolism regulation in an electrochemical microfluidic system (Collaborating with Prof. Dianne K. Newman group at California Institute of Technology)
  - Designed and modified an electrochemical microfluidic system to achieve both high-resolution bacteria imaging and stable electrochemical performance
  - Designed a protocol of inoculation in microfluidic devices together with collaborators
  - Monitored metabolic activity of *P. aeruginosa* under fluorescence microscopy
  - Developed a confocal microscopy optical setting to reduce photobleaching of bacterial fluorescence protein and increase signal noise ratio

- Managed an atomic layer deposition (ALD) equipment
  - Set up an ALD equipment and especially 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

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.

SKILLS

1. Familiarity with general photolithography process
2. Experience in both dry etching (reactive-ion etching) and wet etching (HF etching)
3. Experience in process development and optimization
4. Highly efficient in communication and adept at delivering engaging presentations
5. Proven expertise in effectively managing multiple tasks and prioritizing tasks
6. Exceptional problem-solving skills, whether working independently or collaboratively in a team
7. Good knowledge in ALD usage, management, and basic troubleshooting
8. Ability to use sputter, reactive-ion etching, e-beam evaporator, and reflectometer
9. Comprehensive experience in SEM imaging
10. Experience of using COMSOL Multiphysics in simulation of electrochemistry and fluid flow
11. Experience in MATLAB/Python/C++ script writing for data and image analysis
12. Experience in instrument usage, management, and basic troubleshooting

PRESENTATIONS & SYMPOSIUM

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

2023 ACS Fall August 2023
Title: Machine learning–based inverse design for electrochemically controlled microscopic gradients of O_2 and H_2O_2