

Electrode Catalysts

Catalytic Technologies for Hydrogen Applications



Shaping a Sustainable Future with Catalytic Innovation

Heesung Catalysts provides innovative catalyst solutions to address environmental challenges and lead the transition to carbon neutrality.



40+ years of catalyst innovation

Since 1983, Heesung Catalysts has led Korea's precious-metal catalyst industry, combining decades of R&D and production experience.



In-house catalyst design and advanced precious-metal control

Utilizing nano-structure tuning, alloy engineering, and surface optimization, we provide catalysts with superior activity, durability, and cost efficiency.



Recognized through quality and customer certifications

Heesung Catalysts ensures product excellence through systematic quality management, validated by multiple certifications and proven customer trust.



Global Partnership & Collaboration

Heesung Catalysts operates a 50:50 joint venture with BASF, and continues to expand cross-industry innovation through joint R&D and co-development with Hyundai Motor Company and other leading Korean corporations.

BUSINESS AREA

Automotive Catalysts

Chemical Catalysts

Climate & Environmental Catalysts

Electrode Catalysts

Precious Metal Materials



HISTORY

1980s Laid the foundation to become a leading catalyst company

- 1983 ■ Established Heesung Engelhart Co., Ltd. (part of the Lucky Goldstar Group, now LG Group)
- 1988 ■ Began production and sales of automotive emission control catalysts

1990s Focused on securing top-tier technology and quality

- 1991 ■ Signed a sales contract with Engelhard Corporation for chemical and petrochemical catalysts
- 1992 ■ Established the Corporate R&D Center
- 1995 ■ Acquired quality certification (Kia Motors)
- 1997 ■ Completed new plant construction in Siheung

2000 – 2015 Emerged as the No.1 catalyst company in Korea

- 2002 ■ Awarded the 5-Star Quality Award by Hyundai/Kia Motors.
- 2005 ■ Achieved cumulative production of 50 million automotive catalysts
- 2007 ■ Company name changed to Heesung Catalysts Corp.
- 2010 ■ Completed new R&D center
- 2011 ■ Awarded the Grand 5-Star Quality Certification from Hyundai/Kia Motors.
- 2015 ■ Won “Supplier of the Year” Award from Hyundai/Kia Motors

2016 – Continuing our challenge toward a sustainable future

- 2017 ■ Launched Eco-Energy Material Business
- 2019 ■ Established production line for fuel cell electrode catalysts
- 2022 ■ Surpassed cumulative production of 200 million automotive catalysts
- 2024 ■ Completed the new plant, Cheomdan Plant, for business expansion.



Electrode Catalysts

In line with global carbon reduction goals, Heesung Catalysts develops and produces electrode catalysts and MEAs for fuel cells and water electrolysis. Leveraging over 40 years of expertise in precious-metal catalyst technology, we have established advanced production facilities and scalable process capabilities to ensure reliable supply and consistent quality. We focus on minimizing precious-metal use while enhancing performance, durability, and cost efficiency, delivering sustainable catalyst solutions for hydrogen production and utilization.

PRODUCT PORTFOLIO

Catalysts for PEMFC

· Hydrogen fuel cell vehicles

· Stationary power generator

Catalysts for PEMWE

· Green hydrogen production

· Water electrolysis

MEA for PEMFC & PEMWE

· Fuel cell & Electrolysis stacks

Steam Methane Reforming Catalysts

· Hydrogen production processes

CORE TECHNOLOGIES & COMPETITIVENESS

- 1 | **Advanced precious metal control and dispersion** ensure performance consistency and optimized resource use.
- 2 | **Integrated in-house production** from carbon to MEA enables reliable mass supply and quality assurance.
- 3 | **Enhanced durability** for long-term stability under harsh conditions.
- 4 | **Precisely optimized Catalyst, Ink and MEA design** customized to diverse operating environments.
- 5 | **World-wide collaboration network** with global companies to support and co-develop the hydrogen-friendly economy



Catalysts for PEM Fuel Cell

Since Est. in 1983, we have been leading precious metal catalyst

About Heesung Catalysts CORP.

