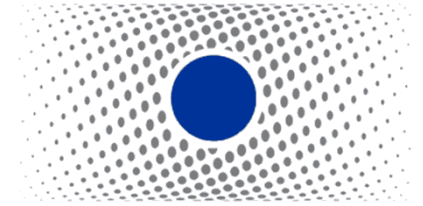




TECHNISCHE
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Institute of Chemical Engineering

Co-processing of biogenic feedstocks in an FCC pilot plant

Biomass Liquefaction online webinar

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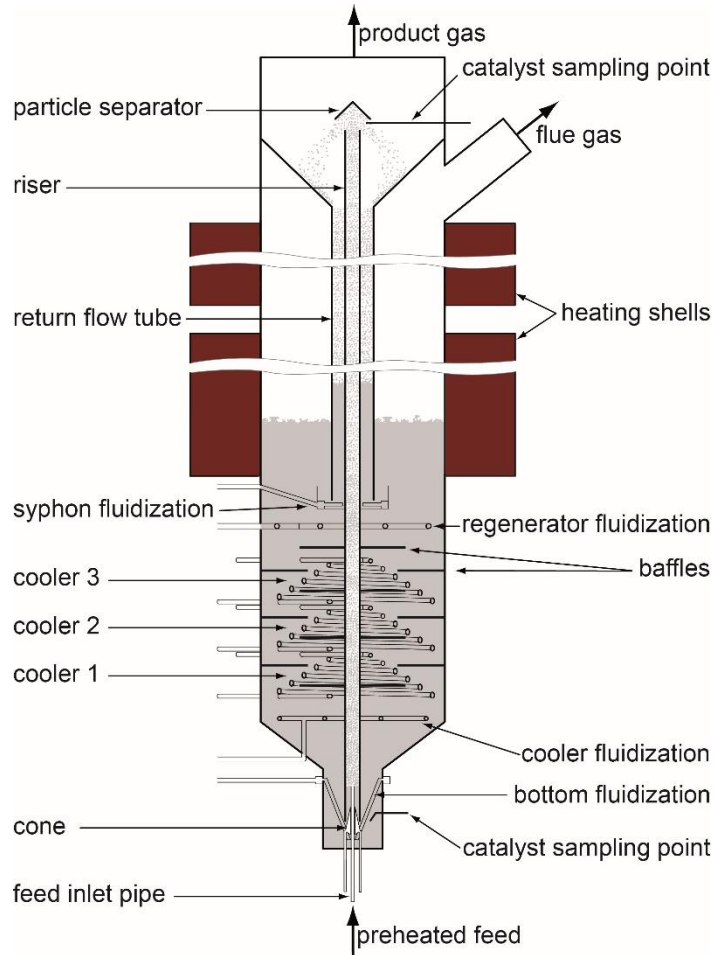
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Florian Knaus

FCC-Pilot plant at TU Wien facilities



FCC pilot plant parameter

PARAMETER	
Feed rate	1,5-8 kg/h
C/O-ratio	10-50
Regenerator diameter	33 cm
Riser length	2,5 m
Riser diameter	2,15 cm
Riser residence time	~1 s
Riser temperature	350-750 °C
Regenerator temperature	550-800 °C
Catalyst mass	45-75 kg
Catalyst circulation rate	80 μm
pressure	atmospheric



Lump Modell

Carbon oxides

Gas

Gasoline

LCO+Residue

Water

Coke

Gas Fraction

Gas Chromatography, NDIR

- CO, CO₂
- C₁ - C₄

Liquid Fraction

Gas Chromatography (SimDist)

