

**HT Oxidation Catalysts**  
**- Thermostable to HT (950 °C) -**

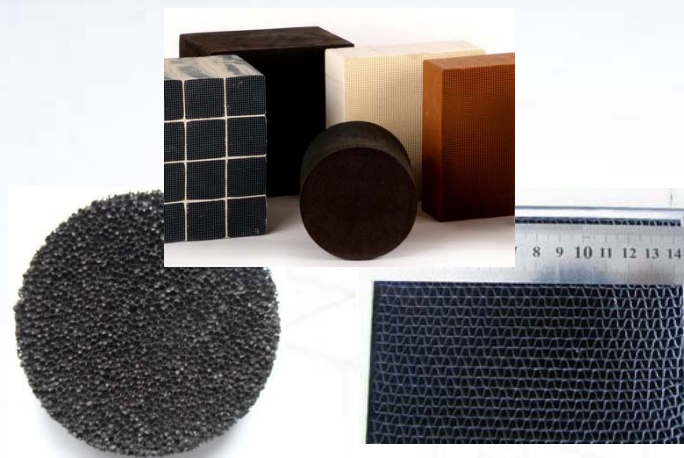
**PURESPHERE CO., LTD.**



# Combustion Catalyst

## Specification of Purelyst PH-304 series catalysts

Subject	Content
Catalyst	Purelyst PH-304
Active metal	Pt-Pd
Shape	Foam, Honeycomb
Temp. resistency	950 °C



### Features

- Thermostable to 950 °C.
- High removal efficiency of bad odor, CO, CH<sub>4</sub>, H<sub>2</sub>, etc.
- Resistant to HCl and SO<sub>2</sub>.
- Shape and Cell density of catalyst can be adjusted.

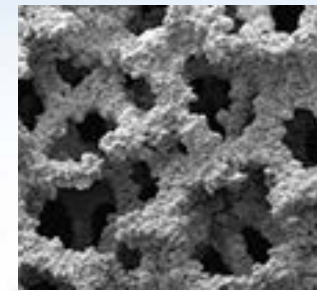
# Catalyst Coated on Metal Foam

## Specifications of Purelyst PH-304MF catalyst

Subject	Content
Foam metal	NiFeCrAl, FeCrAl
Pore size	0.45~1.20 mm
Contact area	7,310~12,700 m <sup>2</sup> /m <sup>3</sup>
Apparent density	0.30~0.65 g/cm <sup>3</sup>



Other alloy foams



High contact area alloy foam

## Features

- Three times high alloy foams than others are used as substrate.
- Catalyst is strongly adhered to alloy foam.

## Application

- Fuel cell : Combustion of residual CO, CH<sub>4</sub>, and H<sub>2</sub> emitted from stack.  
Higher than 99.75% of CO oxidation (CO inlet : 2,000 ppm, CO outlet : under 5 ppm)



Purelyst PH-304MF



Installed in fuel processor  
(1 kW PEMFC)

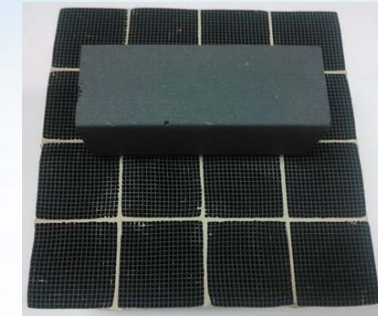
# Catalyst Coated on Ceramic Honeycomb

## Specification of Purelyst PH-304 catalyst

Subject	Content
Honeycomb component	Cordierite, SiC
Size	15 cm x 15 cm x 5 cm
Cell density	75, 100, 200 cells/in <sup>2</sup>



Coated on cordierite honeycomb



SiC honeycomb

## Application

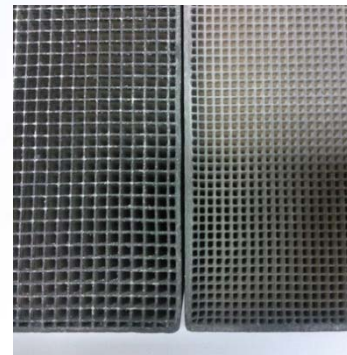
- Enhancement of bad odor removal efficiency  
Installed into RTO (regenerative thermal oxidizer)



RTO



Catalyst installed into RTO



Honeycomb catalyst  
(100, 200 cells/in<sup>2</sup>)



