NREL NATIONAL RENEWABLE ENERGY LABORATORY | ENERGY SYSTEMS INTEGRATION FACILITY

U.S. DEPARTMENT OF ENERGY

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Fuel Cell Development and Test Laboratory

NREL's state-of-the-art Fuel Cell Development and Test Laboratory in the Energy Systems Integration Facility (ESIF) supports NREL's fuel cell research and development projects through in-situ fuel cell testing. Current projects include various catalyst development projects, a system contaminant project, and the manufacturing project. Testing capabilities include but are not limited to single cell fuel cells and fuel cell stacks.

Laboratory Specifications

- ≥ 10 test stands offering 25 - 250 A range
- Comprehensive host of state-of-the-art fuel cell diagnostics
- Testing capabilities for PEMFC, DMFC, PAFC (PBI), AEMFC, and SOFC
- Spatial testing capabilities using 121-channel 50cm^2 segmented cell system or multi-channel potentiostat
- Host of calibration equipment
- Calibration standards in accordance with or exceeding USFCC standards

Application Scenarios

Diagnostics will include, but are not limited to:

- VI performance evaluation
- Linear sweep voltammetry for
  - H2- and MeOH-crossover limiting current determination,
  - Anode polarization, and
  - H2-pump experiments
- Cyclic voltammetry for electrochemically active Pt surface area determination
- AC impedance spectroscopy
- High frequency resistance determination
- Over-potential separation
- Start/stop
- Contaminant effects
- Defect effects
- Load, RH, or temperature cycling
- Durability
- Accelerated stress tests

Partner with Us

Work with NREL experts and take advantage of the state-of-the-art capabilities at the ESIF to make progress on your projects, which may range from fundamental research to applications engineering. Partners at the ESIF's Fuel Cell Development and Test Laboratory may include:

- Fuel cell and fuel cell component manufacturers
- Certification laboratories
- Government agencies
- Universities
- Other National laboratories

Contact Us

If you are interested in working with NREL's Fuel Cell Development and Test Laboratory, please contact:

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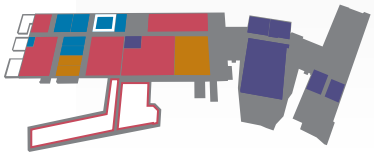
Major Laboratory Equipment

- Single cell fuel cell test stations
  - For PEMFCs sized 5 – 100 cm^2
  - Automated backpressure control
  - Various flow configurations
  - Fully calibrated
  - Script execution
  - Remote access
- Segmented cell fuel cell test station
  - 50cm^2
  - 121 segments, 0.41 cm^2 each
  - 121-channel load unit
  - Script execution
- Autolab potentiostat/ galvanostat
- Solartron multi-channel potentiostat/galvanostat
- Calibration Equipment
  - Bios Met Lab ML-800 Flowmeter
  - Vaisala & Viaspace Humidity Sensors
  - Traceable Temperature Sensors and Pressure Gauges
- *Planned:*
  - Mass spectroscopy/Gas chromatography
  - Full size fuel cell stack test station
  - Additional single cell fuel cell test stations



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