

BASF Research Press Briefing, December 11, 2025

# Rethinking catalysts

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**Dr. Christian Schulz**

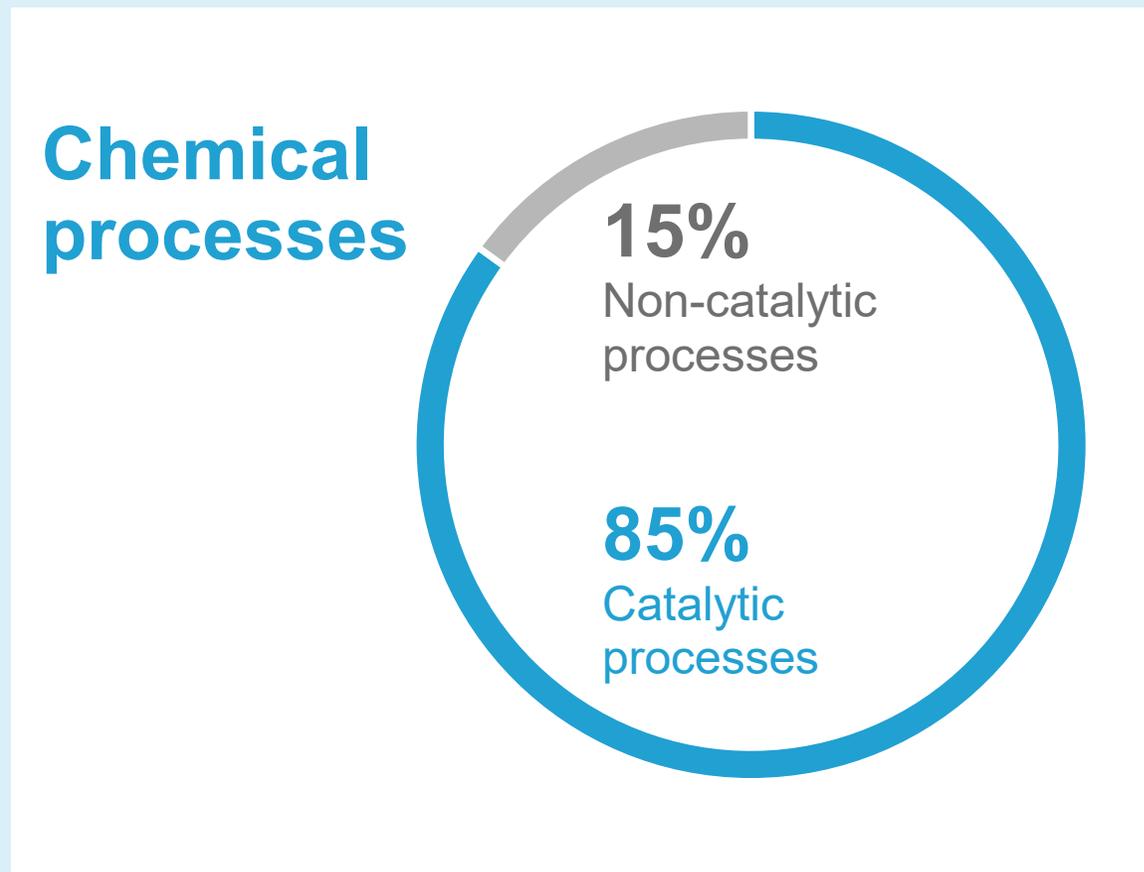
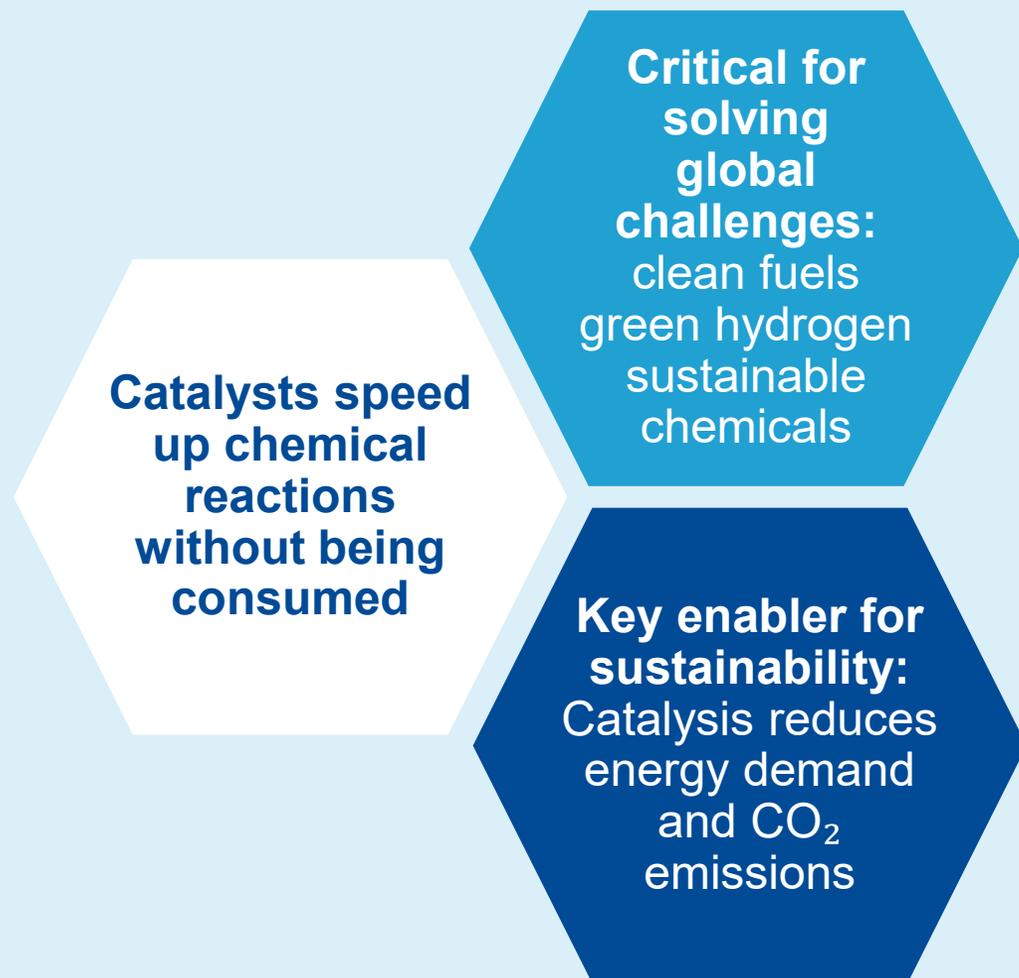
New Business Development & Sustainability Manager,  
Global Chemical Catalysts & Adsorbents



