BU Platinum Engineered Materials

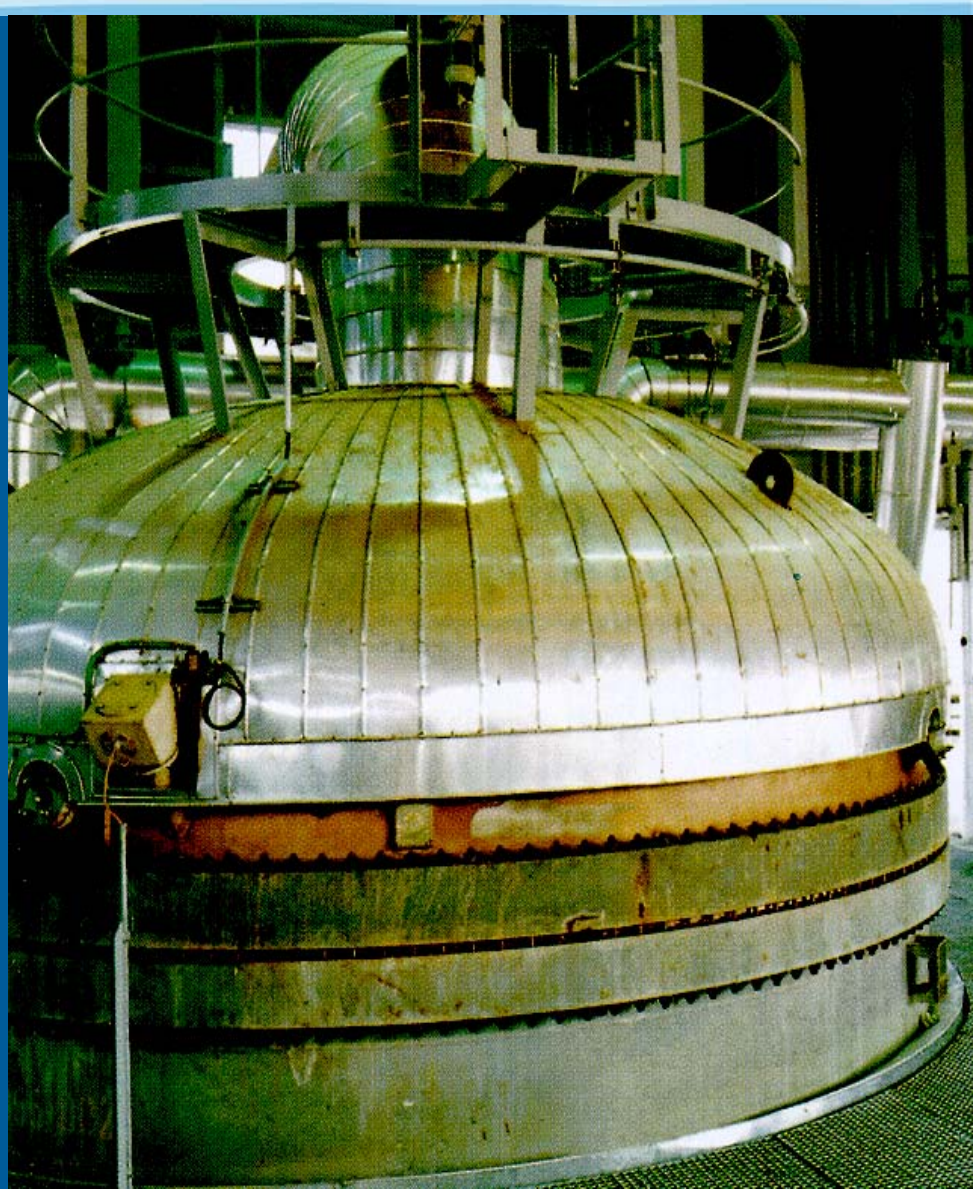
Process Excellence Model

Combining Competencies for Process Excellence

High performance systems for ammonia oxidation reactors

ANNA 2009 – Little Rock

Combining Competencies for Process Excellence
in chemical industries



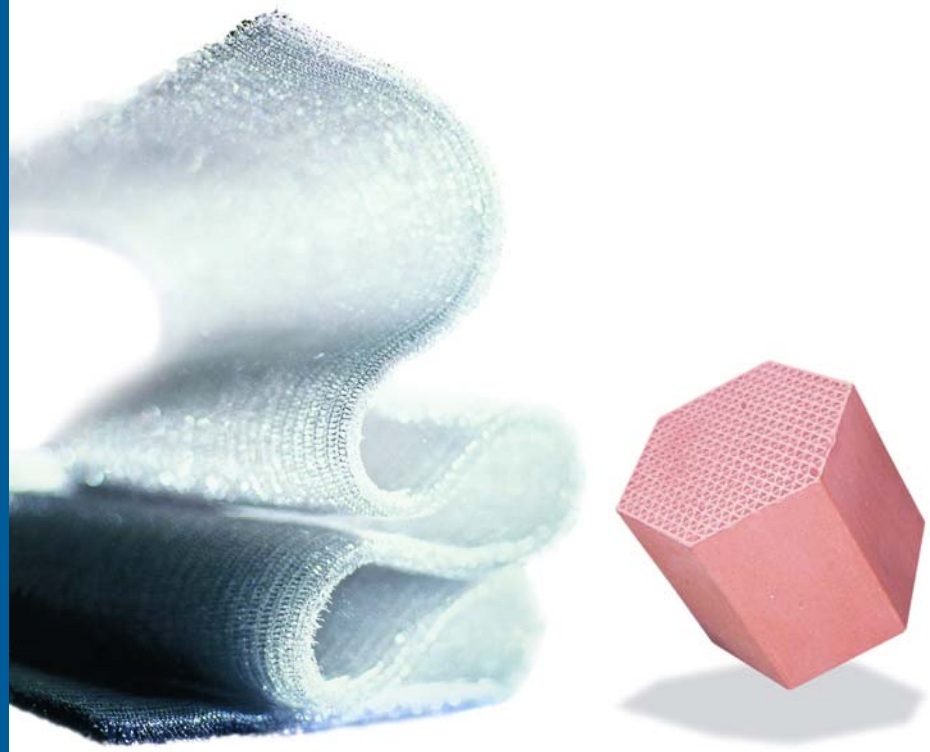
Contents

1. Catalyst gauzes
   MKS precise

2. Getter for high loaded reactors
   Reconit

3. N_2O abatement
   MultiComb GreenLine®

Combining Competencies for Process Excellence
in chemical industries



1. Catalyst gauzes

   MKS precise

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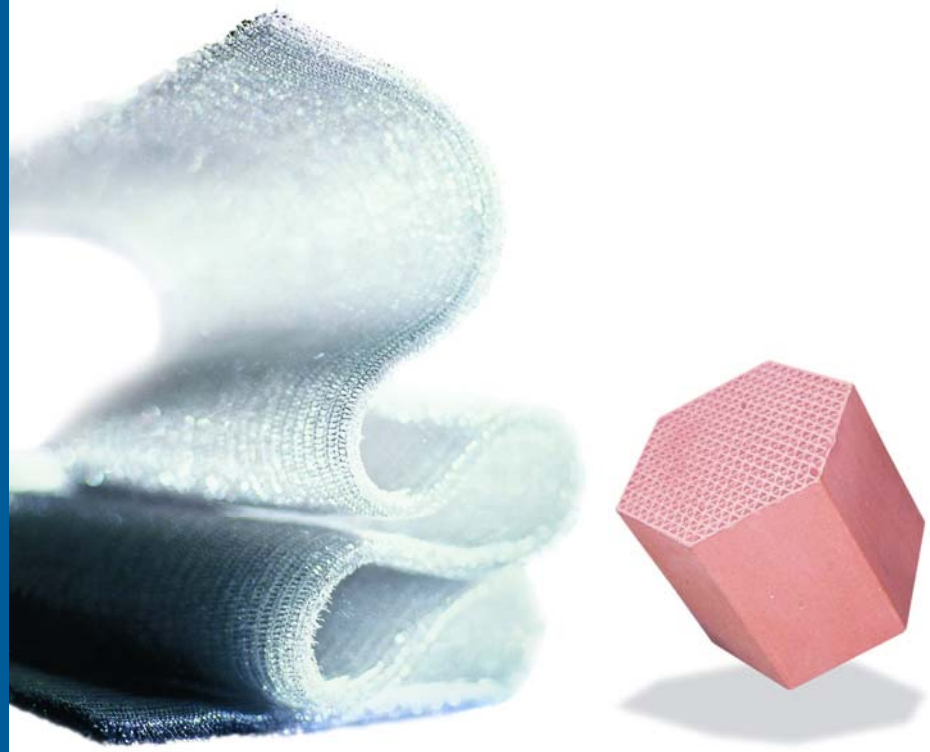

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Modern Knitting Technology

