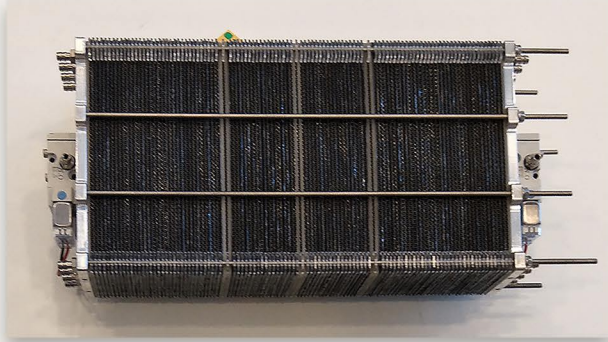


High Power Fuel Cell for Portable and Mobility Applications



Technology Overview

Hydrogen fuel cells convert hydrogen to electricity. Due to the lightweight nature of hydrogen, fuel cells are able to provide long endurance for weight sensitive applications such as flight, personal mobility and portable off-grid power.

Compared to lithium batteries, fuel cell power systems have the following advantages:

- 2-3 times higher energy density
- Ability to rapid refuel in under 10 minutes

Features & Specifications

This technology comprises of:

- Lightweight and compact fuel cells
 - Up to 0.3kW (~1.2kW/kg)
 - Up to 5kW (~1.6kW/kg)
- Form available:
 - Fuel cell stacks 'as is'
 - Fully integrated plug-and-play fuel cell modules (black start capable)
- Customized design for users
 - Includes fuel cell design, manufacturing process, control, integration

Customer Benefits

The fuel cell stack developed has:

- 6-times reduction in volume
- 8-times reduction in weight

Potential Applications

This technology can be adopted in the following areas:

Drones

Fuel cells have been identified as a very promising power source for unmanned aerial vehicles/drones. For such applications, it is important to minimize the weight of the fuel cell system and associated balance-of-plant in order to achieve longer flight times. By using the lightweight fuel cell stacks developed by Temasek Polytechnic, it is possible to triple the flight time of drones over conventional lithium-batteries powered ones.

By extending the flight endurance from tens of minutes to hour-long durations, this fuel cell technology opens up various industrial applications for multi-rotor drones, such as inspection, security and surveillance.

Personal Mobility Devices (PMDs)

Small fuel cell systems can be integrated into PMDs to provide extended run-time and range. This also removes the need to charge batteries, and reduces vehicle down-time and associated charging risks. This is most suitable for centralized areas such as ports, airports and large warehouses.

Portable Off-Grid Power

The lightweight and compact form factor of the developed fuel cell system makes it suitable for off-grid applications, such as soldier portable power for up to 72 hours.

