



# MIKHA ZEFANYA SILITONGA

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Taipei City, Taiwan

Fresh PhD in Materials Science and Engineering with research experience in electrocatalyst development, thin-film fabrication, and electrochemical energy conversion systems. Conducted experimental research on CO<sub>2</sub> reduction, CO<sub>2</sub> adsorption, and water electrolysis, with a focus on mechanistic understanding, reproducibility, and performance evaluation. My current research focus is on advancing electrochemical CO<sub>2</sub> reduction and NO<sub>3</sub><sup>-</sup> reduction systems through systematic experimentation and data-driven analysis, and I am open to extending this expertise to new research directions that align with CO<sub>2</sub> mitigation, including related reaction systems, materials platforms, or mechanistic studies.

## Education Level

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**National Taiwan University of Science and Technology - Taipei, Taiwan**

Feb 2023 - Jan 2026

*Doctor of Department of Materials Science and Engineering*

- Member of the Electrocatalyst for Energy and Environment Research Group (Advisor: Prof. Dong-Hau Kuo)
- Conducted end-to-end doctoral research on electrochemical CO<sub>2</sub> reduction reactions (CO<sub>2</sub>RR) to CO, CH<sub>4</sub>, C<sub>2</sub>H<sub>4</sub>, and HCOOH production
- Synthesized electrocatalyst materials via co-precipitation using metal chloride precursors and hydrogen peroxide
- Fabricated thin films via physical vapor deposition (PVD) techniques for catalysts
- Performed comprehensive material, product characterization, and analyses using SEM equipped with EDS-Mapping, XRD, Raman spectroscopy, XPS, STEM equipped with EDX-Mapping, gas chromatography (GC), HPLC, ICP-OES, and UV-Vis

**National Taiwan University of Science and Technology - Taipei, Taiwan**

Feb 2021 - Jan 2023

*Master of Department of Materials Science and Engineering, 3.86/4.30*

- Member of the Electrocatalyst for Energy and Environment Research Group (Advisor: Prof. Dong-Hau Kuo)
- Conducted end-to-end research on full-cell water electrolysis using an electrochemical analysis approach
- Fabricated electrode of alloy materials using the physical vapor deposition (PVD) and chemical vapor deposition (CVD) techniques
- Performed structural, morphological, and chemical characterizations and analyses using XRD, SEM equipped with EDS-Mapping, XPS, and STEM

## Work Experience

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**Department of Physics, State University of Medan - Medan, Indonesia**

Aug 2019 - Mar 2021

*Research Assistant*

- Designed experimental research protocols for Dye-Sensitized Solar Cells (DSSCs)
- Conducted DSSC fabrication using the sol-gel spin coating method for thin-film preparation
- Assisted in material characterizations and photovoltaic performance evaluation of DSSCs devices
- Assisted in the preparation of two publications

## Research and Project Experiences

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**Department of Materials Science and Engineering, NTUST - Taipei, Taiwan**

Feb 2023 - Jan 2026

*Doctoral Research*

- Designed and optimized experimental parameters for electrochemical CO<sub>2</sub> reduction, including electrode substrates, electrolyte composition, and CO<sub>2</sub> flow rate
- Developed catalyst structural and compositional modification strategies to enhance CO selectivity during CO<sub>2</sub>RR
- Designed, synthesized, and evaluated Ag-based electrocatalysts via co-precipitation using metal chloride precursors and hydrogen peroxide, achieving high electrochemical efficiency for CO<sub>2</sub>-to-CO conversion

**Quanke Green Energy Industry Co., Ltd. - Taipei, Taiwan**

Aug 2023 - Aug 2024

*Company Project*

- Designed and optimized the experimental system for combustion exhaust gas CO<sub>2</sub> adsorption and analysis using gas chromatography to evaluate adsorbent performance
- Quantified CO<sub>2</sub> adsorption rates and assessed adsorbent efficiency under simulated exhaust gas conditions

- Analyzed adsorbent morphology and composition to correlate structural properties with CO<sub>2</sub> adsorption behavior

Department of Materials Science and Engineering, NTUST - Taipei, Taiwan

Jun 2021 - Jan 2023

*Master's Reserach*

- Designed and synthesized electrocatalysts using physical vapor deposition (PVD), chemical vapor deposition (CVD), electrodeposition, and hydrothermal methods
- Developed Ni-based electrocatalysts for energy applications, optimizing bimetallic composition and double-layer structures to enhance hydrogen evolution reaction (HER) and oxygen evolution reaction (OER) in water electrolysis, as well as oxygen reduction reaction (ORR) in zinc-air batteries (ZABs)

## **Skills, Achievements & Other Experience**

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- **Soft Skills:** Individual and team-oriented work, Time management and Prioritization, Problem solving and analytical thinking, Creativity and Innovation, Details
- **Languages:** Indonesia (Fluent), (English (Intermediate), Chinese (Beginner)
- **Technical and Instrumentation Skills:** FE-SEM equipped EDS and elemental mapping (JEOL JSM-6500F and JSM-7900F), XRD (Bruker D2 Phaser), Raman spectroscopy (iHR550), Potentiostat-based electrochemical analysis (LSV, CV, EIS, CED, MB, CstC, and CstV, SP-300), physical vapor deposition (DC/ RF power, PVD), chemical vapor deposition (CVD) gas chromatography (Personal GC-1000), and high-performance liquid chromatography (HPLC), UV-Vis (Jasco V-770)
- **Achievement (2022):** Qualified Award, Huali Innovative Materials Competition, Chinese Society for Materials Science, Taiwan