H_2 4 Industries

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Task 33: Thermal Gasification of Biomass
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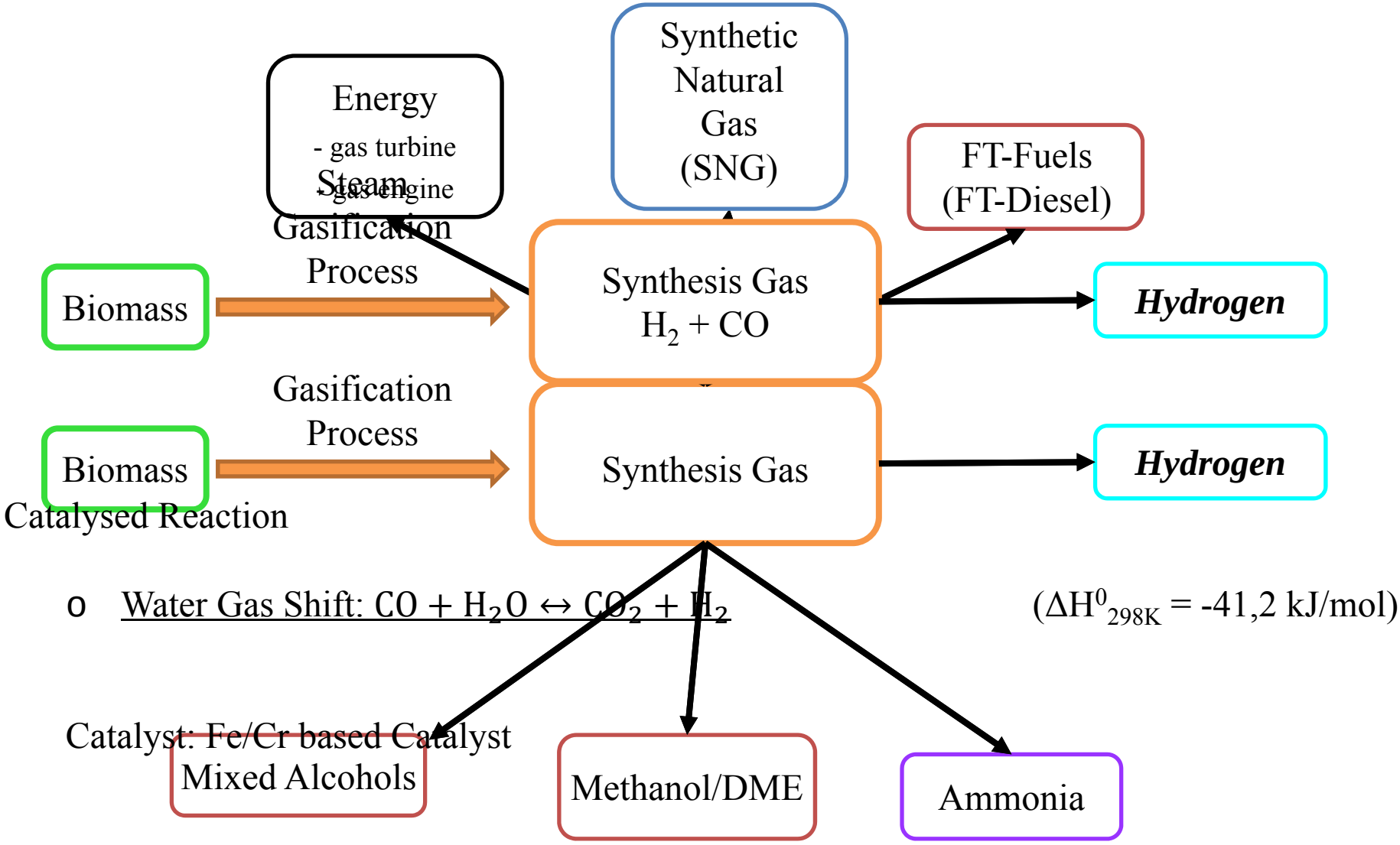
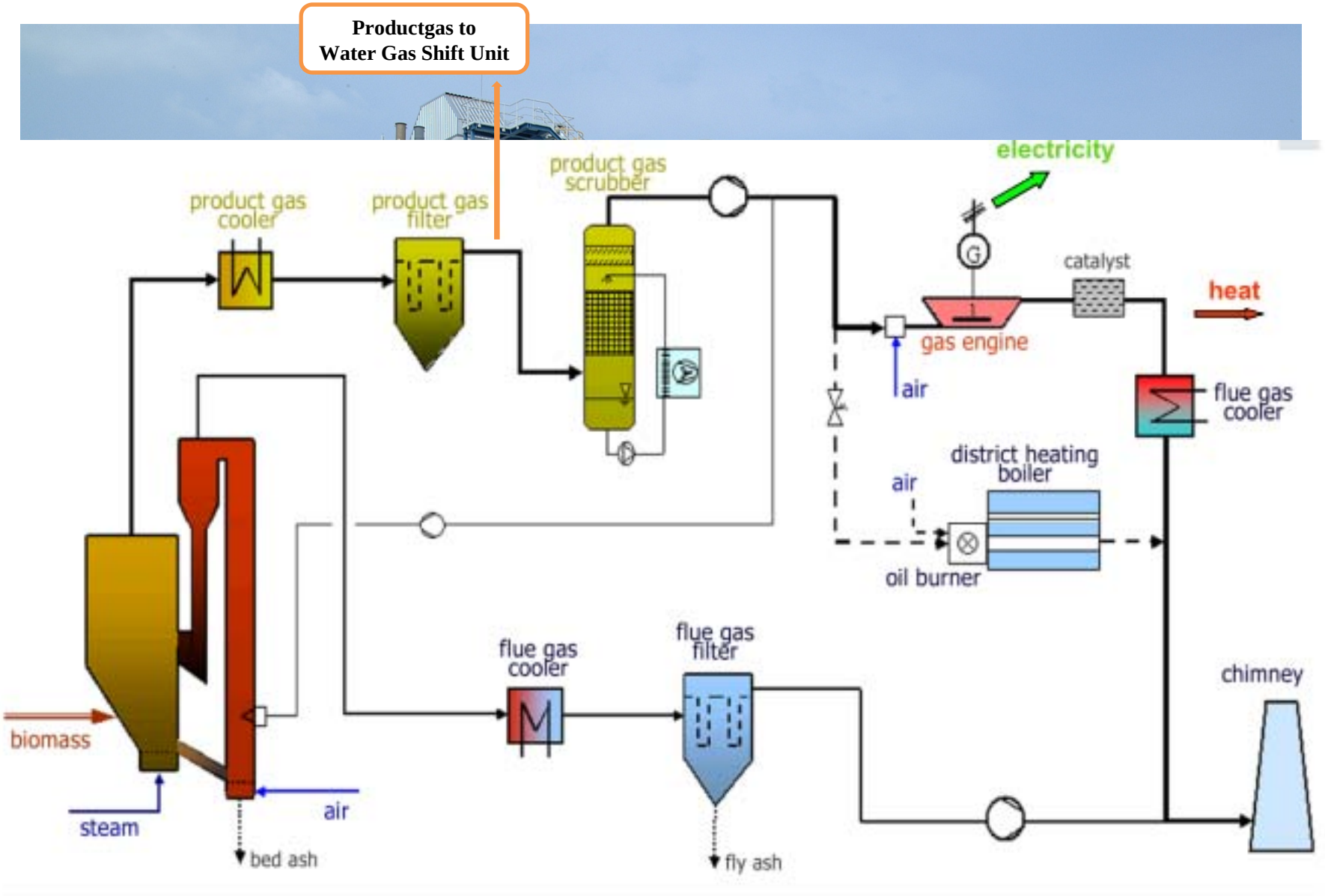
Hydrogen Production