- Gasoline (FBP 215°C)
- LCO (215°C-320°C) + Residue (IBP 320°C)
- Aqueous phase

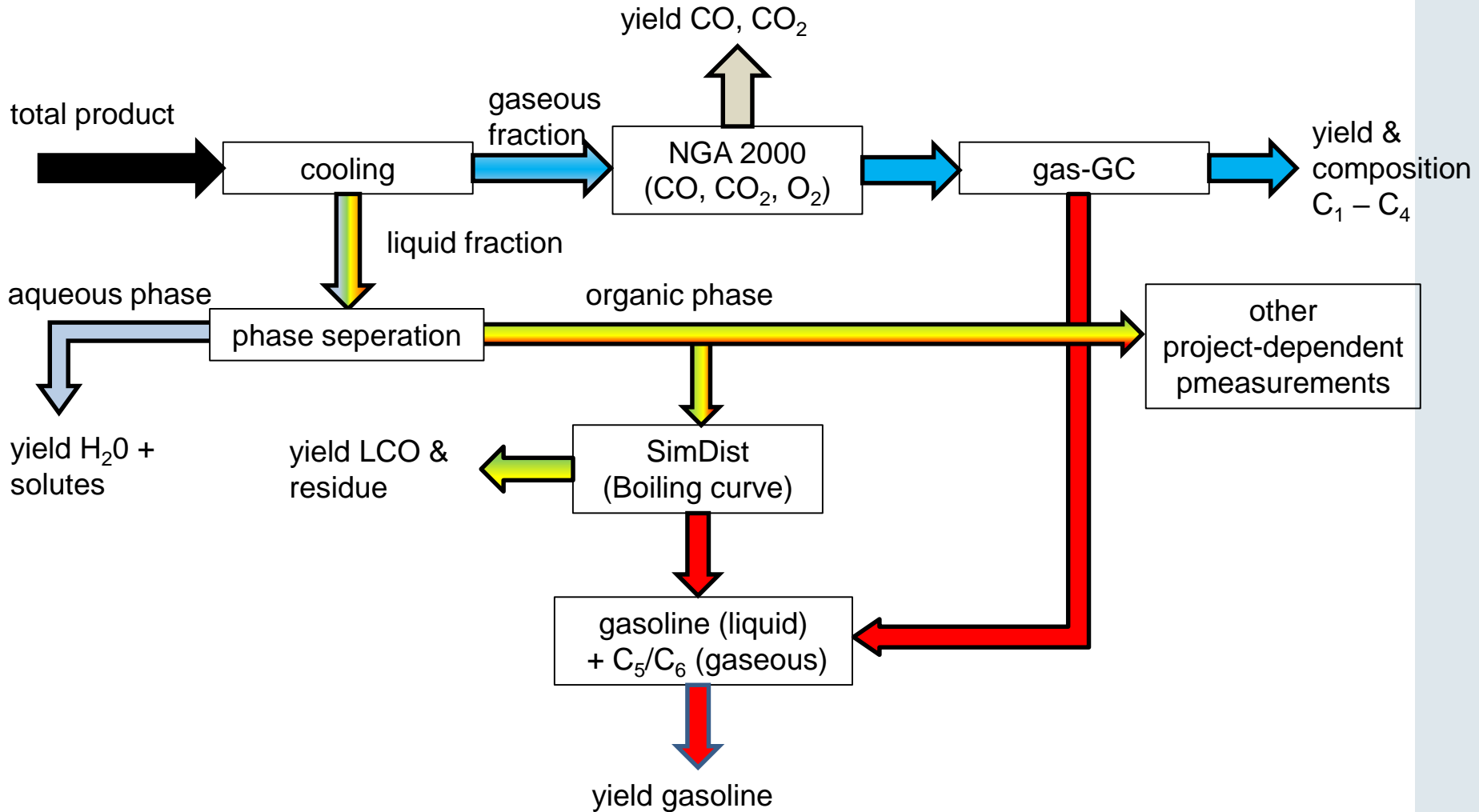
Solid Fraction

NDIR (flue gas)