Round honeycomb

# Catalyst Coated on Cordierite Honeycomb

Cell density (cells/in <sup>2</sup> )	75	100	200
Size (cm)	15 x 15 x 5	15 x 15 x 5	15 x 15 x 5
Number of cells	2,401 (= 49x49)	3,364 (= 58x58)	6,889 (= 83x83)
Cell pitch (mm)	3.06	2.59	1.81
Wall thickness (mm)	0.64	0.55	0.43
Opening (%)	62.5	62.2	58.3
Contact area (m <sup>2</sup> /m <sup>3</sup> )	1,033	1,220	1,690
Catalyst coating (g/in <sup>2</sup> )	1.7±0.2	1.7±0.2	1.7±0.2
Weight (g)	760±50	670±50	720±50

# Coated on Metal Honeycomb

## Specification of Purelyst PH-304MH catalyst

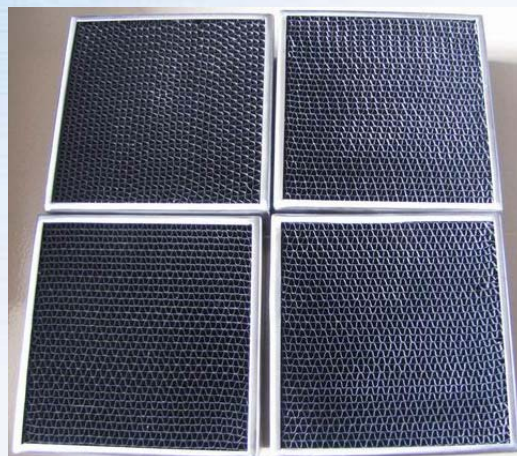
Subject	Content
Honeycomb component	FeCrAl
Cell density	20~400 cells/in <sup>2</sup>

### Application

- Removal of VOCs emitted from varnish coating machine
- Oxidation of H<sub>2</sub> emitted from nuclear power plant
- Required fro low pressure drop application.



Comparison of honeycombs



Square honeycomb



Round honeycomb

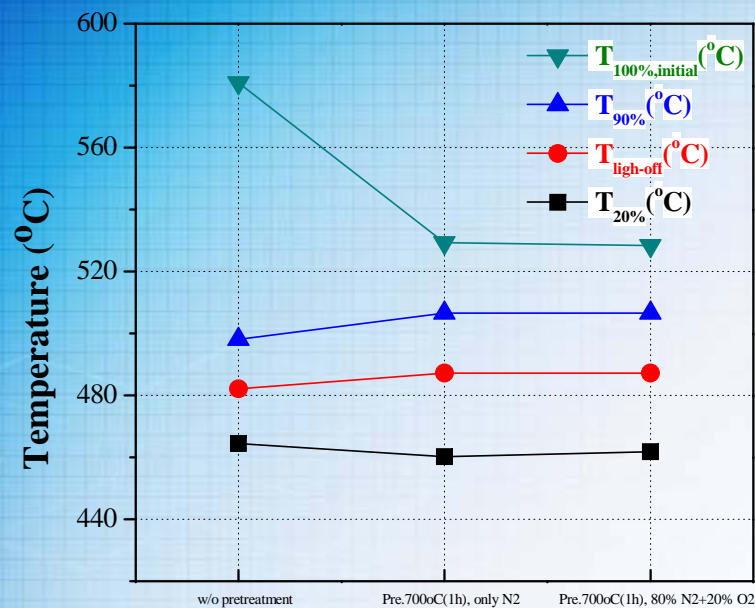
# CH<sub>4</sub> Combustion Efficiency of Purelyst PH-304 Catalyst

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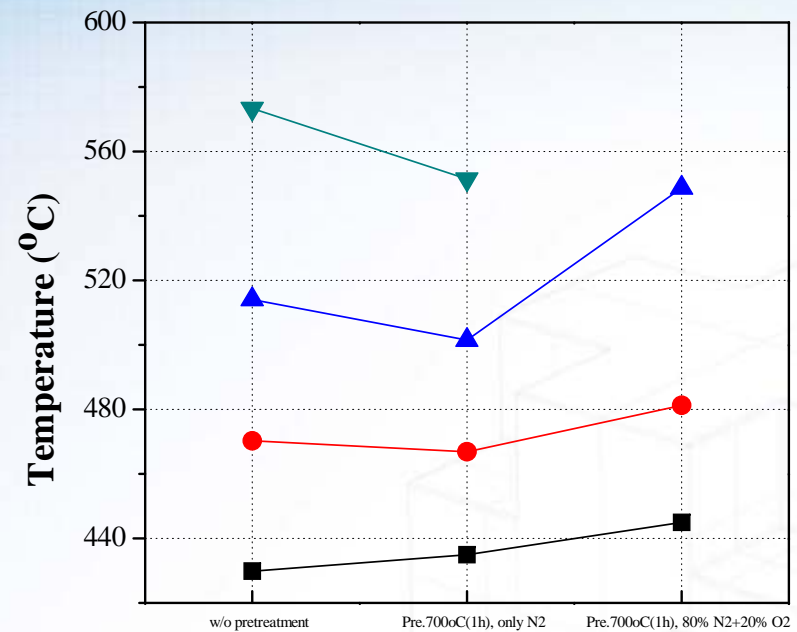
## Test condition