knitting machine

flat bed technology + single piece production

↓

- production flexibility
  like no other player in the market
- adjusting and finetuning
  each single gauze
- short production lead time
  → short reaction time

Catalyst gauzes
→ MKS precise

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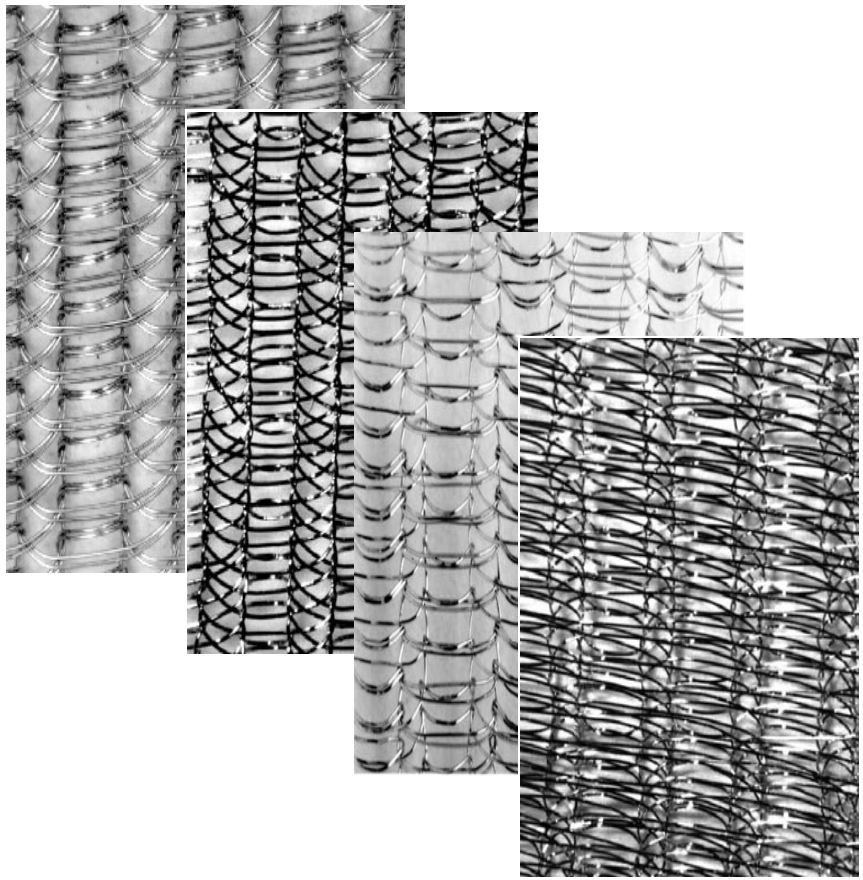
PLATINIT® = single layer gauze

- 4 different basis types
- different porosities
- finetuned by: - alloy composition
  - wire diameter
  - surface weight



variations of PLATINIT® gauzes

Catalyst gauzes
→ MKS precise

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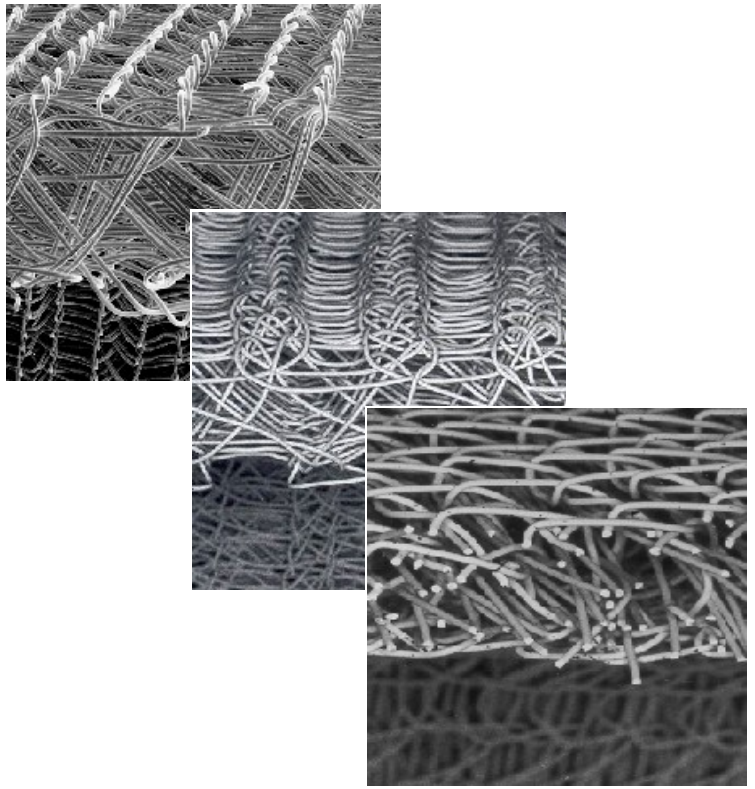
MULTINIT® = multi layer gauze

