



亞太燃料電池科技股份有限公司
Asia Pacific Fuel Cell Technologies, Ltd.

Recent developments in hydrogen fuel cells

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H₂ **FUEL CELL**
TECHNOLOGY
POWERED BY **APFCT**

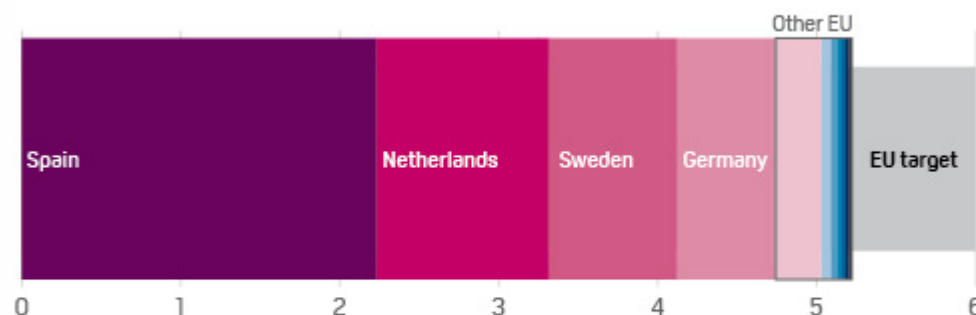
Date: 2023/3/30

The 4th Taiwan-Switzerland Joint Business Council Meeting
Hydrogen and Fuel Cell Forum



Hydrogen fever in EU puts 2024 target of 6-GW electrolyzer capacity in reach

ANNOUNCED EU ELECTROLYZER CAPACITY IN 2024 (GW)



6 GW
of electrolyzer
capacity

1 will produce up to
million mt
of hydrogen/year



Why & Where?

Renewables
begin to rise
and shine!

Climate crisis is
close at hand!

Are fuel cells ready for markets?



Our fuel cell stacks

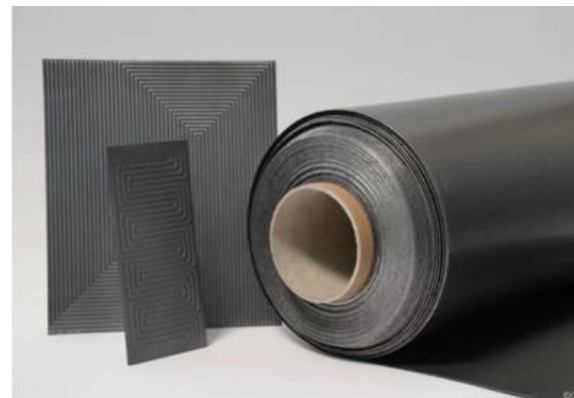


Power output <5kW
Small and compact
Carbon composite plate based

Downsides: The fragility of plates
Production cost is high
Heavy and complex



R&D efforts: Re-design
New materials
Automatic production





Comparison

Table 3: Comparison of the advantages and disadvantages of different bipolar plate materials

Material	Advantages	Disadvantages
Graphite	Excellent corrosion resistance Low bulk resistivity Low contact resistance	Poor mechanical properties (brittleness) Porosity High weight and volume High processing cost
Carbon-carbon composites	Low density High corrosion resistance Low contact resistance	Low mechanical strength Low bulk electrical conductivity High price
Carbon-polymer composites	Low cost Good corrosion resistance Low weight No machining process Commercial availability of the raw materials	Low mechanical strength Low electrical conductivity To be improved!!
Metal	Good electrical conductivity High thermal conductivity Low cost Excellent mechanical properties Ease of fabrication Small volume	Severe corrosion (membrane poisoning and formation of insulating surface oxide)



Design house

From the perspectives of fluid dynamics

Understand and optimize the physical design of fuel cell stacks

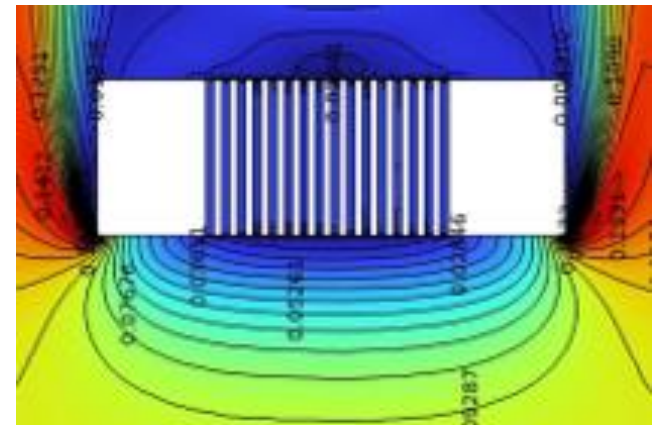
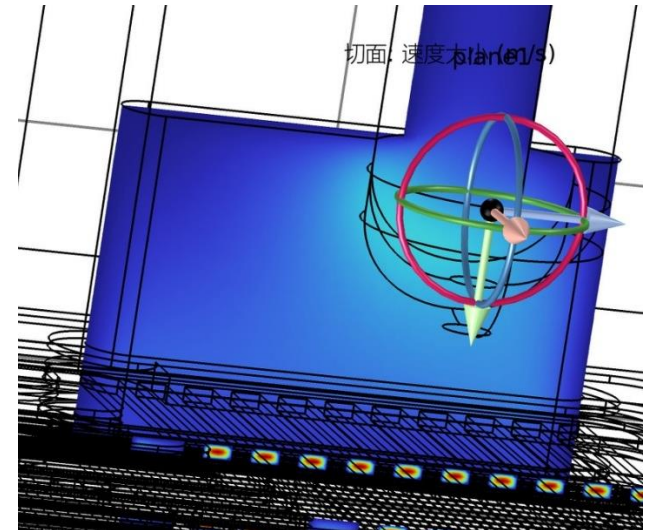
To perform thermal analysis on heat management.



Feasibility Study

Optimization

Reduce R&D resources





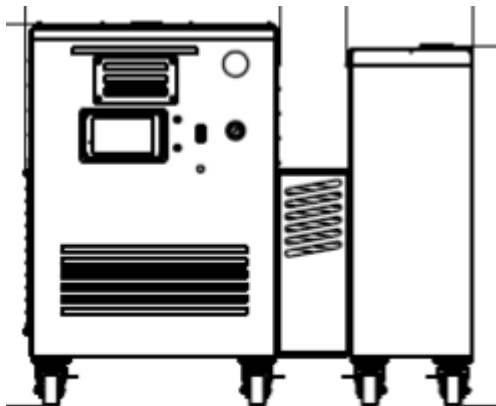
Next products



1st Scooter in the world!

The last model can drive more than 40km/trip with 2 hydrogen canisters.

MIIGHT NOT BE COMPETITIVE WITH Li-battery scooter....



Back-up power generators

From 1kW to 5kW

Suitable for many occasions

Tested and designed with international fuel cell standards

Compatible with more metal hydride canisters



Metal Hydride



The content in our canister is specially formulated to have stable refilling ability.

Can be integrated with power generators/vehicles/electrolyzers etc.

Each canister weighs 4kg with 500NL pure hydrogen.

AB5 type Metal Hydride
Hard to release hydrogen at lower temperatures.



More materials in search...
Release H₂ under freeze point?
Higher Hydrogen capacity?



Thank you for attention!

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