



Center of Excellence in

SUSTAINABLE MANUFACTURING

ROCHESTER INSTITUTE OF TECHNOLOGY

R·I·T

Case Study

Fuel Cell Component Evaluation and Testing

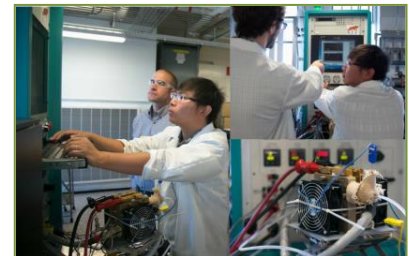
"We have established an excellent relationship with RIT-COESM to further the research, development, test, and manufacture of fuel cell membrane electrode assemblies. We expect to jointly seek funding for advanced catalyst formulations."



- Daniel O'Connell
Co-founder and CEO
American Fuel Cell

Our Partner

American Fuel Cell (AFC), an Upstate New York based company headed by three principals with 40+ years of experience in both fuel cell and electric vehicle technology, is focused on producing a less expensive Proton Exchange Membrane (PEM) fuel cell Membrane Electrode Assemblies (MEA) that can be adapted and modified for a wide range of applications requiring clean energy.



Opportunity Area

The most expensive component in a PEM fuel cell is the catalyst-coated MEA. The MEA accounts for >20% of the cost of a typical fuel cell, but AFC believes this cost can be reduced by up to 25% by (1) developing a new catalyst formulation that contains less precious metal - platinum, (2) improving the manufacturing process, and (3) optimizing the system operating conditions – all while maintaining the fuel cell's overall performance. Potential applications for AFC fuel cells include automotive EVs, backup power for stationary installations such as cell-phone towers, hospitals and military bases, and off-road industrial vehicles such as forklifts and pallet trucks.

Objectives

AFC reached out to and contracted with the Center of Excellence in Sustainable Manufacturing (COESM) at Rochester Institute of Technology (RIT) to evaluate their MEA technology and determine how to achieve the greatest performance while reducing costs. Development work is being conducted at the Fuel Cell Test Bed, located at RIT's Golisano Institute for Sustainability (GIS).

Work Performed

COESM engineers teamed with AFC scientists to develop a series of small-scale prototypes of the AFC MEA with the goal of improving the chemistry and manufacturing process to better align it with the eventual applications envisaged for the fuel cells. At each step in the prototype phase, the resulting MEA designs were systematically tested to ensure both the short- and long-term development objectives of AFC's customers were being met. At the same time, MEA components were evaluated and progressively refined with the goal of ramping up to volume production as rapidly as feasible.

Results

According to Daniel O'Connell, AFC co-founder and CEO, contributions by COE-SM have helped steadily enhance the testing protocol while improving the performance for fuel cells, leading to a recent increase in product sales. The COE-SM team has also worked together with AFC personnel to further optimize the MEA performance evaluation, improving test throughput in the lab. AFC is now looking to RIT to test their scaled up products produced on high-volume production equipment.