

Midlands Advanced Ceramics for Industry 4.0

CASE STUDY

REF No: 2403001

WS7 - Scale up HYDROGEN FIRING OF CERAMICS WATER FILTERS

MODELLING
& DESIGN

RAW
MATERIALS
PROCESSING

FORMING

DRYING &
SINTERING

ANALYTICAL

Porous ceramics are used as filtration media for water and other liquids thanks to their chemical resistance and stability at any temperature. Contaminant retainment is achieved through porosity tuning and additional chemical coatings as required.

Ceramic filters are used for water treatment in agrochemical, food and drink, chemical and pharmaceutical and oil and gas industries. They are produced at large scale by firing with natural gas.

Adding Hydrogen to natural gas is a way to reduce carbon emissions and decrease the national carbon footprint. To this end, the government currently plans to add up to 20% hydrogen to the existing natural gas infrastructure.

Hydrogen and natural gas blend brings different combustion by-products into the kiln environment which may affect the product characteristic.

Access to pilot scale furnaces able to run with hydrogen and natural gas blend is key to support the industry decarbonization journey.

A set of water filters was sintered in a 20% hydrogen natural gas blend following the same sintering profile utilized in a traditional gas kiln. The objective was to assess the fired properties of the product, specifically flexural strength, permeability and shrinkage, when fired in an enriched hydrogen environment versus 100% natural gas.

In all cases, the differences observed between the two firings were deemed negligible. This is a good result growing the industry confidence in transitioning to lower carbon footprint processing.

Figure 1
Porous ceramic filters



Figure 1
High temperature mixed gas kiln



Find more details on the high temperature mixed gas kiln here
<https://cdn.amricc.com/slider-images/Hydrogen-furnace-updated.jpg>

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