- ① J.V with BASF(50:50)
- ② Hyundai automotive emission Cat. M/S No.1
- ③ 40 years of precious of metal control
- ④ Customization of required catalysts
- ⑤ Equipped with production, research, and Small & Large area evaluation facilities(performance, durability) for PEMFC

PEMFC CATALYST SPECIFICATIONS

Application	Catalysts	Precious Metal %	Carbon Support (BET)
PEMFC	Pt/C	5~70%	75~1,200m ² /g
	Pt-Co/C	10~60%	
	Pt-Ni/C	10~60%	
	Pt-Ru/C	10~76%	

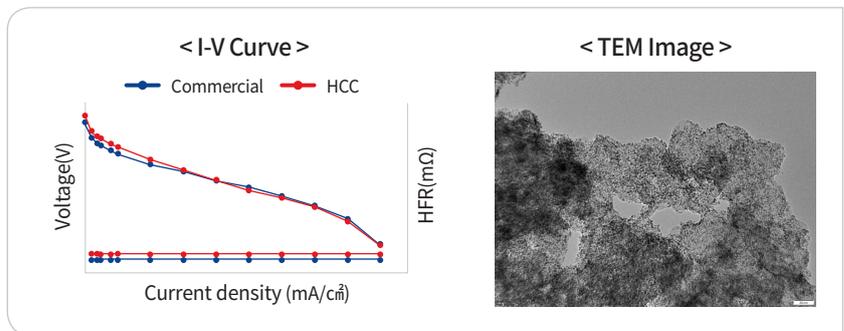


*Pt-X Ratio customizing range: 3:1 ~ 7:1

FUEL-CELL PERFORMANCE

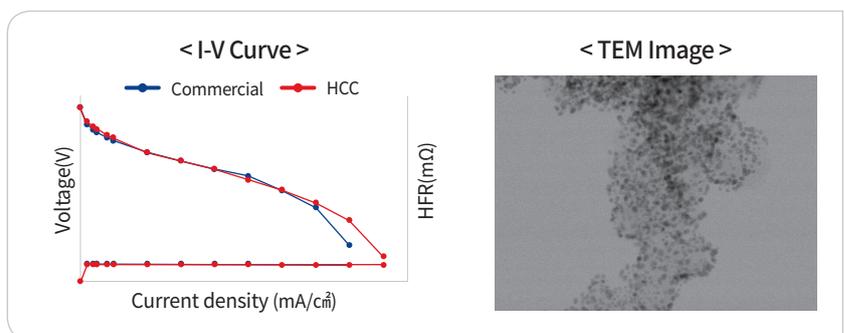
Fuel Cell Cat. 50% Pt/C, Performance

Analysis Condition	
Temperature	65°C
Humidity	RH100
Pressure	1 bar(a)
Active area	25cm ²



Fuel Cell Cat. 50% Pt/C, Performance

Analysis Condition	
Temperature	65°C
Humidity	RH100
Pressure	1 bar(a)
Active area	25cm ²



Catalysts for PEM Water Electrolysis

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PEMWE CATALYST SPECIFICATIONS