- 3 different basis types
- three-dimensional, replacing 3 PLATINIT®
- alternating porosities within the gauze
  - → beneficial impact on primary losses
  - → long lifetime



variations of MULTINIT® gauzes

Catalyst gauzes
→ MKS precise

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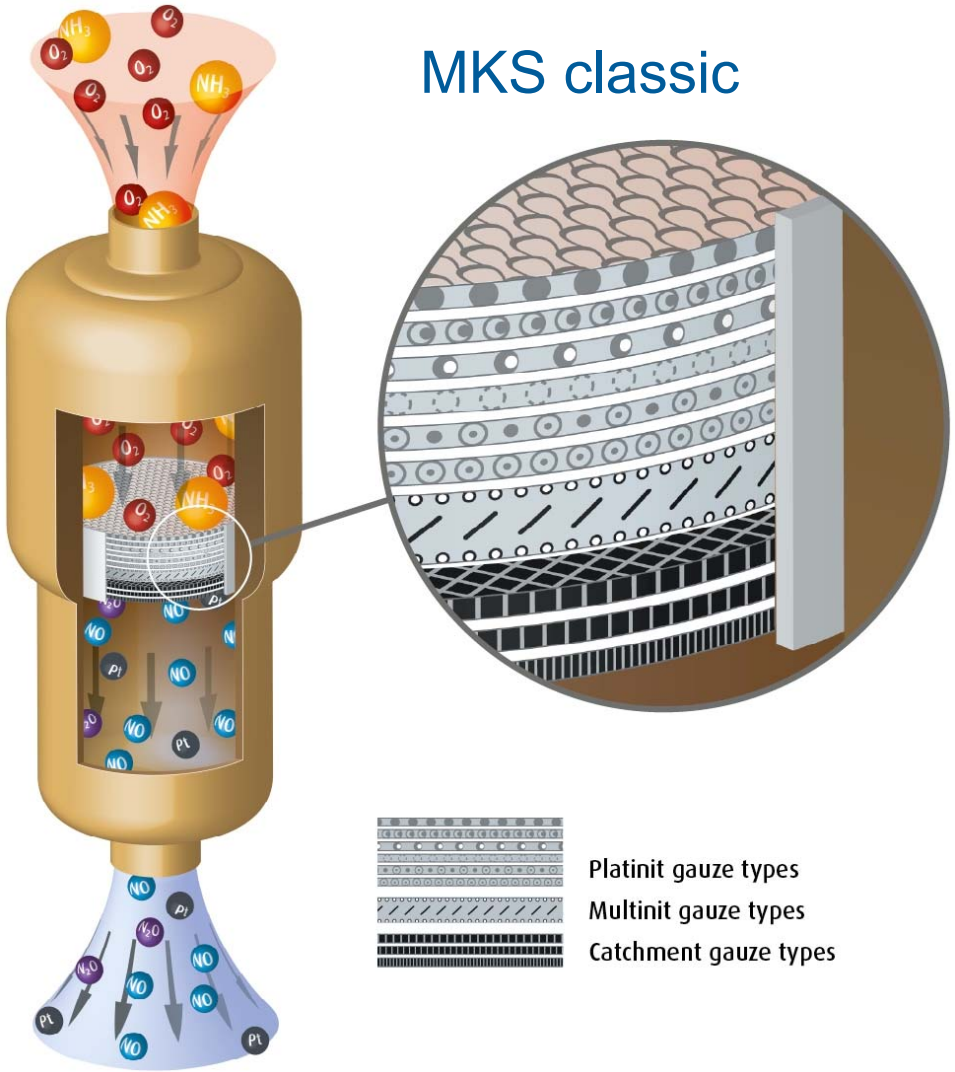


MKS classic

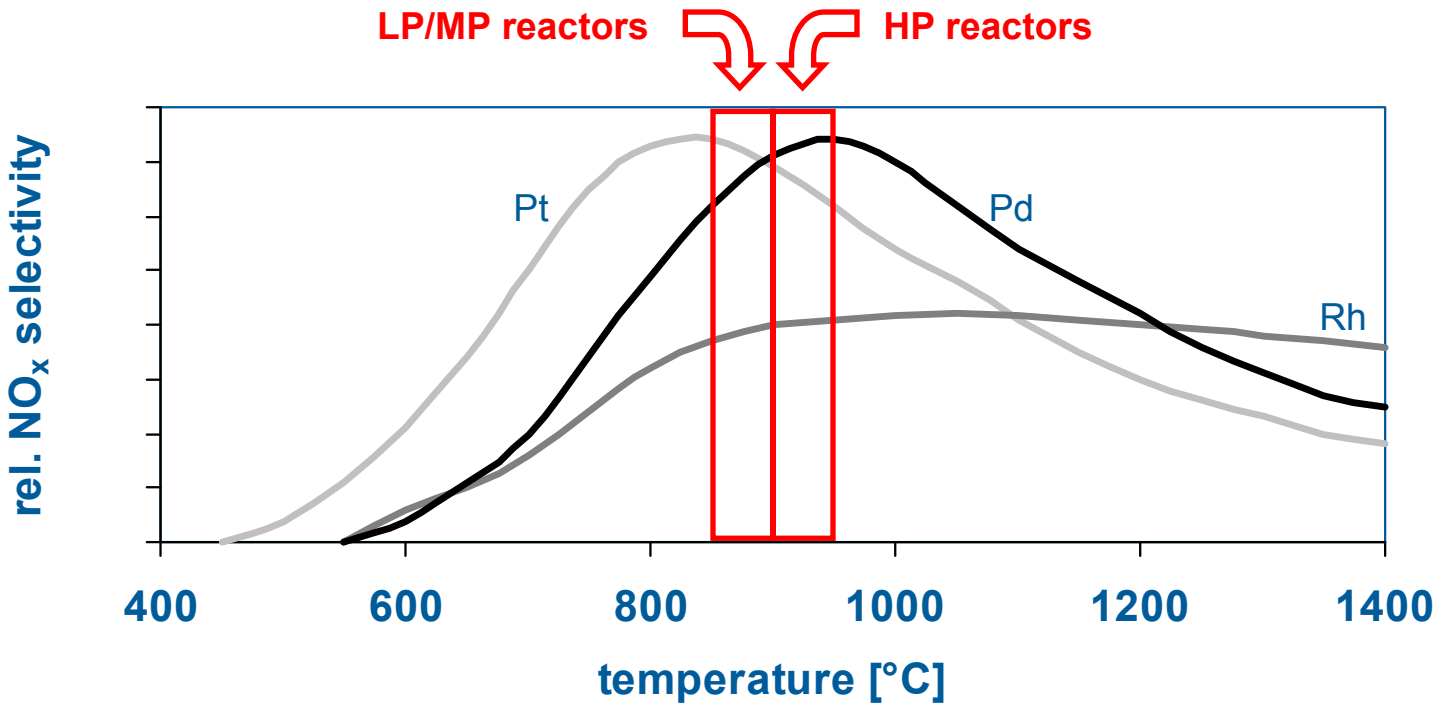
Platinit gauze types
Multinit gauze types
Catchment gauze types

- combination of Pt/Rh-PLATINIT® and MULTINIT®
- each gauze is adjusted to its position in the pack and the application parameters
- each configuration is customized

- Highest efficiency
- Highest process stability
- Longest operating time
- Lowest amount of installed PM
- Lowest PM losses

Catalyst gauzes
→ MKS precise

How does the selectivity of the single components depend on the operating temperature?