- Coke

Total Fuel Yield

$$TFY = \frac{m_{\text{gas}} + m_{\text{gasoline}}}{m_{\text{Feed}}}$$

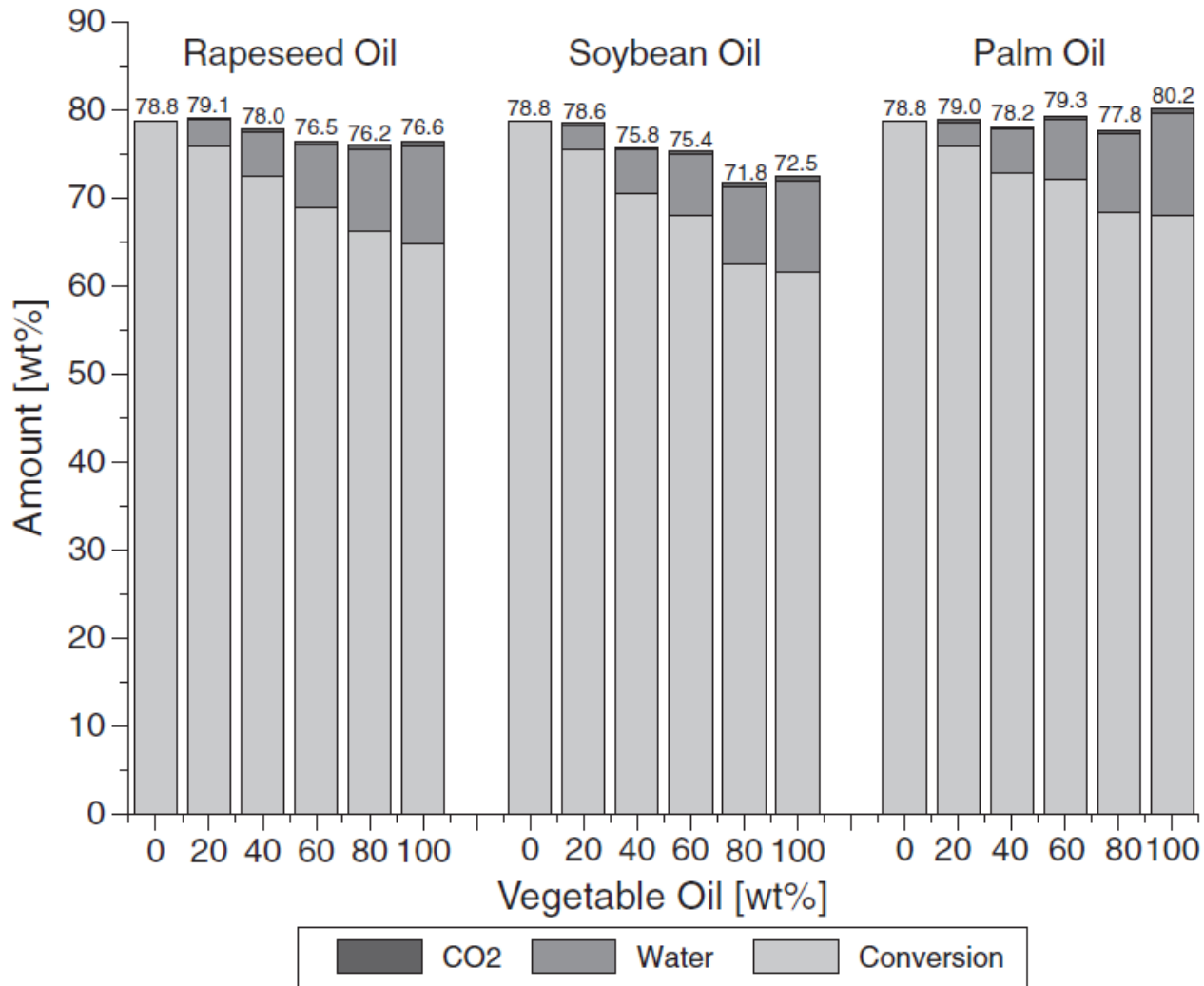


Requirements for the feed properties

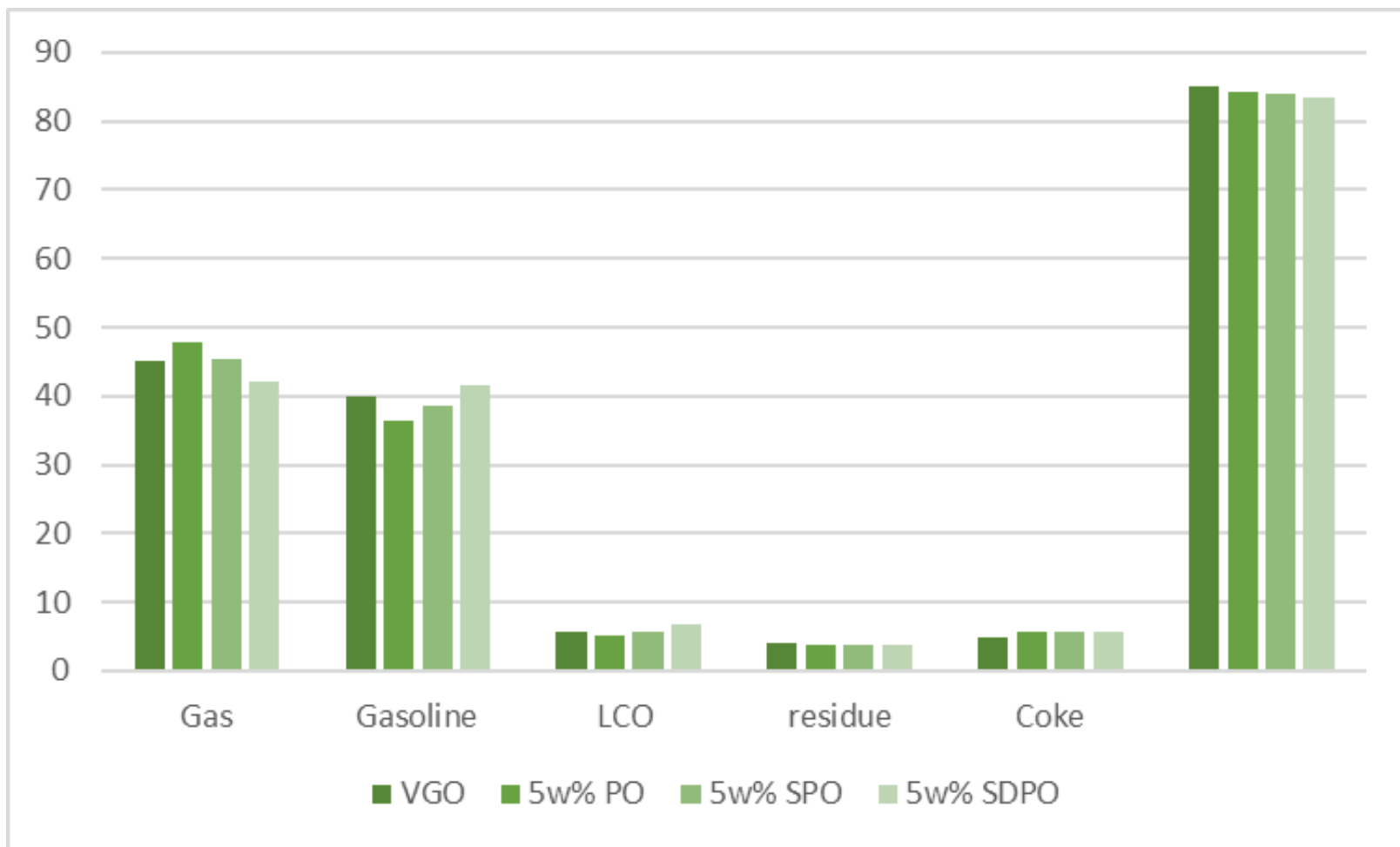
- Liquid at 80°C (no suspension)
- Feeding system with one pump: miscibility with VGO or at least formation of a stable emulsion
 - Otherwise two pumps needed
- Ash content is low enough
 - (< 0,1% in mixture)

possible biogenic Feeds

- plant oils
 - canola oil
 - sunflower oil
 - used cooking oil
- pyrolysis oils
 - different starting materials (e.g. wood, sunflower husk)
 - different refinement stages (e.g. no, mild or severe hydrogenation)



Conversion, water and CO₂ at different vegetable oil blends.





Thank you for your attention.
Questions?