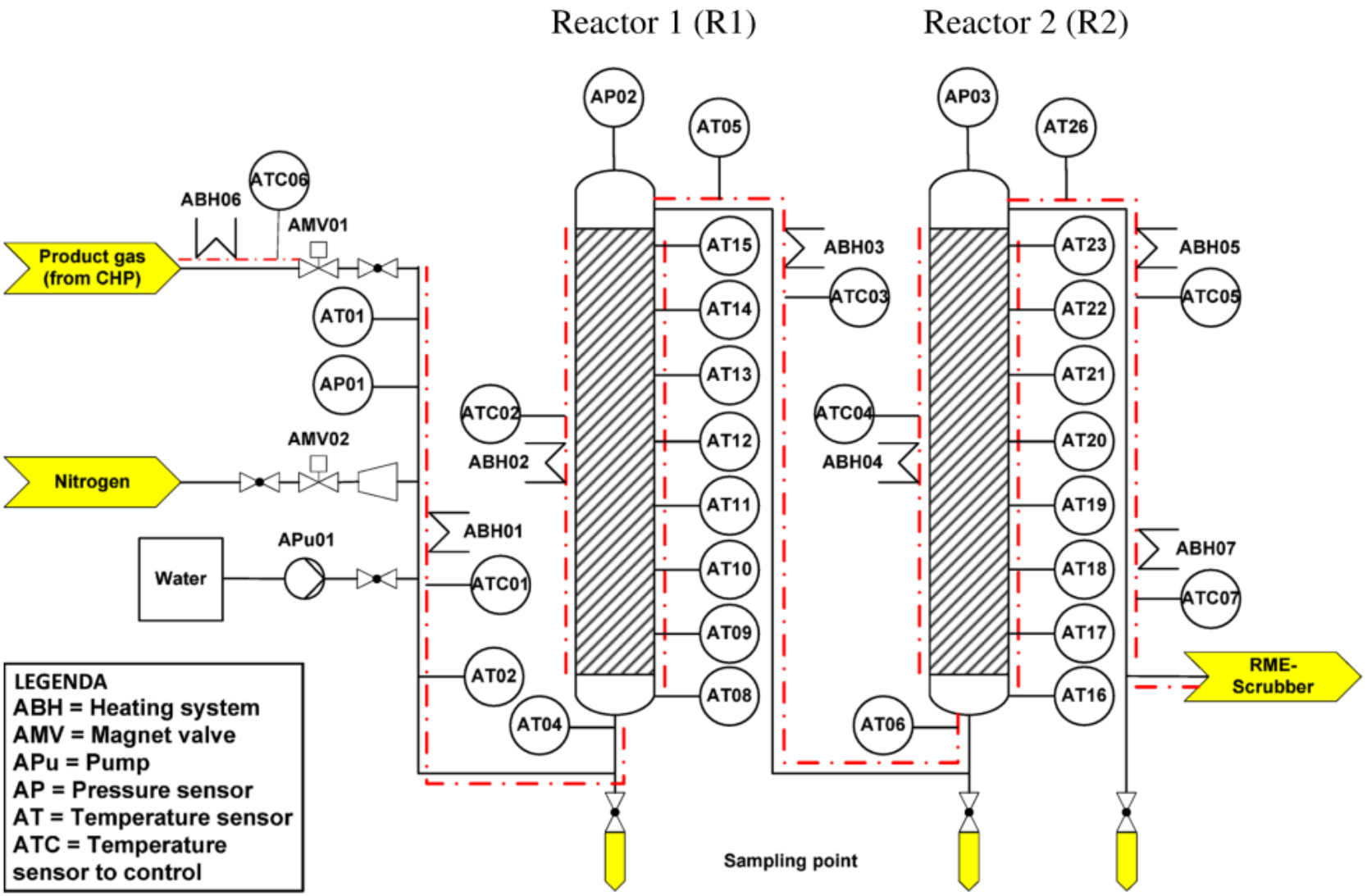


- Water Gas Shift: $CO + H_2O \leftrightarrow CO_2 + H_2$ (ΔH^0_{298K} = -41,2 kJ/mol)

