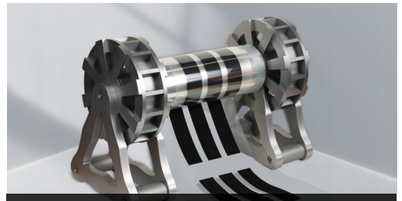
ADVERTISEMENT FEATURE

A GREEN FUTURE OF HYDROGEN FUEL CELLS IN CHINA

Sinosynergy and SinoHyKey are shaping the future for HYDROGEN ENERGY AND FUEL CELLS FOR NATIONAL AND GLOBAL MARKETS.

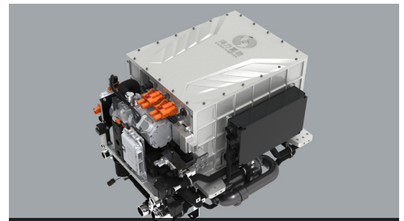
The R&D teams of Sinosynergy and SinoHyKey innovate for high-performance hydrogen fuel cells.



CCM coating is fast with SinoHyKey's proprietary ink preparation and coating techniques for catalyst consistency.

MEAs developed by SinoHyKey can withstand extreme operating conditions of fuel cell vehicles.

A self-developed fuel cell stack by Sinosynergy enables variable load and low-temperature starting performance for engines.



Sinosynergy's power module incorporates full cell stacks for high reliability and easy maintenance.

SinoHyKey's testing and validation lab follows quality control and waste reduction guidelines for automotive manufacturing.

SinoHyKey and Sinosynergy are working together on hydrogen fuel cells for heavy-load transport.

China has pledged to take action to ensure carbon emissions peak before 2030, and aims to become carbon neutral by 2060. Working towards greater industrial collaboration for these dual carbon goals, Sinosynergy and SinoHyKey, two companies based in the Greater Bay Area in southern China, are striving to bring hydrogen fuel cells for use in applications across global markets.

A national green policy will need to be supported by a dramatic change in population habits, for example, in the way we move about. Transport is responsible for 24% of direct carbon dioxide emissions from fossil fuel combustion, and one of the biggest challenges is to significantly reduce transportation sector emissions.

Hydrogen is one of the candidates for enabling energy transition to net-zero emissions for transport systems. Starting with the basics of fuel cell stacks, Sinosynergy and SinoHyKey are working together to lower the cost and enhance the performance and durability of hydrogen fuel cells, while transforming laboratory-scale technological advances to full-scale manufacturing in China.

GETTING TO THE CORE

Siyu Ye, SinoHyKey's chief technology officer, who has more than 30 years of research and industry experience in the fields of electrochemistry and fuel cell development, explained that SinoHyKey was one of the first enterprises in China to invest in the R&D and production of hydrogen fuel cell components.

"The company is committed to the production and commercialization of independently developed high-performance catalyst-coated membranes (CCM) and membrane electrode assemblies (MEA) for proton-exchange membrane (PEM) hydrogen fuel cells, providing low-cost, high-performance cores for domestic and international fuel cell manufacturers," says Ye.

Before coming to SinoHyKey, Ye worked at a fuel cell products manufacturer in Canada for 18 years. Using his knowledge and experience, Ye was instrumental in the development and production of two generations of MEA at SinoHykey.

"Independent large-scale mass production brings down the cost of fuel cell core components rapidly, and provides solid support for the development of China's fuel cell industry," says Ye.

MEAs are known as the chips of fuel cells, which determine their performance and cost. The MEA accounts for about 65% of the total cost of fuel cell stacks, but large-scale production of MEAs had not been possible in China. Traditionally, MEA preparation includes spraying and heat transfer process, which might introduce unforeseen delays and product inconsistencies, slowing down production speed and restricting full-scale industrialization.

In the face of these challenges, Ye explained that SinoHyKey's R&D team has been developing core technologies of CCM and MEA which are independently controllable, along with innovations in double-sided coating, moulding, and rapid packaging.

Their daily production capacity of CCM has reached 15,000 pieces, and that of MEA has topped 10,000, supporting more than 70 clients globally. Drastic transformation is happening at home, according to the China Hydrogen Alliance, a government-supported industry group, which estimated that by 2025, the output value of China's hydrogen energy industry will reach 1 trillion yuan ($US 152.6 billion), and China's demand for hydrogen will reach 35 million tonnes by 2030, accounting for at least 5% of national energy consumption.

"Our efforts are surpassing leading level of performance and consistency for CCM and MEA," says Ye. "Plans are under way to support the large-scale manufacturing of MEAs for PEM water electrolysis, with extensive usage beyond vehicles including drones and backup power banks."

"More importantly, we are transforming the industry to accelerate the industrialization and commercialization of green hydrogen production in China."

LEAD BY EXAMPLE

Xiqiang Yan, deputy general manager of Sinosynergy, has a similar history as Ye in terms of their social contributions towards the commercialization of hydrogen fuel cells in China.

Sinosynergy was established in 2015, when the development of China's hydrogen energy industry faced many difficulties, such as undeveloped technology, high cost, and a lack of supporting facilities. But now, Yan has a production process and quality control system in place at Sinosynergy to ensure high-quality large-scale production of fuel cell products.

"Built on the efforts of our team, as well as SinoHykey's key technologies, our fuel cell stacks are assembled in localized manufacturing plants in China to support the production of MEA, bipolar plates and other key components for PEM fuel cells, while achieving an average product life span of more than 20,000 hours," explains Yan. Sinosynergy's fuel stacks, with self-developed graphite bipolar plates, for example, enables optimal vehicle engine power at varying load and temperature.

"Both SinoHykey and Sinosynergy have been successful in their R&D investments to achieve economies of scale, leading to a rapid decline in the cost of fuel cells and shaping the future of China's hydrogen society," says Yan.

Sinosynergy's self-developed fuel stacks, for example, not only reduce the technological gap between China and other countries, but also cut the cost for their industry partners. "Our stacks are 60% lower in cost compared to the imported ones."

This also significantly contributes to a larger ecosystem for hydrogen fuel cells, and prepares for China's fast-growing energy transition and industry transformation blueprint. Sinosynergy's products alone, which have been used in 16 provinces and 34 cities in China.

"To this day, hydrogen fuel cell vehicles equipped with Sinosynergy products reduce carbon dioxide emissions by about 500,000 tonnes, which is the equivalent of planting 50 million trees each year," says Yan.

Towards 2025, Sinosynergy will focus on expanding the use of hydrogen fuel cells in public transport, but Yan believes wherever there is a need for electricity, their adoption will present a great potential to replace high-emission fuel types.

"SinoHykey and Sinosynergy will work closely, along with other hydrogen energy and fuel cell partners, to accelerate the commercialization of hydrogen energy and together achieve carbon-neutral goals," adds Ye. ■

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