Catalyst gauzes
→ MKS precise

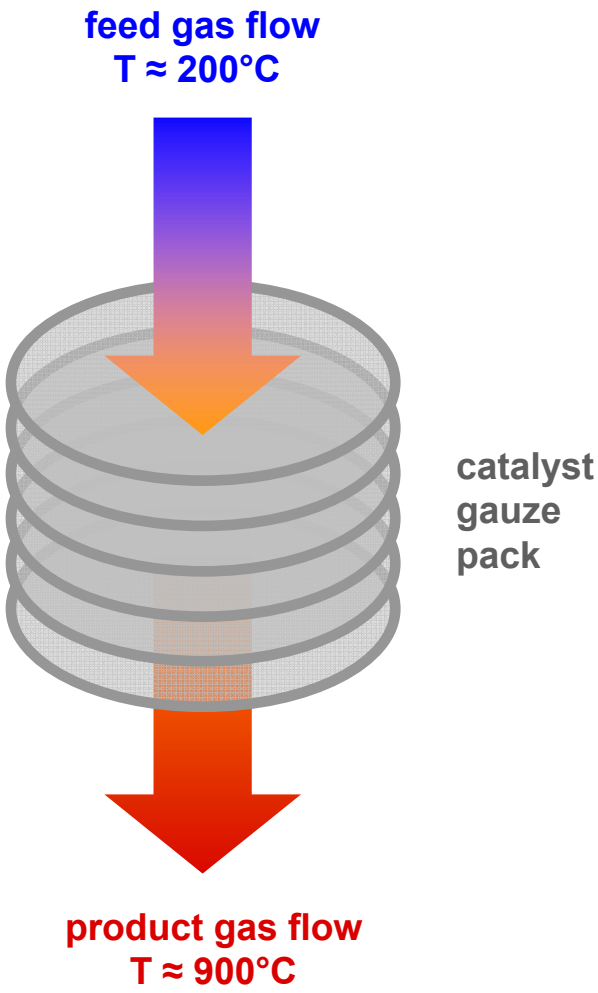
Is this transferable
to configurating the catalyst packs?

gas temperature increases
in the gauze pack

high temperature in the bottom part

lower temperature in the top part

Using the advantages of
Rh (stability) and Pd (recovery)
in the different gauze layers !



Catalyst gauzes
→ MKS precise

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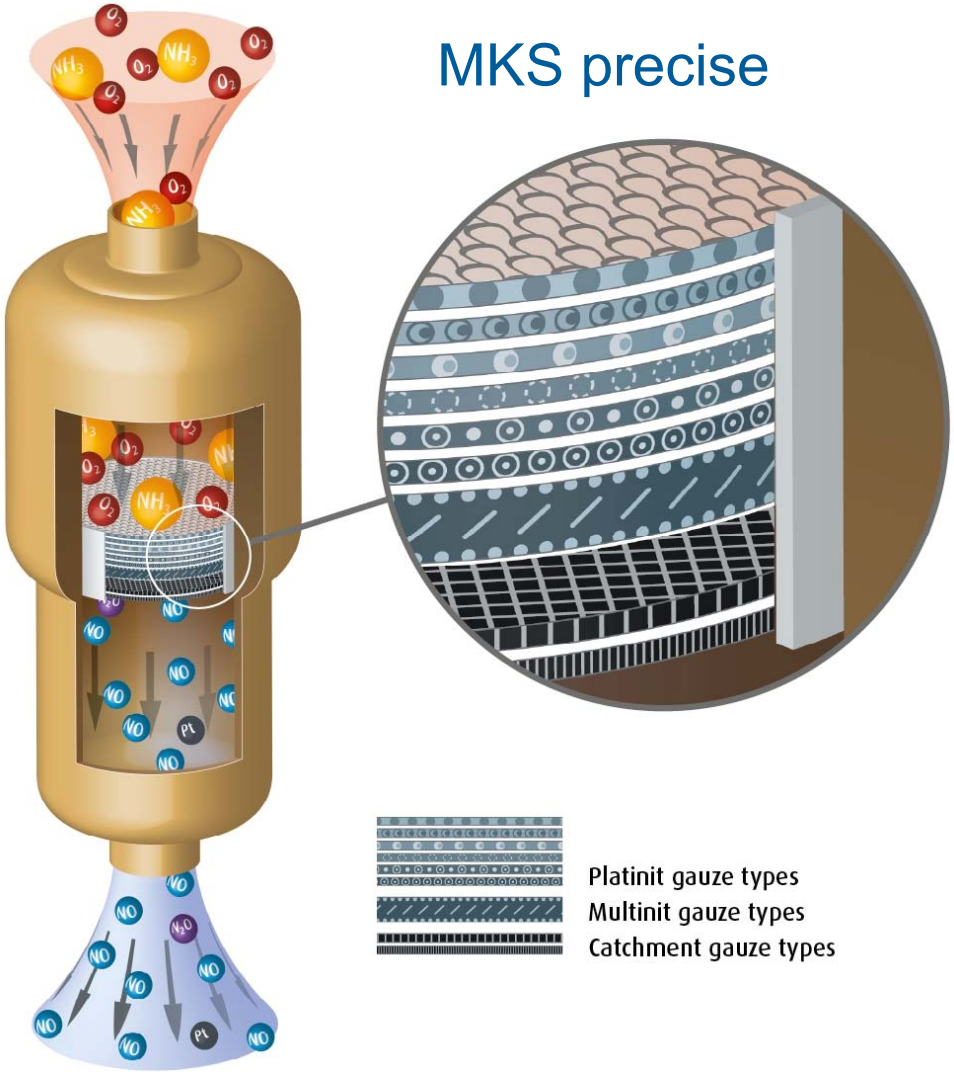