**BASF**

We create chemistry

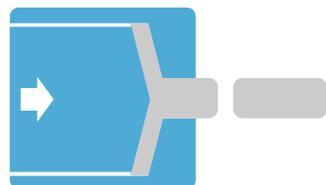
# Catalysts – the hidden drivers of chemistry



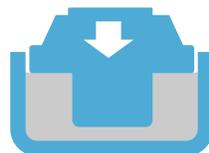
# How are catalysts made?

## Shaping:

**Extruding**  
since 1930s



**Tableting**  
since 1950s



**No major  
manufacturing  
innovation  
in the past  
70 years**

# What are the challenges and the need for innovation in shaping?

## Challenges by

- Limited shape design
- Missing microstructure



## Innovation needed for

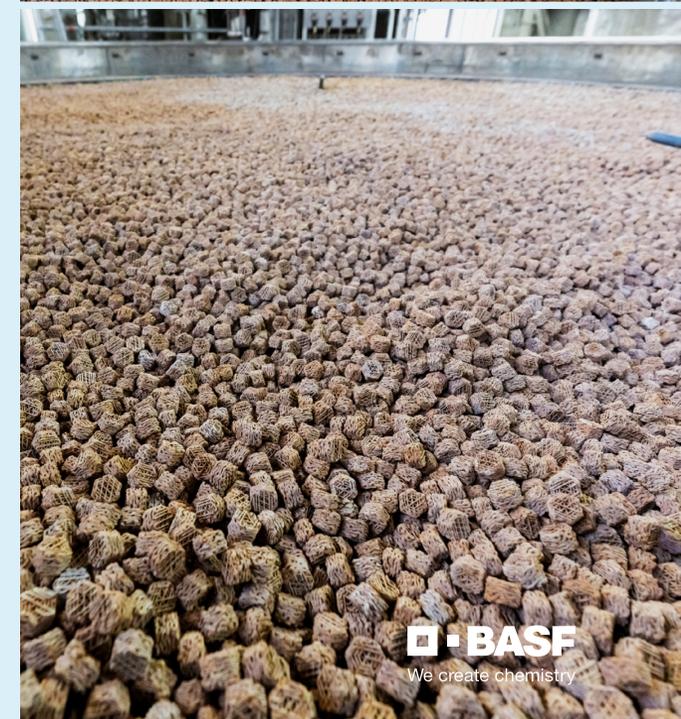
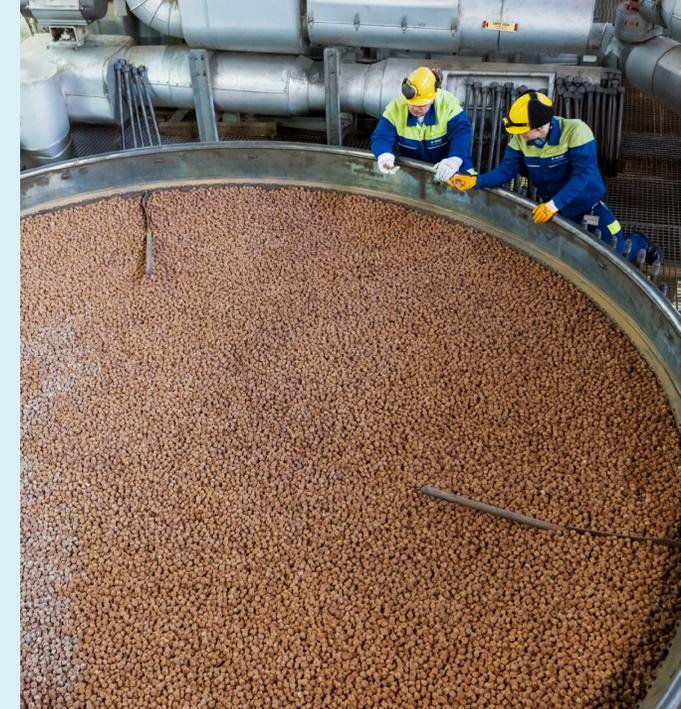
- Increased productivity
- Improved resource efficiency
- Reduced CO<sub>2</sub> emissions
- Supply at scale

# X3D® – The new shaping technology



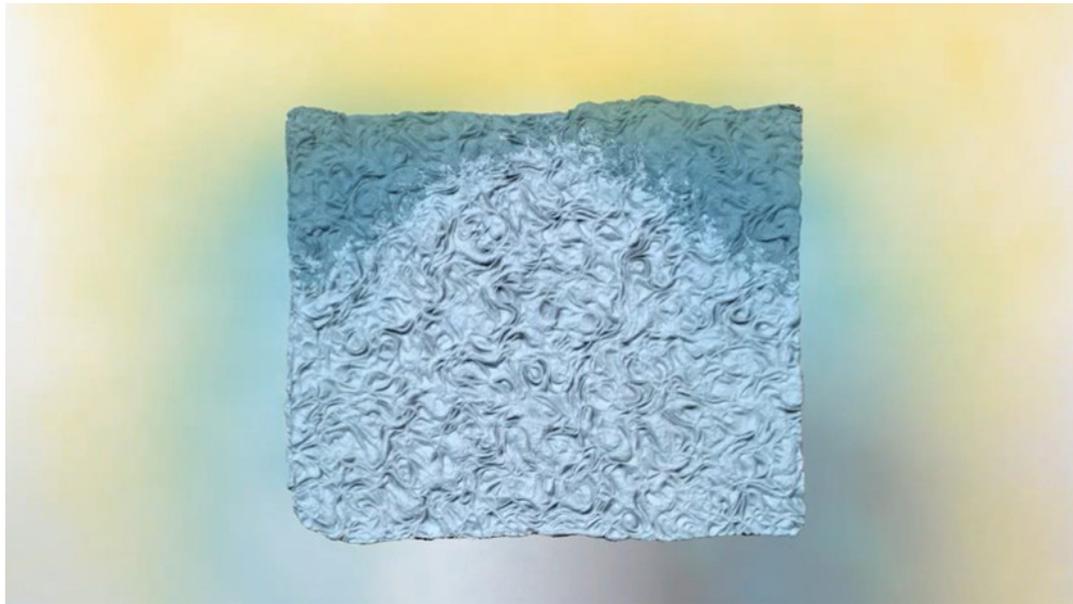
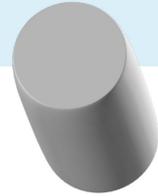
## X3D offers a large number of improvements