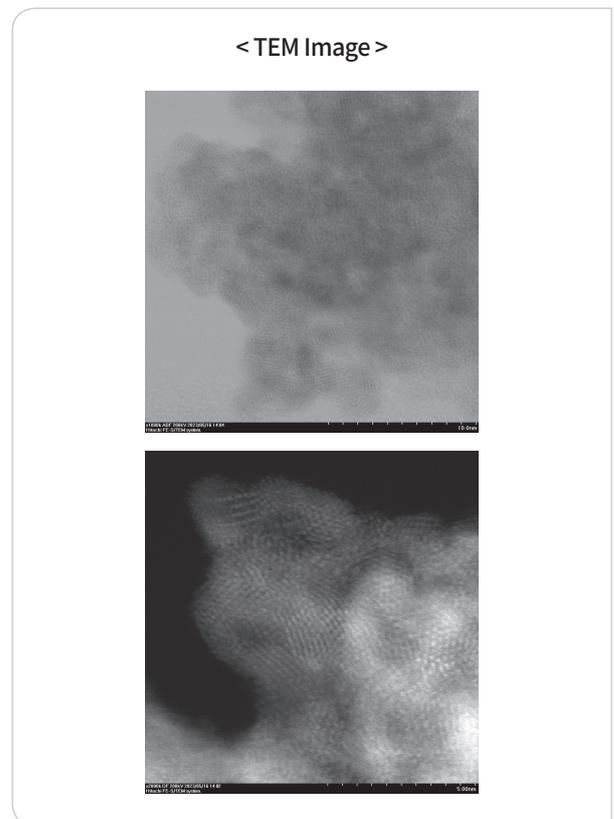
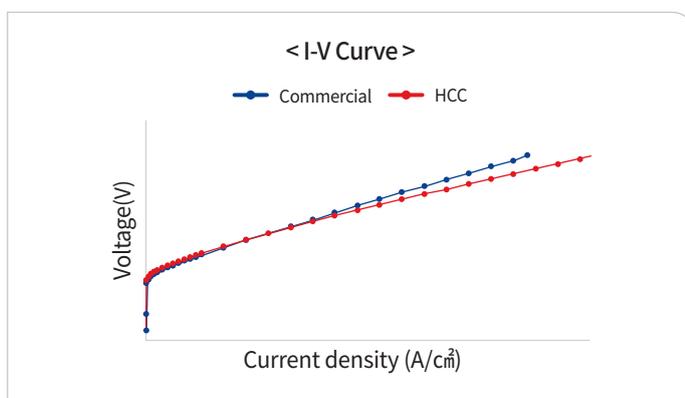
Application	Catalysts	Precious Metal %	Carbon Support (BET)
PEMWE (Anode)	IrO ₂	85%	20 ~ 250 m ² /g
	IrO ₂ /TMO _x	30~70%	
PEMWE (Cathode)	Pt/C	5~70%	75 ~ 1,200 m ² /g
	Pt-X/C	10~60%	



*TMOx : Transition Metal Oxide

PEM WATER ELECTROLYSIS PERFORMANCE

Analysis Condition	
Temperature	80°C
Active area	25cm ²
Anode Cat.	IrO ₂
Anode Cat.	Pt/C



MEA for PEMFC & PEMWE

Since Est. in 1983, we have been leading precious metal catalyst

About Heesung Catalysts CORP.

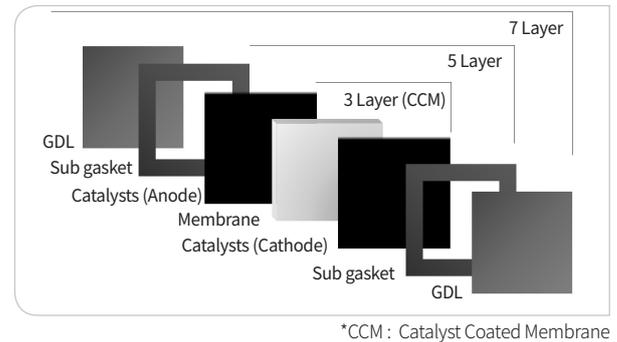
- ① J.V with BASF(50:50)
- ② Hyundai automotive emission Cat. M/S No.1
- ③ 40 years of precious metal control
- ④ MEA customization per request
- ⑤ In-house manufacturing of Catalysts and Ink for optimized MEA

FUEL CELL MEA STRUCTURE & APPLICATION

Application

Type	Active area	Primary Purpose
PEMFC	~ 480 cm ²	Mobility & Power generation
PEMWE	IrO ₂ , IrO ₂ /TMO _x	Hydrogen production

