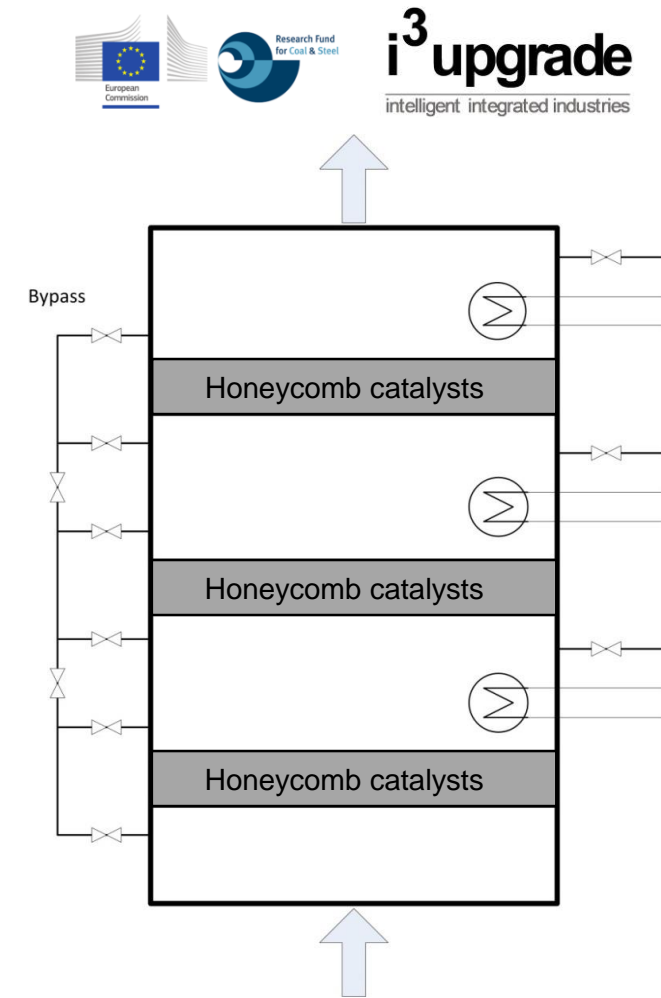
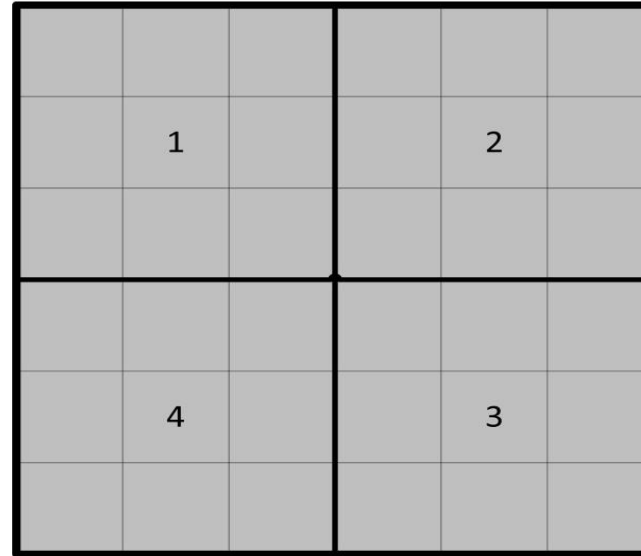


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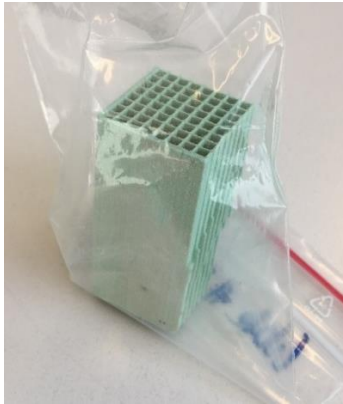
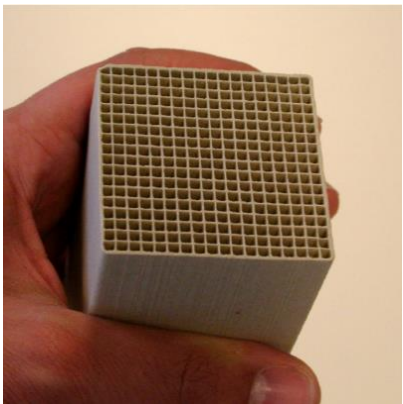
Innovative reactor design

- Load flexible reactor concept with honeycomb catalyst
 - Simple scale-up & modularisation
 - Enhanced stand-by properties and Δp
- Arrangement of honeycombs in compartments
 - Cyclic operation enhances load flexibility
 - Ceramic carrier enables heat storage



Honeycomb catalyst

- Cordierite with high thermal shock resistance
- Two-stage wash-coat with Boehmite & Nickel as catalytic active material
- Catalyst and heat storage medium