- More open and accessible shapes
- High geometric surface area
- Production on industrial scale
- Fast prototyping

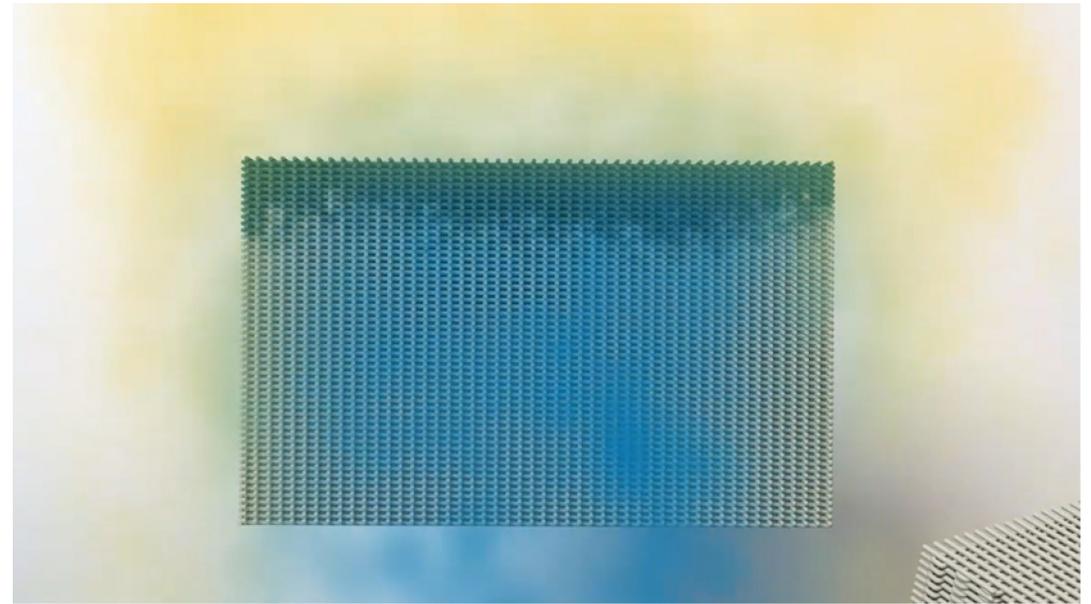
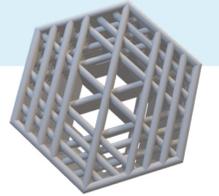