Catalyst	Purelyst PH-304
Space velocity	50,000 h <sup>-1</sup>
CH <sub>4</sub> Conc.	10,000 ppm
O <sub>2</sub> /CH <sub>4</sub>	20
H <sub>2</sub> O Conc.	0 wt% (Dry)/3 wt% (Wet)

# CH<sub>4</sub> Combustion Efficiency of Purelyst PH-304 Catalyst



Pretreatment conditions



Pretreatment conditions

CH<sub>4</sub> combustion efficiency of Purelyst PH-304 catalyst



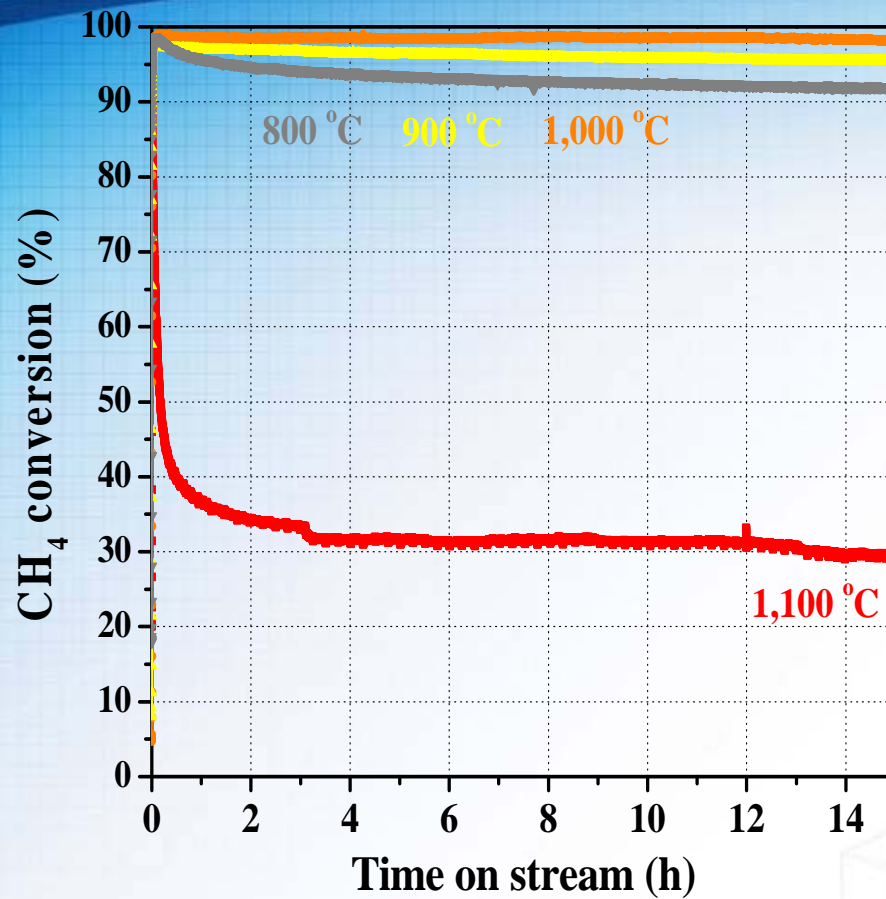
# Thermostability of Purelyst PH-304 Catalyst – CH<sub>4</sub> Combustion

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## Test condition

Catalyst	Purelyst PH-304
Space velocity	50,000 h <sup>-1</sup>
Reaction Temp.	600 °C
CH <sub>4</sub> Conc.	10,000 ppm
O <sub>2</sub> /CH <sub>4</sub>	20
H <sub>2</sub> O Conc.	3 wt%

## Thermostability of Purelyst PH-304 Catalyst – CH<sub>4</sub> Combustion



Effect of heat treatment on CH<sub>4</sub> combustion  
Heat treatment Temp. : 800~1,100 °C

- CH<sub>4</sub> combustion efficiency stiffly decreases on being treated at 1,100 °C.