

PRESS RELEASE

Ultra-thin bipolar plates from Horizon deliver high power density, and offer exciting cost-reduction potential in PEM fuel cells.

Shanghai, China, 22 May 2019:

Horizon Fuel Cell Technologies has announced a breakthrough in PEM fuel cell stack technology, aiming to accelerate the mass commercialization of fuel cell electric vehicles.

Horizon recently unveiled their latest innovation in high power and high power-density automotive fuel cells. Fuel cell stacks made using the company's patent pending, state of the art graphite bipolar plates with thickness of 1.1mm exhibit performance superior to that of conventional metal bipolar plates and typical graphite bipolar plates.

Optimising bipolar plate and membrane electrode assembly material and design configurations, Horizon's Shanghai R&D center has successfully achieved a continuous power density of 1.5W/cm² at 0.6V per cell in a full size short stack, doubling the power density of some commercial automotive fuel cells. Further power density improvement to 1.8W/cm² is expected in the foreseeable future. As an international leader in fuel cell commercialization, Horizon embodies the rapid evolution of fuel cell systems for vehicles in recent years. Commercial production of Horizon's new 60-100kW, high power-density and low cost automotive fuel cell stacks will commence before the end of 2019.

Fuel Cell Electric Vehicle platforms offer great promise for heavy vehicle fleets with long driving range and/or demanding daily operating requirements. Fuel cells are set to play a key role in enabling those applications by dramatically increasing the driving range achievable over batteries alone, and by eliminating down-time for recharging. The shift to fuel cells was highlighted at the recent Advanced Clean Transportation (ACT) Expo in Long Beach, California, where a Fuel Cell Electric truck from leading heavy truck maker Kenworth (powered by Toyota fuel cells) was on display along with new fuel cell electric truck market entrant Nikola.

Mr. Chen Jie, CTO of Horizon Group, commented, "We are very proud of this technological breakthrough by our Shanghai R&D team. With over 16 years of fuel cell R&D experience, we took risks in pursuing an unconventional technical approach which we believe is unique. Our new stack design achieved superior reactant supply, water removal and heat transfer under high current density, even compared to state of the art 3D flow channel structures.

Mr. George Gu, Chairman of Horizon Group, points out that cell power density per square centimeter is more important than volume power density when considering commercial

attractiveness of fuel cell systems. Doubling power density per square centimeter means not only doubling volume power density but also reducing material cost by half, laying down the foundation for near term large-scale commercialization of fuel cell vehicles.

Horizon will combine this breakthrough in bipolar plate technology with recent investments in highly automated manufacturing processes for fuel cell stacks and key materials, with a view to helping customers achieve hitherto unattainable cost structures for both fuel cell vehicle and fuel cell power plant applications. The company recently signed MOU's with global customers for 1,000 automotive fuel cell systems, and fuel cell power plants to generate in excess of 40MW of power from byproduct hydrogen.

About Horizon:

Horizon is a fuel cell pioneer and global leader in fuel cell commercialization, having been engaged in fuel cell R&D for 16 years. Horizon has a strong track record of innovation, winning awards along the way from Frost & Sullivan, Time , RedPoint, etc., and recognition from national research laboratories in many countries. Horizon supplies high power automotive fuel cell stacks up to 100kW, and containerized MW fuel cell power plants. Horizon is one of few enterprises with depth in all core technologies of PEM fuel cells, from catalyst, membrane electrode, bipolar plates and stacks, to system control.

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