Fuel Cell Battery

Advisor: Professor Yun Wang

Members:

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Background: Why Proton Exchange Membrane Fuel Cells (PEMFCs)?

1. Only water as a by-product and zero pollutant emissions (NOx, CO, HC)
2. Fuel cells are more efficient at the same scale; use less fuel and generate more energy
3. Hydrogen is abundant; can be produced from renewable energy
4. Completely renewable system when paired with solar-powered electrolysis

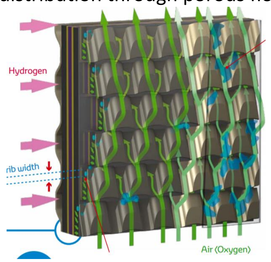
Goals: Improve PEMFC static performance using an inexpensive solution

Requirements:

1. Achieve Department of Energy 2020 targets of 0.8V cell potential when outputting 300mA/cm^2
2. Achieve a limiting current density of 1.5A/cm^2 with air as the oxidant

Innovation:

Reactant distribution through porous flow media rather than conventional flow channels for enhanced heat and electron transfer



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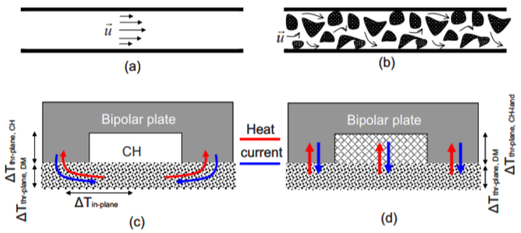

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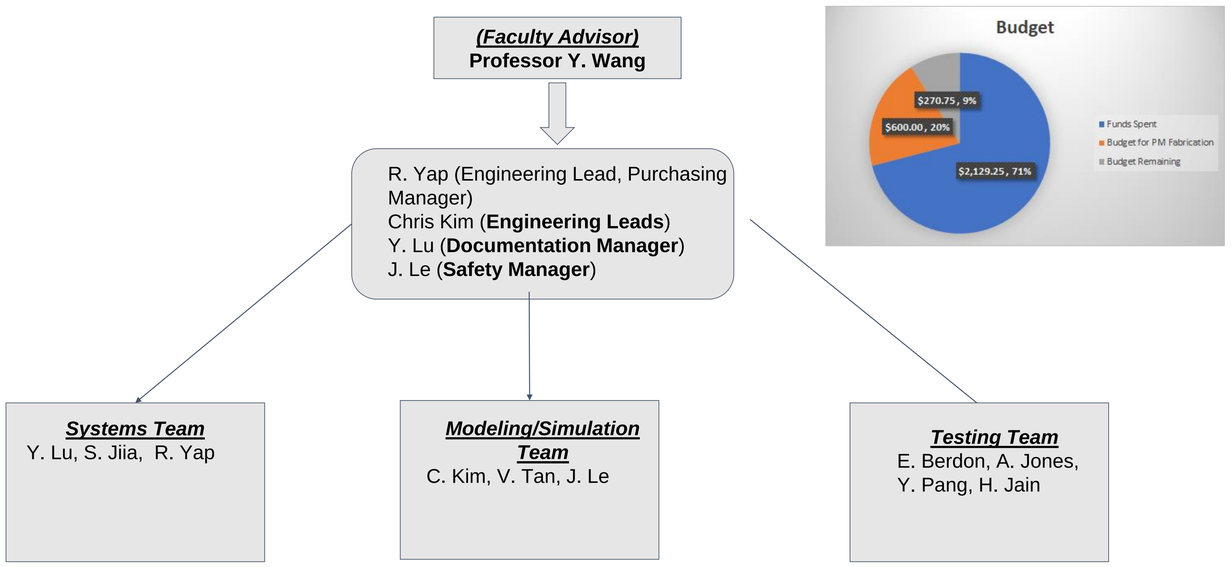
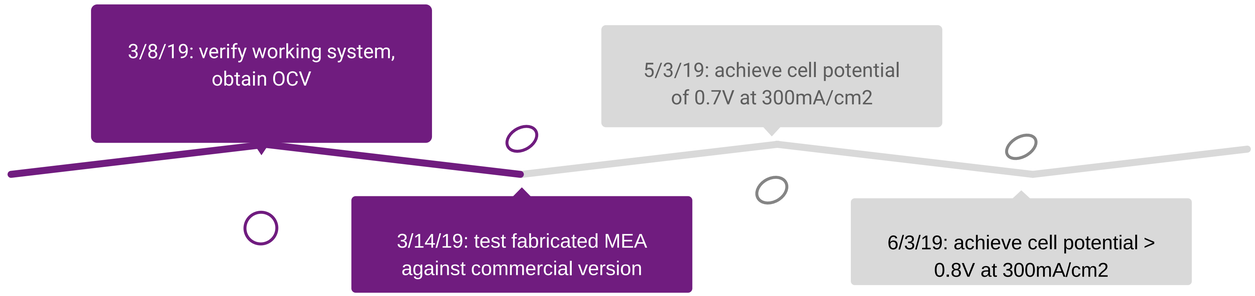
The Bigger Picture:

