



CASE STUDY

NYSP21 Evaluation Confirms Energy Efficiency for American Fuel Cell's New Membrane Electrode Assembly

Fuel cell technology converts energy from a fuel (usually hydrogen) into electricity, with virtually emission-free operation. In addition to being a clean energy source, it also offers the consistency and reliability that other renewable energy options lack. However, due to the reliance on platinum, fuel cells remain fairly expensive. In an effort to combat this problem, American Fuel Cell (AFC) developed a new Membrane Electrode Assembly (MEA) design with reduced platinum (Pt) content as compared to the industry standard MEAs. AFC's ability to tailor the platinum content and assembly process, combined with their access to a nearby thin film coating facility at the Eastman Business Park in Rochester NY, provides AFC an opportunity to produce a less expensive, equally efficient, and more environmentally friendly MEA as compared to those currently available in the industry.

CHALLENGE

AFC requested New York State Pollution Prevention Institute (NYSP21) to perform an independent 3rd party assessment of the energy conversion efficiency and environmental impact of AFC's MEA as compared to the industry standard MEA.

SOLUTION

NYSP21 at Rochester Institute of Technology (RIT) supported AFC by providing an independent, third party performance evaluation and platinum loading assessment for their new MEA.

NYSP21 provided engineering lab and technical resources to test and evaluate AFC's MEA and associated interface hardware, as compared with an industry standard MEA. AFC's MEAs were produced on high volume manufacturing equipment at their Rochester, NY based manufacturing site. NYSP21 provided data analysis of all tested MEAs across various test conditions, and all MEA cell test data was provided to AFC at the conclusion of testing. NYSP21 also analyzed the platinum content as compared to an industry standard MEA. Testing and analysis was conducted in the fuel cell laboratory at Golisano Institute for Sustainability (GIS) at RIT.

RESULTS

After NYSP21's evaluation of the MEAs, it was determined that all of the American Fuel Cell manufactured MEAs exhibited higher performance, relative to output voltages, as compared to the industry standard under the same operating conditions.

Both Lower Pt (-12.5%) and Higher Pt containing AFC MEAs demonstrated higher voltages as compared to the industry standard MEA under both 30% and 100% relative humidity level test conditions.

CHALLENGE

- American Fuel Cell requested a performance evaluation on their reduced platinum MEAs compared to the industry standard MEA

SOLUTION

- NYSP21 performed an independent, third party performance evaluation and platinum loading assessment for American Fuel Cell's new MEA designs

RESULTS

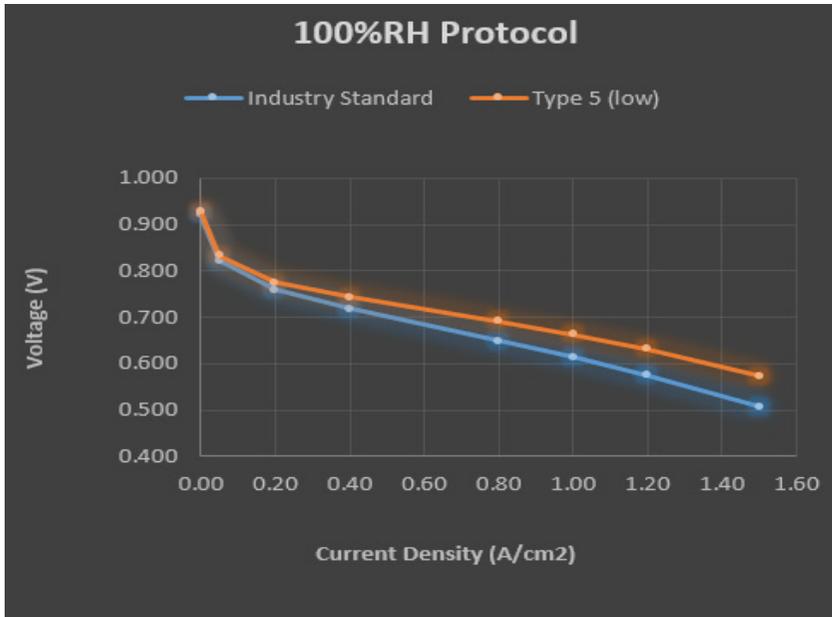
- All American Fuel Cell manufactured MEAs exhibited higher performance as compared to the industry standard under the same operating conditions
- Both Lower Pt (-12.5%) and Higher Pt containing AFC MEAs demonstrated higher voltages as compared to the industry standard MEA under both 30%RH and 100%RH test conditions
- AFC MEAs exhibited a higher level of energy conversion efficiency for hydrogen to electrical power at the test points evaluated

AFC MEAs exhibited a higher level of energy conversion efficiency for hydrogen to electrical power at the test points evaluated.

Based on the results of this study, AFC will provide specific MEA configurations to customers that best meet the application requirements. AFC plans to manufacture their MEAs in Rochester, NY and projects the addition of twelve new jobs over the next three years to support the projected business growth.

**The results described in this case study are only applicable to the specific units evaluated and do not certify the manufacturing or other processes used.*

Low Platinum loaded AFC MEA vs. Industry Standard



TESTIMONIAL

“The support provided by NYSP2I was significant in helping us provide specific MEA configurations to customers that best meet the application requirements. As a result of their commitment to us during this project we plan to manufacture our MEAs in Rochester, NY. Our goal is to bring high tech, high paying jobs to the Rochester region.

–Daniel O’Connell, CEO
American Fuel Cell

NYSP2I PARTNERS



New York Manufacturing Extension Partnership

Funding provided by the New York State Department of Environmental Conservation.
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