- adaptability of MKS classic completed by using different alloys in different gauze layers, due to single piece production
- higher efficiency
- higher stability
- decreased PM losses
- decreased installation value

1. Catalyst gauzes

   MKS

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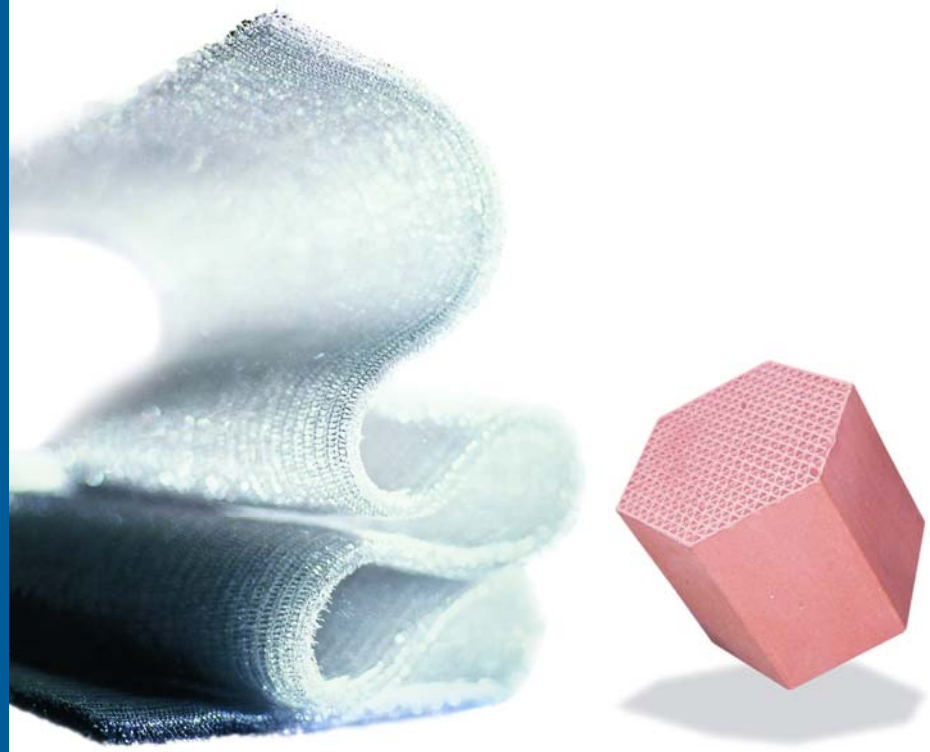

Getter gauzes for high loaded reactors
→ Reconit

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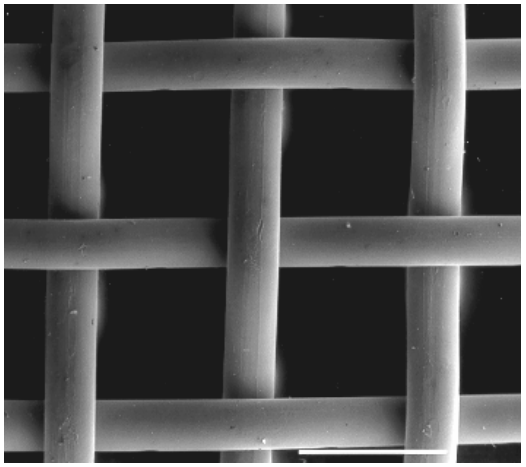
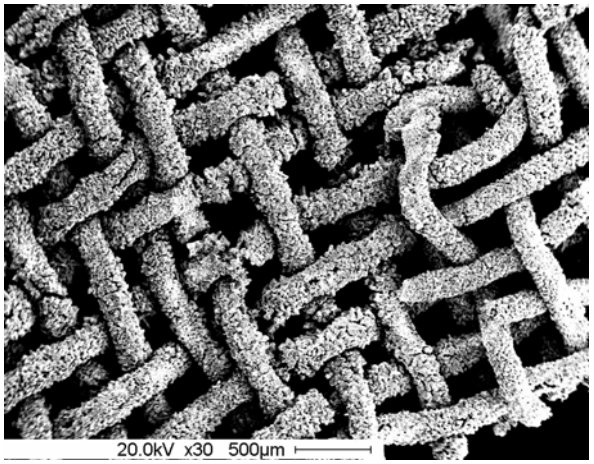
Standard woven getter gauzes

low porosity → Pt/Rh recovery → growth of wire diameter → increasing pressure drop



- new getter gauze



- used getter gauze (30:1)

- used getter gauze (300:1)

Getter gauzes for high loaded reactors
→ Reconit

Standard woven getter gauzes

high loaded reactors: extensively increasing pressure drop,
due to high primary losses

→ operation stops to remove/exchange getter system

→ production loss / unrecovered Pt/Rh losses

→ REQUIREMENT:
getter gauze system with **high recovery** rate and
low pressure drop increase