# Benefits of X3D technology

## Partial use of catalyst mass



## Full use of catalyst mass

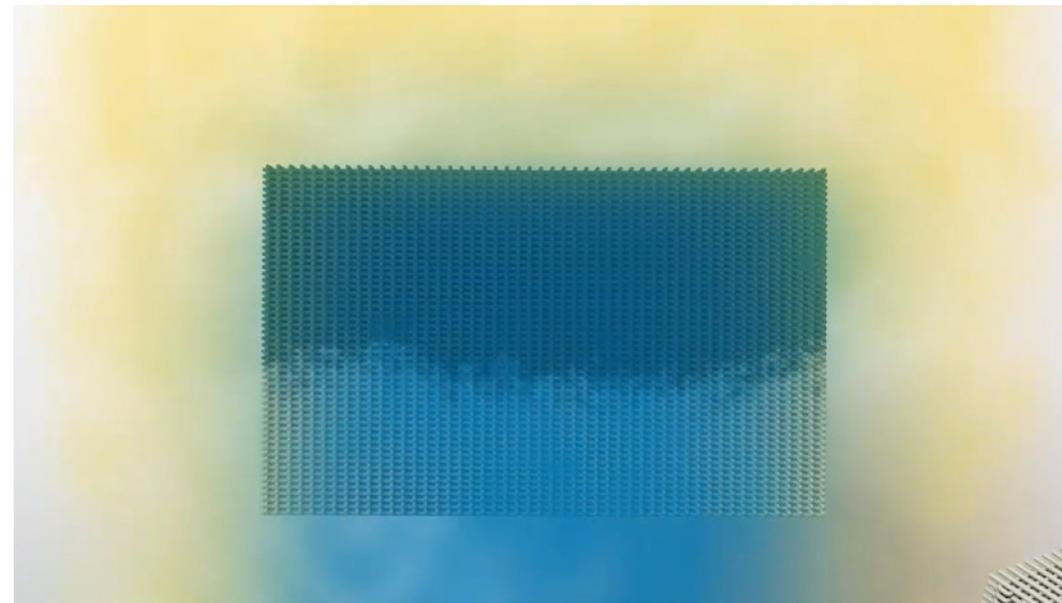
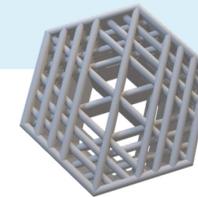


# Benefits of X3D technology

## Partial use of catalyst mass

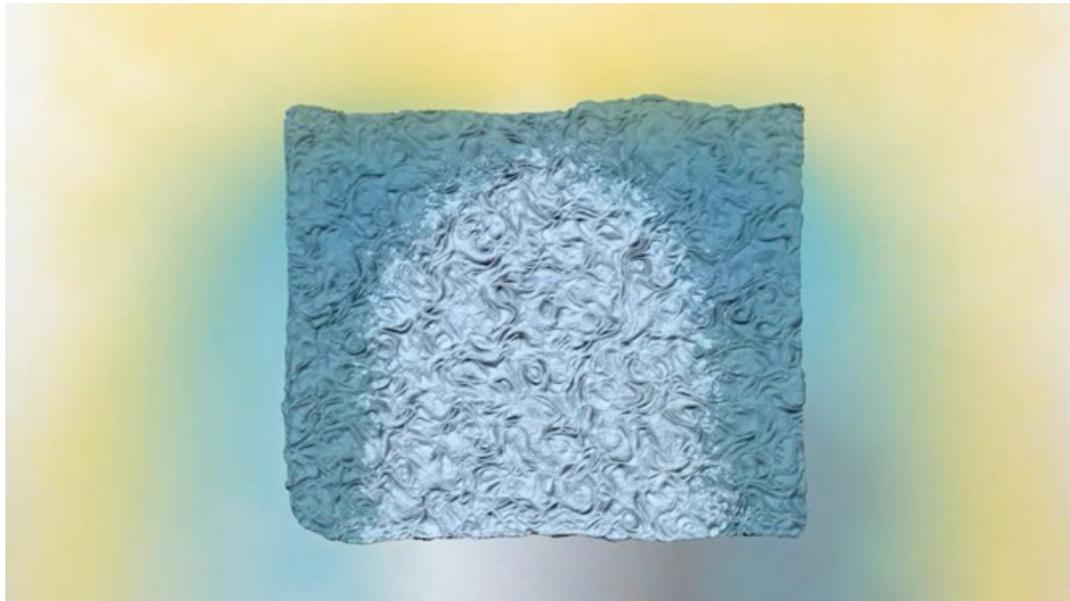
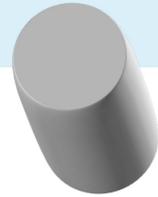