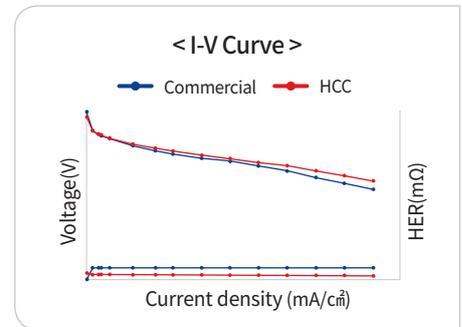
Fuel Cell MEA



PEMFC/PEMWE MEA PERFORMANCE

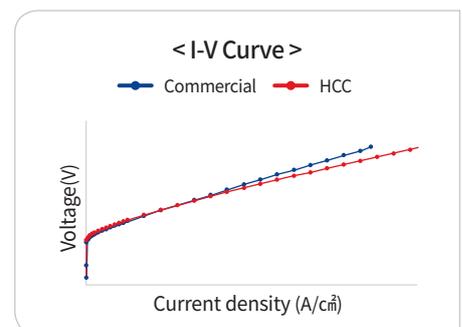
PEMFC MEA Performance

Item Spec		Analysis Condition	
Active area	230cm ²	Temperature	65°C
Anode Cat.	Pt/C	Humidity	RH100
Cathode Cat.	Pt/C	Pressure	1 bar(a)



PEMWE MEA Performance

Item Spec		Analysis Condition	
Active area	25cm ²	Temperature	80°C
Anode Cat.	IrO ₂		
Cathode Cat.	Pt/C		



Steam Methane Reforming Catalysts

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About Heesung Catalysts CORP.

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- 4 Equipped with production line
- 5 In-house manufacturing of Catalysts and Ink for optimized MEA

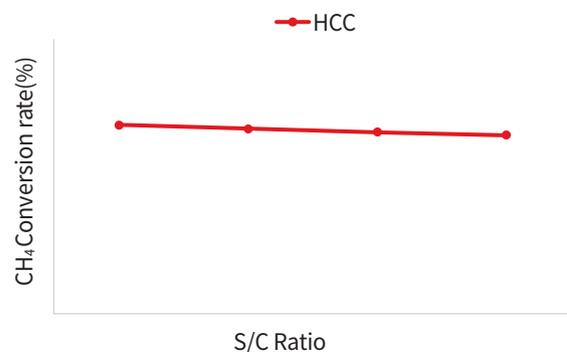
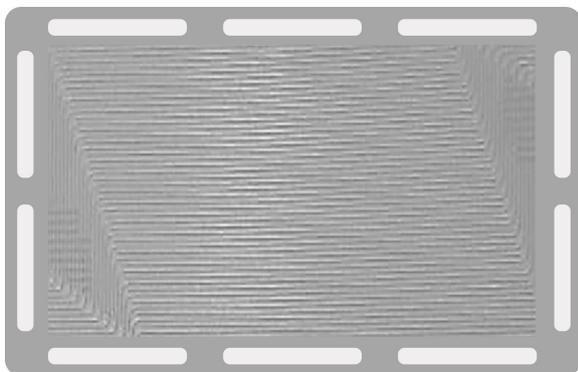
PRODUCT SPECIFICATIONS

Steam Methane Reforming Catalysts Spec	
Application	SOFC
Item	Steam Methane Reforming Catalysts
Viscosity	~1,000cP @30RPM
Particle Size	~6 μ m
Solid %	~35%

CATALYSTS PERFORMANCE

Our SOFC Steam Methane Reforming catalyst delivers excellent thermal stability and high catalytic activity, efficiently reforming methane and other hydrocarbons into hydrogen to maximize fuel-cell efficiency. With outstanding heat resistance and durability, it maintains stable performance even during long-term operation, enhancing system reliability and lifespan for optimal fuel cell performance.

Steam Methane Reforming Catalysts Coated Interconnector for SOFC





Electrode Catalysts



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