

# SydroDIAMOND<sup>®</sup>

Bipolar Plate Coatings



Sydrogen

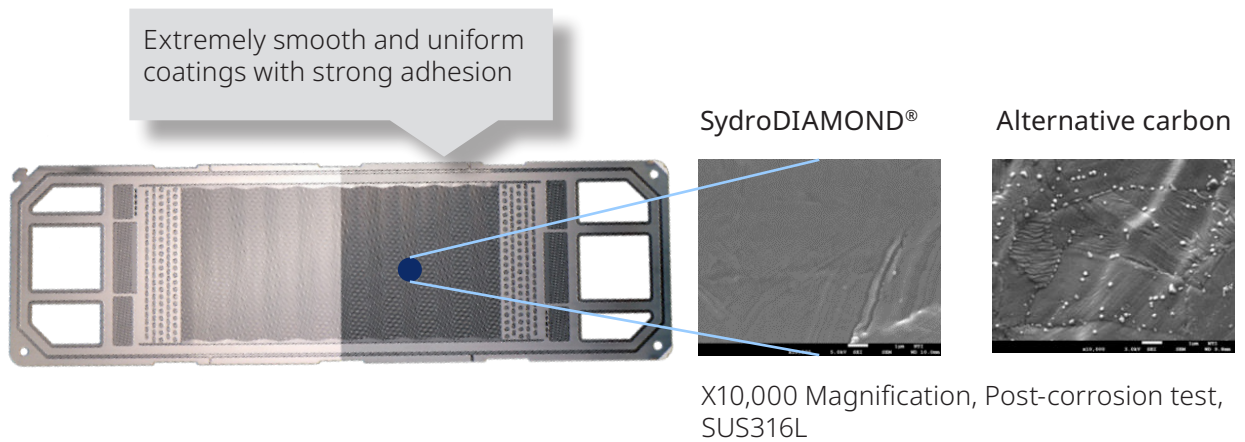
# Enabling energy transition through Deep Tech

Lifetime, efficiency and stability, are crucial factors for fuel cell to satisfy the growing demand of energy needs, and consequently for the profitability and success of fuel cell stack makers.

In a fuel cell, the bipolar plates are core components that evenly distribute fuel and oxidant across the whole active area of the membrane electrode assembly, serve as the electrical connection between cells, assist with water (by-product) removal, enable humidification of the inlet gases and provide pathways for cooling of the cells. Bipolar plates should be electrically conductive for minimum resistive losses, chemically resistant against the corrosive environment within a fuel cell, and thermally conductive for optimum heat management across each cell.

To ensure optimal performance of a fuel cell, Sydrogen has effective solution for metallic bipolar plates, low corrosion and excellent surface properties.

Sydrogen's bipolar plate coating solution replaces precious metal coatings with state-of-the-art properties based on customer's material and operational requirements to improve the efficiency and maximize the product lifespan potentials.



SydroDIAMOND® ion-leaching test result demonstrated to be **9 times** better than PVD gold benchmark

# Your benefits at a glance

FEATURES	ADVANTAGES	BENEFITS
Minimal contact resistance	High stack performance	Better and stable performance in a fuel cell
High corrosion resistance	Increasing lifespan	Improve return of investment
Minimal ion-leaching	Increasing MEA durability	Avoid fuel cell loses efficiency and stability over time
Tunable hydrophobicity	Effective water management	Optimal fuel cell performance
Superior properties of diamond and graphite	Replacing expensive noble metals	Reduction in cost of coating materials
Customizable coating capabilities	Highly matching application requirements	Enhance fuel cell effectiveness of operation

## Global presence

● Singapore    ● China    ● Japan    ● Germany

## Applications

Metallic bipolar plates for PEM fuel cells

# Technical specifications

Specifications presented demonstrate excellent tolerance of high voltage conditions, enabling variable power output and long-lasting durability

SydroDIAMOND®	SUS 316L	Titanium	SUS 304
Voltage Conditions	High @ 0.84V	High @ 1.25V	High @ 0.9V
ICR(mΩ*cm <sup>2</sup> ) @0.6Mpa-pre-test	≤ 2	< 2	≤ 2
ICR(mΩ*cm <sup>2</sup> ) @0.6Mpa-post test delta	≤ 5	< 10	< 5
Corrosion Current (μA/cm <sup>2</sup> )	< 0.05	≤ 1	< 0.1
Iron Ion-leaching (ppb)	< 50	-	< 50

More test data with DOE benchmarks are available upon request.

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Sydrogen Energy Pte. Ltd. is a Joint Venture between Nanofilm Technologies International Limited, a leading Deep Tech nanotechnology materials solution provider in Asia, and a wholly-owned subsidiary of Temasek. Sydrogen develops and manufactures fuel cell components which are critical in overcoming existing limitations in the use of hydrogen as an energy source. Sydrogen leverages the coating technologies and manufacturing capabilities of Nanofilm Technologies International. Building off a strong foundation of both JV partners, Sydrogen brings to market new innovative green energy systems that places Sydrogen in good stead to support the energy transition.

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