## Full use of catalyst mass

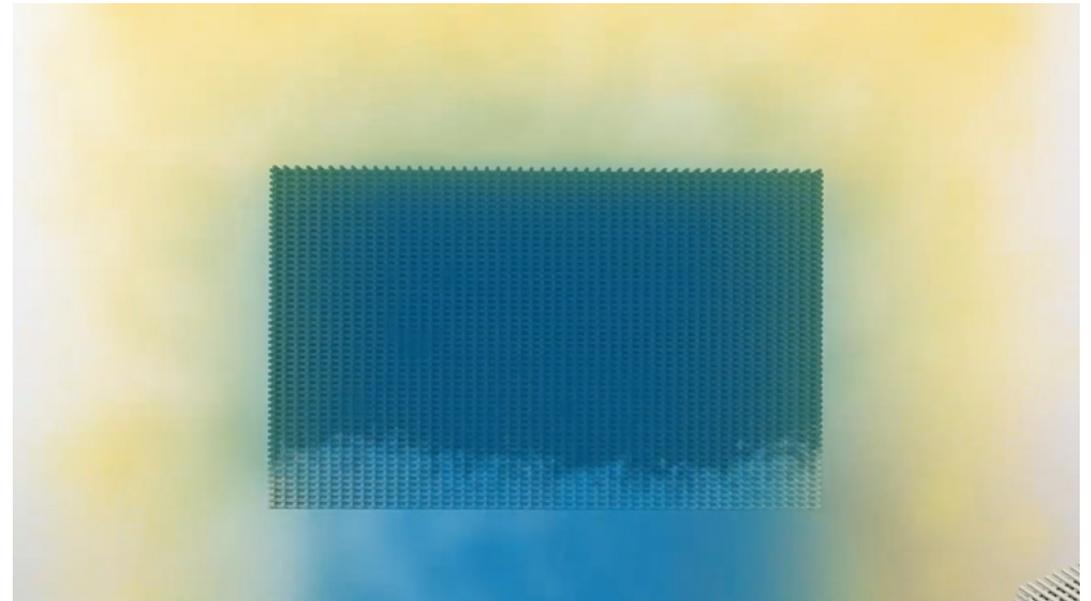
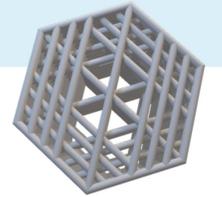