Getter gauzes for high loaded reactors
→ Reconit

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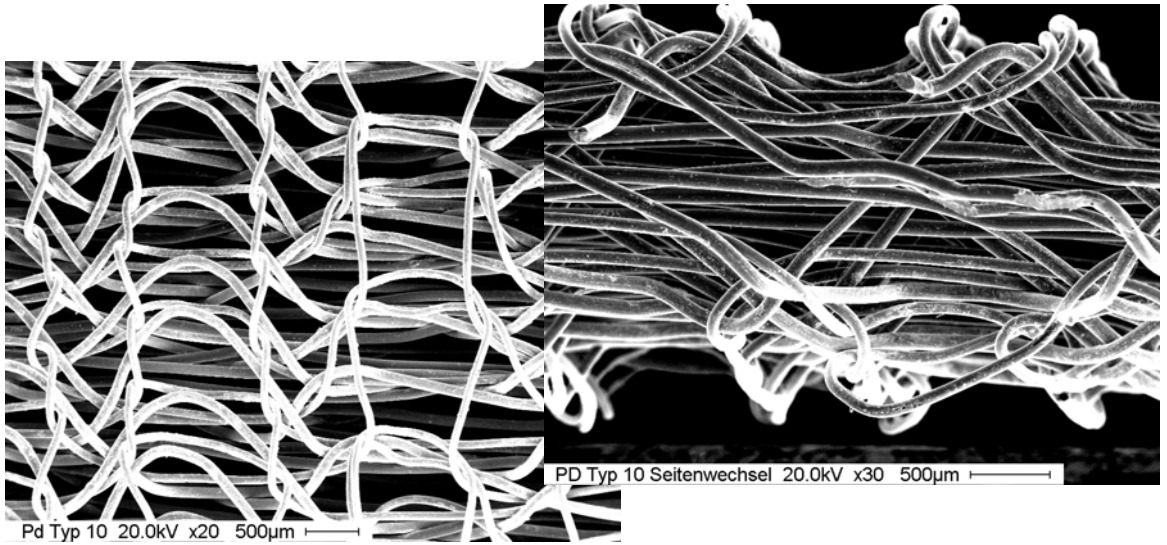
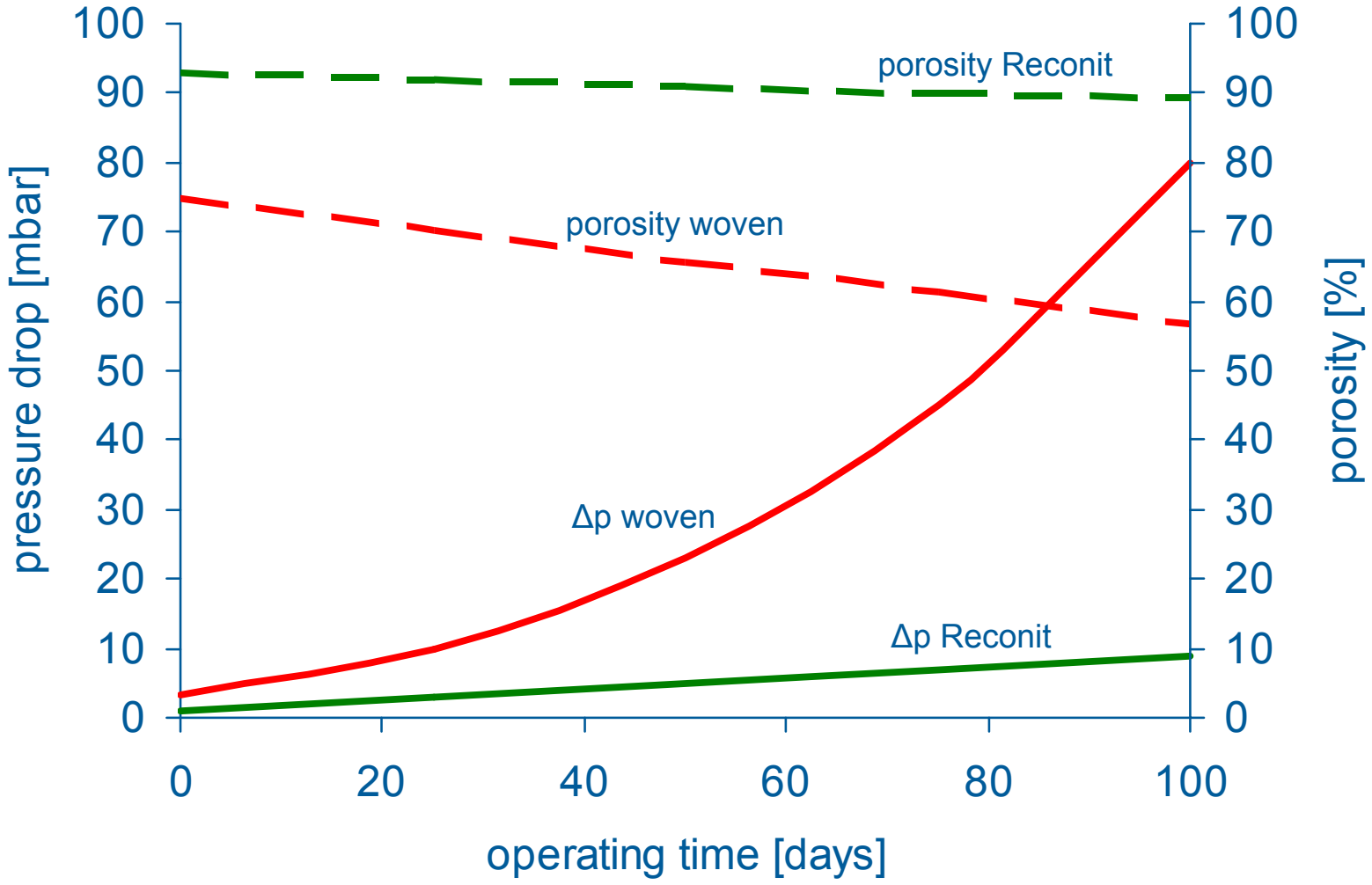
Reconit

- knitted and three dimensional
- gauze height: 2,5 mm
- high porosity (> 90%)
- dense from top view due to weft wire