GÜSSING CHP Biomass Plant



Experimental Unit - Description



Experimental Unit - Description

Parameters for Catalyst Evaluation

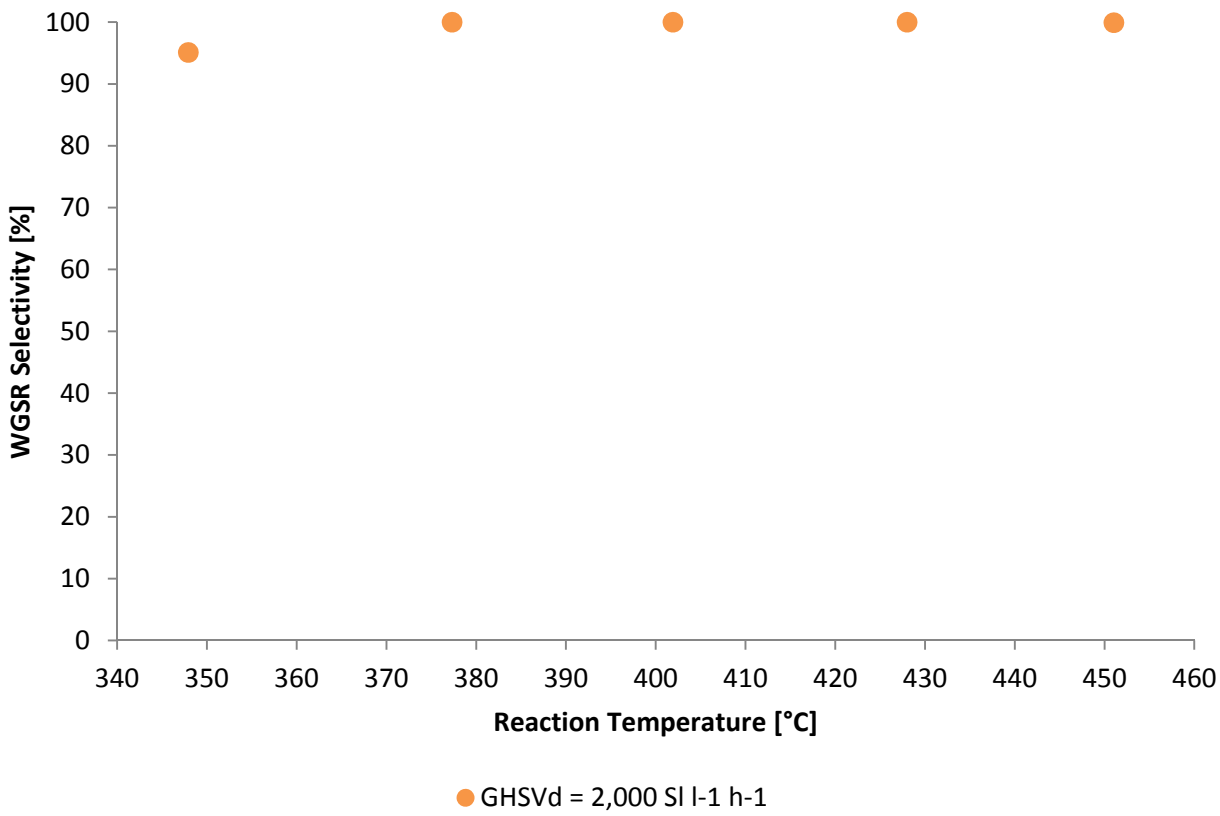
- CO Conversion (X_{CO})

$$X_{CO}(\%) = \frac{[CO|_{in} - CO|_{out}]\ (mol/h)}{CO|_{in}\ (mol/h)} \times 100$$

- Water Gas Shift Reaction Selectivity (WGSR Selectivity)

$$\text{WGSR Selectivity}\ (\%) = \frac{[CO_2|_{out} - CO_2|_{in}]\ (mol/h)}{[CO_2|_{out} - CO_2|_{in}] + [CH_4|_{out} - CH_4|_{in}]\ (mol/h)} \times 100$$

WGSR Selectivity



Conclusions

- An increase in CO conversion was observed as the temperature increased and the space velocity decreased

- The hydrogen sulphide loading effect was investigated, where a decreased catalytic activity was observed as the H_2S concentration increased, although the catalyst showed a good resistance to hydrogen sulphide poisoning deactivation

- The selectivity of the water gas shift reaction was evaluated and a methanation reaction was detected

Thanks for your attention!!