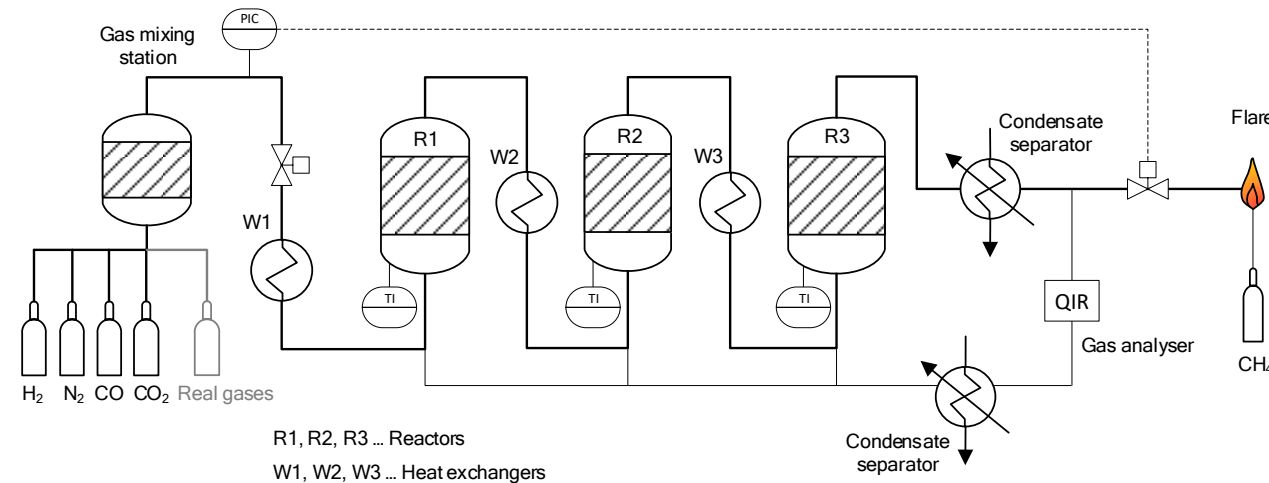
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Dynamic methanation experiments

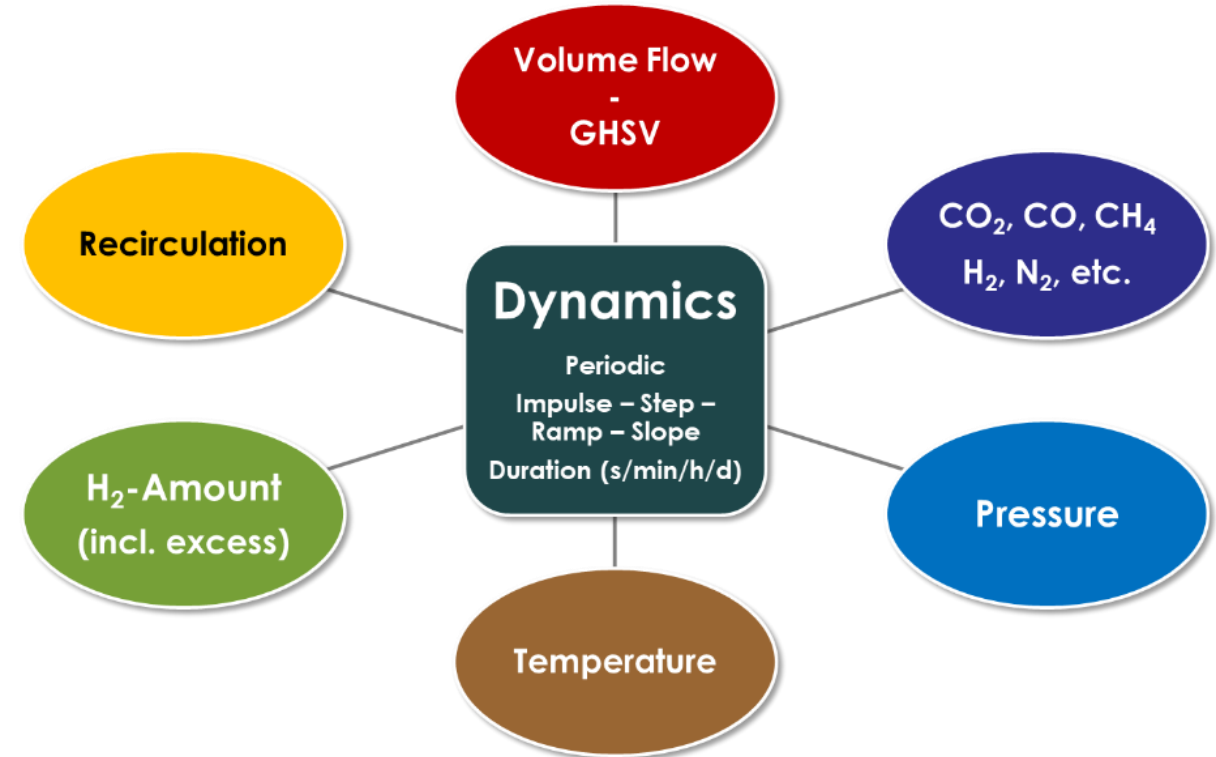


Lab-scaled reactor setup

- 3 reactors in series
- $p_{\max} = 20 \text{ bar}$
- $T_{\max} = 700 \text{ °C}$
- $\dot{V}_{\max} = 50 \text{ NL/min}$
- Bulk/honeycomb catalyst



Dynamic operating parameters



- Experiments with synthetic BFG & BOFG as well as bottled real gases
- Main dynamic case: total volume flow variation due to available H₂ amount from electrolyser

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Summary and results

- Full CO_x conversion for steady-state experiments
 - ... with synthetic BFG and BOFG
 - ... with a hydrogen surplus of 4% ($H_2/CO_x = 1.04$)
 - ... for bottled real gases additional gas cleaning is required (e.g., CuO-coated activated carbon adsorbents)
- Only small variations in CO_x conversion and dry product gas composition for dynamic experiments
 - ... with synthetic BFG, BOFG as well as bottled real gases
 - ... for load changes of $\pm 25\%$ in syngas power in the range of minutes and hours
- Long-term, repeatable & consistent methanation performance for honeycomb catalyst

Contact details

Dipl.-Ing. Philipp Wolf-Zöllner

Tel.: +43 3842 402-5008

philipp.wolf-zoellner@unileoben.ac.at

Montanuniversität Leoben
Franz-Josef-Straße 18
8700 Leoben, Austria