# Benefits of X3D technology

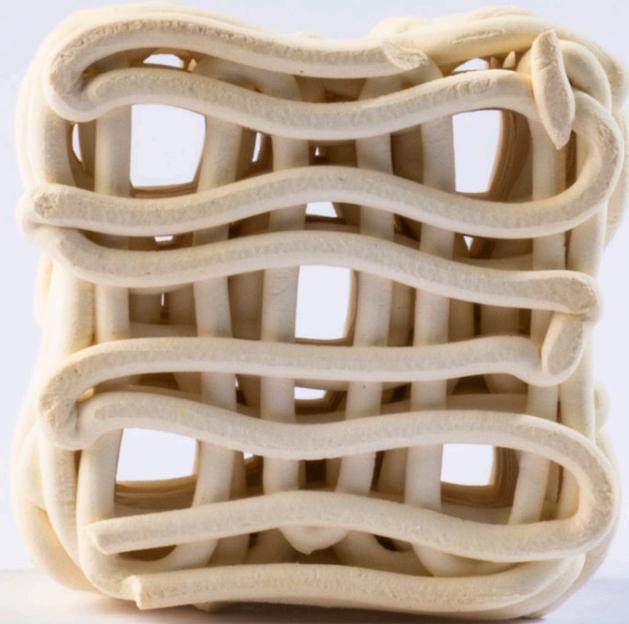
## Partial use of catalyst mass



## Full use of catalyst mass



# Benefits of X3D technology



## Optimized performance

More open and accessible shapes

## Meeting customer demand

Production on industrial scale

## Efficient use of raw material

High geometric surface area

## Increased speed to market

Fast prototyping

# First reference plant

## X3D for sulfuric acid catalysts at BASF

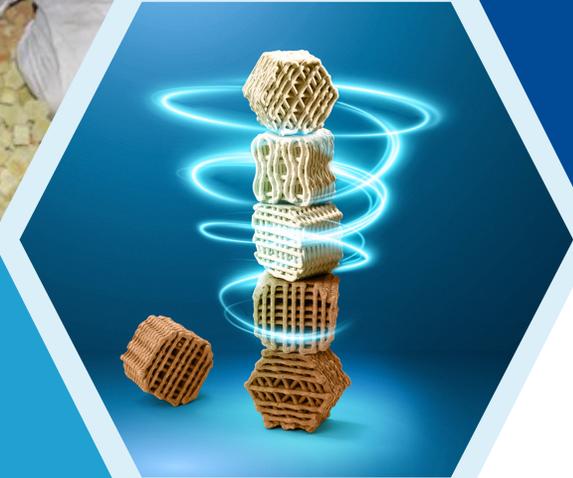
First reference plant in 2019

Sulfonation plant capacity: 32 metric tons per day

Customer benefits by saving €85,000 per year and m<sup>3</sup> of catalyst

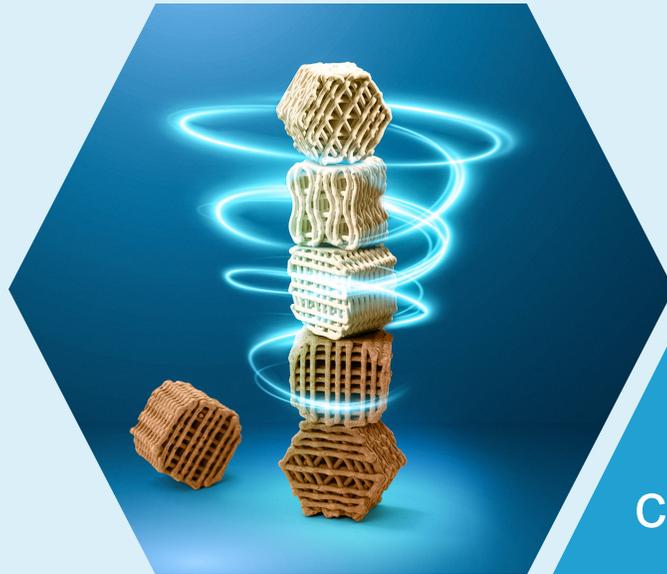
Breakthrough in reactor design results in 25% higher efficiency

X3D can be applied to majority of catalysts (total market size: \$25 billion)



# New commercial plant in 2026

Meeting rising customer demand



Additional  
capacity available  
in Ludwigshafen  
starting from  
Q1 2026



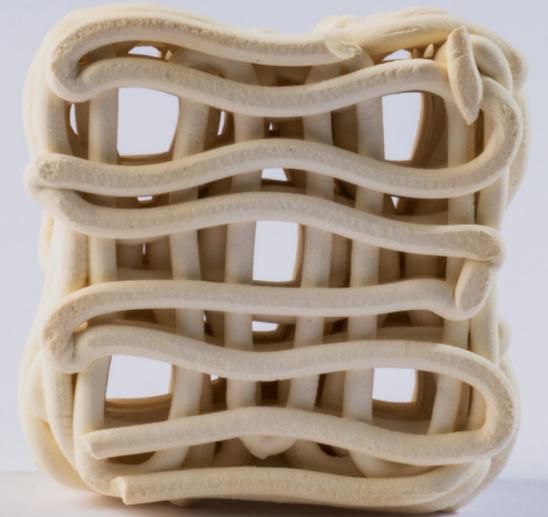
# Rethinking catalysts

**1** **Innovation in catalyst shaping**  
is first breakthrough in 70 years

**2** **Proven on industrial scale**  
in existing plants

**3** **Improve plant performance**  
by more open and accessible shapes

**4** **High resource efficiency**  
thanks to high utilization and lean reactor design





We create chemistry