In order to support the transition from unsustainable energy sources to renewable alternatives, Team Fuel Cell Battery strives to improve the capability of PEMFC's through manufacturing, testing, and modelling a Porous Media (PM) PEMFC.

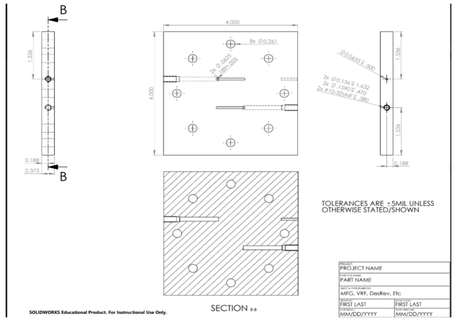


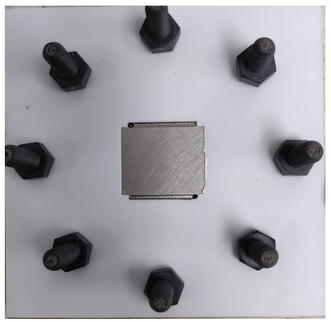


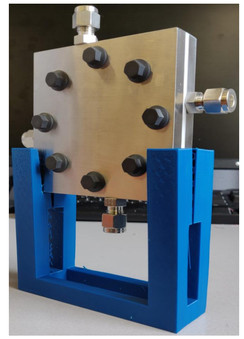
Current Progress:

Systems:

1. Fuel cell and system components ready for assembly, 2. Researching more options (buy or fabricate) for porous stainless steel or titanium

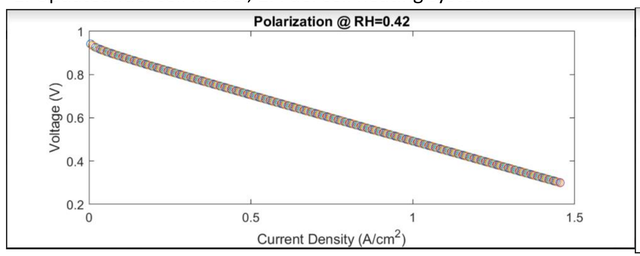


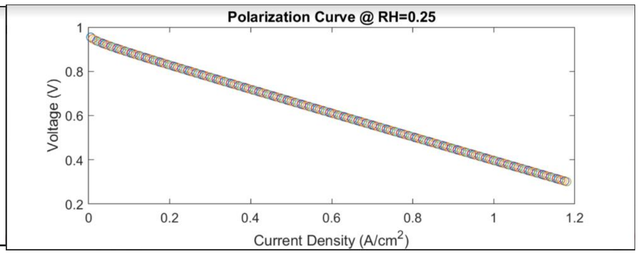




Modelling and Simulation:

1. Updated fuel cell model, 2. Fuel cell heating system





Testing:

1. Torque/pressure - performance experimental procedure

Future Tasks

1. Finish remaining manufacturing and assembly tasks
2. Test fuel cell and compare to predicted behavior
3. Troubleshoot, test, and improve current design to achieve project goals and requirements

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