Ching-Hsien Lin

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SKILLS

- **Language**: English – intermediate to professional proficiency, Chinese – Native proficiency
- **Software**: LabVIEW, Python, MATLAB/Simulink, COMSOL, ImageJ, OriginLab, SolidWorks, Linux.
  Material characterization instruments: SEM, TEM, Raman, FTIR, AFM, CV, LSV, EIS…
- **Processing:** Laser system (CW, fs, ns) PLD, CVD, spin-coating, PEMFC assembly…

EDUCATION

- **Ph.D. in Mechanical Engineering, National Central University, Taiwan (2019-2024)**
  Thesis: "Development of high-performance membrane electrode assembly of PEMFC"
- **M.S. in Physics, National Central University, Taiwan (2015-2018)**
  Thesis: "Fabrication of efficient halide perovskite LED by surfactant-assisted formation of nanometer-sized grains during spin coating of perovskite layer"
- **B.S. in Physics, Fu Jen Catholic University, Taiwan, ROC (2011-2015)**

SCHOLARSHIPS/AWARD

- **2024 Future Tech Award**, Porous Electrodes and Non-Precious Metal Catalysts: The Future of Ion Exchange Membrane Water Electrolysis Technology (Oct. 2024)
- **Scholarship of Outstanding Doctoral Students** by National of Science and Technology Council (NSTC) and National Central University. (Sep. 2021 - Jun. 2024)

RESEARCH EXPERIENCE

Postdoctoral Fellow, Academia Sinica, Taiwan (2024-Present)

- Developed porous carbon structures and CNT sheets on GDLs as catalyst support for PEMFC.
- Development of anion exchange membrane water electrolyzers (AEMWE) and rapid laser deposition of non-precious catalysts on porous electrode surface. (NSTC Industry-Academia Collaboration Project)
- Developing photo-electrodes for solar water splitting hydrogen production by integrating LSPR of metallic nanoparticles with Fabry-Perot nanocavity.

Ph.D. Student, National Central University, Taiwan (2021-2024)

- Developed PEMFC functional layers based on laser processes, which include (a) fs-pulsed laser micro-machining of carbon paper microporous layers, (b) ns-PLD deposition of catalyst particles, and (c) CW-laser heating for material modification.
- Developed MEA components, bipolar plates, and corrosion-resistant porous metals for PEMFC.
- Developed a 2D-CNC drop-casting instrument to explore the roles and functions of different polymers in PEMFC.
- Led multiple NSTC industry-academia collaborative hydrogen energy projects.

M.S. Research Assistant, Institute of Atomic and Molecular Sciences, Academia Sinica (2015-2018)

- Collaborated with the Department of Materials Science and Engineering at National Tsing Hua University (Taiwan), on the development of halide perovskite solar cells and LED.
- Developed PLD NiO and ZnO thin films as carrier transport layers for solar cells.

PUBLICATIONS

- Cheng, P.-C., Wu, J.-E., **Lin, C.-H.**, Lee, K.-R., Lan, P.-K., Osman, N., Tseng, C.-J. (2025). Enhancing power density in protonic ceramic fuel cells with porous interlayer. International Journal of Hydrogen Energy. doi:10.1016/j.ijhydene.2025.04.418
- Wu, G.-Y., Lin, C.-H., Zhan, K.-Y., & Tseng, C.-J. (2024). The corrosion characteristics of graphite coatings on nickel foam and their applications in high-temperature proton exchange membrane fuel cells. International Journal of Hydrogen Energy. doi:10.1016/j.ijhydene.2024.10.087
- Liu, Y.-C., **Lin, C.-H. (Co-1st)**, Chen, S.-Y., & Tseng, C.-J. (2025). Enhancing the power density and durability of polymer electrolyte membrane fuel cells based on pulsed laser deposition-prepared Pt catalyst layer by using a nanoporous CeO2 overlayer and drop-casted Nafion with optimized drying condition. International Journal of Hydrogen Energy, 98, 242–253. doi:10.1016/j.ijhydene.2024.12.086
- **Lin, C.-H.**, Chen, H.-H., Zhan, K.-Y., Chen, S.-Y., & Tseng, C.-J. (2023). Control of self-organization of drop-casted Nafion film for improving proton conduction in a polymer-electrolyte-membrane fuel cell to raise its output power density. International Journal of Hydrogen Energy, 48(68), 26609–26618. doi:10.1016/j.ijhydene.2022.11.031
- Lang, C.-C., **Lin, C.-H. (Co-1st)**, Chen, H.-H., Tseng, C.-J., & Chen, S.-Y. (2021). Performance enhancement of polymer electrolyte membrane fuel cell by PtCo3 nanoporous film as high mass-specific power density catalyst using laser deposition and processing. International Journal of Hydrogen Energy, 46(68), 33948–33956. doi:10.1016/j.ijhydene.2021.07.210

PATENT

- 曾重仁, & **林晉賢**. (2024). Patent No. TW:202450157:A.
- **林晋贤**. (2020). Patent No. CN:110707341:A.

CONFERENCE

- Oral presentation entitled “Research on the Corrosion Resistance Characteristics of Graphene and Nitride Coatings on the Surface of Metal Porous Materials and Their Applications in High-Temperature Proton Exchange Membrane Fuel Cells” at Hydrogen Power theoretical & Engineering Solution International Symposium (HYPOTHESIS XVIII), Oman in Oct. 2023.
- Oral presentation entitled “Thin Metal Mesh as the Gas Diffusion Layer for Proton Exchange Membrane Fuel Cells” at Hydrogen Power theoretical & Engineering Solution International Symposium (HYPOTHESIS XVII), Taiwan in Sep. 2022.
- Oral presentation entitled “Control of self-organization in drop-casted Nafion thin film to raise the maximum power density of PEMFC with nanostructured ultrathin-film catalyst” at HYPOTHESIS XVI, Online in Nov. 2021.
- Oral presentation entitled “Fabrication of low-Pt-loading high performance catalyst for PEMFC by laser-based techniques” at HYPOTHESIS XV, Online in May 2020.

ADDITIONAL EXPERIENCE

- Special Assistant to Chairman, Taiwan Association for Hydrogen Energy and Fuel Cell (2021–2023)
- Supported ITRI research, organized HYPOTHESIS XVII, compiled hydrogen energy tech reports
- Co-authored analysis and news articles on hydrogen development Assisted ITRI in the research