Getter gauzes for high loaded reactors
→ Reconit



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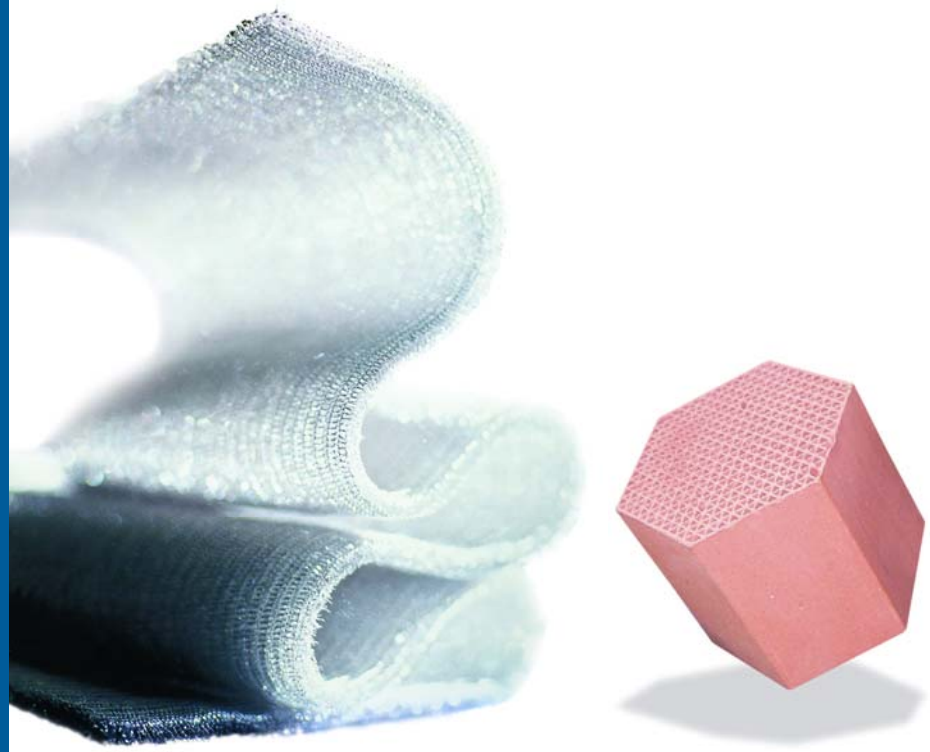
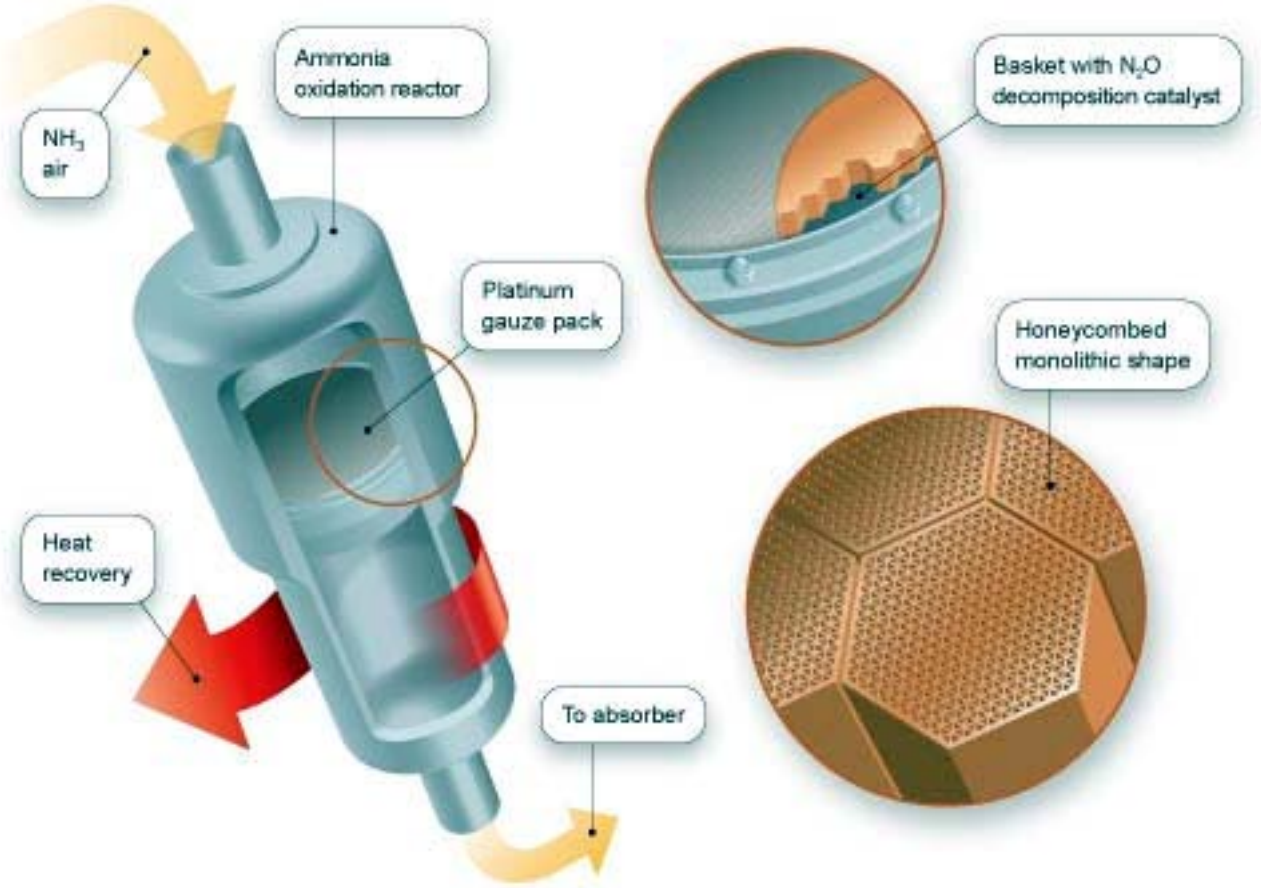


N_2O abatement
→ MultiComb GreenLine®



N_2O abatement
→ MultiComb GreenLine®

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Examples of Industrial Installations of ***MultiComb GreenLine®***

	pressure [bar (abs.)]	load [tN(NH_3)/day*m^2]	v [m/s]	installation height [mm]	N_2O abatement [%]	N_2O abatement [% per 50 mm layer]
1.	5,5	16	2,1	50	85 %	85 %
2.	9,9	23	1,8	100	70 %	45 %
3.	7,5	31	3,2	100	65 %	40 %
4.	6,4	46	5,5	200	75 %	30 %

N_2O abatement
→ MultiComb GreenLine®

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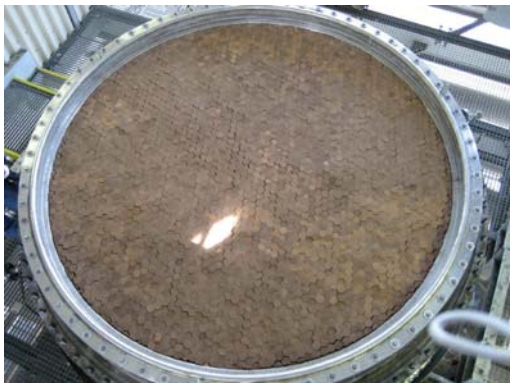
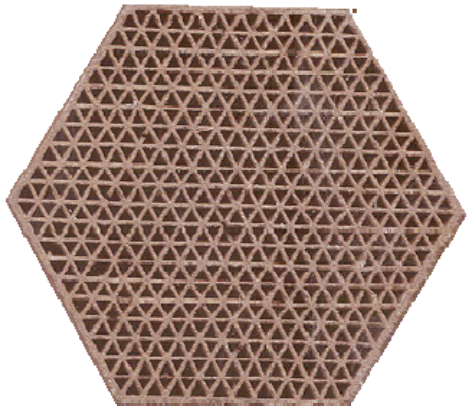
Characteristics of ***MultiComb GreenLine®***



- even structure → stable gauze support
  → uniform pressure drop
- Iron Oxide as essential part of the active component
- hexagonal shape → high mechanical stability and thermal shock resistance
- fully extruded → no agglomeration or abrasion of active component
  → stable efficiency



N_2O abatement
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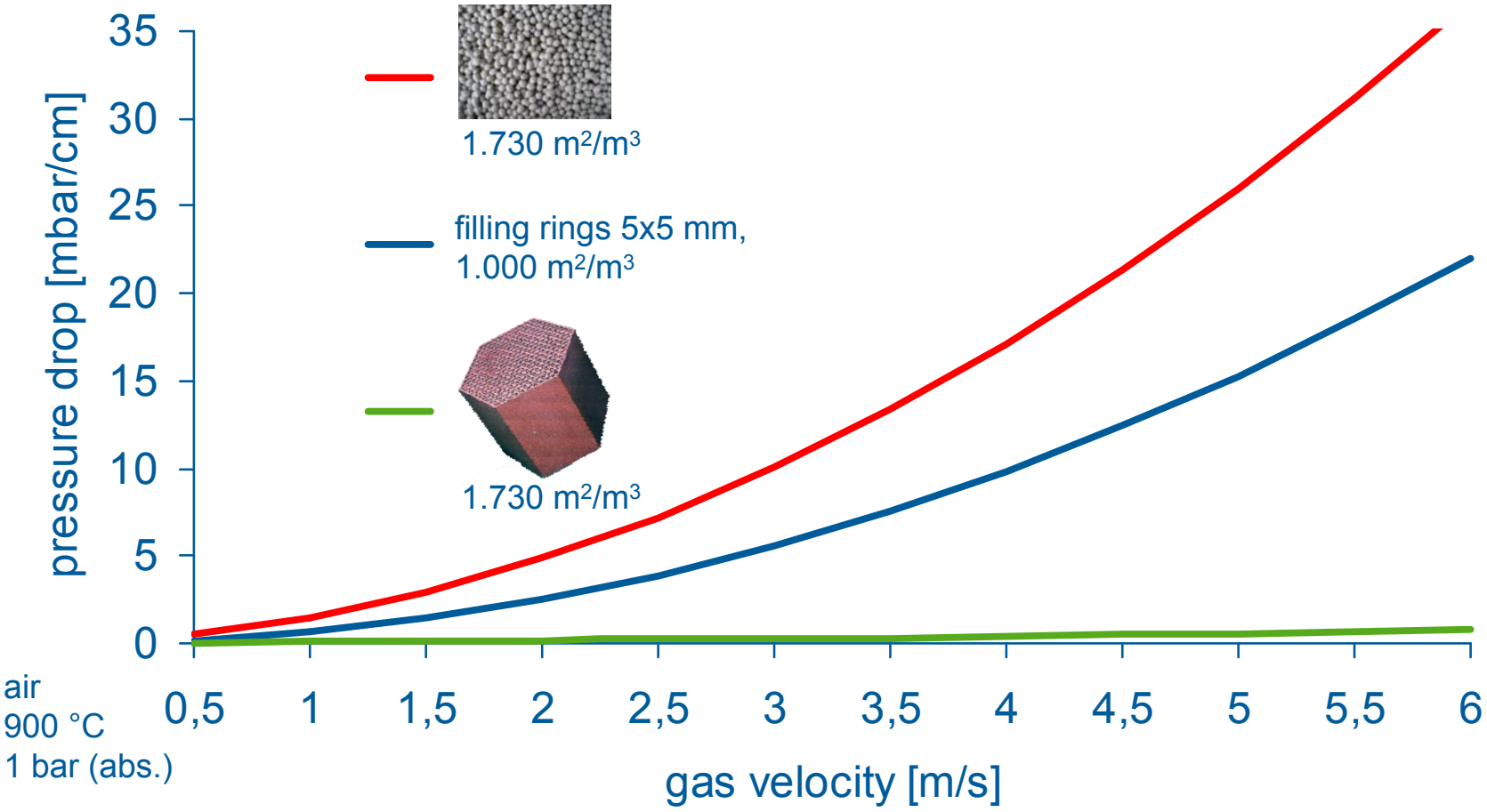
Pressure Drop



N_2O abatement
→ MultiComb GreenLine®

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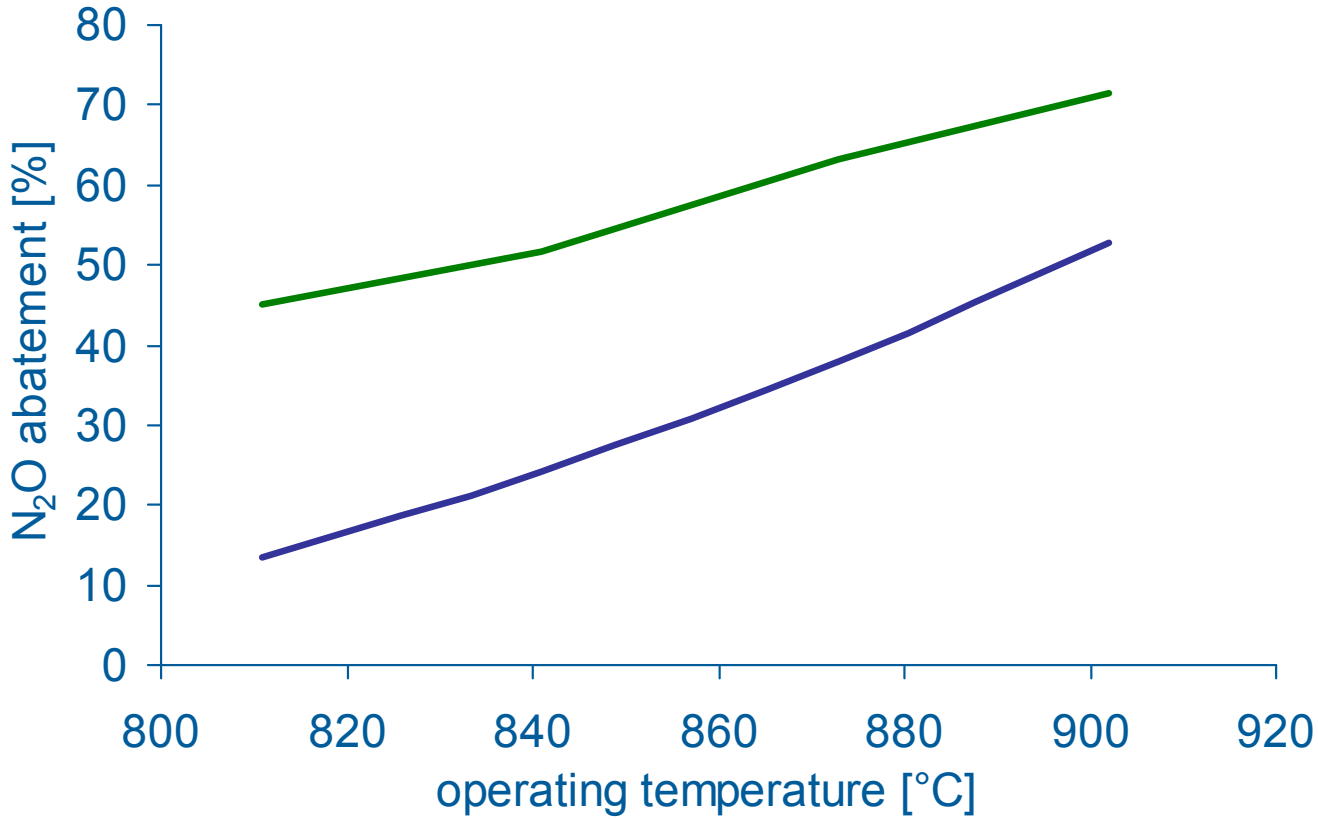
Modified active component



→ much more active especially at low operating temperatures

THANK YOU !

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Challenge us !

More to explore:

www.platinum-engineered-materials.com

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